Studer D950

Digital Mixing System, SW V 3.3/3.4/3.5

Operating Instructions

Software Version

The functions and features described herein cover the software version V3.5, unless otherwise stated.
The information in this manual has been carefully checked and is believed to be accurate at the time of publication. However, nobody is perfect. If you should stumble on an error, we kindly ask you to inform us on that matter in writing (address and web site below). We appreciate every hint. No responsibility can be taken by us for inaccuracies, errors, or omissions, nor is any liability assumed for any loss or damage resulting either directly or indirectly from use of the information contained within this manual and any accompanying documents.

Software Update Information

Software updates may take three basic forms:

- Full software version – full package with installer software on a suitable data carrier, usually a ZIP cartridge,
- New features, improvements – parts of the software that may be sent via e-mail or downloaded from our Web site, including installation instructions,
- Hardware improvements – low-level software may be distributed on EPROMs or other programmable devices.

Studer Product Support shall inform all registered users on the availability and software forms.

Prepared and edited by
Studer Professional Audio GmbH
Technical Documentation
Althardstrasse 30
CH-8105 Regensdorf - Switzerland
http://www.studer.ch

Printed in Switzerland
Order no. 10.27.4833 (Ed. 0106)

A Safety Information

CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN ATTENTION RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR ACHTUNG GEFAHR: ELEKTRISCHER SCHLAG NICHT ÖFFNEN	To reduce the risk of electric shock, do not remove covers. No user-serviceable parts inside. Refer servicing to qualified service personnel (i.e., persons having appropriate technical training and experience necessary to be aware of hazards to which they are exposed in performing a repair action, and of measures to minimize the danger of themselves).
	This symbol alerts the user to the presence of un-insulated *dangerous voltage* within the equipment that may be of sufficient magnitude to constitute a risk of electric shock to a person.
	This symbol alerts the user to *important instructions* for operating and maintenance in this documentation.
CLASS 1 LED PRODUCT CLASS 1 LASER PRODUCT	Assemblies or sub-assemblies of this product can contain opto-electronic devices. As long as these devices comply with Class I of laser or LED products according to EN 60825-1:1994, they will not be expressly marked on the product. If a special design should be covered by a higher class of this standard, the device concerned will be marked directly on the assembly or sub-assembly in accordance with the above standard.

A1 First Aid

In Case of Electric Shock:

Separate the person as quickly as possible from the electric power source:
- By switching the equipment off,
- By unplugging or disconnecting the mains cable, or
- By pushing the person away from the power source, using dry insulating material (such as wood or plastic).
- After having suffered an electric shock, *always* consult a doctor.

Warning!

Do not touch the person or his clothing before the power is turned off, otherwise you stand the risk of suffering an electric shock as well!

If the Person is Unconscious:

- Lay the person down
- Turn him to one side
- Check the pulse
- Reanimate the person if respiration is poor
- *Call for a doctor immediately*.

B General Installation Instructions

Please consider besides these general instructions also any product-specific instructions in the “Installation” chapter of this manual.

B1 Unpacking

Check the equipment for any transport damage. If the unit is mechanically damaged, if liquids have been spilled or if objects have fallen into the unit, *it must not be connected to the AC power outlet, or it must be immediately disconnected by unplugging the power cable.* Repair must only be performed by trained personnel in accordance with the applicable regulations.

B2 Installation Site

Install the unit in a place where the following conditions are met:

- The temperature and the relative humidity of the environment must be within the specified limits during operation of the unit. *Relevant values are the ones at the air inlets of the unit* (refer to Appendix 1).
- Condensation must be avoided. If the unit is installed in a location with large variation of ambient temperature (e.g. in an OB-van), appropriate precautions must be taken *before and after operation* (refer to Appendix 1).
- Unobstructed air flow is essential for proper operation. Air vents of the unit are a functional part of the design and must not be blocked in any way during operation (e.g. by objects placed upon them, placement of the unit on a soft surface, or installation of the unit within a rack or piece of furniture).
- The unit must not be heated up by external sources of heat radiation (sunlight, spotlights).

B3 Earthing and Power Supply

Earthing of units with mains supply (class I equipment) is performed via the protective earth (PE) conductor integrated in the mains cable. Units with battery operation (< 60 V, class III equipment) must be earthed separately.
Earthing the unit is one of the measures for protection against electrical shock hazard (dangerous body currents). Hazardous voltage may not only be caused by a defective power supply insulation, but may also be introduced by the connected audio or control cables.
If the unit is installed with one or several external connections, its earthing must be provided during operation as well as while the unit is not operated.
If the earthing connection can be interrupted, for example, by unplugging the mains plug of an external power supply unit, an additional, permanent earthing connection must be installed using the provided earth terminal.
Avoid ground loops (hum loops) by keeping the loop surface as small as possible (by consequently guiding the earth conductors in a narrow, parallel way), and reduce the noise current flowing through the loop by inserting an additional impedance (common-mode choke).

Class I Equipment (Mains Operation)

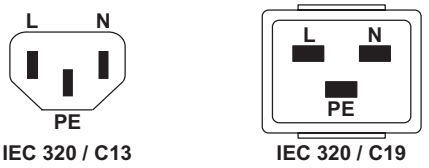
Should the equipment be delivered without a matching mains cable, the latter has to be prepared by a trained person using the attached female plug (IEC 320 / C13 or IEC 320 / C19) with respect to the applicable regulations in your country.

Before connecting the equipment to the AC power outlet, check that the local line voltage matches the equipment rating (voltage, frequency) within the admissible tolerance. The equipment fuses must be rated in accordance with the specifications on the equipment.

Equipment supplied with a 3-pole appliance inlet (protection conforming to class I equipment) *must* be connected to a 3-pole AC power outlet in such a way that the equipment cabinet is connected to the protective earth.

For information on mains cable strain relief, please refer to Appendix 2.

Female Plugs (IEC320), Front-Side View:



European Standard (CENELEC)		North American Standard (NAS)
Brown	L (Live)	Black
Blue	N (Neutral)	White
Green/Yellow	PE (Protective Earth)	Green (or Green/Yellow)

Class III Equipment (Battery Operation up to 60 V_{DC})

Equipment of this protection class must be earthed using the provided earth terminal if one or more external signals are connected to the unit (see explanation at the beginning of this paragraph).

B4 Electromagnetic Compatibility (EMC)

The unit conforms to the protection requirements relevant to electromagnetic phenomena that are listed in guidelines 89/336/EC and FCC, part 15.

- The electromagnetic interference generated by the unit is limited in such a way that other equipment and systems can be operated normally.
- The unit is adequately protected against electromagnetic interference so that it can operate properly.

The unit has been tested and conforms to the EMC standards of the specified electromagnetic environment, as listed in the following declaration. The limits of these standards ensure protection of the environment and corresponding noise immunity of the equipment with appropriate probability. However, a professional installation and integration within the system are imperative prerequisites for operation without EMC problems.

For this purpose, the following measures must be followed:

- Install the equipment in accordance with the operating instructions. Use the supplied accessories.
- In the system and in the vicinity where the equipment is installed, use only components (systems, equipment) that also fulfill the EMC standards for the given environment.

- Use a system grounding concept that satisfies the safety requirements (class I equipment must be connected with a protective ground conductor) and that also takes into consideration the EMC requirements. When deciding between radial, surface, or combined grounding, the advantages and disadvantages should be carefully evaluated in each case.
- Use shielded cables where shielding is specified. The connection of the shield to the corresponding connector terminal or housing should have a large surface and be corrosion-proof. Please note that a cable shield connected only single-ended can act as a transmitting or receiving antenna within the corresponding frequency range.
- Avoid ground loops or reduce their adverse effects by keeping the loop surface as small as possible, and reduce the noise current flowing through the loop by inserting an additional impedance (e.g. common-mode choke).
- Reduce electrostatic discharge (ESD) of persons by installing an appropriate floor covering (e.g. a carpet with permanent electrostatic filaments) and by keeping the relative humidity above 30%. Further measures (e.g. conducting floor) are usually unnecessary and only effective if used together with corresponding personal equipment.
- When using equipment with touch-sensitive operator controls, please take care that the surrounding building structure allows for sufficient capacitive coupling of the operator. This coupling can be improved by an additional, conducting surface in the operator's area, connected to the equipment housing (e.g. metal foil underneath the floor covering, carpet with conductive backing).

C Maintenance

All air vents and openings for operating elements (faders, rotary knobs) must be checked on a regular basis, and cleaned in case of dust accumulation. For cleaning, a soft paint-brush or a vacuum cleaner is recommended.
Cleaning the surfaces of the unit is performed with a soft, dry cloth or a soft brush.
Persistent contamination can be treated with a cloth that is *slightly* humidified with a mild cleaning solution, such as dishwashing detergent.
For cleaning display windows, commercially available computer/TV screen cleaners are suited. Use only a *slightly* damp (never wet) cloth.
Never use any solvents for cleaning the exterior of the unit! Liquids must never be sprayed or poured on directly!
For equipment-specific maintenance information please refer to the corresponding chapter in the operating and service manuals.

D Electrostatic Discharge during Maintenance and Repair

Caution:

Observe the precautions for handling devices sensitive to electrostatic discharge!
Many semiconductor components are sensitive to electrostatic discharge (ESD). The lifespan of assemblies containing such components can be drastically reduced by improper handling during maintenance and repair. Please observe the following rules when handling ESD sensitive components:

- ESD sensitive components should only be stored and transported in the packing material specifically provided for this purpose.

- *When performing a repair by replacing complete assemblies, the removed assembly must be sent back to the supplier in the same packing material in which the replacement assembly was shipped. If this should not be the case, any claim for a possible refund will be null and void.*
- Unpacked ESD sensitive components should only be handled in ESD protected areas (EPA, e.g. area for field service, repair or service bench) and only be touched by persons wearing a wristlet connected to the ground potential of the repair or service bench by a series resistor. The equipment to be repaired or serviced as well as all tools and electrically semi-conducting work, storage, and floor mats should also be connected to this ground potential.
- The terminals of ESD sensitive components must not come in uncontrolled contact with electrostatically chargeable or metallic surfaces (voltage puncture, discharge shock hazard).
- To prevent the components from undefined transient stress and possible damage due to inadmissible voltages or compensation currents, electrical connections should only be established or separated when the equipment is switched off and after any capacitor charges have decayed.

E Repair

By removing housing parts or shields, energized parts may be exposed. For this reason the following precautions must be observed:

- Maintenance may only be performed by trained personnel in accordance with the applicable regulations.
- The equipment must be switched off and disconnected from the AC power outlet before any housing parts are removed.
- Even if the equipment is disconnected from the power outlet, parts with hazardous charges (e.g. capacitors, picture tubes) must not be touched until they have been properly discharged. Do not touch hot components (power semiconductors, heat sinks, etc.) before they have cooled off.
- If maintenance is performed on a unit that is opened while being switched on, no un-insulated circuit components and metallic semiconductor housings must be touched, neither with bare hands nor with un-insulated tools.

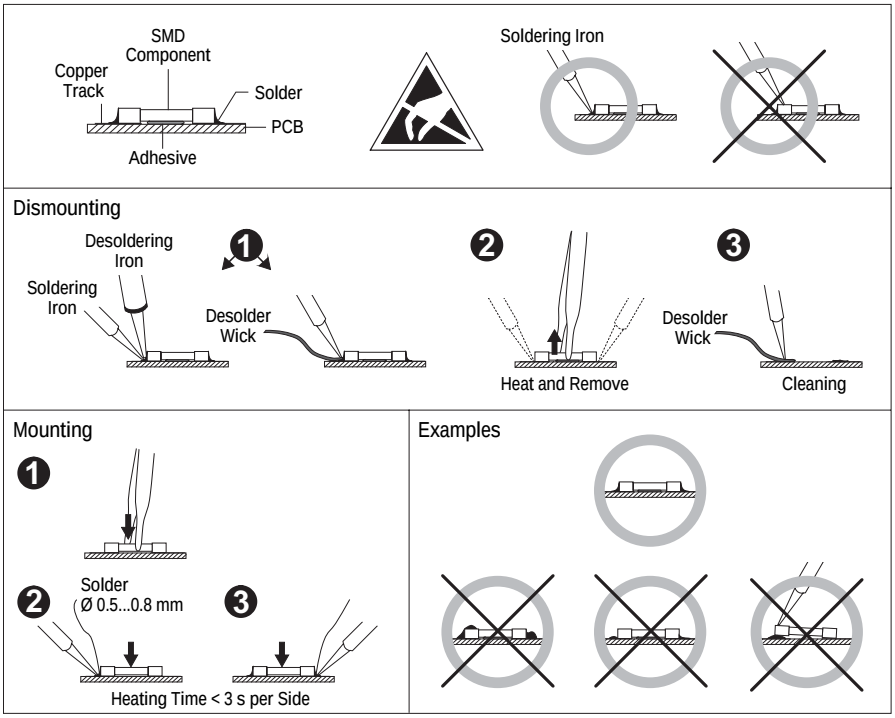
Certain components pose additional hazards:

- *Explosion hazard* from lithium batteries, electrolytic capacitors and power semiconductors (Observe the component's polarity. Do not short battery terminals. Replace batteries only by the same type).
- *Implosion hazard* from evacuated display units.
- *Radiation hazard* from laser units (non-ionizing), picture tubes (ionizing).
- *Caustic effect* of display units (LCD) and components containing liquid electrolyte.

Such components should only be handled by trained personnel who are properly protected (e.g. protection glasses, gloves).

E1 SMD Components

Studer has no commercially available SMD components in stock for service purposes. For repair, the corresponding devices have to be purchased locally. The specifications of special components can be found in the service manual.
SMD components should only be replaced by skilled specialists using appropriate tools. No warranty claims will be accepted for circuit boards that have been damaged. Proper and improper SMD soldering joints are illustrated below.



F Disposal

Packing Materials

The packing materials have been selected with environmental and disposal issues in mind. All packing material can be recycled. Recycling packing saves raw materials and reduces the volume of waste.
If you need to dispose of the transport packing materials, please try to use recyclable means.

Used Equipment

Used equipment contains valuable raw materials as well as materials that must be disposed of professionally. Please return your used equipment via an authorized specialist dealer or via the public waste disposal system, ensuring any material that can be recycled is.
Please take care that your used equipment cannot be abused. To avoid abuse, delete sensitive data from any data storage media. After having disconnected your used equipment from the mains supply, make sure that the mains connector and the mains cable are made useless.

G Declarations of Conformity

G1 Class A Equipment - FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Caution: *Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment. Also refer to relevant information in this manual.*

G2 CE Declaration of Conformity

We,
Studer Professional Audio GmbH,
CH-8105 Regensdorf,
declare under our sole responsibility that the product
D950M2, Digital Mixing System
(from serial no. 0001),
to which this declaration relates, according to following regulations of EU directives and amendments

- Low Voltage (LVD):
  73/23/EEC + 93/68/EEC
- Electromagnetic Compatibility (EMC):
  89/336/EEC + 92/31/EEC + 93/68/EEC

is in conformity with the following standards or normative documents

- Safety:
  EN 60950:2000 (Class I equipment)
- Safety of laser products:
  EN 60825-1: 1994 + A11 + A2, EN 60825-2:2000
- EMC:
  EN 55103-1/-2:1996

Regensdorf, February 27, 2002

B. Hochstrasser, Managing Director

P. Fiala, Manager QA

Appendix 1: Air Temperature and Humidity

General

Normal operation of the unit or system is warranted under the ambient conditions defined by *EN 60721-3-3, set IE32, value 3K3.*
This standard consists of an extensive catalogue of parameters, the most important of which are: ambient temperature +5...+40 °C, relative humidity 5...85% (i.e., no formation of condensation or ice); absolute humidity 1...25 g/m³; rate of temperature change < 0.5 °C/min. These parameters are dealt with in the following paragraphs.
Under these conditions the unit or system starts and works without any problem. Beyond these specifications, possible problems are described below.

Ambient Temperature

Units and systems by Studer are generally designed for an ambient temperature range (i.e. temperature of the incoming air) of +5 °C to +40 °C. When rack mounting the units, the intended air flow and herewith adequate cooling must be provided. The following facts must be considered:

- The admissible ambient temperature range for operation of the semiconductor components is 0 °C to +70 °C (commercial temperature range for operation).
- The air flow through the installation must provide that the outgoing air is always cooler than 70 °C.
- Average heat increase of the cooling air shall be about 20 K, allowing for an additional maximum 10 K increase at the hot components.
- In order to dissipate 1 kW with this admissible average heat increase, an air flow of 2.65 m³/min is required.

Example: A rack dissipating *P = 800 W* requires an air flow of *0.8 * 2.65 m³/min* which corresponds to *2.12 m³/min.*

- If the cooling function of the installation must be monitored (e.g. for fan failure or illumination with spot lamps), the outgoing air temperature must be measured directly above the modules at several places within the rack. The trigger temperature of the sensors should be 65 °C to 70 °C.

Frost and Dew

The unsealed system parts (connector areas and semiconductor pins) allow for a minute formation of ice or frost. However, formation of dew visible to the naked eye will already lead to malfunctions. In practice, reliable operation can be expected in a temperature range above –15 °C, if the following general rule is considered for putting the cold system into operation:
If the air within the system is cooled down, the relative humidity rises. If it reaches 100%, condensation will arise, usually in the boundary layer between the air and a cooler surface, together with formation of ice or dew at sensitive areas of the system (contacts, IC pins, etc.). Once internal condensation occurs, trouble-free operation cannot be guaranteed, independent of temperature.

Before putting into operation, the system must be checked for internal formation of condensation or ice. Only with a minute formation of ice, direct

evaporation (sublimation) may be expected; otherwise the system must be heated and dried while switched off.

A system without visible internal formation of ice or condensation should be heated up with its own heat dissipation, as homogeneously (and subsequently as slow) as possible; the ambient temperature should then always be lower than the one of the outgoing air.

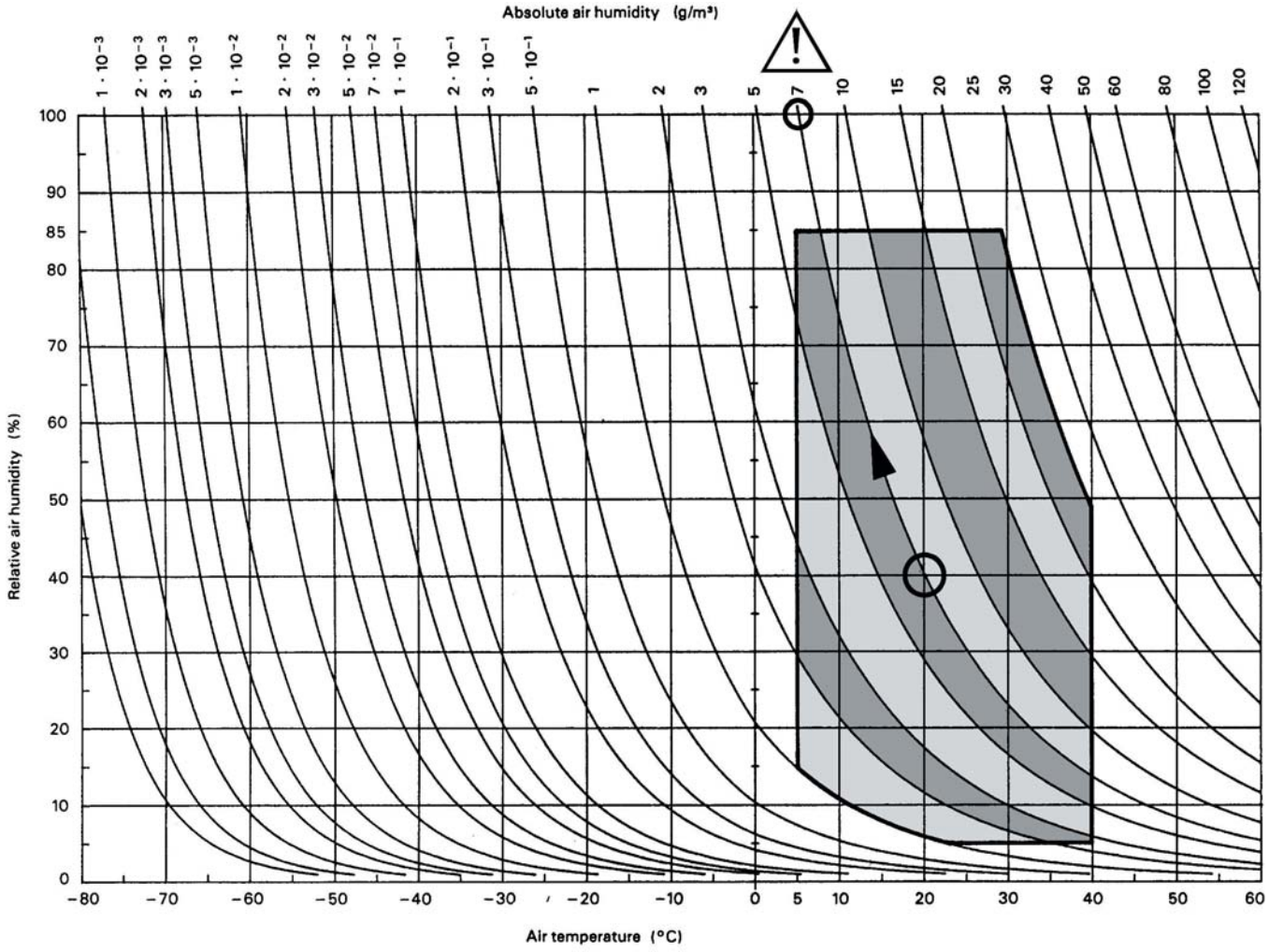
If it is absolutely necessary to operate the cold system immediately within warm ambient air, this air must be dehydrated. In such a case, the absolute humidity must be so low that the relative humidity, related to the coldest system surface, always remains below 100%.

Ensure that the enclosed air is as dry as possible when powering off (i.e. before switching off in winter, aerate the room with cold, dry air, and remove humid objects such as clothes from the room).

These relationships are visible from the following climatogram. For a controlled procedure, thermometer and hygrometer as well as a thermometer within the system will be required.

Example 1: An OB-van having an internal temperature of 20 °C and a relative humidity of 40% is switched off in the evening. If the temperature falls below +5 °C, the relative humidity will rise to 100% (7 g/m³); dew or ice will be forming.

Example 2: An OB-van is heated up in the morning with air of 20 °C and a relative humidity of 40%. On all parts being cooler than +5 °C, dew or ice will be forming.

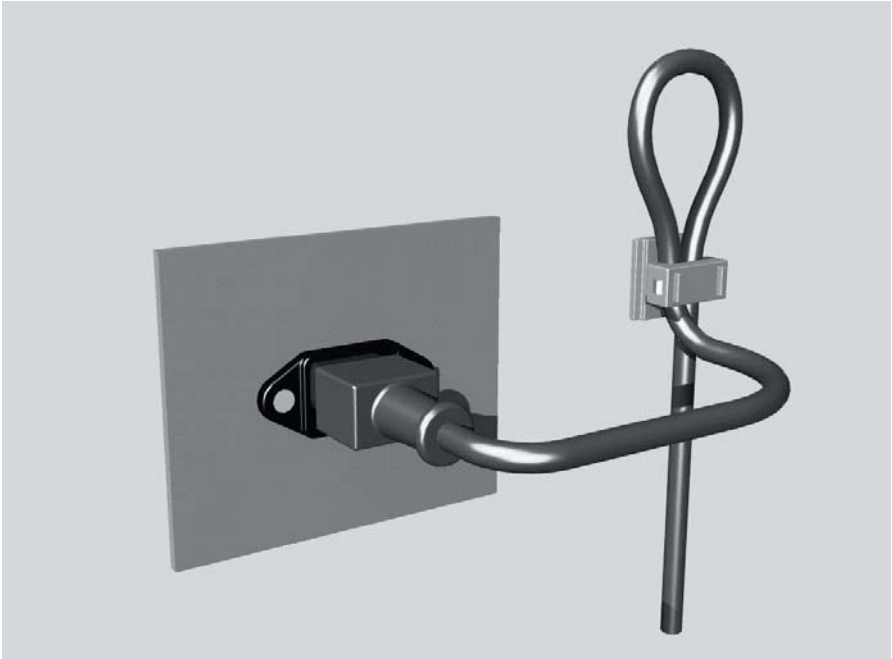


721-3-3 © CEI:1994

Climatogram for class 3K3

Appendix 2: Mains Connector Strain Relief

For anchoring connectors without a mechanical lock (e.g. IEC mains connectors), we recommend the following arrangement:



Procedure: The cable clamp shipped with your unit is auto-adhesive. For mounting please follow the rules below:

- The surface to be adhered to must be clean, dry, and free from grease, oil, or other contaminants. Recommended application temperature range is +20 °C to +40 °C.
- Remove the plastic protective backing from the rear side of the clamp and apply it firmly to the surface at the desired position. Allow as much time as possible for curing. The bond continues to develop for as long as 24 hours.
- For improved stability, the clamp should be fixed with a screw. For this purpose, a self-tapping screw and an M4 bolt and nut are included.
- Place the cable into the clamp as shown in the illustration above and firmly press down the internal top cover until the cable is fixed.

Appendix 3: Software License

Use of the software is subject to the Studer Professional Audio Software License Agreement set forth below. Using the software indicates your acceptance of this license agreement. If you do not accept these license terms, you are not authorized to use this software.

Under the condition and within the scope of the following Terms and Conditions, Studer Professional Audio GmbH (hereinafter "Studer") grants the right to use programs developed by Studer as well as those of third parties which have been installed by Studer on or within its products. References to the license programs shall be references to the newest release of a license program installed at the Customer's site.

Programs Covered by the Agreement

License Programs of Studer

The following Terms and Conditions grant the right to use all programs of Studer that are part of the System and/or its options at the time of its delivery to the Customer, as well as the installation software on the original data disk and the accompanying documentation ("License Material"). In this Agreement the word "Programs" shall have the meaning of programs and data written in machine code.

Using the software indicates your acceptance of this license agreement. If you do not accept these license terms, you are not authorized to use this software.

Programs of Third Parties

Programs of third parties are all programs which constitute part of the System and/or its options at the time of delivery to the Customer but have not been developed by Studer. The following conditions are applicable to programs of third parties:

- The right to use third parties' programs is governed by the License Agreement attached hereto (if applicable), which is an integral part of this Agreement. The Customer shall sign any and all License Agreements for all further programs of third parties installed on the system. The Customer shall be deemed to have received all License Agreements upon delivery of the system and/or its options.
- Studer shall accept no responsibility or liability for, and gives no warranties (express or implied) as to the programs of third parties. The Customer waives any and all claims versus Studer for any consequential damages, which might occur due to defects of these programs.

Right of Use

Principle

Studer grants the Customer the non-exclusive right to use the License Material in one copy on the system and/or its options as laid down by the Sales Agreement concluded between the parties and all Terms and Conditions which shall be deemed to form and be read and construed as part of the Sales Agreement. This right is assignable according to the "Assignability" paragraph hereinafter.

Customized Configurations

The Customer is not entitled to alter or develop further the License Material except within the expressly permitted configuration possibilities given by the software installed on the system or elsewhere. All altered programs, includ-

ing but not limited to the products altered within the permitted configuration possibilities, are covered by this License Agreement.

Reverse Engineering

Reverse engineering is only permitted with the express consent of Studer. The consent of Studer can be obtained but is not limited to the case in which the interface software can not be provided by Studer. In any case Studer has to be informed immediately upon complete or partial reverse engineering.

Copying the License Material

The Customer is entitled to make one copy of all or parts of the License Material as is necessary for the use according to this Agreement, namely for backup purposes. The Customer shall apply the copyright of Studer found on the License Material onto all copies made by him. Records shall be kept by the Customer regarding the amount of copies made and their place of keeping. The responsibility for the original program and all copies made lies with the Customer. Studer is entitled to check these records on first request. Copies not needed anymore have to be destroyed immediately.

Disclosure of License Material

The License Material is a business secret of Studer. The Customer shall not hand out or in any way give access to parts of or the complete License Material to third parties nor to publish any part of the License Material without prior written consent of Studer. The Customer shall protect the License Material and any copies made according to the paragraph above by appropriate defense measures against unauthorized access. This obligation of non-disclosure is a perpetual obligation.
Third parties are entitled to have access to the License Material if they use the License Material at the Customer's site in compliance with this Agreement. Under no circumstance are third parties entitled to have access to the installation software on the original data media. The Customer shall safeguard the original data media accordingly.

Assignability

The rights granted to the Customer according to this License Agreement shall only be assignable to a third party together with the transfer of the system and/or its options and after the prior written consent of Studer.

Rights to License Material

With the exception of the right of use granted by this License Agreement all proprietary rights to the License Material, especially the ownership and the intellectual property rights (such as but not limited to patents and copyright) remain with Studer even if alterations, customized changes or amendments have been made to the License Material.
Studer's proprietary rights are acknowledged by the Customer. The Customer shall undertake no infringements and make no claims of any patent, registered design, copyright, trade mark or trade name, or other intellectual property right.

Warranty, Disclaimer, and Liability

For all issues not covered herewithin, refer to the "General Terms and Conditions of Sales and Delivery" being part of the sales contract.

CHAPTER 1

1 INTRODUCTION

1.1 Technical Features and User Benefits

Studer is an international company with a long tradition in audio engineering and design perfection. It has now taken a major step forward by developing an all-new, state-of-the-art technology for digital mixing consoles. Based on many years of experience in the recording studio, live-performance and post-production markets, allied to the latest advances in scientific achievements, Studer has created a new product family: the D950 Series Digital Mixing System.

By utilizing the industry's most modern technology, users have access to superior amounts of processing power allied to fast system response to every operator command. In addition, space requirements and power consumption are minimized. The D950 Series' flexible control surface and ergonomics has been designed specifically to address the exacting demands of day-to-day recording and production sessions, especially when utilized in live applications. Access to all functions is quick and intuitive.

1.1.1 Leading-Edge Digital Technology

The D950 Series sets new frontiers in digital audio, using the latest-generation technology and highly flexible DSP resource allocation to satisfy the exacting needs of the professional audio industry. Available in two basic versions – the D950B with two-channel stereo panning and monitoring, and the D950S, which offers up to 7.1-channel panning, exclusive Studer Virtual-Surround Panning (VSP), joystick controllers, and a separate multi-format monitor panel – the D950 Digital System can be reconfigured easily within minutes to suit the specific needs of various applications. Facility owners and operators profit from a flexible and versatile product with a clear upgrade path. Recording and production engineers benefit from a clearly laid out user interface, based on a simple-to-learn "analog" design, but one that still allow an intuitive access to all its powerful DSP functionality. Enhanced reliability, outstanding audio quality and the use of industry-standard digital I/O formats help simplify the maintenance engineer's functions.

The D950S Multi-Format Sound version is targeted at film, TV postproduction, multichannel music, and DVD applications, amongst others. The increasing popularity of the Digital Versatile Disc means that more and more projects will be produced in a variety of surround formats, especially 5.1. In addition, older stereo releases are being re-mixed for DVD release. The D950S can be equipped with a variety of panning, monitoring, machine-control and bus re-assignment components.

The new Studer D950 Series Digital Mixing System represents a unique, fourth-generation solution for facility owners that have considered an all-digital solution, but might have reservations about critical operational parameters. Redundant power supplies are available throughout the system to ensure trouble-free operation during critical live-sound or on-air broadcast.

And unused DSP resources can be used as an automatic back-up in the rare event of a DSP card failure that would normally cause a digital system to be non-functional. If a hardware or software error is detected within a specific DSP board, the D950's master CPU immediately assigns its functions to any redundant DSP boards available within the system. A faulty board can even be hot-plugged and replaced without interrupting operation of the console. In this way, additional DSP cards can provide redundant functions.

Redundant power supplies ensure that a session continues uninterrupted, regardless of the problem. In the rare case of a PC or control surface failure, audio will continue to flow, although now without control. When a subsystem comes back on-line, it is automatically and seamlessly reconnected to the system and control is regained. The PC reboots in less that 120 seconds, while reboot of the control surface is approximately 40 seconds; reboot of the DSP Core is just six seconds.

Derived from the industry-proven D940/941 music and broadcast consoles, but with dramatically enhanced and extended SHARC-based DSP functions, the D950 Series comprises a user interface that connects via a simple, high-speed HDLC optical umbilical to a rack of I/O cards and processor engines. Up to four control surfaces can be connected to the same DSP system core, for shared access to resources within a multi-room facility. The D950 will run at 44.1 or 48 kHz sampling rates, with all of the popular video-based pull-up/down offsets.

Swiss-Proven Design

Developed in collaboration with the Swiss Federal Institute of Technology, the D950's DSP Core features powerful parallel processing; the maximum DSP configuration of hot-swappable cards provides almost 15 GFlops of DSP power. Each Core is capable of 40-bit floating point computation, and is fully scaleable through load balancing – a topology that ensures that virtually 100% of the processing power is available for any console configuration. Each card will provide full DSP processing (EQ, dynamics, delay, etc.) for up to 12 signal paths (if less processing is defined for specific module "types", more channels can be accommodated per card). Timing through the core is a consistent 240 microseconds regardless of the amount of processing or the number of channels/busses.

Each DSP board shares access to a central back plane bus that enables distributed processing. These PE (Processing Engine) boards can be supplied in a variety of formats, with or without eight on-board AES/EBU-format dual channel inputs (the first two pairs with integral sample-rate conversion), and eight AES/EBU-format dual output ports. The D950's Core frame can accommodate up to 19 of these PE boards, in addition to cards that handle a pair of optical MADI-format inputs and two outputs for direct D-to-D connection, for example, to a Studer D827 24/48-track DASH-format recorder. The D950 Core draws just 800 W of power from a single-phase supply; an electrical load that makes it ideal for mobile applications and remotes. In the rare event of a power failure, a UPS (Uninterruptible Power Supply) will operate the entire control system for up to 20 minutes.

Analog inputs/outputs are accommodated via outboard converters, including Studer's new range of D19m Series modular interfaces, for example,

24-bit A/D and D/A converters, as well as remote controlled Mic Preamplifiers. The D950 can remotely control the analog gain, high-pass filter, and phantom power of these Line/Mic input boards. Outboard D19m MUX (multiplexer) racks handle conversion in multiplex mode from analog line-level or digital AES/EBU-format signals to MADI format, or in individual mode with AES/EBU-format outputs. D19m DEMUX (demultiplexer) boards can also be supplied for handling analog line-level or AES/EBU-format outputs. A separate Monitoring/Signaling rack provides a variety of control-room and studio outputs, talkback, and related functionality.

Monitor level control is accomplished within the analog domain, thereby ensuring full 24-bit monitoring capability. This is *not* the case with systems that attenuate monitoring signals in the digital domain which, by design, compromise the integrity of monitoring signals by reducing the bit count proportional to the amount of level attenuation.

A fully-loaded D950 DSP frame will accommodate a large number of audio signal paths – over 256, maximum, depending on the channel DSP load – with more than 128 Summing Busses and the ability to handle as many as 800 audio inputs and outputs via the system's built-in signal router.

Computer-based Management

The D950's external PC runs a Windows NT-based application (D950 System software) that controls such functions as system management, control, and automation. In conjunction with a large onboard color video display unit (VDU) and internal keyboard/trackball, the PC can also generate signal-flow diagrams and display various channel features that have been included in a system configuration file. (The system can be also connected to a conventional modem for remote diagnostics and software updates, and also controlled via a facility-wide digital control network.)

Audio paths can be configured during system setup to be either mono or stereo and can provide internal processing blocks such as input selection, filters, four-band parametric EQ, channel insert, variable delay, dynamics control (compression, limiting, gate and expander), stereo or multi-channel panning options, direct out and solos modes. Control Groups capable of controlling all the parameters of multiple channels can also included in the configuration.

The precise nature of the system topology is controlled via a Configuration Utility that runs on the D950's PC (it can also be run on most Windows 9x or NT based PC computer, with a reasonable hardware compliment). This exclusive D950 Configuration software offers users the freedom to configure the console to meet their exact needs within a matter of minutes. With this unique facility, operators are no longer restricted to fixed console architectures and can customize the D950 for the task at hand. Multiple configurations can be stored and quickly recalled. This allows several console designs to be used on the same hardware platform.
The D950 Series Digital Mixing System offers both Snapshot and Dynamic (timecode-based) automation of console settings. Each snapshot stores all console parameters (including patches made in the General Patch), while the *AutoTouch* Dynamic Automation system offers all of the familiar timecode-based update, take-over and glide modes. All knobs and

faders are touch sensitive. No complex menus or toggle switches are needed to automate a parameter; in automation mode, the touch and release of a knob or switch will record and playback the required motion.

An unlimited number of Snapshots can be stored in the system and recalled. The D950 takes an instant to fully reset all audio parameters when a stored Snapshot is recalled.

Console User Interface and Assignable Controls

The D950 Series User Interface/Control Surface comprise a variable number of input/output channel strips plus centralized monitoring and related functions that can be arranged in any configuration to suit the user's needs. Input frames accommodate from 4 to 64 channel strips, each of which can address 10 individual Layers, arranged in five banks of two layers each. An operator can instantly address two separate mono/stereo signal paths via dedicated Layer #1 and #2 buttons on each channel strip, enabling a console equipped with five, 12-module bays of channel strips, for example, can be set to instantly address a total of 120 simultaneous signal sources, with 60 on-surface controls available at any one time. Other banks can be reached via a central Bank Select unit. For added flexibility, channel assignments can be swapped in their location anywhere on the surface.

Each modular Channel Strip offers dedicated controls for input selection (one of three possible sources, including a test tone generator for system calibration and alignment); Direct Out; access to four of the multiple Mono/Stereo Aux Send busses; EQ In/Out; Filter in/out; Compressor-Limiter in/out; Expander/Gate In/Out; Insert on/off; Pan (stereo or surround) In/Out; and Assign Select, which enables the quartet of rotary shaft encoders and programmable "soft" switches to be used to modify parameter settings for the target channel.

Parametric Equalizer

Each EQ section offers four fully parametric bands that extend from 20 Hz and 20 kHz, with a ±18 dB gain range. In addition to a psycho-acoustically corrected frequency response for high frequencies – similar to well-known analog EQ designs – the section's pair of mid-bands can be switched between constant-Q and constant-range modes. High and Low bands can also be switched to Shelve mode.

In the second EQ type available (defined in the Configuration Tool), an additional Notch filter can be defined. The controls for the Notch filter show up in the filters section of the LACP menu system.

Filters

Separate from the EQ Section there are two dedicated High-pass and Low-pass filters associated with the input selector. The range of these filters are continuously variable between 20 Hz and 20 kHz and include slope selections of 12, 18, or 24 dB/octave.

In addition, an analog high-pass filter with a corner frequency of 75 Hz and a slope of 12 dB/octave is available in the D19m 24 bit Mic/Line Preamplifier.

In-Process Listening/IPL This unique function works much like a familiar Solo, but allows monitoring of the following sources from within each channel:

- Post input;
- Post EQ;
- Post insert return;
- Post side chain;
- Post dynamics.

Dynamics The D950 dynamics section consists of a compressor, limiter, expander, and gate processing block. To avoid pumping and modulation, the Dynamics section feature high sampling-rate transient detection (distortion artifacts are minimized through the use of a "look forward" function in the detection path). Attack and release times are variable and an automatic make-up gain feature is provided. Dynamics can be linked for stereo; a Side-chain input with high and low-pass filters is available as well.

Auxiliary Send/Returns The number of Stereo or Mono Aux Sends is user-configurable. An Auxiliary master channel can be equipped with the same selection of processing blocks, including equalizer, dynamics, delay and so on.

Clean Feeds /Mix-Minus Up to 48 of each stereo and mono Clean feeds or Mix-Minus/N–1 busses can be configured by the user.

Solo Modes A variety of Solo/PFL modes are available including:

- Standard Solo;
- Solo-In-Place;
- Standard PFL;
- Broadcast PFL, etc.

Meters and Displays A companion Meter Section above each channel strip provides two plasma bargraph displays for mono or stereo signals. The meters can be set to display PPM, VU, or gain reduction on a global basis as well as peak and peak hold. LEDs are provided to indicate overload, dynamic processing activity, and whether the meters have been switched to monitor gain reduction. A bank of LEDs display the current post-fader track (up to 48 available) or group assignment (up to 48), as well as master bus assignments (up to eight mono/stereo) for the relevant channel.

All physical channel strips are identical, with non-dedicated rotary controls that can be allocated to any function from the central assignment section of the console, or locally on the channel strip itself. An alphanumeric display next to the control clearly indicates its current function until the control is touched, when it displays the current parameter value (this display can also be set to continuously display values once the user is familiar with the assigned functions. A bargraph-type LED array provides an additional, visual indication of the setting. Parametric EQ, filters, compressor/limiters, expander/gates, inserts and pan facilities can be displayed either on a per-channel basis, or globally.

The central Control/Monitoring Section features a number of panels that can be arranged in virtually any configuration, including a pair of motorized joysticks (for the D950S Surround configuration), a Multi-Machine

Motion Controller offering three serial control ports, and PEC/DIRECT paddles for film-style control of recorder and playback/bus switching.

Flexible Digital Routing System

The D950's comprehensive digital routing system eliminates the need for a system patch bay, since all sources and destinations – including insert send/return points – are accessible from the GC software. Patches can be stored as part of a snapshot.

Multichannel Panning Capabilities

The D950S offers a comprehensive package of panning options including stereo, LCR, LCRS, 5.1, and 7.1. There is also a panning mode for controlling a matrixed surround center channel (for use in surround productions). Multichannel panning controls include divergence, LFE send, and an unique center channel percentage control which allows phantom center channel information from the left and right channels to be directed to the center speaker.

The D950S' Virtual Surround Panning provides three-dimensional audio source positioning via a library of software panning functions that enables the operator to place sound sources in virtual 3-dimensional environments. Listener positions are calculated within the DSP Core utilizing a series of Studer-developed algorithms. In addition to the familiar amplitude- or intensity-panning functions – such as LCR, front/back, LsRs, divergence, etc. – the operator can utilize frequency-dependent panning filters and delay-based effects. In this way, it is possible to position a source in a surround mix as though it had been recorded within a three-dimensional environment, complete with sound reflections from distant walls and surfaces.

Virtual Surround Panning enables an adjustable number of discrete echoes to be produced and routed as non-correlated, diffuse signals to the surround channels. Echoes are modified using assignable Ambiance, Source Distance and Room Size controls, allowing the natural reproduction of audio sources from various distances and positions within a "virtual" room, without the need to revert to external processors. A number of special dynamic effects, such as the gradual disappearance of a close sound into the diffuse room, can also be achieved by accentuating its spatial components. Even a simulated Doppler Effect is available.

Multichannel panners with head related transfer functions (HRTF) are also available.

Multiformat Monitoring Unit and Machine Control

The D950's central Multiformat Monitoring Unit (MMU) provides monitor-format selection with display of loudspeaker designations; pre/post decoder monitoring; monitor-to-meter switching; and – dependent upon the format selected – a readout of the names of loudspeaker channels. The MMU supports two multichannel and one stereo speaker system, and each loudspeaker output can be soloed or muted individually. For film-style mixes, loudspeaker outputs can be accurately calibrated. A Dynamic Stem function allows stems to be reconfigured as different sound sources are processed. There are no restrictions on the number of stems, their width or name, aside from an upper bound limit of 96 simultaneously available record busses.

The D950S Surround Sound configuration features a modular Machine Control System that may be expanded to match different applications. Surround-sound and mix-to-picture sessions normally requires access to and control of a number of playback/record transports, ranging from a simple, two/three-machine configuration, to several dozen machines for a complex dub. A simple, one-machine control interface (9 pin) is included in the D950's optional AutoTouch Dynamic Automation system; an expandable multi-machine control system is also available.

The D950S can be supplied with an optional PEC/Direct Panel which, in conjunction with the Machine Control System, controls recorder track arming as well as the record status of each machine track. Up to 64 tracks can be accessed and controlled individually, or in groups. The PEC/Direct Panel features control switches for multi-format monitoring paths, and also allows switching between Send (Bus) and Recorder returns (PB). To enable multiple-operator formats, a maximum of four PEC/Direct Panels can be defined in a system.

1.1.2 Typical System Applications

In all radio, television, film, music production, or post-production applications for which medium- or large-format digital mixing consoles are appropriate, the D950 Series offers an innovative solution. Thanks to all-new DSP design techniques, the D950's DSP section requires less than half the space compared with the one of the last mixing console generation, which means that installation is also possible in situations where space is at a premium.

Because of the D950's scaleable DSP architecture, its modular design, and incredibly simplified configuration tools, a system can be easily adapted to a variety of tasks, and its overall power can be distributed between several operator consoles. Even the most diverse requirements – broadcasting, multi-track production, mix-down, audio post production – can be handled by the same console, since reconfiguration takes just minutes.

Console versions with different surround formats can be configured for music, film, TV, and post-production applications.

1.1.3 Ergonomics and Ease-of-Use

The D950 Series' user interface is designed for professional users, with specific attention being given to the requirements of live operation. The access to all functions is fast and simple. Since the D950's user interface is similar to that of an analog mixing console, the time required for familiarization in using an all-digital solution is dramatically reduced.

Each D950 channel strip contains the various control elements for all parameters being controlled by the selected channel. All channel strips feature the same design, but can be allocated to different functions – for example, input, group, or master. Main functions, such as input selector, processing block selectors, and the AUX section, can always be accessed

directly. For this reason there is no need for an operator to call up “Pages” or to use a central control panel, to access and/or modify a selected function. Direct access also enhances the status feedback of individual channel settings.

The layout of each channel strip is almost identical to a traditional analog strip. Important functions, such as the routing information, input selection, AUX control, and processing selection, are laid out clearly and generously, allowing easy navigation and instant feedback for all channel strips at a glance. Processing functions can be assigned to the four touch-sensitive rotary encoders (and associated switches) that are provided in each channel strip for modifying each of the various system parameters.

The multi-functionality of the D950’s operating surface is achieved by using a simple and intuitive solution: the alphanumeric displays located next to each assignable, high-resolution rotary encoder describe the assigned function being performed. Once touched by the operator, the label changes to display the current value. Values can also be continuously displayed once the user is familiar with the assigned function. In addition, an intuitive “analog” value is always displayed on an LED bar below the knob for instant visual feedback.

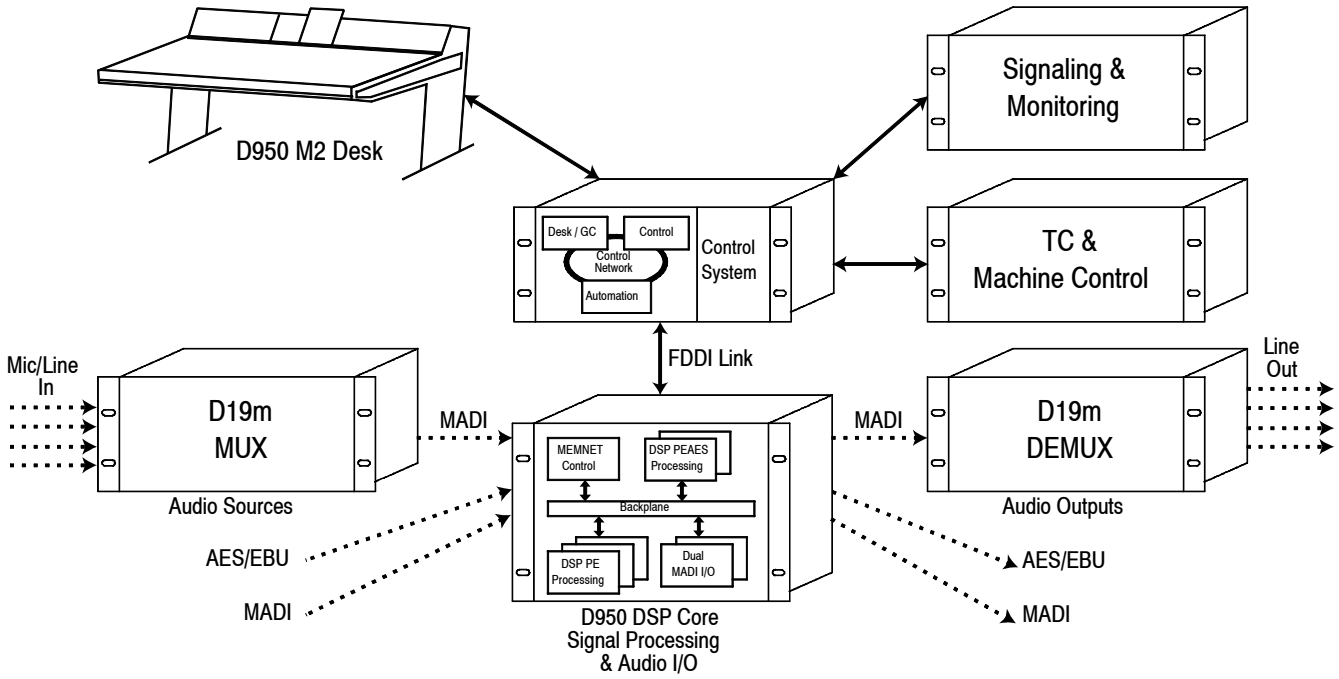
The D950 Series’ operation – particularly the status feedback – are further enhanced by the visual displays of EQ or Dynamics settings on the Graphic Controller. Channels of various types (such as input, groups, masters etc.) can be easily mapped to the operating surface and moved around as needed. The surface is fully modular and can be laid out in a variety of ways to suit individual customer specifications.

1.1.4 Audio Quality

The D950 Series’ DSP Core uses state-of-the-art SHARC (Super Harvard Architecture) digital signal processors with integrated floating point circuitry; internal word length is a full 40 bits. Such high resolution is responsible for the system’s outstanding signal-to-noise ratio, wide dynamic range, and overall sonic precision.

Due to the system’s high processing resolution, any truncation errors – inevitable by-products with some kinds of digital signal processing – are minimized to such an extent that they have no effect on the result. And the ability to connect both multi-channel MADI- and AES/EBU-format signals directly to the DSP Core ensures a future-safe investment with linear 24-bit resolution at all digital inputs and outputs.

1.2 System Components



1.2.1 Audio I/O Interfaces

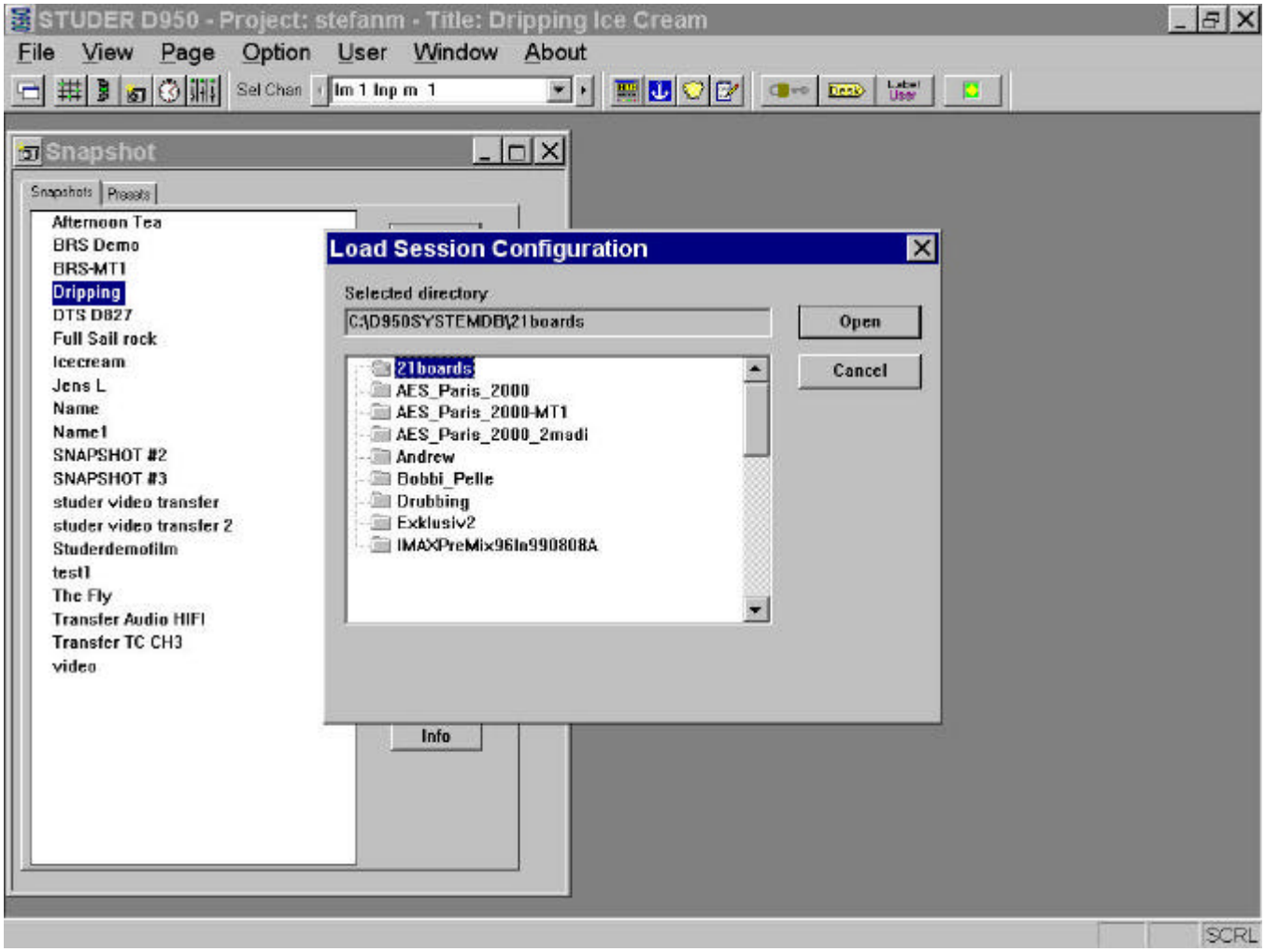
Digital audio connections are established directly on the DSP Core utilizing a user-defined choice of MADI- and/or AES/EBU-format interfaces. Analog-to-Digital conversion is performed via peripheral devices from the Studer D19 or D19m families. These and other peripheral devices can be installed remotely and connected to the mixing console via optical fiber cables, a configuration that minimizes cabling and enable A-to-D conversion to be performed near the sound source. The resultant improvement in sonic resolution can be significant.

High quality Digital-to-Analog conversion is also performed via peripheral devices from the Studer D19 or D19m families or other converters.

1.2.2 Safety and Reliability – Redundancy, Hot-Swap Functions

Digital signal processing is at the heart of all digital mixing consoles. For this reason, any faults that occur in this part of the system can be critical. The Studer D950 continuously monitors all its activities and system functions during operation. If a hardware or software error is detected on a particular DSP board, the D950 immediately puts into action a series of re-routing algorithms that protect the audio information. Critical processing functions are instantly assigned to a redundant DSP board (if installed), and the operator is notified by an on-screen message. The faulty board can even be hot-plugged and replaced without interrupting the console's mixing operation. In the rare instance that a problem occurs in another area of the system the user is again notified and the system Surveyor can be used to find the fault.

1.2.3 Session Configuration



One of the D950 Series' key features is its free configurability, a function that enables the entire configuration to be re-arranged and re-assigned to suit the current application. In the past, mixing console hardware was built in a fixed configuration according to the customer's individual requirements during its manufacture. Today, however, this same function is achieved with a Graphic Configuration Tool. Having selected and entering the desired specifications, after a very brief compiler run the hardware requirements are displayed, and the entire set of DSP software required for the new system is automatically generated.
This allows the operator to create fine tuned configurations for specific applications in only a few minutes. Storing multiple configurations (which can be recalled quickly) allows the use of any number of console architectures on the same system.

But that is just the beginning. Studer has taken a step that goes beyond the mixing console configurability in the traditional sense: combined with highly modular hardware components and extremely flexible software, the Graphic Configuration Tool dramatically reduces – if not eliminates – obsolescence as user's demands evolve. It also greatly reduces overall system delivery time.

The D950's maximum configuration is dependent upon the DSP power available within its main processor rack. By way of an example, consider a "typical" system configuration based on a core array of 8 to 10 DSP cards that can provide:

A Multitrack Recording Topology

With 48 in-line channels offering delay, EQ in monitor path and dynamics in the input path, plus four stereo input channels with EQ, simultaneously routing to 48 busses and four master outputs, with four mono and four stereo AUX busses.

A Surround/7.1 Mixdown Topology

With 96 mono input channels offering EQ, delay, dynamics, and solo, plus four stereo input channels with EQ, routing to eight busses via 16 VCA-style groups, with eight master outputs, 12 mono and four stereo AUX busses.

A Live Broadcast Topology

With 48 mono inputs offering EQ and delay, plus 24 stereo inputs with EQ, routing to direct stereo via eight control groups - each with overall EQ capabilities – with eight mono and two stereo AUX busses, 12 clean feeds, and two master outputs complete with limiter and final EQ.

Within approximately 30 seconds, the configured software can be changed and a mixing console tailored to the current application made available.

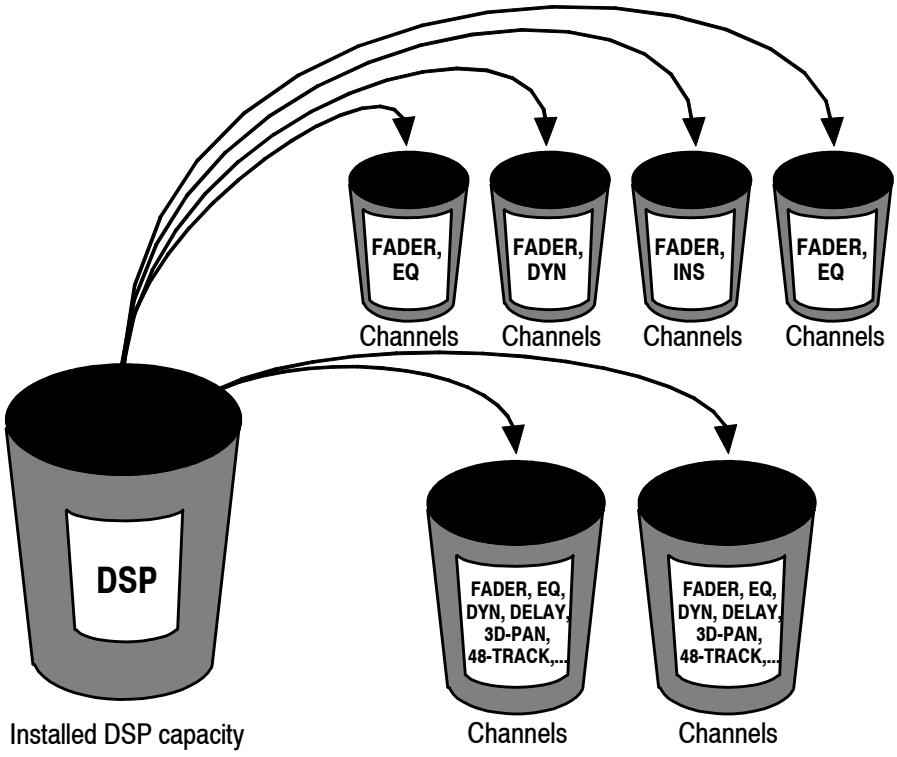
A multi-function facility of studio can now configure a "different" mixing console for each session, for example:

Day #1 **Live Broadcast Configuration**	Day #2 **Multitrack Recording Configuration**	Day #3 **Surround Sound/7.1 Mixdown Configuration**
48 Mono Input Channels with - EQ - Delay	48 Inline Channels with - EQ in monitor path - Comp/Lim/Exp/Gate in input path - Delay	96 Mono Input Channels with - EQ - Delay - Comp/Lim/Exp/Gate - IPL
24 Stereo Input Channels with - EQ	4 Stereo Input Channels with - EQ	4 Stereo Input Channels with - EQ
0 Routing busses	48 Routing busses	8 Routing busses
8 Groups with - EQ	0 Groups	16 Groups
2 Master Outputs with - Output Limiter - EQ	4 Master Outputs	8 Master Outputs
8 Mono Auxiliaries	4 Mono Auxiliaries	12 Mono Auxiliaries
2 Stereo Auxiliaries	4 Stereo Auxiliaries	4 Stereo Auxiliaries
12 Clean feed busses	0 Clean feed busses	0 Clean feed busses

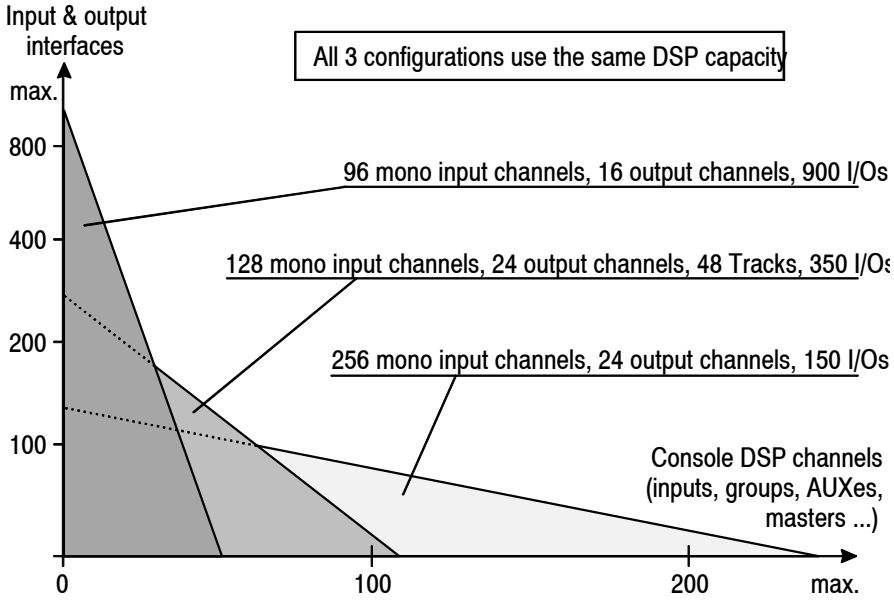
1.2.4 Channel Topologies and Types

Each channel of the D950 Series Mixing System can be defined as mono or stereo. From a central library, individual processing blocks – such as equalizer, delay, dynamics, pan, etc. – can be selected and assigned to individual channels (it makes no difference whether these selected channels are input, group, master, or AUX channels).

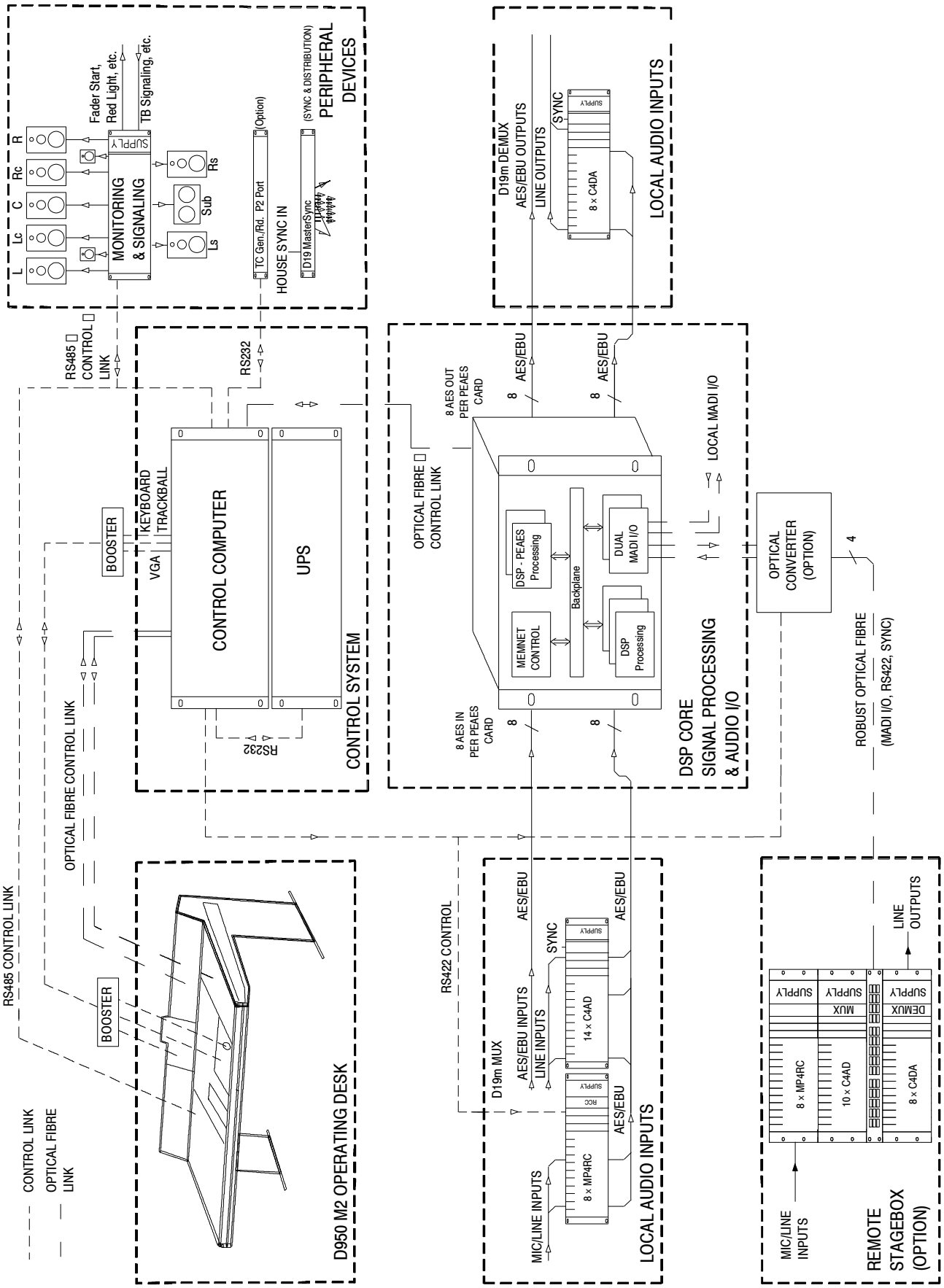
As can be seen from the following diagram, the amount of DSP power that will be used by a channel depends upon the number and type of processing blocks that are configured for that particular channel. In other words, the same amount of DSP power can be used to create many channels with only a few processing blocks, or less channels but with full processing on each channel.



In this way, many combinations of AUX, Clean-feed, multitrack selection, group and master busses can be configured. Since the available DSP power is shared by the channels, busses, and I/O interfaces, there is no maximum number of channels for a D950 console; this number is solely a function of the installed DSP functionality.



1.3 Basic System Block Diagram



CHAPTER 2

2 GETTING STARTED

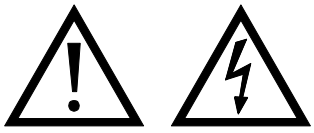
2.1 Utilization for the Purpose Intended

The D950 Digital Mixing System is intended for professional use.
It is presumed that the unit is operated only by trained personnel. Servicing is reserved to skilled technicians.
The electrical connections may be connected only to the voltages and signals designed in this manual and on the units.

2.2 First Steps

2.2.1 Unpacking and Inspection

Your new mixing system is shipped in a special packing which protects the unit against mechanical shock during transit. Care should be exercised when unpacking so that its surfaces do not get marred.
Verify that the content of the packing agrees with the items listed on the enclosed shipping list.
Check the condition of the equipment for signs of shipping damage. If there should be any complaints you should immediately notify the forwarding agent and your nearest Studer distributor.
Please retain the original packing material because it offers the best protection in case your equipment ever needs to be transported.



2.2.2 Installation

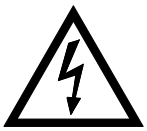
Power connection: The attached female IEC 320/C 13 mains cable socket has to be connected to an appropriate mains cable by a trained technician with respect to your local regulations. Refer to the "Installation, Operation, and Waste Disposal" section at the beginning of this manual.
Maintenance work inside the unit must be performed by a trained technician.

Humidity: Do not use the unit near any source of moisture or in excessively humid environments.

Ventilation: When installing the unit in a rack or any other location, be sure that there is adequate ventilation. The unit should be situated so that its location or position does not interfere with its proper ventilation.
The ambient temperature of the D950 must not exceed 35 °C, otherwise the longevity might be drastically reduced.

2.2.3 Adjustments, Repair

Danger: *All internal adjustments as well as repair work on this product are to be performed by skilled technicians!*



Primary fuse: The primary fuses (various ratings) are located inside the supply unit(s). *Therefore only skilled technicians are authorized to replace the fuses.*

2.2.4 Accessories, Options

Accessories shipped with the D950: This Operating manual (English) Order No. 10.27.4832
Female mains connector (IEC 320/C 13) Order No. 54.42.1050
Other connector types and/or accessories may be included, depending on the country and installation environment.

2.3 System Startup and Shutdown

System Startup

Basically, the D950 Series Digital Mixing system should be wired on one master power switch. There is no specific order in which the D950's system components have to be powered up.
Referring to the external PC monitor, first check the location of the various system utilities and applications. If the D950 System icon is in the Windows NT Startup directory, the application will be automatically started. Otherwise, start the system by double-clicking on the D950 System icon or shortcut. You might also start the D950 System application from the Windows Start menu.

System Shutdown

Please ensure that the D950 System application and all other Windows applications are terminated before you initialize Windows NT shutdown procedure. Only power-off when you see the familiar "It is now safe to turn off your computer" message on the monitor.

Note: Please refer to the Graphic Controller, chapter 4, for more information. Because each D950 every console is configured differently, there may be other procedures necessary for reliable startup and shutdown for your particular system.

2.4 Basic Operating Principles

2.4.1 Operating Desk Concept

Opinions are often divided on how Virtual DSP channels should be correlated with the physical channel strips located in front of the operator. One design philosophy is to install a single fader strip for each audio channel; this approach comes close to mimicking the familiar layout of an analog mixing console – operating "layers" or assignability are not required. Using this method the D950 can be made to emulate inline consoles, classic split consoles, or any variation in between.

By contrast, many users prefer smaller operator control surfaces, for example, equipped with 24 dual-layer fader strips for 48 channels. In this case, simple assignability plays a major role during operation.

The Studer D950 Series supports both philosophies. It is possible to operate each channel *individually,* or to allocate up to *10 physical channels* to each fader strip. In an extreme example, 120 channels could be controlled with just 12 faders. The specific strip setup is held within the D950's data storage system; so it can be permanently stored, modified, and later recalled. In other words, it is no longer necessary to define the channel organization at the time of ordering the D950 mixing console; since changes are possible at any time.

Setting parameters of a channel located relatively off-axis from the console's central "sweet spot" is often difficult, because the engineer needs to move away from the optimum listening zone and then back aging to check

the results of a parameter change. With the D950, the targeted channel strip can be swapped temporarily with a strip located in the center, and then be swapped back. Now, *any* channel can function as the "Sweet-Spot" channel.

2.4.2 MultiDesk – Multiple Operating Surfaces

Up to four highly independent Operating Desks, working in different studios, can access the same DSP core. Each Operating Desk has independent monitor sections, PFL and solo buses, as well as master outputs.

Depending upon on the specific D950 system configuration, individual desks can be considered independently in terms of their assigned channels, I/Os, and bookkeeping functions. It is also possible for different studios to access the same audio signals – for example, input sources – through the built-in router, as well as peripheral devices such as A/D and D/A converters. For certain applications, such as live-performance theaters, multiple, parallel access to the same channels can be provided. For film-style mixing, the system can be set up to work in a familiar three-operator configuration, with each position sharing the same machine control and monitoring system, but working on independent channels. In all cases, all desks use a common timecode base.

For consoles equipped with the MultiDesk capability there is a separate description covering the project specifics.

2.4.3 The Graphic Controller (GC)

An important feature of the new D950 Digital Mixing System is its integrated flat-panel LC display, which serves as the primary video monitor for the system's Graphic Controller, a Windows NT application also referred to as "GC". The Graphic Controller program is used for operating all mixing console functions that extend the D950's functionality (output from the LC display can also be routed to a conventional SVGA monitor located close to the digital mixer).

Specifically, the Graphic Controller's extended functions include:
- General and channel-specific router control;
- Recall and management of snapshots and cue points;
- Saving of desk clipboards;
- Assignment of the DSP channels to the fader strips;
- Automation control and operation of the timecode control;
- Tone generator and metering control;
- Control group and linkage control;
- Production and Title management;
- System administration.

Various display windows and dialog boxes group logically the individual functions. Visual elements are optimized for simple and intuitive operation.

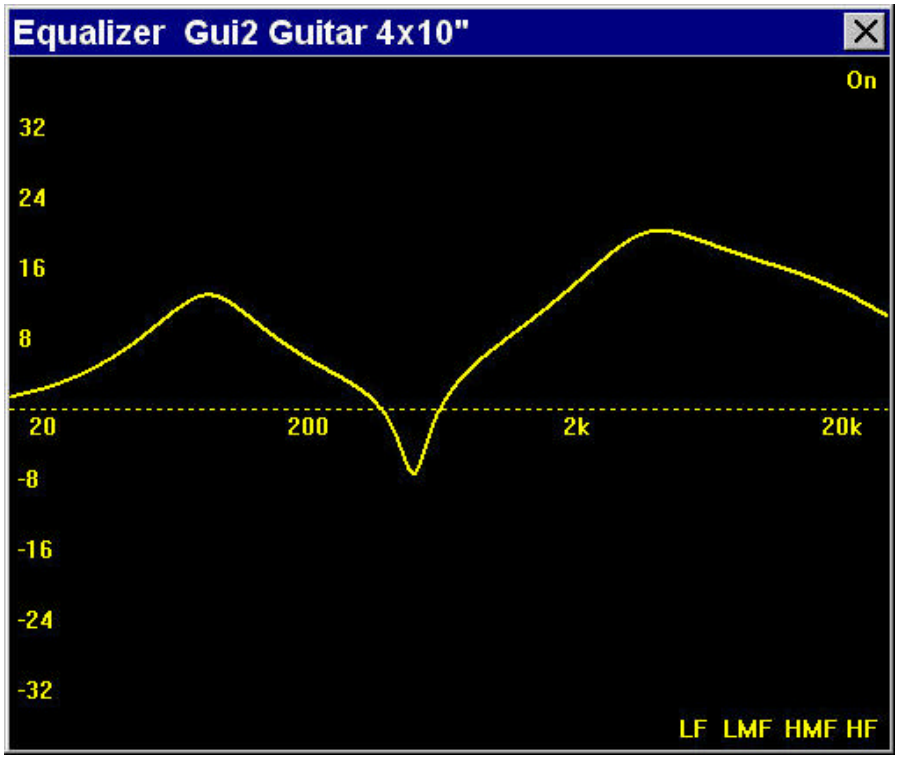
With the help of an easy-to-understand General Patch page, the setup of router cross points is dramatically simplified, even for large mixing console configurations. Via a Snapshot window, all mixing console parameters can be stored and recalled using mouse clicks. In the pull-down AutoTouch dynamic automation panel, all timecode, loop points, and mix passes can be controlled easily and intuitively.

The concept of overall system configurability has been also adopted within the Graphic Controller application. Since most functions are arranged in overlapping windows of changeable sizes, users can set up their work environment to suit their specific requirements for each recording or production session. These settings can be saved and recalled at any time, allowing for fast and application-oriented operation of the D950.

GC Functions and Screens

These provide the following:

- *Strip setup,* which allows the user to create and store the layout of the operating desk, using five Banks with two Layers per bank.
- Tone generator and metering control.
- Time-code reader/generator and machine-control setup.
- Visualization of EQ response and dynamics curves (as shown below).

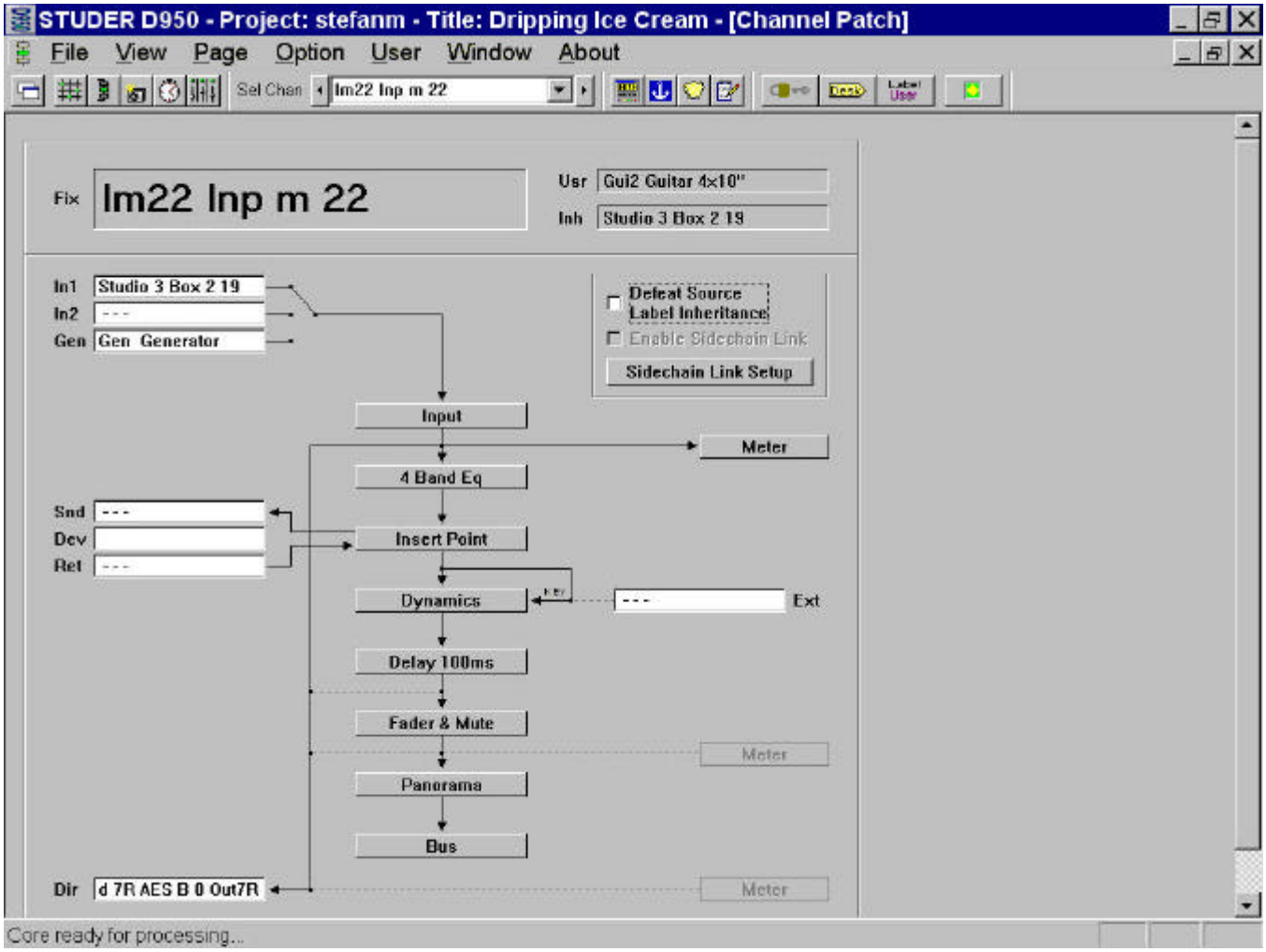


Example: EQ visualization window

- Stem Setup (D950S Surround Sound version only).
- Mix settings.
- Mix-Minus/N–1 assignment/setup.
- Control group and channel link setup.

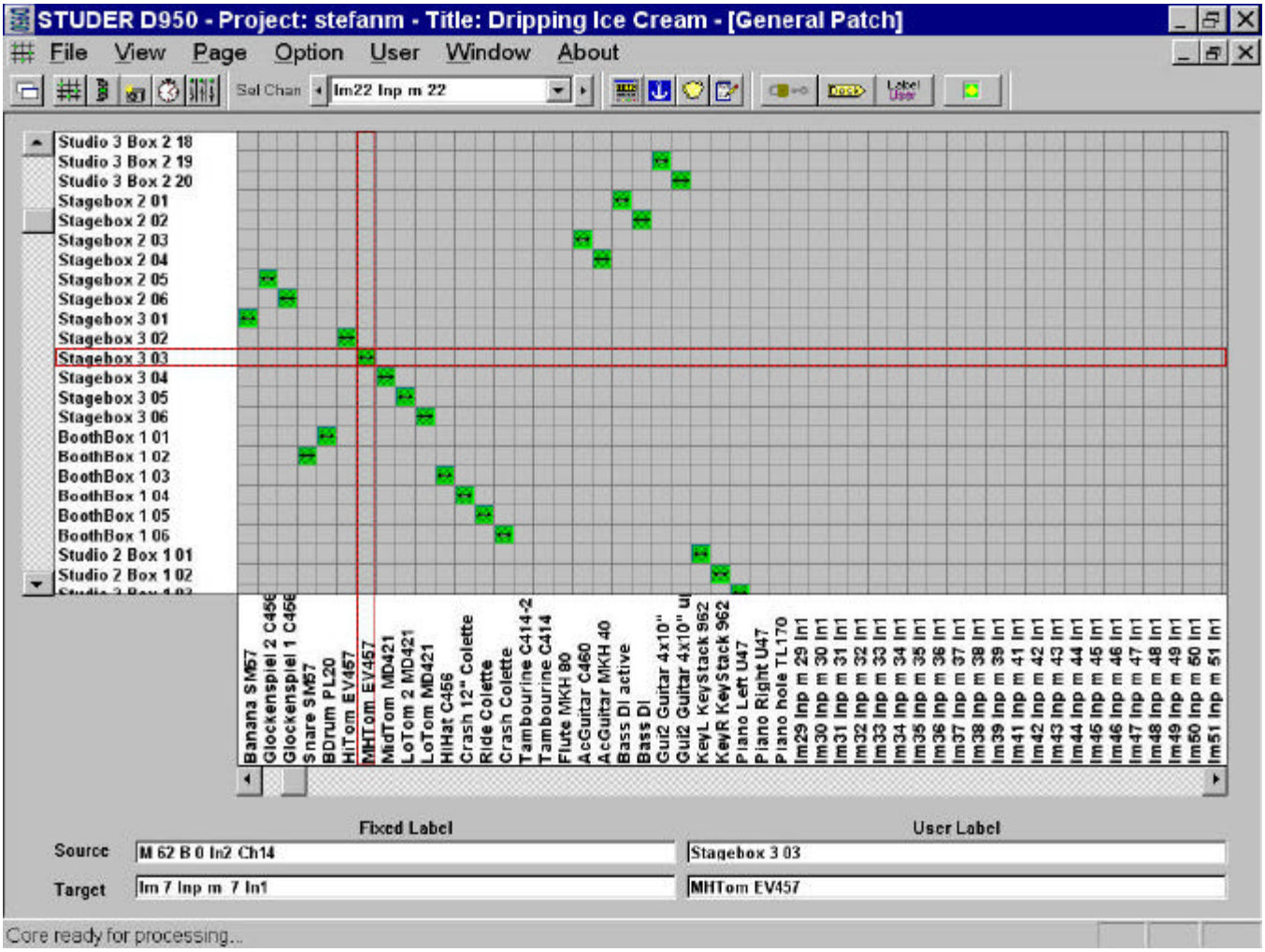
Internal routing matrix control

The Channel Patch screen is an audio path-oriented view for controlling the routing of a particular channel, and is used to set up the sequence of channel processing blocks (EQ, Insert, Delay, etc.) and metering locations within the signal path. This screen also displays the connections made to the channel's various inputs and outputs. By double clicking on one of these display boxes the system will go directly to the associated connection in the General Patch. The Channel Patch also includes solo safe, labeling, and dynamics link facilities.



Example: Channel patch

Within the General Patch window, the various cross point routing of sources and targets (destinations) is displayed. For example, it will show which audio signals (AES/EBU in, Direct outs, etc.) connected to the DSP sections are assigned to the corresponding channels and outputs (Input channel, MADI out etc.). These connections are stored within Snapshots and Presets. The sources and targets can be identified by fixed or user labels.

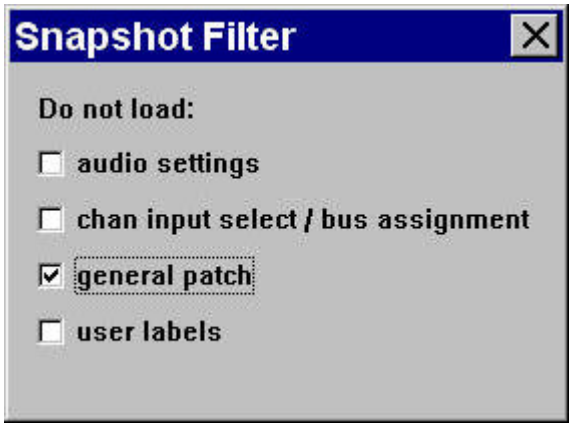


Example: General Patch

Snapshot Functions: Display and control of the D950's snapshot settings (in other words, complete "pictures" of the operating desk's controls and of the console's internal settings) and factory/user presets provide basic working templates for the D950 system.

Example: Snapshot screen

Control of snapshot/preset filters and channel protection is achieved via separate screens:



Example: Snapshot filter view

Dynamic Automation Control

The AutoTouch dynamic automation page contains mix setup and file management functions. It provides basic single machine control functions such as transport control, auto-location to cue points, looping, and drop-ins. In addition, it displays timecode information.

The AutoTouch panel

Administration Functions

This menu bar area provides access to the following:

- *Title/Mix Management*, which contains the book-keeping functions for organizing the studio work.
- *User Preferences* administration.
- *View and Page* menus, which control which screens are displayed.
- *Options* menu, which contains controls for various system elements such as the tone generator, meters, stems, mix options, control groups, and so on.
- *Surveyor,* which provides a quick and simple status report of the D950 for fault analyses.
- *System Administration*, which accesses a password protected area, and enables a variety of setup controls and diagnostic functions.

2.4.4 Automation Functions

Snapshots An unlimited number of snapshots can be captured, stored, and recalled for each Project Title. All control parameters of the console are stored in the snapshots. When a snapshot is recalled, the console typically requires 50 ms to fully reset itself. Snapshots can be recalled through channel protection filters or function protection filters that yield editing flexibility and safety in live operations.

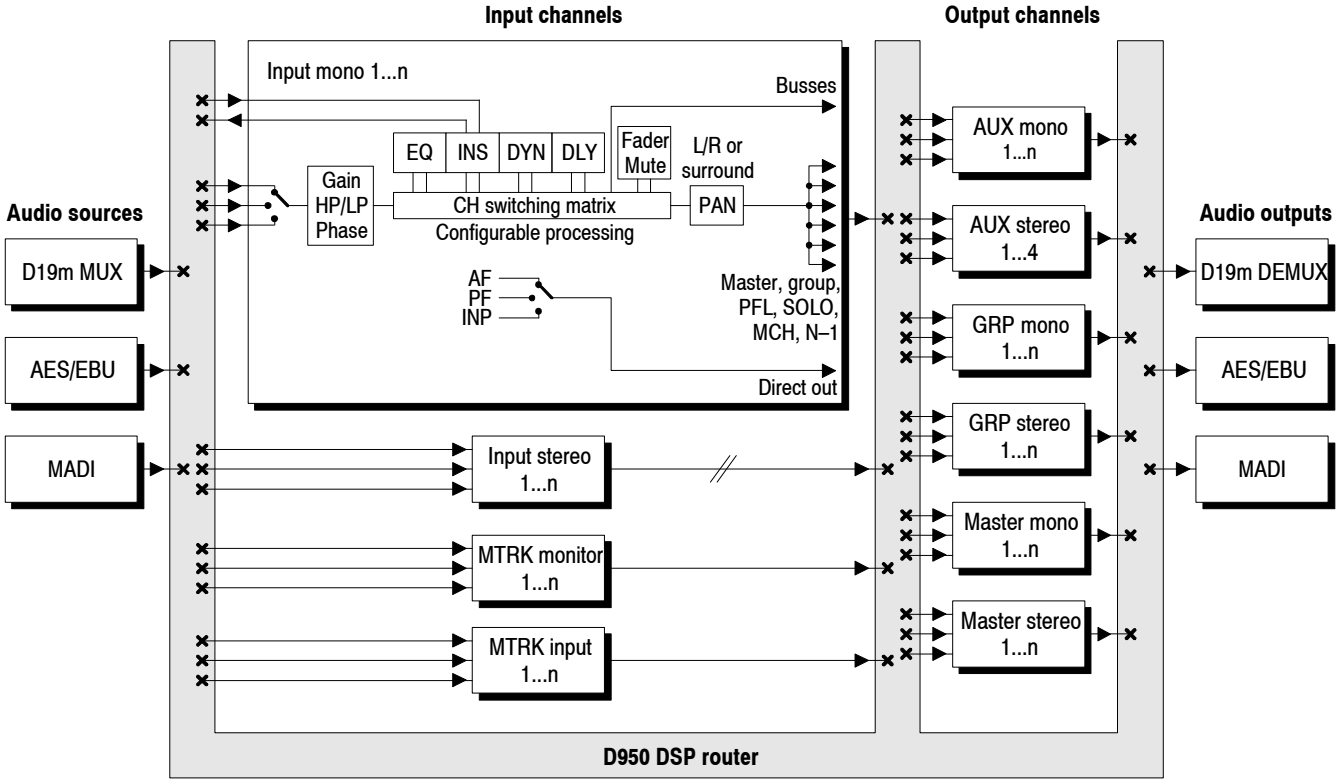
Copy & Paste Clipboard The D950 System supports copy and paste of some or all channel settings to one or more other channels. This ability streamlines the set-up of the console when an operator is starting from scratch with a new layout. However, if starting from a clean slate is desired clearing all or some of the parameters is also possible.

AutoTouch Dynamic Automation Each audio parameter of the D950 mixing console can be stored and recalled dynamically against timecode information.
Such enormous versatility can be accompanied, of course, by a certain operation complexity. For this reason, Studer has developed a simple yet highly practical concept for the D950: all operator controls capable of being automated are touch-sensitive. If any of these controls is touched while an automation pass is being played back, the control immediately switches from “READ” to “RECORD” mode, the modification being written immediately into the automation memory. When the control is released, the reaction of the corresponding parameter depends on the selected WRITE option. Null indicators are provided to allow seamless transitions.

Because of this conceptual simplicity, an operator no longer has to worry about automation and can fully concentrate on creative tasks.

The AutoTouch dynamic automation is an option that can either be integrated when the mixing console is ordered, or retrofitted later in the field.

2.4.5 Channels, Routing, and Buses



Processing blocks, such as equalizer, dynamics, delay, etc., can be configured for all channel types.

Input Channels The D950's digital routing matrix is located between the console's physical inputs and the actual DSP channels. This topology means that the physical analog and digital inputs can be assigned to any channel of the console via the General Patch page on the Graphic Controller. The patch setup forms part of each individual snapshot, and can be saved, updated and recalled within the Snapshot/Preset system.

Output Channels The same concept applies to the outputs. On the General Patch page, each channel's output can be selected and sent to any analog or digital output destination.

Auxiliaries The number of stereo or mono AUX sends is fully configurable. The users can establish the number and type of AUX sends they would like to use. The AUX master channel can be equipped with the same selection of processing blocks such as equalizer, dynamics, delay, and more.

Clean-Feeds/Mix-Minus (N–1) Clean-Feeds/Mix-Minus or N–1 buses can be set up in stereo or mono, and are configurable in number.

Multitrack and Group Routing Full multitrack and group routing can be configured, with selected destinations being displayed via back-lit numerical readouts located below each channel's bar graph level meter. This arrangement provides a continuous overview of the D950's entire console routing.

Central Assign Panel This panel is located in the console's center section. It is used for the assignment of masters, groups, auxiliaries, multitrack buses, and mix-minus feeds.

Solo Modes Each channel features a Solo/PFL Switch. Depending upon the mode selected within the center section, a variety of functions can be achieved, including: Standard Solo, Solo-In-Place, Standard PFL, Broadcast PFL, etc. A very handy PFL/Solo Reset is provided to disengage any solos regardless of where they are engaged on the console. This eliminates the need to "search" for solos when using large console configurations. Solo safe and interlock functions are also provided.

2.4.6 Processing Blocks

Equalizers Four fully parametric bands are provided on the D950. Each band, which can be switched in and out independently, extends from 20 Hz to 20 kHz, with a ±18 dB gain range. The EQ features a psycho-acoustically corrected frequency response for high frequencies, similar to well-known analog EQ designs. The two mid-bands can be switched between constant-Q and constant-range modes. The high and low frequency bands can also be switched to shelving mode. A second EQ type is available (defined in the Configuration Tool), which features an additional Notch filter. The controls for the Notch filter show up in the filters section of the LACP menu system.

Filters High-pass and low-pass filters are provided, with cutoff frequencies that are variable between 20 Hz and 20 kHz, and slope selections of 12, 18, or 24 dB/octave.
In addition, an analog high-pass filter with a cutoff frequency of 75 Hz and a slope of 12 dB/octave is available in the D19m 24 bit Mic/Line preamplifier.

Dynamics Two types of dynamics processing are available for the D950:

- *Limiter/Compressor*, which performs peak limiting and compression.
- *Expander/Gate*, which consists of an expander and gate processing block.

To avoid pumping and modulation, the dynamics processing sections feature high sampling rate transient detection. Distortion artifacts are minimized through selectable, program-dependent attack and release times. The D950's dynamics feature a side-chain input that can be used with or without HP/LP filters. A unique "look forward" function is also featured. If desired, this allows the entire transient portion of a waveform to be affected when using the limiter/compressor or to be passed when the expander/gate is used.

2.4.7 Monitoring and Communication

Monitoring

The Control Room (CR) monitoring section provides control of up to three different speaker systems, (two multi-channel and one stereo), and a configurable number of source selectors. Analog or digital, internal or external sources can be assigned to any of the source selector keys. A headphone panel is also supplied with the communication module for use within the control room.

The Studio Monitor is configurable in the same way as the CR monitor section, although only one pair stereo loudspeakers is supported. Along with the controls located on the console, the studio can have remote volume control.

IPL function

In addition to the normal monitoring facilities provided on a conventional mixing console, the Studer D950 offers additional monitoring paths: the "IPL" or "In-Process Listening" function. This function enables signal monitoring after individual processing blocks within a channel, specifically:

- After the input;
- After the equalizer;
- At the return point of the insert;
- After the dynamic unit, and
- At the key input (side chain) of the dynamic unit.

This function can be configured for any channel in the same way as other processing blocks.

Talkback

An extensive talkback system is implemented within the D950. The talkback source can be either the built-in, or an external microphone. Several destinations, such as multitrack buses, direct outputs, auxiliaries, groups, and master outputs are available. In addition, each channel is fitted with a talkback key that activates talkback to the direct output of the corresponding channel. The talkback return signal can be monitored on the small talkback loudspeaker built into the console.

Machine control

(option)
Basic machine control supports one P2 9-pin port and is included in the AutoTouch automation package. An integrated multi-machine control system is a further option and can be supplied on request.

2.5 The Assignable Operating Desk

2.5.1 Basic Desk Functions

The D950's Operating Desk basically consists of two parts:
- The Channel Strips;
- The Central Section(s).

The *Channel Strip* consists of three parts:
- The Fader;
- The Processing and I/O panel;
- The VFD Meters.

The *Central Section* consists of a variety of functional modules, and is laid out individually for each console (annotated drawings of the two basic console versions – D950B and D950S configurations – with their Desk parts can be found on the next two pages.)

The D950 Operating Desk is assignable in two important respects:
- *Any* DSP channel can be assigned to *any* channel strip;
- Every channel strip has up to *10* layers for channel assignment.

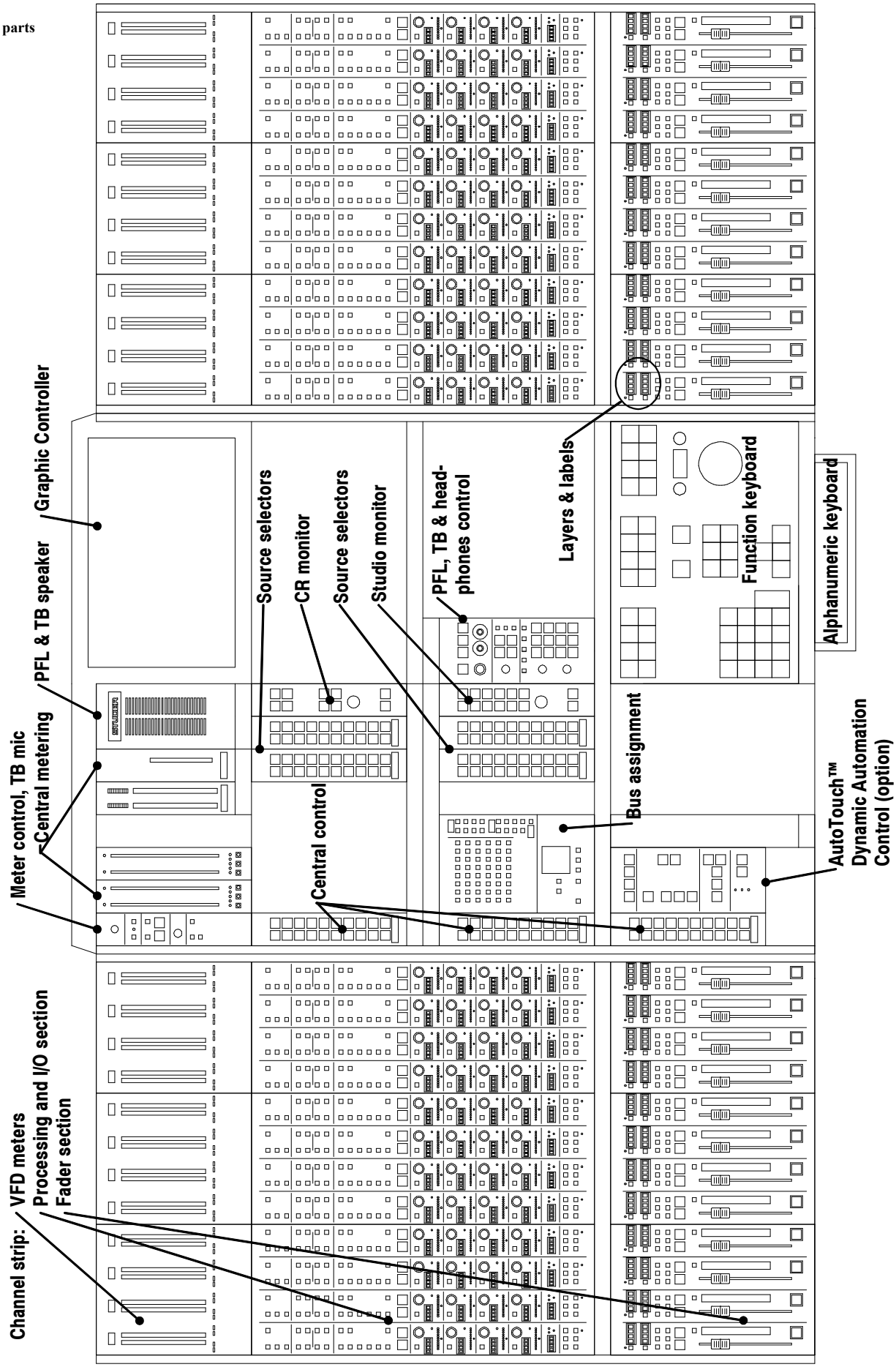
By using the system's Channel Strip assignability, it is possible to lay out the desk operating surface in the most appropriate topology. Because all Channel Strips are identical, Input Channels, Multitrack Monitor Channels, AUX Channels, Group Channels, and Master Channels can be assigned to *any* Strip and in *any* order. The actual assignment is performed within the Graphic Controller using the Strip Setup page and then stored (refer to chapter 4.4.6). A pointer is stored with each Title to assure the proper Strip Setup is recalled when Titles are loaded. Using this combination of facilities Strip Setups can be customized for each application or project and easily recalled.

Layers An assignable desk with layers provides the unique ability to make the desk more compact, while still retaining full operational power. Consider the following way of visualizing the use of layers:

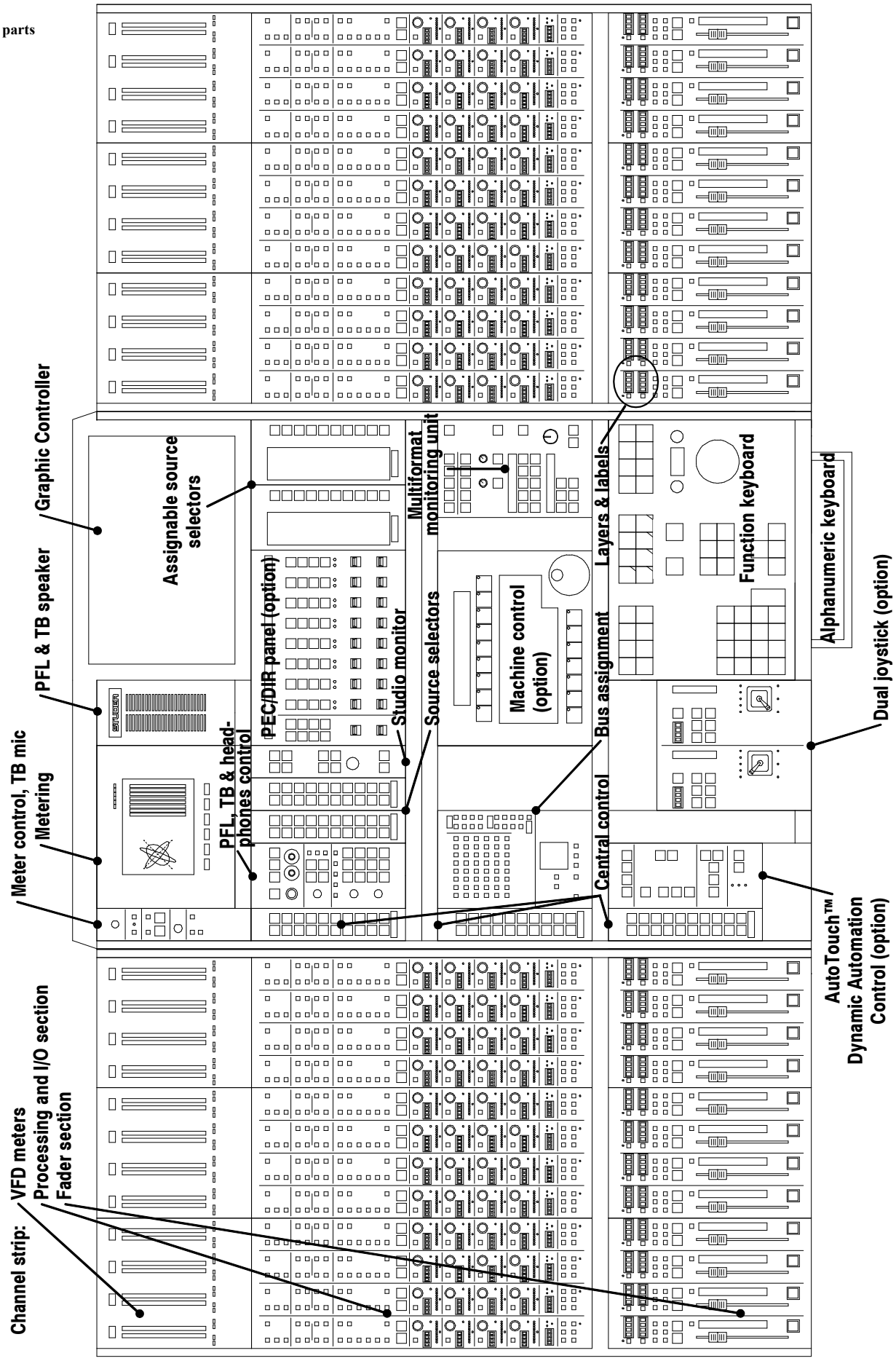
Assume that your studio or facility did not have sufficient space for a 96-fader analog console, and you wanted to reduce its size. Let us also again assume that it was technically possible to divide the console into two identical and separate halves, and yet that it would still be fully functional. Now, let us cut the console in half and stack the two 48-fader parts one on top of the other to save space (thereby creating two layers). If you want to work on fader #24, you just use the top layer. If you need to access fader #76, you simply use a forklift to remove the top layer – with faders 1 through 48 – on the floor, and then stack the second layer – with faders 49 through 96 – on the top, and reach for the fader #76. It's as simple as that.

(continued...)

D950B
Desk surface parts

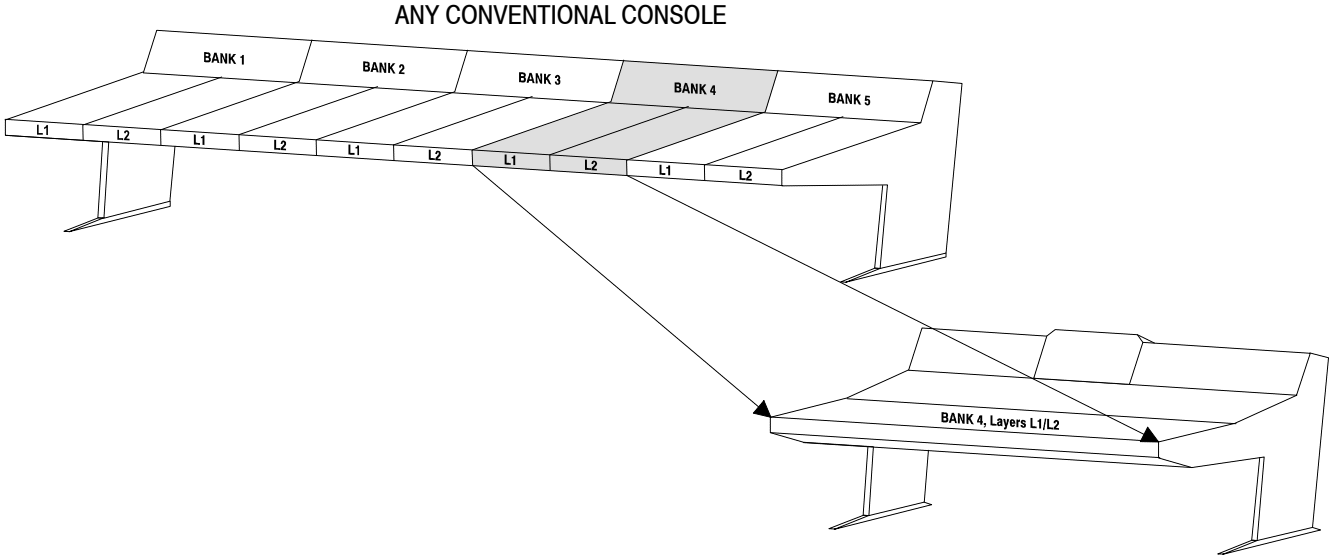


D950S
Desk surface parts



(cont.:)

In the case of the D950 Digital Mixing System, Studer created 10 of these layers, and instead of the forklift (an impracticable tool for typical studio environments), we can use Layer/Bank control keys. So, in concept, we could cut a conventional console in up to 10 parts and map them to the D950 Assignable Desk Surface in 10 layers, as follows:



Managing the Layers

For reasons of convenient operation, the D950's 10 layers have been organized into five groups of two layers each, called Banks. One Bank is always displayed on the Desk Surface, with both layers visible on each Channel Strip.

Some more useful facts:

- A D950 Desk can be laid out conventionally with as many Channel Strips as DSP Channels.
- All 10 layers have identical importance. The navigation to a layer is via the Bank and Layer selection.
- A D950 Desk can always manage a maximum of 10 layers, even if they are not used at a certain time. There is no problem to start using a fresh Bank at any time.
- Any number of channel strips may be "locked" into place as other Layers/Banks are globally recalled and then released as needed by the operator (using the Strip Lock Edit and Lock Strip facilities).
- If some channels within a bank are on Layer 1 and other are on Layer 2, the alternate position can be toggled using the Swap L1/L2 control. This layer assignment can also be stored and recalled by the user while still in the same Bank.
- The console can be split (at a predetermined location) with independent Bank/Layer and Menu control for each side.

Important Point to Remember

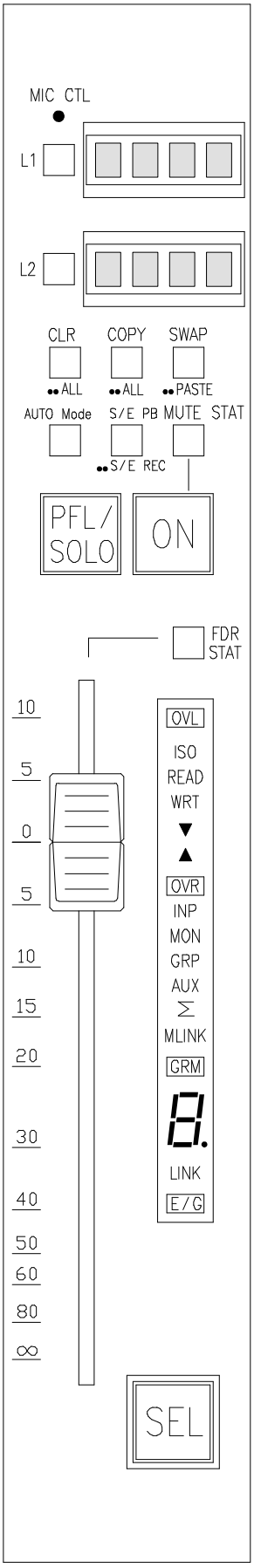
Even if you change the current arrangement of layers and/or banks, the sound being produced by the D950 will not change. In other words, an operator can make changes freely on layers and banks without upsetting the signals being processed by the console.

Channel Swap

Unlike assigning DSP Channels to Channel Strips using the GC's Strip Setup page, there is a quick and simple way to re-assigning a channel: Using the CH SWAP (Channel Swap) function. Simply press CH SWAP, and

then the SEL keys of two channel strips you want to be swapped – it's done. The CH SWAP can be used, for example, to temporarily re-locate the controls for a Kick Drum routed through Channel #1 nearer to the center into the sweet spot to work on it for a while. When finished, pressing the appropriate BANK key once again puts the Desk assignment back to its original layout from the Strip Setup page. Multiple Swaps are also possible. Swapped assignment is a temporary measure; it will be set back to default by hitting a Bank key, or at console shutdown.

2.5.2 Fader Unit



The D950's Fader Unit is an essential part for the channel operation.
It has been designed as a "four-channel" unit: four identical fader strips are integrated into a single module. Dimensions are 162.5 × 250 mm; the drawing *left* shows just a one-channel portion of the unit.

Operator Controls:

MIC CTL
This LED indicates that the channel strip is assigned for remote control of a connected microphone pre-amplifier.

L1, L2
These keys select which of the two layers from the current bank will be assigned to the Channel Strip, and can be activated at any time.

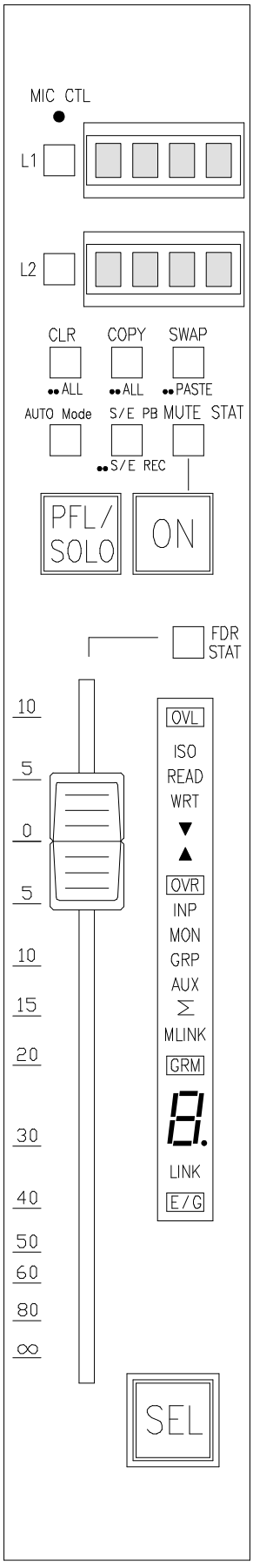
Alphanumeric displays
These displays indicate the alphanumeric label of the corresponding audio channel that is assigned to the Strip using the L1 and L2 Layer keys.

CLR/••ALL
Pressing this key *once* activates the Parameter Clear Mode. Subsequently pressing any or several of the channel section(s), followed by the CLR/••ALL key, clears its/their settings.
A *double-click* of this key illuminates all channel section keys and allows them to be *deselected*. A subsequent pressing of the CLR/••ALL key clears the selected channel section parameters, and restores the default values (EQ flat, etc.).
The original positions of the parameters are copied to the clipboard when the clear function is executed; this is indicated by the illumination of the COPY/••ALL key.

COPY/••ALL
Pressing this key *once* activates the Parameter Copy Mode. Subsequently pressing any or several of the channel section(s), followed by the COPY/••ALL key, places those settings into the clipboard.
A *double-click* on this key illuminates all channel section keys and allows them to be *deselected*. A subsequent pressing of the COPY/••ALL key copies the selected channel section parameters into the clipboard.

SWAP/••PASTE
A *single* press on this key effects an exchange of the clipboard data with the local channel parameters, effectively allowing comparison of two different settings.
A *double-click* on this key replaces or overwrites the current channel parameters with the contents of the clipboard.

AUTO Mode
This key toggles the AutoTouch Dynamic Automation Mode between ISO, READ and WRT for the whole channel.



S/E PB / ••S/E REC
A *double-click* of this key activates *all* channel functions (except Fader and Mute) to the automation system's active RECORD status (S/E stands for Switches and Encoders).
A *single press* on this key performs the same functions as ••S/E REC, but switches back to PLAYBACK status.

MUTE STAT
This key toggles the status of the Mute Automation between PLAYBACK and RECORD, and also indicates that the ON key is in REC status.

PFL/SOLO
Selection between PFL and SOLO (and SOLO-IN-PLACE) is performed globally using keys located in the D950's Central Section.

ON
This key provides ON/OFF control for the audio signal currently assigned to the channel strip.

FDR STAT
This key allows toggling automation status PLAYBACK and RECORD for the fader *only*, and also indicates that the fader is in REC status. By first pressing CLR and then the FDR STAT button, the fader level is set to unity gain.

SEL
This key has two main purposes:

- Access of the central audio and control facilities (CAU, ACU, etc.),
- Softkey for channel parameter control (SOLO SAFE, CH SWAP, etc.).

In addition, this key is used for other functions including control group, strip lock, and joystick assignments and so on.

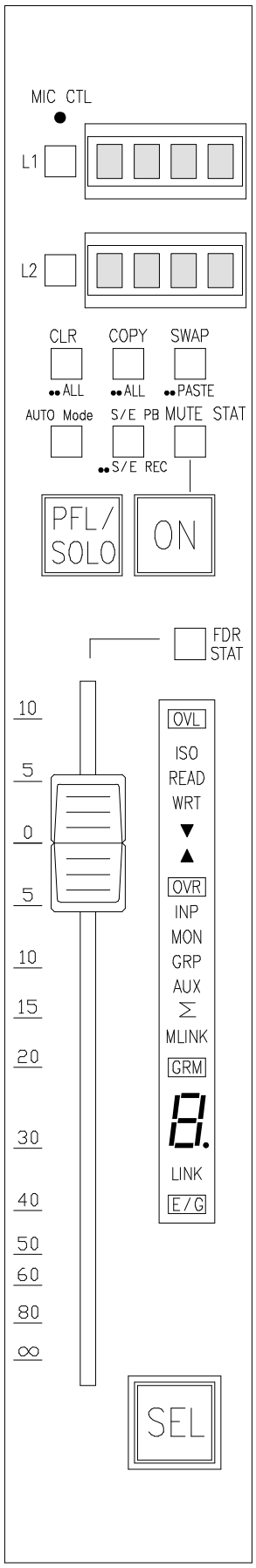
Fader
A 104 mm motorized fader providing highest reliability and smooth user operation.

LED Indicators:

OVL
This is a real-time indicator of overloads occurring within the channel. A global HOLD function also allows checking of overloads within "hidden" channels.

ISO/READ/WRT
These LEDs indicate the current mode of Dynamic Automation system.

▼, ▲
These LEDs indicate offset – greater or less than – between the current fader position and the value stored by the AutoTouch Dynamic Automation, when active. These provide the ability to null the fader position to create seamless transitions.



OVR
This indicates an out-of-range condition for the channel fader and can possibly occur while updating a fader move under Automation.

INP
Channel type indicator: Input Channel (mono or stereo).

MON
Channel type indicator: Monitor Channel.

GRP
Channel type indicator: Group channel (mono or stereo).

AUX
Channel type indicator: AUX Master Channel (mono or stereo).

S
Channel type indicator: Master Channel (mono or stereo).

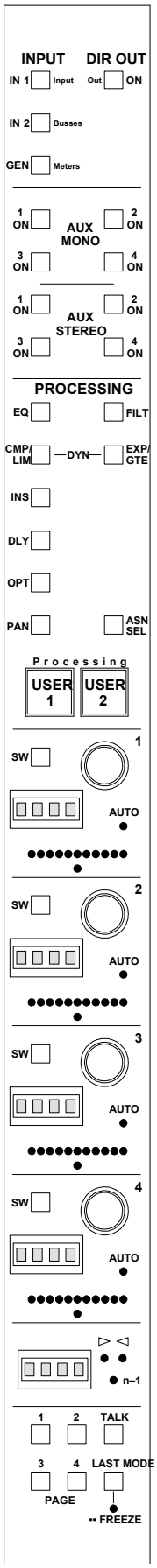
MLINK
This indicates that this particular Channel Strip is a Link Master.

Digit Display
This indicates the Link number.

LINK
This LED is lit if the Channel Strip forms part of a Link.

E/G
This is a real-time indication of the Expander/Gate activity.

2.5.3 Input/Output Unit



The Input/Output Unit provides a detailed display of and access to Channel Functions, and is used in conjunction with the Fader Unit. It is designed as a "four-channel" unit with four identical input/output strips integrated into a single module. Dimensions: 162.5 × 420 mm; the drawing *left* shows just a one-channel portion of the unit.

Because of the D950's free configurability, it can happen that certain functions (EQ, Dynamics, etc.) have not been configured for a particular channel. In such cases, the controls listed below will *not* be active and will not illuminate.

The Input/Output Unit is logically divided into:

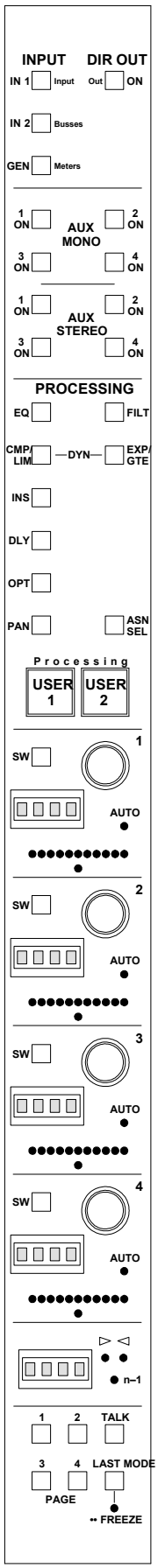
- A Fixed Part that contains dedicated controls for audio functions.
- An Assignable Part that contains general-purpose controls. These may be assigned to the various sections of audio parameters available within the Channel Strip.
  This latter part is referred to as the LACP, standing for Local Assignable Control Panel.

Controls (Fixed Part):

IN 1
This selects the first of three inputs to be used for the channel.
The input can be connected via the integrated DSP matrix (the Global Patch) to any source available within the DSP frame.
For GROUP, MASTER, and AUX MASTER channels, Input #1 is automatically assigned to the corresponding summing bus output.
This key also allows selection/de-selection of the channel's input selection when using the copy and clear parameter facilities.

IN 2
This selects the second of three inputs to be used for the channel.
The input may be connected via the integrated DSP matrix to any source available within the DSP frame. This key also allows selection/de-selection of the channel's bus assignments when using the copy and clear parameter facilities.

GEN
This selects the third of three inputs to be used for the channel, normally the Test Generator signal.
The Test Generator is a global resource that can be accessed from all channels. The operator can still select a different signal to this input, via the integrated DSP matrix, the same as for IN 1 and IN 2.
This key also allows selection/de-selection of the channel's meter position when using the copy and clear parameter facilities.



DIR OUT ON
This is an ON/OFF function for the channel's Direct Output. For all MASTER and AUX MASTER channels it is automatically turned on and cannot be disabled.
This key also allows selection/de-selection of the channel's direct output when using the copy and clear parameter facilities.

AUX MONO 1...4 ON
These four keys provide direct ON/OFF control of Mono AUX sends 1 through 4. Since there can be more than four Mono AUX sends, these keys control only the first four Mono AUX sends. Mono AUX sends 5 and above can be turned on and off using the Central Assign Unit (CAU).

AUX STEREO 1...4 ON
These four keys provide direct ON/OFF control of Stereo AUX sends 1 through 4. Since there can be more than four Stereo AUX sends, these keys control only the first four Stereo AUX sends. Stereo AUX sends 5 and above can be turned on and off using the Central Assign Unit (CAU).

EQ
This is an ON/OFF control for the four-band Equalizer.

FILT
This is an ON/OFF control for the High-pass/Low-pass Filter.

COMP/LIM
This is an ON/OFF control for the Compressor/Limiter functions.

EXP/GATE
This is an ON/OFF control for the Expander/Gate functions.

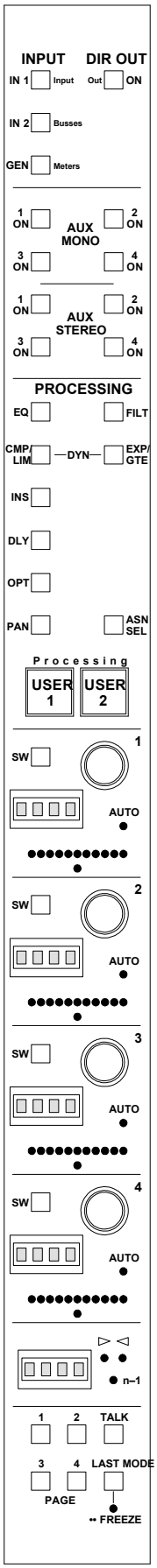
INS
This is an ON/OFF control for the Insert Return signal.

DLY
This is an ON/OFF control for the variable Delay function.

OPT
This is a control reserved for future functions.

PAN
This is an ON/OFF control for the channel Panning/Direction function.

ASN SEL
Activation of the Assign Selection function enables a set of functions to be assigned to the Local Assignable Control Panel (LACP). For example, pressing the ASN SEL key followed by the EQ key assigns the EQ parameters to the LACP soft controls (encoders and switches). However, unless the EQ has already been turned ON, it will not be active and the EQ key will not illuminate. A subsequent press of the EQ key will engage the EQ and it's key will light.



USER 1/2
These keys are reserved for programmable user- or application-specific functions.

Controls (assignable part, LACP):

The Local Assignable Control Panel consists of four identical control sections, 1 through 4, plus a common area for overall control and display.

Rotary Encoder
This rotary shaft encoder features a very high-resolution adjustment, which implements an analog feel for level controls, etc. A touch-sensitive knob provides a very direct and intuitive operation during automated operation.

SW
This key is used for various switching functions, whose function is dependent upon the LACP's current assignment (for example, AUX send PRE/POST).

Display
This four-character alphanumeric display serves various purposes:

- Labeling of the Encoder parameter – for example PAN, GAIN, etc.
- Display of the parameter value – for example +2 (dB).

LED bar
This LED bar graph array provides a quasi-analog indication of the current parameter value, making it easy to visually scan the entire desk and secure an idea of the settings, without having actually to read digits and characters.

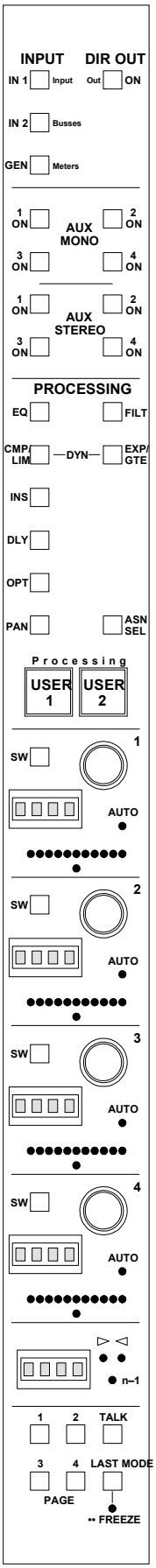
CENTER LED
Used for centered parameters such as PAN, DIRECTION, etc., or to indicate nominal positions, such as 0 dB gain, etc.

AUTO LED
This two-colour LED indicates various Automation Status settings.

► ◄
These two LEDs indicate precisely the offset between an actual value and the playback value during Automation operation of the rotary encoders. The LEDs are always assigned to the last-touched rotary encoder and are useful when nulling the encoder's position.

DISPLAY
This alphanumeric display provides an overall label for the currently selected page of the Local Assignable Control Panel (for example, LIM, PAN, etc.).

n–1 LED
This LED indicates that the channel has an activated N–1 (or Mix-minus) function; in other words, this particular channel is a Bus Owner.



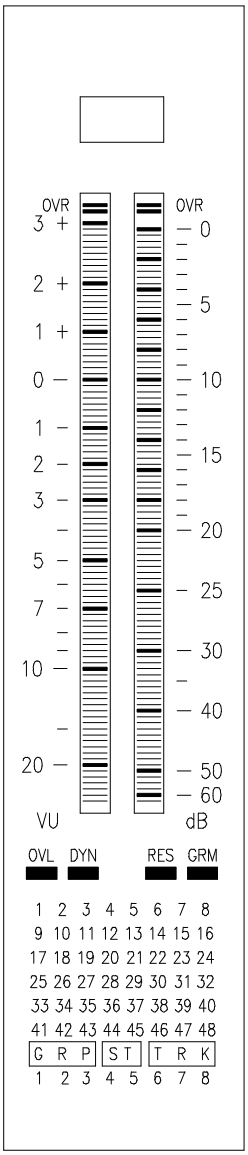
PAGE 1 through PAGE 4
These keys select between pages of the currently assigned audio section.

TALK
This key activates talkback to the channel's direct output, or to the N–1/Mix-minus output if the latter mode is activated. In order to function, an output assignment must be made.

LAST MODE
This key recalls the last-used LACP audio section.

••FREEZE
A *double-click* of this key activates the FREEZE function, after which the channel is locked out from the global LACP menu selection (local LACP menu selection is still available). A subsequent *double-click* of this key or pressing Freeze Off in the center section will turn off the FREEZE function.

2.5.4 Audio Display Unit



The Audio Display Unit is a general purpose, channel strip-related module. It is designed as a four-channel unit, with four identical display strips integrated into a single module. Dimensions: 162.5 × 190 mm. The drawing *left* shows just a one-channel portion of the unit.

If used as a channel-related bar graph, it provides the following functions:

Meter
Two 100-segment bar graphs are used to display the level of a signal that has been selected as a Meter Source for the corresponding channel.
For Mono channels, both bar graphs feature the same display; for Stereo channels, left and right information will be displayed on separate bar graphs.
Meter characteristics can be selected between PPM- and VU-response on a global basis; both bars will always function in the same mode. Each meter features an integrated peak-hold function with auto and manual reset.
Two overload indicators are provided, each of them referring to the particular signal indicated by the corresponding bar graph below. A global peak-hold function can be set to memorize overload occurrences, even if the channel is currently unassigned to the strip.

OVL
This red LED below the meter indicates all overload conditions of the corresponding channel. A global peak-hold function can be set to memorize overload occurrences even if the channel is currently unassigned to the strip.

DYN
This yellow LED indicates the activity of the channel's Dynamics unit; if any of the four functions – limiter, compressor, expander, or noise gate – is active and working, the LED will light.

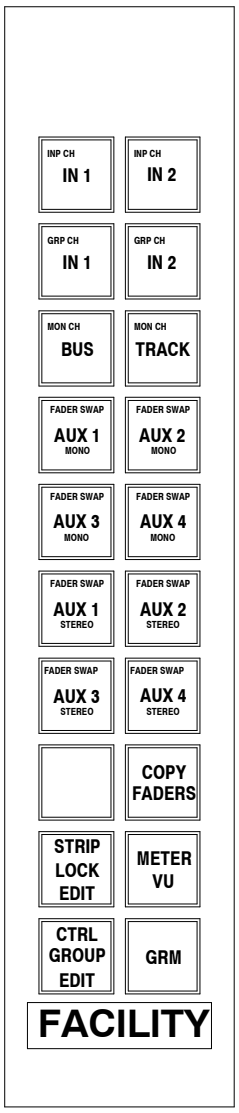
RES
This LED is reserved for a future function.

GRM
By using a global function, it is possible to change the function of the right-hand bar graph display from Level to GRM (Gain Reduction Meter). This change of mode only affects those channels that have a dynamics unit configured within the signal path.
During GRM Mode, the left-hand bar graph will continue to display the level (for stereo channels, the higher level of the left- and the right-hand channel is displayed); while the right bar graph indicates current gain change as effected by the Dynamics unit.

Bus Assign
This section includes 48 individual LEDs for display of track/group assignment, plus eight LEDs for master assignment from the corresponding channel. The ST LED indicates that Stereo Master Bus assignments are selected for viewing (as set on the Central Assign Unit).

Note: Due to the configurability of the system, it is possible that some of the functions described above are not installed on particular consoles.

2.5.5 Central Facilities Unit (CFU)



The Central Facilities Unit is used to implement some often needed, global operations. This unit is installed in the central area of the console and is labeled as FACILITY. Dimensions: 40.6 × 190 mm.

INP CH IN 1, INP CH IN 2
GRP CH IN 1, GRP CH IN 2
MON CH BUS, MON CH TRACK
This set of keys will switch all channels belonging to a specific channel type from IN1 to IN2 input.
The channel types are:

- Input channel Mono and Stereo: Switched with the INP CH IN 1/IN 2 keys.
- Group channels: Switched with the GRP CH IN 1/IN 2 keys.
- Monitor channels: Switched with the MON CH BUS/TRACK keys.

For Group Channels the keys enable switching of inputs to Groups between Bus (IN 1) and the other input (IN 2), which can be patched, for example, to recording machine returns to provide quick monitoring.

FADER SWAP MONO AUX 1...4
FADER SWAP STEREO AUX 1...4
These keys enable the AUX level control function to be assigned temporarily to the faders, and *vice versa*. This function simplifies, for example, headphone pre-mixes on AUX buses, etc. During operation, the original AUX level rotary encoders will alter the corresponding fader levels.

COPY FADERS
These switches copy fader settings to AUX. For example, if a rough mix has already been prepared on the faders, it can be very useful to be able copy these fader levels to the AUX level controls for headphone mixes, etc.
When COPY FADERS is activated, the Mono/Stereo AUX 1 through 4 FADER SWAP keys are used to copy the fader-level settings to the selected AUX-level settings.

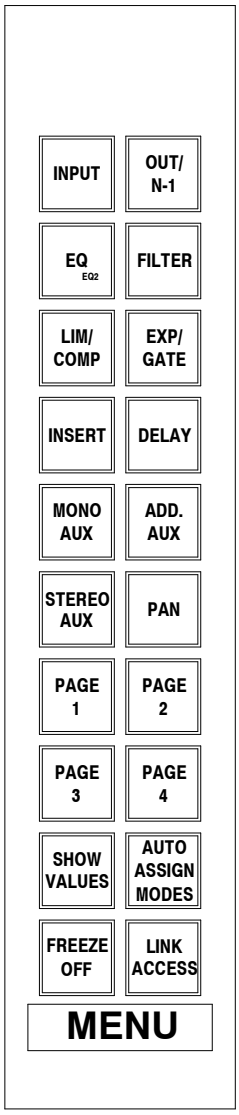
METER VU
This switch globally changes the characteristics of the digital channel-related meters from PPM to VU, and *vice versa*.

GRM
This switch enables display of gain-reduction on the right channel bar graph. GRM values are only displayed when the channel's dynamics unit is active.

STRIP LOCK EDIT
This key activates Strip Lock Edit mode, which allows the user to select which channel strips will *not* change when Strip Lock is engaged. Once engaged, channel strips may be selected by pressing their CH SEL keys.

CTRL GROUP EDIT
This key activates the Control Group Edit mode, which allows the user to select which channels will be members of a Control Group. Once engaged, use CH SEL keys to select the Control Group Master and to assign the group members. Engaging the CTRL GROUP EDIT key will open the Control Group Filter screen on the GC, where parameters to be controlled are selected and a Group name can be set.

2.5.6 Master Menu Selector (MMS)



The Master Menu Selector (MMS) is used to globally modify assignable sections of the Channel Strips (LACP). In other words these buttons allow you to assign the knobs in each channel strip to be associated with a specific type of function (EQ, Pan, etc.). This unit is installed in the central area of the console and is labeled as MENU. Dimensions: 40.6 × 190 mm.

Pressing one of these keys will assign the associated channel section's parameters to the channel strip encoders (knobs) and soft switches on a global basis (unless the console is in Split Banks mode in which case only one "side" of the console will be affected).

INPUT
This key selects the Input Section, including gain, stereo mode, phase, etc. If remote Mic/Line preamplifiers are assigned as the input to the channel, their controls (mic/line switching, phantom power, gain, and filter) are available from the INPUT selection.

OUT/N–1
This key selects the Output Section, including direct output and N–1 assignment.

EQ/EQ2
This key selects the Four-band Equalizer for adjustment, with each band displayed on a separate page. Pressing this key a second time changes to EQ2 mode, that is, to an overview of all four bands at once with Q and frequency settings on subsequent pages.
If the EQ with the Notch Filter is defined in the channel's configuration, the Notch Filter controls are available in the FILTER menu selection.

FILTER
This key selects the Two-band Filter for adjustment.
If the EQ *with* the Notch Filter is defined in the channel's configuration, the Notch Filter controls are available in this menu selection.

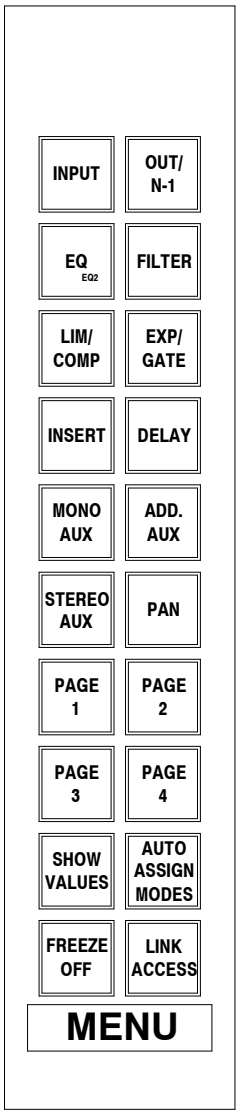
LIM/COMP
This key selects the Limiter/Compressor section of the Dynamics unit for adjustment.

EXP/GATE
This key selects the Expander/Gate section of the Dynamics unit for adjustment.

INSERT
This key selects the Insert section for adjustment.

DELAY
This key selects the Variable Delay for adjustment.

MONO AUX
This key selects AUX Mono Sends 1 through 16 for adjustment.



STEREO AUX
This key selects AUX Stereo Sends 1 through 8 for adjustment.

ADD. AUX
This key selects any additional AUX sends that exist in the configuration (Mono Aux sends above 16, and Stereo Aux sends above 8).

PAN
This key selects the Panning section for adjustment.

PAGE 1...4
These keys provide Global Selection of pages 1 through 4 for the LACPs of all channel strips.

SHOW VALUES
If activated, this key causes all LACP displays to always show *Parameter values*. If not activated, all LACP displays will show the *Names of the functions* until touched, at which point they show parameter values.

AUTO ASSIGN MODES
The AUTO ASSIGN function has three MODES:

Off AUTO ASSIGN MODES is dark, the console operates as "normal". Pressing a processing IN/OUT key toggles the status of that key. (In this mode, pressing ASN SEL on the channel strip is not necessary to change the LACP assignment on a local basis.)

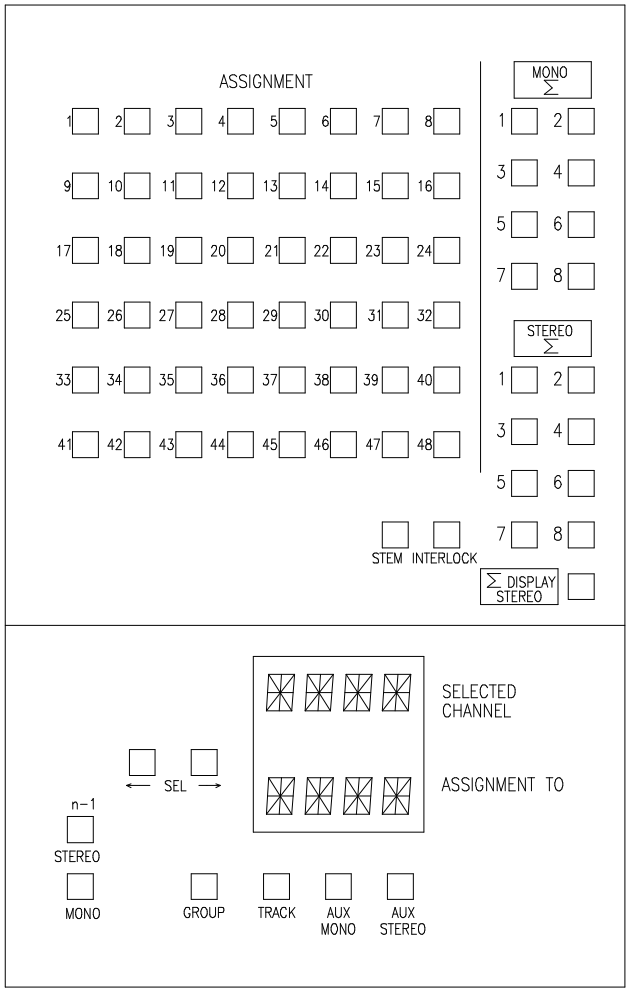
In-Only When pressing AUTO ASSIGN MODES a first time, the key is illuminated. When pressing a processing IN/OUT key on a channel strip, the knobs are assigned to that function, provided the function toggles to an IN status. If it toggles to an OUT (or Off) status, the knob status does not change.

In and Out When pressing AUTO ASSIGN MODES a second time, the key is illuminated, together with the ASN SEL keys on all channel strips. Every time a processing IN/OUT key is pressed (regardless of what status it toggles to) the knobs are assigned to that processing function.
When pressing AUTO ASSIGN MODES for the next time, the auto assign mode is switched off again – the key and all ASN SEL keys are dark.

FREEZE OFF
This key resets all Freeze functions on all channels; a function that enables the Master Menu Selector to once again access *all* LACPs of *all* channels.

LINK ACCESS
If activated, the assignment functions of *all* strips can be linked.
When the user implements a local LACP assignment on one strip, the remaining strips will automatically follow.
As a result, all LACPs will always show the *same* section and page.

2.5.7 Central Assign Unit (CAU)



The Central Assign Unit (CAU) is used to control the assignment of Channels to Buses, and is installed within the central section. Dimensions: 121.8 × 190 mm.

The user selects a channel via the individual Channel SEL key, or ← SEL → keys on the Central Assign Unit, which provides access to *all* bus contributions from that channel. The selected channel is indicated in the SELECTED CHANNEL display.

Modifications of the bus assignment can be effected using the CAU keys. The actual bus assignment is displayed on the unit, and, at the same time, on the channel-related audio display unit (if installed).

n–1 STEREO
n–1 MONO
GROUP
TRACK
AUX MONO
AUX STEREO
These master keys select the function of the 48 LED/key array, and cause the CAU to display and control the bus assignment for N–1/Mix-minus, Group, Track, and AUX buses. The selected bus type is indicated within the ASSIGNMENT TO display.

MONO S
These keys provide the bus assignment for up to eight mono Master buses.

STEREO S
These keys provide the bus assignment for up to eight stereo Master buses.

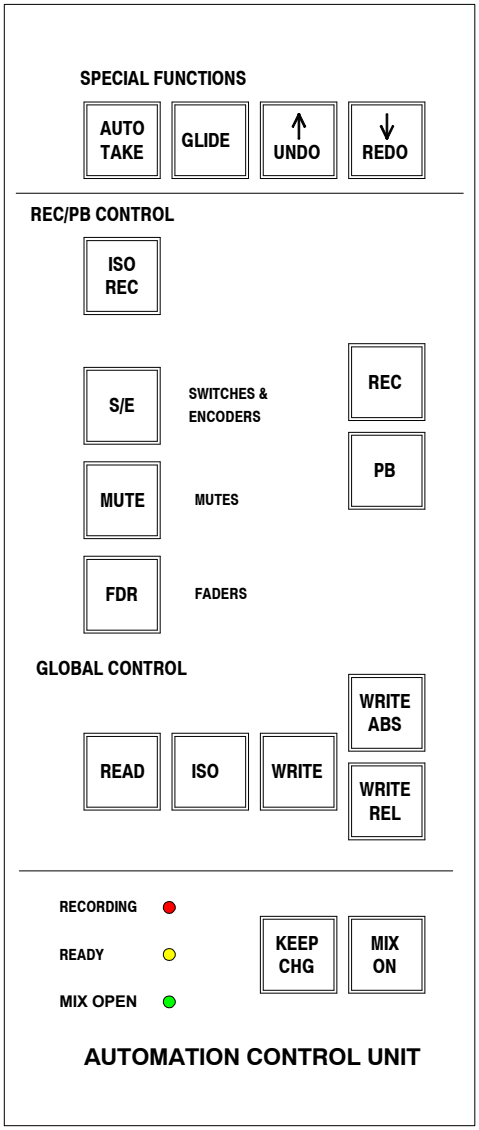
S **DISPLAY STEREO**
This key switches the LED array on the bar graph meters to "ST", to indicate bus assignment to stereo Master buses instead of mono buses.

¬ **SEL** ®
These two keys used are used to select the channel to be modified.

STEM
Future function.

INTERLOCK
Future function.

2.5.8 Automation Control Unit (ACU)



The Automation Control Unit (ACU) controls the basic functions related to the D950's Auto Touch Dynamic Automation system, and is used to quickly access and activate the most frequently used statuses and modes. More automation features are available on the Graphic Controller (GC) or on the Channel strip itself. The ACU is a panel unit measuring 80 × 190 mm (2U) size, usually mounted in the fader level of the desk, to the right of the Bank Select Unit.

The ACU provides central control of:
- Mix on/off and save functions
- Global Automation Modes (READ, ISOLATE, WRITE, WRITE ABSOLUTE, and WRITE RELATIVE),
- Automation Statuses (PLAYBACK, RECORD), as well as special modes (AUTO TAKEOVER and GLIDE), down to the level of a strip section. UNDO and REDO functions are also available.
- Global selection of which channel functions (switches/encoders, mutes, faders) will be automated.

The ACU displays also status information for the Dynamic Automation system.

Channel strips are equipped with LEDs for indicating the current mode/status of each control. These indicators are active during automation and provide channel by channel feedback of the operator's actions. As a result, the ACU does not have to offer comprehensive mode/status indications.

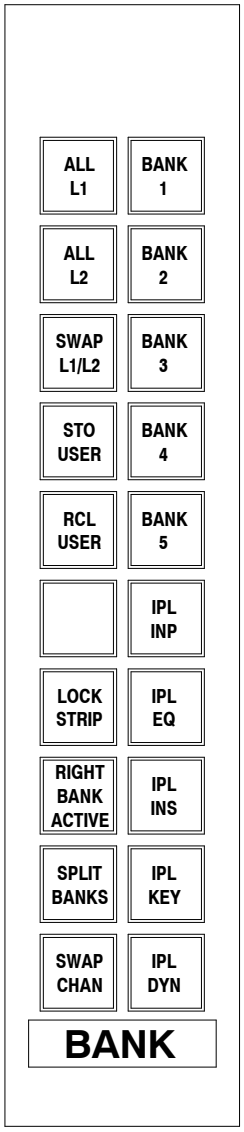
The ACU is de-activated if the optional Dynamic Automation system is not installed. It is also switched off while the Dynamic Automation system is not active.

The ACU is divided into four operational areas:
- SPECIAL FUNCTIONS control area
- RECORD/PLAYBACK control area
- GLOBAL control area
- DISPLAY/MIX control area.

For most of the time, the Dynamic Automation's basic operating modes are set automatically by the system. If the entire console is to be used in one of the three WRITE modes, no more keystrokes on the ACU are required. For READ mode, the READ key has to be pressed. If only *some* or *several* channels strip sections are to be modified, the ACU can be used to select these.

Should a detailed automation setup be required, the flow of keystrokes during operation begins at the bottom of the ACU (with the MIX ON) and continues upward to the global modes. After one of the global modes has been selected (if not already set up), sections of one or several channel strips can be placed individually into RECORD mode using the ACU's REC/PB CONTROL area. Finally, the uppermost part of the ACU can be used to select special modes that are then valid for the whole console.

2.5.9 Bank Select Unit (BSU)



The Bank Select Unit is designed to support the easy use of the D950's layered console structure; it is usually located with the center section and is labeled as BANK.
During the D950 setup process, a default assignment of the configuration's channels to channel strips is created. During operation, the user can modify this assignment and develop alternate assignments using the Strip Setup page on the Graphic Controller. The console supports up to 10 layers, organized in five banks with two layers each.
Using the BSU, bank setups may be activated and recalled at any time by using the BANK 1 through BANK 5 keys.
The unit is usually located in the console's center section, on the level of the rotary encoders; dimensions: 40.6 mm × 190 mm (2U).

In addition, the BSU includes the following functions:

ALL L1
This key allows all strips to be assigned to layer L1 of the current bank.

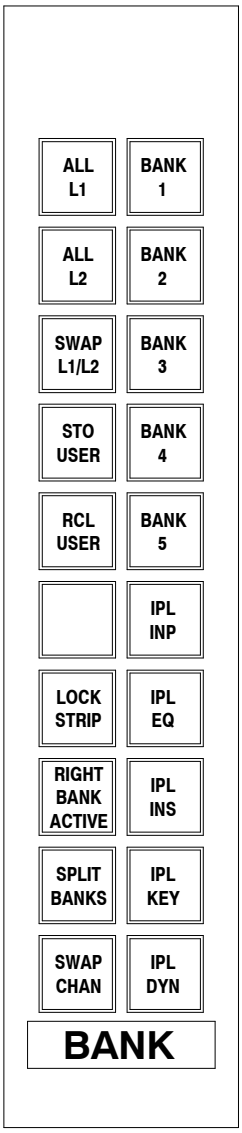
ALL L2
This key allows all strips to be assigned to layer L2 of the current bank.

SWAP L1/L2
This key inverts the current L1/L2 selection setup, and allows easy change-over to those channels that currently are unavailable on the strip to provide quick recovery of a previous setup. For example, if some channel strips are assigned to Layer 1 and others are assigned to Layer 2 within the same bank, the SWAP L1/L2 key will toggle between these assignments.

STO USER
For each bank, one User Memory is available that stores an L1/L2 strip setup for the currently selected bank. Pressing this key causes those values to be stored.

RCL USER
This key allows the User Memory of the currently selected bank to be recalled at any time. While changing to a different bank, the system will recover automatically the L1/L2 setting that was active when the bank was left; in addition, the corresponding User Memory of that bank will again be available.

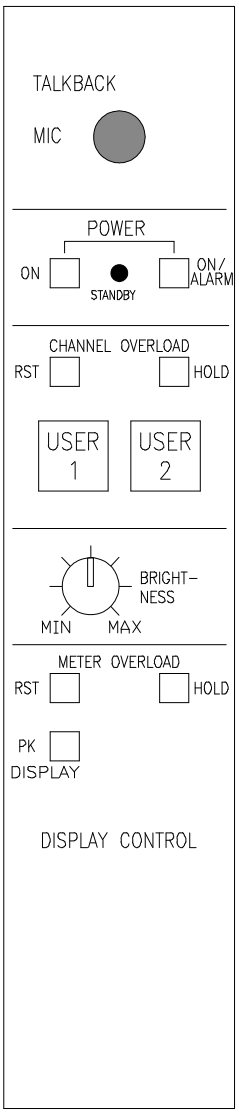
SWAP CHAN
This key provides on-line channel swap, and activates a mode where, by pressing the SEL keys, desk strip assignments of any two channels can be swapped. This is a useful function to bring, temporarily, a particular channel nearer the center of the control surface for tuning audio functions. Pressing any BANK key will return the swapped channels to their original locations.



IPL INP, IPL EQ
IPL INS, IPL KEY
IPL DYN

These five keys activate the In-Process Listening (IPL) function, if configured. IPL allows monitoring of a signal after the input section, after the EQ, after the Insert return, after Dynamics, as well as the key signal of the Dynamic Side-chain. This mode is activated by pressing the desired IPL key followed by the CH SEL for the desired channel. While IPL mode is engaged it is possible to select other IPL options without further pressing of CH SEL keys. It is also possible to select other channels while a particular IPL mode is active. To deactivate the IPL mode, press the illuminated IPL key, and the console will resume normal monitoring operation.

2.5.10 TB Mic/Display Control Unit



The TB Mic/Display Control Unit contains a range of different functions, and is usually located in the center section, within the meter bridge, to the left of the Graphic Controller screen. Dimensions: 40.6 mm × 190 mm (2U).

TALKBACK MIC
A flush-mounted electret microphone used for console talkback..

POWER
Using these two keys, the D950 desk (user interface) can be switched on and off.
To prevent undesired operation, both keys must be pressed simultaneously.

STANDBY
If the STANDBY LED is on, it indicates that the user interface is turned off but that power is still connected.

ON/ALARM
The ON/ALARM LED flashes if the user interface has detected a power-supply failure.

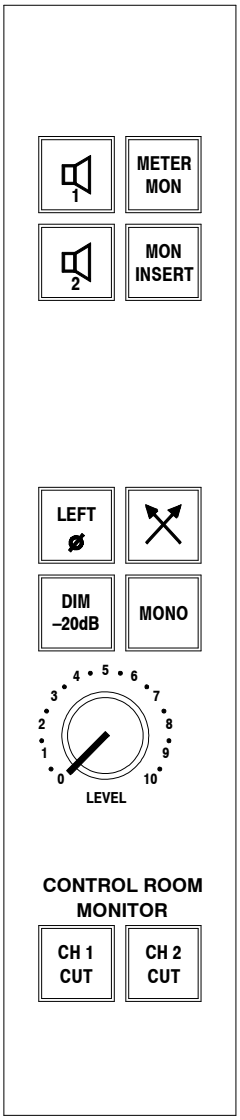
CHANNEL OVERLOAD RST/HOLD
RESET and HOLD of the channel LED overload indication can be activated using these controls.

USER 1/2
Keys and indicators provided for custom functions.

BRIGHTNESS
This control provides dimming of all keys, LEDs, and bar graph indicators with the exception of the channel strip alphanumeric displays.

DISPLAY CONTROL
This set of keys provide a number of functions for the channel bar graph meters, including RESET and HOLD of overload indication. PK DISPLAY activates the peak indication.

2.5.11 Control Room Monitor Unit



The Control Room Monitor Unit is used with the Studer D950B for stereo applications. It features controls for adjusting the monitor signal selected by means of 20-pushbutton source selectors, and is installed next to the source selectors in the center section, usually within the upper part. All monitoring outputs are electronically balanced.
Dimensions: 40.6 mm × 190 mm (2U).

This unit provides the following functions:

1, 2
These keys provide selection from two speaker pairs.

METER MON
This key routes the signal connected to the external meter input of the monitoring rack to the level meter.

MON INSERT
This key allows a separate signal processor to be inserted into the monitor signal path.

LEFT Ø
This key provides phase inversion for the left monitor channel.

This key provides Channel flip L/R for just the monitor path.

DIM –20 dB
This key provides attenuation of the monitoring signal by 20 dB.

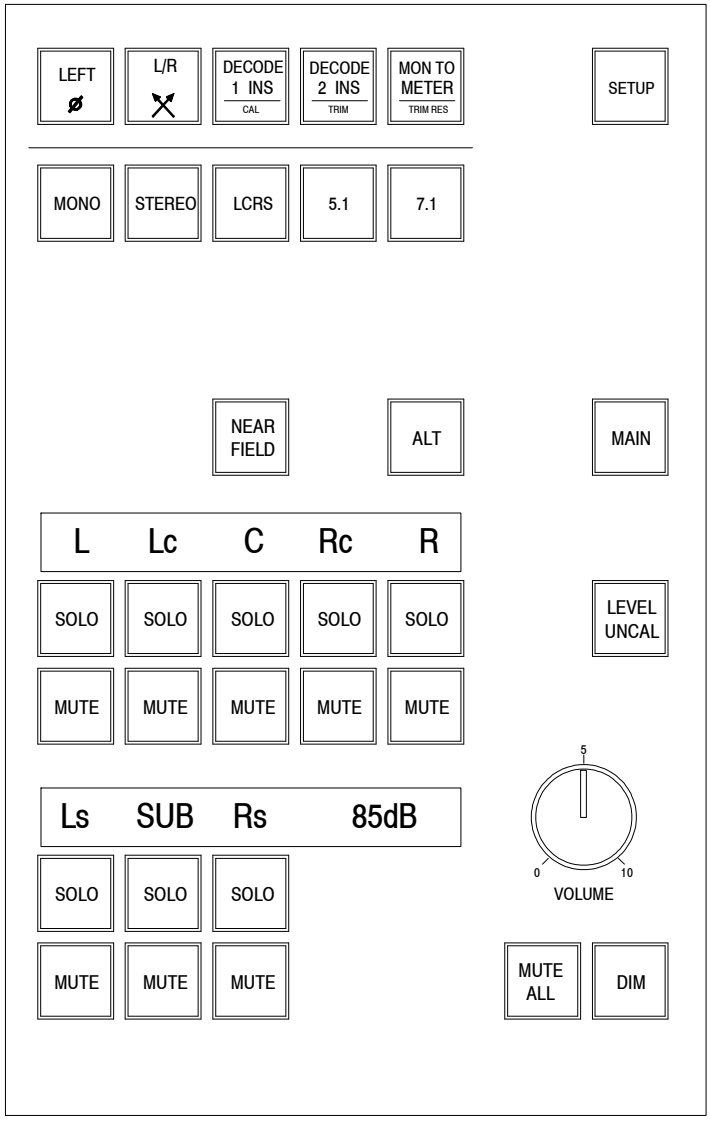
MONO
This key sums left and right channel signals and routes the result to both monitor speakers.

CH 1 CUT (left)
CH 2 CUT (right)
These keys provide muting of the monitoring signal, separate for both channels.

LEVEL
This key provides an MDAC level control for the monitoring level.

All monitoring outputs are electronically balanced.

2.5.12 Multi-Format Monitor Unit



The Multi-format Monitor Unit is used by the D950S for all mono, stereo, and surround-sound applications. Up to eight monitoring channels can be controlled simultaneously. This unit is located in the center section of the desk, usually within the lower part. Dimensions: 121.8 mm × 190 mm (2U). It offers the following functions:

NEARFIELD, ALT, MAIN
These keys provide selection from three different speaker systems:
- MAIN and ALTernate: two surround systems.
- NEARFIELD: stereo system.

DECODE 1 INS, DECODE 2 INS
These keys activate the monitor insert return from external surround-sound decoders (if installed).

MON TO METER
This key routes the monitoring signal to the master level meter.

MONO, STEREO, LCRS, 5.1, 7.1
These keys provide selection of the required multi-channel monitoring format.

LEFT Ø
This key provides inversion of the left monitor channel's phase.

L/R ×
This key swaps the left and right monitor channels.

SOLO, MUTE
These are individual Solo and Mute keys for each surround channel.

L, Lc, C, Rc, R, Ls, LFE, Rs, XX dB These alphanumeric LED displays show which speaker outputs are currently active, and the adjusted level. Only the available selections illuminate.

SETUP This key provides calibration and trim of all speaker outputs.
The Setup mode is activated by the SETUP key on the MMU panel. In Setup mode, two sub modes are available: TRIM and CALIBRATE.
The first three keys in the upper row on the MMU panel have been assigned additional functions in the Setup mode. The combinations of functions are now:

KEY	Normal mode	Setup mode
1	DECODE 1 INSERT	CAL sub mode
2	DECODE 2 INSERT	TRIM sub mode
3	MON TO METER	TRIM RES

DECODE 1/2 INSERT and MON TO METER functions are not available in Setup mode.

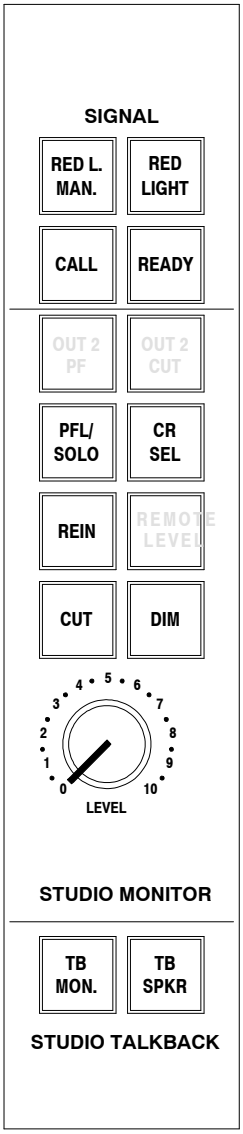
TRIM sub mode: The TRIM sub mode allows setting a level offset for a single speaker relative to other speakers in the group. The offset range is ±10 dB. The TRIM sub mode is selected by the Trim sub mode key on the MMU (see table above). The key lights if TRIM sub mode is active. One monitor group (MAIN, ALT or NEARFIELD) has to be selected. A single speaker of this group can be selected by pressing the corresponding SOLO key. Now the current trim offset of the selected speaker is displayed in the level display. The Trim offset can be changed in ¼ dB steps (if the 1.917.410.24 Monitor Group Selector cards are used). With the earlier version of the Monitor Group Selector cards (1.917.410.21) audio will only change in ½ dB steps. As soon as any Trim offsets are set in the selected monitor group, the TRIM RES key lights. By pressing this key all trim offsets in this monitor group are deleted (same as PFL/Solo Reset).

CAL sub mode: The CALIBRATE sub mode allows setting a level offset for the whole monitor group (MAIN, ALT or NEARFIELD) relative to the other two. The offset range is –20 dB to +10 dB. The CALIBRATE sub mode is set by the Calibrate sub mode key on the MMU panel. One monitor group has to be selected. The current calibration offset of the selected monitor group is displayed in the level display. The Calibration offset can be changed in ¼ dB steps (if the 1.917.410.24 Monitor Group Selector cards are used). With the earlier version of the Monitor Group Selector cards (1.917.410.21) audio will only change in ½ dB steps.

LEVEL UNCAL, VOLUME This key activates the VOLUME level control. If LEVEL UNCAL is illuminated, the VOLUME control is active. If not, the Volume is locked at its last active setting.

MUTE ALL, DIM Keys for muting and attenuation (20 dB) for all active monitor channels..

2.5.13 Studio Monitor Unit



The Studio Monitor Unit houses controls for the studio monitors, talkback controls, and the studio signaling system. It is usually located within the center section. Depending upon the studio configuration, a Studer D950 can be outfitted with one or several Studio Monitor Units, or none at all. Dimensions: 40.6 mm × 190 mm (2U).

This unit offers the following functions:

***SIGNAL** (Signaling):*

RED L. MAN., RED LIGHT
These keys provide red-light control (manual or automatic).

CALL
This key provides Call function with optical feedback.

READY
This key provides a switchable READY signal.

***STUDIO MONITOR**ing functions:*

PFL/SOLO
This key routes the PFL/Solo signal to the studio monitors.

CR SEL
This routes the control room monitor input selection to the Studio Monitors.

REIN
This key is used for the re-injection function that deactivates the automatic muting.

CUT, DIM
These keys provide muting or 20 dB attenuation of the studio speakers.

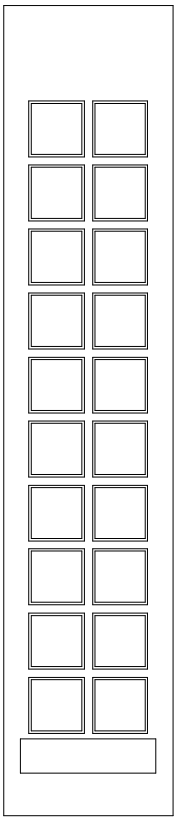
LEVEL
This is the master Studio Monitor Level control.

STUDIO TALKBACK:

TB MON.
This key provides talkback to the studio monitor output.

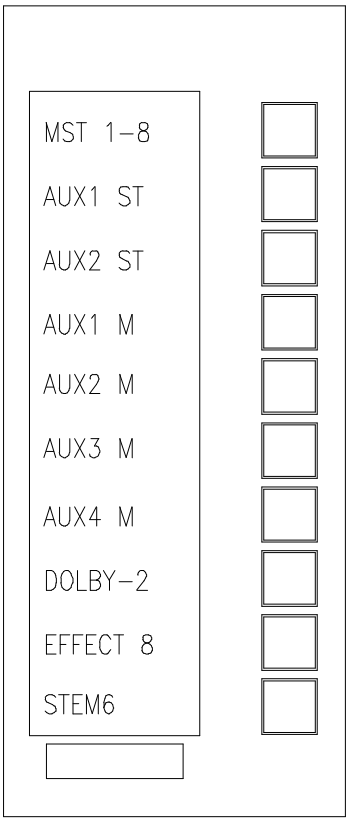
TB SPKR
This key provides talkback to a separate output (for example, a studio communication speaker, etc.)

2.5.14 20-Pushbutton Source Selector



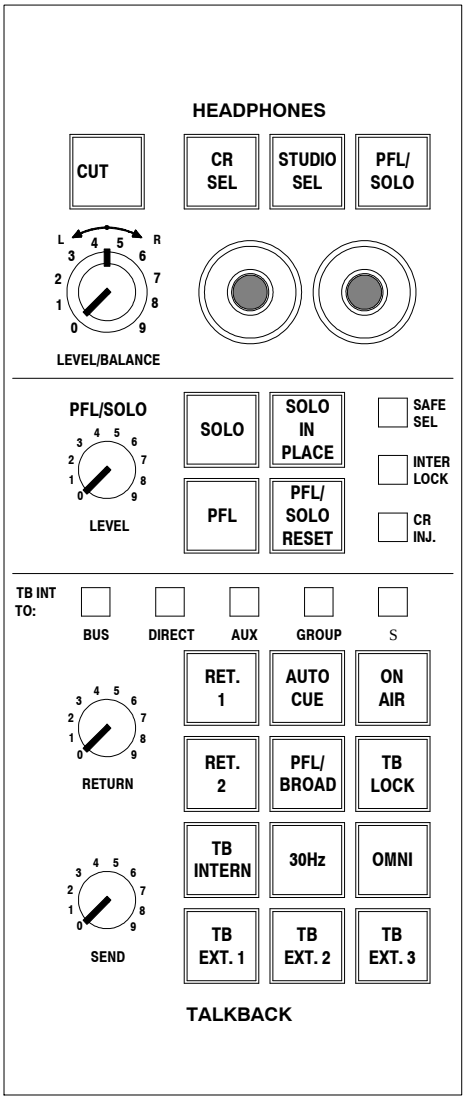
A number of these Source Selector units can be specified for the Control Room Monitor Unit and the Studio Monitor Unit to provide selection of monitor sources. Sources to be monitored are configured onto the appropriate keys using a monitor configuration file. Source labels are inscribed using transparent inlays. This unit is usually located within the center section and is labeled as STUDIO. Dimensions: 40.6 mm × 190 mm (2U).

2.5.15 Assignable Source Selector



The Assignable Source Selector is intended for use with the Multi-format Monitor Unit for monitor selection of mono, stereo, and surround sources. A number of these 10-key selectors can be specified. The unit can also be used with the stereo CR Monitor Units and the Studio Monitor Units if desired.
Sources to be monitored are configured onto the appropriate keys using a monitor configuration file. Programmable source labels are displayed on the eight-character legend adjacent to each key. This unit is located usually in the center section of the desk and typically has the C.R. label. Dimensions: 80 mm × 190 mm (2U).

2.5.16 PFL, Talkback, Headphones



The PFL, Talkback, and Headphones unit houses all controls necessary for central operation of the pre-listening, communication, and control room headphones functions. This unit is located within the center section. Dimensions: 80 mm × 190 mm (2U).

This unit offers the following functions:

HEADPHONES:

CR SEL, STUDIO SEL, PFL/SOLO
These keys provide source selection for the CR headphones.

LEVEL/BALANCE, CUT, jacks
Level and Balance control, muting key (CUT), and two 6.35 mm (¼") TRS jacks for headphones.

***PFL/SOLO** (Pre-listening functions):*

SOLO
This key activates Solo Mode for the entire console.

SOLO IN PLACE
This key activates Solo-In-Place mode for the entire console. Channels being not in SOLO mode, or which are not solo-protected (SOLO SAFE), will be muted.

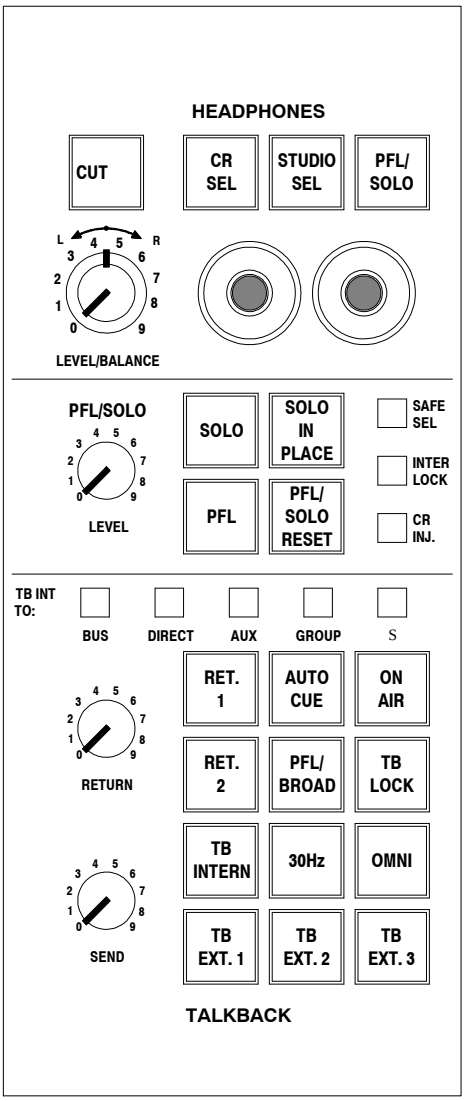
PFL
This key activates PFL mode for the entire console.

PFL/SOLO RESET
This key indicates the PFL/SOLO or SOLO-IN-Place mode (illuminated if active), and is used to cancel the mode on a global basis.

SAFE SEL
This is a programming key for the SOLO SAFE function. Pressing CH SEL keys while the SAFE SEL key is illuminated will place the selected channels in the solo-protected mode. This will disable muting of these channels when other channels are soloed (very handy for effect returns).

INTERLOCK
This key allows several channel PFL/SOLO keys to be active simultaneously.

CR INJ.
This key routes the PFL and SOLO signals to the CR monitor speakers.



TALKBACK *(communication functions):*

RETURN 1/2
These keys select one of two switchable talkback return signals.

AUTO CUE
This key provides activation of the TB system from an external control signal.

ON AIR
This key provides Safe mode activation – SOLO IN PLACE and talkback to the master buses are disabled.

PFL/BROAD
When activated, this function ensures that any channel PFL is turned off when the channel fader is opened – Broadcast Mode.

TB LOCK
When activated, this function allows the talkback keys to be changed from momentary to latching function.

TB INT. TO:
This key allows Desk-internal talkback to be routed to whichever of the following targets is selected: BUS, DIRECT, AUX, GROUP, Σ (master).

TB EXT 1...3
This key controls Talkback routing to up to three separate external destinations.

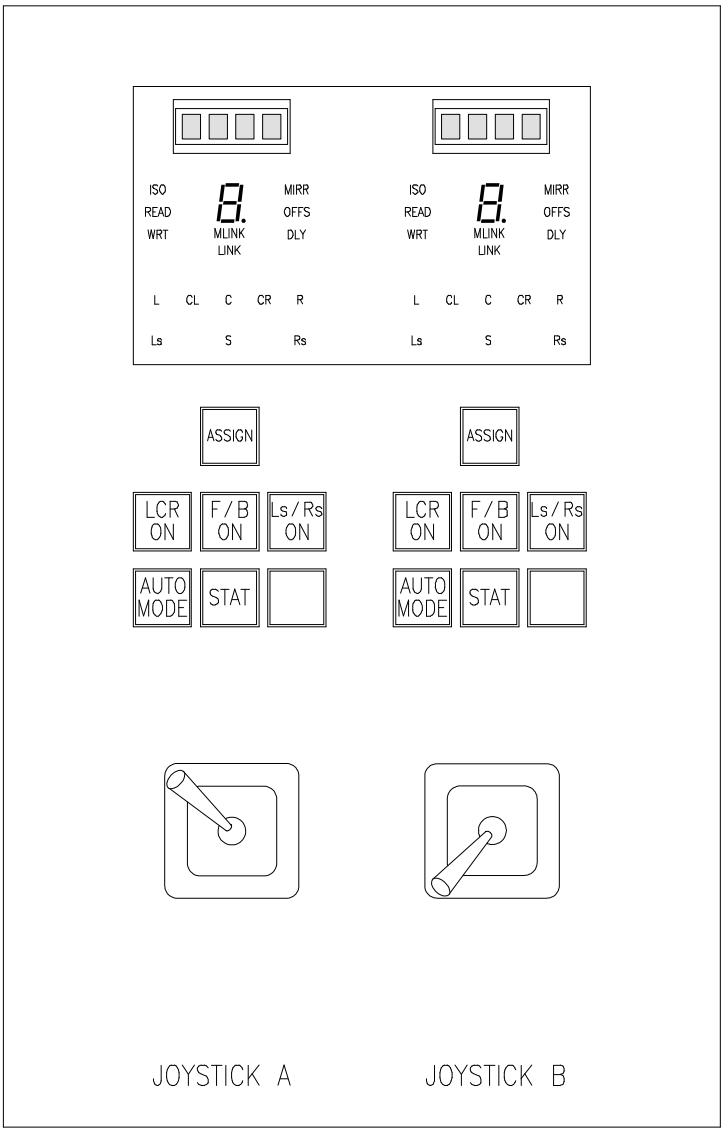
30 Hz
This key adds a 30 Hz tone to the internal talkback signal.

OMNI
This key activates all configured talkback send destinations at the same time.

SEND
This is a Level control for talkback send.

RETURN
This is a Level control for the Return 1 and 2 signals to talkback.

2.5.17 Multi-Format Panning Unit



The optional Multi-format Panning Unit provides easier control of panning functions with the D950S. Up to four units with dual joysticks can be installed within the system. Using the ASSIGN key, a joystick can be assigned to any channel to control its panning. The Joysticks are motorized and fully automated within the AutoTouch dynamic automation system. These units are usually located in the center section of the desk, in the lower part or in the fader region. Dimensions: 121.8 mm × 190 mm (2U).

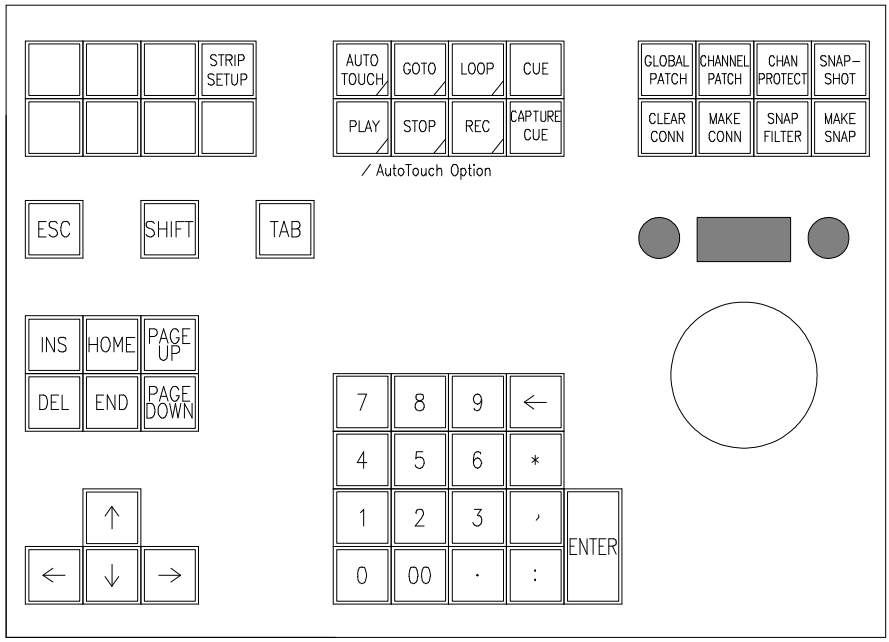
ASSIGN
This key flashes if pressed *once*. Use of the CH SEL keys assigns a channel to the selected joystick. Pressing ASSIGN *twice* de-assigns a joystick and readies it for another assignment. A third press deactivates the joystick assignment mode.

Other keys and indicators:
As soon as a joystick is assigned to a channel, the active panning destinations (L,R,C, etc.) are indicated in the joystick's display. The appropriate output keys (LCR ON, F/B ON and Ls/Rs ON) will illuminate, where these active outputs can be deselected. The channel's dynamic automation, control group, and other information is also displayed. Automation and status control is available using the AUTO MODE and STAT keys. Most panner settings can be controlled from the joystick indicators. These settings can also be controlled from the joystick panel, in parallel with the controls on the channel strip.

2.5.18 Keyboard and Track Ball Units

The track ball unit houses the track ball, Graphic Controller keys, a numeric keypad, and several keys that parallel those found on the PC keyboard. This unit is located within the center section.
Dimensions: 143.6 mm × 190 mm (2U).

Track Ball Panel: The track ball and its associated keys/buttons are used for operating the Graphic Controller, the Configuration Tool, and all other areas of the PC. It includes a series of keys that provide direct access to the most used Graphic Controller screens, as well as a few shortcuts. These keys also provide some of the basic machine control functions found on the Auto Touch page. Several keys that parallel those found on the PC keyboard are provided, as well as a numeric keypad.

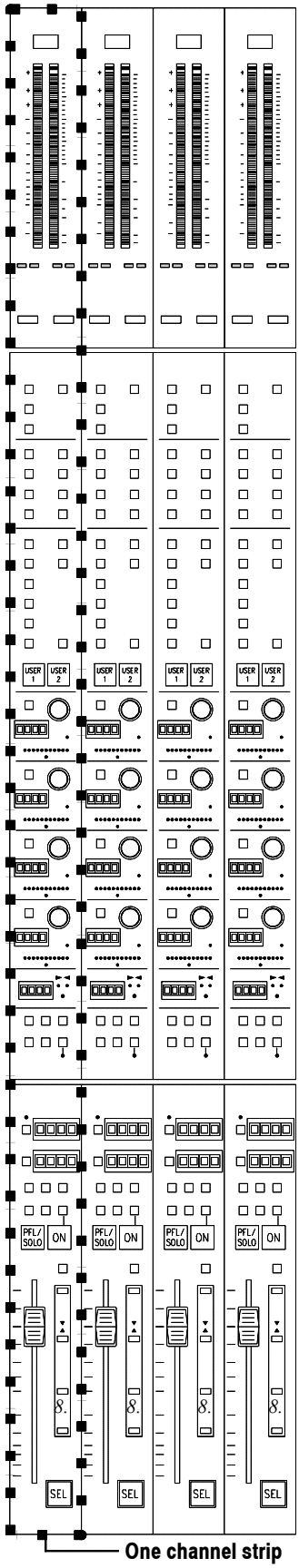


PC Keyboard: A removable, full-function PC keyboard is located in the drawer mounted in the center section armrest. This unit includes an alphanumeric QWERTY keyboard, function keys, arrow keys, and other PC-related functions.

CHAPTER 3

3 DESK OPERATION

3.1 Introduction

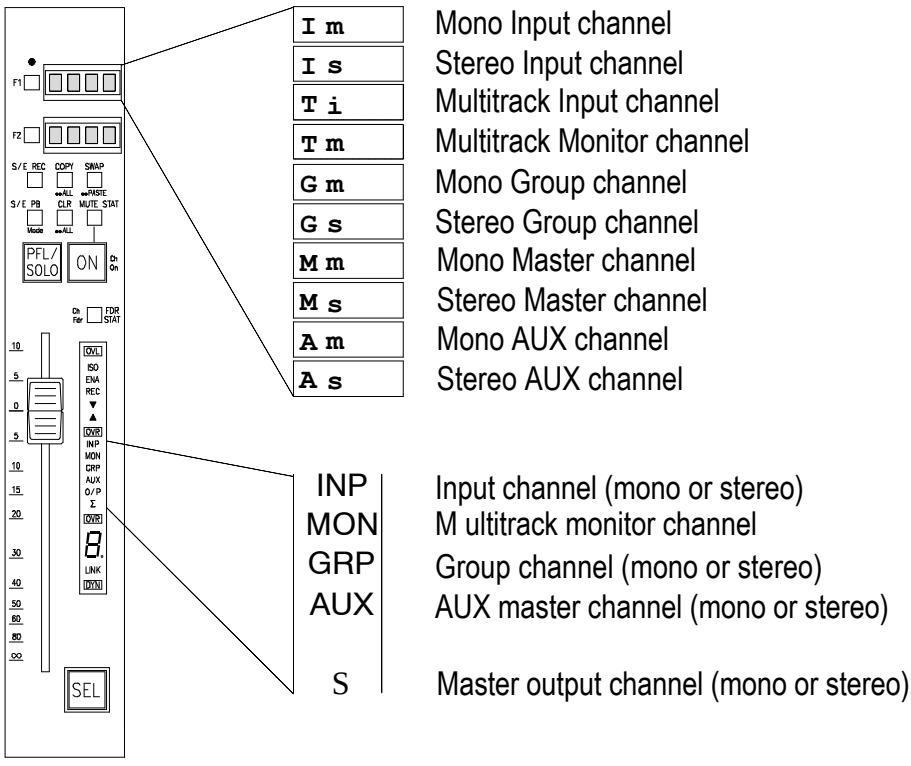


Within the D950 Digital Mixing Console, the following input and output channel configurations are available:

- Mono input channel
- Stereo input channel
- Mono multitrack input channel
- Mono multitrack monitor channel
- Mono group channel
- Stereo group channel
- Mono master channel
- Stereo master channel
- Mono AUX channel
- Stereo AUX channel
- Mono control master channel (for VCA-like control, no audio function).

The operating desk is subdivided into mechanical frames, each of which is subdivided again into four channel strips. These can be regarded as similar to the channel modules of a conventional analog mixing console. All channel strips – inputs and outputs – feature identical controls. The drawing to the *left* shows a complete four-channel strip with meter unit, input/output unit, and fader unit.

Although input and output channels look identical, the function of the channel strip can be easily identified by the fader module's display elements (see *below*).



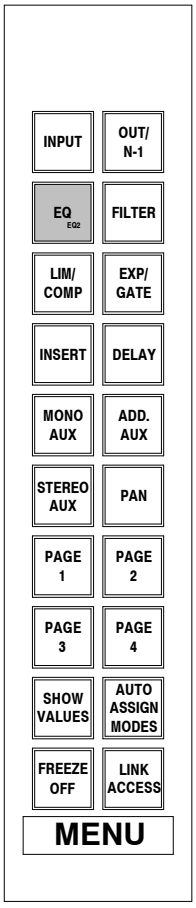
Each of these input/output channel strips features its own particular set of audio processing functions, depending on the assigned DSP channel.

3.1.1 Audio Processing Functions

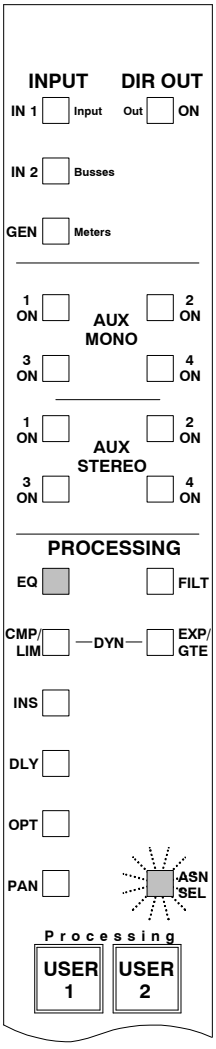
There are two ways to select an audio processing function:
- Globally, on the Master Menu Selector (MMS) unit, or
- Locally, on the upper part of the Input/Output unit.

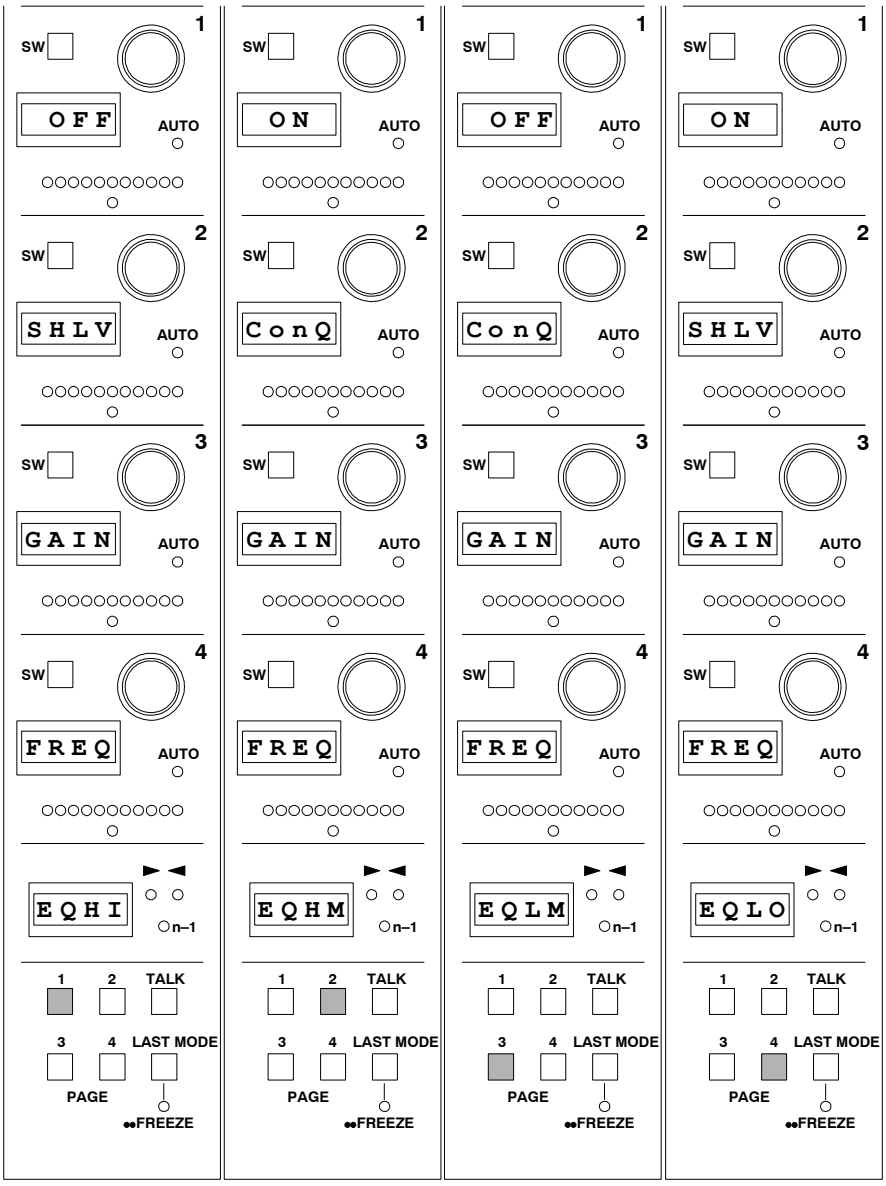
Having selected an audio processing function (for example, EQ) on the Master Menu Selector, the displays of *all* channels supporting this function will indicate the current parameters of this function. Settings can be made with the switches and rotary encoders within the Local Assignable Control Panel (LACP) section of the Input/Output unit. For several functions, as many as sixteen parameters can be adjusted. These functions are indicated on four different Pages with up to four parameters per page. The PAGE 1 through PAGE 4 keys enable an operator to browse through these pages.

Example 1: Select EQ on the Master Menu Selector; the EQ key located on the Master Menu Selector illuminates.



Now all channel strips supporting the EQ function will display the first page of their EQ settings. Browsing through other pages can be performed either with the PAGE 1 through 4 keys located on the Master Menu Selector (simultaneously for *all* channels), or with the PAGE 1 through 4 keys located at the lower end of the LACP (for an *individual* channel).





EQ setting, page 1 | EQ setting, page 2 | EQ setting, page 3 | EQ setting, page 4

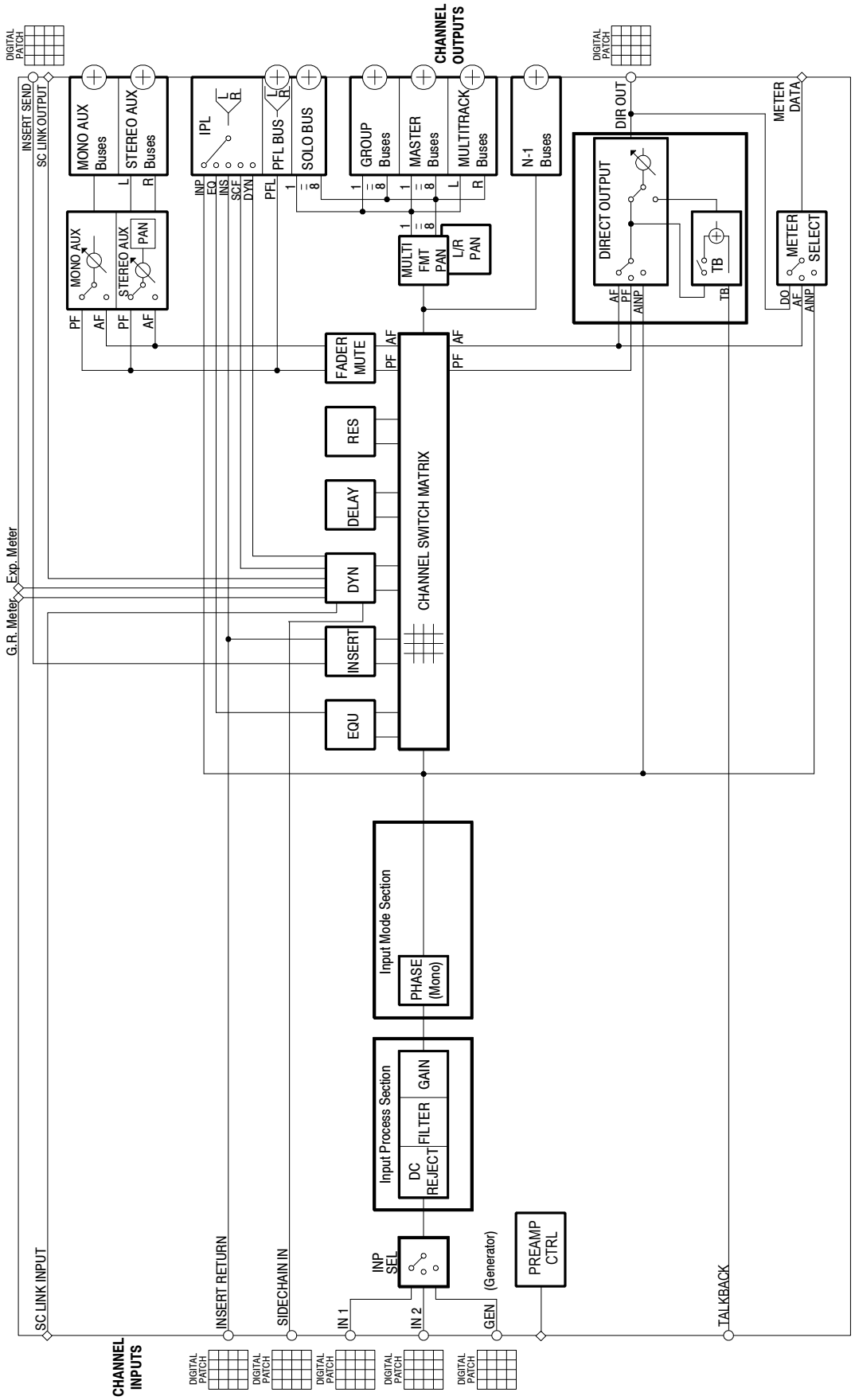
Example 2: Pressing the ASN SEL key, followed by EQ on the upper part of the desired Input/Output unit, causes the displays of the selected channel to indicate their current parameters.
Settings can be made with the switches and rotary encoders in the Local Assignable Control Panel (LACP) section of the Input/Output unit, as in the above example.

Notes: If LINK ACCESS is activated on the Master Menu Selector, the local assignment functions of all strips are linked (refer to chapter 2.5.6).
Channels with FREEZE activated will not change their LACP assignments when global selections are made.

3.2 Channel Audio Block Diagram

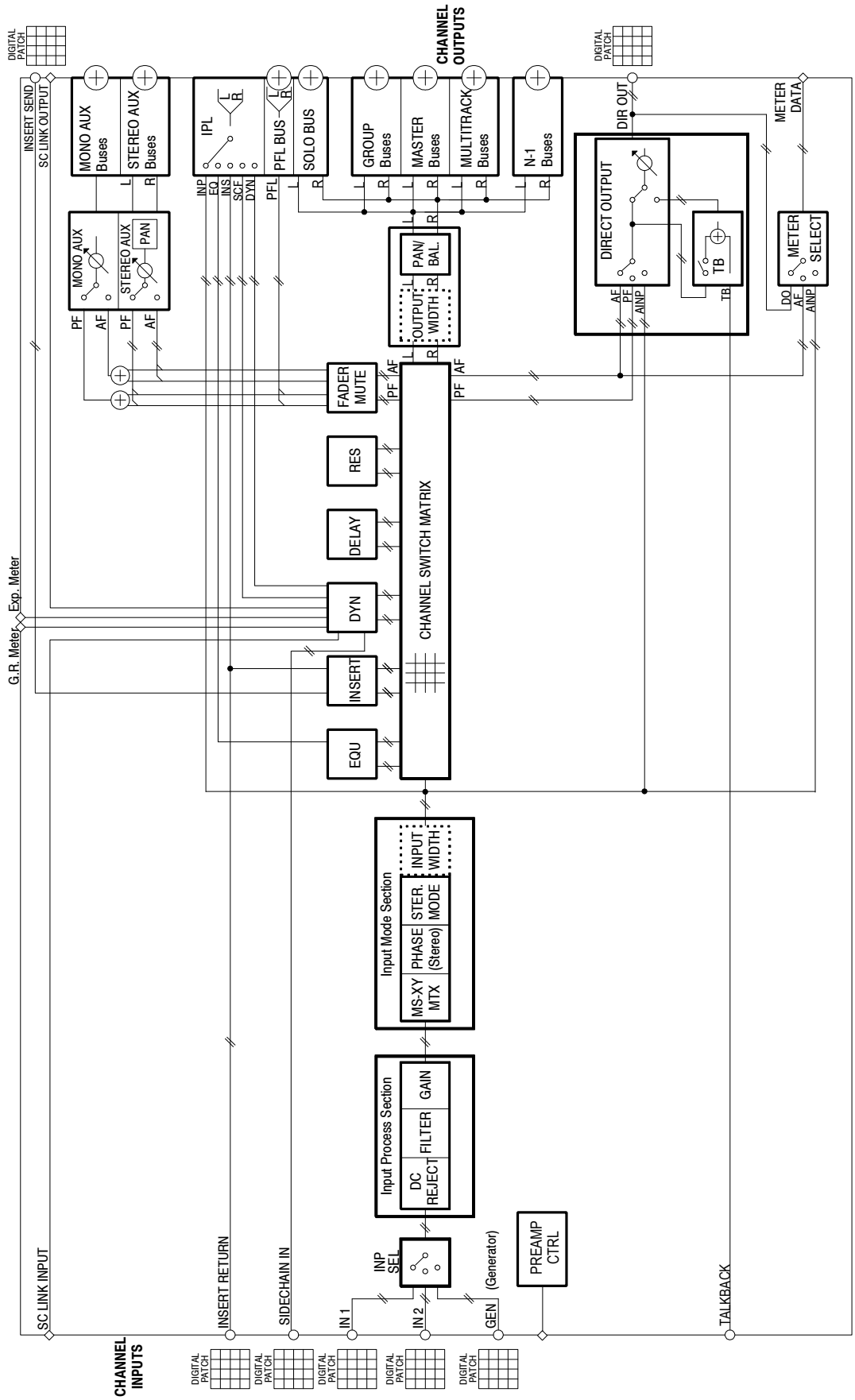
Typical mono input channel:

Please note that, essentially, all channel types have the same structure, regardless of the type (input, AUX, group, master, etc.)



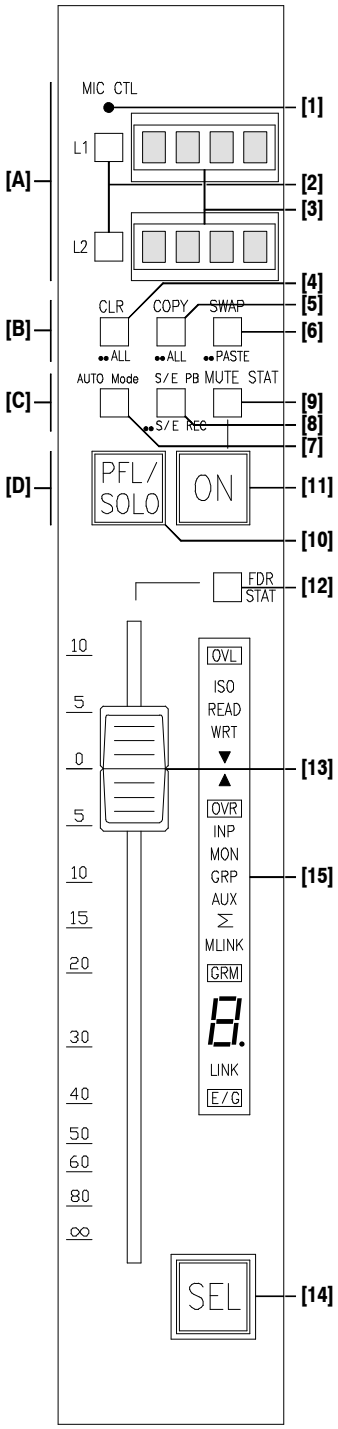
Typical stereo input channel:

Please note that, essentially, all channel types have the same structure, regardless of the type (input, AUX, group, master, etc.)



3.3 The Channel Strip

3.3.1 Fader Unit



The Fader section of a channel strip contains the main channel fader, channel ON/OFF, PFL/SOLO, layer, clipboard, automation, and channel selection controls. In addition, it contains a variety of channel and fader displays.

The Fader Unit consists of the following sections:

[A] Layer control and display section
[B] Clipboard control section
[C] Automation control section
[D] PFL/SOLO and ON/OFF control section
[13] Fader
[14] Channel selection key
[15] Fader display unit.

[1] **MIC CTL** (remote pre-amplifier control indicator)
This LED indicates that a remote controlled microphone/line pre-amplifier is assigned to the channels.

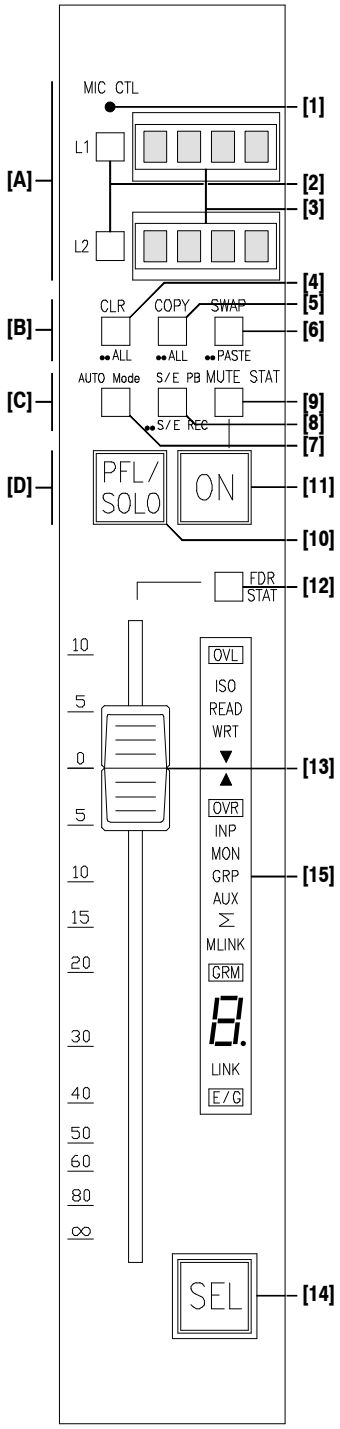
[2] **L1, L2** (layer 1 and 2)
These layer 1 and 2 selection keys determine which of the two layers from the current bank is active on the Channel Strip. The active layer's key is illuminated.

[3] **Four-character alphanumeric displays**
Labels for the two layers currently assigned to the channel strip are shown on these displays. Depending on selections made in the Graphic Controller, Fixed, User, or Inherited labels will be displayed.

[4] **CLR / ••ALL** (clear/clear all)
Pressing this key *once* activates the Parameter Clear Mode. Subsequently pressing any or several of the channel section(s), followed by the CLR / ••ALL key, clears its/their settings. A *double-click* of this key illuminates all channel section keys and allows them to be *deselected*. A subsequent pressing of the CLR / ••ALL key clears the selected channel section parameters, and restores the default values (EQ flat, etc.).
The original positions of the parameters are copied to the clipboard when the clear function is executed and is indicated by the illumination of the COPY / ••ALL key.

[5] **COPY / ••ALL** (copy/copy all)
Pressing this key *once* activates the Parameter Copy Mode. Subsequently pressing any or several of the channel section(s), followed by the COPY / ••ALL key, places its/their settings into the clipboard. A *double-click* on this key illuminates all channel section keys and allows them to be *deselected*. A subsequent pressing of the COPY / ••ALL key copies the selected channel section parameters into the clipboard.

[6] **SWAP / ••PASTE**
A *single* press on this key effects an exchange of the clipboard data with the local channel parameters, effectively allowing comparison of two different settings. A *double-click* on this key replaces or overwrites the current channel parameters with the contents of the clipboard.



[7] AUTO Mode
This key toggles the AutoTouch Dynamic Automation mode between ISO, READ and WRT for the entire channel.

[8] S/E PB / ••S/E REC (switches and encoders playback/record)
A *double-click* of this key engages the Dynamic Automation active RECORD status for the channel's switches and rotary encoders.
A subsequent press returns the switches and encoders back to PLAYBACK status.

[9] MUTE STAT
This key toggles the status of the Mute Automation between RECORD and PLAYBACK, and indicates that the channel ON key is in REC status.

[10] PFL/SOLO
This key engages the PFL or SOLO for the channel. The particular PFL or SOLO mode is determined by a global selection in the center section.

[11] ON
This key provides ON/OFF (mute) control for the currently active channel.

[12] FDR STAT (fader status)
This key allows toggling automation status RECORD and PLAYBACK for the fader *only*, and also indicates that the fader is in REC status.

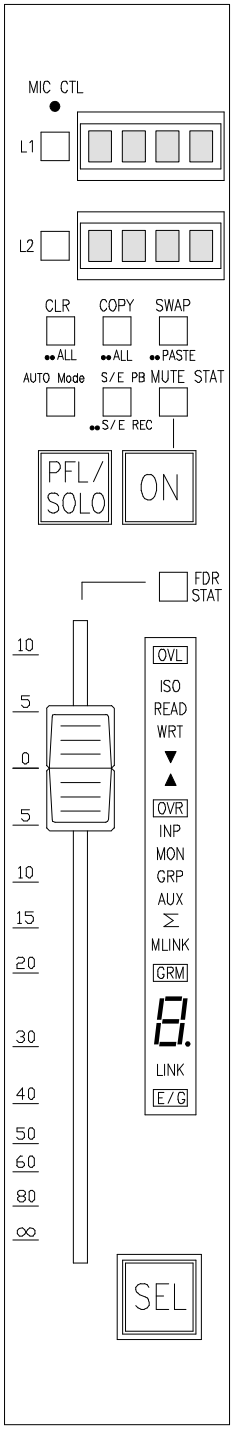
[13] Fader
This 104 mm touch-sensitive, motorized fader serves as the primary level control for the channel's audio path.

[14] SEL
The channel selection (CH SEL) key has two main purposes:
- Access of the central audio and control facilities (CAU, ACU, etc.),
- Softkey for channel parameter control (SOLO SAFE, CH SWAP, etc.).

In addition, this key is used for other functions including control group, strip lock, and joystick assignments and so on.

[15] Fader LED Indicators:
OVL = indicates real-time overloads occurring within the channel.
ISO/READ/WRT = indicates the current Dynamic Automation mode.
▼, ▲ = indicate offset – i.e., greater or less than – between the current fader position and the value stored by the Dynamic Automation.
OVR = indicates an out-of-range condition for the channel fader.
INP, MON, GRP, AUX, S = indicates channel types: input, tape monitor, group, auxiliary, or master.
MLINK = indicates that this particular Channel Strip is a Link Master (control group master).
Digit Display = indicates the Link number (control group number).
LINK = indicates the Channel Strip is a Link member (control group member).
E/G = indicates real-time Expander/Gate activity.

3.3.1.1 Clipboard Functions



The D950 supports a comprehensive set of clipboard copy and paste functions that can be used to compare and move parameter settings between channels. A parameter clear function is also provided. These functions can be applied to one channel section, multiple sections, or an entire channel.

A. Comparing Parameters:

- Press the COPY / ••ALL key once and it will *flash.*
- Press the channel section key whose settings you want to compare (such as EQ).
- Press the COPY / ••ALL key again. The COPY / ••ALL key will illuminate indicating that settings have been stored in the clipboard.
- Now change the EQ settings to the comparison values.
- Pressing the SWAP / ••PASTE key will toggle between the current settings and the clipboard settings. When the clipboard settings are active the SWAP / ••PASTE key will illuminate.
- Using the SWAP / ••PASTE key on other channel strips, the clipboard settings may be compared with those channel's settings as well (assuming the same channel sections are configured on those channels).

Notes: The parameter settings for multiple channel sections can be copied to the clipboard by pressing the desired section keys while the COPY / ••ALL key is illuminated.

The parameter settings for *all* channel sections can be copied to the clipboard by *double clicking* the COPY / ••ALL key. In this mode, all channel section keys will illuminate, and de-selection of undesired sections is possible. A subsequent press of the COPY / ••ALL key will send the selected channel sections settings to the clipboard (all sections will be sent if none are deselected).

B. Pasting Parameters:

Once settings have been copied to the clipboard, they may be permanently pasted to the channel sections.

- *Double click* the SWAP / ••PASTE key.

Note: In order for the PASTE function to work, the channel must be using its original settings *before* double clicking (SWAP / ••PASTE must not be illuminated).

C. Clearing Parameters:

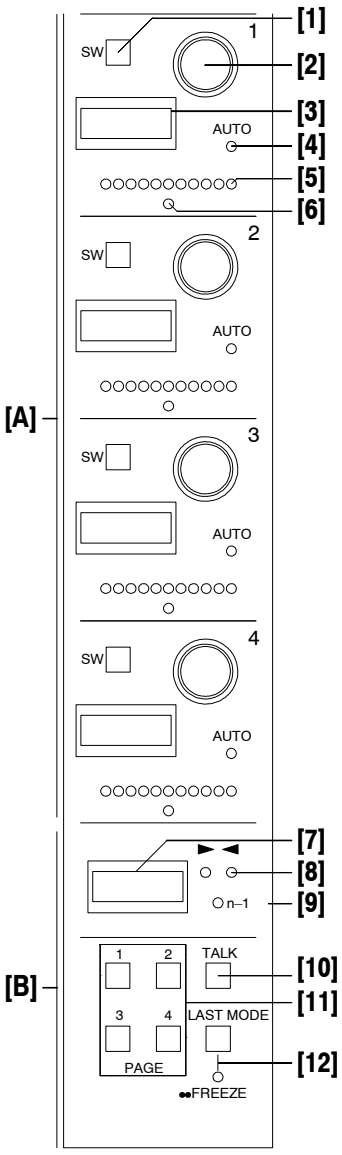
Clearing parameter settings works much the same way as copying to the clipboard.

- Press the CLEAR / ••ALL key once.
- Press the channel section key that whose settings want to clear
- Press the CLEAR / ••ALL key again. The settings will return to their default or nominal positions and the COPY / ••ALL key will illuminate indicating the original settings have been stored in the clipboard.

Notes: The parameter settings for multiple channel sections can be cleared by pressing the desired section keys while the COPY / ••ALL key is lit.

The parameter settings for *all* channel sections can be cleared by *double clicking* the CLEAR / ••ALL key. In this mode, all channel section keys will illuminate, and de-selection of undesired sections is possible. A subsequent press of the CLEAR / ••ALL key will clear the selected channel sections (all sections will be cleared if none are deselected).

3.3.2 The LACP section



The LACP section (Local Assignable Control Panel) of a channel strip is used to set or to adjust the parameters of the available processing functions, such as "EQ", "Filter", "Dynamics", etc.
The LACP consists of four identical Control Sections 1 through 4 [A], and a common area for overall control and display [B].

Note: Because the D950 is fully configurable, the user may have programmed it in such a way that not all functions are available to all channels. The displays will not light up if a function is unavailable on a particular channel. Descriptions in this manual always assume that *all* functions are available.

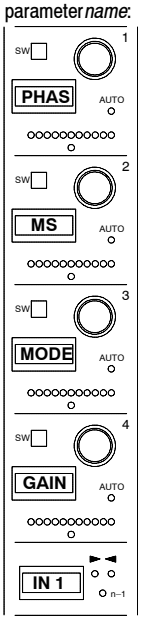
[1] SW
The SW key is used to switch functions ON/OFF (for example, EQ HI on; high- or low-pass filter, etc.), or to change a mode belonging to this section (for example, PHASE, from in-phase to out-of-phase).

[2] Rotary encoder
The rotary encoder is used to adjust parameters, as with INPUT GAIN, or to change a mode, for example, PHASE, from in-phase to out-of-phase.
The rotary encoder is touch sensitive.
If SHOW VALUES on the Master Menu Selector is *not* activated, touching or turning a rotary encoder will change the information in the four-character display from parameter *name* to parameter *value*.

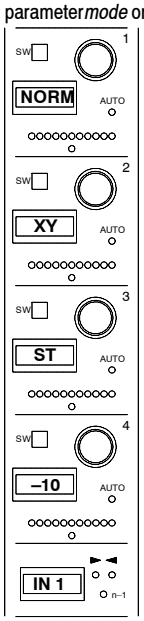
[3] Four-character alphanumeric display
- If SHOW VALUES on the Master Menu Selector (MMS) is not selected, the display indicates the *label* of the available function within the corresponding LACP section (e.g. PHAS = phase, GAIN = input gain, etc.)
- If the corresponding rotary encoder has been touched or turned, the display indicates the *value* (e.g. –40) or a selected mode (e.g. PH 1).
- If SHOW VALUES on the MMS is activated, the values *or* the mode are displayed continuously.

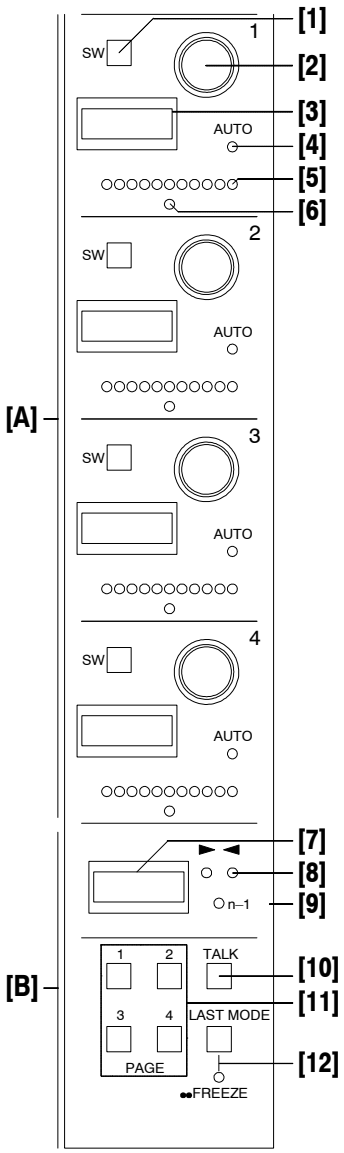
Example: Stereo channel (input control)

Display indicates the parameter *name*:



Display indicates the parameter *mode* or *value*:

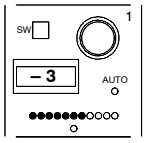




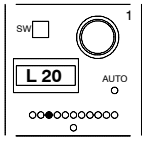
[4] AUTO LED (automation mode indicator)
This two-color LED is used during Dynamic Automation to indicate the automation status of the switch and rotary encoder.

[5] LED bar display
The yellow LED bar display provides a quick overview of the position of adjusted parameters, and is linked with the four-character display.
Depending on the current application, the display is implemented either as a *bar graph* display, or as a *single-dot* display.

Example:
Input gain –3 dB



Example:
Pan; position left of center



[6] Center LED
This red LED is illuminated when a center position (for example, PAN in center, or EQ gain flat), a default or nominal value, or a 0 dB position (for example, Input Gain 0 dB) has been set.

[7] Four-character alphanumeric display
The display indicates an overall label for the currently selected page of the LACP (for example, EQHI or PAN).

[8] ►◄
These two LEDs are used for the Dynamic Automation of rotary encoders. They display the last-touched position of a rotary encoder, with respect to the automation data already recorded. This function allows changes to be made, and then set the rotary encoder back to the recorded mix data.

[9] n–1
The n–1 LED indicates that an n–1/Mix-minus mode has been set for this channel.

[10] TALK
The TALK key activates talkback to the direct output for the channel, or to the n–1/Mix-minus output, depending on the selected mode.

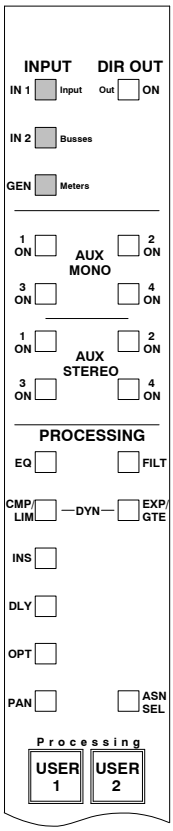
Note: TALK is only active for channels with assignments made for the direct or n–1 outputs.

[11] PAGE 1...4
Audio processing functions such as "EQ" contain more than four parameters. By pressing the appropriate PAGE key, additional parameters are available on the LACP, and then can be adjusted.

[12] LAST MODE / ••FREEZE
Pressing this key *once* causes the LACP to indicate the previously assigned audio processing section.
For example, having adjusted input gain, the user is now adjusting EQ During this latter operation, it may become necessary to re-adjust input gain.
By simply pressing the LAST MODE / ••FREEZE key, the LACP returns to the input control (in this example, it is now possible to toggle between Input and EQ control modes).
A *double click* activates the FREEZE function. Having activated the FREEZE function, the channel's LACP is locked out from global selection

mode on the Master Menu Selector or from being changed by the LINK ACCESS function. Local LACP selection, however, is still available. A subsequent double clicking of the LAST MODE / ••FREEZE key deactivates that channel strip's FREEZE mode. Pressing the FREEZE OFF key on the Master Menu Selector deactivates the FREEZE function on a global basis.

3.3.3 Input Section



Every input/output module features three input selectors:

IN 1: Input 1 (access via internal switching matrix)

IN 2: Input 2 (access via internal switching matrix)

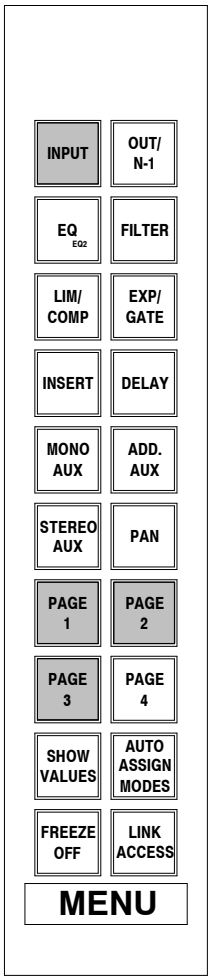
GEN: Generator (default mode) or Input 3 (access via internal switching matrix).

IN 1 / IN 2 If one of these inputs has been selected, the signal source connected to the channel via the internal switching matrix (General Patch) will be routed to the DSP channel.

GEN If this input has been selected, the signal source connected to the channel via the internal switching matrix (labeled as Channel In3 in the General Patch) will be routed to the DSP channel.
By default, the generator signal is connected to this input. *Any other signal can be connected using the internal switching matrix, as is the case for IN 1 and IN 2.*

Notes: IN 1, IN 2, and GEN inputs can also be selected on Master, Group and AUX output channels; however, IN 1 then defaults to the corresponding bus source.
LACP Input parameters are only available for channels that have been configured with the "INPUT HPF/LPF & GAIN" function. However, *all* channels must be configured with Input Selectors. Refer to chapter 7.4.3.1 for details.

3.3.3.1 Assigning the Input Section



A. **Global Assignment** (LACPs on *all* Channel strips are affected):

- Press INPUT on the Master Menu Selector.
  The displays on all channel strips supporting the input parameters will indicate the input control parameters, except those in FREEZE mode, see chapter 3.3.2.
- Press one of the PAGE 1 through 4 keys on the MMS for global selection of the corresponding input parameters for the required input source (PAGE 1 = IN1, PAGE 2 = IN2, PAGE 3 = GEN; PAGE 4 = input control for pre-amplifier).

B. **Local Assignment** on the channel strip:

- Press ASN SEL, and the ASN SEL key will *flash*.
- Press any source selector key (IN1, IN2, or GEN).

ASN SEL + IN1: The INPUT 1 parameters will be displayed on the LACP (= PAGE 1)
ASN SEL + IN2: The INPUT 2 parameters will be displayed on the LACP (= PAGE 2)
ASN SEL + GEN: The GEN input parameters will be displayed on the LACP (= PAGE 3).

C. **Local Assignment** affecting *all* channel strips:

- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips except for those in FREEZE mode. The same functions as described in "B" are available.

D. **Local Assignment** with Auto Assign Modes "In-Only":

- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing a channel INPUT key on the channel strip will assign the INPUT parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

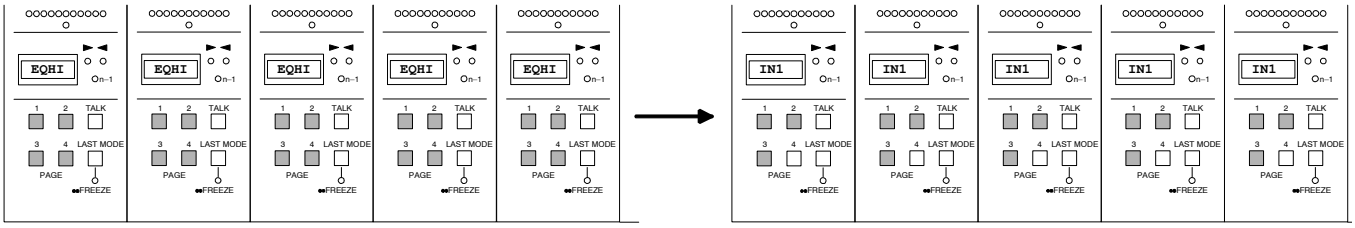
E. **Local Assignment** with Auto Assign Modes "In and Out":

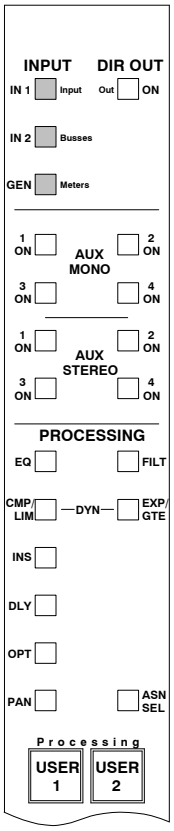
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time a channel INPUT key on the channel strip is pressed (regardless of what status it toggles to), the INPUT parameters are assigned to the knobs on the LACP).

Note: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.

Example 1: Global Assignment

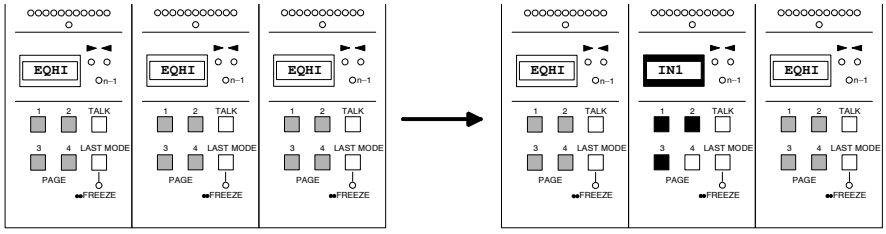
- Press INPUT on the MMS.
  On the LACP of the appropriate channel strips, corresponding input parameters are displayed.
- Press PAGE 1 (IN1), PAGE 2 (IN2), or PAGE 3 (GEN) to get access to the appropriate input controls for the input source to be adjusted. PAGE 4 will provide access to the controls for remote microphone/line pre-amplifiers (if assigned).





Example 2: Local Assignment

- Press ASN SEL on the channel strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates a Select Assignment mode. In this case, pressing input source IN2, for example, will not change the audio signal assigned to the DSP channel. However, the controls for IN2 will be assigned to the LACP.
- Press either IN1, IN2, or GEN to display the desired input control on the LACP.
- Press the corresponding PAGE key locally on the channel strip to control the required input source.



3.3.3.2 Input Parameters

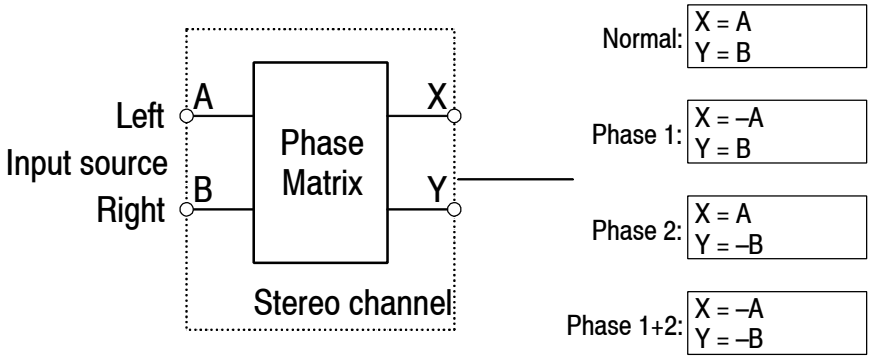
For input sources IN 1, IN 2, and GEN, an input control section is available. The number of functions available on Input/Output channels, as well as on Mono or Stereo channels, depends on the active configuration.

For IN/OUT channels, the following parameters are available:

	MONO INPUT			STEREO INPUT			MONO GROUP			STEREO GROUP			MONO/STEREO MASTER			MONO/STEREO AUX		
Page	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Parameters	IN1	IN2	GEN	IN1	IN2	GEN	IN1	IN2	GEN	IN1	IN2	GEN	IN1	IN2	GEN	IN1	IN2	GEN
PHASE	X	X	X	X	X	X	X	X	X	X	X	X	–	–	–	–	–	–
XY/MS-MODE	–	–	–	X	X	–	–	–	–	X	X	–	–	–	–	–	–	–
INPUT MODE	–	–	–	X	X	–	–	–	–	X	X	–	–	–	–	–	–	–
INPUT GAIN	X	X	X	X	X	X	X	X	X	X	X	X	–	–	–	–	–	–
DC REJECT	X	X	X	X	X	X	X	X	X	X	X	X	–	–	–	–	–	–

PHASE: *On MONO channels,* two positions are provided:
- NORM, in phase (default setting).
- REV, out-of-phase.

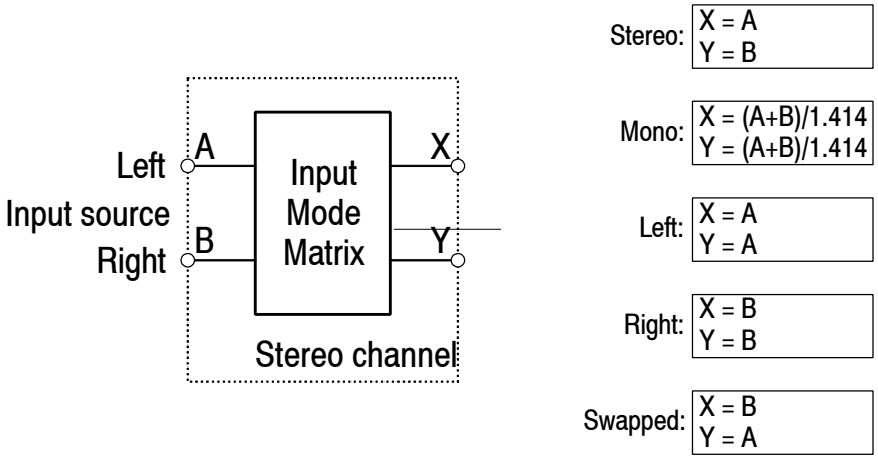
On STEREO channels, four different positions are provided:
- NORM, in phase (default setting).
- PH 1, left channel or input A out-of-phase.
- PH 2, right channel or input B out-of-phase.
- PH12, left and right channels or inputs A and B out-of-phase.



XY/MS MODE: *On STEREO channels only.*
- XY, (default setting), for coincident XY stereo microphone setups.
- MS, (Mid/Side information), used for decoding MS information from appropriate coincident stereo-microphone arrays.

INPUT MODE: *On STEREO channels only*; five different modes can be selected.

- ST (default setting), stereo.
- REV, left and right signals are swapped.
- L__L, left signal only is routed to both left and right outputs.
- R__R, right signal only is routed to both left and right outputs.
- MONO, left and right signal mixed together (–3 dB) and routed to both left and right outputs.



INPUT GAIN: This function is available on Mono and Stereo channels.
The input gain can be adjusted from –24 dB (attenuation by 24 dB) to +24 dB. Resolution is in 1 dB steps. Default value: 0 dB.
In a Stereo channel, left and right input gains are treated simultaneously, since there is not a separate input gain setting for left/right input.
Illuminating the SW key activates the DC Rejection mode.

D19 MicAD control parameters: On Page 4 of all input and output units, various functions of the D19 MicAD units can be remote controlled (refer to chapter 4.4.2.2 for details of how to activate/deactivate pre-amp remote control).

LINE Selects the line-level input (mutually releasing the MIC-level input), with gain setting in 30 steps of 1 dB, within a –9 through +20 dB range (dependent upon the console's current headroom and nominal level settings).

MIC Selects the microphone-level input (mutually releasing with the LINE-level input), with gain setting in 70 steps of 1 dB, within a –5 through +64 dB range (dependent upon the console's current headroom and nominal level settings).

HPF An analog high-pass filter for the microphone-level input, with a fixed cutoff frequency of 75 Hz and a slope of 12 dB/octave is available. The SW key activates this filter.

48 V Selects Phantom Power ON/OFF for the microphone pre-amplifier.

D19m-MP4RC control parameters: On Page 4 of all input and output units, various functions of the D19m-MP4RC quad mic/line input cards can be remote controlled (refer to chapter 4.4.2.2 for details of how to activate/deactivate pre-amp remote control).

LINE Selects the line-level input (mutually releasing the MIC-level input), with gain setting in 35 steps of 1 dB, within a –9 through +25 dB range (dependent upon the console's current headroom and nominal level settings).

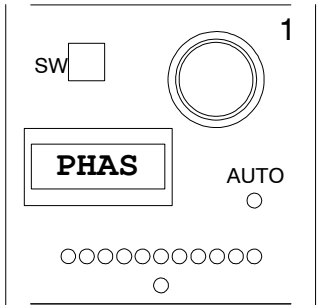
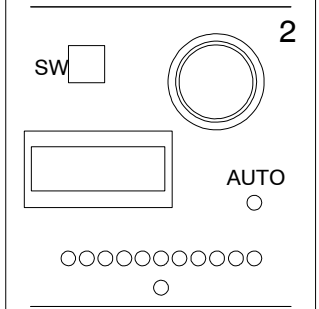
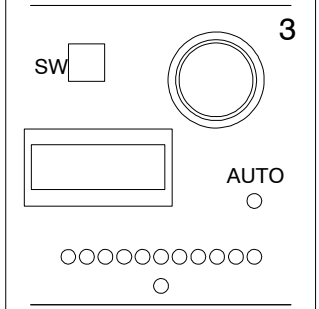
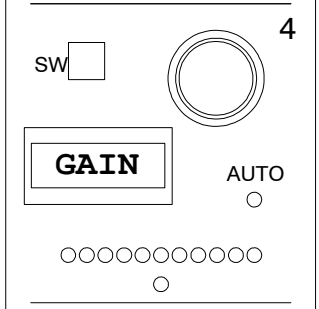
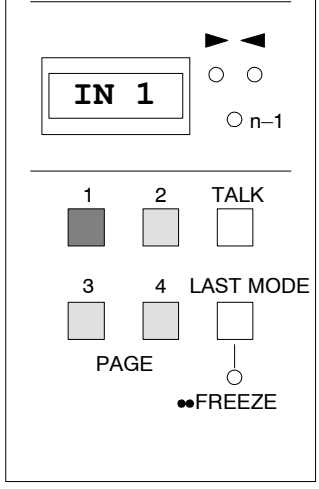
MIC Selects the microphone-level input (mutually releasing with the LINE-level input), with gain setting in 60 steps of 1 dB, within a +15 through +75 dB range (dependent upon the console's current headroom and nominal level settings).

HPF An analog high-pass filter for the microphone-level input, with a fixed cutoff frequency of 75 Hz and a slope of 12 dB/octave is available. The SW key activates this filter.

48 V Selects Phantom Power ON/OFF for the microphone pre-amplifier.

3.3.3.3 Input Parameters on the LACP

Example: Mono channel

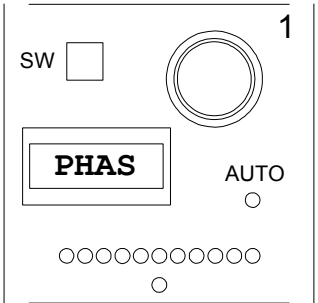
Mono input control parameters		Available operating elements and their function
PHASE		**SW key** = select phase NORM, REV **Rotary encoder** = select phase NORM, REV **LED bar** = no function **Center LED** = no function **Display** = PHAS; label of control parameter NORM; in phase REV; out of phase
not used		not used
not used		not used
INPUT GAIN and DC REJECT		**SW key** = DC reject ON/OFF (SW key is illuminated when DC reject is ON) **Rotary encoder** = Input gain setting **LED bar** = Bar display, indicates input gain **Center LED** = On at input gain = 0 dB **Display** = GAIN; label of control parameter – 20; indicates set gain value
		**Display** = Indication of selected input IN_1; input 1 (page 1) IN_2; input 2 (page 2) GEN; test generator (page 3) MICP; preamp control (page 4)

Example: Stereo channel

Stereo input control parameters

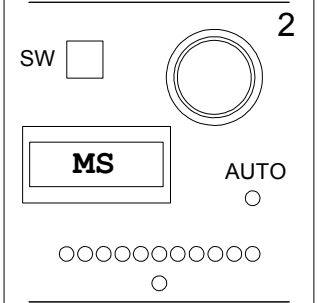
Available operating elements and their function

PHASE



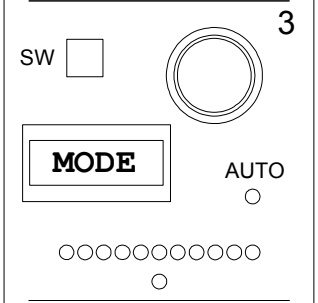
SW key	=	select phase NORM, PH_1, PH_2, PH12
Rotary encoder	=	select phase NORM, PH_1, PH_2, PH12
LED bar	=	no function
Center LED	=	no function
Display	=	PHAS; label of control parameter NORM; in phase PH_1; CH1 (left) out of phase PH_2; CH2 (right) out of phase PH12; both channels out of phase

XY/MS



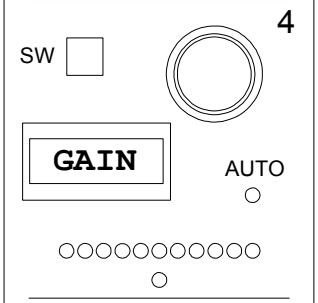
SW key	=	select mode XY, MS
Rotary encoder	=	no function
LED bar	=	no function
Center LED	=	no function
Display	=	XY; XY mode MS; MS mode

INPUT MODE

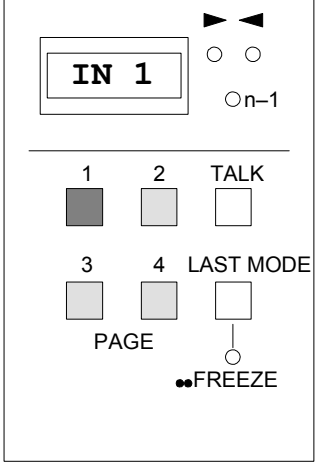


SW key	=	select input mode ST, REV, L__L, R__R, MONO
Rotary encoder	=	select input mode ST, REV, L__L, R__R, MONO
LED bar	=	●○○○○○○○○○○ ST ○○●○○○○○○○○ REV ○○○○●○○○○○○ L__L ○○○○○○●○○○○ R__R ○○○○○○○○●○○ MONO
Center LED	=	no function
Display	=	MODE; label of control parameter ST; stereo (default setting) REV; left and right signals swapped MONO; mono L__L; left signal to left and right channel R__R; right signal to left and right channel

INPUT GAIN and DC REJECT

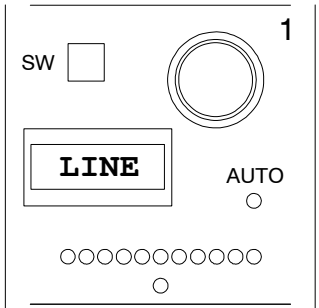
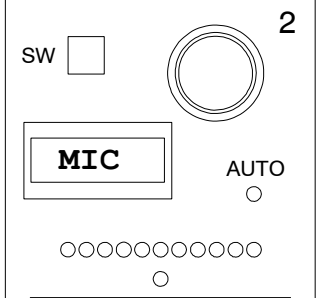
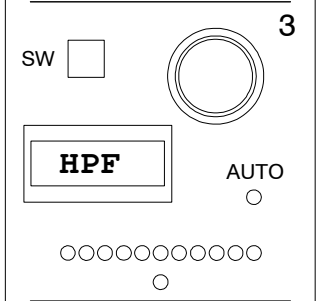
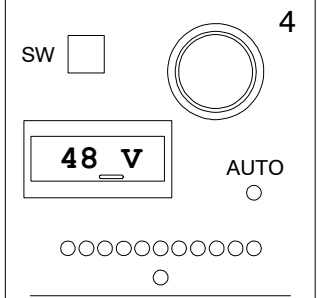
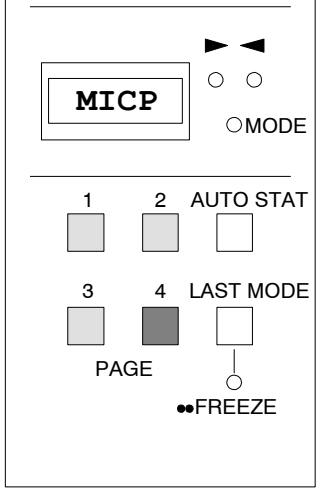


SW key	=	DC reject ON/OFF (SW key is illuminated when DC reject is ON)
Rotary encoder	=	Input gain setting
LED bar	=	Bar display, indicates input gain
Center LED	=	On at input gain = 0 dB
Display	=	GAIN; label of control parameter – 20; indicates set input gain value

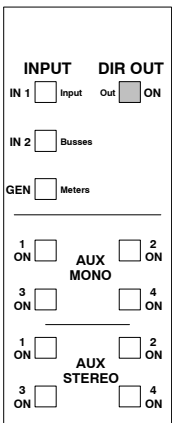


Display	=	Indication of selected input IN_1; input 1 (page 1) IN_2; input 2 (page 2) GEN; test generator (page 3) MICP; preamp control (page 4)

Example: Pre-amplifier parameters (appear only if pre-amps are available and assigned to a channel input)

Preamp control parameters		Available operating elements and their function
LINE INPUT		**SW key** = Input selector LINE,mutually releasing with MIC **Rotary encoder** = Input gain (for details refer to section "Preamplifier control parameters" above) **LED bar** = Bar display, indicates input gain **Center LED** = On at input gain 0 dB **Display** = LINE; label of control parameter –9; indicates set input gain
MIC INPUT		**SW key** = Input selector MIC, mutually releasing with LINE **Rotary encoder** = Input gain(for details refer to section "Preamplifier control parameters" above) **LED bar** = Bar display, indicates input gain **Center LED** = On at input gain 0 dB **Display** = LINE; label of control parameter –5; indicates set input gain
HIGH-PASS FILTER (MIC input only)		**SW key** = High-pass filter ON/OFF; key is illuminated if ON **Rotary encoder** = no function **LED bar** = no function **Center LED** = no function **Display** = LPF; label of control parameter
PHANTOM POWER		**SW key** = Phantom power ON/OFF; key is illuminated if ON **Rotary encoder** = no function **LED bar** = no function **Center LED** = no function **Display** = 48_V; label of control parameter
		**Display** = Indication of selected input IN_1; input 1 (Page 1) IN_2; input 2 (Page 2) GEN; test generator (Page 3) MICP; preamp control (Page 4)

3.3.4 Direct Output/N–1 Section



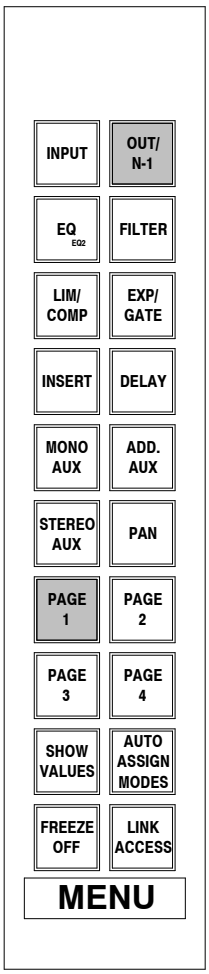
DIR OUT Using the DIR OUT key, the channel's Direct Output can be switched ON/OFF. The following parameter is available for the Direct Output:

- Direct Output level

Notes: The Direct Output is available for all channels for which it has been configured.
The Direct Output cannot be defeated on MASTER or AUX channels.
The Direct Output can be fed from the following channel locations (refer to chapter 4.4.3.5):

- After the channel input
- Pre-fader
- After-fader.

3.3.4.1 Assigning the Output Section



A. Global Assignment:

- Press OUT/N–1 on the Master Menu Selector.
  Displays of all Channel strips will switch over and indicate output control parameters, except those in FREEZE mode; see chapter 3.3.2.
- PAGE 1 is the only page available.

B. Local Assignment on the channel strip:

- Press ASN SEL; the ASN SEL key will *flash*.
- Press the DIR OUT key. The DIR OUT parameters will be displayed on the LACP (= PAGE 1 only).

C. Local Assignment affecting *all* channel strips:

- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in "B" are available.

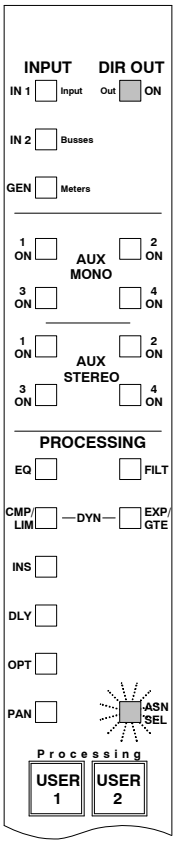
D. Local Assignment with Auto Assign Modes "In-Only":

- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the DIR OUT key on the channel strip will assign the DIR OUT parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. Local Assignment with Auto Assign Modes "In and Out":

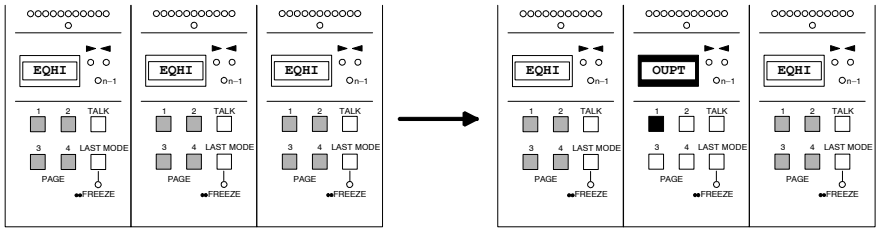
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the DIR OUT key on the channel strip is pressed (regardless of what status it toggles to), the DIR OUT parameters are assigned to the knobs on the LACP).

Note: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local assignment and adjustment

- Press ASN SEL on the channel strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates a select assignment mode.
- Press DIR OUT on the channel strip to control the Direct Output's parameter.
- Pressing the SW key will toggle the Direct Output on and off.
- The rotary encoder will control the Direct Output level between –∞ dB and +10 dB.



3.3.4.2 Direct Output Parameters

The Output Section enables the user to control the level of the Direct Output.

DIR OUT: Direct output ON/OFF.

LEVEL: Direct Output send level, MUTE (i.e. –∞ dB) to +10 dB. Gain range:
- –90 through –80 dB, in steps of 2 dB;
- –80 dB through –20 dB, in steps of 1 dB;
- –20 dB through –10 dB, in steps of 0.5 dB;
- –10 dB through +10 dB, in steps of 0.1 dB.

Note: 0.5 dB are denoted by a decimal point that is not followed by another number.
0.1 dB increments are always followed by the $1/10^{th}$-dB value.
For example, –19.5 dB is displayed as "**–19.**", and –9.4 is displayed as "**–9.4**".

3.3.4.3 N–1 Output Parameters

The N–1 Section enables the user to control the level of the N–1 Output, provided that an N–1 output has been configured for this channel.

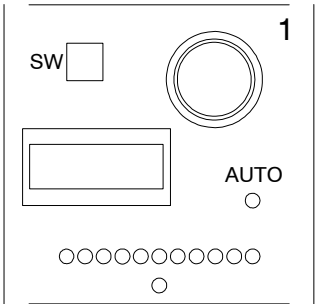
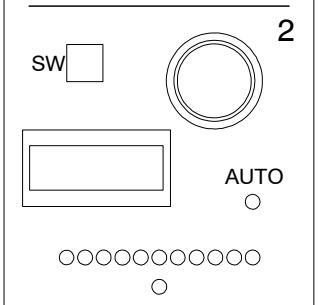
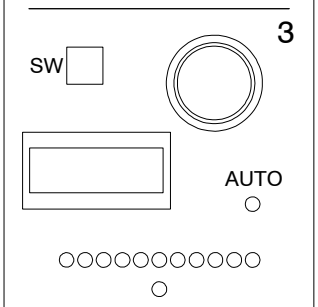
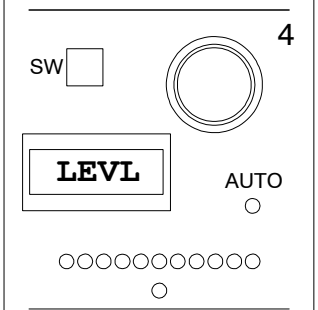
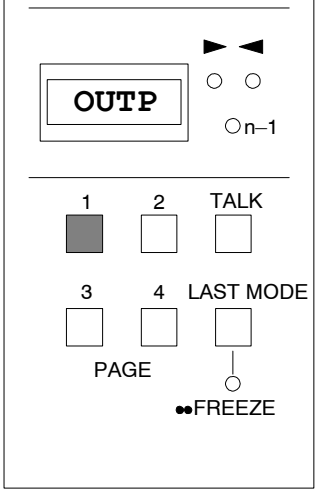
N–1 OUT: N–1 output ON/OFF.

LEVEL: N–1 Output send level, MUTE (i.e. –∞ dB) to +10 dB. Gain range:
- –90 through –80 dB, in steps of 2 dB;
- –80 dB through –20 dB, in steps of 1 dB;
- –20 dB through –10 dB, in steps of 0.5 dB;
- –10 dB through +10 dB, in steps of 0.1 dB.

Note: 0.5 dB are denoted by a decimal point that is not followed by another number.
0.1 dB increments are always followed by the $1/10^{th}$-dB value.
For example, –19.5 dB is displayed as "**–19.**", and –9.4 is displayed as "**–9.4**".

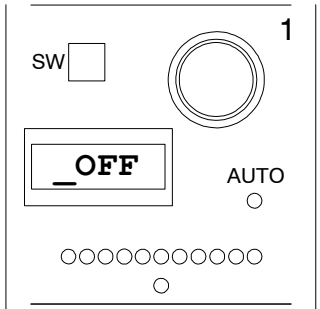
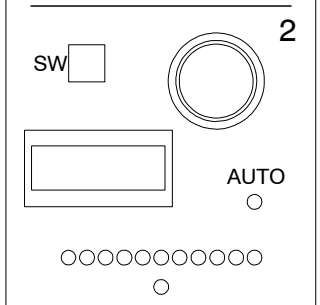
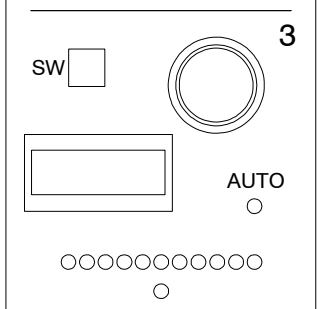
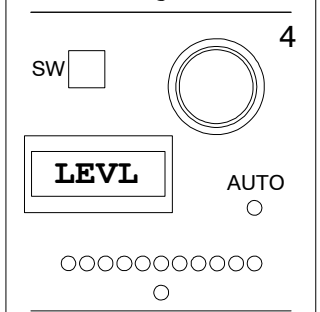
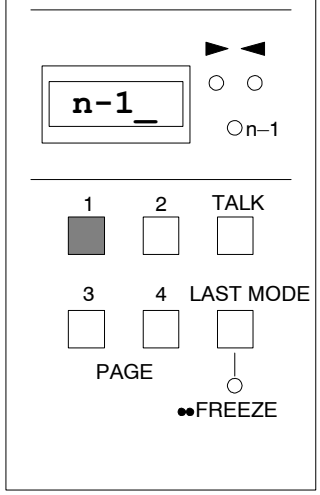
3.3.4.4 Direct Output Parameters on the LACP

Example:

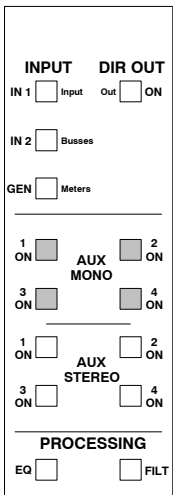
Direct output control parameters		Available operating elements and their function
not used		not used
not used		not used
SIGNAL TAP POINT (not in V1.0)		not used
LEVEL		**STAT key** = Dir Out ON/OFF **Rotary encoder** = Dir Out level **LED bar** = Bar display, indicates current level **Center LED** = ON if level is set to0 dB **Display** = LEVL; label of control parameter; –20; indication of current level; MUTE; indication of current level
		**Display** = Indication of selected parameter (Pages 2 to 4 not used)

3.3.4.5 N–1 Output Parameters on the LACP

Example:

n–1 output control parameters		Available operating elements and their function
n–1 OUT ON/OFF		**STAT key** = n–1 ON/OFF **Rotary encoder** = no function **LED bar** = no function **Center LED** = no function **Display** = OFF: n–1 output off ON: n–1 output on
not used		not used
not used		not used
LEVEL		**STAT key** = no function **Rotary encoder** = n–1 Out level **LED bar** = Bar display, indicates current level **Center LED** = ON if level is set to0 dB **Display** = LEVL; label of control parameter; –20; indication of current level
		**Display** = Indication of selected parameter (Pages 2 to 4 not used)

3.3.5 Mono AUX Section

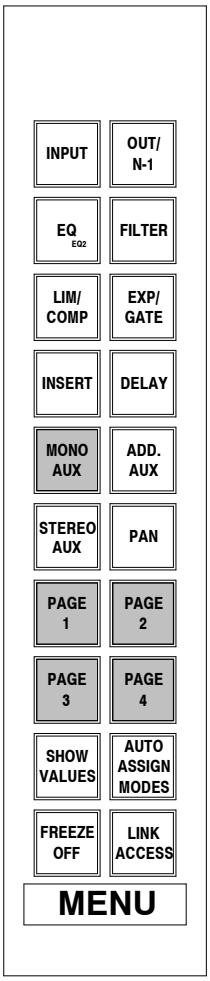


On the channel strip, the channel signal can be routed to the mono AUX busses 1 through 4 without having to access the LACP controls. In other words, a dedicated set of ON/OFF controls for the mono AUX sends 1 through 4 are provided at the top of the channel strip. This routing can also be accomplished using the Central Assign Unit.
Routing to the mono AUX busses 5 and above can only be performed via the Central Assign Unit (CAU) or via the LACP page keys.
Mono AUX bus assignment is possible only on mono/stereo input channels, multitrack input/monitor channels, and group channels.
The available parameters for mono AUX are the following:

- Send level for all configured mono AUX channels (AUX 1 to max.)
- Pre-/after-fader position for all configured mono AUX channels

Note: The maximum number of mono AUX channels available via the channel strip PAGE selectors is 16.

3.3.5.1 Assigning the Mono AUX Section



A. Global Assignment:

- Press MONO AUX on the Master Menu Selector.
  The displays of *all* Channel Strips will switch over and indicate the mono AUX control parameters, except those in FREEZE mode; see chapter 3.3.2.
- Press one of the PAGE 1 through 4 keys on the MMS (PAGE 1 for mono AUX 1 through AUX 4; PAGE 2 for mono AUX 5 through AUX 8; and so on).

B. Local Assignment on the Channel Strip:

- Press ASN SEL; the ASN SEL key will *flash*.
- Press any AUX MONO selector key (AUX MONO 1 ON through AUX MONO 4 ON).
  ASN SEL + AUX MONO 1 ON (*or* AUX MONO 2, 3, or 4 ON):
  The AUX 1 through AUX 4 parameters will be displayed on the LACP PAGE 1.
- Press PAGE 2 on the LACP or MMS, and the AUX 5 through AUX 8 parameters will be displayed. PAGE 3 will display AUXs 9 through 12, and PAGE 4 will display AUXs 13 through 16.

C. Local Assignment affecting *all* Channel Strips:

- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in “B” are available.

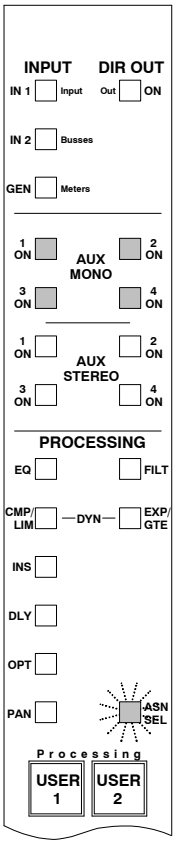
D. Local Assignment with Auto Assign Modes "In-Only":

- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing one of the AUX MONO keys on the channel strip will assign the MONO AUX parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. Local Assignment with Auto Assign Modes "In and Out":

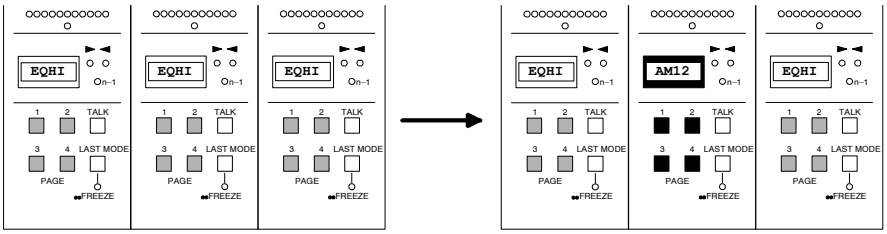
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time one of the AUX MONO keys on the channel strip is pressed (regardless of what status it toggles to), the MONO AUX parameters are assigned to the knobs on the LACP).

Note: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment

- Press ASN SEL on the Channel Strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assignment Mode.
- Press AUX MONO 1 through 4 ON on the Channel Strip to control the mono AUX parameters.



3.3.5.2 Mono AUX Parameters

The Mono AUX Section provides selection of the AUX bus (ON/OFF), send level adjustment, and pre-/after-fader switching.

SEND LEVEL: The Send Levels for Mono AUX 1 through the maximum number configured can be adjusted using this rotary encoder.
Adjustment range MUTE (i.e. –∞) through +10 dB:

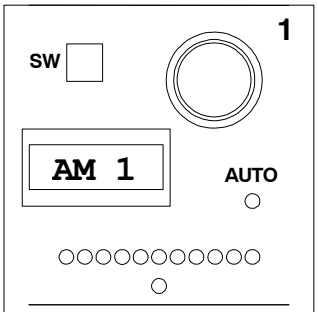
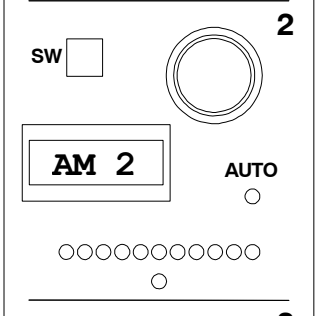
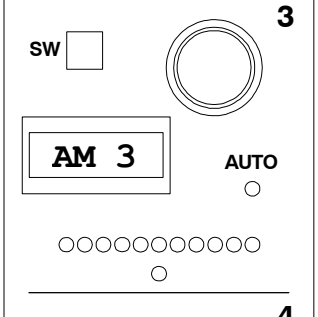
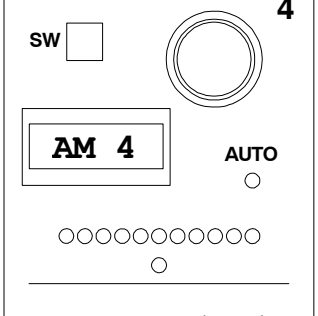
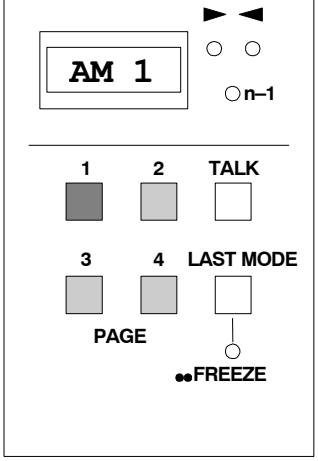
- MUTE through –20 dB, in 1 dB steps,
- –20 through –10 dB, in 0.5 dB steps
- –10 through +10 dB, in 0.1 dB steps.

Note: 0.5 dB increments are denoted by a decimal point that is not followed by another number.
0.1 dB increments are always followed by the 1/10th-dB value.
For example, –19.5 dB is displayed as "**–19.**", and –9.4 is displayed as "**–9.4**".

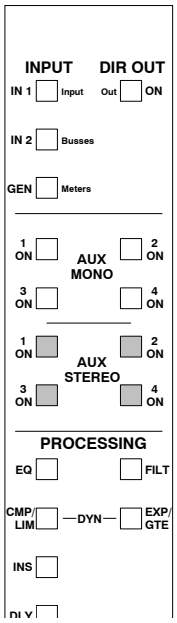
AUX POSITION: The signal sent to the Mono AUX bus can be selected Pre- or After-fader using the SW key. Pre-fader is indicated by an illuminated SW key.

3.3.5.3 Mono AUX Parameters on the LACP

Example:

Mono AUX control parameter		Available operating elements and their function
AUX 1 / 5 / 9 / 13 SEND LEVEL		**SW key** = Pre-/post fader switchover **Rotary encoder** = Mono AUX send level **LED bar** = Bar display, indicates AUX send level **Center LED** = On at 0 dB **Display** = AM 1/AM 5/AM 9/AM13; label of control parameter – 20, indicates AUX send level (MUTE to +10 dB)
AUX 2 / 6 / 10 / 14 SEND LEVEL		**SW key** = Pre-/post fader switchover **Rotary encoder** = Mono AUX send level **LED bar** = Bar display, indicates AUX send level **Center LED** = On at 0 dB **Display** = AM 2/AM 6/AM10/AM14; label of control parameter – 20, indicates AUX send level (MUTE to +10 dB)
AUX 3 / 7 / 11 / 15 SEND LEVEL		**SW key** = Pre-/post fader switchover **Rotary encoder** = Mono AUX send level **LED bar** = Bar display, indicates AUX send level **Center LED** = On at 0 dB **Display** = AM 3/AM 7/AM11/AM15; label of control parameter – 20, indicates AUX send level (MUTE to +10 dB)
AUX 4 / 8 / 12 / 16 SEND LEVEL		**SW key** = Pre-/post fader switchover **Rotary encoder** = Mono AUX send level **LED bar** = Bar display, indicates AUX send level **Center LED** = On at 0 dB **Display** = AM 4/AM 8/AM12/AM16; label of control parameter – 20, indicates AUX send level (MUTE to +10 dB)
		**Display** = Indication of mono AUX bus selection AM 1; mono AUX bus 1/2/3/4 (page 1) AM 2; mono AUX bus 5/6/7/8 (page 2) AM 3; mono AUX bus 9/10/11/12 (page 3) AM 4; mono AUX bus 13/14/15/16 (page 4)

3.3.6 Stereo AUX Section



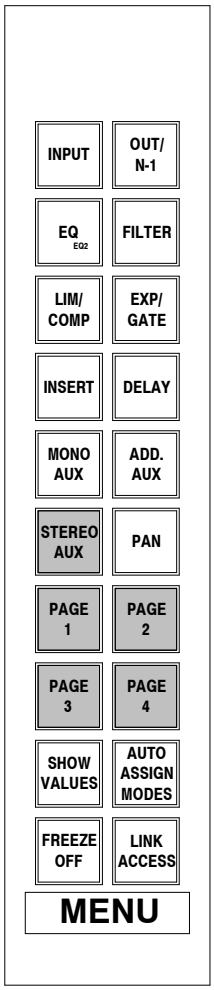
On the channel strip, the channel signal can be routed to the stereo AUX busses 1 through 4 without having to access the LACP controls. In other words, a dedicated set of ON/OFF controls for the stereo AUX sends 1 through 4 are provided at the top of the channel strip. This can also be done on the Central Assign Unit (CAU).
Routing to the stereo AUX busses 5 and above can only be performed via the Central Assign Unit (CAU) or via the LACP page keys.
Stereo AUX bus assignment is possible only on mono/stereo input, multi-track input/monitor channels, and group channels.

The available parameters for stereo AUX are the following:

- Send level for all configured stereo AUX channels (AUX 1 to max.)
- Pre-/after-fader position for all configured stereo AUX channels
- Stereo balance (L/R panning)

Note: The maximum number of stereo AUX channels available via the channel strip page selectors is 8.

3.3.6.1 Assigning the Stereo AUX Section



A. Global Assignment:

- Press STEREO AUX on the Master Menu Selector.
  The displays of *all* Channel Strips will switch over and indicate the Stereo AUX control parameters, except those in FREEZE mode; see chapter 3.3.2.
- Press one of the PAGE 1 through 4 keys on the MMS (PAGE 1 for Stereo AUX 1 and 2; PAGE 2 for Stereo AUX 3 and 4, and so on).

B. Local Assignment on the channel strip:

- Press ASN SEL; the ASN SEL key will flash.
- Press any AUX STEREO selector key (AUX STEREO 1 through AUX STEREO 4 ON).

ASN SEL + AUX STEREO 1 or ASN SEL + AUX STEREO 2 ON:
The Stereo AUX 1 and 2 parameters will be displayed on LACP PAGE 1.
ASN SEL + AUX STEREO 3 or ASN SEL + AUX STEREO 4 ON:
The stereo AUX 3 and 4 parameters will be displayed on LACP PAGE 2.

C. Local Assignment affecting *all* Channel Strips:

- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local AUX STEREO key will now affect all Channel Strips. The same functions as described in “B” are available.

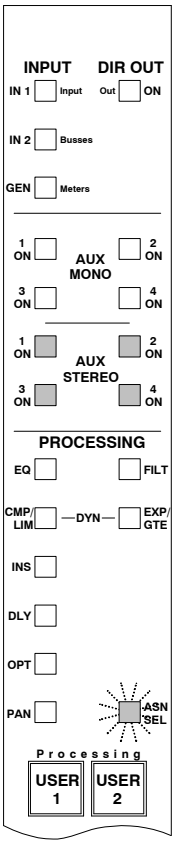
D. Local Assignment with Auto Assign Modes "In-Only":

- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing one of the AUX STEREO keys on the channel strip will assign the STEREO AUX parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. Local Assignment with Auto Assign Modes "In and Out":

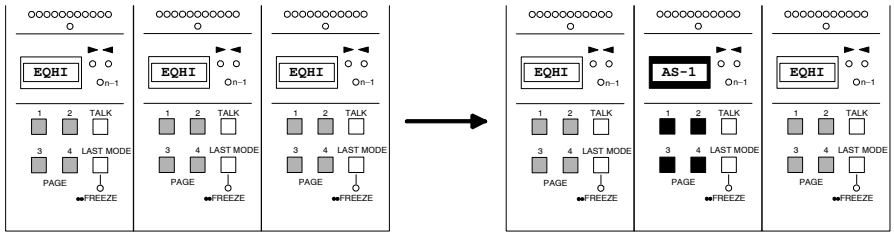
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time one of the AUX STEREO keys on the channel strip is pressed (regardless of what status it toggles to), the STEREO AUX parameters are assigned to the knobs on the LACP).

Note: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment

- Press ASN SEL on the Channel Strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assignment Mode.
- Press AUX STEREO 1 through 4 ON on the Channel Strip to control the stereo AUX parameters.



3.3.6.2 Stereo AUX Parameters

The Stereo AUX Section provides selection of the AUX bus (ON/OFF), send level adjustment, pre-/after-fader switching, and balance setting.

SEND LEVEL: The Send Levels for Stereo AUX 1 through 4 can be adjusted using this rotary control.
Adjustment range MUTE (i.e. –∞) through +10 dB:
- MUTE through –20 dB, in 1 dB steps,
- –20 through –10 dB, in 0.5 dB steps,
- –10 through +10 dB, in 0.1 dB steps.

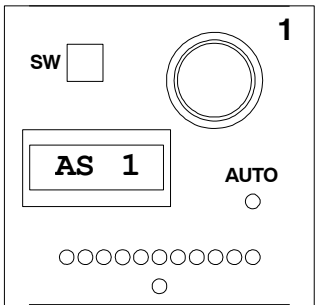
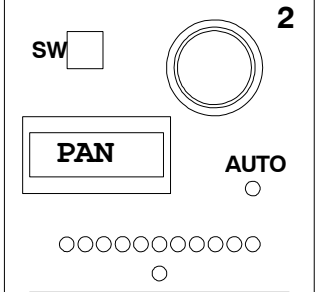
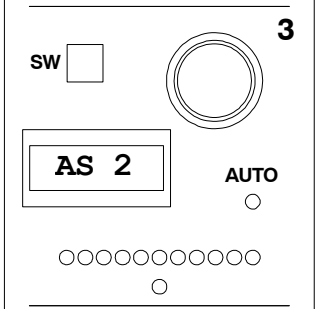
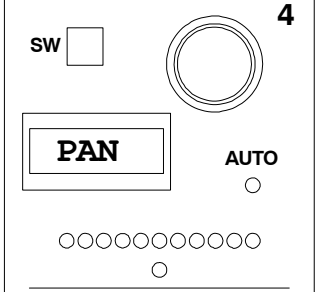
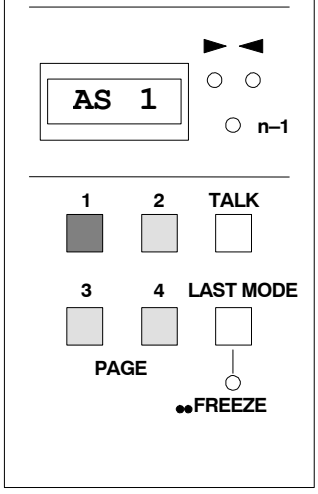
Note: 0.5 dB increments are denoted by a decimal point that is not followed by another number.
0.1 dB increments are always followed by the 1/10th-dB value.
For example, –19.5 dB is displayed as "**–19.**", and –9.4 is displayed as "**–9.4**".

AUX POSITION: The signal sent to the Stereo AUX bus can be selected pre- or after-fader using the SW key. Pre-fader is indicated by an illuminated SW key.

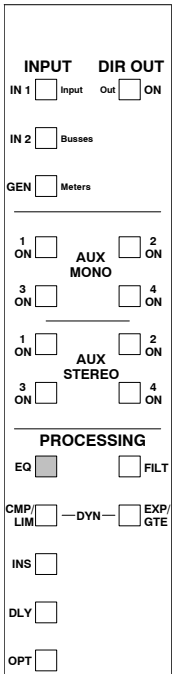
PANNING: Either Stereo AUX channel can be attenuated, which provides a L/R panning function.
- L30_, fully left (i.e. right-hand channel is attenuated by 30 dB),
- _30R, fully right (i.e. left-hand channel is attenuated by 30 dB),
- L00R, center (i.e. both channels are attenuated by 3 dB).

3.3.6.3 Stereo AUX Parameters on the LACP

Example:

Stereo AUX control parameter		Available operating elements and their function
SEND LEVEL Page 1: Stereo AUX 1 Page 2: Stereo AUX 3 Page 3: Stereo AUX 5 Page 4: Stereo AUX 7		**SW key** = Pre-/post fader switchover **Rotary encoder** = Stereo AUX send level **LED bar** = Bar display, indicates AUX send level **Center LED** = On at 0 dB **Display** = AS 1/AS 3/AS 5/AS 7; label of control parameter – 20, indicates AUX send level (MUTE to +10 dB)
PAN Page 1: Stereo AUX 1 Page 2: Stereo AUX 3 Page 3: Stereo AUX 5 Page 4: Stereo AUX 7		**SW key** = no function **Rotary encoder** = PAN adjustment **LED bar** = Dot display, PAN indication **Center LED** = ON at PAN center position **Display** = PAN; label of control parameter L30_; PAN position fully left L00R; PAN position center _30R; PAN position fully right
SEND LEVEL Page 1: Stereo AUX 2 Page 2: Stereo AUX 4 Page 3: Stereo AUX 6 Page 4: Stereo AUX 8		**SW key** = Pre-/post fader switchover **Rotary encoder** = Stereo AUX send level **LED bar** = Bar display, indicates AUX send level **Center LED** = On at 0 dB **Display** = AS 2/AS 4/AS 6/AS 8; label of control parameter – 20, indicates AUX send level (MUTE to +10 dB)
PAN Page 1: Stereo AUX 2 Page 2: Stereo AUX 4 Page 3: Stereo AUX 6 Page 4: Stereo AUX 8		**SW key** = no function **Rotary encoder** = PAN adjustment **LED bar** = Dot display, PAN indication **Center LED** = ON at PAN center position **Display** = PAN; label of control parameter L30_; PAN position fully left L00R; PAN position center _30R; PAN position fully right
		**Display** = Indication of stereo AUX bus selection AS 1; stereo AUX bus 1/2 (page 1) AS 2; stereo AUX bus 3/4 (page 2) AS 3; stereo AUX bus 5/6 (page 3) AS 4; stereo AUX bus 7/8 (page 4)

3.3.7 EQ Section



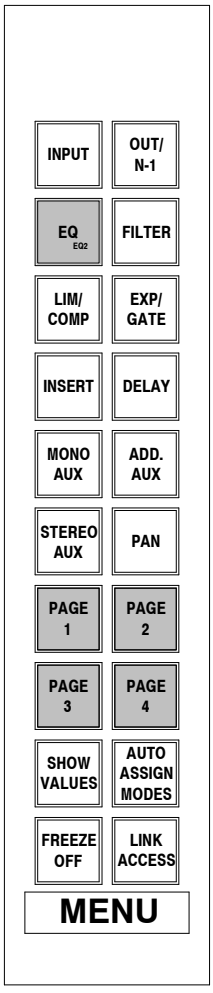
From the Channel Strip, the complete four-band EQ Section can be switched ON/OFF using the channel strip EQ key.
EQ assignment is available for all channel types.

EQ1 Mode For each of the four bands (LF, LM, HM, and HF), one of the four pages is used. Each PAGE will contain the band ON/OFF switch, constant-Q/constant-range selection (or shelving/bell for the highest and lowest bands), frequency setting, and gain controls for one of the four bands.

EQ2 Mode Each page will contain the same EQ parameter for all four bands. For example, PAGE 4 will contain the gain controls for all four bands.
EQ2 mode can only be selected from the Master Menu Selector.

Notes: *In addition to a Master ON/OFF function, each of the four single bands can be switched ON/OFF individually. As a consequence, the EQ key on the Channel Strip has* no *effect if all EQ bands have been switched OFF individually.*
Assigning the EQ to the LACP using the ASN SEL or MMS keys will not activate the EQ. If it is not already engaged, the EQ key must be pressed to activate the unit, and the EQ key will illuminate.
If the EQ is not engaged, the EQ curve will not be displayed on the Graphic Controller (although the EQ screen will appear when rotary encoders assigned to EQ are touched or moved).

3.3.7.1 Assigning the EQ Section



A. Global Assignment:

- Press EQ on the Master Menu Selector.
  The displays of *all* Channel Strips will switch over and indicate the EQ control parameters in EQ1 mode, except those in FREEZE mode; see chapter 3.3.2.
- To switch over to EQ2 mode, press EQ on the Master Menu Selector a second time.
- Press one of the PAGE 1 through 4 keys on MMS to select the desired set of parameters (depending upon selected EQ1 or EQ2 mode).

For *EQ1 mode,* page assignment is as follows:
PAGE 1 = EQHI (high frequency band)
PAGE 2 = EQHM (high-mid frequency band)
PAGE 3 = EQLM (low-mid frequency band)
PAGE 4 = EQLO (low frequency band)

- Press one of the PAGE 1 through 4 keys on MMS to select the desired band.

For *EQ2 mode*, page assignment is as follows:
PAGE 1 = Display of the last used frequency
PAGE 2 = Center/turnover frequency controls
PAGE 3 = Q controls (shelving/bell for H/L, and constant Q/constant range for HM/LM)
PAGE 4 = Gain controls (boost/cut)

- Press one of the PAGE 1 through 4 keys on the Master Menu Selector (MMS) to select the desired set of parameters.

Note: *EQ2 mode can only be selected from the Master Menu Selector (MMS).*

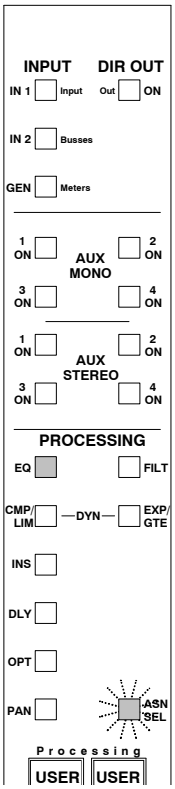
B. **Local Assignment** on the Channel Strip:
- Press ASN SEL; the ASN SEL key will *flash*.
- Press the EQ key.
- Press one of the PAGE 1 through 4 keys on the Channel Strip to select band or control sets.

C. **Local Assignment** affecting *all* Channel Strips:
- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in “B” are available.

D. **Local Assignment** with Auto Assign Modes "In-Only":
- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the EQ key on the channel strip will assign the EQ parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

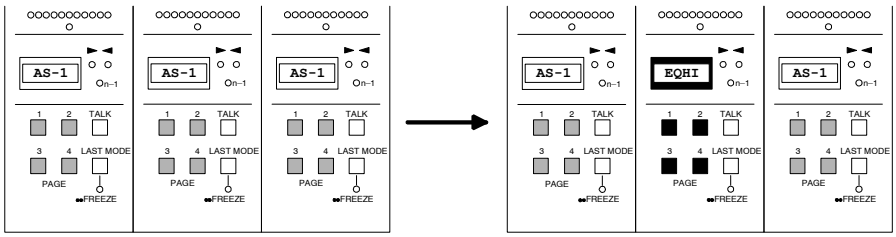
E. **Local Assignment** with Auto Assign Modes "In and Out":
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the EQ key on the channel strip is pressed (regardless of what status it toggles to), the EQ parameters are assigned to the knobs on the LACP).

Notes: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.
When using any form of local assignment of EQ parameters, whichever EQ mode (EQ1 or EQ 2) that was last selected on the Master Menu Selector will be applied. EQ modes cannot be changed from the channel strips.



Example: Local Assignment

- Press ASN SEL on the Channel Strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assignment Mode.
- Press EQ on the Channel Strip, followed by one of the four PAGE keys, to control the EQ parameters of the desired band.



3.3.7.2 EQ Parameters

The four-band EQ section can be used in one of two distinct modes: *EQ1* and *EQ 2*.

EQ1 Mode: Each band of the EQ Section is available on an individual Page (1 through 4), consisting of three parameters: Q (bandwidth), center frequency (in Hz), Gain (in dB), as well as ON/OFF selection of the particular band.

EQ BAND ON/OFF: The SW key on the LACP controls the ON/OFF function for the selected band. The band is active when the key is illuminated.

Q: The Q (bandwidth) can be set to several discrete values. In addition, for the low- and high-frequency bands, a shelving-type filter can be selected.

- EQHI, high-frequency: SHLV (shelving-type), or Q = 0.27 through 8.7, in 30 steps. The SW key is illuminated when in SHLV mode.
- EQHM, high-/mid-frequency: Q = 0.27 through 8.7, in 30 steps,
- EQLM, low-/mid-frequency: Q = 0.27 through 8.7, in 30 steps,
- EQLO, low-frequency: SHLV (shelving-type), or Q = 0.27 through 8.7, in 30 steps. The SW key is illuminated when in SHLV mode.

Note: For EQHM and EQLM bands, Q can be selected between “constant-Q” (ConQ) and “constant-range” (ConR) filter types, whereas for the EQHI and EQLO bands, “shelving” (SHLV) or “constant-Q” can be selected.
The SW keys are illuminated when the bands are in constant-range or shelving modes, respectively.

GAIN: Boost/cut adjustment; ±18 dB in steps of 0.5 dB.

FREQUENCY: Center frequency (or, if SHLV is selected for the low or high frequency band: turnover frequency) adjustment. For all four bands, the center or turnover frequency can be adjusted from 20 Hz through 20 kHz, in 120 steps.

EQ2 Mode: Each page will contain the same EQ parameter for all four bands. For example, Page 2 will contain the frequency controls for all four bands. As with EQ1 mode, there are three parameters: Q (bandwidth), center frequency (in Hz), Gain (in dB), as well as ON/OFF selection of the particular band.

EQ BAND ON/OFF: The SW keys on Pages 1, 2, and 4 control the ON/OFF function for the selected band. The band is active when these keys are illuminated.

Last used Frequency (Page 1): On Page 1, the last used frequencies of all four bands are displayed. In addition, each band can be switched ON/OFF with its SW key.

FREQUENCY (Page 2): Center frequency (or, if SHLV is selected for the low or high frequency band: turnover frequency) adjustment:

- EQHI: 20 Hz through 20 kHz, in 120 steps;
- EQHM; 20 Hz through 20 kHz, in 120 steps;
- EQLM; 20 Hz through 20 kHz, in 120 steps;
- EQLO; 20 Hz through 20 kHz. in 120 steps;

Note: In EQ2 mode, the last used frequency is displayed on PAGE 1. Adjustment of the frequency controls is available on PAGE 2.

Q (Page 3): The Q (bandwidth) can be set to several discrete values. In addition, for the low- and high-frequency bands, a shelving-type filter can be selected.

- EQHI, high-frequency: SHLV (shelving-type), or Q = 0.27 through 8.7, in 30 steps. The SW key is illuminated when in SHLV mode.
- EQHM, high-/mid-frequency: Q = 0.27 through 8.7, in 30 steps,
- EQLM, low-/mid-frequency: Q = 0.27 through 8.7, in 30 steps,
- EQLO, low-frequency: SHLV (shelving-type), or Q = 0.27 through 8.7, in 30 steps. The SW key is illuminated when in SHLV mode.

Notes: In EQ2 mode, the Q controls are only available on PAGE 3.
For EQHM and EQLM bands, Q can be selected between “constant-Q” (ConQ) and “constant-range” (ConR) filter types, whereas for the EQHI and EQLO bands, “shelving” (SHLV) or “constant-Q” can be selected.
The SW keys are illuminated when the bands are in constant-range or shelving modes, respectively.

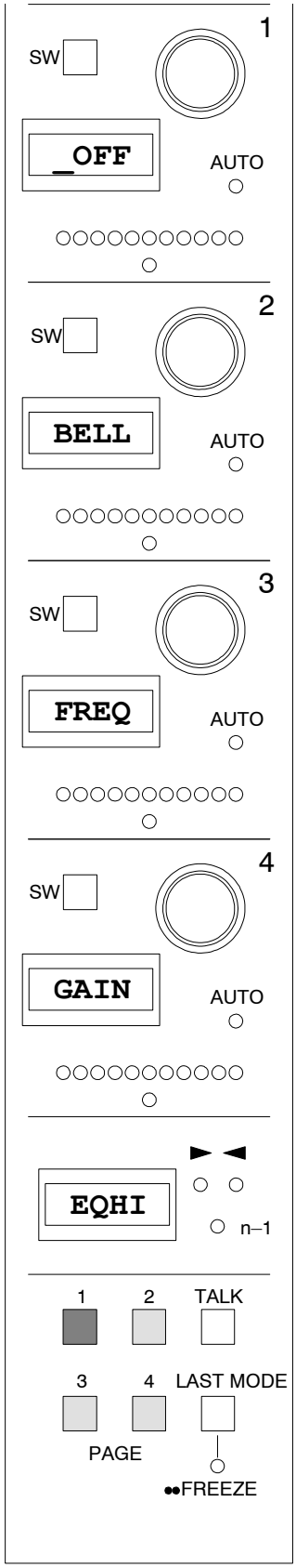
GAIN (Page 4): Boost/cut adjustment; ±18 dB in steps of 0.5 dB.

Note: In EQ2 mode, the gain controls are only available on PAGE 4.

3.3.7.3 EQ1 Mode Parameters on the LACP

Example EQ1 Mode:

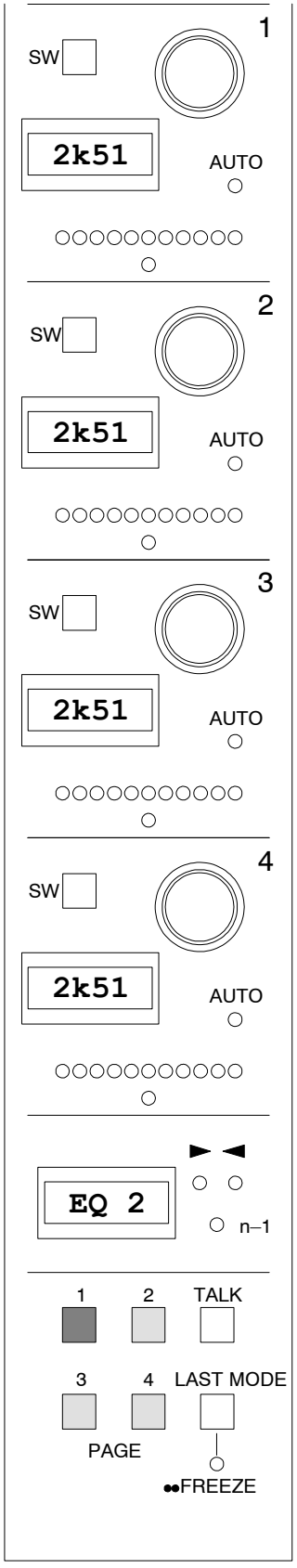
EQ1 mode control parameter	Available operating elements and their function
EQ BAND ON/OFF	**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = no function **LED bar** = no function **Center LED** = no function **Display** = OFF: band off ON: band on
Q/FILTER TYPE	**SW key** = Selects SHELVE/BELL or ConQ/ConR **Rotary encoder** = Selects SHELVE/BELL or ConQ/ConR **LED bar** = Dot display, indicates Q **Center LED** = no function **Display** = SHLV; shelving filter (for EQHI and EQLO only) BELL; bell filter (for EQHI and EQLO only) ConQ; constant-Q (for EQHM and EQLM only) ConR; constant-range (for EQHM and EQLM only) Q0.2; Q value indication
FREQUENCY	**SW key** = no function **Rotary encoder** = Frequency adjustment **LED bar** = Dot display, indicates frequency setting **Center LED** = no function **Display** = FREQ; labelof control parameter 141; frequency in Hz 2k51; frequency in kHz
GAIN	**SW key** = no function **Rotary encoder** = EQ gain adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = GAIN; labelof control parameter –13. ; gain = –13.5 dB (i.e. cut) 6.5 ; gain = +6.5 dB (i.e. boost)
	Display = Indication of EQ selection EQHI; high frequency band (page 1) EQHM; high/mid frequency band (page 2) EQLM; low/mid frequency band (page 3) EQLO; low frequency band (page 4)



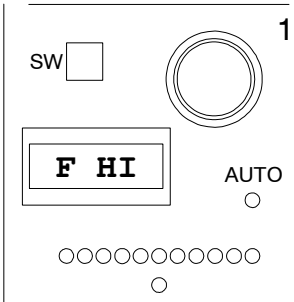
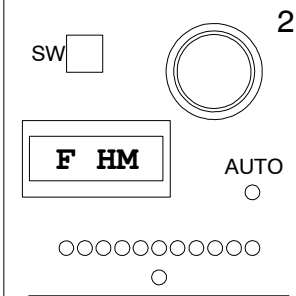
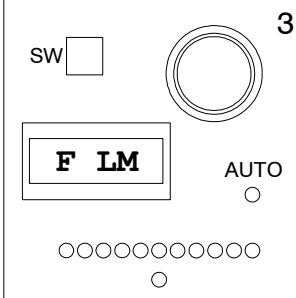
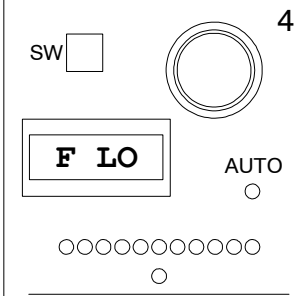
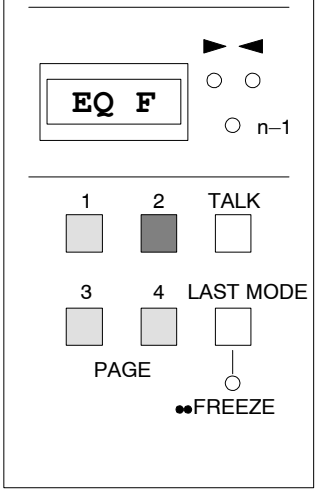
3.3.7.4 EQ 2 Mode Parameters on the LACP

Example EQ2 Mode, General Page:

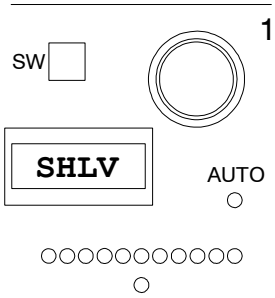
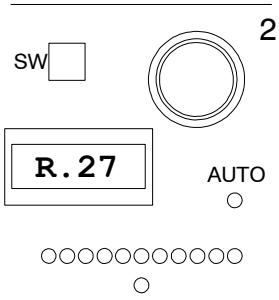
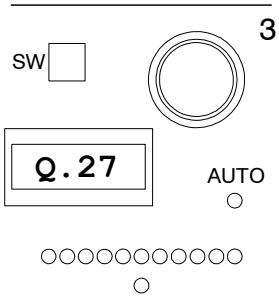
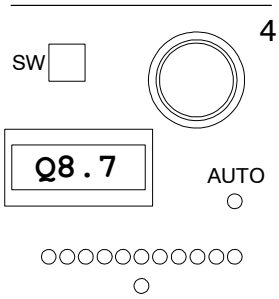
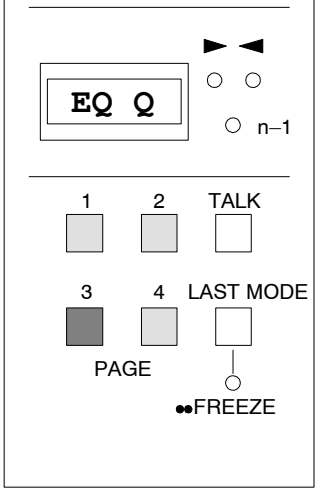
EQ2 mode control parameter	Available operating elements and their function
Last used HI band frequency indication, HI band gain	**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = 141; frequency in Hz 2k51; frequency in kHz
Last used HM band frequency indication, HM band gain	**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = 141; frequency in Hz 2k51; frequency in kHz
Last used LM band frequency indication, LM band gain	**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = 141; frequency in Hz 2k51; frequency in kHz
Last used LO band frequency indication, LO band gain	**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = 141; frequency in Hz 2k51; frequency in kHz
	Display = Indication of EQ selection EQ_2; EQ2 mode general page (page 1) EQ_F; EQ2 mode frequency setting page (page 2) EQ_Q; EQ2 mode Q setting page (page 3) EQ_G; EQ2 mode gain setting page (page 4)



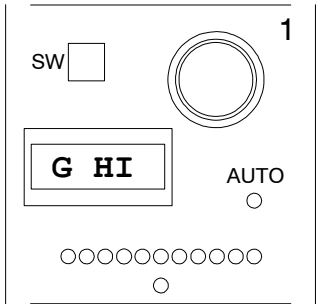
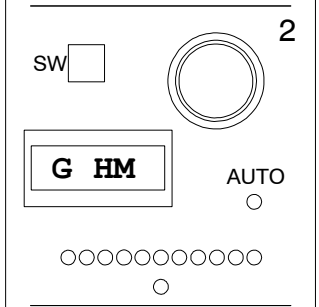
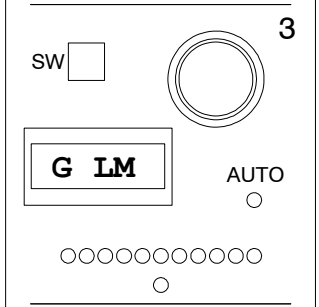
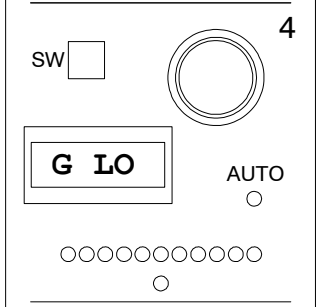
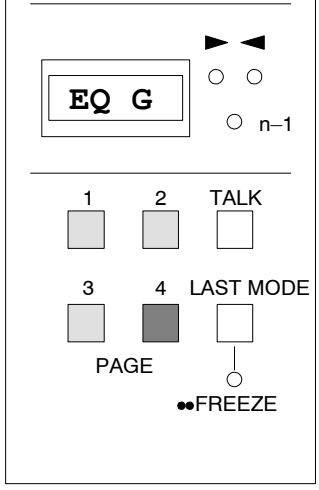
Example EQ2 Mode, Frequency Page:

EQ2 mode control parameter		Available operating elements and their function
HI band frequency		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Frequency adjustment **LED bar** = Dot display, indicates frequency setting **Center LED** = not used **Display** = F_HI; label of control parameter 141; frequency in Hz 2k51; frequency in kHz
HM band frequency		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Frequency adjustment **LED bar** = Dot display, indicates frequency setting **Center LED** = not used **Display** = F_HM; label of control parameter 141; frequency in Hz 2k51; frequency in kHz
LM band frequency		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Frequency adjustment **LED bar** = Dot display, indicates frequency setting **Center LED** = not used **Display** = F_LM; label of control parameter 141; frequency in Hz 2k51; frequency in kHz
LO band frequency		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Frequency adjustment **LED bar** = Dot display, indicates frequency setting **Center LED** = not used **Display** = F_LM; label of control parameter 141; frequency in Hz 2k51; frequency in kHz
		**Display** = Indication of EQ selection EQ_2; EQ2 mode general page (page 1) EQ_F; EQ2 mode frequency setting page (page 2) EQ_Q; EQ2 mode Q setting page (page 3) EQ_G; EQ2 mode gain setting page (page 4)

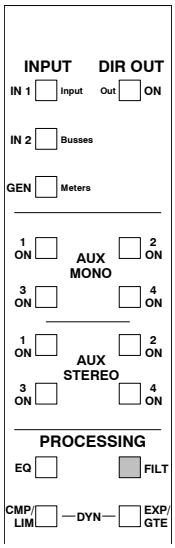
Example EQ2 Mode, Q Page:

EQ2 mode control parameter		Available operating elements and their function
HI band Q setting and shelving/peaking selection		**SW key** = Filter shelving/peaking selection (key is illuminated when shelving is selected) **Rotary encoder** = Q adjustment **LED bar** = Bar display, indicates Q setting **Center LED** = not used **Display** = SHLV; shelving filter is selected Q . 27; Q is set to 0.27 (peaking filter) Q8 . 7; Q is set to 8.7 (peaking filter)
HM band Q setting and constant Q/constant range selection		**SW key** = Filter constant Q/constant range selection (key is illuminated when constant range is selected) **Rotary encoder** = Q adjustment **LED bar** = Bar display, indicates Q setting **Center LED** = not used **Display** = R . 27; Q is set to 0.27 (constant range) Q8 . 7; Q is set to 8.7 (constant Q)
LM band Q setting and constant Q/constant range selection		**SW key** = Filter constant Q/constant range selection (key is illuminated when constant range is selected) **Rotary encoder** = Q adjustment **LED bar** = Bar display, indicates Q setting **Center LED** = not used **Display** = R . 27; Q is set to 0.27 (constant range) Q8 . 7; Q is set to 8.7 (constant Q)
LO band Q setting and shelving/peaking selection		**SW key** = Filter shelving/peaking selection (key is illuminated when shelving is selected) **Rotary encoder** = Q adjustment **LED bar** = Bar display, indicates Q setting **Center LED** = not used **Display** = SHLV; shelving filter is selected Q . 27; Q is set to 0.27 (peaking filter) Q8 . 7; Q is set to 8.7 (peaking filter)
		**Display** = Indication of EQ selection EQ_2; EQ2 mode general page (page 1) EQ_F; EQ2 mode frequency setting page (page 2) EQ_Q; EQ2 mode Q setting page (page 3) EQ_G; EQ2 mode gain setting page (page 4)

Example EQ2 Mode, Gain Page:

EQ2 mode control parameter		Available operating elements and their function
HI band gain setting		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = G_HI; label of control parameter –13 . ; gain is set to –13.5 dB (i.e. cut) +6.5; gain is set to +6.5 dB (i.e. boost)
HM band gain setting		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = G_HM; label of control parameter –13 . ; gain is set to –13.5 dB (i.e. cut) +6.5; gain is set to +6.5 dB (i.e. boost)
LM band gain setting		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = G_LM; label of control parameter –13 . ; gain is set to –13.5 dB (i.e. cut) +6.5; gain is set to +6.5 dB (i.e. boost)
LO band gain setting		**SW key** = Band ON/OFF (key is illuminated when ON) **Rotary encoder** = Gain (boost/cut) adjustment **LED bar** = Dot display, indicates gain setting **Center LED** = On if gain = 0 dB (no boost/cut) **Display** = G_LO; label of control parameter –13 . ; gain is set to –13.5 dB (i.e. cut) +6.5; gain is set to +6.5 dB (i.e. boost)
		**Display** = Indication of EQ selection EQ_2; EQ2 mode general page (page 1) EQ_F; EQ2 mode frequency setting page (page 2) EQ_Q; EQ2 mode Q setting page (page 3) EQ_G; EQ2 mode gain setting page (page 4)

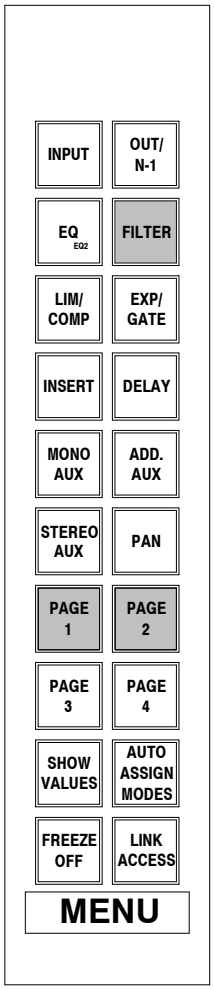
3.3.8 Filter Section



On all Channel types, both a high- and a low-pass filter can be configured. These filters can be switched ON/OFF on each Channel Strip.
In addition, a notch filter is available if the EQ with Notch Filter is included in the channel configuration

Note: *In addition, both filters can be switched ON/OFF individually. As a consequence, the FILT key on the channel strip has no effect if both filters have been switched OFF*

3.3.8.1 Assigning the Filter Section



A. Global Assignment:
- Press FILTER on the Master Menu Selector.
  The displays of all Channel Strips will switch over and indicate the filter control parameters, except those in FREEZE mode; see chapter 3.3.2.
- Press one of the PAGE 1 through 3 keys on the MMS to select the desired filter (PAGE 1 for HPF, PAGE 2 for LPF, *PAGE 3 for NTCH if configured*).

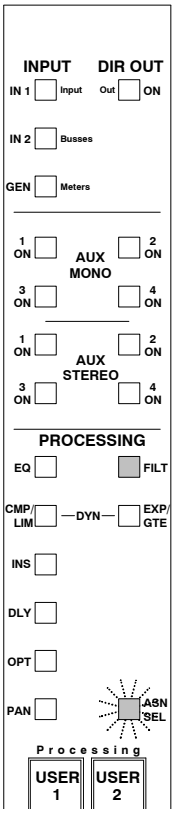
B. Local Assignment on the channel strip:
- Press ASN SEL; the ASN SEL key will *flash*.
- Press the FILT key.
- Press one of the PAGE 1 through 3 keys on the Channel Strip to select the desired filter (PAGE 1 for HPF, PAGE 2 for LPF, *PAGE 3 for NTCH if configured*).

C. Local Assignment affecting *all* channel strips:
- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in “B” are available.

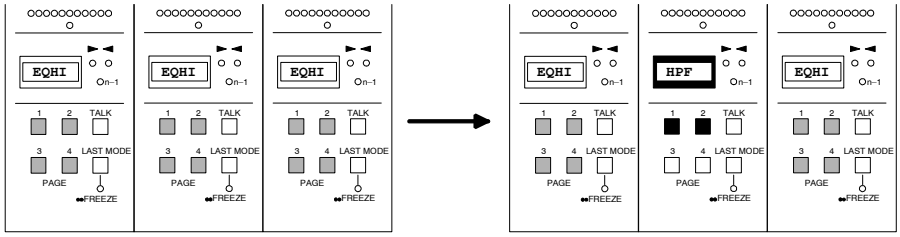
D. Local Assignment with Auto Assign Modes "In-Only":
- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the FILT key on the channel strip will assign the FILTER parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. **Local Assignment** with Auto Assign Modes "In and Out":
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the FILT key on the channel strip is pressed (regardless of what status it toggles to), the FILTER parameters are assigned to the knobs on the LACP).

Notes: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment
- Press ASN SEL on the channel strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assignment Mode.
- Press FILT on the Channel Strip followed by one of the PAGE 1 or PAGE 2 keys (*or PAGE 3 for the notch filter, if configured*) to control the parameters of the required filter.



3.3.8.2 Filter Parameters

High- and Low-pass filters are available on PAGE 1 and 2 (PAGE 1 = HPF, PAGE 2 = LPF, PAGE 3 = notch filter, if configured). Each filter has three parameters: ON/OFF, slope, and frequency. The Notch filter has two selectable Q values instead of adjustable slope.

ON/OFF: ON/OFF function for the selected filter (high- and low-pass, notch).

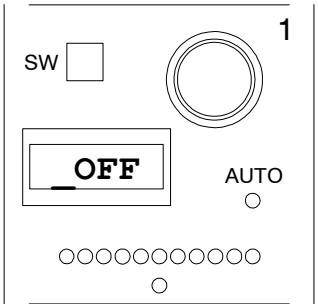
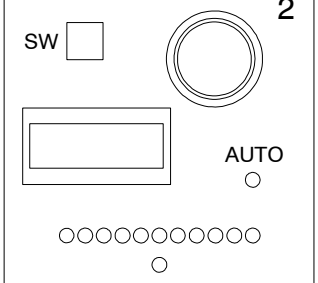
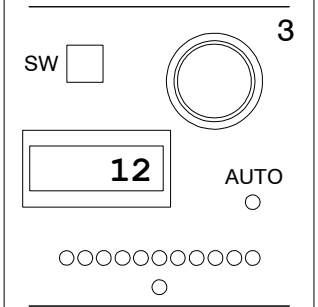
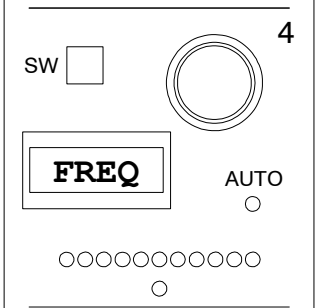
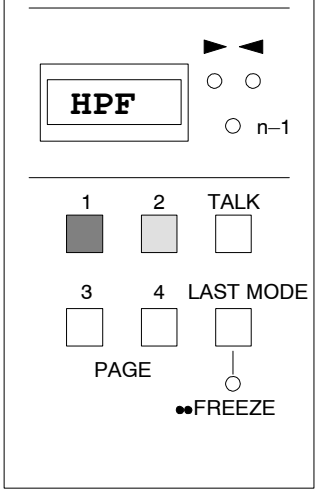
SLOPE: Filter slope (high- and low-pass filters), selectable from 12 dB/octave, 18 dB/octave, and 24 dB/octave, or

Q: *The notch filter's Q (if configured) is selectable from two fixed values; 2 and 10.*

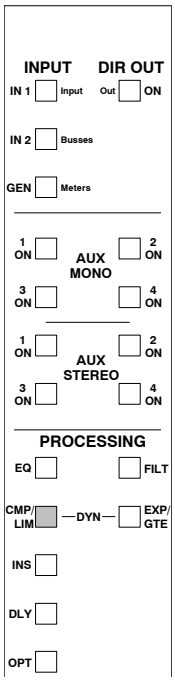
FREQUENCY: Cutoff frequency adjustment for both HP and LP filters, *as well as the notch frequency for the notch filter (if configured)*: 20 Hz through 20 kHz, in 120 steps.

3.3.8.3 Filter Parameters on the LACP

Example High-Pass Filter:

Filter control parameter		Available operating elements and their function
ON/OFF		**SW key** = Filter ON/OFF (key is illuminated when ON) **Rotary encoder** = no function **LED bar** = no function **Center LED** = no function **Display** = ON, OFF
not used		not used
FILTER SLOPE		**SW key** = Slope selection **Rotary encoder** = Slope selection **LED bar** = ●●●○○○○○○○ 12 dB/oct. ○○○○●●●○○○○ 18 dB/oct. ○○○○○○○○●●● 24 dB/oct. **Center LED** = no function **Display** = 12; 12 dB/oct. 18; 18 dB/oct. 24; 24 dB/oct.
CUTOFF FREQUENCY		**SW key** = no function **Rotary encoder** = Selects cutoff frequency (20 Hz to 20 kHz) **LED bar** = Dot display, indicates cutoff frequency **Center LED** = no function **Display** = FREQ; label of control parameter 31.5; 31.5 Hz 6k31; 6.31 kHz
		**Display** = Indication of filter selection HPF; high-pass filter (Page 1) LPF; low-pass filter (Page 2) NTCH; notch filter, only if configured (Page 3) (Page 4 not used)

3.3.9 Dynamics Section (Limiter & Compressor Part)



For Dynamics Processing, a Limiter/Compressor function and an Expander/Gate function can be configured. These functions can be switched ON/OFF on the Channel Strip.

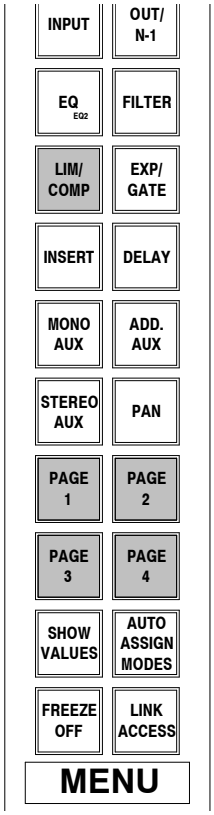
Notes: *In addition, Limiter and Compressor can be switched ON/OFF individually. As a result, the DYN–CMP/LIM key on the Channel Strip has no effect if both have been switched OFF individually.*
Pages 3 and 4 (look-forward and key control) are common to the entire dynamics section.

Dynamic Keying: The Key Source input can be selected from CHAN (dynamics processing depends on the channel's input signal) or PTCH (processing is controlled by a signal connected via the patch). High- and low-pass filters are available for the side-chain (key source) path.

Dynamic Link: Several channels can be linked together, which means that a control signal of the the channel with the *highest* level will control all *other* channels. The Links can be turned on and off from the LACP and are setup via the Graphic Controller, refer to chapter 4.4.3.7.

GRM: Gain Reduction can be displayed on the channel meters. GRM is activated on the Central Facilities Unit (CFU).
This switchover affects only channels configured with a Dynamics Unit. In GRM mode, the left bar on the Channel Meter indicates the level (for stereo channels, the higher-channel level is shown), while the right bar indicates the current gain reduction produced by the Dynamics Unit. In addition, a three-colour L/C LED, which displays dynamic unit activity, is included in the fader unit.

3.3.9.1 Assigning the Limiter/Compressor Section



A. Global Assignment:
- Press LIM/COMP on the Master Menu Selector.
  The displays of *all* Channel Strips will switch over and indicate the Limiter/Compressor control parameters, except those in FREEZE mode; see chapter 3.3.2.
- Press one of the PAGE 1 through 4 keys on the MMS to select the desired parameters (PAGE 1 for Limiter on-off/attack/release/threshold, PAGE 2 for Compressor ratio/on-off/attack/release/threshold, PAGE 3 for Compressor auto make-up gain and dynamics look-forward/keying source/gain, PAGE 4 for Key HPF/LPF/key input/side-chain link on-off).

B. Local Assignment on the Channel Strip:
- Press ASN SEL; the ASN SEL key will *flash*.
- Press the DYN–CMP/LIM key.
- Press one of the PAGE 1 through 4 keys on the Channel Strip to select the desired parameters.

C. Local Assignment affecting *all* Channel Strips:
- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in "B" are available.

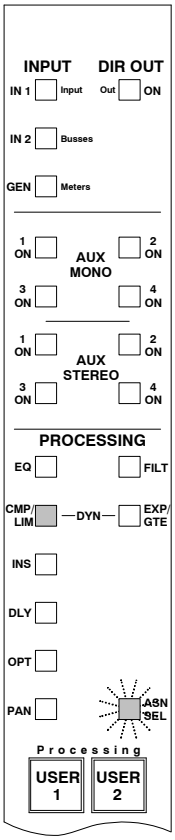
D. **Local Assignment** with Auto Assign Modes "In-Only":

- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the DYN–CMP/LIM key on the channel strip will assign the Limiter/Compressor parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. **Local Assignment** with Auto Assign Modes "In and Out":

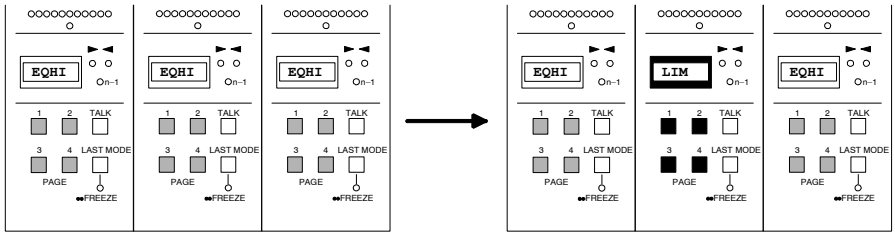
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the DYN–CMP/LIM key on the channel strip is pressed (regardless of what status it toggles to), the Limiter/Compressor parameters are assigned to the knobs on the LACP).

Notes: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment

- Press ASN SEL on the Channel Strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assignment Mode.
- Press DYN–CMP/LIM on the channel strip, followed by one of the PAGE 1 through 4 keys, to control the required Dynamics Processing parameters.



3.3.9.2 Limiter/Compressor Parameters

The Limiter/Compressor parameters are available on four pages:

PAGE 1 = LIM: ON/OFF, ATCK (attack time), RLSE (release time), THRS (threshold);

PAGE 2 = COMP: ON/OFF, RATIO, ATCK (attack time), RLSE (release time), THRS (threshold);

PAGE 3 = CLVL: AUTO (compressor auto make-up gain ON/OFF), LFWD (look forward), GAIN (output gain);

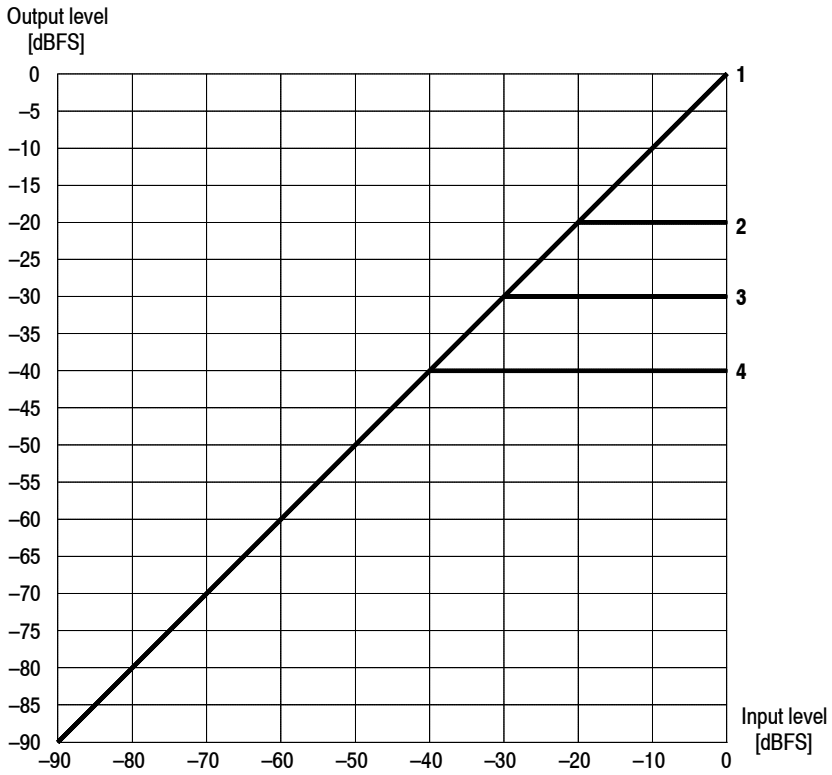
PAGE 4 = KEY: HPF (ON/OFF), LPF (on/off), KINP (key input CHAN or PTCH), SCL (side-chain link on/off).

PAGE 1 (LIM) ON/OFF: ON/OFF function for the Limiter.

ATTACK TIME: The limiter attack time (ATCK) can be adjusted within a 200 µs to 1 ms range in 9 discrete steps (0.2 ms, 0.3 ms, 0.4 ms, 0.5 ms, 0.6 ms, 0.7 ms, 0.8 ms, 0.9 ms, and 1 ms).

RELEASE TIME: The limiter release time (RLSE) can be adjusted within a 10 ms to 10 s range, in 13 discrete steps (10 ms, 20 ms, 30 ms, 50 ms, 100 ms, 200 ms, 300 ms, 500 ms, 1 s, 2 s, 3 s, 5 s, 10 s).

THRESHOLD: The limiter threshold (THRS) can be adjusted in 1 dB steps from 0 dB_{FS} to –48 dB_{FS}. The limiter threshold corresponds to the output level.



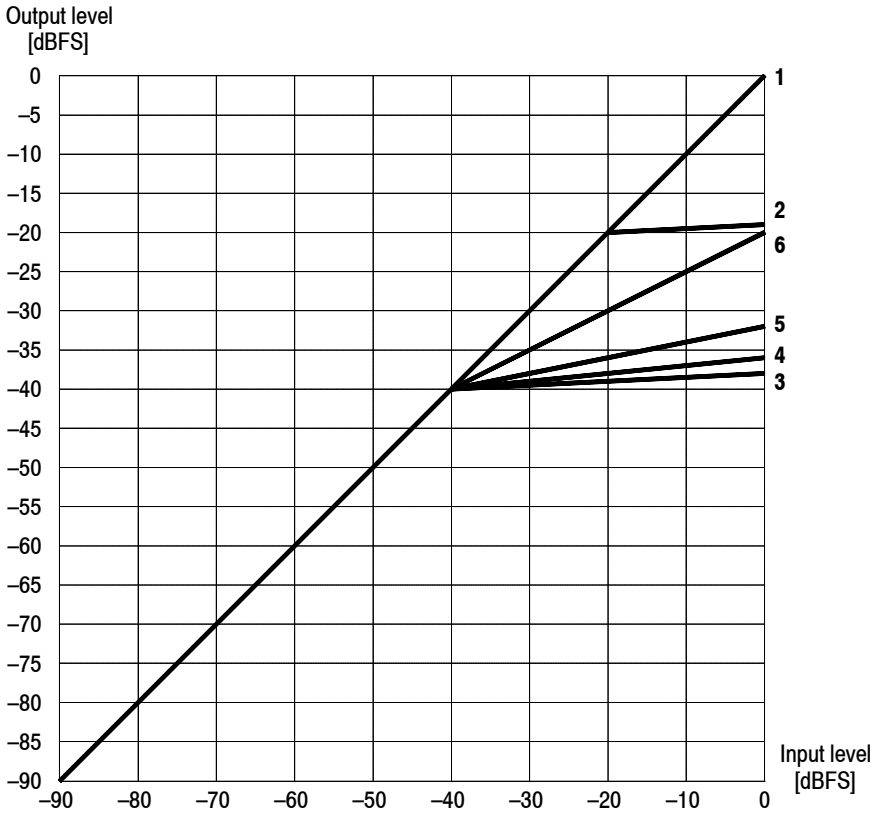
Curve	Limiter	Threshold [dB]
1	OFF	Any
1	ON	0
2	ON	–20
3	ON	–30
4	ON	–40

PAGE 2 (COMP) **RATIO:** The compressor ratio (RTIO) can be adjusted from 1:1 (no compression) to 1:20 (heavy compression) in the following discrete steps: 1:1, 4:5, 3:4, 2:3, 3:5, 1:2, 1:3, 1:5, 1:7, 1:10, 1:20. The SW key functions as the compressor ON/OFF key.

ATTACK TIME: The compressor attack time (ATCK) can be adjusted within a 200 µs to 20 ms range, in 9 discrete steps (0.2 ms, 0.3 ms, 0.5 ms, 1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms).

RELEASE TIME: The compressor release time (RLSE) can be adjusted within a 10 ms to 10 s range, in 13 discrete steps (10 ms, 20 ms, 30 ms, 50 ms, 100 ms, 200 ms, 300 ms, 500 ms, 1 s, 2 s, 3 s, 5 s, 10 s).

THRESHOLD: The compressor threshold level (THRS) can be adjusted in 1 dB steps from 0 dB_{FS} to –96 dB_{FS}.



Curve	Compressor	Threshold [dB]	Ratio
1	OFF	any	any
1	ON	0	1:1
2	ON	–20	1:20
3	ON	–40	1:20
4	ON	–40	1:10
5	ON	–40	1:5
6	ON	–40	1:2

PAGE 3 (CLVL): **AUTO:** The SW key within the first LACP section switches the program-sensitive Auto Make-up Gain function ON or OFF.

LOOK FORWARD: A special function of the Dynamics Section, the Look Forward function allows a variable delay for anticipating sudden changes in audio levels, thus helping the Dynamics Section to fully process fast events. Delay is adjustable within a range from 0 to 25 ms in discrete steps (0 ms, 0.2 ms, 0.3 ms, 0.5 ms, 1 ms, 2 ms, 3 ms, 5 ms, 10 ms, 20 ms, 25 ms). This allows the Dynamic unit to act upon the entire transient portion of the input signal, if desired.

Note: *The Look Forward function is shared by all dynamic unit processes.*

GAIN: For manual gain compensation; gain values from 0 through +24 dB can be added in 1 dB steps.

PAGE 4 (KEY) **HPF/LPF:** High-pass and low-pass filters are available within the side-chain key signal. This facilitates frequency-dependent dynamic processing for creating effects such as de-essing. Both filters can be switched ON/OFF independently and feature cut-off frequencies that are continuously adjustable between 20 Hz and 20 kHz.

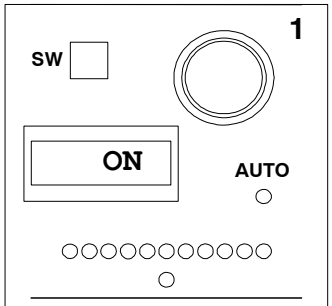
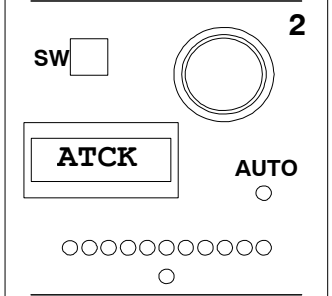
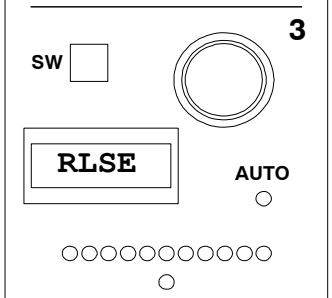
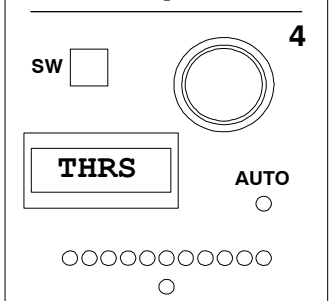
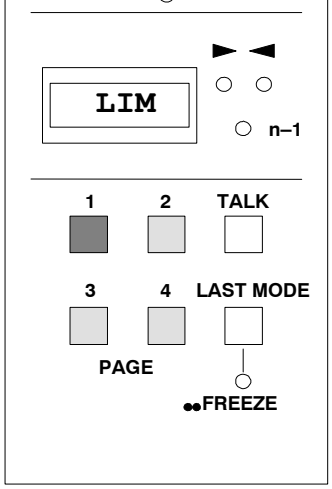
KEY SOURCE: The Key Source input can be selected from CHAN (dynamics processing depends on the channel's input signal) or PTCH (processing is controlled by a signal connected via the patch).

SCL: Activates the Side-Chain Link function, if it is available for the specified channel.

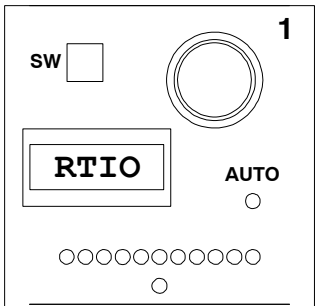
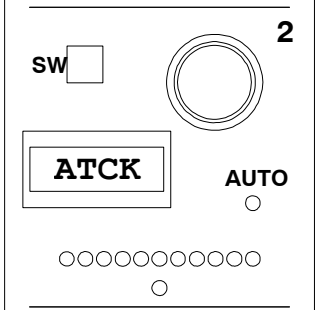
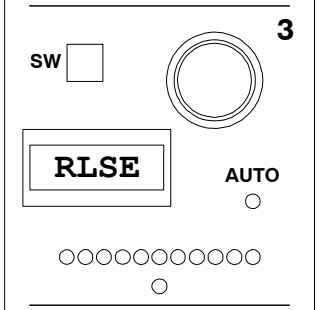
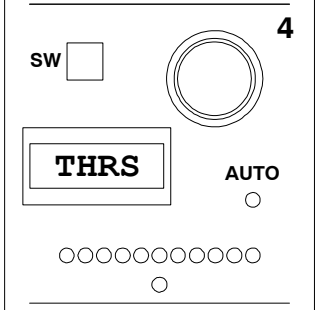
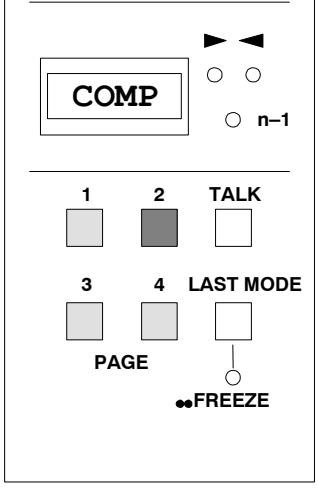
Note: *All PAGE 4 functions (HPF/LPF, Key Source, and Side-Chain Link) are shared by all dynamic unit processes.*

3.3.9.3 Limiter/Compressor Parameters on the LACP

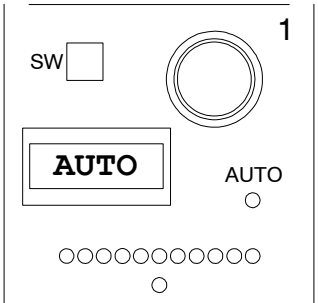
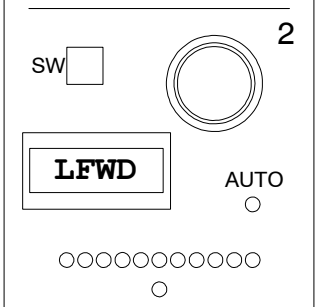
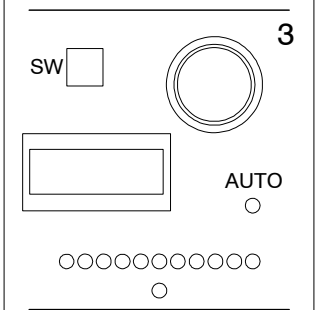
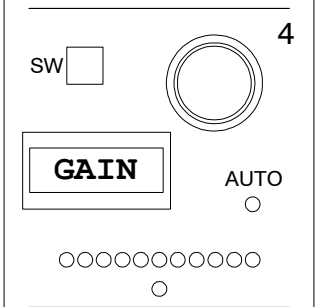
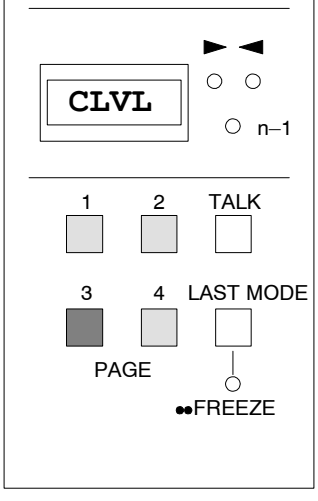
Example 1 (PAGE 1, LIM):

Dynamics control parameter (Limiter/Compressor)		Available operating elements and their function
LIMITER ON/OFF		**SW key** = Limiter ON/OFF **Rotary encoder** = no function **LED bar** = no function **Center LED** = no function **Display** = ON/OFF
ATTACK TIME		**SW key** = no function **Rotary encoder** = Attack time adjustment; 0.2 to 1 ms **LED bar** = Dot display, indicates adjusted attack time **Center LED** = no function **Display** = ATCK; label of control parameter 0.5; attack time set to 0.5 ms
RELEASE TIME/HOLD		**SW key** = HOLD function ON/OFF; ON = 150 ms / OFF = 0 ms **Rotary encoder** = Release time adjustment; 10 ms to 10 s **LED bar** = Dot display, indicates adjusted release time **Center LED** = no function **Display** = RLSE; label of control parameter 100m; release time set to 100 ms 1s; release time set to 1 s
THRESHOLD		**SW key** = no function **Rotary encoder** = Threshold adjustment; 0 to –48 dBFS in 1 dB steps **LED bar** = Bar display, indicates threshold Full bar = 0, empty bar = –48 dB **Center LED** = Is ON if threshold is set to 0 dBFS **Display** = THRS; label of control parameter – 24; indicates threshold value –24 dBFS
		**Display** = Indication of Limiter/Compressor selection LIM; limiter parameters (page 1) COMP; compressor parameters (page 2) CLVL; level/gain parameters (page 3) KEY; common parameters for limiter and compressor (page 4)

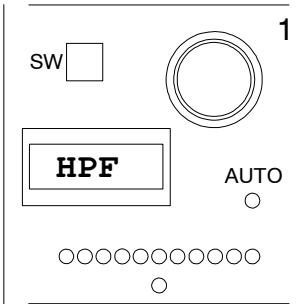
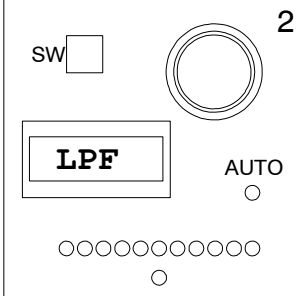
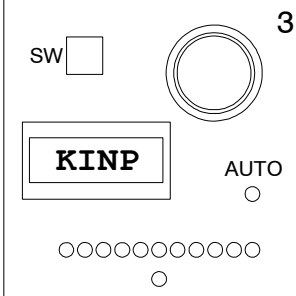
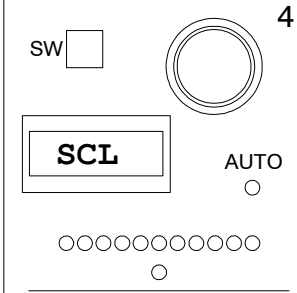
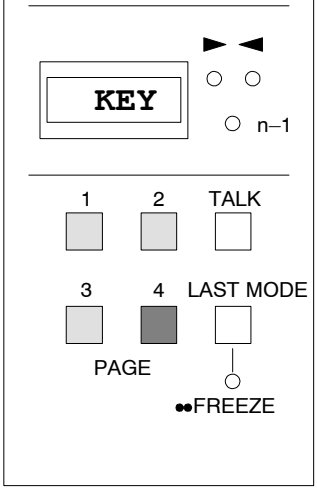
Example 2 (PAGE 2, COMP):

Dynamics control parameter (Limiter/Compressor)		Available operating elements and their function
RATIO		**SW key** = Compressor ON/OFF **Rotary encoder** = Ratio adjustment; 1:1 to 1:20 **LED bar** = Bar display for ratio; empty bar: 1:1, full bar: 1:20 **Center LED** = ON if ratio 1:1 is set **Display** = RTIO; label of control parameter 1/3; ratio 1:3
ATTACK TIME		**SW key** = no function **Rotary encoder** = Attack time adjustment; 0.2 to 20 ms **LED bar** = Dot display, indicates adjusted attack time **Center LED** = no function **Display** = ATCK; label of control parameter 0.2; attack time 0.2 ms
RELEASE TIME/HOLD		**SW key** = HOLD function ON/OFF; ON=150 ms/OFF=0 ms **Rotary encoder** = Release time adjustment; 100 ms to 10 s **LED bar** = Dot display, indicates adjusted release time **Center LED** = no function **Display** = RLSE; label of control parameter 100m; release time 100 ms
THRESHOLD		**SW key** = no function **Rotary encoder** = Threshold adjustment; 0 to –96 dBFS in 1 dB steps **LED bar** = Bar display, indicates adjusted threshold **Center LED** = ON if 0 dBFS is adjusted **Display** = THRS; label of control parameter –13; indicates threshold value –13 dBFS
		**Display** = Indication of Limiter/Compressor selection LIM; limiter parameters (page 1) COMP; compressor parameters (page 2) CLVL; level/gain parameters (page 3) KEY; common parameters for limiter and compressor (page 4)

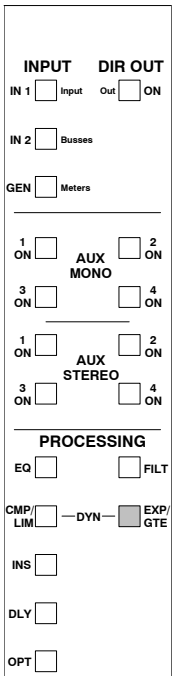
Example 3 (PAGE 3, CLVL):

Dynamics control parameter (Limiter/Compressor)		Available operating elements and their function
AUTO MAKE-UP GAIN		**SW key** = Auto function ON/OFF **Rotary encoder** = If touched, the display indicates ON or OFF **LED bar** = no function **Center LED** = no function **Display** = AUTO; label of control parameter
LOOK FORWARD		**SW key** = LFWD function ON/OFF **Rotary encoder** = Look forward time adjustment; 0 to 25 ms **LED bar** = Bar display, indicates adjusted look forward time **Center LED** = On for 0 (zero) look forward time **Display** = LFWD; label of control parameter 0; look forward time 0 ms
not used		not used
DYNAMICS GAIN		**SW key** = no function **Rotary encoder** = Gain level adjustment **LED bar** = Bar display, indicates adjusted gain **Center LED** = ON if 0 dB gain is adjusted **Display** = GAIN; label of control parameter + 15; 15 dB gain
		**Display** = Indication of Limiter/Compressor selection LIM; limiter parameters (page 1) COMP; compressor parameters (page 2) CLVL; level/gain parameters (page 3) KEY; common parameters for limiter and compressor (page 4)

Example 4 (PAGE 4, KEY):

Dynamics control parameter (Limiter/Compressor)		Available operating elements and their function
HIGH-PASS FILTER		**SW key** = High-pass filter ON/OFF **Rotary encoder** = Frequency adjustment **LED bar** = Frequency display **Center LED** = no function **Display** = HPF; label of control parameter 20; frequency 20 Hz 20k; frequency 20 kHz
LOW-PASS FILTER		**SW key** = Low-pass filter ON/OFF **Rotary encoder** = Frequency adjustment **LED bar** = Frequency display **Center LED** = no function **Display** = LPF; label of control parameter 20; frequency 20 Hz 20k; frequency 20 kHz
KEY INPUT SELECTION		**SW key** = Toggles KEY input **Rotary encoder** = Selects KEY input **LED bar** = ●●●○○○○○○○ CHAN ○○○●●●○○○○ PTCH **Center LED** = no function **Display** = KINP; label of control parameter CHAN; key taken from own signal PTCH; key taken from the patch
SIDECHAIN LINK		**SW key** = Link ON/OFF **Rotary encoder** = If touched, the display indicates ON or OFF **LED bar** = no function **Center LED** = no function **Display** = SCL; label of control parameter
		**Display** = Indication of Limiter/Compressor selection LIM; limiter parameters (page 1) COMP; compressor parameters (page 2) CLVL; level/gain parameters (page 3) KEY; common parameters for limiter and compressor (page 4)

3.3.10 Dynamics Section (Expander & Gate Part)



For dynamics processing, an Expander/Gate function and a Limiter/Compressor function can be configured. These functions can be switched ON/OFF on the Channel Strip.

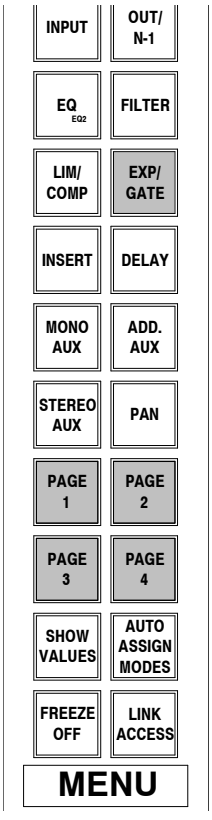
Notes: *In addition, Expander and Gate can be switched ON/OFF individually. As a result, the DYN–EXP/GTE key on the Channel Strip has no effect if both have been switched OFF individually. Pages 3 and 4 (look-forward and key control) are common to the entire dynamics section.*

Dynamic Keying: The Key Source input can be selected from CHAN (dynamics processing depends on the channel's input signal) or PTCH (processing is controlled by a signal connected via the patch). High- and low-pass filters are available for the side-chain (key source) path.

Dynamic Link: Several channels can be linked together, which means that a control signal of the channel with the *highest* level will control all *other* channels. Links are can be turned on and off from the LACP and are setup via the Graphic Controller; refer to chapter 4.4.3.7).

GRM: Gain Reduction can be displayed on the channel meters. GRM is activated on the Central Facilities Unit (CFU). This switchover affects only channels configured with a Dynamics Unit. In GRM mode, the left bar on the Channel Meter indicates the level (for stereo channels, the higher-channel level is shown), while the right bar indicates the current gain reduction produced by the Dynamics Unit. In addition, a three- colour E/G LED, which displays dynamic unit activity, is included in the fader unit.

3.3.10.1 Assigning the Expander/Gate Section



A. Global Assignment:
- Press EXP/GATE on the Master Menu Selector. The displays of *all* Channel Strips will switch over and indicate the Expander/Gate control parameters, except those in FREEZE mode; see chapter 3.3.2.
- Press one of the PAGE 1 through 4 keys on the MMS to select the desired parameters (PAGE 1 for Gate attenuation/on-off/attack/hysteresis/release/ threshold, PAGE 2 for Expander ratio/on-off/attack/release/ threshold, PAGE 3 for Look-forward, PAGE 4 for HPF/LPF/key input/side-chain link on-off).

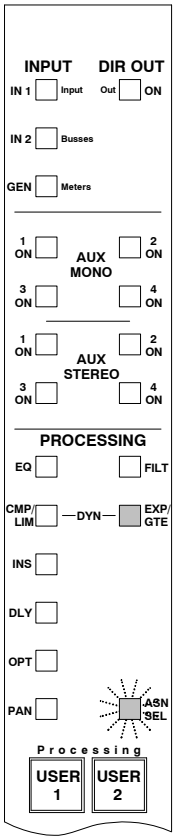
B. Local Assignment on the channel strip:
- Press ASN SEL; the ASN SEL key will *flash*.
- Press the DYN–EXP/GATE key.
- Press one of the PAGE 1 through 4 keys on the Channel Strip to select the desired parameter.

C. Local Assignment affecting *all* channel strips:
- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in "B" are available.

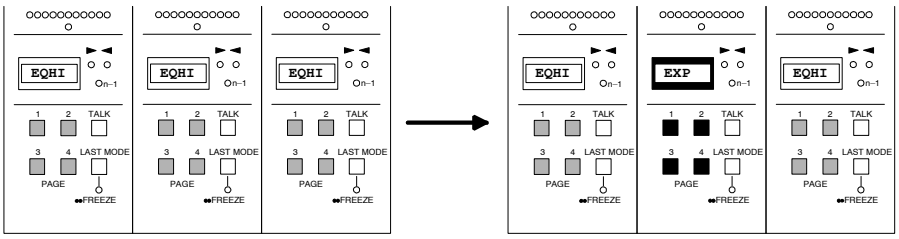
D. **Local Assignment** with Auto Assign Modes "In-Only":
- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the DYN–EXP/GTE key on the channel strip will assign the Expander/Gate parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. **Local Assignment** with Auto Assign Modes "In and Out":
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the DYN–EXP/GTE key on the channel strip is pressed (regardless of what status it toggles to), the Expander/Gate parameters are assigned to the knobs on the LACP).

Notes: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment
- Press ASN SEL on the Channel Strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assignment Mode.
- Press DYN–EXP/GTE on the Channel Strip, followed by one of the PAGE 1 through 4 keys, to control the required Dynamics Processing parameters.



3.3.10.2 Expander/Gate Parameters

The Expander/Gate parameters are available on four pages:

PAGE 1 = GATE: ON/OFF, ATTN (attenuation), HYSTERESIS (on/off), ATCK (attack time), RLSE (release time), THRS (threshold)

PAGE 2 = EXP: ON/OFF, RATIO, ATCK (attack time), RLSE (release time), THRS (threshold)

PAGE 3 = LFWD: LFWD (look forward)

PAGE 4 = KEY: HPF (on/off), LPF (on/off), KINP (key input CHAN or PTCH), SCL (side-chain link on/off)

PAGE 1 (GATE)

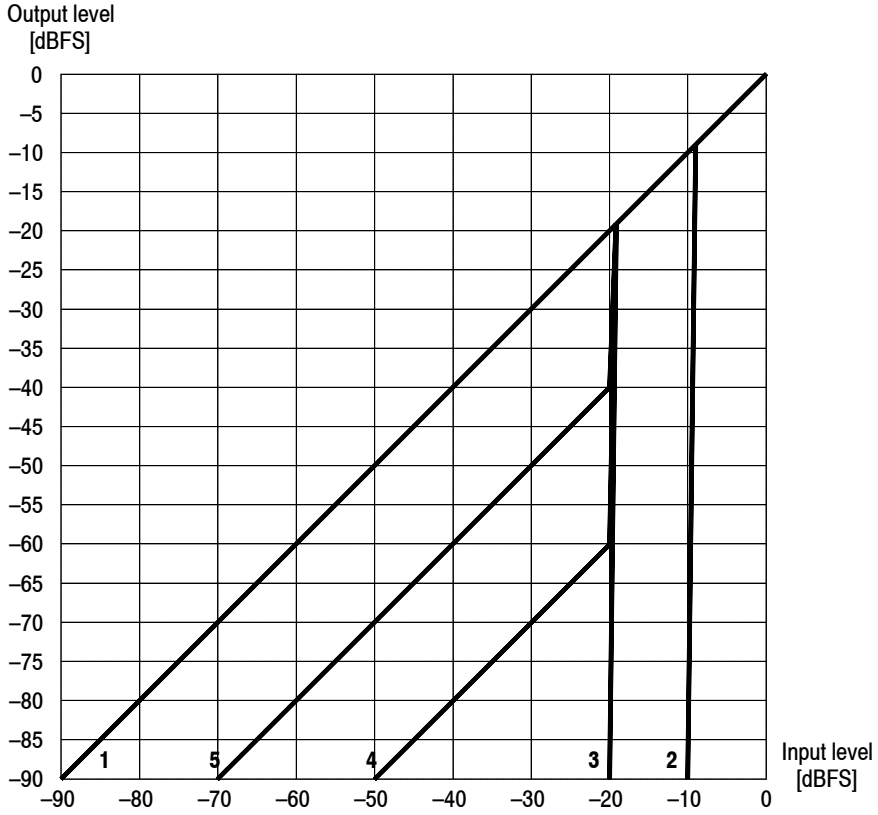
ATTENUATION: The attenuation level (ATTN) can be adjusted in 1 dB steps from 0 dB_{FS} to –48 dB_{FS} and MAX. The SW key functions as the gate ON/OFF key.

ATTACK TIME: The gate attack time (ATCK) can be adjusted within a 200 µs to 1 ms range, in 9 discrete steps (0.2 ms, 0.3 ms, 0.4 ms, 0.5 ms, 0.6 ms, 0.7 ms, 0.8 ms, 0.9 ms, 1 ms).

HYSTERESIS: The gate hysteresis function provides an offset between the un-mute and mute thresholds. This means the gate will remain open (un-muted) at a lower level than the level than was required to open it. For example, a threshold can be set so that amp noise from an electric guitar will be attenuated until the guitar is played. However, as the guitar sustains and loses energy (level) over time, the gate will remain open at levels below that which caused it open in the first place (un-mute threshold). Once the level falls far enough, the gate will close (mute) again. The hysteresis can be switched ON/OFF using the SW key located within the second LACP section.

RELEASE TIME: The gate release time (RLSE) can be adjusted within a 10 ms through 10 s range, in 13 discrete steps (10 ms, 20 ms, 30 ms, 50 ms, 100 ms, 200 ms, 300 ms, 500 ms, 1 s, 2 s, 3 s, 5 s, 10 s).

THRESHOLD: The gate threshold (THRS) can be adjusted in 1 dB steps from 0 dB_{FS} to -96 dB_{FS}.



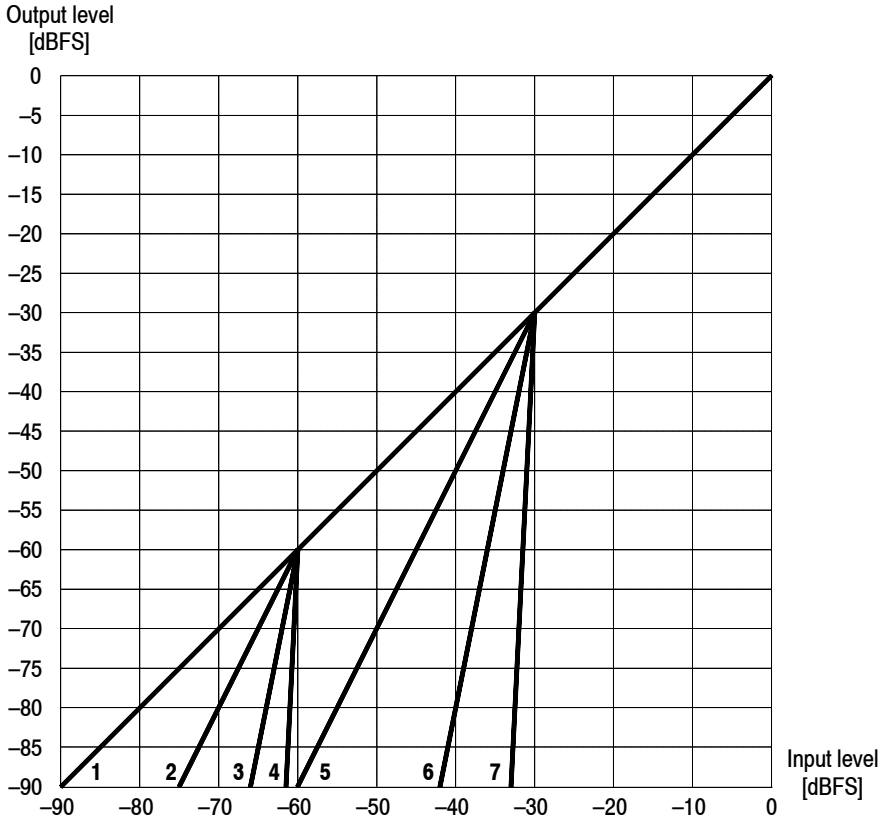
Curve	Gate	Threshold [dB]	Attenuation [dB]
1	OFF	any	any
1	ON	0	0
2	ON	–10	max.
3	ON	–20	max.
4	ON	–20	–40
5	ON	–20	–20

PAGE 2 (EXP) **RATIO:** The expander ratio (RTIO) can be adjusted from 1:1 (no expansion) to 1:20 (heavy expansion) in the following discrete steps: 1:1, 5:4, 4:3, 3:2, 5:3, 2:1, 3:1, 5:1, 7:1, 10:1, 20:1. The SW key functions as the expander ON/OFF key.

ATTACK TIME: The expander attack time (ATCK) can be adjusted within a 200 µs to 1 ms range, in 9 discrete steps (0.2 ms, 0.3 ms, 0.4 ms, 0.5 ms, 0.6 ms, 0.7 ms, 0.8 ms, 0.9 ms, 1 ms).

RELEASE TIME: The expander release time (RLSE) can be adjusted within a 10 ms through 10 s range, in discrete steps (10 ms, 20 ms, 30 ms, 50 ms, 100 ms, 200 ms, 300 ms, 500 ms, 1 s, 2 s, 3 s, 5 s, 10 s).

THRESHOLD: The expander threshold level (THRS) can be adjusted in 1 dB steps from 0 dB_{FS} to –96 dB_{FS}.



Curve	Expander	Threshold [dB]	Slope
1	OFF	any	any
1	ON	–96	any
1	ON	–30	1:1
2	ON	–60	2:1
3	ON	–60	5:1
4	ON	–60	20:1
5	ON	–30	2:1
6	ON	–30	5:1
7	ON	–30	20:1

PAGE 3 (LFWD)

LOOK FORWARD: A special function of the Dynamics Section, the feed-forward function allows a variable delay for anticipating sudden changes in audio levels, this helping the Dynamics Section to fully process fast events such as transient signals. Delay is adjustable from 0 through 25 ms.

PAGE 4 (KEY)

HPF/LPF: High-pass and low-pass filters are available within the side-chain key signal for creating effects such as frequency-dependent gating. Both filters can be switched ON/OFF independently and feature cut-off frequencies that are continuously adjustable between 20 Hz and 20 kHz.

KEY SOURCE: The Key Source input can be selected from CHAN (dynamics processing depends on the channel's input signal) or PTCH (processing is controlled by a signal connected via the patch).

SCL: Activates the Side-chain Link function, if it is available for the specified channel.

Note: *Look Forward and all PAGE 4 functions (HPF/LPF, key source, and side-chain link) are shared by all dynamic unit processes.*

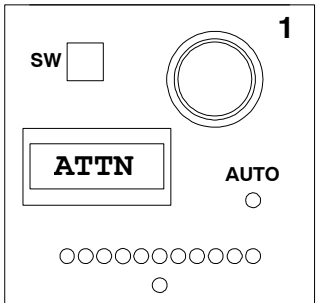
3.3.10.3 Expander/Gate Parameters on the LACP

Example 1 (PAGE 1, GATE):

Dynamics control parameter (Expander/Gate)

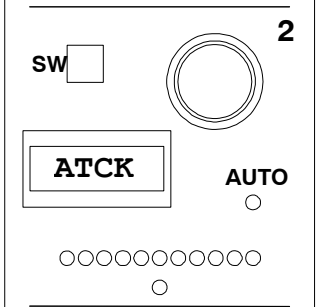
Available operating elements and their function

ATTENUATION



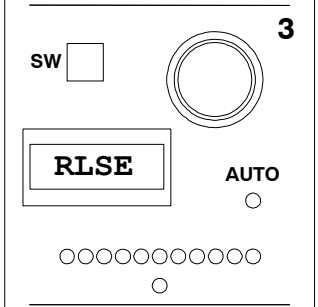
SW key = Gate ON/OFF
Rotary encoder = Attenuation setting; MAX., –48 dBFS to 0 dBFS
LED bar = Bar display, indicates current attenuation
Center LED = On if 0 dBFS is set
Display = ATTN; label of control parameter
MAX; indication of attenuation value
– 4; attenuation value –4dBFS

ATTACK TIME / HYSTERESIS



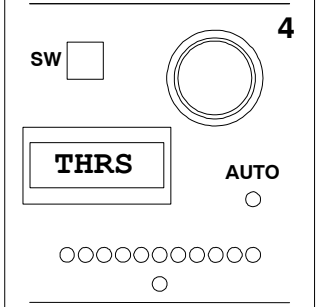
SW key = Hysteresis function ON/OFF
ON: 5 dB hysteresis, OFF: 0 dB hysteresis
Rotary encoder = Attattack time adjustment; 0.2 ms to 1 ms
LED bar = Dot display, indicates adjusted attack time
Center LED = no function
Display = ATCK; label of control parameter
0.5; attack time set to 0.5 ms

RELEASE TIME/HOLD

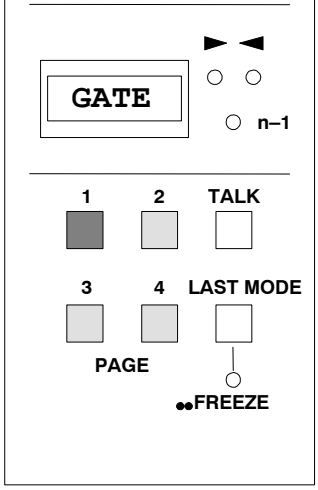


SW key = HOLD function ON/OFF; ON=150 ms/OFF=0 ms
Rotary encoder = Release time adjustment; 10 ms to 10 s
LED bar = Dot display, indicates adjusted release time
Center LED = no function
Display = RLSE; label of control parameter
100m; release time set to 100 ms
1s; release time set to 1 s

THRESHOLD

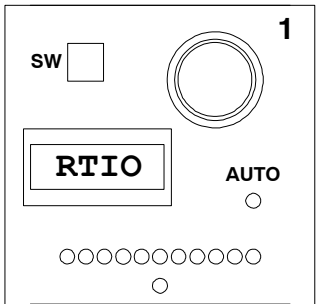
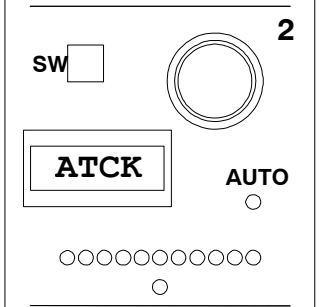
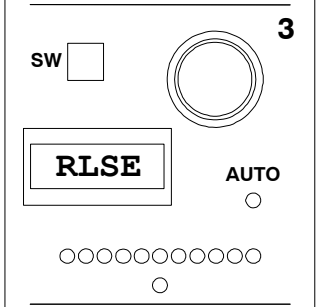
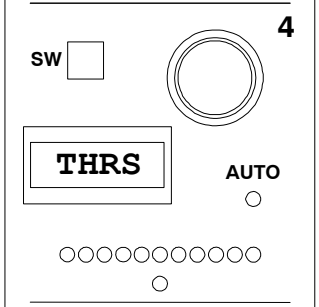
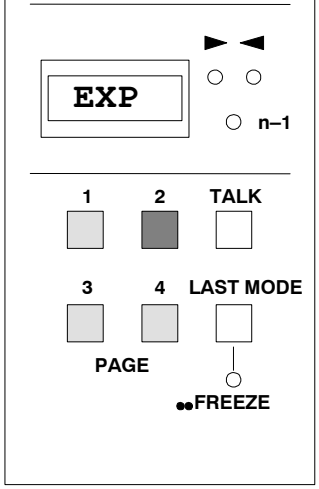


SW key = no function
Rotary encoder = Threshold adjustment; 0 to –96 dBFS, 1 dB steps
LED bar = Bar display, indicates threshold
Full bar = 0 dB, empty bar = –96 dB
Center LED = Is ON if threshold is set to 0 dBFS
Display = THRS; label of control parameter
–24; indicates threshold value –24 dBFS

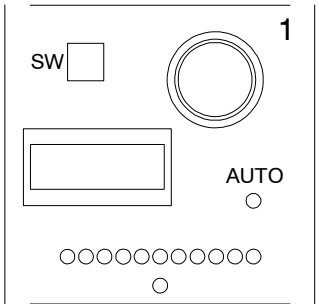
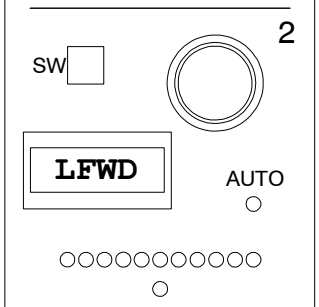
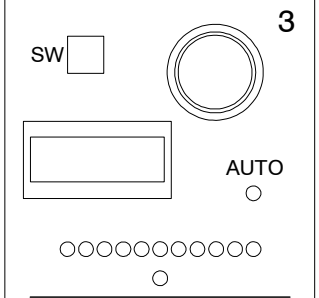
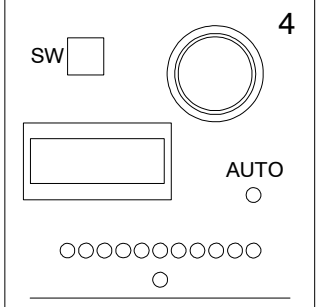
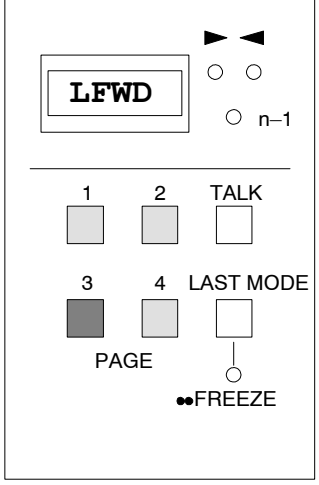


Display = Indication of Expander/Gate selection
GATE; gate parameters (page 1)
EXP; expander parameters (page 2)
LFWD; look forward time (page 3)
KEY; common parameters for expander and gate (page 4)

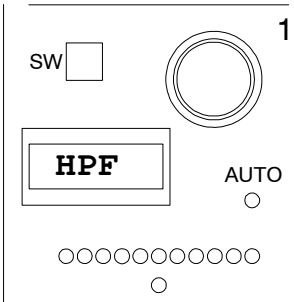
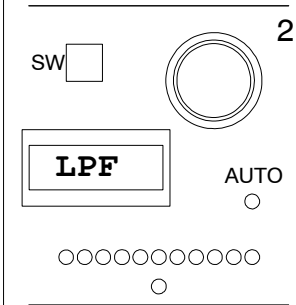
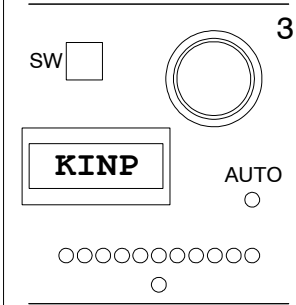
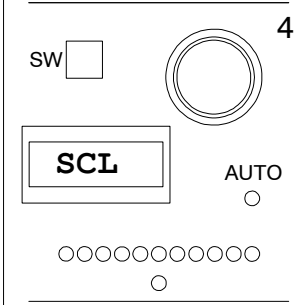
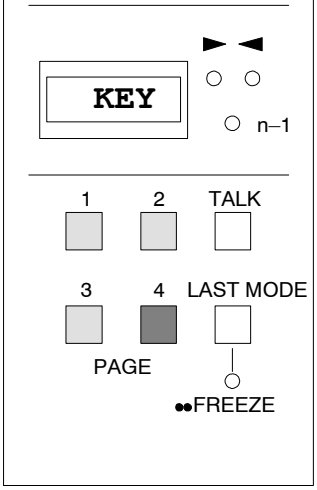
Example 2 (PAGE 2, EXP):

Dynamics control parameter (Expander/Gate)		Available operating elements and their function
RATIO		**SW key** = Expander ON/OFF **Rotary encoder** = Ratio adjustment; 1:1 to 20:1 **LED bar** = Bar display for ratio; empty bar: 1:1, full bar: 20:1 **Center LED** = ON if ratio 1:1 is set **Display** = RTIO; label of control parameter 3/1; ratio 3:1
ATTACK TIME		**SW key** = no function **Rotary encoder** = Attack time adjustment; 0.2 to 1 ms **LED bar** = Dot display, indicates adjusted attack time **Center LED** = no function **Display** = ATCK; label of control parameter 0.2; attack time 0.2 ms
RELEASE TIME/HOLD		**SW key** = HOLD function ON/OFF; ON=150 ms/OFF=0 ms **Rotary encoder** = Release time adjustment; 100 ms to 10 s **LED bar** = Dot display, indicates adjusted release time **Center LED** = no function **Display** = RELT; label of control parameter 100m; release time 100 ms 1s; release time 1 s
THRESHOLD		**SW key** = no function **Rotary encoder** = Threshold adjustment; 0 to –96 dBFS, 1 dB steps **LED bar** = Bar display, indicates adjusted threshold **Center LED** = Full bar = 0 dBFS, empty bar = –96 dBFS **Display** = ON if 0 dBFS is adjusted THRS; label of control parameter – 13; indicates threshold value –13 dBFS
		**Display** = Indication of Expander/Gate selection GATE; gate parameters (page 1) EXP; expander parameters (page 2) LFWD; look forward time (page 3) KEY; common parameters for expander and gate (page 4)

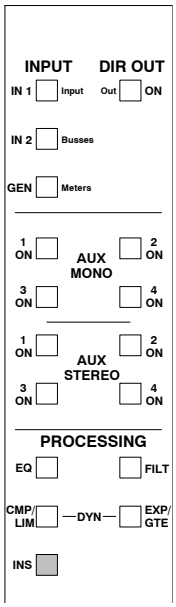
Example 3 (PAGE 3, LFWD):

Dynamics control parameter (Expander/Gate)		Available operating elements and their function
not used		not used
LOOK FORWARD		**SW key** = LFWD function ON/OFF **Rotary encoder** = Look forward time adjustment; 0 to 25 ms **LED bar** = Bar display, indicates adjusted look forward time **Center LED** = On for 0 (zero) look forward time **Display** = LFWD; label of control parameter 0; look forward time 0 ms
not used		not used
not used		not used
		**Display** = Indication of Expander/Gate selection GATE; gate parameters (page 1) EXP; expander parameters (page 2) LFWD; look forward time (page 3) KEY; common parameters for expander and gate (page 4)

Example 4 (PAGE 4, KEY):

Dynamics control parameter (Expander/Gate)		Available operating elements and their function
HIGH-PASS FILTER		**SW key** = High-pass filter ON/OFF **Rotary encoder** = Frequency adjustment **LED bar** = Dot display indicating adjusted frequency **Center LED** = no function **Display** = HPF; label of control parameter 20; frequency 20 Hz 20k; frequency 20 kHz
LOW-PASS FILTER		**SW key** = Low-pass filter ON/OFF **Rotary encoder** = Frequency adjustment **LED bar** = Dot display indicating adjusted frequency **Center LED** = no function **Display** = LPF; label of control parameter 20; frequency 20 Hz 20k; frequency 20 kHz
KEY INPUT SELECTION		**SW key** = Toggles KEY input **Rotary encoder** = Selects KEY input **LED bar** = ●●●○○○○○○○ CHAN ○○○●●●○○○○ PTCH **Center LED** = no function **Display** = KINP; label of control parameter CHAN; key taken from own signal PTCH; key taken from the patch
SIDECHAIN LINK		**SW key** = Link ON/OFF **Rotary encoder** = If touched, the display indicates ON or OFF **LED bar** = no function **Center LED** = no function **Display** = SCL; label of control parameter ON; link function ON OFF; link function OFF
		**Display** = Indication of Limiter/Compressor selection LIM; limiter parameters (page 1) COMP; compressor parameters (page 2) CLVL; level/gain parameters (page 3) KEY; common parameters for limiter and compressor (page 4)

3.3.11 Insert Section

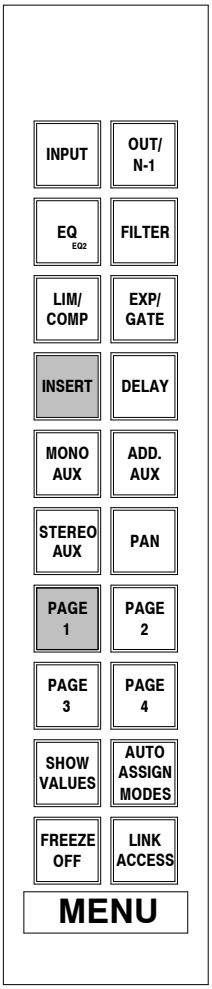


Insert points are available for all channels. Adjustable parameters are:

- INS ON/OFF (same function as the INS key on the Channel Strip),
- MIX function ON/OFF,
- MIX percentage level setting (send-to-return ratio).

Note: Pressing the INS key can interrupt the signal path if no signal is connected to the Insert Return.

3.3.11.1 Assigning the Insert Section



A. Global Assignment:

- Press INSERT on the Master Menu Selector.
  The displays of *all* Channel Strips will switch over and indicate the insert control parameters, except those in FREEZE mode; see chapter 3.3.2.
- PAGE 1 is the only page available.

B. Local Assignment on the Channel Strip:

- Press ASN SEL; the ASN SEL key will *flash*.
- Press the INS key. The Insert parameters will be displayed on the LACP
  (= PAGE 1 only)

C. Local Assignment affecting *all* channel strips:

- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in “B” are available.

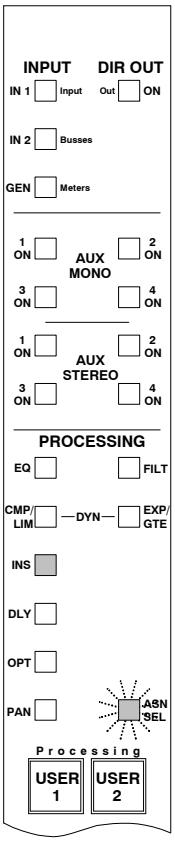
D. Local Assignment with Auto Assign Modes "In-Only":

- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the INS key on the channel strip will assign the Insert parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. Local Assignment with Auto Assign Modes "In and Out":

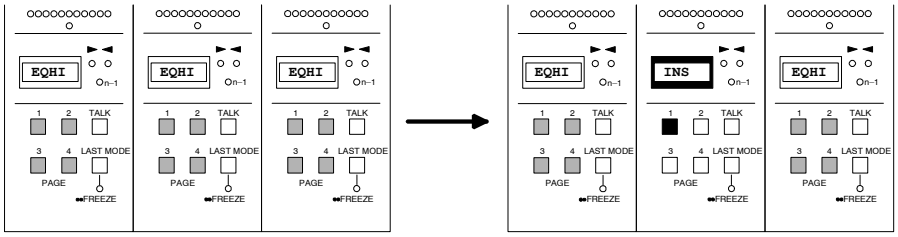
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the INS key on the channel strip is pressed (regardless of what status it toggles to), the Insert parameters are assigned to the knobs on the LACP).

Notes: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment

- Press ASN SEL on the channel strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assign Mode.
- Press INS on the channel strip to control the Insert parameters.



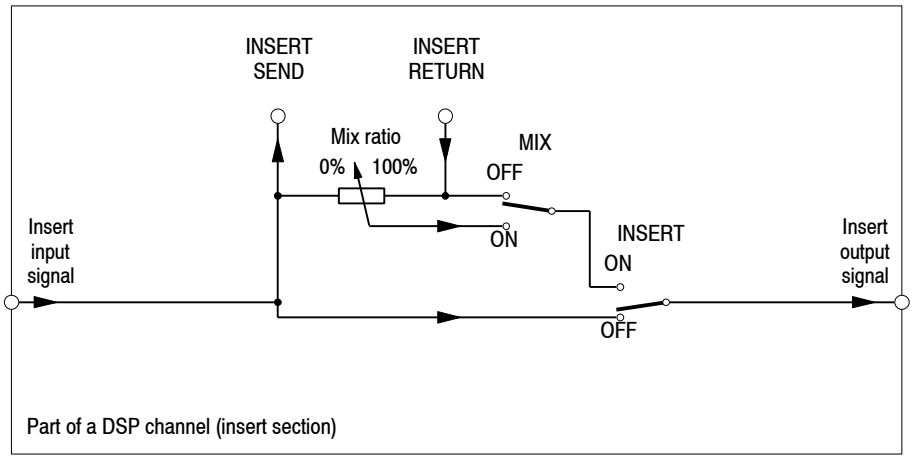
3.3.11.2 Insert Parameters

The Insert section provides selection and control of the insert point (INS ON/OFF) and the MIX function (ON/OFF), plus defining the Mix Ratio (MIX%).

INSERT: ON activates the Insert Return signal; OFF selects the Input Signal (which corresponds to the Insert Send signal).

MIX: ON activates the Insert MIX function; OFF selects only the Insert Return signal.
When the MIX function is set to ON, the ratio of the dry (send) to the wet (return) signal depends on the selected Mix Ratio. In other words, mixing between the Insert Send and the Insert Return signals is possible.

MIX %: If the MIX function is ON, this parameter allows mixing or blending of the dry (send) signal with the wet (return) in 1% increments. Dry signal only: 0% setting; wet signal only: 100% setting.

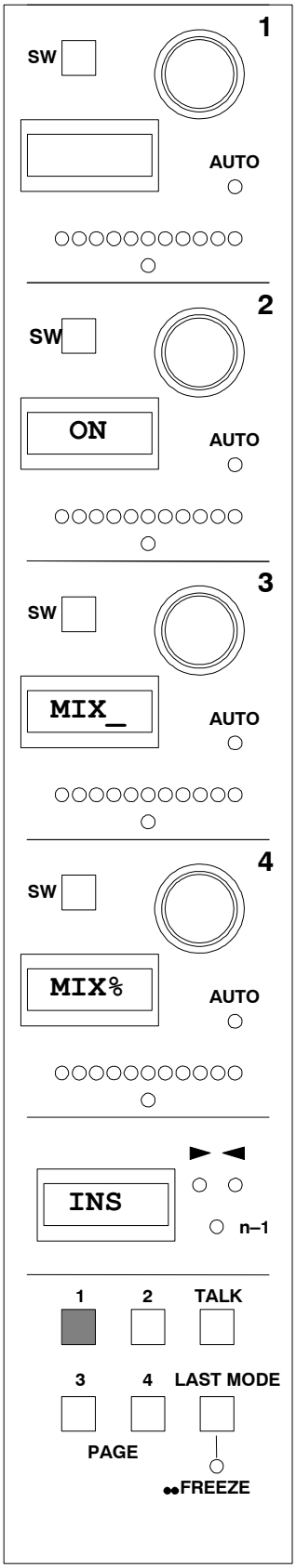


Part of a DSP channel (insert section)

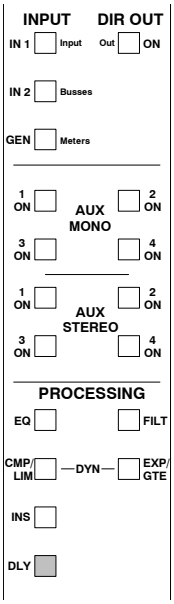
Note: *If the Insert is routed to a non-digital external device (such as an analog compressor patched through D/A and A/D converters), a comb-filter effect will result if the Insert Return and Mix are activated and the MIX % is set anywhere between DRY and WET. When inserting external analog devices, the MIX% should always be set to WET (unless this comb-filter effect is desired).*

3.3.11.3 Insert Parameters on the LACP

Example:

Insert control parameters		Available operating elements and their function
not used		not used
INSERT ON/OFF		**SW key** = Insert function ON/OFF **Rotary encoder** = no function **LED bar** = no function **Center LED** = no function **Display** = ON / OFF
MIX ON/OFF		**SW key** = Mix function ON/OFF **Rotary encoder** = If touched, the display indicates ON or OFF **LED bar** = no function **Center LED** = no function **Display** = MIX; label of control parameter
MIX RATIO		**SW key** = no function **Rotary encoder** = Signal ratio setting; dry (insert send) signal: 0%, wet (insert return) signal: 100% **LED bar** = Dot display, indicates mix ratio (dry: left, wet: right) **Center LED** = ON if 50% is set **Display** = MIX%; label of control parameter 0%; insert send signal only (dry) 100%; insert return signal only (wet)
		Display = Indication of Insert selection (Pages 2 to 4 not used)

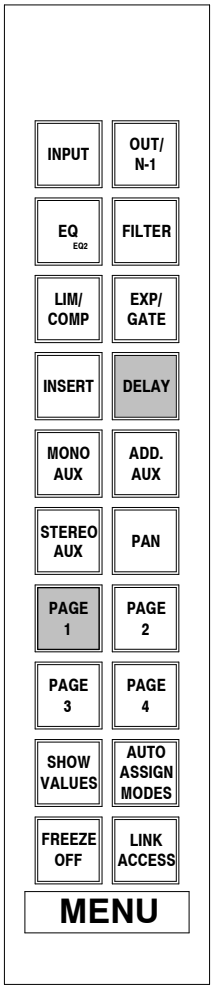
3.3.12 Delay Section



A delay function is available for all Channel Types, that can be switched ON/OFF on the Channel Strip using the DLY key.

The Delay Section provides selection and control of the delay function (ON/OFF) and setting of delay time. Delay time can be adjusted from 0 through 47 samples, and from 1 ms through 100 ms (or, depending on the system configuration, up to 240 ms). Delay time in ms is automatically converted into a delay distance (from 0 through 33.3 cm, and from 0.34 through 34/81.5 m, depending on the system configuration). Both values are displayed simultaneously.

3.3.12.1 Assigning the Delay Section



A. Global Assignment:
- Press DELAY on the Master Menu Selector.
  The displays of all Channel Strips will switch over and indicate the delay control parameters, except those in FREEZE mode; see chapter 3.3.2.
- PAGE 1 is the only page available.

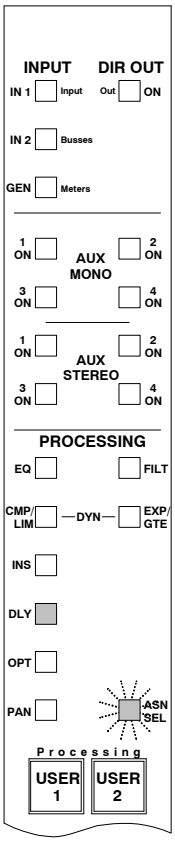
B. Local Assignment on the Channel Strip:
- Press ASN SEL; the ASN SEL key will *flash*.
- Press the DLY key. The insert parameters will be displayed on the LACP (= PAGE 1 only)

C. Local Assignment affecting *all* Channel Strips:
- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in “B” are available.

D. Local Assignment with Auto Assign Modes "In-Only":
- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the DLY key on the channel strip will assign the DELAY parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

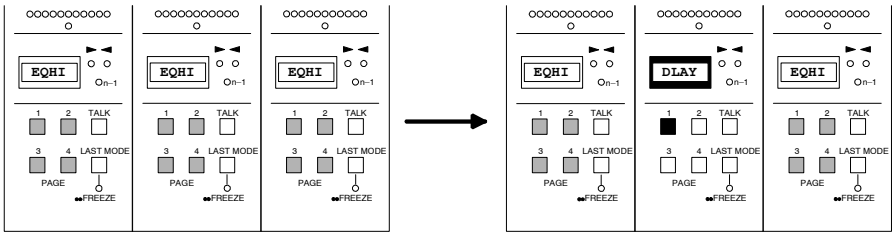
E. Local Assignment with Auto Assign Modes "In and Out":
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the DLY key on the channel strip is pressed (regardless of what status it toggles to), the DELAY parameters are assigned to the knobs on the LACP).

Notes: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment

- Press ASN SEL on the Channel Strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Edit Mode.
- Press DLY on the Channel Strip to control the delay parameters.



3.3.12.2 Delay Parameters

The Delay value can only be adjusted as a delay time (displayed in samples or ms) using the rotary encoder within the fourth LACP section. As the Delay time is adjusted, the distance display changes to show the corresponding physical distance (displayed in centimeters and meters).

DELAY: Delay can be switched ON/OFF using the DLY key on the Channel Strip.

DELAY TIME: Delay time can be set in a range from 0 through 47 samples, and from 1 ms through 100 ms (or, dependent upon the system configuration, to a maximum of 240 ms). While adjusting delay time, the value is simultaneously converted into a delay distance (from 0 through 33.3 cm, and from 0.34 through 34 m, or up to 81.5 m, depending on the system configuration). Both values are displayed simultaneously on the LACP.

DELAY DISTANCE: Delay distance (display only, no delay distance setting) in cm or m, see DELAY TIME above.

3.3.12.3 Delay Parameters on the LACP

Example:

Delay control parameters

DELAY DISTANCE UNIT – INDICATION ONLY

Indicates the distance units. Display in centimeters (cm) or in meters (m)

DELAY DISTANCE – INDICATION ONLY

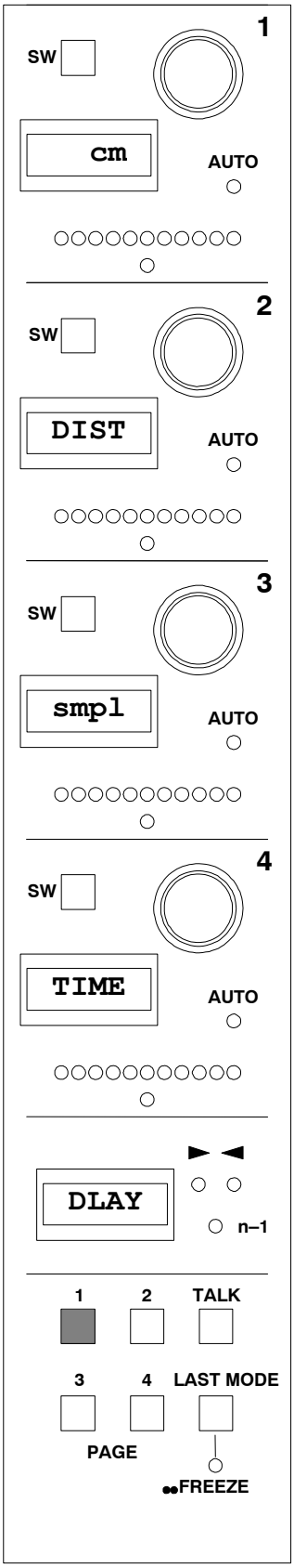
When adjusting the delay time, the distance indication will change simultaneously.

DELAY TIME UNIT – INDICATION ONLY

Indicates the set delay time; display in samples (smpl) or in milliseconds (ms)

DELAY TIME

Delay time adjustment; when adjusting the delay distance indication will change simultaneously.



Available operating elements and their function

DELAY DISTANCE UNIT – INDICATION ONLY

SW key	=	no function
Rotary encoder	=	no function
LED bar	=	no function
Center LED	=	no function
Display	=	cm; centimeters m ; meters

DELAY DISTANCE – INDICATION ONLY

SW key	=	no function
Rotary encoder	=	If touched, the display indicates adjusted distance
LED bar	=	Bar display, indicates adjusted distance
Center LED	=	no function
Display	=	DIST; label of control parameter Distance in cm or m if rotary encoder is touched

DELAY TIME UNIT – INDICATION ONLY

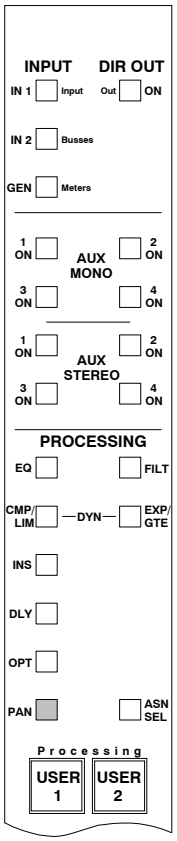
SW key	=	no function
Rotary encoder	=	no function
LED bar	=	no function
Center LED	=	no function
Display	=	smpl; samples msec; milliseconds

DELAY TIME

SW key	=	no function
Rotary encoder	=	Delay *time* setting 0 to 47 samples, 1 to 100 or 240 ms
LED bar	=	Bar display, indicates adjusted time
Center LED	=	no function
Display	=	TIME; label of control parameter

Display	=	Indication of Delay selection (Pages 2 to 4 not used)

3.3.13 Panning Section

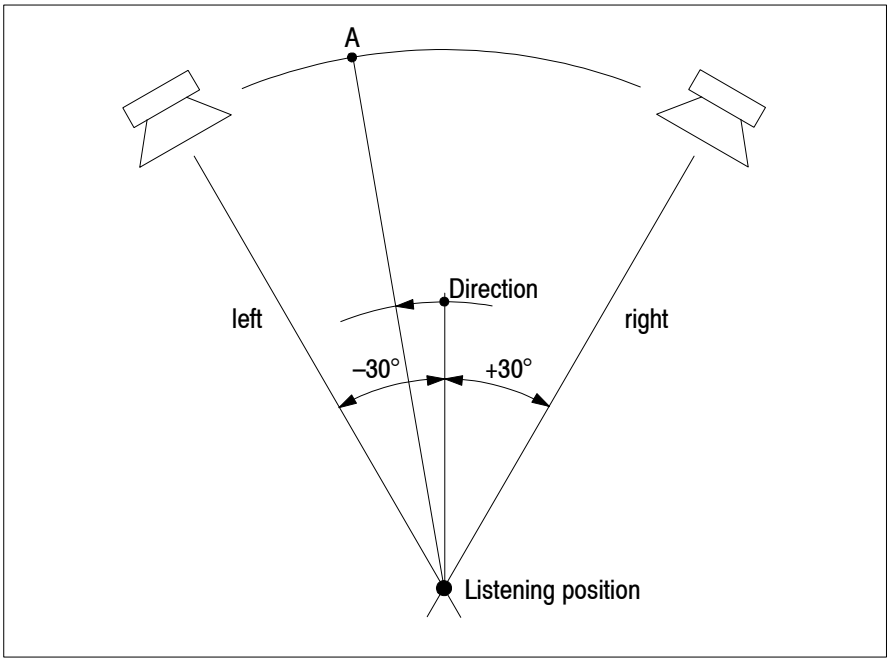


There are several panning options available for the D950. These range from a simple left/right pan, to a stereo direction pan with width control, to the sophisticated family of *Virtual Surround Panning* (VSP) modules. Left/Right and VSP functions are available for mono input, group, multitrack input, and multitrack monitor channels. Direction and Direction with Width functions are available for stereo input and group channels.

If fitted, all panning functions can be controlled by the D950 motorized Joysticks. To assign a channel to a Joystick, press the Joystick ASSIGN key (it will flash) and then the CH SEL key for the desired channel. A Joystick can be used to automate panning functions (if the console is fitted with Dynamic Automation) and then reassigned to another channel.

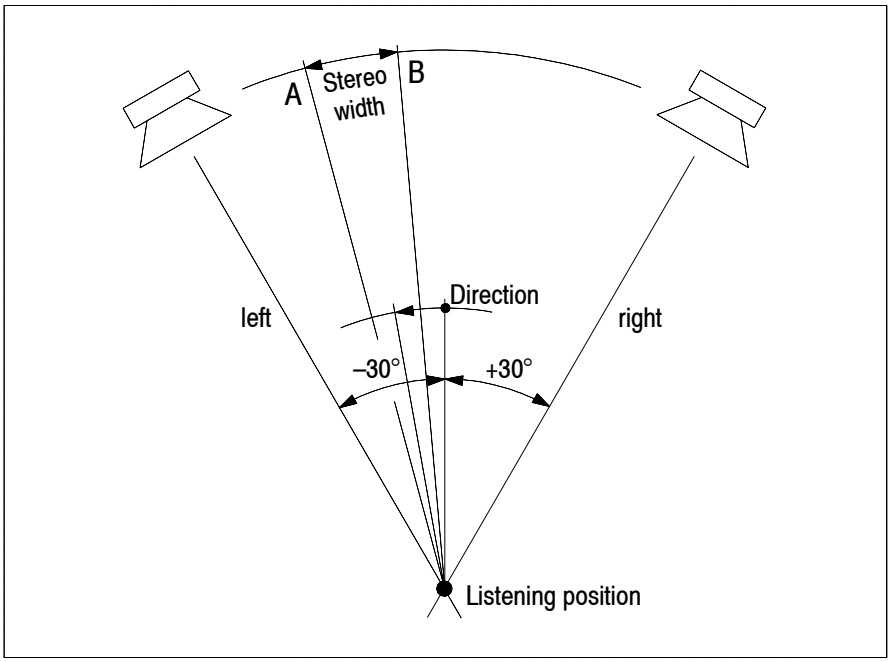
For mono channels, the LR Panning function is a simple PAN potentiometer controlling the contribution of the mono signal to the odd and even or left and right busses.

- PAN ON/OFF
- PAN function: Changes the mono direction in 1° steps from –30° (left) to +30° (right).



For stereo channels,
- PAN ON/OFF and
- PAN Function

have been extended to enable working with either standard (L/R) stereo or with MS (mono/side) signals. In addition, features are available to increase the stereo image manipulation possibilities, such as
- Input Direction or
- Input Balance,
- Stereo Width (pan width), and
- Stereo Direction.



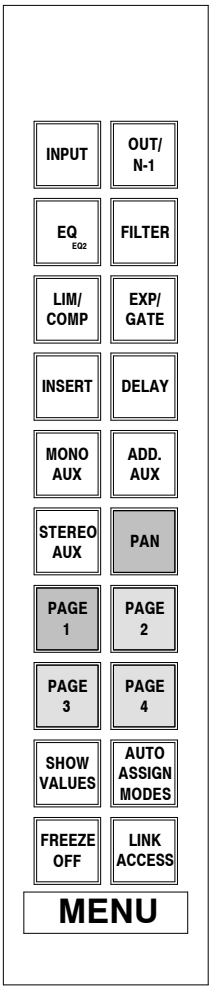
Virtual Surround Panning (VSP): Various surround panning algorithms can be configured for mono input, group, multitrack input, and multitrack monitor channels using the Session Configuration Tool.

Basically, three different surround pan algorithms are available: Multi-format pan, HRTF (Head-Related Transfer Function) pan, and VSP (Virtual Surround Panning), see table; some more information on these algorithms is given in the "Parameters" sections below.

Algorithm:	Format 2-CH to 7.1-CH	LCR, F/B, Ls/Rs pan	Diver-gence	Pan mode	VSP controls: Ambience, Distance, Absorption, Room size
Multi-format pan	X	X	X	Amplitude	–
HRTF pan	X	X	X	Ampl., HRTF, Sphere, ORTF, AB	–
VSP pan	X	X	X	Ampl., HRTF, Sphere, ORTF, AB	X

Depending upon the currently loaded session configuration, some or all of the three algorithms above may be present in the console.

3.3.13.1 Assigning the Panning Section



A. Global Assignment:

- Press PAN on the Master Menu Selector.
  Displays of *all* Channel Strips will switch over to indicate the panning control parameters, except those in FREEZE mode; see chapter 3.3.2.
- PAGE 1 is the only page available for Stereo PAN.
- PAGEs 1 through 4 are available for Surround PAN.

B. Local Assignment on the Channel Strip:

- Press ASN SEL; the ASN SEL key will *flash*.
- Press the PAN key. The Panning parameters will be displayed on the LACP.

C. Local Assignment affecting *all* channel strips:

- Press LINK ACCESS on the Master Menu Selector.
- Pressing a local assignment key will now affect all Channel Strips. The same functions as described in “B” are available.

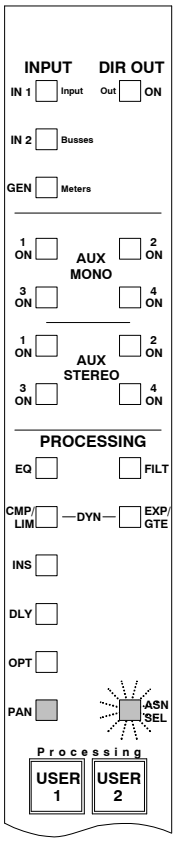
D. Local Assignment with Auto Assign Modes "In-Only":

- Press AUTO ASSIGN MODES on the Master Menu Selector once (AUTO ASSIGN MODES is illuminated).
- Pressing the PAN key on the channel strip will assign the Panning parameters to the LACP without pressing the ASN SEL key, provided the function toggles to an IN (or ON) status. If it toggles to an OUT (or OFF) status, the knob status does not change.

E. Local Assignment with Auto Assign Modes "In and Out":

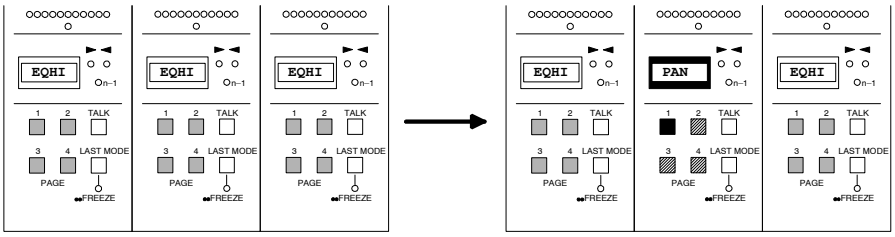
- Press AUTO ASSIGN MODES on the Master Menu Selector twice (the AUTO ASSIGN MODES key and the ASN SEL keys on all the channel strips are illuminated).
- Every time the PAN key on the channel strip is pressed (regardless of what status it toggles to), the Panning parameters are assigned to the knobs on the LACP).

Notes: AUTO ASSIGN MODES and LINK ACCESS may be engaged at the same time.



Example: Local Assignment

- Press ASN SEL on the Channel Strip; the ASN SEL key will *flash*. The flashing ASN SEL key indicates Select Assignment Mode.
- Press PAN on the Channel Strip to control the Panning parameters.



3.3.13.2 Panning Parameters

LR PAN: The LR PAN has only one panning function: left/right panning. It is useful for left and right panning to stereo master or group busses or odd/even panning to group or multitrack busses. *The LR PAN is available only on mono channel types.*

LR PAN (PAN) has the following parameters:

ON/OFF: The first SW key on the LACP provides an ON/OFF function.

PAN: The fourth LACP rotary encoder provides left and right (odd/even) panning control with 1° steps from –30° (left) to +30° (right). L30 indicates full left, 30R indicates full right, and L00R indicates the center position.

DIR: The DIR is a stereo direction pan *and is available only in stereo channel types*. It is useful for controlling the direction of stereo signals to master, group, and multitrack busses.

DIR has the following parameters:

FUNC: The SW key or rotary encoder is used to select one of two input functions: IBAL *or* IDIR.

IBAL: This parameter is used to control the input balance of a stereo channel. The SW key is used to turn this function ON/OFF. Turning the rotary encoder to the left attenuates the right channel from 0 to -∞ dB (L30) while the left channel remains at full input level, and vice versa. L30 indicates full right channel attenuation, 30R indicates full left channel attenuation, and L00R indicates 0 attenuation on either channel.

IDIR: The rotary encoder is used to control the input direction of a stereo channel in 1° steps from –30° (left) to +30° (right). The SW key is used to turn this function ON/OFF. L30 indicates full left, 30R indicates full right, and L00R indicates the center position.

DIR: This provides left and right (odd/even) panning control in 1° steps from –30° (left) to +30° (right). L30 indicates full left, 30R indicates full right, and L00R indicates the center position.

DIR WIDTH: The DIR WIDTH is identical to the DIR pan with the addition of a width control.

DIR WIDTH (DIR) has the following parameters:

FUNC: The SW key or rotary encoder is used to select between two input functions: IBAL and IDIR.

IBAL: This parameter is used to control the input balance of a stereo channel. The SW key is used to turn this function ON/OFF. Turning the rotary encoder to the left attenuates the right channel from 0 to -∞ dB (L30) while the left channel remains at full input level, and vice versa. L30 indicates full right channel attenuation, 30R indicates full left channel attenuation, and L00R indicates 0 attenuation on either channel.

IDIR: The rotary encoder is used to control the input direction of a stereo channel in 1° steps from –30° (left) to +30° (right). The SW key is used to turn this function ON/OFF. L30 indicates full left, 30R indicates full right, and L00R indicates the center position.

PWTH: The Pan Width parameter is used to control the width of the stereo signal. PWTH is only functional if there is a difference between the left and right input channels, or IBAL or IDIR has been used to create an offset between the channels. The DIR control directs the position of the stereo signal, and the PWTH control determines the *width* or *stereo spread* either side of that position. PWTH operates over a range between 0% and 200%. The SW key activates this function.

DIR: This provides left and right (odd/even) panning control with 1° steps from –30° (left) to +30° (right). L30 indicates full left, 30R indicates full right, and L00R indicates the center position.

3.3.13.3 VSP (Virtual Surround Panning) Parameters

Virtual Surround Panning is a comprehensive family of three panning algorithms: Multi-Format Pan, HRTF (Head Related Transfer Function) Surround Pan, and VSP (Virtual Surround Pan). These panners support a variety of surround formats and applications; in all these modes, an LFE (Low Frequency Effects) control is available. *VSP panning functions can be configured only in mono channel types.*

3.3.13.3.1 Multi-Format Pan

The Multi-format Pan w/LFE (MPAN) parameters are available on four pages. The parameters that appear on these pages depend on the selected format. Formats include two-channel (2CH), three-channel (LCR), four-channel (LCRS), six-channel (5.1), seven-channel (EX), and eight-channel (7.1). The format selection parameter is found on PAGE 2 regardless of which format is currently selected for use.

2CH PAN: The 2CH PAN is a basic stereo pan intended for left/right and odd/even panning applications. 2CH PANning parameters are as follows:

- PAGE 1 = MPAN: 2CH
- PAGE 2 = FEED: FRMT (format)

2CH: The fourth LACP rotary encoder provides left and right (odd/even) panning control with 1° steps from –30° (left) to +30° (right). L30 indicates full left, 30R indicates full right, and L00R indicates the center position. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to “lock” the pan position in place.

FRMT: This serves as the format selector in all MPAN modes. The following selections are possible: 2CH, LCR, LCRS, 5.1, EX, and 7.1.

Note: The order of 2CH bus assignments is as follows: L, R.

LCR PAN:

The LCR (Left/Center/Right) PAN is a basic three-channel panner with divergence and center channel controls. LCR PANning parameters are as follows:

- PAGE 1 = MPAN: CENT (center percentage), LCR (left/center/right)
- PAGE 2 = FEED: FRMT (format)
- PAGE 3 = MODE: DIVM (divergence mode), DIVG (divergence function)

CENT: A center percentage control is provided to adjust the amount of signal sent directly to the center channel. This function has 5% increments and is activated using the SW key. When this parameter is inactive or set to 0%, the LCR control acts as a traditional L/R pan pot with no signal being sent to the center channel. This provides a phantom center channel image between the left and right speakers. When CENT is active and set to 100%, signals panned between the left and right channels are directed to the center channel. In this case, as the rotary encoder is moved from center towards the left, the signal shifts from the center channel towards the left channel with the right channel receiving no contribution, and vice versa.

LCR: This parameter controls the front left/center/right pan with 1° steps from –30° (left) to C (center) to +30° (right). L30 indicates full left, 30R indicates full right, and C indicates the center position. The contribution to the center channel is determined by the CENT parameter. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

FRMT: This serves as the format selector in all MPAN modes. The following selections are possible: 2CH, LCR, LCRS, 5.1, EX, and 7.1.

DIVM: This is the divergence mode selector. *Front* is the only diverge mode available in the LCR pan. The SW key or rotary encoder selects between OFF and FRNT (active).

DIVG: The divergence function is used to bleed portions of sound from the panned output to the other speakers. For example, if the divergence is active and set to 100%, the LCR control will act as a traditional L/R pan pot (assuming there is no center channel contribution). Panning to full left will result in full attenuation of the right channel. If the divergence is then set to 50%, one half of the left channel signal strength will be *bled* into the right channel (without effecting the left channel). With the divergence control set to 1%, equal signal will be fed to both channels and the LCR pan pot will have no effect. Divergence values are as follows: 1%, 2%, 3%, 4%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 60%, 70%, 80%, 90%, 100%. Careful use of this control may have the effect increasing the size of the mix "sweet spot", particularly for large auditoriums. Misuse of this control may result in essentially mono panning.

Note: The order of LCR bus assignments is as follows: L, R, C.

LCRS PAN:

The LCRS (Left/Center/Right/Surround) PAN is a four-channel panner intended for use in 4-2-4 matrixed surround systems. In addition to the same parameters found in LCR mode, the LCRS panner includes front/surround and an unique *Pan-Around* function. LCRS PANning parameters are as follows:

- PAGE 1 = MPAN: CENT (center percentage), F/S (front/surround), LCRS (left/center/right)
- PAGE 2 = FEED: FRMT (format)
- PAGE 3 = MODE: PANA (Pan-Around), DIVM (divergence mode), DIVG (divergence function)

CENT: A center percentage control is provided to adjust the amount of signal sent directly to the center channel. This function has 5% increments and is activated using the SW key. When this parameter is inactive or set to 0%, the LCR control acts as a traditional L/R pan pot with no signal being sent to the center channel. This provides a phantom center channel image between the left and right speakers. When CENT is active and set to 100%, signals panned between the left and right channels are directed to the center channel. In this case, as the rotary encoder is moved from center towards the left, the signal shifts from the center channel towards the left channel with the right channel receiving no contribution, and vice versa.

F/S: This front/surround parameter provides panning between front channels (LCR) and the rear channel (surround). This control operates within a range of 60 increments. F30 indicates full front, 30B indicates full surround, and 0 indicates the mid position. The SW key allows the rotary encoder to be deactivated and provides the ability to "lock" the pan position in place.

LCRS: This parameter controls the front left/center/right pan with 1° steps from –30° (left) to C (center) to +30° (right). L30 indicates full left, 30R indicates full right, and C indicates the center position. The contribution to the center channel is determined by the CENT parameter. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

FRMT: This serves as the format selector in all MPAN modes. The following selections are possible: 2CH, LCR, LCRS, 5.1, EX, and 7.1.

PANA: An unique *Pan-Around* function is activated by the SW key and controlled with the rotary encoder. This is a single-knob function that provides an easy-to-use pan setting around all selected loudspeakers (depending on format) in a circular fashion.

DIVM: This is the divergence mode selector. The divergence function can be applied to panning between all channels or the front channels only. The SW key or rotary encoder selects between OFF, FRNT, and ALL.

DIVG: The divergence function is used to bleed portions of sound from the panned output to the other speakers. For example, if the divergence is active and set to 100%, the LCR control will act as a traditional L/R pan pot (assuming there is no center channel contribution). Panning to full left will result in full attenuation of the right channel. If the divergence is then set to 50%, one half of the left channel signal strength will be *bled* into the right channel (without effecting the left channel). With the divergence control set to 1%, equal signal will be fed to both channels and the LCR pan pot will have no effect. Divergence values are as follows: 1%, 2%, 3%, 4%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 60%, 70%, 80%, 90%, 100%. Careful use of this control may have the effect increasing the size of the mix "sweet spot", particularly for large auditoriums. Misuse of this control may result in essentially mono panning.

Note: The order of LCRS bus assignments is as follows: L, R, C, S.

5.1 PAN:

The 5.1 PAN is a six-channel panner with left, center, right, left surround, right surround, and low frequency effects (LFE) channels. In addition to the same parameters found in LCRS mode, the 5.1 panner includes left/right surround panning and a LFE feed. 5.1 PANning parameters are as follows:

- PAGE 1 = MPAN: CENT (center percentage), LsRs (left surround/ right surround), F/S (front/surround), 5.1 (left/center/right)
- PAGE 2 = FEED: FRMT (format), LFE (low frequency effects)
- PAGE 3 = MODE: PANA (Pan-Around), DIVM (divergence mode), DIVG (divergence function)

CENT: A center percentage control is provided to adjust the amount of signal sent directly to the center channel. This function has 5% increments and is activated using the SW key. When this parameter is inactive or set to 0%, the LCR control acts as a traditional L/R pan pot with no signal being sent to the center channel. This provides a phantom center channel image between the left and right speakers. When CENT is active and set to 100%, signals panned between the left and right channels are directed to the center channel. In this case, as the rotary encoder is moved from center towards the left, the signal shifts from the center channel towards the left channel with the right channel receiving no contribution, and vice versa.

LsRs: This parameter controls panning between the left and right surround channels. This control provides 1° steps from –30° (left surround) to +30° (right surround). L30 indicates full left surround, 30R indicates full right surround, and L00R indicates the mid position. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

F/S: This front/surround parameter provides panning between front channels (LCR) and the rear channels (left and right surround). This control operates within a range of 60 increments. F30 indicates full front, 30B indicates full surround, and 0 indicates the mid position. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

5.1: This parameter controls the front left/center/right pan with 1° steps from –30° (left) to C (center) to +30° (right). L30 indicates full left, 30R indicates full right, and C indicates the center position. The contribution to the center channel is determined by the CENT parameter. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

FRMT: This serves as the format selector in all MPAN modes. The following selections are possible: 2CH, LCR, LCRS, 5.1, EX, and 7.1.

LFE: The SW key serves as an ON/OFF for the Low Frequency Effects channel. The rotary encoder controls the LFE level over a mute to +10 dB range in 0.5 dB increments (–∞ dB to +10 dB).

PANA: An unique *Pan-Around* function is activated by the SW key and controlled with the rotary encoder. This is a single-knob function that provides an easy-to-use pan setting around all selected loudspeakers (depending on format) in a circular fashion.

DIVM: This is the divergence mode selector. The divergence function can be applied to panning between all channels or the front channels only. The SW key or rotary encoder selects between OFF, FRNT, and ALL.

DIVG: The divergence function is used to bleed portions of sound from the panned output to the other speakers. For example, if the divergence is active and set to 100%, the LCR control will act as a traditional L/R pan pot (assuming there is no center channel contribution). Panning to full left will

result in full attenuation of the right channel. If the divergence is then set to 50%, one half of the left channel signal strength will be *bled* into the right channel (without effecting the left channel). With the divergence control set to 1%, equal signal will be fed to both channels and the LCR pan pot will have no effect. Divergence values are as follows: 1%, 2%, 3%, 4%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 60%, 70%, 80%, 90%, 100%. Careful use of this control may have the effect increasing the size of the mix "sweet spot", particularly for large auditoriums. Misuse of this control may result in essentially mono panning.

Note: The order of 5.1 bus assignments is as follows: L, R, C, Ls, Rs, LFE.

EX PAN: The EX PAN is exactly the same as the 5.1 panner except it provides a LCR mode for the surround channels. It has a seven-channel panner with left, center, right, left surround, center surround, right surround, and low frequency effects (LFE) channels. EX PANning parameters are as follows:

- PAGE 1 = MPAN: CENT (center percentage), sLCR (left surround/ center surround/right surround), F/S (front/surround), 5.1 (left/center/ right)
- PAGE 2 = FEED: FRMT (format), LFE (low frequency effects)
- PAGE 3 = MODE: PANA (Pan-Around), DIVM (divergence mode), DIVG (divergence function)

CENT: A center percentage control is provided to adjust the amount of signal sent directly to the center channel. This function has 5% increments and is activated using the SW key. When this parameter is inactive or set to 0%, the LCR control acts as a traditional L/R pan pot with no signal being sent to the center channel. This provides a phantom center channel image between the left and right speakers. When CENT is active and set to 100%, signals panned between the left and right channels are directed to the center channel. In this case, as the rotary encoder is moved from center towards the left, the signal shifts from the center channel towards the left channel with the right channel receiving no contribution, and vice versa.

sLCR: This parameter controls panning between the left, center, and right surround channels. This control provides 1° steps from –30° (left surround) to 0° (center surround) to +30° (right surround). L30 indicates full left surround, 30R indicates full right surround, and L00R indicates center surround. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

F/S: This front/surround parameter provides panning between front channels (LCR) and the rear channels (left and right surround). This control operates within a range of 60 increments. F30 indicates full front, 30B indicates full surround, and 0 indicates the mid position. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

EX: This parameter controls the front left/center/right pan with 1° steps from –30° (left) to C (center) to +30° (right). L30 indicates full left, 30R indicates full right, and C indicates the center position. The contribution to the center channel is determined by the CENT parameter. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

FRMT: This serves as the format selector in all MPAN modes. The following selections are possible: 2CH, LCR, LCRS, 5.1, EX, and 7.1.

LFE: The SW key serves as an ON/OFF for the Low Frequency Effects channel. The rotary encoder controls the LFE level over a mute to +10 dB range in 0.5 dB increments (–∞ dB to +10 dB).

PANA: A unique *Pan-Around* function is activated by the SW key and controlled with the rotary encoder. This is a single-knob function that provides an easy-to-use pan setting around all selected loudspeakers (depending on format) in a circular fashion.

DIVM: This is the divergence mode selector. The divergence function can be applied to panning between all channels or the front channels only. The SW key or rotary encoder selects between OFF, FRNT, and ALL.

DIVG: The divergence function is used to bleed portions of sound from the panned output to the other speakers. For example, if the divergence is active and set to 100%, the LCR control will act as a traditional L/R pan pot (assuming there is no center channel contribution). Panning to full left will result in full attenuation of the right channel. If the divergence is then set to 50%, one half of the left channel signal strength will *bleed* into the right channel (without effecting the left channel). With the divergence control set to 1%, equal signal will be fed to both channels and the LCR pan pot will have no effect. Divergence values are as follows: 1%, 2%, 3%, 4%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 60%, 70%, 80%, 90%, 100%. Careful use of this control may have the effect of increasing the size of the mix "sweet spot", particularly for large auditoriums. Misuse of this control may result in essentially mono panning.

Note: The order of EX bus assignments is as follows: L, R, C, Ls, Rs, LFE, Cs.

7.1 PAN:

The 7.1 PAN is an eight-channel panner with left, left center, center, right center, right, left surround, right surround, and low frequency effects (LFE) channels. 7.1 PANning parameters are as follows:

- PAGE 1 = MPAN: CENT (center percentage), LsRs (left surround/ right surround), F/S (front/surround), 5.1 (left/center/right)
- PAGE 2 = FEED: FRMT (format), LFE (low frequency effects)
- PAGE 3 = MODE: PANA (Pan-Around), DIVM (divergence mode), DIVG (divergence function)

CENT: A center channel is turned ON/OFF using the SW key.

LsRs: This parameter controls panning between the left and right surround channels. This control provides 1° steps from –30° (left surround) to +30° (right surround). L30 indicates full left surround, 30R indicates full right surround, and L00R indicates the mid position. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

F/S: This front/surround parameter provides panning between front channels (LCR) and the rear channels (left and right surround). This control operates within a range of 60 increments. F30 indicates full front, 30B indicates full surround, and 0 indicates the mid position. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

7.1: This parameter controls the front panning between the left, left-center, center, right-center, and right channels with 1° steps. L30 = left, L15 = left- center, C = center, 15R = right-center, and 30R = right. The contribution to the center channel is determined by the CENT control. The SW key allows the rotary encoder to be deactivated and therefore provides the ability to "lock" the pan position in place.

FRMT: This serves as the format selector in all MPAN modes. The following selections are possible: 2CH, LCR, LCRS, 5.1, EX, and 7.1.

LFE: The SW key serves as an ON/OFF for the Low Frequency Effects channel. The rotary encoder controls the LFE level over a mute to +10 dB range in 0.5 dB increments (–∞ dB to +10 dB).

PANA: An unique *Pan-Around* function is activated by the SW key and controlled with the rotary encoder. This is a single-knob function that provides an easy-to-use pan setting around all selected loudspeakers (depending on format) in a circular fashion.

DIVM: This is the divergence mode selector. The divergence function can be applied to panning between all channels or the front channels only. The SW key or rotary encoder selects between OFF, FRNT, and ALL.

DIVG: The divergence function is used to bleed portions of sound from the panned output to the other speakers. For example, if the divergence is active and set to 100%, the LCR control will act as a traditional L/R pan pot (assuming there is no center channel contribution). Panning to full left will result in full attenuation of the right channel. If the divergence is then set to 50%, one half of the left channel signal strength will be *bled* into the right channel (without effecting the left channel). With the divergence control set to 1%, equal signal will be fed to both channels and the LCR pan pot will have no effect. Divergence values are as follows: 1%, 2%, 3%, 4%, 5%, 10%, 15%, 20%, 25%, 30%, 35%, 40%, 45%, 50%, 60%, 70%, 80%, 90%, 100%. Careful use of this control may have the effect increasing the size of the mix "sweet spot", particularly for large auditoriums. Misuse of this control may result in essentially mono panning.

Note: The order of 7.1 bus assignments is as follows: L, R, C, Ls, Rs, LFE, Lc, Rc.

3.3.13.3.2 VSP (Virtual Surround Panning):

The exclusive D950 Virtual Surround Panning provides three-dimensional audio source positioning via a library of software panning functions that enables the operator to place sound sources in virtual 3-dimensional environments. Listener positions are calculated within the DSP Core utilizing a series of Studer-developed algorithms. In addition to the familiar amplitude- or intensity-panning functions – such as LCR, front/back, LsRs, divergence, etc. – the operator can utilize frequency-dependent panning filters and delay-based effects. In this way, it is possible to position a source in a surround mix as though it had been recorded within a three-dimensional environment, complete with sound reflections from distant walls and surfaces.

Virtual Surround Panning enables an adjustable number of discrete echoes to be produced and routed as non-correlated, diffuse signals to the surround channels. Echoes are modified using assignable Ambiance, Source Distance and Room Size controls, allowing the natural reproduction of audio sources from various distances and positions within a "virtual" room, without the need to revert to external processors. A number of special dynamic effects, such as the gradual disappearance of a close sound into the diffuse room, can also be achieved by accentuating its spatial components. Even a simulated Doppler Effect is available.

Channels configured with the VSP Pan have the following pan formats available: 2 CH, LCR, LCRS, and 5.1. For the most part, these modes function exactly like their Multi-format Pan counterparts, but with the ad-

dition of the extra Panning Modes and Distance parameters listed below. Panning Modes are selected using the PMOD control, and Distance parameters are selected from the ROOM page.

PMOD (Panning Modes):

AMPL: This function provides standard amplitude panning with sine/cosine characteristics. If the source is placed *exactly* between two adjacent loudspeakers, the amplitudes of each are attenuated by 3 dB. Front LCR, back LR, and front/back are separately adjustable. If the joystick is utilized, front LCR and back LR are coupled. Divergence is also available.

Note: AMPL is the only Panning Mode in which the left surround/right surround (LsRs) panning function is available for the 5.1 panner.

HRTF: (Head-Related Transfer Function) This function provides a newly developed, head-related left/right panning with frequency-depending amplitude and delay characteristics. Sources can be placed beyond the arc of the front stereo loudspeakers' base. In use, the Sweet Spot is more critical. Front LCR and back LR are always coupled. Front/back control is also available, but with conventional amplitude panning characteristics applied.

SPHR: (Sphere) This function provides head-related left/right panning according to the transfer characteristics of the "Sphere Microphone" proposed by *Theile*. Front LCR and back LR are always coupled. Front/back control is available, but with conventional amplitude panning characteristics applied.

ORTF: This function provides head-related left/right panning according to the transfer characteristics of the "ORTF" format stereo microphone layout (two cardioid microphones, spaced 18 cm at a 110° angle). It combines angle-depending amplitude panning and delay characteristics. Front LCR and back LR are always coupled. Front/back control is available, but with conventional amplitude panning characteristics applied.

AB: This function provides left/right panning based on delay differences only, according to the "AB" microphone layout (two omnidirectional microphones, spaced 0.5 m). Front LCR and back LR are always coupled. Front/back control is available, but with conventional amplitude panning characteristics applied.

ROOM (Room Parameter Control):

AMBI: (Ambience) This function scales the amplitudes of the automatically generated echoes from 0% (no effect) over 10% (most natural effect, factory preset) up to 100% (full effect, echoes exaggerated). If the operator only wants to place sounds at distinct distances from the listener without adding coloration, the preset should be left unchanged.

DIST: (Distance) This function adjusts the apparent distance between the sound source and the listener, if the front/back and left/right control knobs (or the joystick) are set to a maximum position. By adjusting these parameters, the sound can be moved, for example, from the extreme left front to the extreme right rear.

ABSN: (Absorption) This function simulates frequency-depending room absorption caused by walls or obstacles. It can be adjusted from 0% (cold hall, no absorption) up to 100% (anechoic room; full sound absorption).

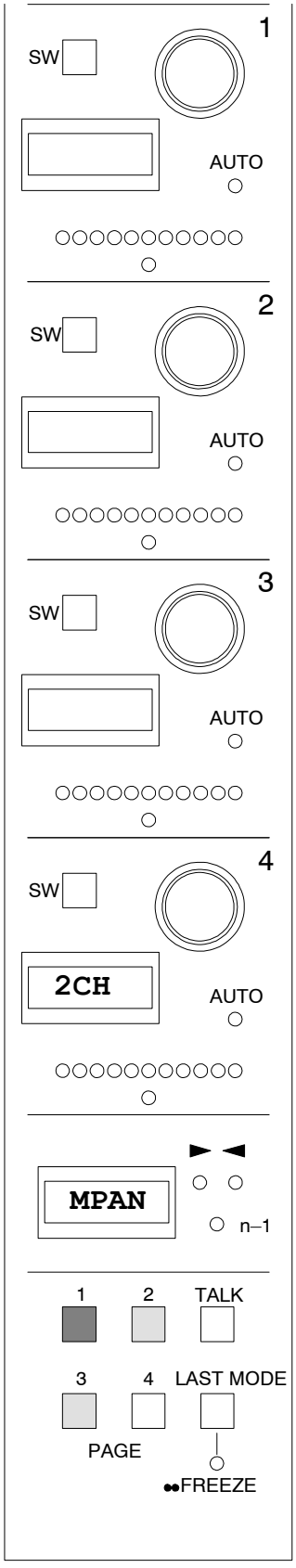
SIZE: (Room Size) This function scales the room size. The maximum achievable distance effect is determined herewith. Normally set to maximum (100%, largest room available).

3.3.13.3.3 HRTF Surround PAN:

The HRTF Surround PAN w/LFE has the same Panning Modes as the VSP Pan, but without the generation of echoes. Therefore, the Distance controls are not available. In addition, the divergence modes are only available in the AMPL Panning Mode.

3.3.13.4 Panning Parameters on the LACP

Example: Mono Channel Panning, Page 1

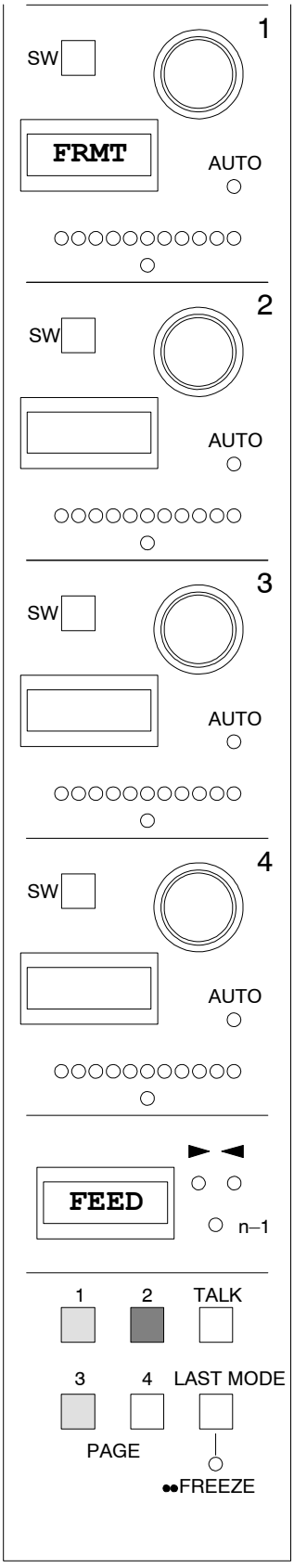
Mono 2-channel panning control parameters		Available operating elements and their function
not used		**not used**
not used		not used
not used		not used
PAN		**SW key** = PAN function ON/OFF **Rotary encoder** = PAN setting **LED bar** = Dot display, indicates current panning setting **Center LED** = ON if PAN in center position **Display** = 2CH; label of control parameter L30_; fully left L00R; center _30R; fully right
		Display = Indication of panning selection (Page 1) FEED indication (Page 2) MODE indication (Page 3) (Page 4 not used)

Example: Mono Channel Panning, Page 2

Mono 2-channel panning control parameters

Available operating elements and their function

PANNING FORMAT



SW key = Toggles FRMT (format) selection
Rotary encoder = FRMT selection
LED bar = FRMT indication
Center LED = no function
Display = FRMT; label of control parameter
2CH ; 2-channel mode
LCR ; 3-channel mode (left/center/right)
LCRS; 4-channel mode (left/center/right/surround)
5.1 ; 6-channel mode (L/C/R/Ls/Rs/Sub)
EX ;
7.1 ; 8-channel mode (L/LC/C/RC/R/Ls/Rs/Sub)

not used

not used

not used

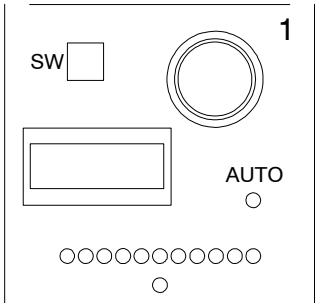
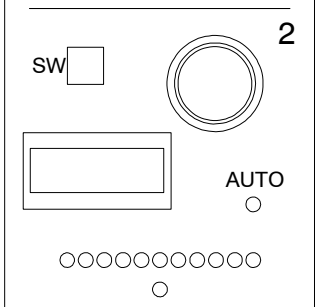
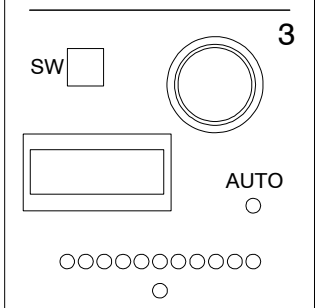
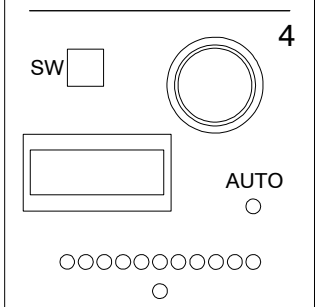
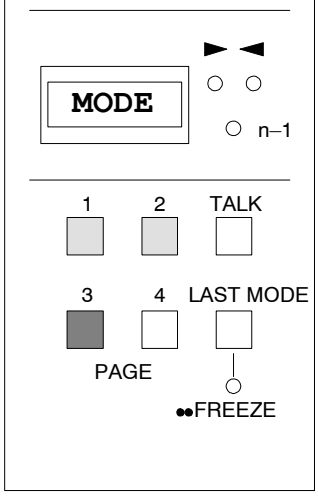
not used

not used

not used

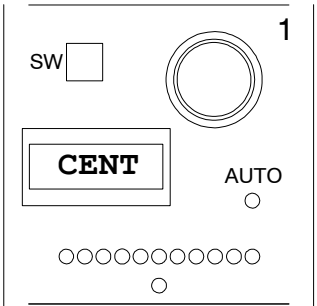
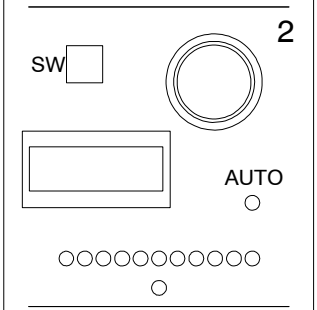
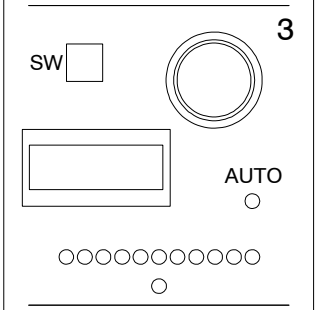
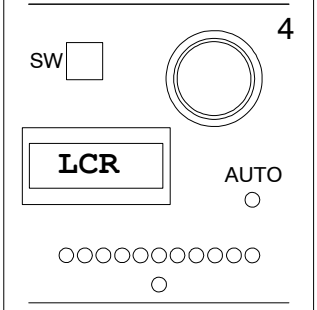
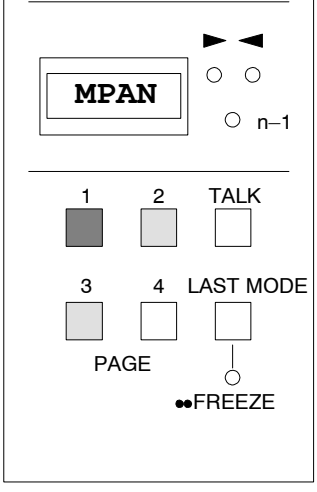
Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

Example: Mono Channel Panning, Page 3

Mono 2-channel panning control parameters		Available operating elements and their function
not used		not used
not used		not used
not used		not used
not used		not used
		**Display** = Indication of panning selection (Page 1) FEED indication (Page 2) MODE indication (Page 3) (Page 4 not used)

3.3.13.5 Multi-format *LCR* Panning Parameters on the LACP

Example: Multi-Format LCR Panning, Page 1

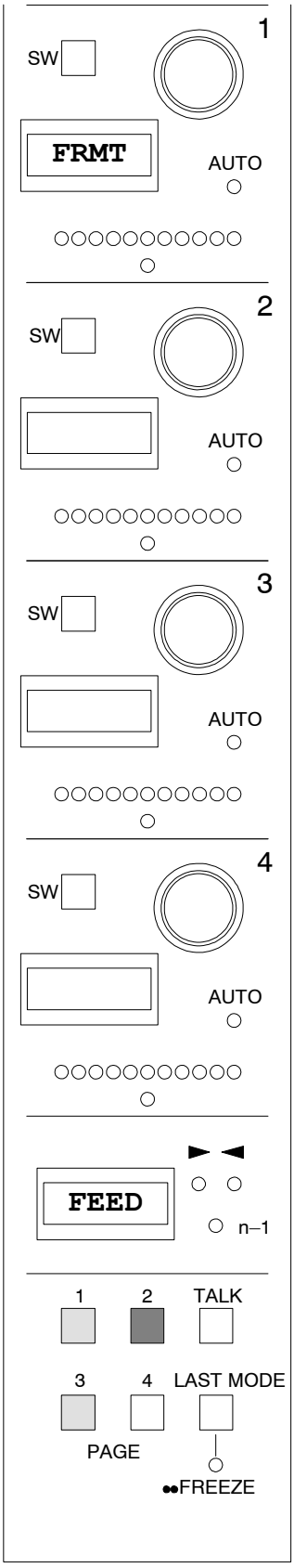
Mono LCR panning control parameters		Available operating elements and their function
CENT		**SW key** = CENT function ON/OFF **Rotary encoder** = 0 to 100% setting (0% = phantom center) **LED bar** = ○○○○○●○○○○○ Phantom center ●●●●●●●●●●● Center fully active **Center LED** = no function **Display** = CENT; label of control parameter 0%; Phantom center 100%; Center fully active
not used		not used
not used		not used
LCR PANNING		**SW key** = LCR panning function ON/OFF **Rotary encoder** = LCR panning setting **LED bar** = ●○○○○○○○○○○ fully left ○○○○○●○○○○○ center ○○○○○○○○○○● fully right **Center LED** = ON if LCRS panning in center position **Display** = LCR_; label of control parameter L30_; fully left __C_ ; center _30R; fully right
		**Display** = Indication of panning selection (Page 1) FEED indication (Page 2) MODE indication (Page 3) (Page 4 not used)

Example: Multi-Format LCR Panning, Page 2

Mono LCR panning control parameters

Available operating elements and their function

PANNING FORMAT



SW key = Toggles FRMT (format) selection
Rotary encoder = FRMT selection
LED bar = FRMT indication
Center LED = no function
Display = FRMT; label of control parameter
2CH ; 2-channel mode
LCR ; 3-channel mode (left/center/right)
LCRS; 4-channel mode (left/center/right/surround)
5.1 ; 6-channel mode (L/C/R/Ls/Rs/Sub)
EX ;
7.1 ; 8-channel mode (L/LC/C/RC/R/Ls/Rs/Sub)

not used

not used

not used

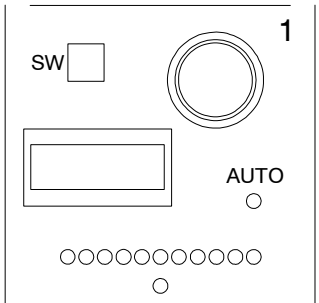
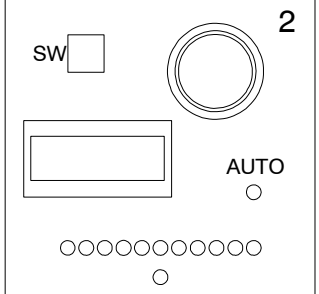
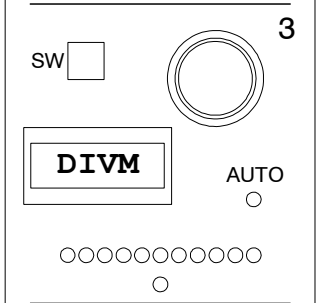
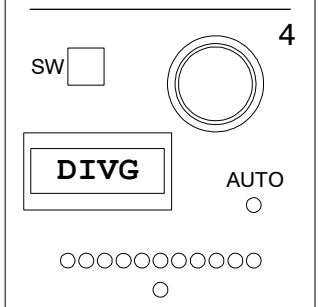
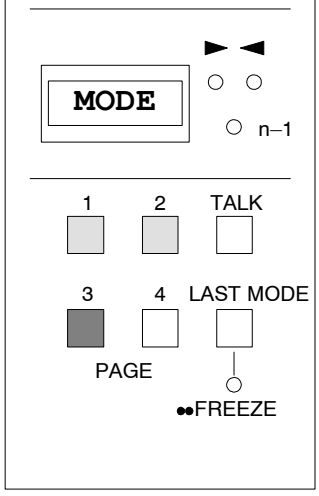
not used

not used

not used

Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

Example: Multi-Format LCR Panning, Page 3

Mono LCR panning control parameters		Available operating elements and their function
not used		not used
not used		not used
DIVM		**SW key** = Divergence mode FRNT/OFF **Rotary encoder** = Divergence mode FRNT/OFF selection **LED bar** = ●●●○○○○○○○ Divergence OFF ○○○○●●●○○○○ Divergence FRNT **Center LED** = no function **Display** = DIVM; label of control parameter OFF ; Divergence mode off FRNT; Divergence mode for LCR front channels
DIVG		**SW key** = no function **Rotary encoder** = Divergence setting 1% to 100% **LED bar** = ○○○○○●○○○○○ Divergence setting 100% ●●●●●●●●●●● Divergence setting 1% **Center LED** = no function **Display** = DIVG; label of control parameter 1% to 100%; Divergence setting
		**Display** = Indication of panning selection (Page 1) FEED indication (Page 2) MODE indication (Page 3) (Page 4 not used)

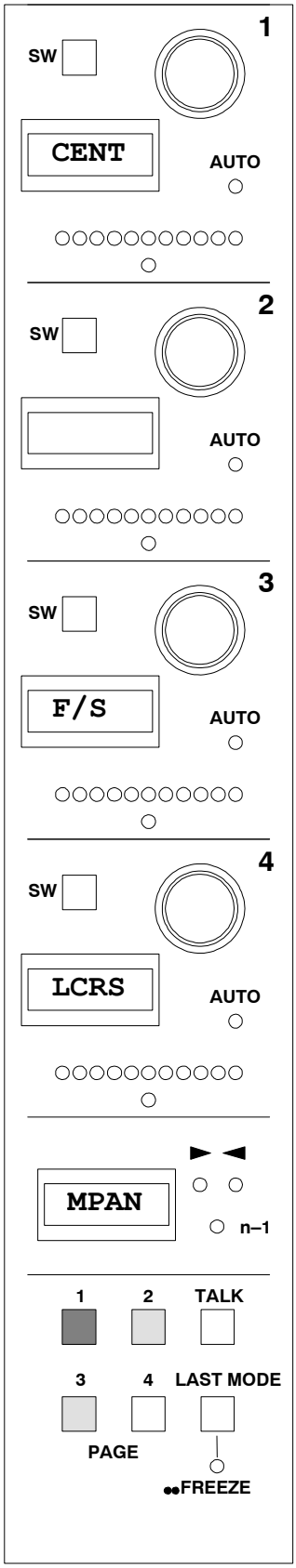
3.3.13.6 Multi-format *LCRS* Panning Parameters on the LACP

Example: Multi-Format LCRS Panning, Page 1

Mono LCRS panning control parameters

Available operating elements and their function

CENT



SW key = CENT function ON/OFF
Rotary encoder = 0 to 100% setting (0% = phantom center)
LED bar = ○○○○○●○○○○○ Phantom center
●●●●●●●●●●● Center fully active
Center LED = no function
Display = CENT; label of control parameter
0%; Phantom center
100%; Center fully active

not used

not used

F/S PANNING (FRONT/SURROUND)

SW key = F/S panning function ON/OFF
Rotary encoder = F/S panning setting
LED bar = ●○○○○○○○○○○ fully front
○○○○○●○○○○○ middle between front and back
○○○○○○○○○○● fully back (surround)
Center LED = ON if F/S panning in middle position
Display = F/S ; label of control parameter
_F30; fully front
__C_ ; center (middle) between front and back
_B30; fully back

LCRS PANNING

SW key = LCRS panning function ON/OFF
Rotary encoder = LCRS panning setting
LED bar = ●○○○○○○○○○○ fully left
○○○○○●○○○○○ center
○○○○○○○○○○● fully right
Center LED = ON if LCRS panning in center position
Display = LCRS; label of control parameter
L30_; fully left
__C_ ; center
_30R; fully right

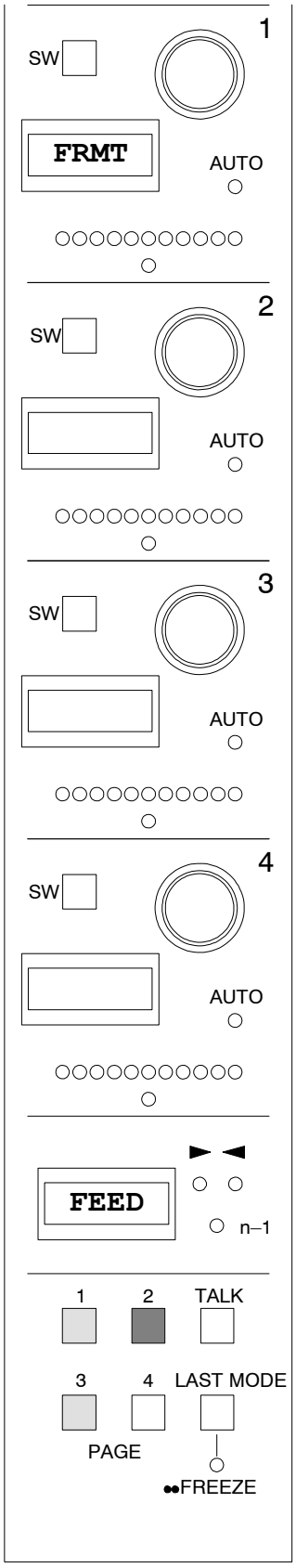
Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

Example: Multi-Format LCRS Panning, Page 2

Mono LCR panning control parameters

Available operating elements and their function

PANNING FORMAT



SW key = Toggles FRMT (format) selection
Rotary encoder = FRMT selection
LED bar = FRMT indication
Center LED = no function
Display = FRMT; label of control parameter
2CH ; 2-channel mode
LCR ; 3-channel mode (left/center/right)
LCRS; 4-channel mode (left/center/right/surround)
5.1 ; 6-channel mode (L/C/R/Ls/Rs/Sub)
EX ;
7.1 ; 8-channel mode (L/LC/C/RC/R/Ls/Rs/Sub)

not used

not used

not used

not used

not used

not used

not used

not used

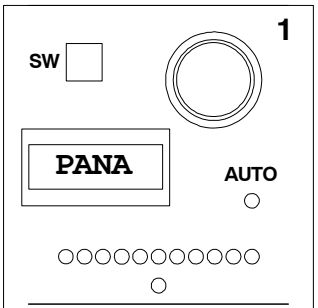
Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

Example: Multi-Format LCRS Panning, Page 3

Mono LCRS panning control parameters

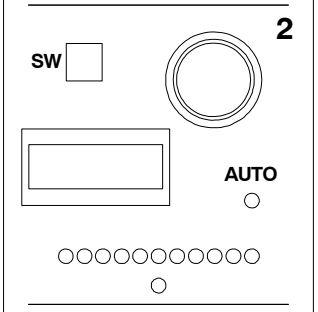
Available operating elements and their function

PANAROUND



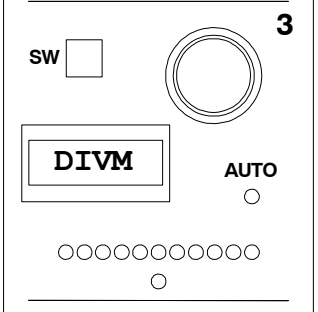
SW key = Panaround function ON/OFF
Rotary encoder = Panaround setting
LED bar = Dot display for L/R component of PANA function
Center LED = On if front and center is adjusted
Display = PANA; label of control parameter
F__0; front center, FRxx; between front and right,
_R30; fully right, BRxx; between right and back,
B__0; back center, BLxx; between back and left,
_L30; fully left, FLxx; between left and front,
F__0; front center (again)

not used



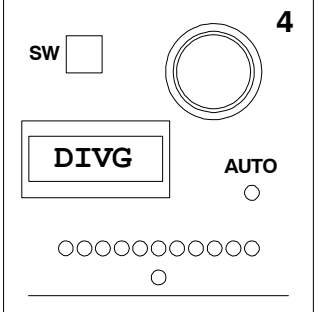
not used

DIVM

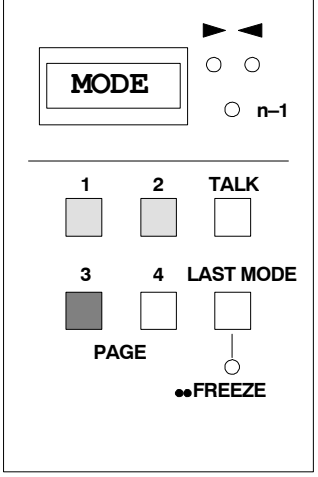


SW key = Divergence mode FRNT/OFF
Rotary encoder = Divergence mode FRNT/OFF selection
LED bar = ●●●○○○○○○○ Divergence OFF
○○○○●●●○○○○ Divergence FRNT
Center LED = no function
Display = DIVM; label of control parameter
OFF ; Divergence mode off
FRNT; Divergence mode for LCR front channels

DIVG



SW key = no function
Rotary encoder = Divergence setting 1% to 100%
LED bar = ○○○○○●○○○○○ Divergence setting 100%
●●●●●●●●●●● Divergence setting 1%
Center LED = no function
Display = DIVG; label of control parameter
1% to 100%; Divergence setting

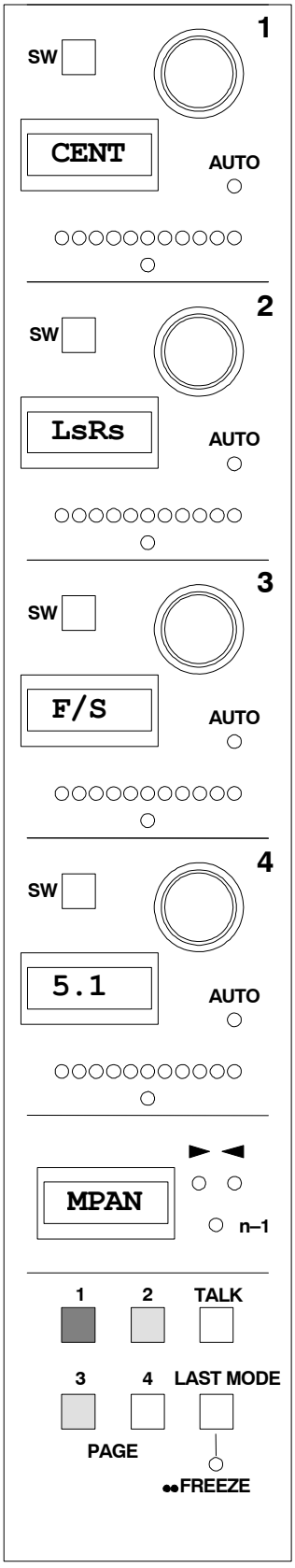


Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

3.3.13.7 Multi-format *5.1* Panning Parameters on the LACP

Example: Multi-Format 5.1 Panning, Page 1

Mono 5.1 panning control parameters



Available operating elements and their function

CENT

SW key	=	CENT function ON/OFF
Rotary encoder	=	0 to 100% setting (0% = phantom center)
LED bar	=	○○○○○●○○○○○ Phantom center
		●●●●●●●●●●● Center fully active
Center LED	=	no function
Display	=	CENT; label of control parameter
		0%; Phantom center
		100%; Center fully active

LsRs BALANCE

SW key	=	LsRs balance function ON/OFF
Rotary encoder	=	LsRs balance setting
LED bar	=	●○○○○○○○○○○ fully left
		○○○○○●○○○○○ center
		○○○○○○○○○○● fully right
Center LED	=	ON if LsRs in center position
Display	=	LsRs; label of control parameter
		L30_; fully left
		L00R; center
		_30R; fully right

F/S PANNING (FRONT/SURROUND)

SW key	=	F/S panning function ON/OFF
Rotary encoder	=	F/S panning setting
LED bar	=	●○○○○○○○○○○ fully front
		○○○○○●○○○○○ middle between front and back
		○○○○○○○○○○● fully back (surround)
Center LED	=	ON if F/S panning in middle position
Display	=	F/S_; label of control parameter
		_F30; fully front
		__C_ ; center (middle) between front and back
		_B30; fully back

5.1 PANNING

SW key	=	5.1 panning function ON/OFF
Rotary encoder	=	5.1 panning setting
LED bar	=	●○○○○○○○○○○ fully left
		○○○○○●○○○○○ center
		○○○○○○○○○○● fully right
Center LED	=	ON if 5.1 panning in center position
Display	=	5.1 ; label of control parameter
		L30_; fully left
		__C_ ; center
		_30R; fully right

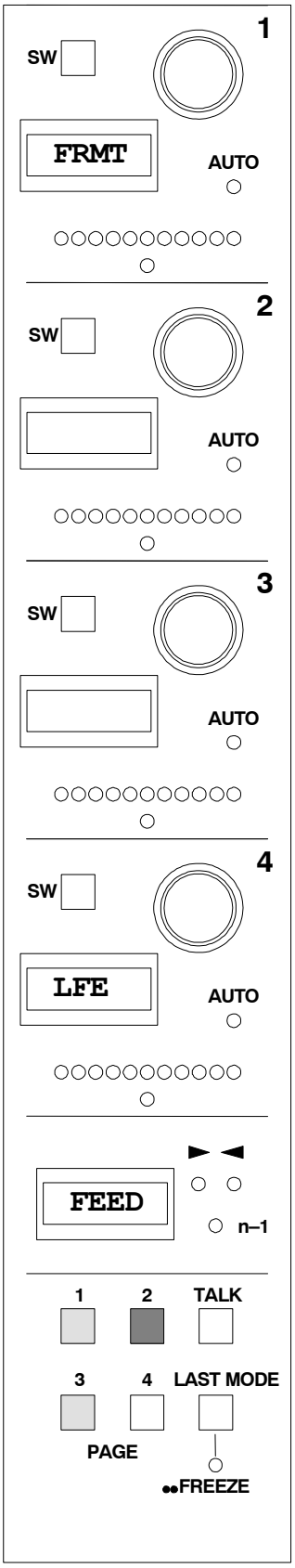
Display	=	Indication of panning selection (Page 1)
		FEED indication (Page 2)
		MODE indication (Page 3)
		(Page 4 not used)

Example: Multi-Format 5.1 Panning, Page 2

Mono 5.1 panning control parameters

Available operating elements and their function

PANNING FORMAT



SW key = Toggles FRMT (format) selection
Rotary encoder = FRMT selection
LED bar = FRMT indication
Center LED = no function
Display = FRMT; label of control parameter
2CH ; 2-channel mode
LCR ; 3-channel mode (left/center/right)
LCRS; 4-channel mode (left/center/right/surround)
5.1 ; 6-channel mode (L/C/R/Ls/Rs/Sub)
EX ;
7.1 ; 8-channel mode (L/LC/C/RC/R/Ls/Rs/Sub)

not used

not used

not used

not used

LFE (LOW FREQUENCY EFFECTS) CHANNEL

SW key = LFE function ON/OFF
Rotary encoder = LFE level setting
LED bar = ●○○○○○○○○○ MUTE
●●●●●●●●●● +10 dB
Center LED = On if LFE level set to 0 dB
Display = LFE ; label of control parameter
MUTE; indicates set level (–∞ dB)
– 90; indicates set level (–90 dB)
+ 10; indicates set level (+10 dB)

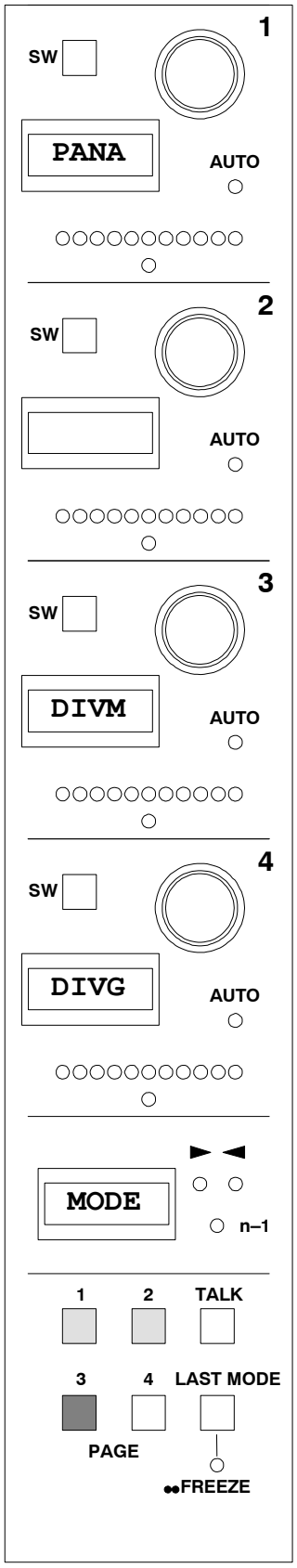
Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

Example: Multi-Format 5.1 Panning, Page 3

Mono 5.1 panning control parameters

Available operating elements and their function

PANAROUND



SW key = Panaround function ON/OFF
Rotary encoder = Panaround setting
LED bar = Dot display for L/R component of PANA function
Center LED = On if front and center is adjusted
Display = PANA; label of control parameter
F__0; front center, FRxx; between front and right,
_R30; fully right, BRxx; between right and back,
B__0; back center, BLxx; between back and left,
_L30; fully left, FLxx; between left and front,
F__0; front center (again)

not used

not used

DIVM

SW key = Divergence mode FRNT/OFF
Rotary encoder = Divergence mode FRNT/OFF selection
LED bar = ●●●○○○○○○○ Divergence OFF
○○○○●●●○○○○ Divergence FRNT
Center LED = no function
Display = DIVM; label of control parameter
OFF ; Divergence mode off
FRNT; Divergence mode for LCR front

DIVG

SW key = no function
Rotary encoder = Divergence setting 1% to 100%
LED bar = ○○○○○●○○○○○ Divergence setting 100%
●●●●●●●●●●● Divergence setting 1%
Center LED = no function
Display = DIVG; label of control parameter
1% to 100%; Divergence setting

Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

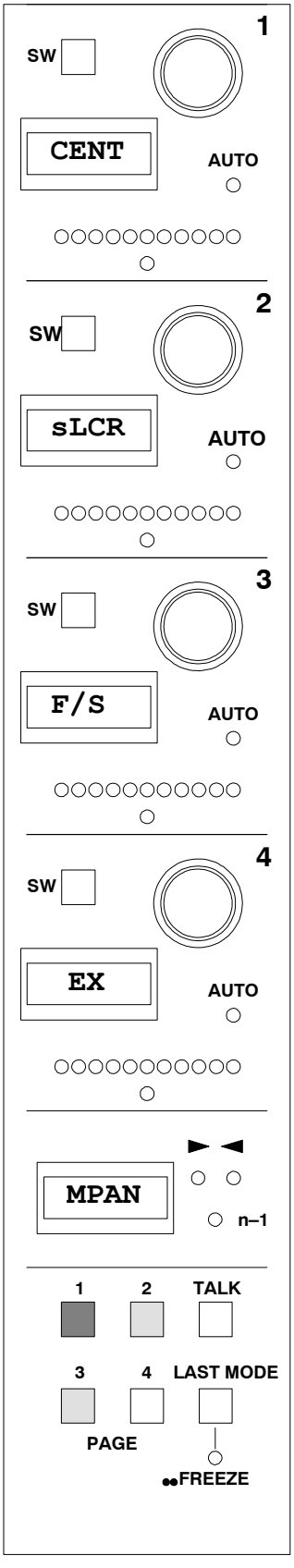
3.3.13.8 Multi-format *EX* Panning Parameters on the LACP

Example: Multi-Format EX Panning, Page 1

Mono EX panning control parameters

Available operating elements and their function

CENT



SW key = CENT function ON/OFF
Rotary encoder = 0 to 100% setting (0% = phantom center)
LED bar = ○○○○○●○○○○○ Phantom center
●●●●●●●●●●● Center fully active
Center LED = no function
Display = CENT; label of control parameter
0%; Phantom center
100%; Center fully active

sLCR BALANCE

SW key = sLCR balance function ON/OFF
Rotary encoder = sLCR balance setting
LED bar = ●○○○○○○○○○○ fully left
○○○○○●○○○○○ center
○○○○○○○○○○● fully right
Center LED = ON if sLCR balance in center position
Display = sLCR; label of control parameter
L30_; fully left
L00R; center
_30R; fully right

F/S PANNING (FRONT/SURROUND)

SW key = F/S panning function ON/OFF
Rotary encoder = F/S panning
LED bar = ●○○○○○○○○○○ fully front
○○○○○●○○○○○ middle betw. front & back
○○○○○○○○○○● fully back (surround)
Center LED = ON if F/S panning in middle position
Display = F/S_; label of control parameter
_F30; fully front
__C_ ; center (middle) between front and back
_B30; fully back

EX PANNING

SW key = EX panning function ON/OFF
Rotary encoder = EX panning setting
LED bar = ●○○○○○○○○○○ fully left
○○○○○●○○○○○ center
○○○○○○○○○○● fully right
Center LED = ON if EX panning in center position
Display = EX ; label of control parameter
L30_; fully left
__C_ ; center
_30R; fully right

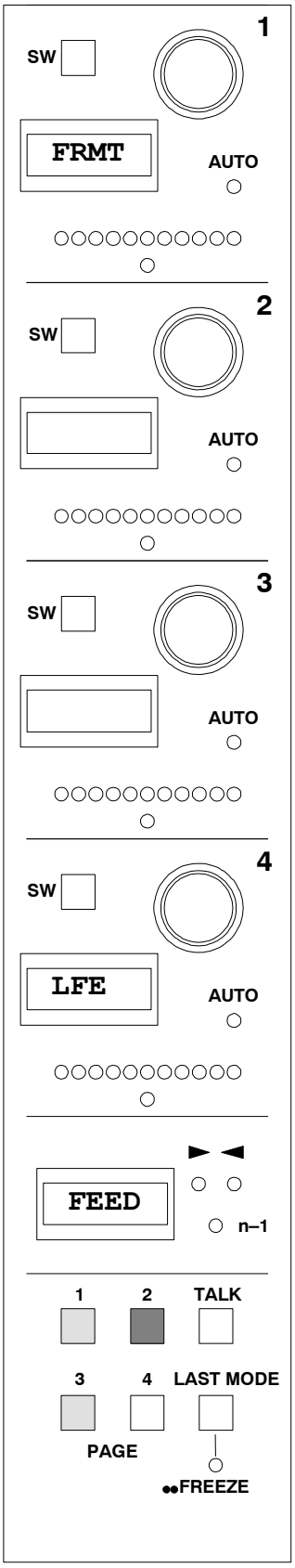
Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

Example: Multi-Format EX Panning, Page 2

Mono EX panning control parameters

Available operating elements and their function

PANNING FORMAT



SW key = Toggles FRMT (format) selection
Rotary encoder = FRMT selection
LED bar = FRMT indication
Center LED = no function
Display = FRMT; label of control parameter
2CH ; 2-channel mode
LCR ; 3-channel mode (left/center/right)
LCRS; 4-channel mode (left/center/right/surr.)
5.1 ; 6-channel mode (L/C/R/Ls/Rs/Sub)
EX ;
7.1 ; 8-channel mode (L/LC/C/RC/R/Ls/Rs/Sub)

not used

not used

not used

not used

not used

not used

LFE (LOW FREQUENCY EFFECTS) CHANNEL

SW key = LFE function ON/OFF
Rotary encoder = LFE level setting
LED bar = ●○○○○○○○○○○ MUTE
●●●●●●●●●●● +10 dB
Center LED = On if LFE level set to 0 dB
Display = LFE ; label of control parameter
MUTE; indicates set level (–¥ dB)
– 90; indicates set level (–90 dB)
+ 10; indicates set level (+10 dB)

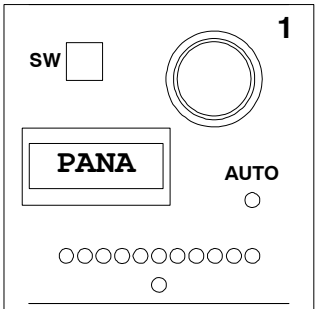
Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

Example: Multi-Format EX Panning, Page 3

Mono EX panning control parameters

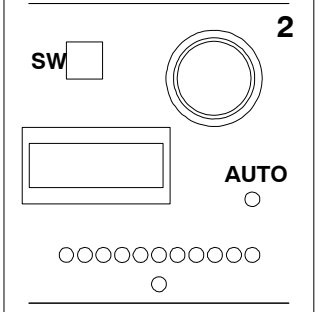
Available operating elements and their function

PANAROUND



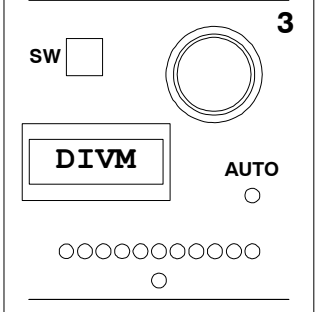
SW key = Panaround function ON/OFF
Rotary encoder = Panaround setting
LED bar = Dot display for L/R component of PANA function
Center LED = On if front and center is adjusted
Display = PANA; label of control parameter
F__0; front center, FRxx; between front and right,
_R30; fully right, BRxx; between right and back,
B__0; back center, BLxx; between back and left,
_L30; fully left, FLxx; between left and front,
F__0; front center (again)

not used



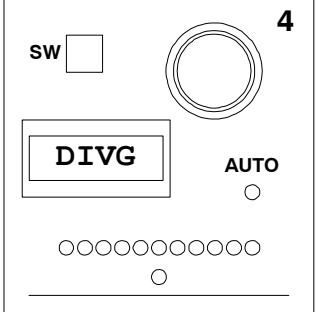
not used

DIVM

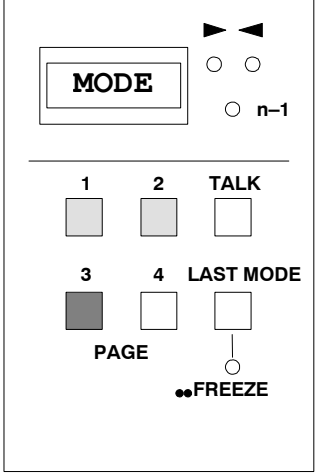


SW key = Divergence mode FRNT/OFF
Rotary encoder = Divergence mode FRNT/OFF selection
LED bar = ●●●○○○○○○○ Divergence OFF
○○○○●●●○○○○ Divergence FRNT
Center LED = no function
Display = DIVM; label of control parameter
OFF ; Divergence mode off
FRNT; Divergence mode for LCR front channels

DIVG



SW key = no function
Rotary encoder = Divergence setting 1% to 100%
LED bar = ○○○○○●○○○○○ Divergence setting 100%
●●●●●●●●●●● Divergence setting 1%
Center LED = no function
Display = DIVG; label of control parameter
1% to 100%; Divergence setting



Display = Indication of panning selection (Page 1)
FEED indication (Page 2)
MODE indication (Page 3)
(Page 4 not used)

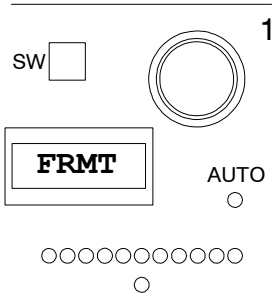
3.3.13.9 HRTF Panning Parameters on the LACP

Example: Mono channel, HRTF panning, page 1

HRTF pan control parameters

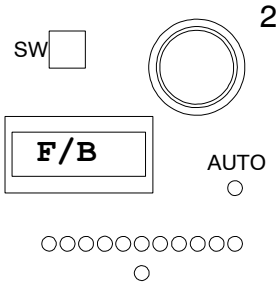
Available operating elements and their function

FORMAT SELECTION



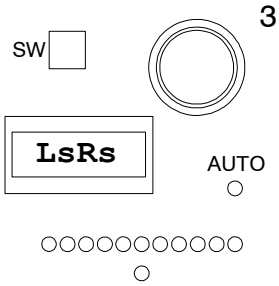
SW key = no function
Rotary encoder = Pan format selection
LED bar = no function
Center LED = no function
Display = FRMT; label of control parameter
2CH; 2-channel pan
LCR; 3-channel pan
LCRS; 4-channel pan (Dolby surround)
LCRX; 5.1-channel pan
7.1; 7.1-channel pan

FRONT/BACK PAN



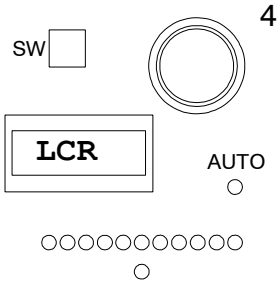
SW key = Front/back pan ON/OFF
Rotary encoder = Front/back setting (B30 to 0 to F30)
LED bar = Bar display
Center LED = Center position
Display = F/B; label of control parameter
B30; full back
F30; full front

SURROUND L/R PAN

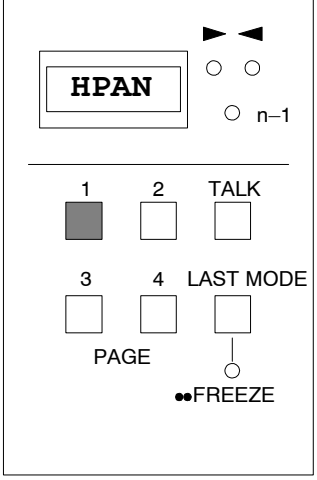


SW key = Left surround/right surround pan ON/OFF
Rotary encoder = Ls/Rs setting
LED bar = Bar display
Center LED = Center position
Display = LsRs; label of control parameter
L30; full left surround
L00R; center
30R; full right surround

FRONT PAN



SW key = Front pan ON/OFF
Rotary encoder = Front pan setting
LED bar = Bar display
Center LED = Center position
Display = LCR; label of control parameter
L30; full left front
C; center
30R; full right front



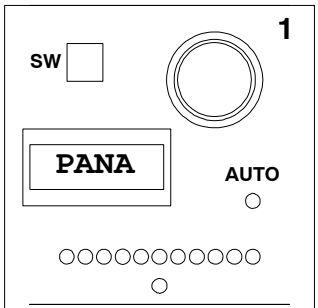
Display = Indication of HRTF panorama selection
(Pages 3 and 4 not used)

Example: Mono channel, HRTF panning, page 2

HRTF pan control parameters

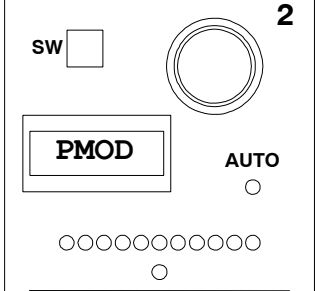
Available operating elements and their function

PANAROUND



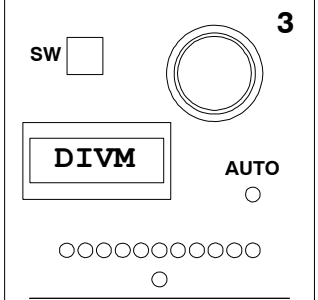
SW key = Panaround function ON/OFF
Rotary encoder = Panaround position
LED bar = Dot display
Center LED = Front center position
Display = PANA; label of control parameter
F0; front center position, FR29; front right position
R30; right position, BR1; back right position
B0; back center, BL29; back left position
L30; left position, FL1; front left position

PAN MODE



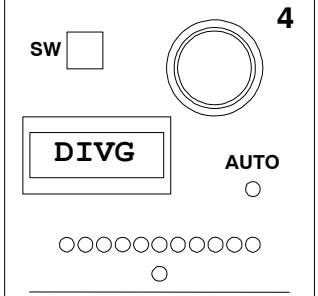
SW key = Pan mode selector
Rotary encoder = Pan mode selector
LED bar = no function
Center LED = no function
Display = AMPL; amplitude mode
HRTF; HRTF mode
SPHR; sphere mode
ORTF; ORTF mode
AB; AB mode

DIVERGENCE MODE

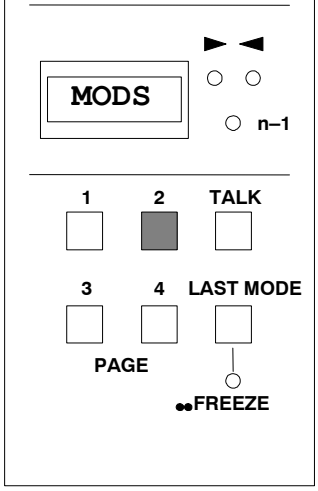


SW key = Divergence mode select
Rotary encoder = Divergence mode select
LED bar = ●●○○○○○○○○ OFF
○○○●●●○○○○○ front
○○○○○○●●●○○ all
Center LED = no function
Display = DIVM; label of control parameter
OFF; no divergence
FRNT; divergence on front speakers
ALL; divergence on all speakers

DIVERGENCE CONTROL



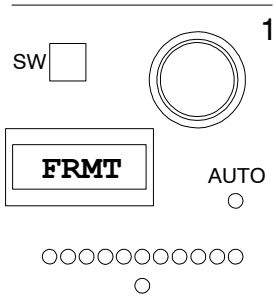
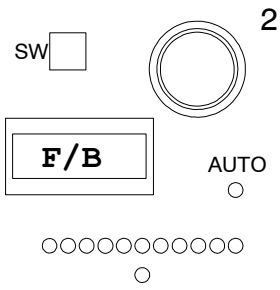
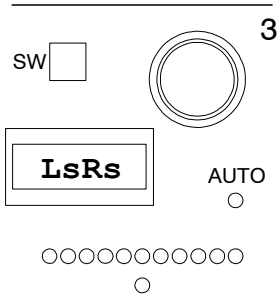
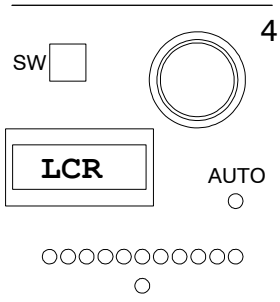
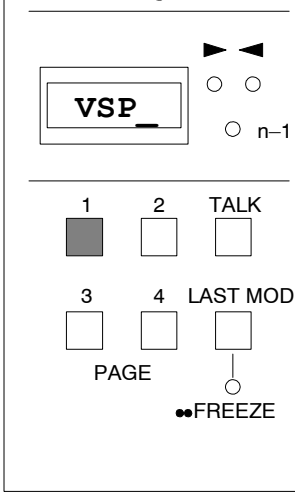
SW key = Center speaker ON/OFF
Rotary encoder = Divergence control
LED bar = ○○○○○●○○○○○ 1%
●●●●●●●●●●● 100%
Center LED = no function
Display = DIVG; label of control parameter
1%; minimum divergence
100%; maximum divergence



Display = Indication of HRTF pan divergence MODeS
(Pages 3 and 4 not used)

3.3.13.10 VSP Panning Parameters on the LACP

Example: Mono channel, VSP panning, page 1

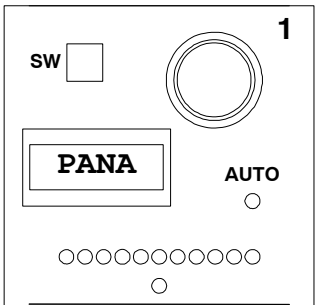
VSP pan control parameters		Available operating elements and their function
FORMAT SELECTION		**SW key** = no function **Rotary encoder** = Pan format selection **LED bar** = no function **Center LED** = no function **Display** = FRMT; label of control parameter 2CH; 2-channel pan LCR; 3-channel pan LCRS; 4-channel pan (Dolby surround) LCRX; 5.1-channel pan 7.1; 7.1-channel pan
FRONT/BACK PAN		**SW key** = Front/back pan ON/OFF **Rotary encoder** = Front/back setting (B30 to 0 to F30) **LED bar** = Bar display **Center LED** = Center position **Display** = F/B; label of control parameter B30; full back F30; full front
SURROUND L/R PAN		**SW key** = Left surround/right surround pan ON/OFF **Rotary encoder** = Ls/Rs setting **LED bar** = Bar display **Center LED** = Center position **Display** = LsRs; label of control parameter L30; full left surround L00R; center 30R; full right surround
FRONT PAN		**SW key** = Front pan ON/OFF **Rotary encoder** = Front pan setting **LED bar** = Bar display **Center LED** = Center position **Display** = LCR; label of control parameter L30; full left front C; center 30R; full right front
		**Display** = Indication of VSP panorama selection (Page 4 not used)

Example: Mono channel, VSP panning, page 2

VSP pan control parameters

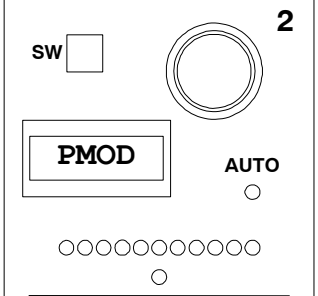
Available operating elements and their function

PANAROUND



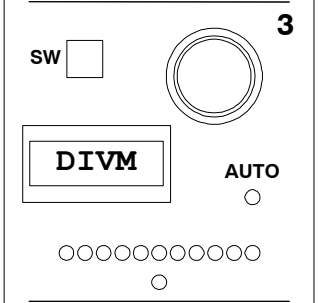
SW key = Panaround function ON/OFF
Rotary encoder = Panaround position
LED bar = Dot display
Center LED = Front center position
Display = PANA; label of control parameter
F0; front center position, FR29; front right position
R30; right position, BR1; back right position
B0; back center, BL29; back left position
L30; left position, FL1; front left position

PAN MODE



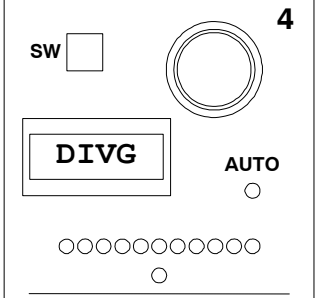
SW key = Pan mode selector
Rotary encoder = Pan mode selector
LED bar = no function
Center LED = no function
Display = AMPL; amplitude mode
HRTF; HRTF mode
SPHR; sphere mode
ORTF; ORTF mode
AB; AB mode

DIVERGENCE MODE

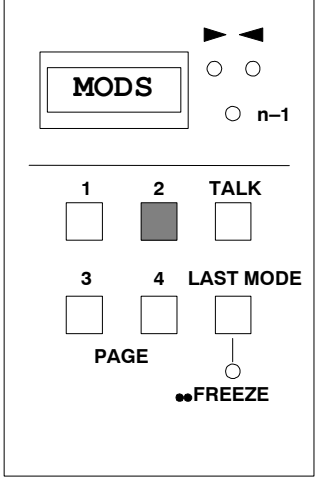


SW key = Divergence mode select
Rotary encoder = Divergence mode select
LED bar = ●●●○○○○○○○ OFF
○○○●●●○○○○○ front
○○○○○○●●●○○ all
Center LED = no function
Display = DIVM; label of control parameter
OFF; no divergence
FRNT; divergence on front speakers
ALL; divergence on all speakers

DIVERGENCE CONTROL

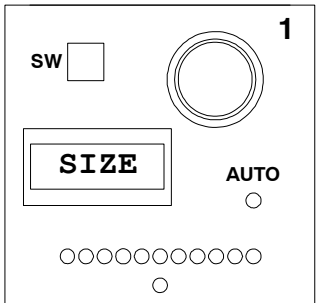
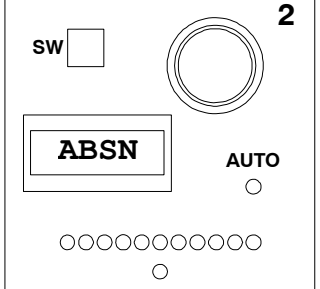
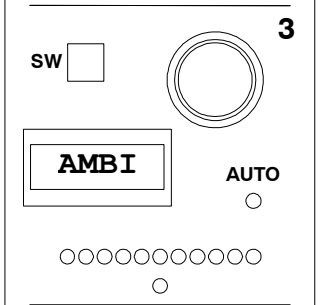
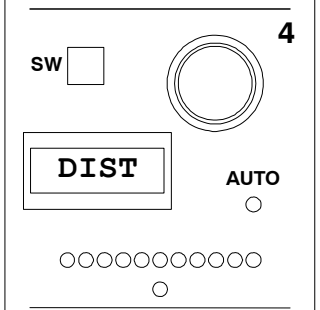
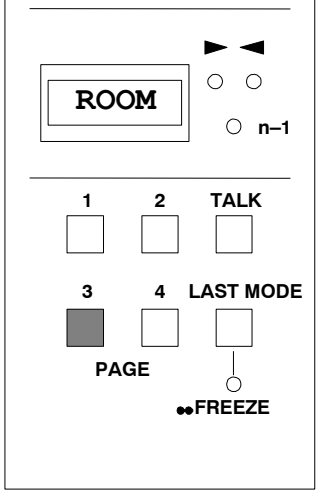


SW key = Center speaker ON/OFF
Rotary encoder = Divergence control
LED bar = ○○○○○●○○○○○ 1%
●●●●●●●●●●● 100%
Center LED = no function
Display = DIVG; label of control parameter
1%; minimum divergence
100%; maximum divergence

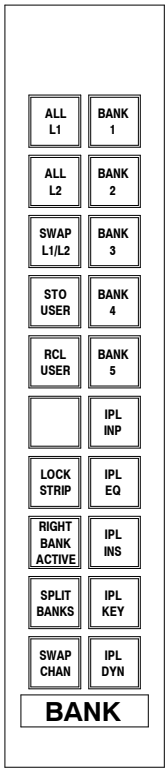


Display = Indication of VSP pan divergence MODeS
(Page 4 not used)

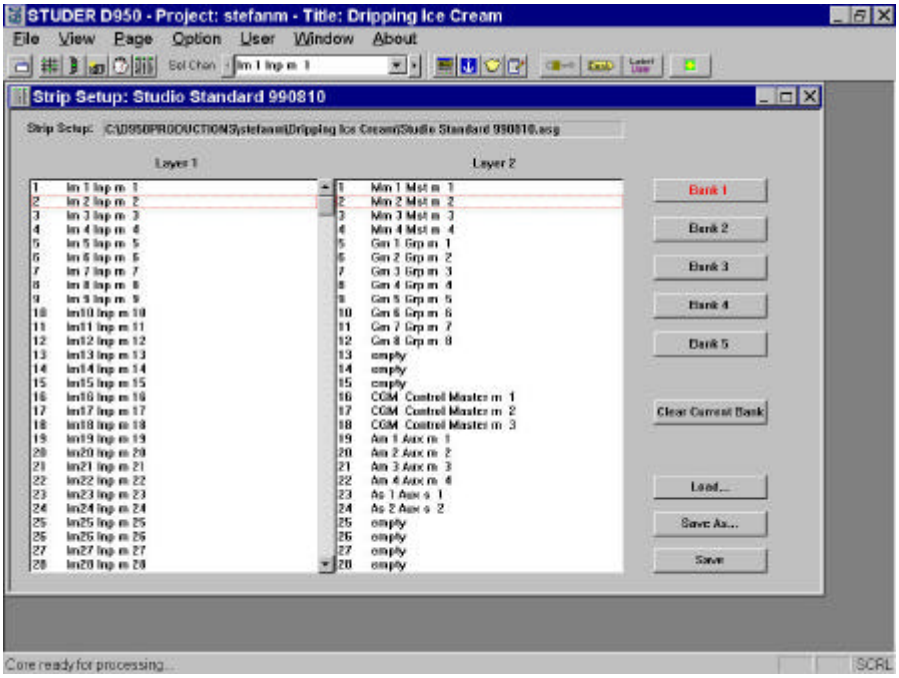
Example: Mono channel, VSP panning, page 3

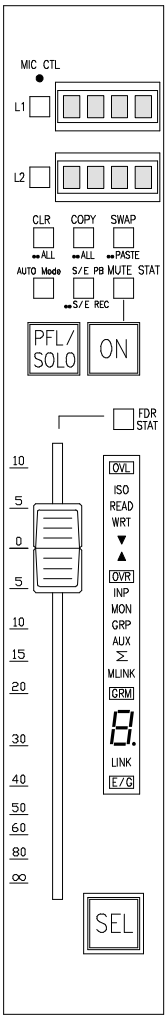
VSP pan control parameters		Available operating elements and their function
ROOM SIZE		**SW key** = Room parameters ON/OFF **Rotary encoder** = Room size adjustment **LED bar** = Center spread display **Center LED** = no function **Display** = SIZE; label of control parameter 0; min. room size 31; max. room size
ROOM ABSORPTION		**SW key** = no function **Rotary encoder** = Absorption adjustment **LED bar** = bar display **Center LED** = no function **Display** = ABSN; label of control parameter 0%; min. absorption 100%; max. absorption
ROOM AMBIENCE		**SW key** = no function **Rotary encoder** = Ambience adjustment **LED bar** = Bar display **Center LED** = no function **Display** = AMBI; label of control parameter 0%; min. ambience 100%; max. ambience
SOURCE DISTANCE		**SW key** = no function **Rotary encoder** = Distance adjustment **LED bar** = Bar display **Center LED** = no function **Display** = DIST; label of control parameter 0%; min. distance 100%; max. distance
		**Display** = Indication of various VSP room parameters (Page 4 not used)

3.3.14 Layer Control



D950 channels are assigned to the operating desk in five Banks, with each Bank containing two Layers. These assignments are made using the Strip Setup screen in the Graphic Controller (see chapter 4.4.6).



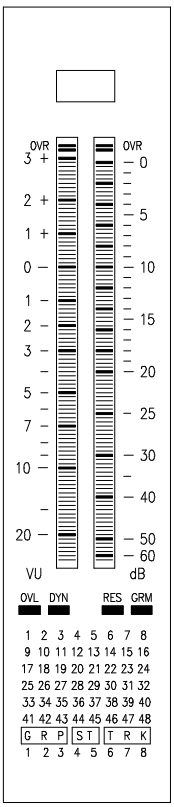


With the Bank Select Unit (BSU) in the center section, bank setups may be activated and recalled at any time by the BANK 1 through BANK 5 keys.
Channel Strips contain controls for Layer 1 and Layer 2 (L1, L2), as well as an alphanumeric display for each Layer.

L1, L2: These keys select which of the two layers from the current bank will be assigned to the Channel Strip, and can be activated at any time. The key will illuminate when the Layer is active.

L1/L2 Display: The L1 and L2 displays indicate the alphanumeric label of the corresponding audio channel that is assigned to the Channel Strip using the L1 and L2 Layer keys. The label type displayed (Fixed, User, or Inherited) is determined by the Label controls in the Graphic Controller (see chapter 4.3.3).
Channel Strips can be changed from Layer 1 to Layer 2 (and vice versa) on a global basis using the ALL L1 and ALL L2 keys in the BSU.
Layer assignments can be inverted using the SWAP L1/L2 key in the BSU. When some Channel Strips are set to Layer 1 and others are set to Layer 2, this function activates the alternate assignment (i.e., Channel Strips set to Layer 1 will switch to Layer 2, and those set to Layer 2 will change to Layer 1). Subsequent presses of this key will toggle between Layer 1 and Layer 2 assignments.
The Layer assignments can be stored and recalled on a Bank-by-Bank basis. Pressing the STO USER key in the BSU stores Layer assignments within the current Bank's user memory. Each Bank has its own memory. Pressing the RCL USER (also in the BSU) will recall the stored Layer assignment. When changing to a different Bank, the system will recover automatically the L1/L2 setting that was active when the Bank was left.

3.3.15 Metering Functions



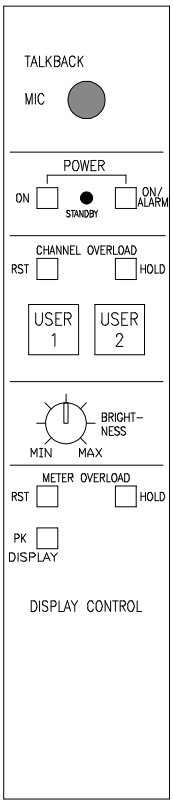
The D950 provides a wide range of metering functions via the Audio Display Unit. This unit consists of dual 100 segment bar graph displays and a series of LED indicators for each Channel Strip. These displays and LEDs show audio level, gain reduction, overload, bus assignments, and some channel section information.

If used as a channel-related bar graph, this panel provides the following functions:

METER: Two 100-segment bar graph meters are used primarily to display audio levels. For Mono channels, both bar graphs feature the same display; for Stereo channels, left and right information will be displayed on separate bar graphs.

Audio Levels: Meter characteristics can be selected to display PPM or VU on a global basis. Switching is accomplished using the METER VU key on the Central Facilities Unit (CFU). When illuminated, the Meters display VU. Both bar graphs will always function in the same mode.

Peak Hold: Each Meter features an integrated peak-hold function with automatic and manual reset. All Meter Peak controls are found in the METER OVERLOAD section of the TB Mic/Display Control Unit. Engaging the METER OVERLOAD PK DISPLAY key activates the Meter Peak indication mode. In this mode, the meter will show the peak value (highest level) for a short period of time and then automatically reset. The display will show the peak value indefinitely if the METER OVERLOAD HOLD key is engaged in addition. Held peaks can be reset manually using the METER OVERLOAD RST (reset) key.

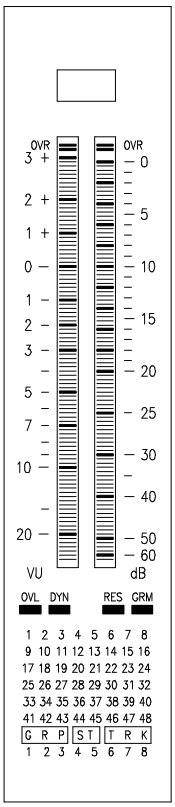


Channel Overload: Each Meter provides an overload indication function, which is controlled using the keys in the CHANNEL OVERLOAD section of the TB Mic/Display Control Unit. Overloads are indicated when the OVR segment of the Meter lights temporarily. Engaging the CHANNEL OVERLOAD HOLD key will allow overloads to be memorized, even if the channel is currently unassigned to the strip. Clearing Meter overload indications is accomplished with the CHANNEL OVERLOAD RST (reset) key.

Gain Reduction: Meters are switched to display dynamics unit gain reduction on a global basis by engaging the GRM key on the Central Facilities Unit (CFU). The Gain Reduction Meter (GRM) mode only affects channels configured with a dynamics unit, and GRM values are only displayed when this dynamics unit is active. In GRM mode the left bar graph will display audio level (for stereo channels, the higher level of left- and right-channels is displayed), while the right bar graph indicates gain reduction.

LEDs: LED indicators provide the following indications: Channel overload (OVL), activation of the channel's dynamics unit (DYN), Gain Reduction Meter mode (GRM), and bus assignments.

OVL: The red OVL LED illuminates when an overload occurs in the channel.



DYN: The yellow DYN LED indicates that the channel's dynamics unit has been activated.

RES: The LED labeled RES is reserved for a future function.

Bus Assignment: 48 numbered back-lit indicators display the multitrack, group, and master bus assignments. TRK illuminates to indicate multitrack assignments, and GRP lights to indicate group assignments. An additional array of 8 numbered back-lit indicators displays master bus assignments. ST illuminates if assignments are made to the stereo master busses.

Note: A BRIGHTNESS control is provided within the TB Mic/Display Control Unit to provide dimming of all keys, LEDs, and bar graph indicators with the exception of the channel strip alphanumeric displays.

3.3.16 Control Groups

A Control Group is a group of console channels controlled by a Control Group Master (CGM), similarly to the VCA groups in analog consoles.

Control Group Master

The Control Group Master is a dedicated channel of a special type. The sole purpose of the Control Group Master is to control the audio functions of its Members.

The Control Group Master channels are defined in the Session Configuration. It is possible to configure up to 16 Control Group Master channels. The Control Groups are separate for every MultiDesk group. The number of each Control Group Master is shown on the 7-segment display in the channel strip of each CGM, following the rule:

Control Group **1**	Display: **1**
Control Group **2**	Display: **2**
...	**...**
Control Group **9**	Display: **9**
Control Group **10**	Display: **0**
Control Group **11**	Display: **A**
Control Group **12**	Display: **b**
Control Group **13**	Display: **C**
Control Group **14**	Display: **d**
Control Group **15**	Display: **E**
Control Group **16**	Display: **F**

The Control Group Master channel controls the audio functions of the Members. Master channels can be assigned to desk strips in the same way as any other console channel. The desk strip to which a Control Group Master is assigned will display the following:

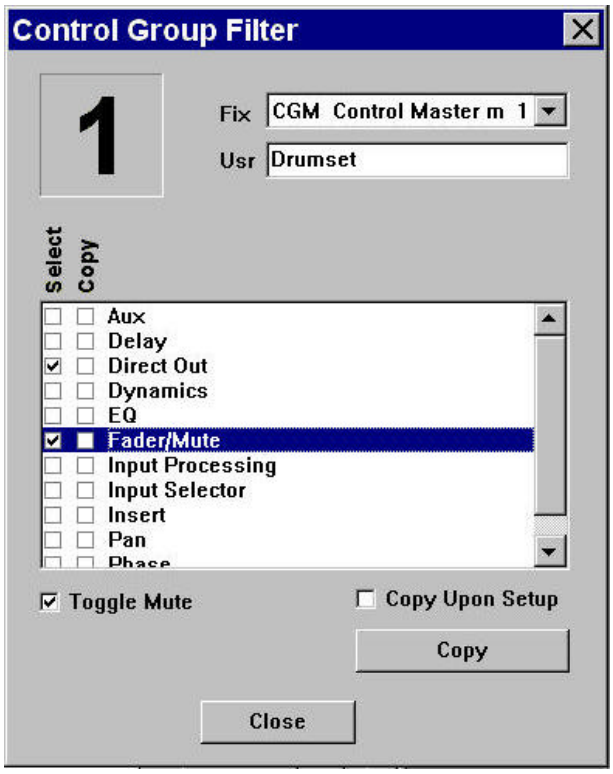
- Control Group Master number 1 through 9, 0, or letters A through F in the seven-segment display next to the fader;
- MLNK LED indication;
- The Fixed Label is set to CGM (Control Group Master), but can be set to display user labels such as DRUM, LVOX, BVOX, RTHM, etc.

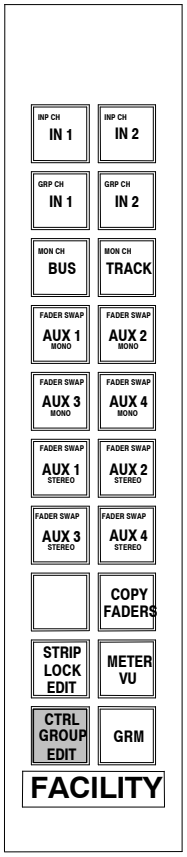
Control Group Members

Control Group Members can be selected to and deselected from a Control Group during the console operation. This is done in a special Control Group Edit mode. Any console channel can be selected as a member in a Control Group. The members can be "stolen" from one Control Group to another. When a channel is selected as a member in a Control Group, its channel strip displays the following:

- Control Group number 1 through 9, 0, or letters A through F in the seven-segment display next to the fader;
- LINK led indication.

Operating an audio parameter on the Control Group Master influences that parameter on all members (if that parameter has been selected in the Control Group Filter Dialog Box during Control Group Edit mode). It offsets the member value by the move amount of the Master. Operating the parameter on the member influences only that member's parameter.





Control Group Edit

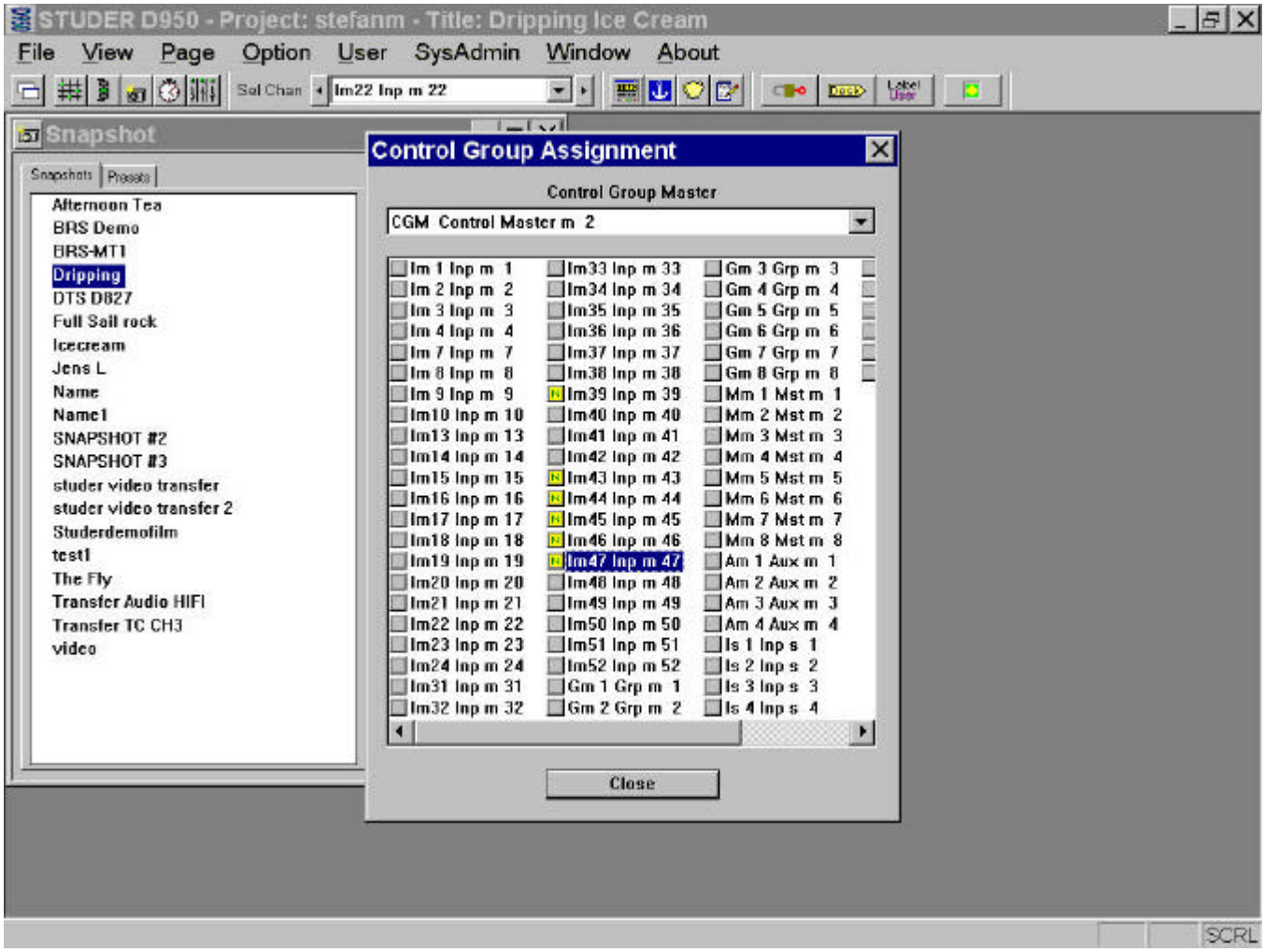
The Control Groups are edited in the Control Group Edit Mode. This mode is activated through the CONTROL GROUP EDIT key on the Central Facilities Unit (CFU).

On first press, the CONTROL GROUP EDIT key starts flashing to show that an activity has been started but not yet finished. All SEL keys become dark. Pressing the SEL key of one of the dedicated Control Group Masters enables the editing of the corresponding Control Group. The SEL keys of the members are lit and the SEL key of the Master flashes. The Graphic Controller automatically activates the Control Group Filter dialog (see below) for the selected Control Group.

When a Control Group is selected for editing (SEL keys of the members are lit, and the SEL key of the Master flashes), member channels can be added or removed from the Control Group by using their SEL keys. During editing, the Control Group is not active – the setting of the Control Group Master can be changed without influencing the members. This can be used to adjust the offset between the Master and the Members if needed.

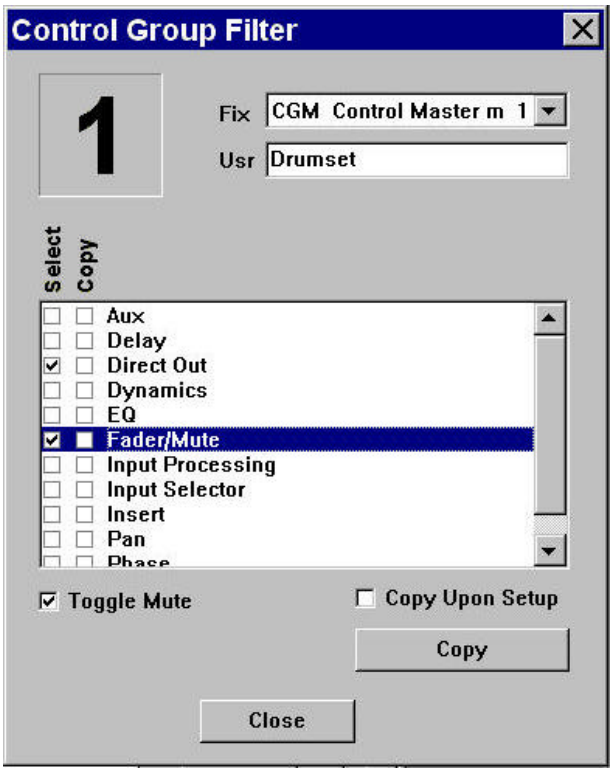
Editing of a control group can be concluded either by pressing the SEL key of the master or by exiting the EDIT mode (CONTROL GROUP EDIT key on the BSU). If you now want to proceed with editing of another control group, first deselect (using the SEL key) the CGM you have just finished with and then select the new control group master that you wish to edit.

Note: A Control Group Assignment dialog box can be started from the SysAdmin (System Administration) menu in the Graphic Controller. This box allows to view the members for a selected Control Group and to edit the members by clicking or dragging them graphically on the screen. Selection of the control group to be edited is not synchronized with the Desk selection – so two different control groups can be viewed at the same time.



Control Group Filter

When Control Group Editing is activated, the Graphic Controller automatically activates the Control Group Filter dialog box for the selected Control Group:



In the Control Group Filter dialog, the user can define functions to be grouped or not. To group the desired function, the appropriate Select checkbox must be checked. If Select is unchecked, the functions' control can be moved freely without influencing the members. Normally, when the members are grouped, their local values of Fader/Mute are left untouched when the group is formed – they are grouped in a relative way. If absolute grouping is desired, values can be copied from the master to the members:

- By checking the Copy Enable checkbox and clicking on the Copy button;
- By completing the editing of a group while the Copy Upon Setup checkbox is checked.

There is also a context menu available, called up by right-clicking within the edit dialog:

- If the cursor is placed over the Select items, the menu allows to check or clear all select boxes;
- If the cursor is placed over the Copy column, the menu allows to check and clear all copy parameters;
- and if it is placed over a white space, it does both.

Note: The Control Group Filter dialog box can also be started by clicking on the Control Group Filter item on the Options menu of the Graphic Controller. Clicking on the Close button does *not* terminate the Desk editing mode.

Absolute/Relative Faders are implicitly controlled in a relative way. This means that all the members will remain in relative positions to each other when the Master Fader (or other control) is moved. The member Faders can be forced to match the Master Fader using the Copy function in the Control Group Filter dialog, see above.
Muting can be controlled absolutely and relatively. The relative (Toggle) mode for the Mutes can be selected by the user in the Group Filter dialog. If selected, the Mutes can be set to On or Off on the members and will be toggled when the Master Mute is used. If Toggle is not selected, all Mutes on the members will be forced to the same status as the Master Mute the next time the Master Mute is used, regardless of their original status.

Member behavior When a new member is added to a Control Group, it keeps its values until a change is made in the Control Group Master. At that moment, the change is transferred to all members. When a member is separated from a Control Group it keeps its current setting which includes the Master offset(s) that have been applied along the way. Member values can be changed locally at any time, without affecting the status of the other members or of the Control Group Master.

Over-range The Faders can have an over-range. The over-range condition can occur if the Member Fader has reached its top or bottom position while the Master Fader is still moving. During over-range, the relative levels of the members are kept intact, even if the Fader (and the audio level) can not move anymore.
Over-range can be positive or negative. The maximum value of over-range can be twice the normal working range of the Fader (100 dB) in both up and down directions. The over-range status of the Member Fader level is displayed in the member channel strip by the OVR LED. Green OVR means that the member's Fader has reached its bottom position and can not move anymore. Red OVR means that the member's Fader has reached its top position and can not move anymore.
The over-range of a Member can be zeroed easily. Simply move the Fader of a Member being in over-range a little bit, and the over-range will be zeroed.

Note: This will, however, destroy the initial relative level of that particular Member with respect to the other Members.

Snapshots Control Groups are part of the snapshot. Control Group data comprise three parts:

- Members of a Control Group (which channels are Members in a Control Group);
- Control Group settings (filter and Copy settings);
- Parameter values of Member channels;
- Parameter values of the Control Group Masters.

Automation

Control Group Masters and Members are automated in the same way as all other channels. The Control Group function is active during dynamic automation.

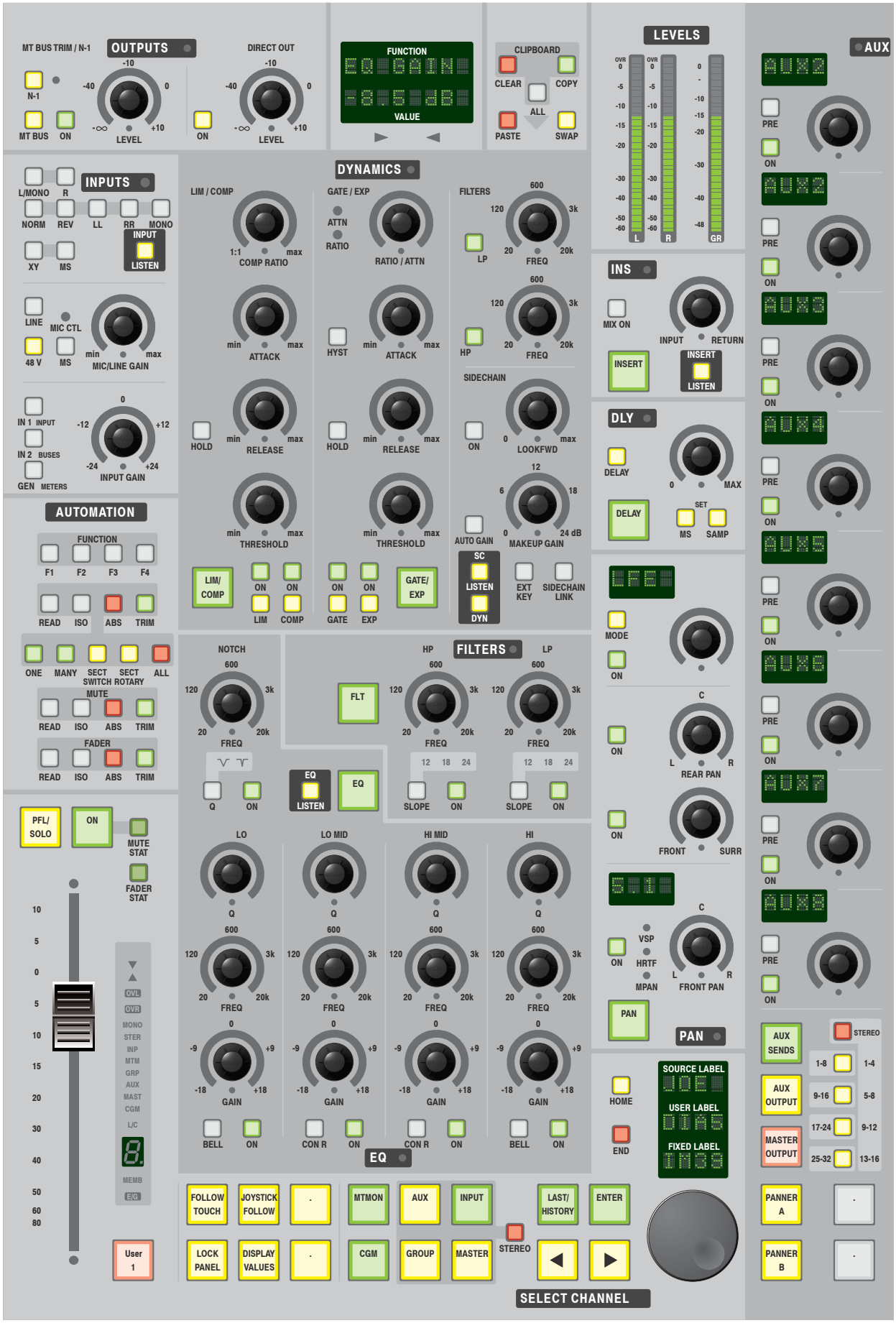
The Mix Start Snapshot keeps the Control Group data. The existence of the Control Groups in mixes ensures that the audio for the members behaves in the same way as it would in a non-automated environment.

It is not possible to edit or to unlink the Control Groups in the automation during a running mix, i.e. the current mix pass needs to be finished, and "keep changes" done before editing may be performed. *The Control Group edit process itself is not automated.*

Automation modes, as they are set by the CGM, are propagated (or "transmitted") to the Control Group Members. "Touch" status is propagated to the Control Group Members as well.

The automation data, as propagated to the Control Group Members, is stored within each Member's data stream in such a way that, if a Group is disbanded, the members will always play back all of their automated data.

3.4 Central Assign Section (CAS)



The Studer D950 Central Assign Section (CAS) represents a new operational paradigm for current and future owners of the D950 Digital Mixing System. The CAS is a complete expanded channel strip that is laid out in a clear and logical manner allowing its operation to be understood almost instantly. Designed to be mounted in the center section of the console, the CAS brings expanded channel control and sweet spot mixing to the D950. Much more than the "central section" sometimes found in other digital consoles, the CAS has unique navigational controls making it faster, easier and more efficient.

The D950 Central Assign Section is made up of easy-to-see visual blocks that each represent a separate processing section of a D950 channel. Even a complete Fader section, identical to those on the console channel strips, is presented within the CAS.

The Central Assign Section encompasses 46 rotary controls, each surrounded by a 21-LED concentric data ring that displays the current knob position. In addition, a central readout always displays the exact numerical value of the current or last touched control. In-Process-Listen (IPL) keys in each main section allow the mix engineer to monitor the audio signal at each main stage within the channel. Large Processing In/Out keys within each section give quick channel status information at a glance.

3.4.1 Channel Selection

Assigning a channel to the CAS is easy: Either just press the SEL key on the desired channel strip, or select it with the Channel Selection section on the CAS itself.
This unique Channel Selection section has two functions. First, to display the type of channel assigned to the CAS (Input, Aux, Group, Control Group Master, etc.) as well as the channel number, the user label assigned to that channel, and the label of the source signal patched into that channel. The second function is to allow navigation through the console, so that any channel within the system may be selected and assigned to the CAS without having to move (or reach) out of the sweet-spot monitoring position. A variety of controls is provided, including Arrow keys, Scroll Wheel, and Home and End keys. An other unique feature is the History Browser that allows any of the last 20 channels that have been assigned to the CAS to be instantly brought back to the CAS for further channel tweaking.

3.4.2 EQ

Full four-band equalizer with three knobs per band. Each band allows a full 20 Hz to 20 kHz frequency selection. The outer bands can be switched from bell to shelving, while the inner bands can be switched from Constant Bandwidth (Q) to Constant Range operation. This wide flexibility makes the Studer D950 EQ ideal for both musical and surgical use. For those channels configured with a notch filter, a separate knob/key set is provided.

3.4.3 Filters

Just adjacent to the EQ section are the two full-range (20 Hz to 20 kHz) high- and low-pass filters. Keys are provided for In/Out and Slope (12/18/24 dB/oct.) for each band, as well as overall filter set In/Out.

3.4.4 Dynamics

The dynamics section contains a full control set for the four-band dynamics section including Limiter, Compressor, Gate, and Expander. In addition, controls for the sidechain include HP/LP filters, look-forward, makeup gain, and side chain keying and linking. Independent In/Out keys are provided for each dynamics band as well as for the Compressor/Limiter and the Gate/Expander sections.

3.4.5 Panning

In the dedicated panning section, three knobs provide Front LCR, Front/Back, and Rear LCR controls. A fourth knob can be switched through several modes to provide center feed %, LFE (low-frequency effect) feed, and divergence control.

3.4.6 Input

The comprehensive input section provides controls for polarity inversion, stereo mode switching, input selection, and input gain. On those channels patched to Studer's remote controlled microphone/line pre-amplifiers, there are dedicated controls for mic/line switching, HPF, mic and line gain, as well as phantom power on/off. All of this control takes place in the analog sections of the remote mic/line pre-amps, providing maximum headroom and digital resolution.

3.4.7 Fader

The fader section is a complete duplicate of the fader section within the normal channel strip. In addition to the precision, long-throw moving fader, Solo/PFL, Channel On, and Automation switching is provided.

3.4.8 Outputs

Dedicated Level and On/Off controls are provided for the Direct Output and the Multitrack or N–1 bus output.

3.4.9 Insert

In addition to the Insert In/Out switch, an Insert Mix control is provided that allows the insert return to be mixed with the direct signal coming through the channel, providing local “wet/dry” mixing on any channel.

3.4.10 Auxiliary

The primary function of this section is to allow eight mono or four stereo AUX Sends to be controlled simultaneously. Switching is provided for access to up to 32 mono AUX Sends and 16 stereo AUX send buses. However, this section can also be used to control the AUX output levels or the eight stereo or mono master output levels of the console. Each of the eight knob sections has a dot-matrix display that labels the function of each knob, also allowing the numeric value to be displayed when each knob is touched.

3.4.11 Delay

Up to 100 ms (optional: 240 ms) of Delay may be configured within any console channel. The CAS provides delay control both in ms (milliseconds) and sample resolution.

3.4.12 AutoTouch+ Automation

Complete mode switching is provided within the CAS so that different controls within a channel can simultaneously be in different automation modes. All of the knobs in the CAS are touch-sensitive for fast and efficient automation operation.

CHAPTER 4

4 GRAPHIC CONTROLLER OPERATION

4.1 Introduction

The Graphic Controller (GC) is an essential part of the D950/Vista Digital System's operation, because it enables the user to utilize all of its enhanced functions, such as the snapshots, book-keeping, AutoTouch automation, and much more. It is also the place where the operating software is started and shut down – becoming, in fact, the console's main operations center.

All the operating software – consisting of a large number of individual files needed for proper operation of the console – is stored on the Control PC's hard disk. Even if there are hundreds of configuration, automation, snapshot and related files stored here from previous D950/Vista sessions, the user basically needs to start only *one* application program: `D950SYSTEM.EXE`.

Note: The version of the D950/Vista System software is typically included in the application name, for example: `D950SYSTEMV3.10.EXE`.

The `D950SYSTEM.EXE`, represented by one of the following icons (Windows Shortcut) on the monitor screen:

Note: The D950/Vista System software may also be started from the Windows Start menu (if programmed).

All the D950 or Vista software runs under Windows NT or Windows 2000 operating system, respectively. All files used by the D950/Vista and all the files produced by the user (snapshots, mixes, etc.) are fully compatible with the Windows standard. Which means that they can be copied to other compatible media (floppy, Iomega ZIP®, JAZ®, or CD-R drives, or other networked computers), using the Make Backup facility and standard Windows tools and procedures. Long file names (more than eight characters) are supported.

One of the advantages of using standard Windows techniques is that the majority of users will already be familiar with operating a PC-based system. Because all screen and trackball procedures are derived from the Windows operating systems, please refer to the appropriate manuals if you are not familiar with using them.

Operation of the Graphic Controller is also fully Windows-compatible. Text strings, files, or even pictures can be copied from one location to the other using the Windows clipboard principle and keyboard shortcuts: **Ctrl+c** or **Ctrl+Ins** will copy to, and **Ctrl+v** or **Shift+Ins** will paste from the clipboard. This technique can be used, for example, to enter repetitive labels into the User Labels, or for copying mixes from one Title to another.

Full use is made of the Windows-standard, context-sensitive menus that can be accessed by the right trackball button, as well as conventional dou-

ble-click techniques. The **Tab, PgUp/Dn,** and **arrow** keys behave according to standard Windows operations.

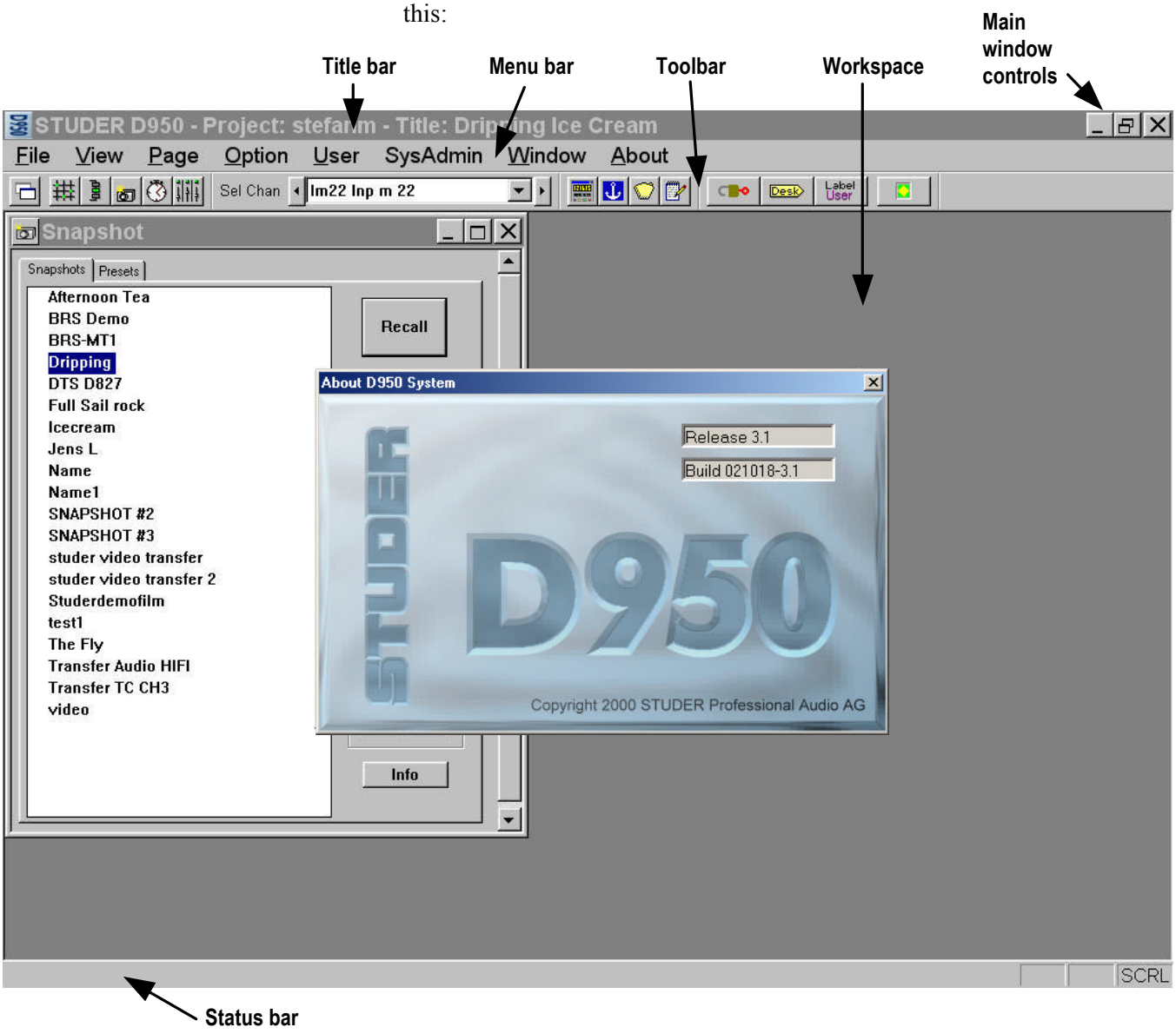
The Graphic Controller's screen colors, screen sizes, individual window positions and sizes, certain font sizes etc., are also part of the Windows Screen Properties, and can be adjusted there.

Because the Graphic Controller's user interface can be configured to suit the individual needs of specific users, all the graphics shown in this User Manual may differ slightly from what you will see on the GC display of *your* D950/Vista Digital Console.

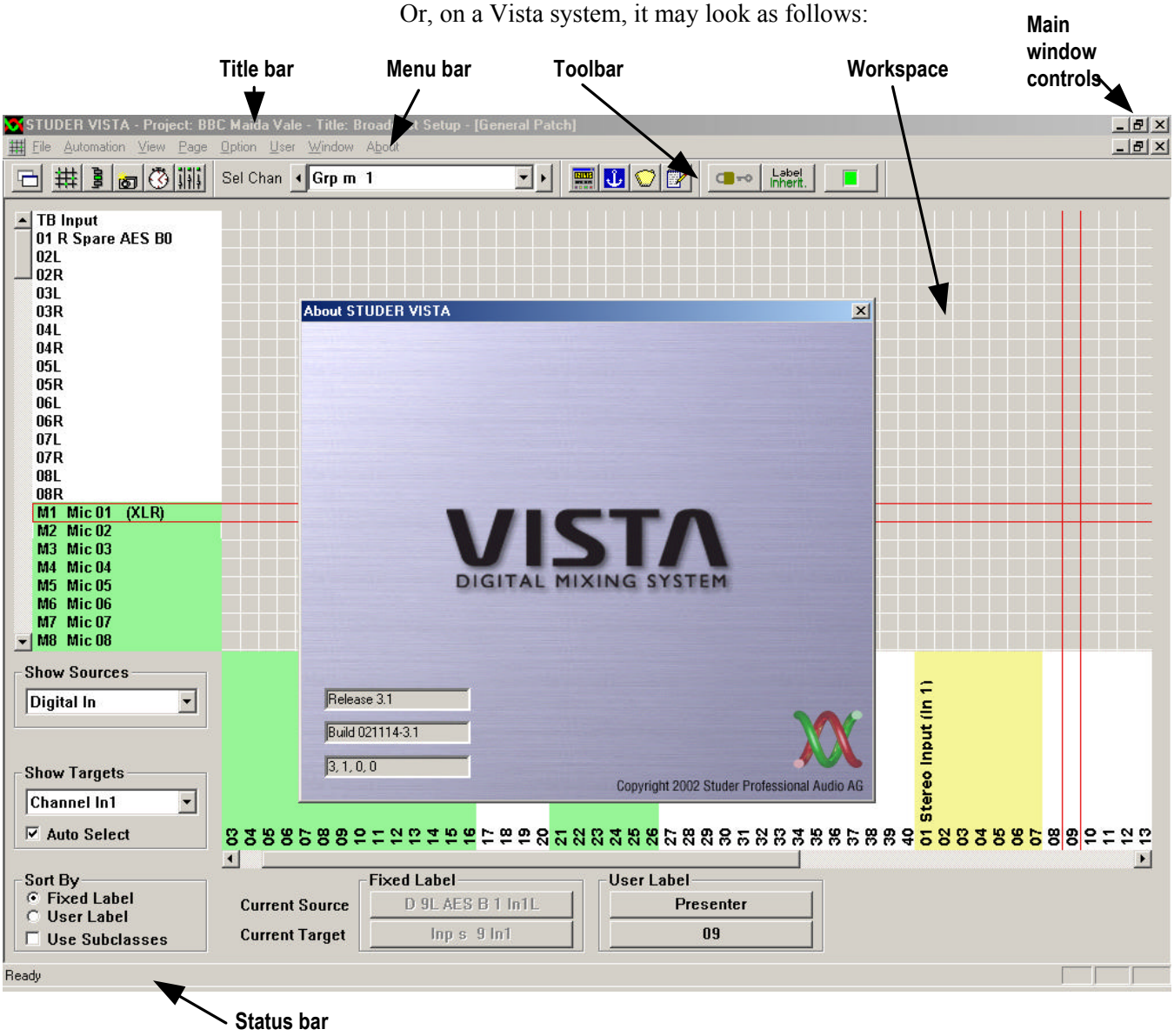
The appearance of the GC screen will also depend on the installed options. Several menu items, tools, or the AutoTouch+ panel will not function and/or be grayed out if the appropriate option is not installed. In the following text, we assumed that *all* the options were installed (otherwise, there would be no point in explaining them).

4.2 The GC Screen

Upon starting the GC for the first time, the screen will look something like this:



Or, on a Vista system, it may look as follows:



Please note the most important parts of the screen:

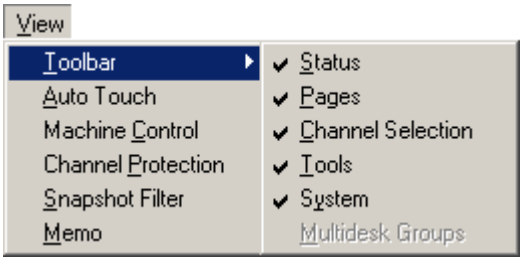
- The *Menu Bar*, allowing access to all the D950/Vista's functions. Refer to chapter 4.6;
- The *Toolbar*, containing various short-cut icons for the most important functions;
- The *Status Bar*, displaying system information and short on-line help information;
- The *Workspace*, where you will open the Main GC Pages and do other useful things;
- The *D950/Vista Logo Splash*, which will disappear a few seconds after the start;
- The *Main Window Controls (minimize, maximize/window mode, quit).*

4.2.1 The Toolbar

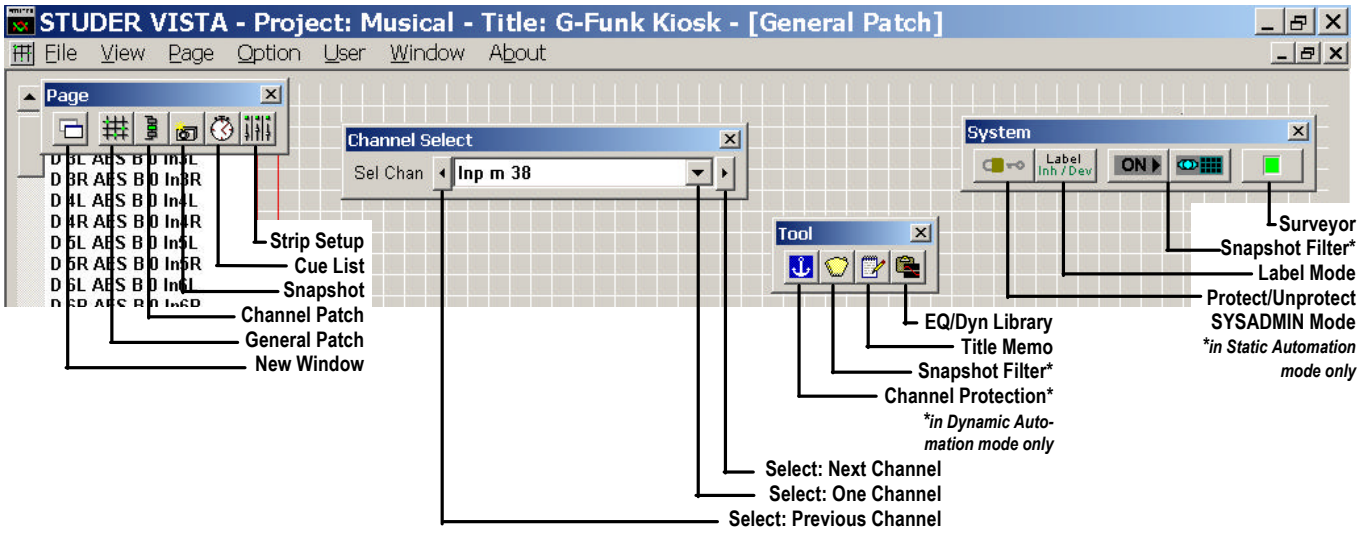
The *toolbar* contains a number of short-cut icons for the D950/Vista's most important functions.

There are four (or five) individual parts of the toolbar: Page Selection, Channel Selection, Tools, System Functions *(and Multidesk Groups, if configured)*.

Each of the four parts can be switched ON and OFF individually. The simplest way to do so is the View menu, item Toolbar:



This menu item also contains the Status bar (refer to chapter 4.2.2). The toolbar elements can be arranged in one continuous bar – as shown in the illustration above – or positioned individually, using conventional drag-and-drop technique:



This arrangement may be stored in a "preferences" file.
The icons represent D950/Vista system functions as described in the illustration; individual functions will be explained later in this chapter.

4.2.2 The Status Bar

The *Status Bar* has two functions:

- Displaying system information;
- Short on-line help information.

Status information is displayed in the Status Bar continually. It is especially helpful to view the Status Bar during startup of the D950/Vista system, because various information regarding the boot process and system parts will be displayed on the monitor screen.

"Ready" in the Status Bar indicates that everything within the D950/Vista is working satisfactorily. Check Status will be displayed if there is something wrong with the system (specifically, a red circle appears in the Surveyor button, refer to chapter 4.8 for more information), and sometimes during system booting (which is normal).

If you move the cursor over a specific item in the toolbar, on-line help information will be displayed. The information displayed describes the basic function of the selected tool.

4.3 Graphic Controller Basics

This chapter describes the basic concepts of the work with the Graphic Controller (GC).

4.3.1 Sources and Targets

Generally, all audio signals available to the D950/Vista can be divided into *Sources* and *Targets*. These names are used rather than "Input", "Output", etc., in order to avoid any confusion regarding where the audio signal comes from, and to where it goes.

Sources: A *Source* is anything that delivers an audio signal:

- *Digital Input Interface* (AES/EBU or MADI);
- *Analog Input Interface* (D19m Mic Input, A/D Converter);
- *Channel Output* (for example, Direct Out of Input Channel #24, Master Output, etc.);
- *Channel Insert Send*;
- *Bus Output* (unlike analog consoles, within the D950/Vista any bus is a valid audio signal source; for example, AUX Mono Bus 12 can be used to feed an output interface, or to become an input to an input channel);
- *Test Generator*.

Targets: A Target is anything that can receive one (mono or stereo) audio signal:

- *Channel Input 1* (first audio input to a channel; free for all input channels; used to connect Sources to input/track monitor channels, such as a MADI output from a digital multi-track to a track monitor channel, or the corresponding bus to an output channel, such as a Group, Master, or AUX channel);
- *Channel Input 2* (second audio input to a channel; free for all channels);
- *Channel Input 3* (third audio input to a channel; used for the test generator connection per default, can be re-patched to any source at any time),
- *Channel insert returns*;
- *Digital output interfaces* (AES/EBU or MADI);
- *Analog output interfaces*.

Sources and Targets implicitly behave as mono or stereo, depending upon their character. A *stereo* Source or Target can be treated, nevertheless, as consisting of two *mono* parts.

Any Source can be connected to as many Targets as needed via the Patch pages. However, a Target (stereo or mono) can have only one Source (stereo or mono) assigned to its input.

4.3.2 The Session Configuration

The *Session Configuration* is the physical and electrical definition of the D950/Vista Digital Mixing System installed at your recording studio or production facility. Session Configuration contains data about the mixing console channels, the patch, the labels, and so on. A Session Configuration *must* be loaded in order for the console to function.

We often refer to the *Virtual Mixing Console (VMC)* when speaking about the Session Configuration. VMC is another concept that forms the very foundation of a D950/Vista: all functions and the current Session Configuration data are stored within the VMC. A simplified definition of the VMC is:
"The VMC is a data structure containing descriptions of the console's functions, including all the current statuses of all functions."

That is why, as we will see later, all the Session Configuration files have the extension `*.vmc`.

Because of the flexibility provided by the Session Configuration Tool, you can create customized, application specific, console configurations. In most cases the facility's D950/Vista system administrator will create the necessary Session Configurations. However, there are some cases where you will not need to be concerned with the Session Configuration, because the one configuration that was loaded at the Studer factory will remain loaded and active unless you changed it. The last-loaded Session Configuration will remain loaded and active until it is either changed, or another one is loaded.
If a production is recalled that has been created with an other Session Configuration, the correct Session Configuration will be automatically loaded.

Please refer to chapter 7 for more details.

4.3.3 Labels

Labels are used extensively within the system to define objects, such as audio sources, channel names, etc., and to visualize these objects in various windows within the GC.

Please note that all labels are stored within Snapshots and Presets, together with all audio settings.

There are various ways to work with labels within the system. For a description of how to use labels, refer to chapter 4.4.2.6. Basic label types are described below:

Fixed Labels These are generated automatically at the time of system configuration, and used to identify *hardware-oriented* objects. For example:

Fixed Label	Meaning
D 1 AES B0 In 1	Digital AES/EBU, on PE/AES Board 0, Physical Input 1
Input m 8 In 1	DSP Mono Input Channel 8, Input 1 of 3
M25 B0 Out 1CH25	MADI Output CH 25, on MADI B 0, MADI Interface 1

Note: *It is advised never to change the Fixed Labels.*

User Labels These by default are identical to the Fixed Labels at the start of a new Session Configuration. The user is able to rename these User labels in the GC to make the system environment more user friendly. User labels are used to give the objects a useful, *application-oriented* name. For example:

Fixed Label	User Label	Meaning
D 1 AES B0 In 1	**DAT 1**	DAT Player 1, coming in via Digital AES/EBU, on PE/AES Board 0, Physical Input #1
Input m 8 In 1	**BASS**	DSP Mono Input Channel 8, Input 1 of 3, used for the audio signal of the Bass Guitar
M25 B0 Out 1CH25	**Foldback 1**	MADI Output CH 25, on MADI B 0, MADI Interface 1, is the foldback Send 1 to the Studio Floor

Inherited Labels Inherited labels are used primarily to indicate the *Source Signal* that is connected to the Channel Strip, rather than the User Label of the Channel. In this way, as soon as the signal is connected to a channel's input, the channel strip display inherits the Label from the actual Source.

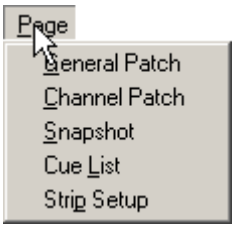
4.4 First Level of Operation: Main GC Pages

There are five main Graphic Controller pages, each of which deals with a different operating part of the D950/Vista System:

- General Patch Page
- Channel Patch Page
- Snapshot Page
- Cue List Page
- Strip Setup Page

These main pages can be accessed in three different ways:

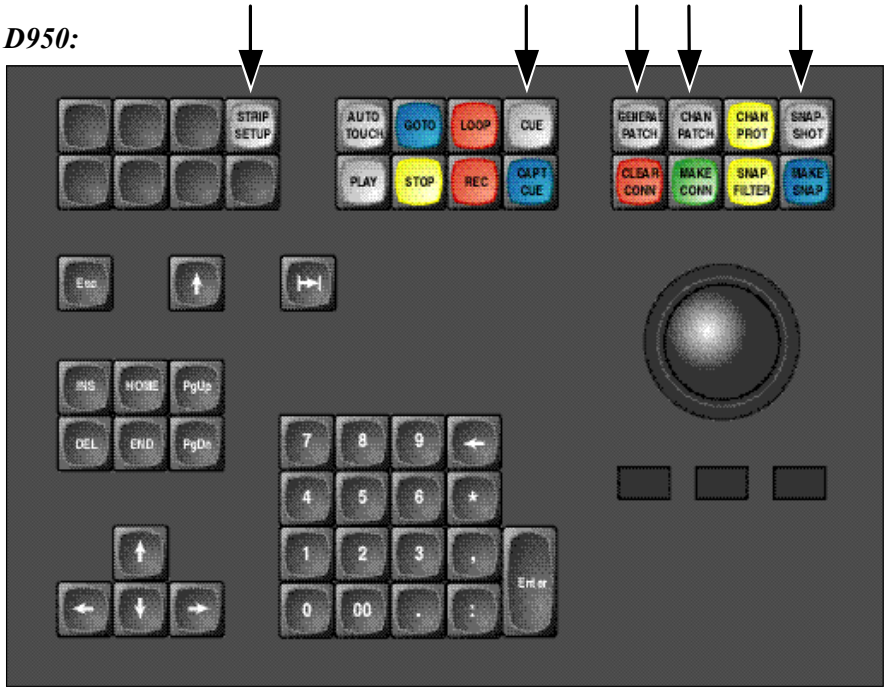
- From the *Page* menu, by clicking on the appropriate menu item:



- Using the Page icons, by clicking on the appropriate icon in the toolbar (see above), or
- Using the function keys on the control surface keyboard – which is probably the fastest way:

Vista:

D950:

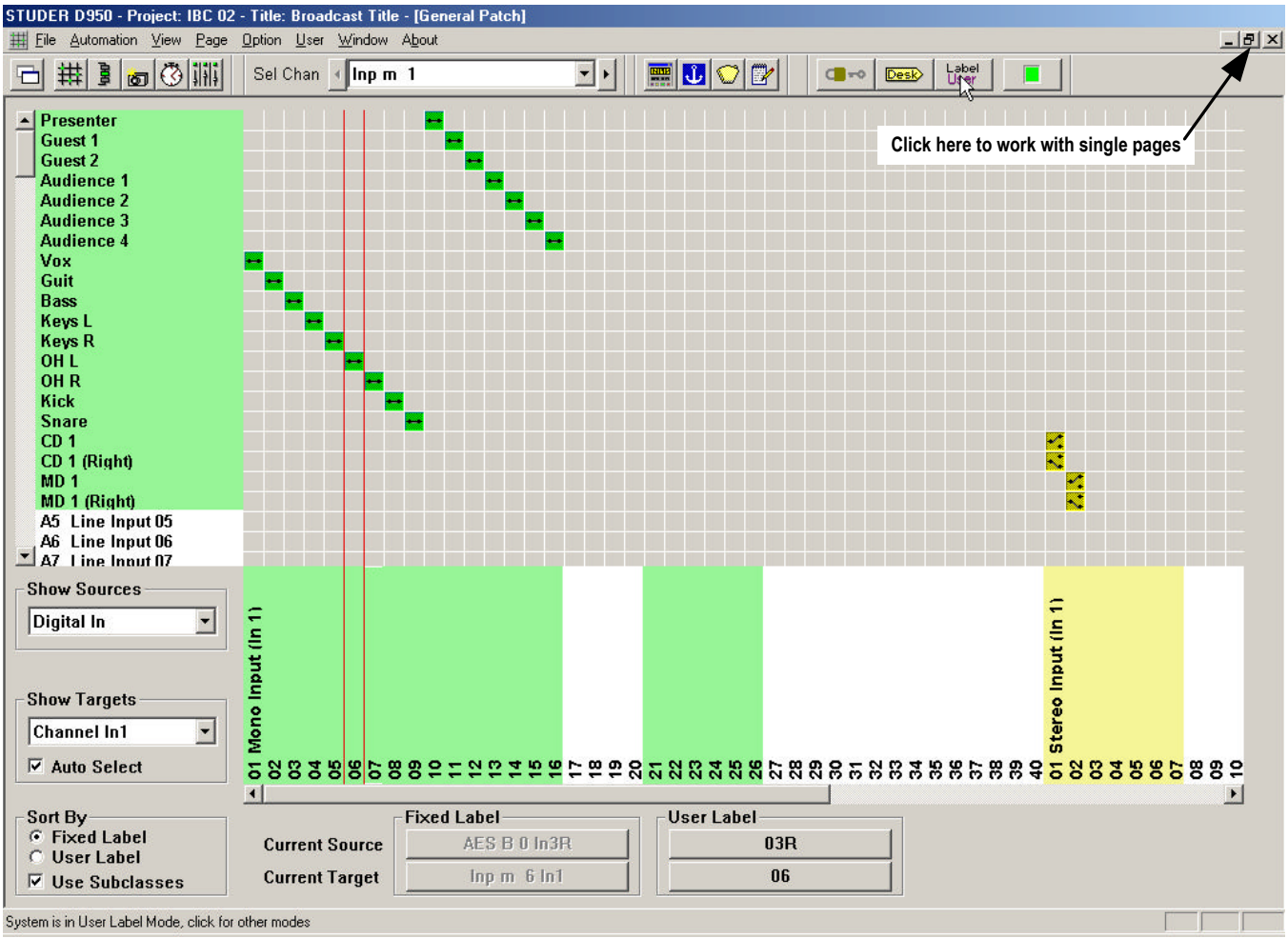


4.4.1 One Page, or More...

The GC Workspace can be used to display one single page, or a number of pages and panels at the same time. Because different users will prefer different page layouts, the User Menu enables Workspace layouts to be stored and retrieved for later use by any number of users. Page layouts can be manipulated using standard Windows techniques.

4.4.1.1 Working with one Single Page

If you prefer working with a single page, select the page using one of the methods listed above. Then click to full-page mode:



The selected single page will now be fully visible. Selecting a single page has the advantage that you always see all parts of a page (except for the General Patch), and that operating via the Function Keys/Page menu always affects the page you want – because there is only *one* to work with.

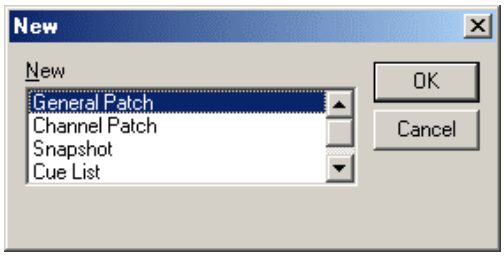
4.4.1.2 Working with Multiple Pages

A number of different pages can be opened on the screen at the same time, and drag-and-drop techniques used to position and size the selected pages.

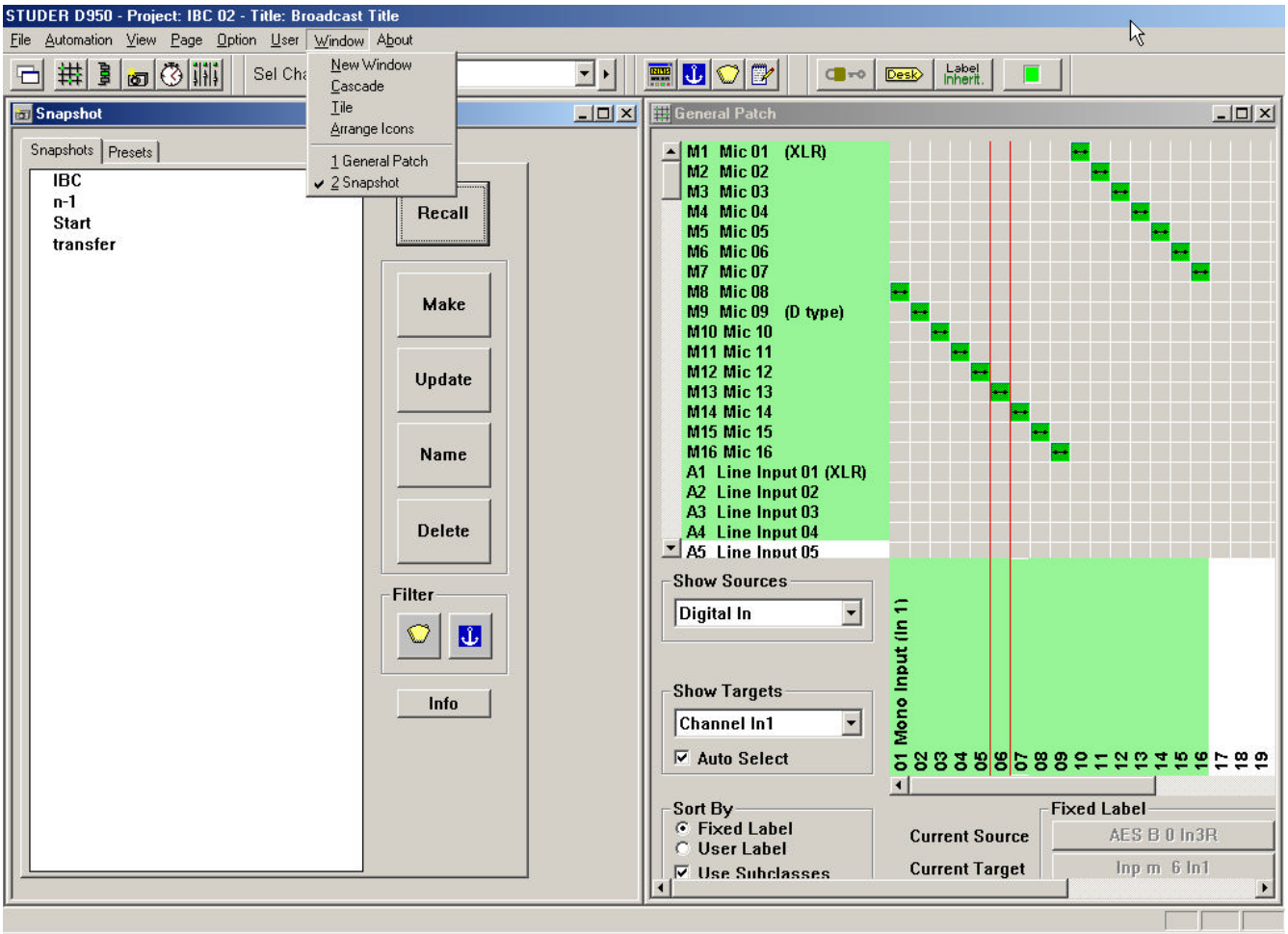
☞ **Tip** To open more than one page, open the first page using the methods listed above; then:

- Use the Window menu item *New Window*, or
- The Toolbar icon *New Window*, and

- Select as many pages as you require.



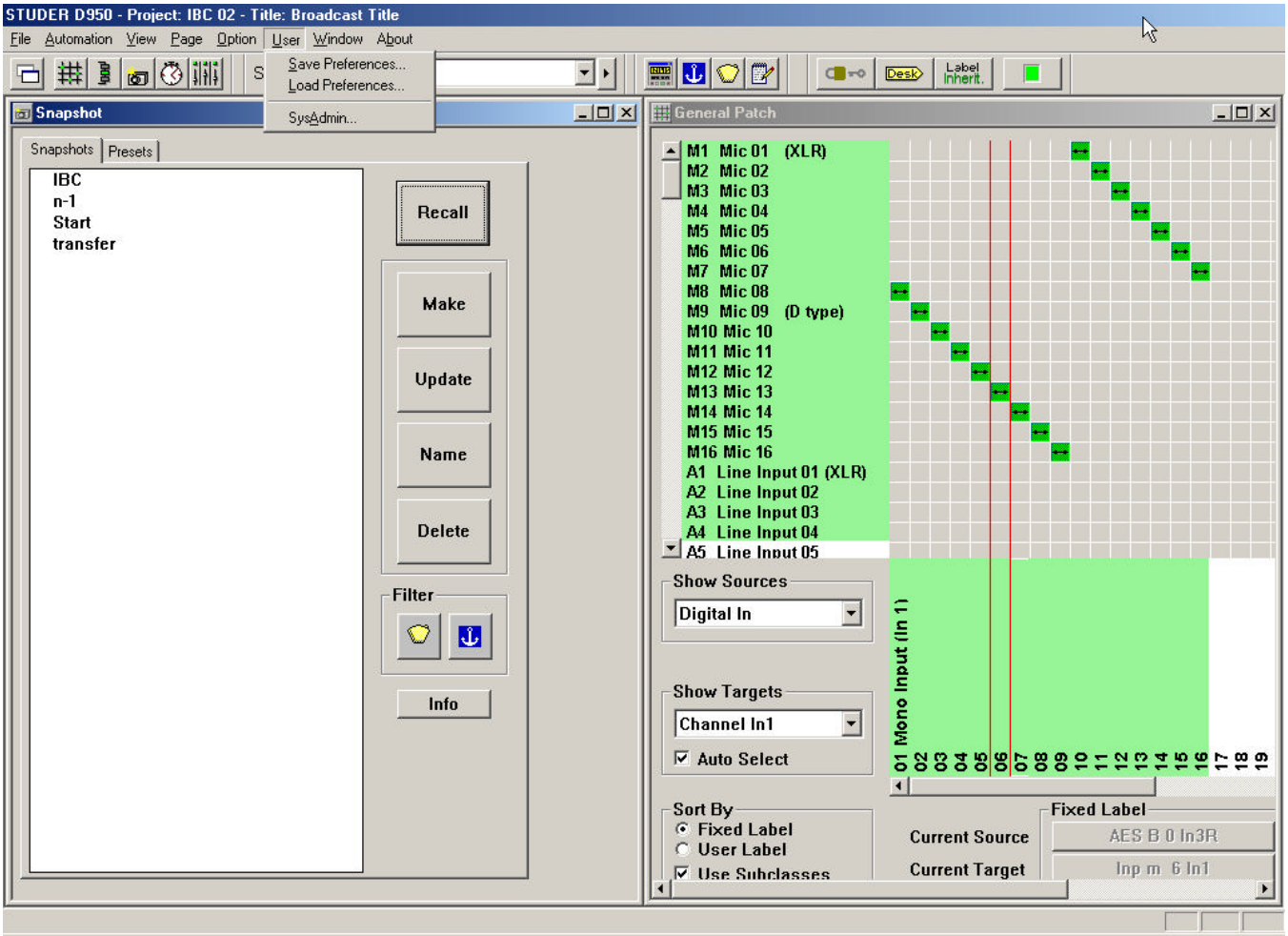
In this example, there are *two* active pages displayed on the same screen:



You can also open the *same* page more than once, which can be useful for simultaneously viewing different areas of the General Patch page, for example. The page you used last will be *selected*, which is indicated by highlighting the Title bar in blue.

Generally, this means that various functions activated through the function keys will only affect the *selected* page. To highlight another page, simply click on it once, or use the familiar Windows **Ctrl+Tab** key combination.

To position and size the pages, use the normal Window menu items Cascade and Tile. Alternatively, use drag-and-drop techniques to position and arrange each page, and experiment with their locations to suit your own requirements. Once you have developed a favorite page layout, store it for later retrieval using the User Menu items Save Preferences and Load Preferences:



☞ **Tip** If you should forget to save your particular preference, don't worry. The system will store automatically the screen layout used when you shut down the system. When starting the system the next time, the screen will appear exactly as you left it.

4.4.2 The General Patch

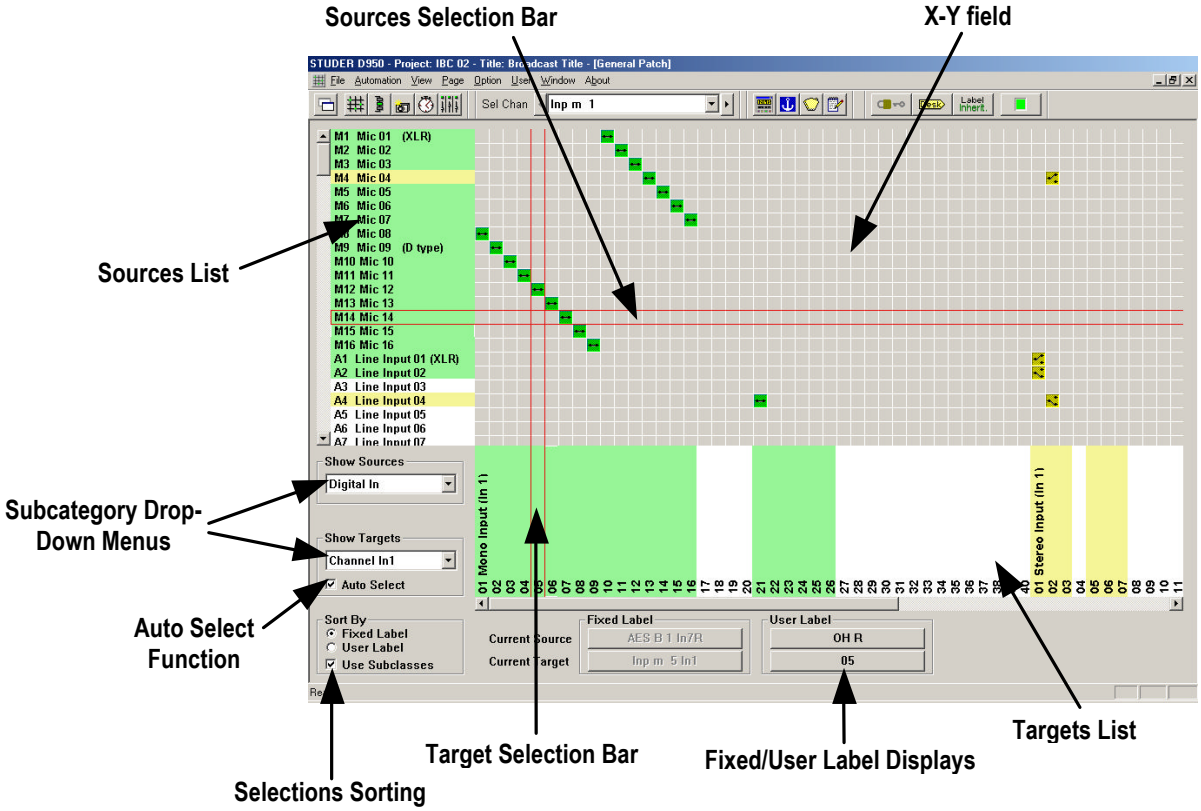
The GC General Patch page can be accessed in three different ways:

- From the Page menu, by clicking on the appropriate menu item
- Using the Page icons, by clicking on the appropriate icon in the tool-bar
- Using the **GENERAL PATCH** *(D950)* or **GLOBAL PATCH** *(Vista)* function key. This is the fastest way.

The General Patch is the main tool used to establish and clear audio connections within the system. The name “Patch” is used because it mimics the conventional patch bay used in analog consoles. It accomplishes all the tasks of a conventional patch bay, and much more. Patch cross-points are stored into the Snapshot/Preset memories.

It utilizes an X-Y axis (or side-to-side/up-down) representation to aid viewing and editing of existing connections or cross-points (equivalent to the location of patch cords), and all existing Sources and Targets (equivalent to the patch-jack pairs used in most patch bays).

The General Patch can be thought of as a number of “sub-patches” whereby single subcategories of the sources and targets can be viewed at one time.



The General Patch consists of:

- A Targets list (the lower horizontal, or x axis), equivalent to the lower jack row in a patch bay
- A Sources list (the left-hand vertical or y axis), equivalent to the upper jack row in a patch bay
- The X-Y field, where the cross-point icons enable interrogation and editing of cross-point connections
- The Source and Target selection Bars

- Source and Target drop-down menus for selection of the subcategory to be viewed
- Auto Select function
- Viewing selections which allow sorting of the Sources and Targets Lists by label type
- The Fixed/User Label displays for the selected Source/Target (refer to chapter 4.3.3).

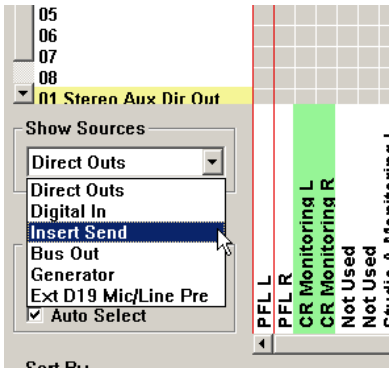
4.4.2.1 General Patch Navigation

4.4.2.1.1 Navigating the Sources/Targets List

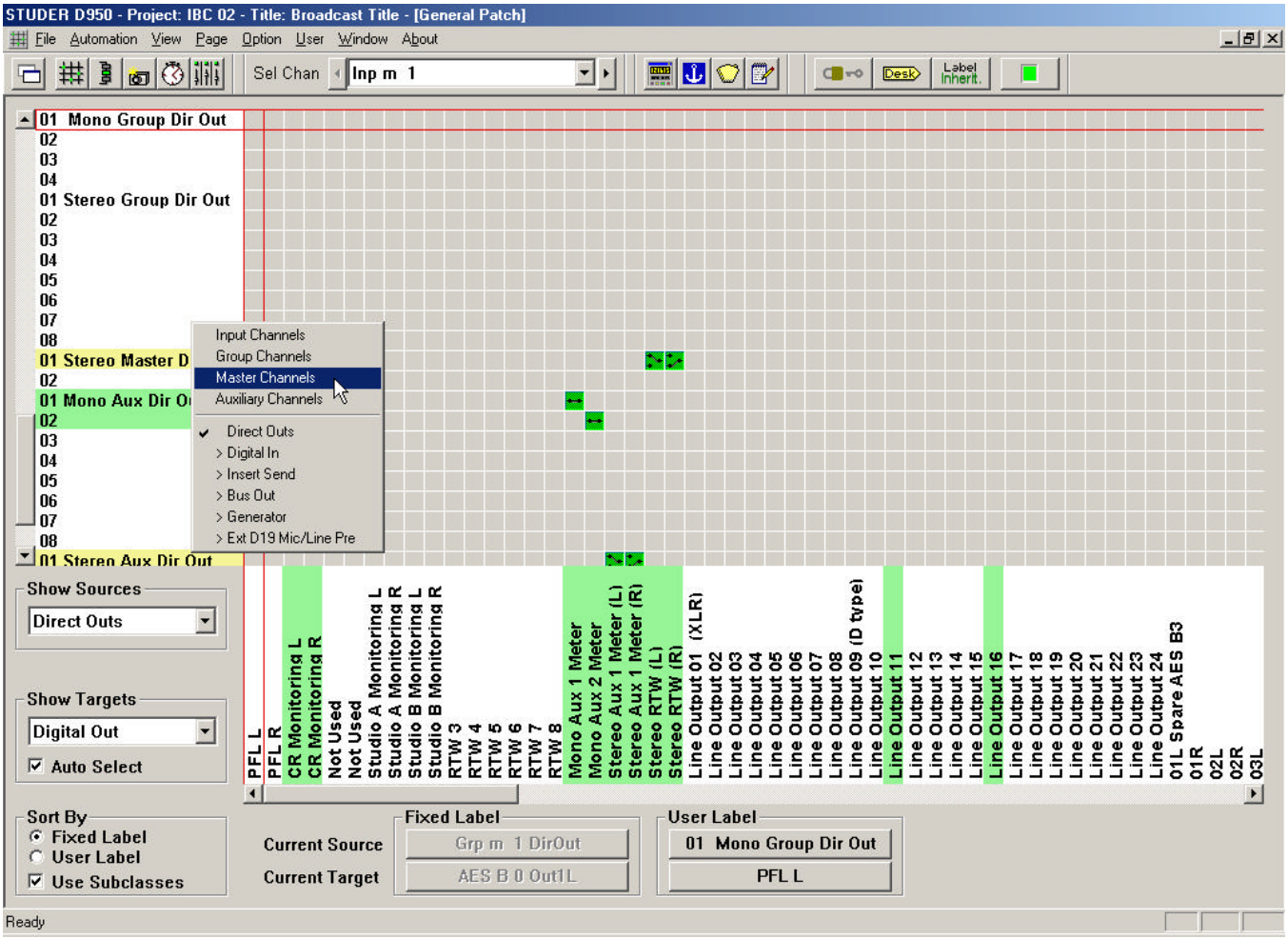
The audio sources list (located on the Y axis) and the targets list (on the X axis) allow the user to find and select a Source/Target pair, and to make or clear a required cross-point connection.

There are different ways to navigate and select the required source and target for making or clearing patch connections. The simplest process to select the required Source/Target selection is described below:

1 Select the subcategory of the required source/target using the "Show Sources" and "Show Targets" drop-down menus. This will show in the X-Y axis list all the possible sources/targets available in the Session Configuration currently loaded. Scrolling using the standard windows scroll bar may be required to see all the sources/targets from the chosen category. Scrolling is *not* recommended as the fastest way to navigate the sources list.



2 Move the cursor into the Sources/Targets List and right-click. This will open a selection list to allow fast navigation to some pre-defined subclasses of Inputs or Channel types (such as Input Channels, Auxiliary Channels, etc.), see the screenshot below. Select the required Input or Channel type category. This will navigate directly to the first Source/Target of the chosen category (e.g Mono Input Channel 1, Auxiliary Channel 1, etc.). Select the required Source/Target by clicking on the Source/Target name or by using the keyboard cursor arrows to move up and down the list. This will position the Selection Bars of the X-Y axis to the chosen Source/Target. The intersection of the two Selection bars will allow the making or clearing of a cross-point based on the chosen Source and Target (see chapter 4.4.2.4 for information on how to make cross-point connections).

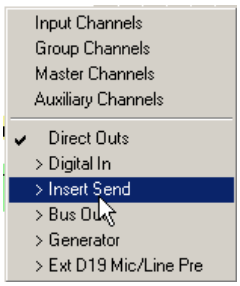

STUDER D950 - Project: IBC 02 - Title: Broadcast Title - [General Patch]
File Automation View Page Option User Window About
Sel Chan
Inp m 1
Desk
Label Inherit.
01 Mono Group Dir Out
02
03
04
01 Stereo Group Dir Out
02
03
04
05
06
07
08
01 Stereo Master D
02
01 Mono Aux Dir O
02
03
04
05
06
07
08
01 Stereo Aux Dir Out
Input Channels
Group Channels
Master Channels
Auxiliary Channels
Direct Outs
Digital In
Insert Send
Bus Out
Generator
Ext D19 Mic/Line Pre
Show Sources
Direct Outs
Show Targets
Digital Out
Auto Select
Sort By
Fixed Label
User Label
Use Subclasses
PFL L
PFL R
CR Monitoring L
CR Monitoring R
Not Used
Not Used
Studio A Monitoring L
Studio A Monitoring R
Studio B Monitoring L
Studio B Monitoring R
RTW 3
RTW 4
RTW 5
RTW 6
RTW 7
RTW 8
Mono Aux 1 Meter
Mono Aux 2 Meter
Stereo Aux 1 Meter (L)
Stereo Aux 1 Meter (R)
Stereo RTW (L)
Stereo RTW (R)
Line Output 01 (XLR)
Line Output 02
Line Output 03
Line Output 04
Line Output 05
Line Output 06
Line Output 07
Line Output 08
Line Output 09 (D type)
Line Output 10
Line Output 11
Line Output 12
Line Output 13
Line Output 14
Line Output 15
Line Output 16
Line Output 17
Line Output 18
Line Output 19
Line Output 20
Line Output 21
Line Output 22
Line Output 23
Line Output 24
01L Spare AES B3
01R
02L
02R
03L
Fixed Label
Current Source
Grp m 1 DirOut
Current Target
AES B 0 Out1L
User Label
01 Mono Group Dir Out
PFL L
Ready

4.4.2.1.2 Other Navigation Methods

Choosing Source/Target Subcategory:

There are two methods to select the required Source/Target subcategory:

1. Use the Source/Target subcategory drop-down menu.
2. Right-click directly in the Sources/Targets List. All the available subcategories (identical to those in the drop-down menus) can be accessed directly from the lower portion of the menu.



Source Subcategory Selection

Target Subcategory Selection

Using "Auto Select" Feature:

For faster selection of the Source/Target subcategories, a useful feature can be activated called "Auto Select". To activate this function, click on the "Auto Select" checkbox.
This function will automatically select the most logical subcategory of Targets as soon as a Source Subcategory is selected. That is, if the "Digital In" Source Subcategory is selected, the Targets List will automatically switch to show the "Channel In 1" subcategory. However, even if this option is selected, it is possible to navigate to other Target subcategories manually after Source navigation.

Use of Color for Navigation:

Color is used in the Sources and Targets lists to give a clear indication and overview of the sources and targets which have connections patched. If a Source is connected to a Target or multiple targets, the Source label in the Sources List will be highlighted by a color. Similarly, if a target is connected to a Source or a number of different Sources, then the Target label in the Targets List will be highlighted by a color. The meaning of each color is as follows:

GREEN: A single connection is made to the indicated Source or Target.
YELLOW: Two or more connections are made to the indicated Source or Target.
RED: The Target has a protected connection.

If a Source or Target is highlighted (indicating a connection is made to it), double-clicking on the label in the Sources/Targets Lists will navigate directly to the cross-point so that the Source Selection Bar and Target Selection Bar intersect at that cross-point. This is an extremely fast method to find what is connected to a Source or Target without the need for scrolling or manual searching of the sub patches. If a Source or Target is highlighted in Yellow (indicating two or more connections are made to it), double-clicking on the label in the Sources/Targets Lists will navigate directly to the first cross-point. Subsequent double-clicks will navigate to each of the following connections that are made to the Source/Target in question. If all connections have been shown, a further double-click will return the user to the first connection and loop around the connections once again with further double-clicks.

4.4.2.1.3 What Subcategories are There?

There are basically seven different subcategories for each of the Sources and Targets Lists:

Sources	Targets
Digital In	Channel In1
Dir Out	Channel In2
Insert Send	Insert Return
Bus Out	Digital Out
Generator	Channel In3
Ext Source	Dyn Ext Key
Ext D19 Mic/line Pre	Ext Target

Each subcategory contains a number of Sources or Targets, depending on the current Session Configuration. Sometimes certain sections will not be present; for example, if no Channel Inserts have been configured, there will be no Insert Send section within the Sources List, and no Insert Return section within the Targets List.

The size of the X-Y General Patch automatically adapts to the number of channels, input interfaces, output interfaces, and to the presence of DSP function blocks in the channels – as defined in the Session Configuration.

Some detail information on the sections:

Sources List:

Digital In: All input audio interfaces (AES/EBU, MADI, or D21m A/D converters).

Dir Out: All Direct Outputs of all channel types.

Insert Send: Sends from the inserts of all channel types.

Bus Out: Unlike analog consoles, with the D950/Vista any bus is a valid audio signal source; AUX Mono Bus 12 can be used to feed an output interface, or to become an input to an input channel.

Generator: The Test Generator's signal.

Ext Source: This is *not* an audio signal, but a *logical Source* to be used in conjunction with future A/D converters (not used in this software version).

Ext D19 Mic/Line Pre: This is *not* an audio signal, but a *logical Source* to be used in conjunction with the remote-controlled D19m Mic/Line Pre-amps/converters.

Targets List:

Channel In1: First audio input to all channel types,
- Free to use for all input channels,
- Used for default connection of the corresponding Bus for an output channel, such as a Group, Master, or Aux channel.

Channel In2: Second audio input to all channel types,
- Free for all input and output channels.

Insert Return: Returns to the inserts of all channel types.

Digital Out: All output audio interfaces (AES/EBU or MADI, D/A converters).

Channel In3: Third audio input to all channel types,
- Used for the Test Generator connection per default,
- Can be re-patched to any source at any time.

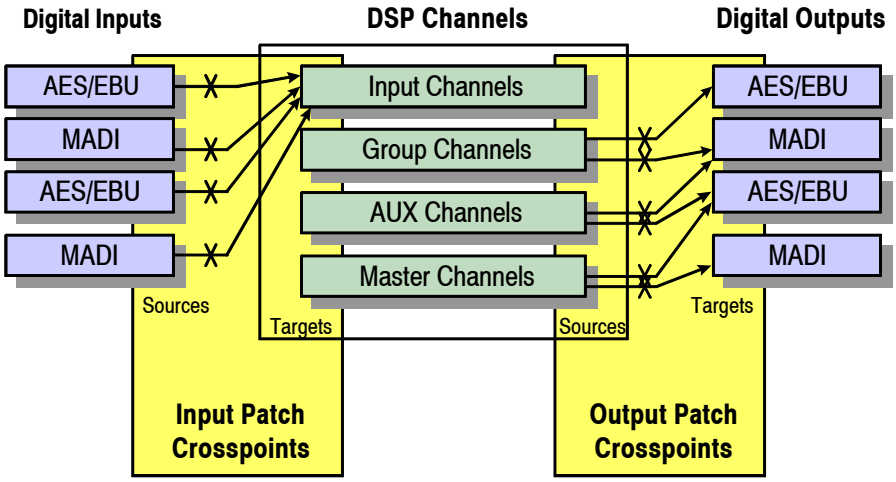
Dyn Ext Key: Input for the external control signal (key) to the Dynamics Sidechain of all channel types.

Ext Target: This is *not* an audio signal, but a *logical Target* to be used in conjunction with external converters.

4.4.2.2 How to Deal with the Analog Interfacing?

"Where are the analog interfaces coming in?", you might be asking. We still need some analog sound. Here is how we achieve that task:

The D950/Vista Patch and DSP systems only know about *digital* interfacing, as can be seen from the following simplified block diagram:



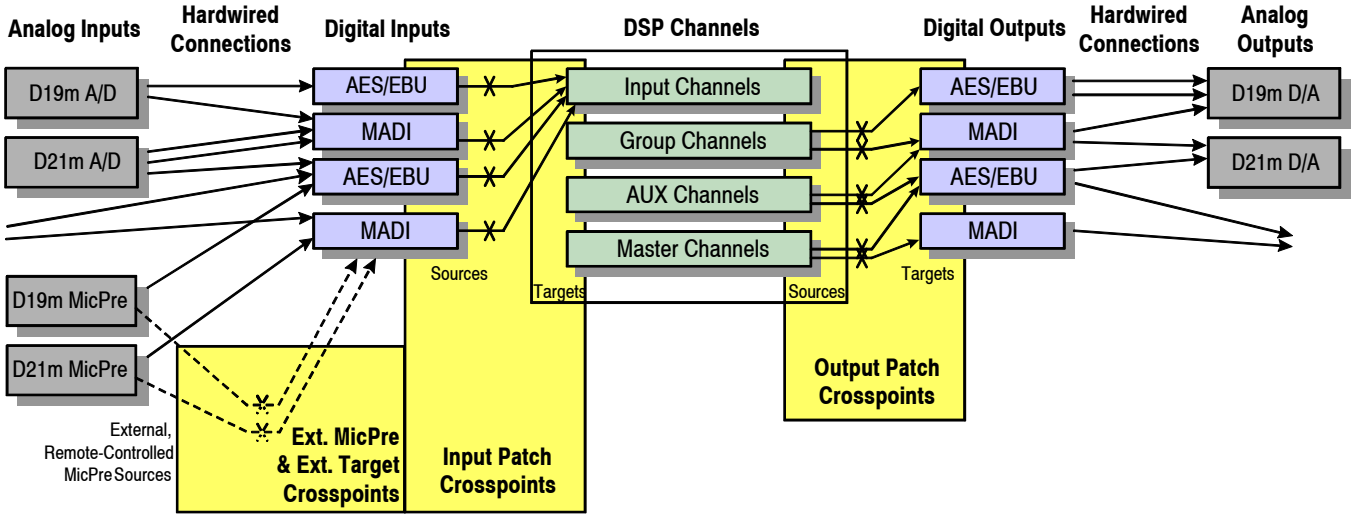
To accommodate analog sources, we need to make a distinction between

- Remotely controllable devices (D19m/D21m mic pre-amps), and
- Non-controllable devices (D19m/D21m A/D and D/A converters).

The mic pre-amps have to be connected to the system using General Patch connections, in order to establish the correct remote control and audio inputs. In addition, they are also hardwired to digital inputs (AES/EBU or MADI).
All other currently available analog interfaces are only hardwired to their digital counterpart sources.

For this reason, all microphone/line sources coming from D19m/D21m mic pre-amps need to be patched *twice (where one of these patches remains the same as long as the wiring of the analog pre-amps to the digital input is not changed)*:

Source	to	Target	Reason
D19m Mic/Line Pre	**to**	Ext Target	Prepare the remote control link, and
Digital Input	**to**	e.g. Channel In1	Establish the connection & control link



As soon as both cross-points have been made, the MIC CTL LED on the corresponding console Channel Strip will be lit to indicate an established connection (assuming the corresponding channel input has been selected).

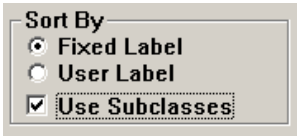
☞ **Tip** Even if it appears complicated, this procedure really is quite simple. As a rule, the Ext D19m mic/line pre-amp Target connections, as well as most of the output patch cross-points, may have been factory-configured, and saved as a Basic Preset, along with appropriate Labels and other useful pre-fabricated settings. In some cases, your subsequent work will be based on that Basic Preset. Unless your console's layout needs to be radically re-configured, you will probably never have to change this preset. In other situations, multiple Presets (and possibly Session Configurations) will be used to allow optimized configurations for a variety of applications.

4.4.2.3 Digital Input/Output Subclasses

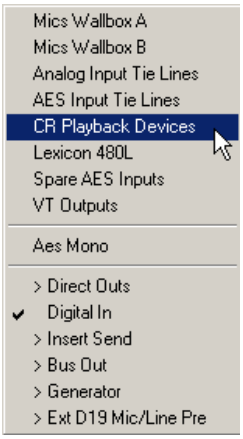
The two subcategories “Digital In” (Sources) and “Digital Out” (Targets) show the list of available physical inputs and outputs of the loaded Session Configuration. These sources and targets provide all the interfacing of the console to the outside world. For this reason, these are the most used of the sources and targets. It would therefore be extremely useful to be able to group certain physical inputs and similarly physical outputs together within the General Patch to aid navigation and viewing possibilities. This grouping of the “Digital In” Sources and “Digital Out” Targets is known as Subclasses. For the creation of these subclasses, please refer to chapter 4.7.1. Subclasses are usually generated by the facility’s system administrator.

4.4.2.3.1 Using Subclasses to Aid Navigation

To use the subclasses, ensure that the “Use Subclasses” check box is selected in the “Sort By” window.



When either the “Digital In” or “Digital out” subcategories are showing, right-click on the Sources/Targets list to show the selection menu.



In the case of Digital Input as shown above, as well as the general selection of Digital Input type such as “MADI Mono”, “AES Mono” or “AES Stereo”, the predefined list of subclasses is also shown. By selecting a subclass, the Source Selection Bar/Target Selection Bar navigates directly to the first of the Sources/Targets within the subclass. This provides fast navigation to physical I/O.

Note: Subclass Names are stored within User Preference files. If changes are made to the Subclass Names, a User Preference should be stored (see chapter 4.6.6).

4.4.2.4 Making and Clearing the Cross-Points

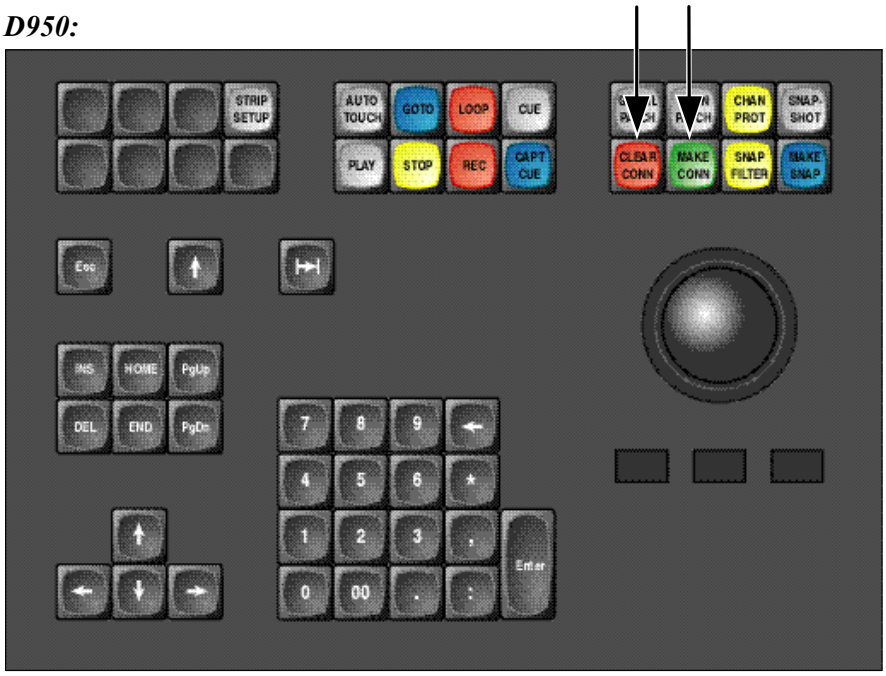
The creation and updating of cross-points is simple. First, select the Source and Target; the Selection Bars have to be crossed to form an X-Y pair.

There are two ways of making or breaking a cross-point connection:

- By double-clicking the left trackball button, while the cursor is positioned over the crossed Selection Bars, or
- By using the function keys on the control surface keyboard;

Vista:

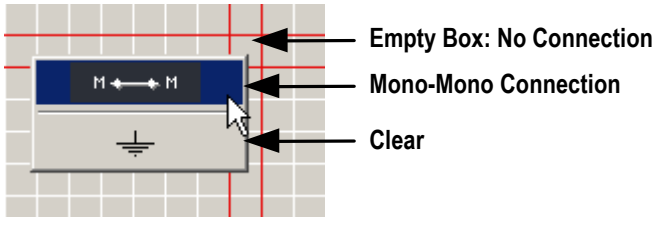
D950:



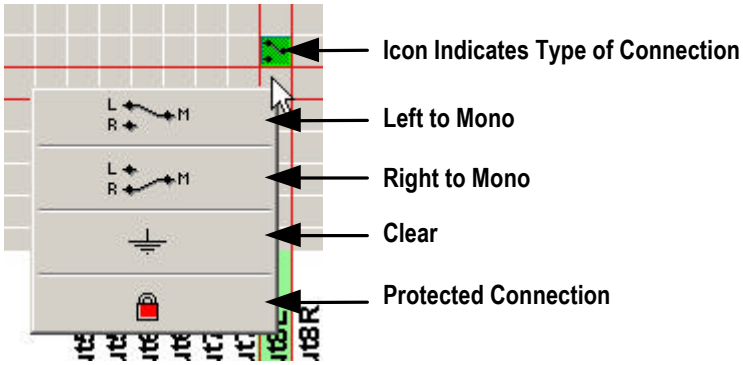
Using the **MAKE CONN** (make connection) function key will always make a default connection, depending on the Source- and Target-type combination. Using the **CLEAR CONN** (clear connection) function key will always clear any cross-point connection. (This is the *fastest* method to make or clear a connection.)

Double-clicking the left track ball button: This method is more sophisticated, because it allows you to select from a *number* of connection options displayed in a pop-up menu box. The menu display depends upon the combination of Source (mono or stereo) and Target (mono or stereo). The uppermost connection type in the menu is the default connection type, which is applied if you use the function keys, as shown above.

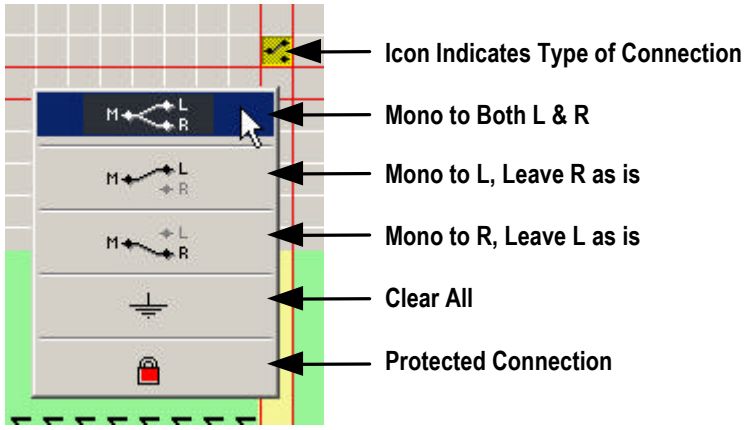
Mono Source – Mono Target:



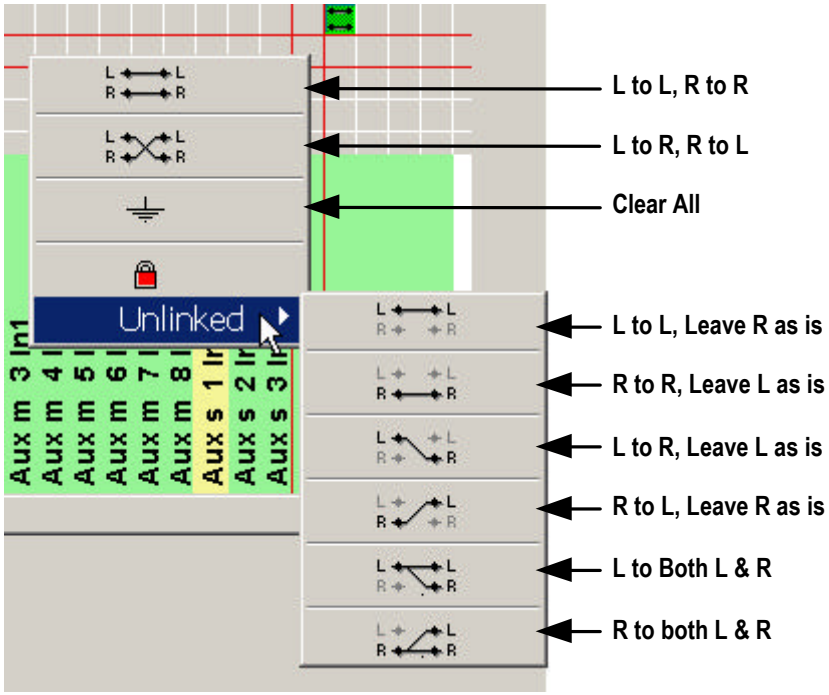
Stereo Source – Mono Target:



Mono Source – Stereo Target:

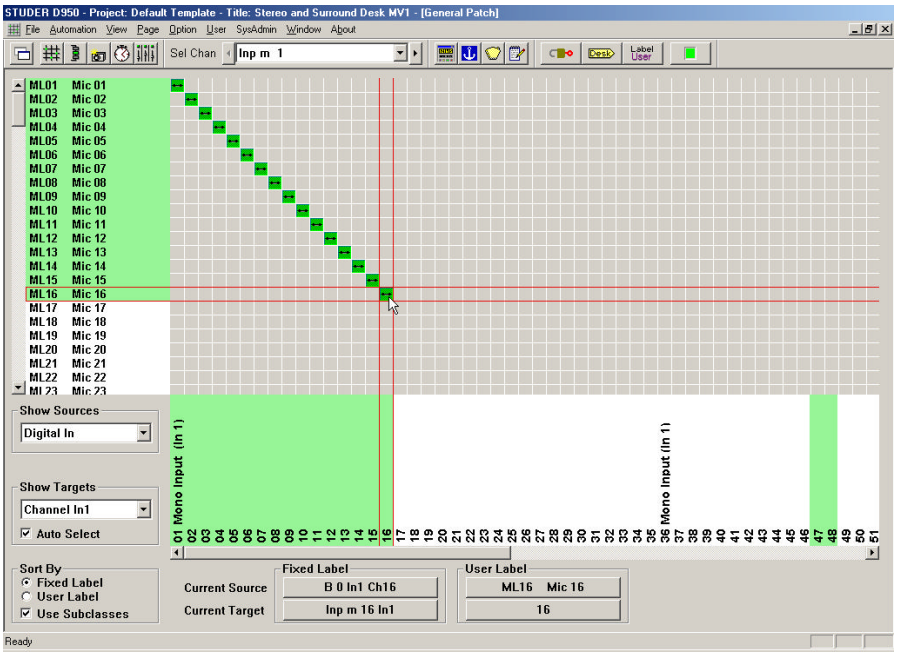


Stereo Source – Stereo Target:



The last menu allows *unlinked* operation, a phrase that refers to a Stereo Target being unlinked and its left and right components used with *different* Sources. Such cross-point connections enable one Target to be connected with *two* Sources, and are indicated with *a yellow icon*.

☞ **Tip** A feature is available for fast diagonal patching of multiple Sources to multiple Targets. The example below shows this feature used in practice.



Example: Patching the first 16 Mic inputs to the first 16 Mono Input Channels.

1. First make the first connection (In this instance Mic 01 to Mono Input Channel 1).
2. Then whilst holding the SHIFT key on the keyboard, make a connection on the last of the diagonal connections (in this instance, Mic 16 to Mono Input 16). This will automatically establish all the connections on the diagonal line between the first and last connection, respectively.

Similarly, if whilst holding SHIFT, the last connection of a diagonal line of connections is double-clicked, then all connections running back up the diagonal will be cleared.

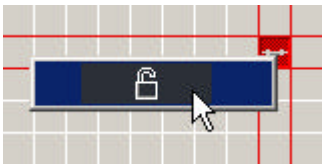
This function provides time saving possibilities when patching.

Connection Protection:

It is also possible to protect a certain connection from accidental change both by the user or by recalling a snapshot.

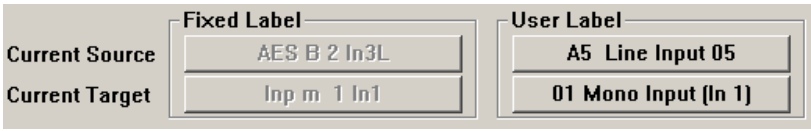
Double-clicking on a connection selects the padlock item to lock the connection. To unlock, double-click again.

Both the background of the Target as well as the connection become red. When attempting to change a protected connection, a warning appears, together with the instructions on how to unprotect the connection.

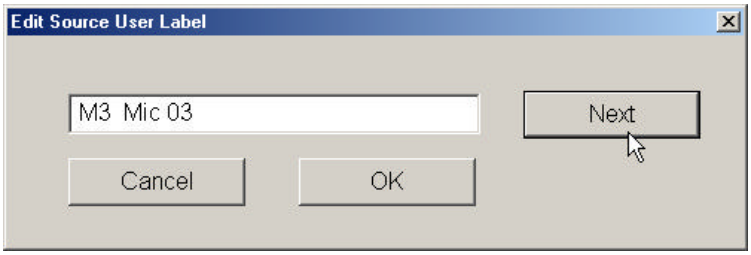


4.4.2.5 Editing the User Labels in the General Patch

To edit the User Labels in the General Patch, first click on the desired Source/Target in the Sources/Targets list. The User Label and Fixed Label for the chosen Source/Target will be shown in the Label Fields at the bottom of the screen:



Click on the User Label Field of the Source/Target. This will open a dialog box which allows a User Label to be entered:



To automatically move to the next Source/Target in the list, either click on "Next" or hit **ENTER** on the keyboard. To close the dialog box click on "OK". It is possible to choose a Source/Target from the General Patch list without closing the Edit User Label dialog box. Simply click on the desired Source/Target from the General Patch list with the window still open. This will automatically enter it into the window for editing.

For D950 Users: The first four characters of the User Label will be displayed in the channel strip display when "Inherited Labels" are selected to be shown. It is important to choose sensible labels that will show useful information in the first four characters. The screenshot above shows an example of integrating two labels into one, e.g. M3__Mic_03.

For Vista Users: User Labels with up to 13 characters (depending on the width of the individual characters) can be used for Digital Input sources.

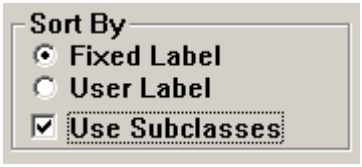
4.4.2.5.1 Sorting Options

There is a number of options for sorting the display of the Sources and Targets in the General Patch Lists. This sorting is independent of which label type is being displayed due to the global label mode selection.

Sort by Fixed Label: Independent of the User Label, the Sources and Targets will be sorted and displayed in alphabetical order, depending on the Fixed Label of the Sources/Targets.

Sort by User Label: The Sources and Targets will be sorted and displayed in alphabetical order, depending on the User Labels of the Sources/Targets.

To select the sorting method, check the "Fixed Label" or "User Label" option button as shown below:



If the "Use Subclasses" checkbox is selected, then the "Digital Input" Source List and "Digital Output" Target List will be sorted and grouped by the defined subclasses. This selection has highest priority of sorting.

☞ **Tip** The most useful sorting method is to Sort by "Fixed Label" and "Use Subclasses".

4.4.2.5.2 How to View the Different Label Types

It is typical that a user will work in a single mode of label type display within the GC. There are times, however, when it is useful to temporarily display another of the label types globally within the GC to help with patching. The Label mode is changed by clicking on the "Label" button in the system toolbar:

Clicking this button will toggle the label view globally throughout all parts of the GC (*D950 and Vista*) and channel strip display (*D950 only*). The label display can be toggled between "User", "Inherited" and "Fixed". For a detailed description of how to work best with labels, see below.

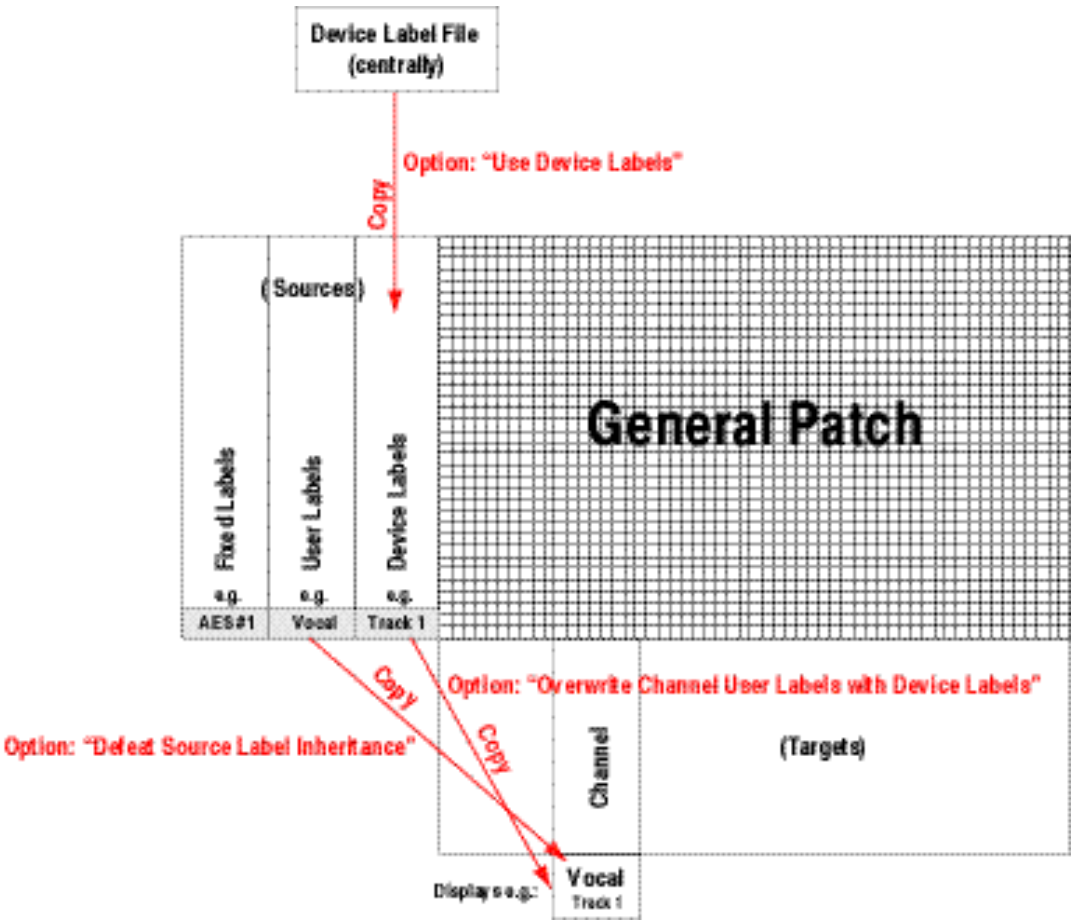
4.4.2.6 Working with Labels

For a detailed description of different label types, please refer to chapter 4.3.3.

The most important aspect of any audio patching system is its labeling. Clear labeling allows fast navigation and fault-free patching.

Labels exist within the general patch window as well as within each single channel. Depending on your preferred way of working, some of the label fields may be filled in automatically by the system (by setting some options), or you choose to type the labels manually in all the places. Two principal automatisms for automatically copying labels exist within your system:

1. Your studio device names (devices connected to a specific console input) may be filled in automatically into the General Patch window after you made a new title, or recalled a snapshot or preset. These labels are then read from a file stored centrally. So you can change your studio wiring, only having to update one file, and then seeing your updated wiring even when opening former projects.
2. The labels within your channels may be filled with the names of connected sources, copying labels from the source to the channel whenever a patch point is set, cleared, or changed.



Note: The "Defeat Source Label Inheritance" option is normally not activated. The other two options may vary, depending on your preferred way of working.
In principle, you can select to work according to one of the two methods described below.

4.4.2.6.1 Method 1: Analog-Style

A lot of D950 users work in this way. Although it is well possible to apply this working style on a Vista, some typographic issues may come up when looking at the label display on a Vista desk. *This is the reason why we recommend not to work with this method on a Vista console.*

The typical method of working in an analog-style environment is as follows:

1 The user decides which sources are to be connected to which physical channels on the console. This will be the channel strip layout. The user then labels the channel strips with labels that are sensible for the sources connected to the respective channels. These could be thought of as the "session" labels, i.e. they only remain valid for that particular session, for example: Violin 1, WW, Bass, DAT, etc.

2 The user patches the audio sources to the respective channels, i.e. Mic 16 to Channel 1 labeled Vln 1, DAT output to Stereo Channel 1 labeled DAT.

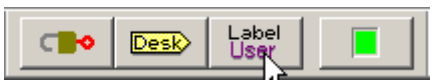
In other words: You name your channels for each of your sessions, and normally do not edit any labels within the patch. However, if you change a patch point to another channel, you will most probably have to rename the channels as well, since e.g. "Vocal Left" was moved to another channel. With this method, the channel displays are an electronic replacement of the tape you had stuck across your analog console in order to name the channels.
In this way of working, you will type your "track sheet" (e.g. "Vocal Left") within the Channel Patch window.

How to Proceed:

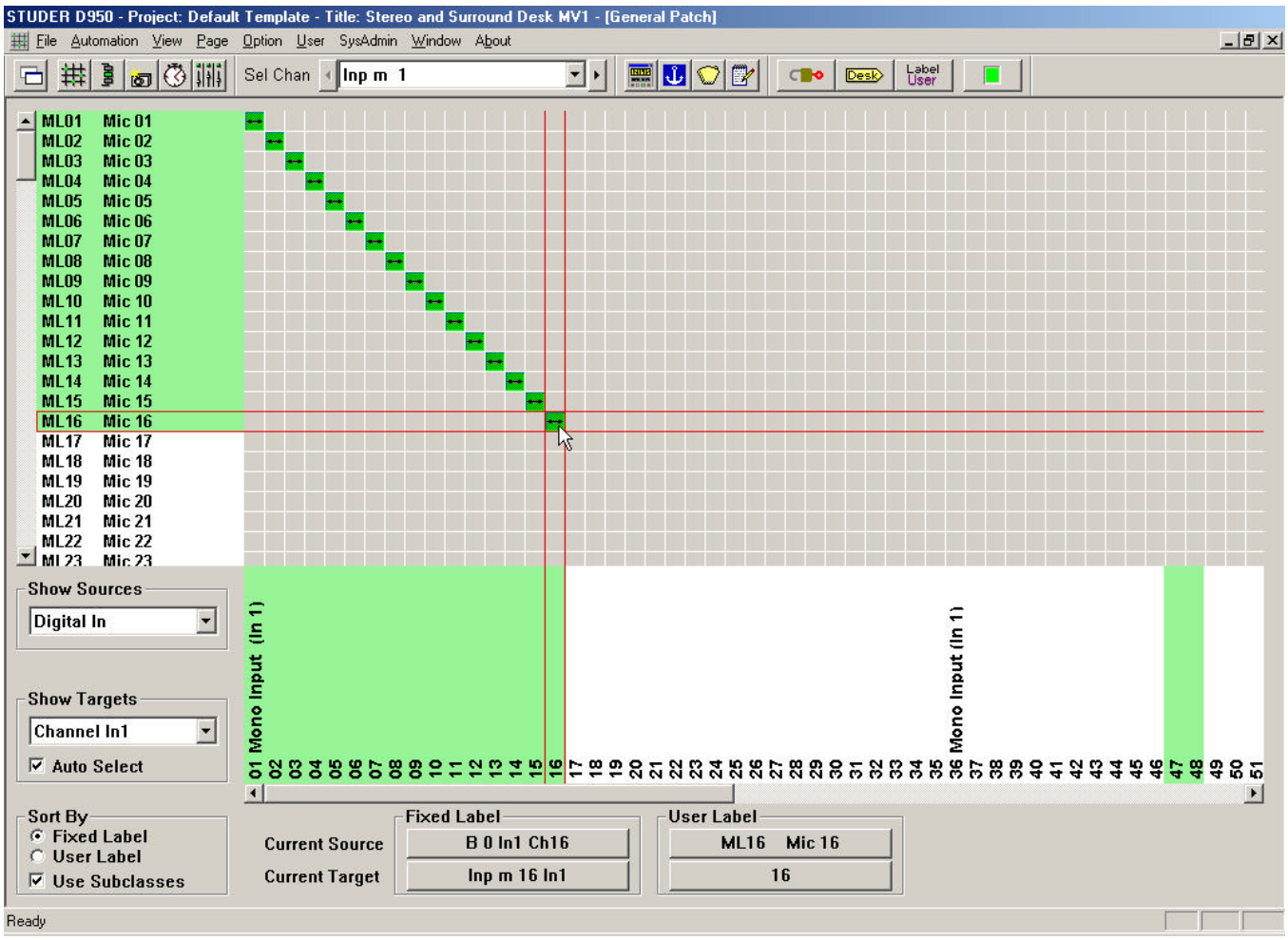
- Switch *off* the "Overwrite Channel User Labels with Device Labels" option in the SysAdmin/Device Labels menu.
- The "Use Device Labels" option in the SysAdmin/Device Labels menu doesn't help you either, since you will most likely not look at these labels while working.
- In order to have your studio environment visible (e.g. "Mic 16"), you will most likely want to edit the User Label of your patch sources. Since one of the copying mechanisms is always active (see above), you will have that information also available in the "INHERITED LABEL" field of the connected channels. In this example, the labels in the various locations will look like as follows:

General Patch Fixed Label	General Patch User Label	Channel Patch Fixed Label	Channel Patch User Label	Channel Patch Inherited Label
M25 M B0 In1 Ch25	M16 Mic 16	Im01 Imp m 01 In 1	Vln	M16 Mic 16

When working with labels in this way, you should work in "Show User Labels" mode at all times.



This means that the User Labels will be shown in all GC windows. On the channel strip displays, the User Label of the Channel Patch will be shown. To see which Source is routed to the channels on the channel strips, switch the label mode to “Show Inherited Labels”. To see which DSP Channel is represented on the channel strips in the channel strip displays, switch the label mode to “Show Fixed Label”. This will then show the Fixed Label of the DSP channel in the channel strip displays, and the General Patch will show the Fixed labels of Sources and Targets.
See below for an example of the User Labels displayed in the General Patch window:



☞ **Tip** It is strongly recommended to make a default “Title” containing all of the labeling, default patching, and audio settings, which can be used as a template for every new session. Before using the console in a situation where a new Title would be generated, first open this default Title and immediately “Save As ...” with another Title name. This means the default Title will remain unchanged, and the user has all the correct labels and default patching already made for his newly saved Title (see chapter 4.6.1.1).
Alternatively, when a new session configuration is loaded, first label the General Patch. Once the General Patch has been labeled, make a Preset (see chapter 4.4.4). This is essentially a Snapshot containing all of the General Patch labeling. Whenever a new title is made in the same Session Configuration, this Preset can be recalled, and all the labeling is in place before starting work. The Preset can even be imported to a new Title if a new but similar Session Configuration is loaded.

4.4.2.6.2 Method 2: Automatic Label Propagation

This is the typical way the users will work on a Vista console, but it can be applied to the D950 as well.

D950:

You type all your labels in the patch and let the system propagate them automatically to the connected channels. If you change any patch point, the channel labels will be updated automatically. Also, if you have one source connected to multiple channels, all of them will have the same labels. In this way, you will type your "track sheet" (e.g. "Violin") within the General Patch window, and you will never edit any label within the Channel Patch itself.

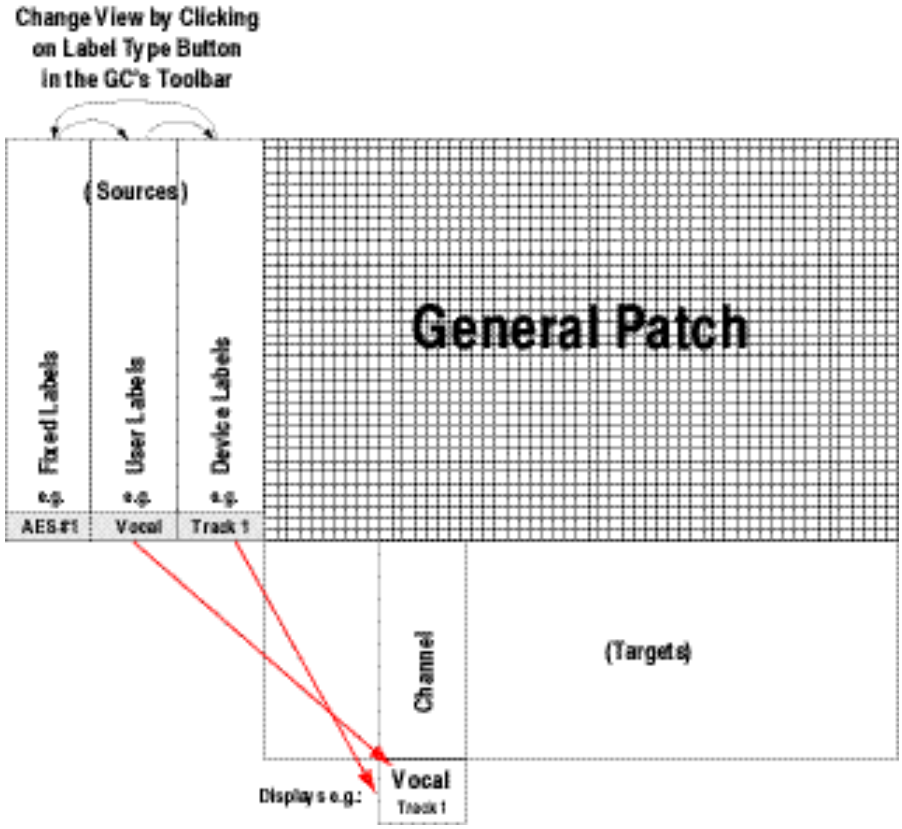
How to Proceed:

- Switch *on* the “Overwrite Channel User Labels with Device Labels” option in the SysAdmin/Device Labels menu.
- Switch *on* the “User Device Labels” option in the SysAdmin/Device Labels menu.
- There must be a file “`__DeviceLabels.pre`” present, which holds your device labels (technical labels), e.g. “Studio 1”, “Mic 1”).
- Type your track sheet into the USER LABEL field of the General Patch.
- Switch to “Show Inherited Labels” mode.

You will now see your session labels (e.g. “Violin”) within the channel strips, while the patch is showing you where it is coming from (e.g. “Mic 1”). On the CAS you will see all this information at the same time.

Vista:

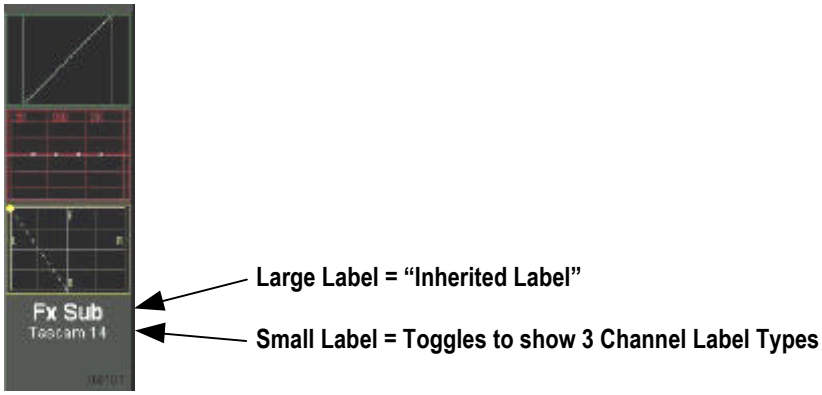
The philosophy on Vista consoles concerning labeling is not to name any labels *within channels*, but to name *patch sources* in the General Patch, letting the system propagate them to the connected channels. Specifically, we are talking about two kinds of labels which will be propagated in this way: Device labels (technical labels), and User labels (session labels, e.g. track sheet). This also supports the workflow, whereby the operator first names his sources and then patches them to any possible channel.
Advantages: If a source is connected to more than one channel, or if a patch is changed, the labels are correctly updated on the actually patched channels. You see what you hear!



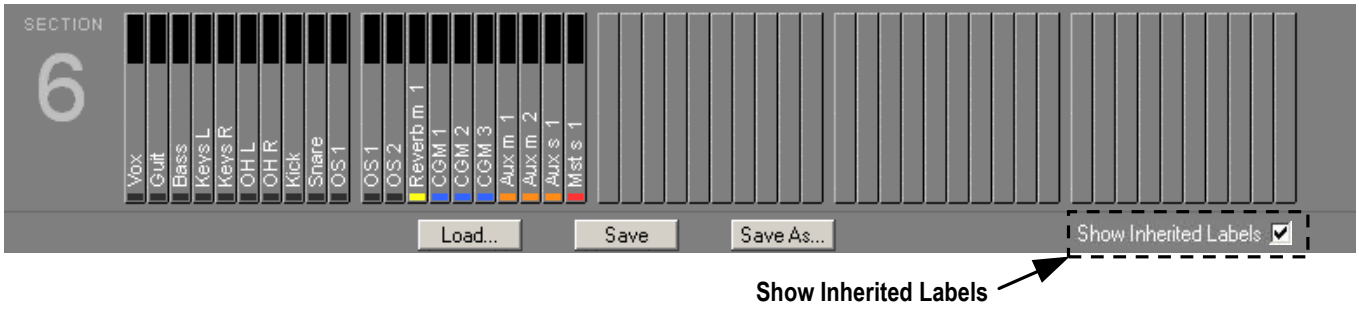
How to Proceed:

- Switch *on* the "Use Device Labels" option in the SysAdmin/Device Labels menu.
- Switch *on* the "Overwrite Chan. User label with Device Label" option in the SysAdmin/Device Labels menu.
- There must be a file "`__DeviceLabels.pre`" present, which holds your device labels (technical labels), e.g. "Studio 1", "Mic 1").
- Type your track sheet into the USER LABEL field of the General Patch.
- Patch Sources to Channels, and you will see session labels displayed in the top line of each channel You may have to press the **GLOBAL VIEW: LABEL TYPE** key a few times until you see device labels or fixed labels (the actual channel number) in the second line.

This may look as follows:



Note: In the Strip Setup window it is possible to display either the session labels (standard) or the device labels, depending on the option indicated in the lower right corner of the window.



Show Inherited Labels

4.4.2.7 What are Device Labels?

All labels shown in the general patch and within the channel strips are always stored together with all audio settings within snapshots and presets. Some of the labels you will name in the patch will most likely represent your studio environment and where your equipment is connected to the console. E.g. you might possibly want to label the AES/EBU input 30 as “Tascam 11”, in order to recognize that you have connected your recorder that way. Since these labels are contained within each snapshot or preset, it is theoretically also possible to change the labels just by recalling a snapshot. In some cases this may be very useful (e.g. if you have entered a track sheet, but would like to use a different one for your next song), but in some cases this can be a handicap: E.g. you change your studio wiring slightly, e.g. add new equipment, but still want to use some of your older project settings. This would lead to the fact that you would have to update all the old snapshots and presets. The same handicap applies if you start with a new title. You will most likely want to see your equipment names appear in the patch automatically. This is where the device label functionality comes up. We have one file holding your device labels (such as “Tascam 11” for the AES/EBU input 30), and the system is able to automatically read these labels from that file and apply it to your current General Patch screen.

4.4.2.8 How to Activate the Device Label Functionality

In order to activate the automatic import of your device labels from the device label file, two conditions must be met:

- There must be a preset file named “`__DeviceLabels.pre`” matching your current session configuration and holding your device label names.
- You must have activated the “User Device Labels” option in the SysAdmin/Device Labels menu.

This will automatically show you the device labels in the General Patch window when switching to the corresponding label mode.

4.4.2.9 Where are the Device Labels Stored?

As you know, these labels are normally not changed for a specific session, but will stay constant in a studio installation. This is why they are stored in a preset (`*.pre`) file, being valid for a whole session configuration, rather than just a snapshot or title. If you make a new session configuration or edit an existing one using the Session Configuration Tool, you will need to import the "`__DeviceLabels.pre`" file from the previous configuration.

4.4.2.10 How to Create or Overwrite a Device Label

If you create a device label file from scratch or overwrite an existing one with a new one, you may proceed as follows:

- Enter the device labels into the USER LABEL field of the patch (input ports and output ports). *Do this in the USER LABEL field*.
- Enter SysAdmin mode in the GC by clicking the padlock icon on the toolbar, and enter the system password.
- Go to the SysAdmin/Device Labels menu and select "Save and Apply User Labels as Device Labels".

4.4.2.11 How to Edit an Existing Device Label

Since the device labels are stored in a regular preset file, you just log in as the system administrator and recall the"`__DeviceLabels.pre`" file. You will see the device labels again in the patch (USER LABEL field). Now you may edit them; then either click UPDATE, or go to the SysAdmin / Device Labels / "Save and Apply User Labels as Device Labels" menu.

4.4.2.12 Background Information for Technically Interested Users

If you are using the device label functionality (option SysAdmin/Device Labels/Use Device Labels), you activate an automatic and repetitive import of these labels from the "`__DeviceLabels.pre`" file into your patch. If you create any snapshots, the current device labels will be part of the snapshot. However, if you recall older snapshots that have been stored at a time when no device labels were active, that snapshot on the disk will not be changed at all. The snapshot will be loaded onto your console, visualized as it was stored in your General Patch screen; but an instant later the current device labels of your console will be copied into your patch. If you now choose to update your snapshot or make any new ones, these will contain exactly the labels you see on your General Patch screen.

4.4.3 Channel Patch

The Channel Patch page of the Graphic Controller can be called up in three different ways:

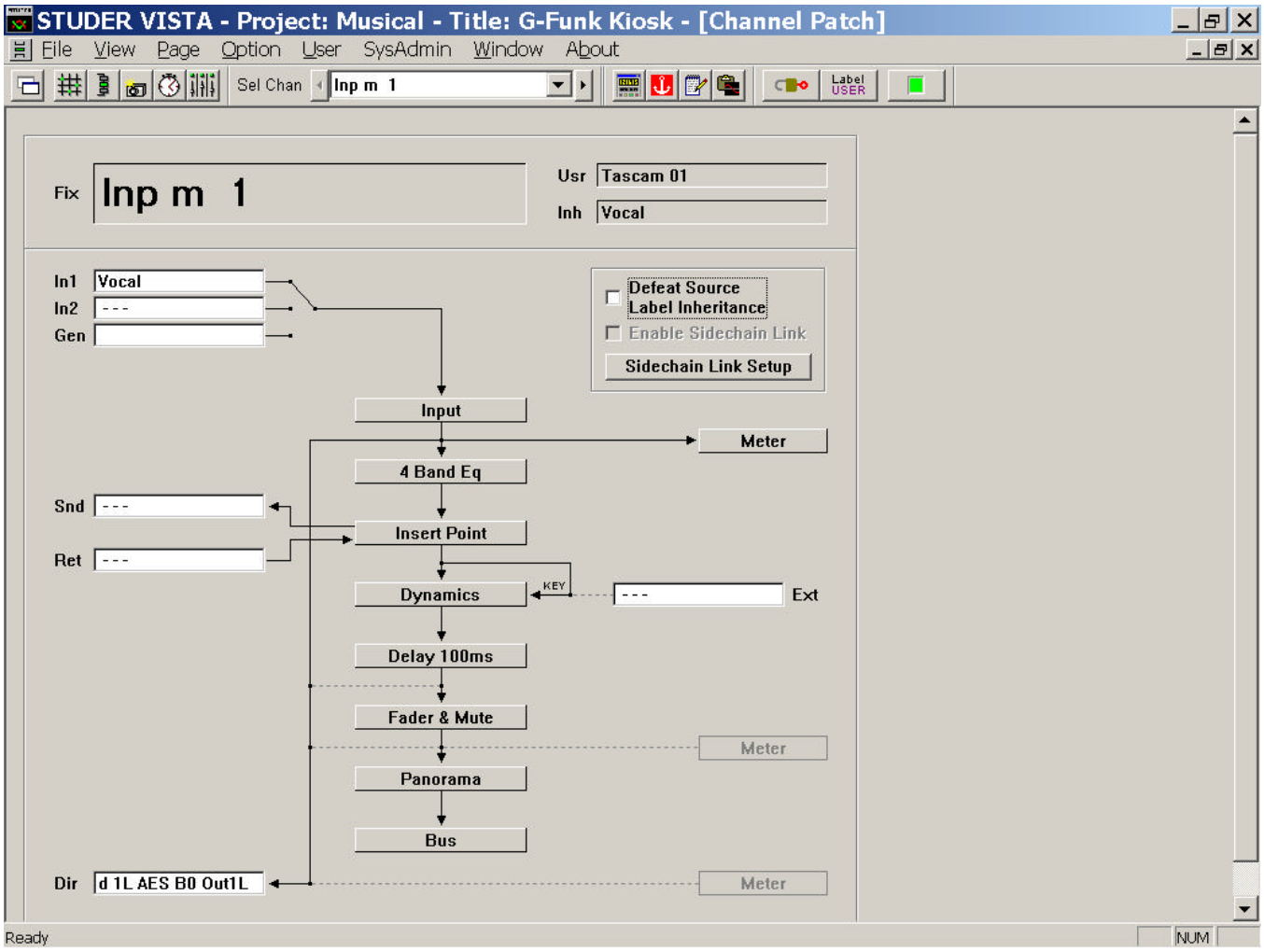
- From the Page menu, by clicking on the appropriate menu item;
- Using the Page icons, by clicking on the appropriate icon in the tool-bar;
- Using the **CHAN PATCH** function key on the control surface – which is probably the fastest way.

To quickly switch back from General Patch to Channel Patch page, just click the right trackball button while the cursor is positioned over the X-Y field in the General Patch.

As its name implies, the Channel Patch is channel-oriented, which means that only *one* channel is displayed at a time.

To select a channel to be displayed in the Channel Patch page:

- Press the **SEL** key *(***LINK/SEL** *key for Vista)* on the desired Desk Channel Strip, or
- Use the Channel Selector in the Toolbar (refer to chapter 4.2.1).



☞ **Tip** If using the **SEL** key on the Desk, make sure that the Follow Desk icon

in the toolbar (refer to chapter 4.2.1) is *not* crossed out. If it is crossed out, click it once to establish Follow Desk selection mode.

Essentially, the Channel Patch provides a block diagram of the selected channel's audio path. All channel types can be selected. From the Channel Patch, you can:

- View General Patch connections to and from the selected channel;
- Directly access the channel's patch points in the General Patch;
- View channel's DSP processing blocks;
- Set the order of DSP processing blocks in the selected channel's audio path;
- Toggle three-way input selector of the selected channel;
- Toggle selected channel's two-way Dynamics key selector;
- View and edit selected channel's Desk Labels;
- Switch off selected channel's Label Inheritance function;
- Set the Metering source point in the selected channel's audio path;
- Set the Direct Output source point in the selected channel's audio path;
- Setup the Sidechain Links;
- Activate the Sidechain Link for the selected channel.

4.4.3.1 Using the Channel Patch for Patching Audio

The Channel Patch page displays the following channel-oriented patch items of the selected channel for viewing:

In1 The first audio input;
In2 The second audio input;
Gen (In3) The third audio input;
Snd The Insert Send;
Ret The Insert Return;
Ext The key signal to Dynamics Block;
Dir The Direct Out.

These labels will be displayed according to the current Label Mode. To edit the patch connection, just double-click the left trackball button while the cursor is positioned on a connection. This will toggle over to the General Patch page, allowing actions to be performed. The connection you pointed at will be pre-selected automatically.

Examples for channel Im1 (Input Mono 1):

*Double-click on **In1** field*
⇨ toggles to General Patch
⇨ pre-selects Target Im 1 Input m 1 In1
⇨ now only select a Source and patch it.

*Double-click on **Dir** field*
⇨ toggles to General Patch
⇨ pre-selects Source Im 1 Input m 1 DirOut
⇨ now only select a Target and patch it.

Obviously, if the connection you selected is a Source (Snd, Dir), you will only have to select a Target in the General Patch. If the connection is a Target (In1, In2, Gen, Ret, Ext), you will only have to select a Source.

All patch cross-points are stored with Snapshots and Presets.

☞ **Tip** To quickly toggle the display from Channel Patch to General Patch page, just click the right trackball button while the cursor is positioned anywhere in the Channel Patch page.
To quickly switch back from General Patch to Channel Patch page, just click the right trackball button while the cursor is positioned over the X-Y field in the General Patch.

4.4.3.2 Setting the Order of DSP Processing Blocks

The following processing blocks (provided they have been configured) can be placed individually at different locations along the Audio Path of each channel:
- EQ;
- Insert Point;
- Dynamics (Compressor/Limiter/Expander/Gate/Sidechain);
- Delay;
- Fader & ON/OFF Mute.

The actual order of the system blocks is user-modifiable, and can be changed at any time. The order is stored with Snapshots and Presets.

To change the system-block order, use the familiar drag-and-drop technique:
- Click on the selected blocks, and hold down the trackball button;
- Available positions in the signal path are shown as a *reversed embossed graphic;*
- Drag the selected block to the required position in the signal path;
- If the block can be inserted at that location, the block name will turn *red*;
- Release the button and the selected block will be inserted into the new location.

4.4.3.3 On-screen Toggles for Input Selector and Dynamics Key Selector

Input Selector To toggle the three-way input selector (In1, In2, Gen), click on the switch icon that corresponds to the location at which you want the selector to point. The Desk Input Selector keys will follow the changes, and display the correct source.

Dynamics Key Selector To toggle the two-way input selector (Int, Ext), click on the switch icon that corresponds to the location at which you want the selector to point.

The selector settings are stored within Snapshots.

4.4.3.4 Editing the Channel User Labels

Double-click on the User Label field (Usr) to open the Edit window. Proceed to edit and/or change the Desk Label using the same techniques used in the General Patch. ***D950 only:*** Note that the Channel User Label display has four characters, and will display only the *first four* characters of what you type. The edited Labels can be stored within Snapshots and Presets.

4.4.3.5 Set the Metering and Direct Out Source Point

Set Metering Source Point: To set the Metering Source point in the selected channel's audio path, click on one of the three Meter boxes. The channel meter will now be sourced from the selected point in the signal path.
Available points in the signal path are:
- After Input Block;
- After Fader & Mute;
- After Direct Out level control.

The Meter Source point is stored within Snapshots and Presets.

Note: There will only be two Meter Source points if Direct Outputs have not been configured for the selected channel.

To set the Metering Source points for more channels at a time, use the Option – Meter/Generator menu (refer to chapter 4.6.5.1).

Set Direct Output source Point: If a Direct Output is included in a channel's configuration, it can be fed from one of three points in the audio path. To set the Direct Output source point, click on one of the three "wires" connected to the Dir Box (the current connection will be shown *solid*, while the two possible connections are displayed as *dotted* lines).
The Direct Out will now be fed from the selected point in the signal path.

Available points in the signal path are:
- After Input Block;
- Pre Fader & Mute;
- After Fader & Mute.

The selected Direct Output source points are stored within Snapshots and Presets.

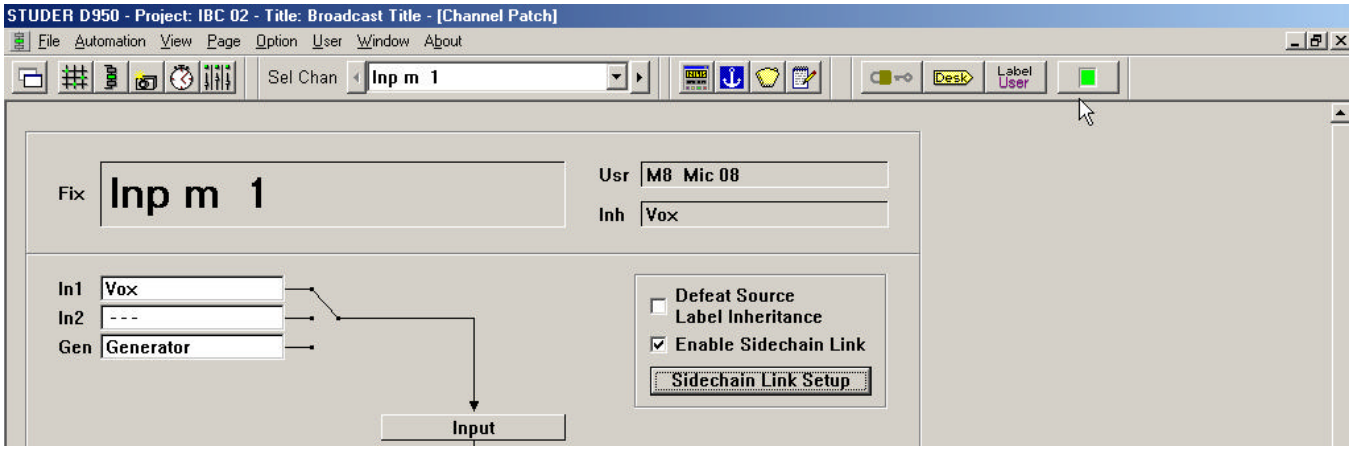
☞ **Tip** If you have changed the order of the processing blocks, note that the Meter and Direct Out source points will move *together* with the processing blocks to which they are attached (except the Input Block, which cannot be moved).

4.4.3.6 Switch off the Label Inheritance

The Desk Label displays will show Source Labels (from the General Patch) if the console is set to Inherited Label mode and if a source is patched in to the channel. If you wish to remain in Inherited Mode, but do not wish to see Source Labels for certain channels, check the Defeat Source Label Inheritance box. The Desk Label display will now show the *name* of the channel rather than the Source Label, assuming the User Label on the Channel Patch has not been changed from the default. If the User Label has been changed on the Channel Patch screen, the Desk Labels will display this User Label when the Defeat Source Label Inheritance box has been checked. User Labels entered on the Channel Patch screen are stored with Snapshots and Presets.

4.4.3.7 Setup & Activate the Dynamics Sidechain Link

The effect of a Dynamics Sidechain Link, if activated, is identical to any item of outboard gear set to Link or Stereo mode. This function is used to control between two and eight Dynamics Processors inserted into up to eight different channels. Regardless of which channel is carrying the highest signal level, all processors will the provide the *same* gain modification. In this way, Stereo or Multi-channel Surround image stability will be preserved. Unlike in many analog consoles with dynamics units, the channels to be linked do not need to have adjacent locations.

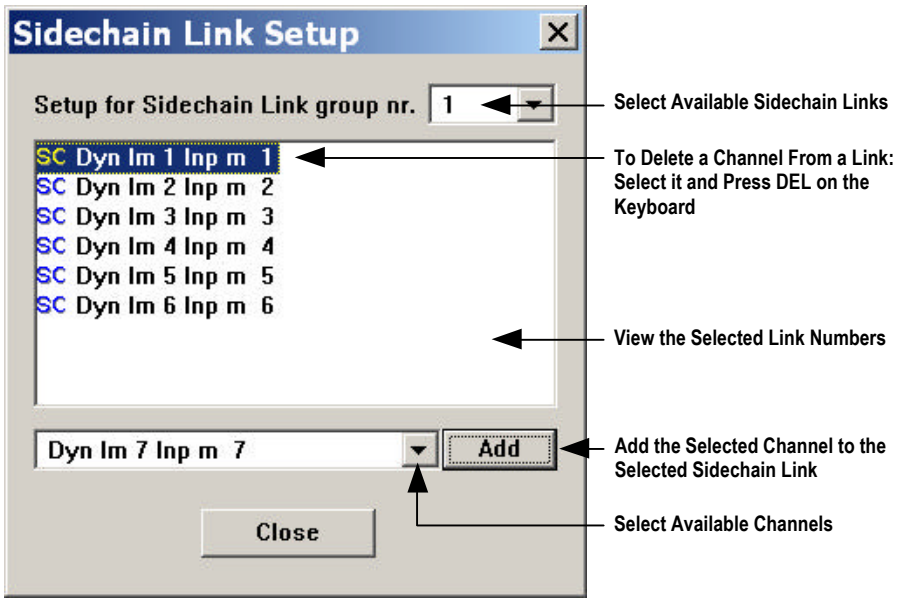


Note: The number of Sidechain Links available (if any) is determined by the Session Configuration. Additional links can only be created using the Session Configuration Tool; please refer to chapter 7.

To activate the Sidechain Link for a selected channel, check the Enable Sidechain Link box. This will activate linking of the Sidechain with another channel, or with other channels assigned to that particular Link Group. The channel must be assigned to a Link Group in order for the Enable Sidechain Link box to function. The SCL (Sidechain Link) keys on the LACP *(D950)* or Vistonics *(Vista)* will follow the selections.

The status of the Sidechain Link is stored within Snapshots and Presets.

Sidechain Link Setup: Click on the Sidechain Link Setup button to bring up the Sidechain Link editor screen, which allows selection of available links and addition/removal of channels from the links.



The D950S/Vista is able to link together more than two side chains – in fact up to eight per Sidechain Link. For these reasons, a number of Sidechain Links (each for up to eight member channels) has to be specified during setting up of the Session Configuration. There can be any number of configured Sidechain Links. A channel can be a member in only *one* Link at a time.

To set up the Sidechain Links:

- Select a Sidechain Link using the on-screen icon;
- If there are any members in the Link, they will now be displayed;
- Add new member channels with the Add button;
- Remove members by selecting one or more of them in the list and pressing the **DEL** key on the keyboard;
- Proceed to edit the next Link number.

☞ **Tip** If a channel is a member of a Sidechain Link, its graphical representation in the Channel Patch will change:

The following indicates a Dynamics Block:

The following indicates a Dynamics block that is a member of a Sidechain Link:

4.4.4 Snapshot Page

The Snapshot page of the Graphic Controller can be called up in four different ways:

- From the Page menu, by clicking on the appropriate menu item
- Using the Page icons, by clicking on the appropriate icon in the toolbar
- Using the **SNAPSHOT** function key on the console – which is probably the fastest way.

The Snapshot Page deals with Snapshot and Preset management. Snapshots and Presets are extremely helpful when working with a digital console as they contain the static values for all console parameters. The difference between Snapshots and Presets is simple: while Snapshots can be edited freely, Presets can only be edited in System Administration mode (refer to chapter 4.7) after having entered the System Administrator password.

Snapshots are stored within Titles, and Presets are stored with Session Configurations. Because of this, Snapshots are readily available only while using the Title in which they were created. On the other hand, all Presets that were created using a particular Session Configuration are available in any Title that uses that configuration. This allows Presets to be used as templates (based upon that configuration), while Snapshots are specific to individual projects or sessions.
An other difference between Snapshots and Presets is that any filtering mechanism is active for Snapshots only, but not for Presets. This means that after having recalled a Preset, the user can always be sure to have all audio settings applied.

Using the Import facility from the File menu, it is possible to use Snapshots and Presets from other titles and configurations, refer to chapter 4.6.1.4.

Because it is possible to store an *unlimited* number of Snapshots, D950/Vista operators will probably find themselves using them more and more every day.

A Snapshot or Preset will store:

- All audio settings: Fader levels, auxiliary settings, dynamics, delays, input selectors, etc.
- Order of channel processing blocks;
- Direct output and meter source points;
- Bus assignments;
- All labels;
- All patch cross-point connections;
- Channel and other links;
- N–1/Mix-minus assignments.

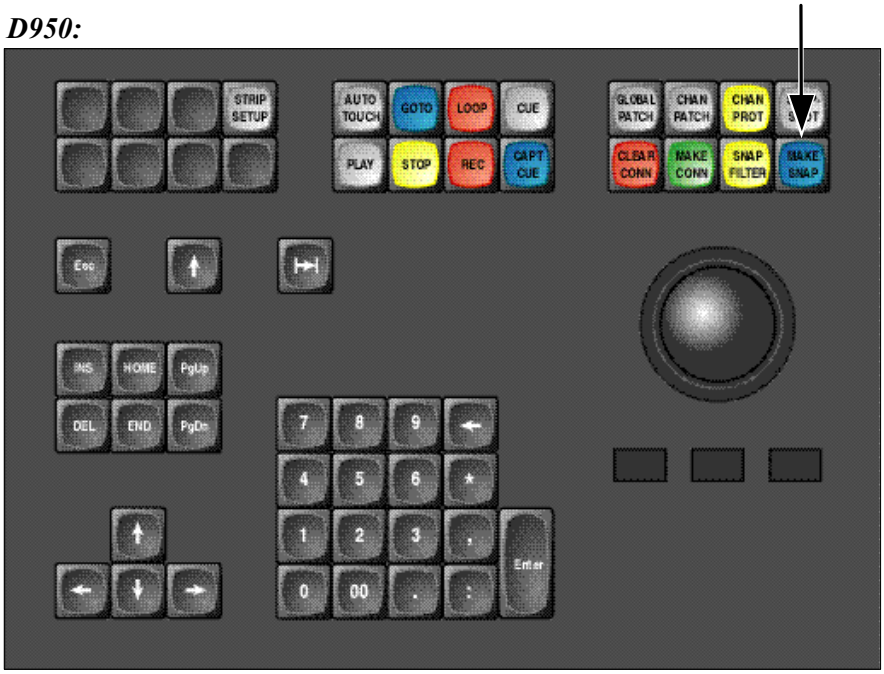
☞ **Tip** Snapshots and Presets always store *every* control and switch setting for the *entire* console. The choice of recalling every setting to every control is up to the operator. A sophisticated filtering system is available in order to keep certain settings even when recalling a Snapshot.

4.4.4.1 Snapshots

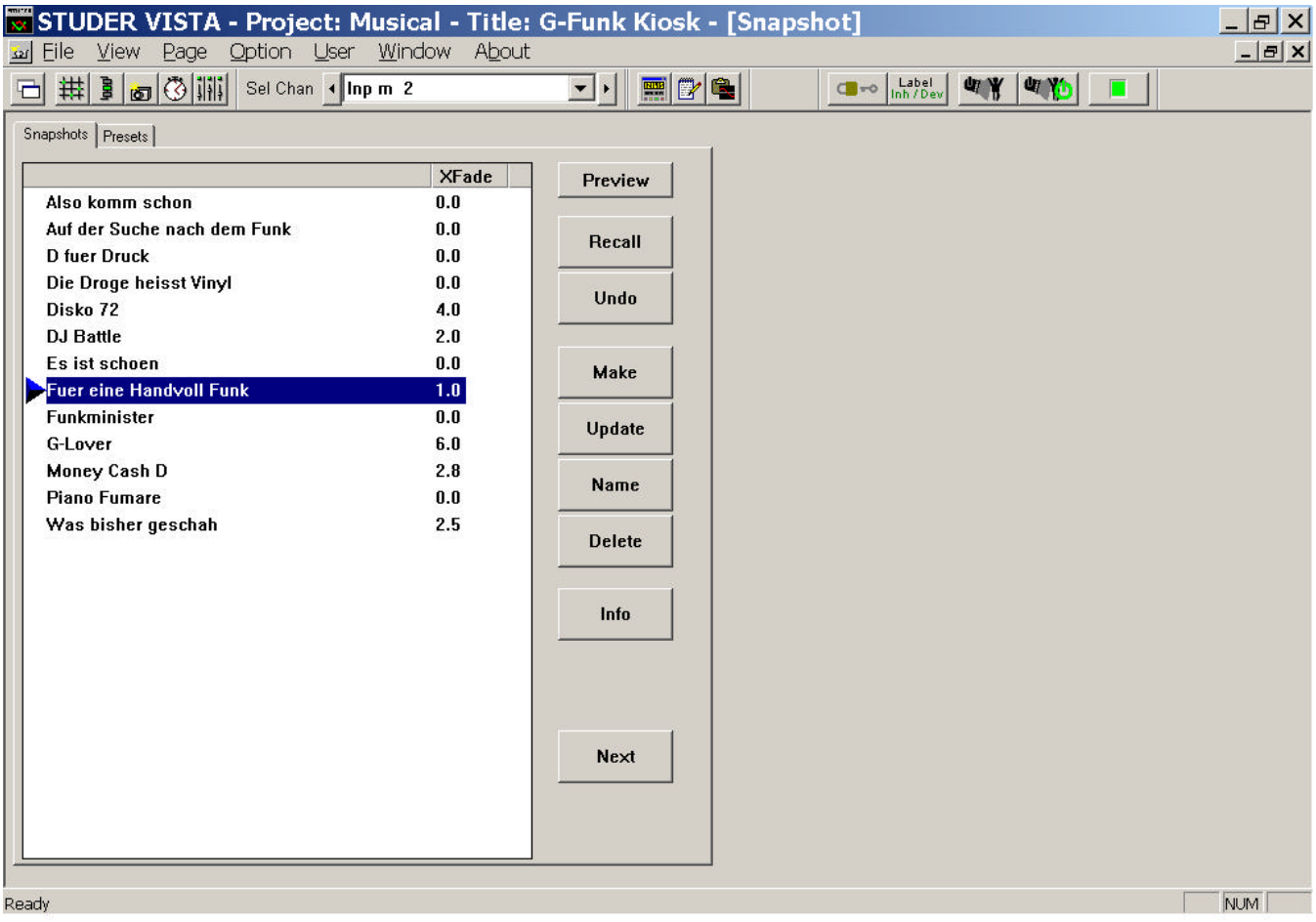
To capture a new Snapshot of the various user controls, press the **MAKE SNAP** key *(D950)* or **MAKE SNAPSHOT** key *(Vista)* on the console:

Vista:

D950:



The new Snapshot will automatically be numbered something like `SNAPSHOT #1`, `SNAPSHOT #2`, etc.



Now You Can: ***Recall a Snapshot***

- Select a Snapshot from the List, and
- Click on the Recall button, or
- Simply double-click on the Snapshot you wish to recall.

Clicking on the Next button will recall the currently selected snapshot and automatically move one line down within the Snapshot list and recall the next Snapshot.

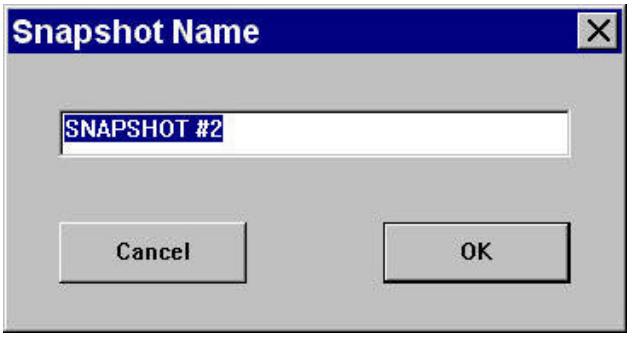
The Snapshot that was recalled last is marked with a small triangle. If the Snap Confirm option in the Options menu (refer to chapter 4.6.5.6) is checked, there will be a pop-up dialog requiring confirmation of Snapshot Recall. This capability is useful for live environments, where you may not wish to delete or overwrite too easily what you are doing.

Note: Once a Snapshot or Preset is applied, the existing parameter settings are replaced by those contained within the Snapshot or Preset. If the previous settings have not been stored, there is an Undo button available, in order to go back to the last settings before recalling the Snapshot or Preset.

Name a Snapshot

- Select a Snapshot from the List, and
- Click on the Name button.

This action will bring up an editing window that allows the user to enter the new name. Since Snapshots are listed in alphabetical order, by carefully naming you can arrange them exactly as you wish.



Update a Snapshot

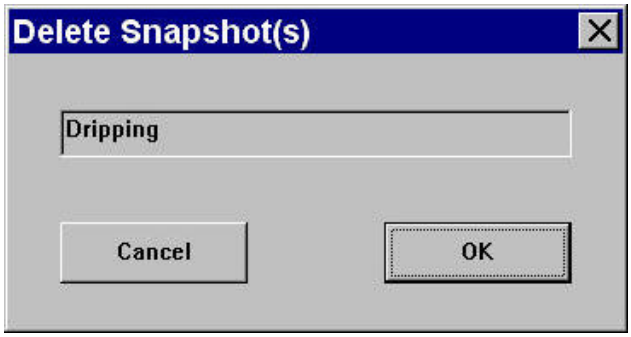
- Select a Snapshot from the List, and
- Click on the Update button.

This action will bring up a window that allows the user to confirm the update. An update will store any changes you since made under the selected Snapshot's name.

The "Audio Only" button is valid if a partial snapshot is about to be updated. The update wold normally change audio settings as well as the potential change in focus of that snapshot. By clicking the Audio Only button, the focus of the partial snapshot will not be changed, and only parameters of the corresponding snapshot are being updated.

Delete Snapshot(s)

- Select a Snapshot from the List, or
- Select any number of Snapshots from the List using the familiar Windows multiple-selection techniques. (Either drag the trackball, or press Shift and select with the cursor). Click on the Delete button, an action that will bring up a window to confirm the deletion.



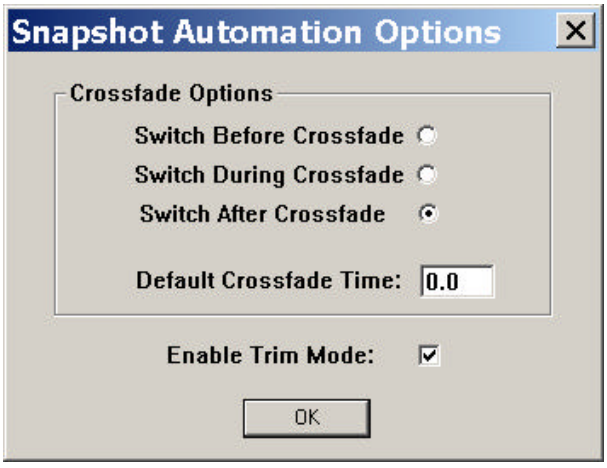
View the Snapshot Info

- Select a Snapshot from the List, or
- Click on the Info button. This will bring up a window displaying the Snapshot Name, the Snapshot Creation Date & Time, and the Snapshot Last Modification Date & Time.

Snapshots are stored with the current Title, the file extension is `*.snp`.

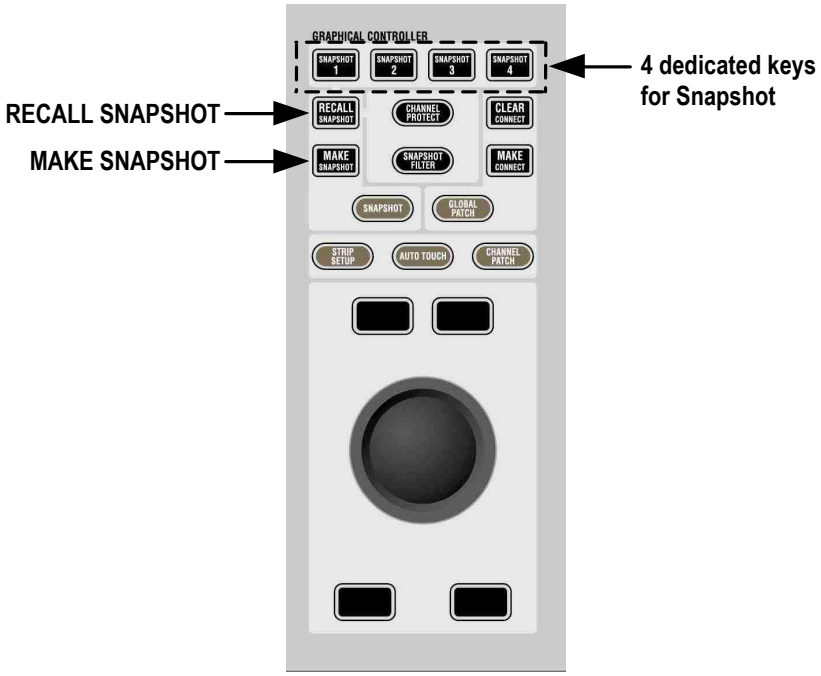
4.4.4.2 Snapshot Crossfading

It is possible to define a crossfade time for each Snapshot. This is done by simply clicking on the crossfade time and scroll your trackball up or down. If the crossfade feature is deactivated (see below), it is impossible to adjust the crossfade time.
The Snapshot crossfading may be deactivated by deselecting the Xfade Active option on the Snapshot Screen. On Vista 7, this can also be done by pressing the **GLIDE** key on the **AUTOMATION** panel in the Control Bay.
Settings which cannot be crossfaded (switches) can either switch at the beginning, in the middle of the crossfade or after the crossfade. This behavior can be defined in the Snapshot Automation Options window selected from th Options menu. There, it is also possible to define a Default Crossfade Time.
For an explanation of the Enable Trim Mode option, refer to chapter 4.4.4.5.



4.4.4.3 Additional Snapshot Functionality for Vista

In addition to the dedicated **MAKE SNAPSHOT** hardware key on the Vista surface, there are four **SNAPSHOT 1...4** keys for storing and recalling four individual snapshots on these keys.



Assign a Snapshot to a Key: To store a snapshot onto one of the 4 keys, *push and hold down* the **MAKE SNAPSHOT** key, then hit the key you would like it to be stored on. Depending on which of the keys you select, a snapshot will be generated in the Snapshot List called `__Snapx_Key`, where *x* is the number of the selected button between 1 and 4. This snapshot can now be recalled at any time using the dedicated key by *holding down* the **RECALL SNAPSHOT** key and pressing the desired **SNAPSHOT** key. The need for a two-key operation provides a certain level of security.

A new snapshot can be applied to one of the dedicated keys even if the button already has a snapshot stored to it. In this instance, the previously stored snapshot will be overwritten.

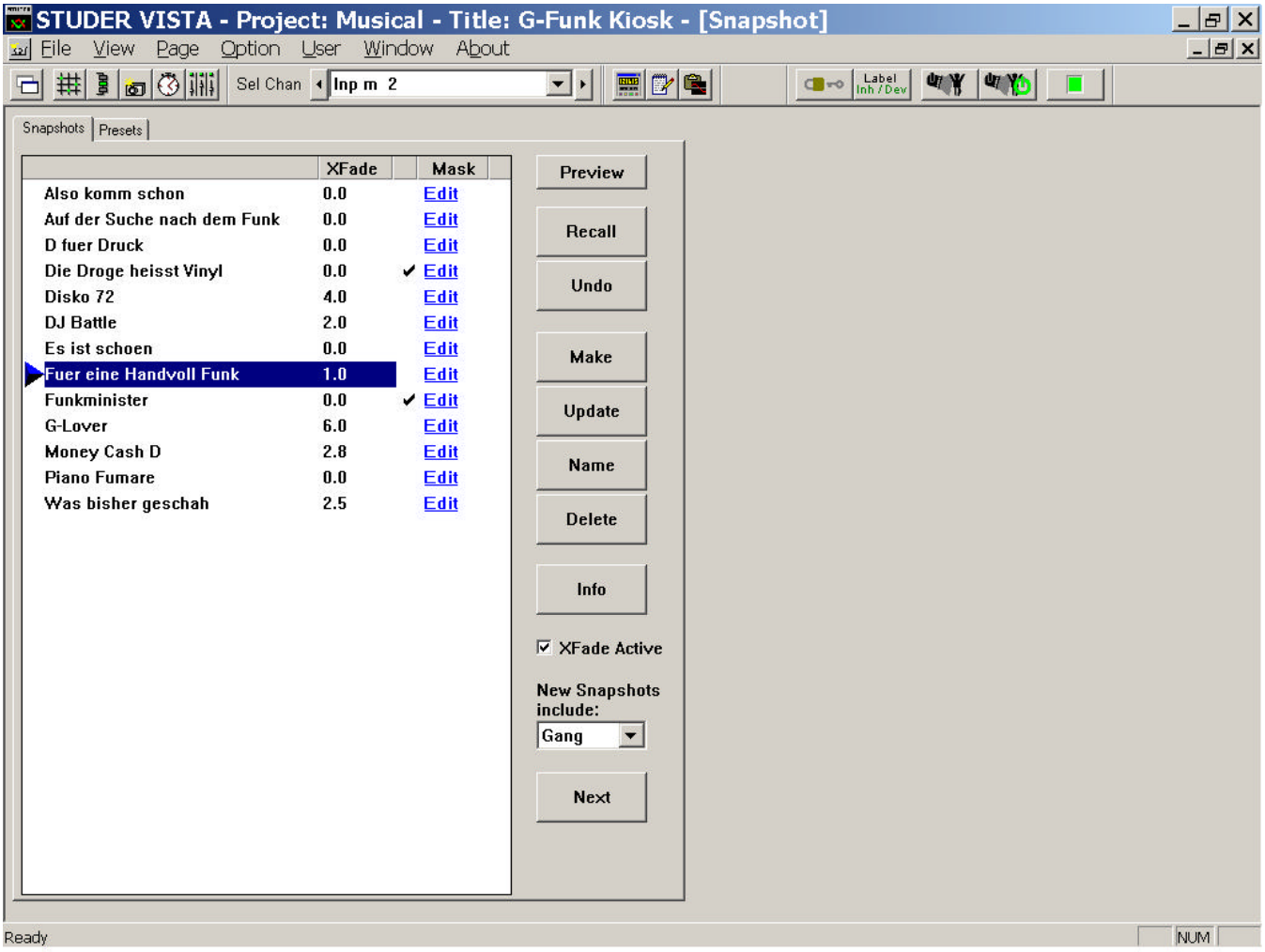
☞ **Tip** To ensure that a snapshot that has been stored on a dedicated key is not overwritten, and hence lost from the snapshot list, always make the snapshot twice, once to the key and once in the normal way just by pressing the **MAKE SNAPSHOT** key by itself. In this case the same snapshot will appear in the Snapshot list twice; once called `__Snapx_Key` and a second time as `Snapshot x`. Rename the latter snapshot as required; this will ensure that the snapshot is not lost even if is removed from the dedicated key.

Note: It is possible to rename any snapshot already existing in the snapshot list to `__Snapx_Key`. Doing this will put the renamed snapshot onto the chosen hardware key directly without having to recall it first. *Make sure that only one instance of* `__Snap1_Key`, `__Snap2_Key`, `__Snap3_Key`, *or* `__Snap4_Key` *exists in the Snapshot list at any time.*

Snapshot Preview: By clicking on the PREVIEW button, the console enters this mode. Whichever Snapshot the user selects, pink elements within all Vistonics™ elements will show any difference between the current console settings and the settings within the previewed Snapshot. It is still possible to recall any Snapshot by all mechanisms described above.
When pressing any of the four dedicated **SNAPSHOT 1...4** keys without pressing the **RECALL SNAPSHOT** key at the same time, that corresponding snapshot is automatically only previewed. It is also possible to preview it only momentarily by pressing e.g. the **SNAPSHOT 1** key for a longer period; the key will be lit as long as the preview is active.

4.4.4.4 Partial Snapshots

It is possible to create snapshots that do not affect the whole console when recalled. They are called “partial snapshots”. When recalling such a snapshot, only some of the channels – or even only some of their elements – are being changed on the desk. Partial snapshots are being marked with a checkmark next to the crossfade time.



Creating a Partial Snapshot

The easiest way to create a partial snapshot is to gang some channels and make a snapshot, while having the “New Snapshots include:” setting set to “Gang”:

If no gang is present, the whole console settings will be stored in a full snapshot. If the “New Snapshots include:” setting is set to “No Mask”, there will always be made a full snapshot, regardless of a gang being present or not.

It is also possible to set the partial snapshot to “Active Snapshot Filter”. This will actually create a partial snapshot out of the settings currently *not* masked out by a Snapshot Filter.

4.4.4.5 Snapshot Filtering (Static Automation)

At the time of recalling a snapshot, there might be a filter active, leaving some console settings unchanged upon recall of any snapshot. Each console parameter can therefore be in one of the following states:

- Isolate (= part of the filter); this parameter will not be influenced by snapshot recalls. Indication: yellow “I”.
- Read (= not filtered); this parameter may be changed upon recall of any snapshots. Indication: none.
- Trim (= offsets applied to snapshot recalls); any changes since the last snapshot recall will be applied in a relative way to upcoming snapshot recalls. Indication: red “T”.

There are some different ways to define the parameters to be filtered out.

Note: The static automation system (filtering) *cannot* be active on a console which has dynamic automation available. The decision which functionality is available is made by an entry in a `*.ini` file before the system is rebooted, or by using a special way to boot the system (alternate icon on the desktop).

Channel-Based Masking

You may add whole channels or only parts of them to your mask by pressing the **AUTO MODE** key *(Vista 7; see chapter 2.2.4 for details)* or **AUTO** key *(D950; see chapter 2.5.2 for details)*.

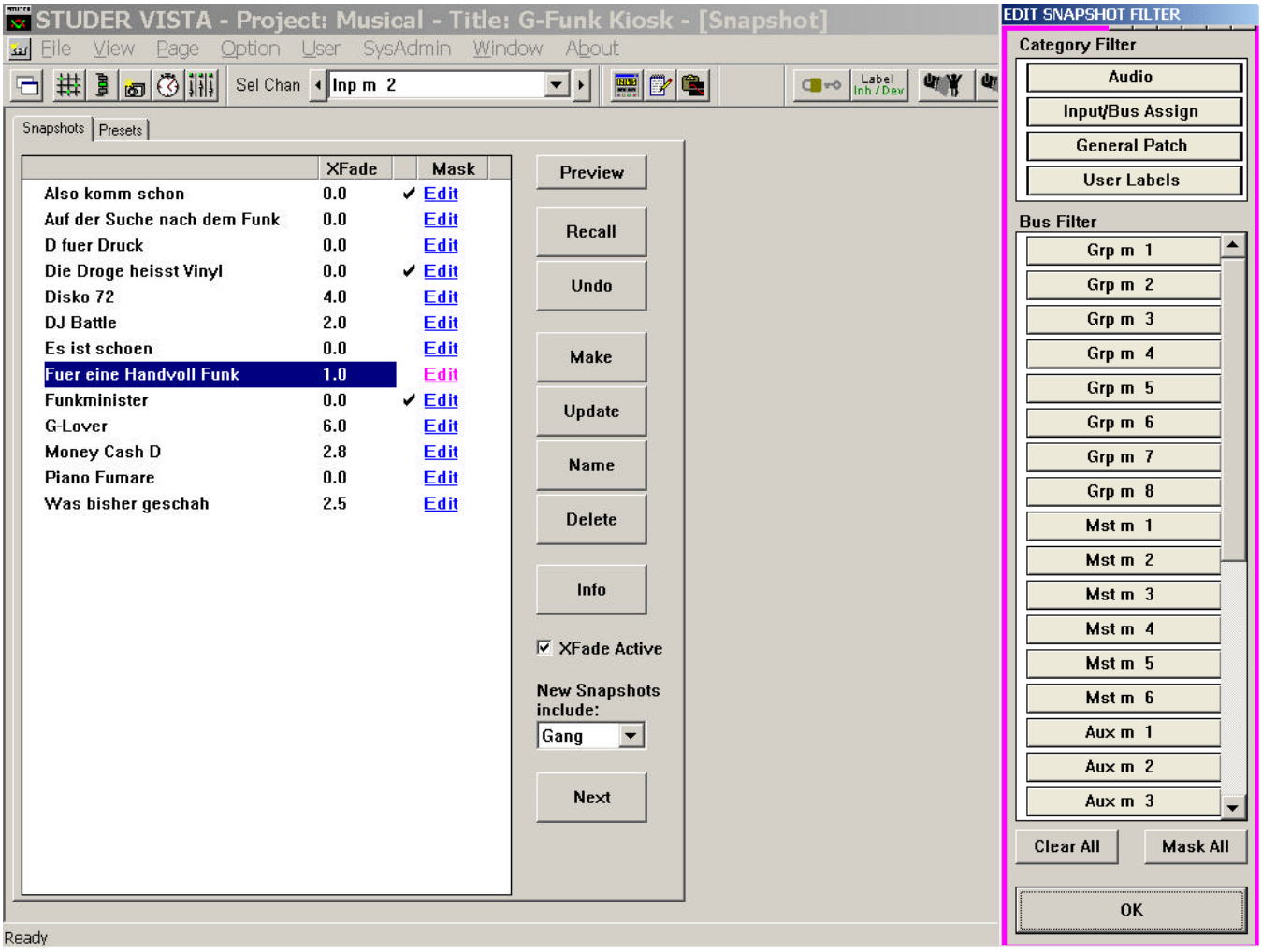
Entering Edit Filter Mode

When you click the Edit Snapshot Filter button in the toolbar or press the **LOCAL / EDIT** keys on the Vista’s control bay Automation panel, you will put the whole console into edit snapshot filter mode. Exit by clicking/pressing the same button or key again. While the console is in edit snapshot filter mode, it is not primarily showing audio settings, but actually visualizing the snapshot filter. Each LED will indicate that this parameter is currently part of the snapshot filter, meaning being filtered out from snapshot recalling. Vistonics™ elements are indicating a small letter “I” – Vistonics™ keys change their color to yellow if they are part of the snapshot filter. E.g. seeing the EQ key lit will indicate that this equalizer is currently part of the snapshot filter including all its parameters. If the key is half-lit, there are some – but not all – parameters of that equalizer part of the snapshot filter. If dark, it indicates that none of the equalizer parameters are part of the snapshot filter. You may make the whole equalizer be part of the snapshot filter or not by pressing its key.
If the console is in edit snapshot filter mode, this is indicated by the opened EDIT SNAPSHOT FILTER window (as shown below); on a Vista console, the Vistonics™ elements are marked by magenta-colored frames in addition.

Notes: It is of course also possible to use ganging in order to add an element of multiple channels to the snapshot filter.
To add a whole channel to the snapshot filter, press the **AUTO MODE** key on the channel strip.
Also the copy/paste mechanism works in order to copy selections across one or multiple channels.

Adding a Whole Bus to the Snapshot Filter

In edit snapshot filter mode (as described above), the following window is shown on the GC screen:



This window allows adding a whole group of parameters to your snapshot filter. Either select one of the four groups on top, or one of the listed buses.

Audio Settings: Will add all channel processing functions to your snapshot filter.

Input/Bus Assign Settings: Will add the input switches of all channels as well as all bus assignments to your snapshot filter.

General Patch Setting: Will add the General Patch to your snapshot filter, meaning that no patch points will change when recalling a snapshot.

User Labels: Will add all user labels (within the General Patch as well as within the channel strips) to the snapshot filter.

Bus: This is a very powerful feature. By clicking e.g. on “Aux m 1”, you will add all relevant parameters to your snapshot filter, such that the Mono AUX Bus 1 will not be influenced by any snapshot recalling. Included are:

- The levels of all channels routed onto that bus
- The bus assign (on/off switch) of all channels for that bus
- The corresponding master channel with all its settings
- The output patch made from that master channel to any output ports.

Caution: Clicking on the “Clear All” button will completely remove the snapshot filter and therefore may change all console parameters upon the next snapshot recall.
Clicking on the “Mask All” button will protect the whole console (with some exceptions, such as Patch points) against snapshot recalls, afterwards allowing to enable just single elements to be activated.

De-activating Snapshot Filters

It is possible to de-activate an existing filter in order to re-activate it at a later point. Click on the corresponding icon in the toolbar to activate/de-activate the current snapshot filter, or press the MIX ON key on the Automation panel.
If the snapshot filter is de-activated, the icon for entering the snapshot filter edit mode is grayed-out and not accessible.

Trim Mode

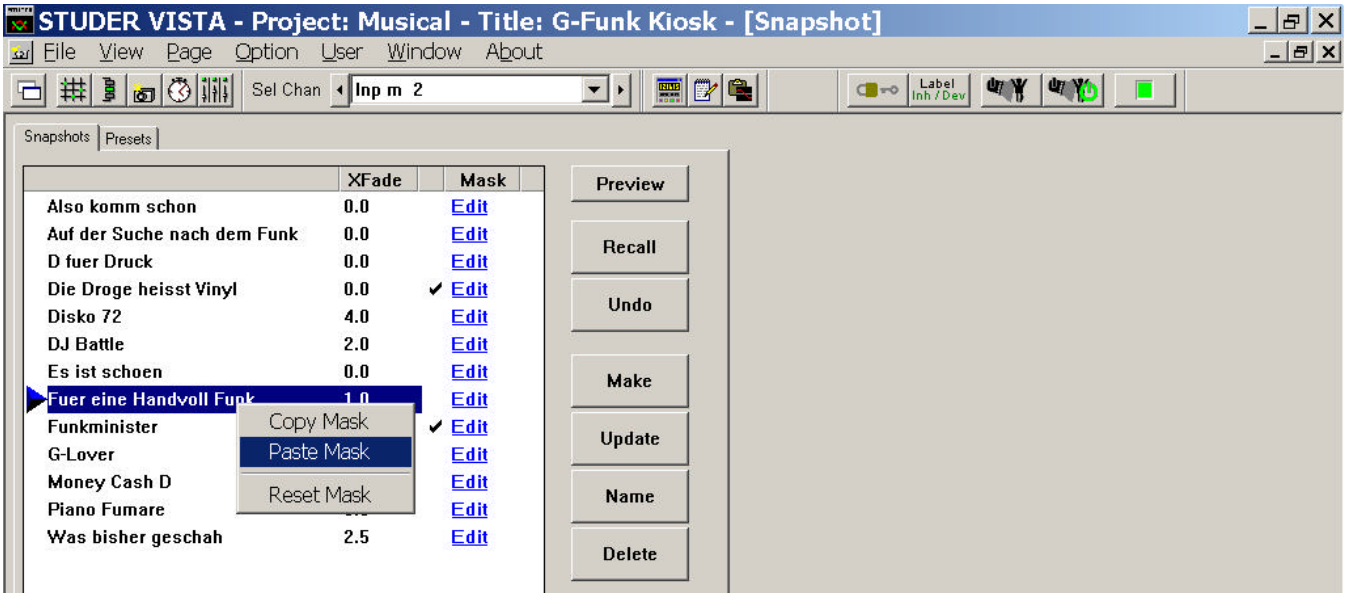
It is also possible to put elements into Trim mode. In that mode, you may have recalled a snapshot and make some corrections (e.g. push the fader up by some dB). This change will then be applied to all following snapshots when recalling them. This feature is very handy if you have prepared a performance and need to correct some levels when the show really starts. Obviously it is good to have that correction applied to all snapshots of the show.

Note: When going back to Read mode, the elements will jump back to the original snapshot value.

In order to activate the Trim mode as a third possible status of the elements, the Enable Trim Mode option must be activated in the Snapshot Automation Options window. Then the snapshot filter will not only contain two (Read and Isolate) but three modes: Read, Isolate, and Trim. Switches cannot go into Trim mode, therefore their indication is not different (yellow “I”). However, the rotary controllers and faders will toggle between “Read”, yellow “I” for “Isolate” and red “T” for “Trim”.

4.4.4.6 Correcting the Mask of a Partial Snapshot

If a partial snapshot already has been made and the user finds that he forgot to have some channels in that snapshot, there is a powerful method to correct the mask contained in a partial snapshot. As it has been mentioned at the beginning of this chapter, each snapshot file in general contains all settings of the console. A partial snapshot just adds an invisible mask to the audio settings. Therefore it is possible to enter an edit mode, showing the *mask of a partial snapshot* and giving the possibility to edit it. Let's say you had channels 1 to 5 in a gang and made a partial snapshot of them, it is easily possible afterwards to tell the system that this snapshot should have also contained the channel 6. How to do this?



Next to each snapshot there is an Edit link at the very right of the snapshot list. By clicking this button, you will put the console into the "partial snapshot filter edit" mode. Then you will see the same edit dialog box on the screen as when editing the snapshot filter. Also the desk doesn't show your audio settings anymore, but the mask defining the focus of that partial snapshot. You may now press **AUTO MODE** on one or more channels, create a gang, and add multiple channels to the partial snapshot, or touch and press any other control. The same mechanism will apply as when editing the snapshot filter. Upon clicking the Edit link again, you leave the edit mode, and the console is back to display normal audio settings.
When you are not in the edit mode of the partial snapshots mask, you are also able to copy and paste masks across from one snapshot to one or multiple others. Simply *right-click* on the Edit link of a snapshot mask and use the standard windows commands.

4.4.4.7 Typical Application Examples

Isolate one or more channels from being changed by upcoming snapshot recalls:

Press **AUTO MODE** on the corresponding channels. On Vista the user may create a gang first in order to isolate multiple channels at a time.

Isolate just the EQ of one or more channels from being changed by upcoming snapshot recalls (Vista only):

Press and hold **AUTO MODE** in order to enter the edit snapshot filter mode, indicated by magenta-colored frames within all Vistonics™ elements of this channel. *All LEDs will now display their isolation status but not the audio*. E.g. if the EQ button is lit at this time, the EQ is isolated. In order to change the isolation status, press the corresponding key, touch the fader or knob while still holding the **AUTO MODE** key. The word "ISOLATE" will now show up in the generic display area, indicating that some element is currently isolated. You may also use a gang in order to isolate one element of multiple channels.

De-Activate the whole snapshot filtering mechanism on the console

De-activate **MIX ON** on the Automation panel on the Control Bay, or click on the snapshot filter icon in the toolbar to de-activate the snapshot filtering while keeping its definition for later use.

Create Snapshots, that contain only some of the channels, but not the whole console

Set the "New Snapshot includes:" option to "Gang". Whenever a gang is present, only the gang will be "part of the snapshot". If there is no gang, the whole console is affected by the recall of freshly created snapshots. A snapshot not affecting the whole channel is graphically marked by a checkmark.

4.4.4.8 Presets

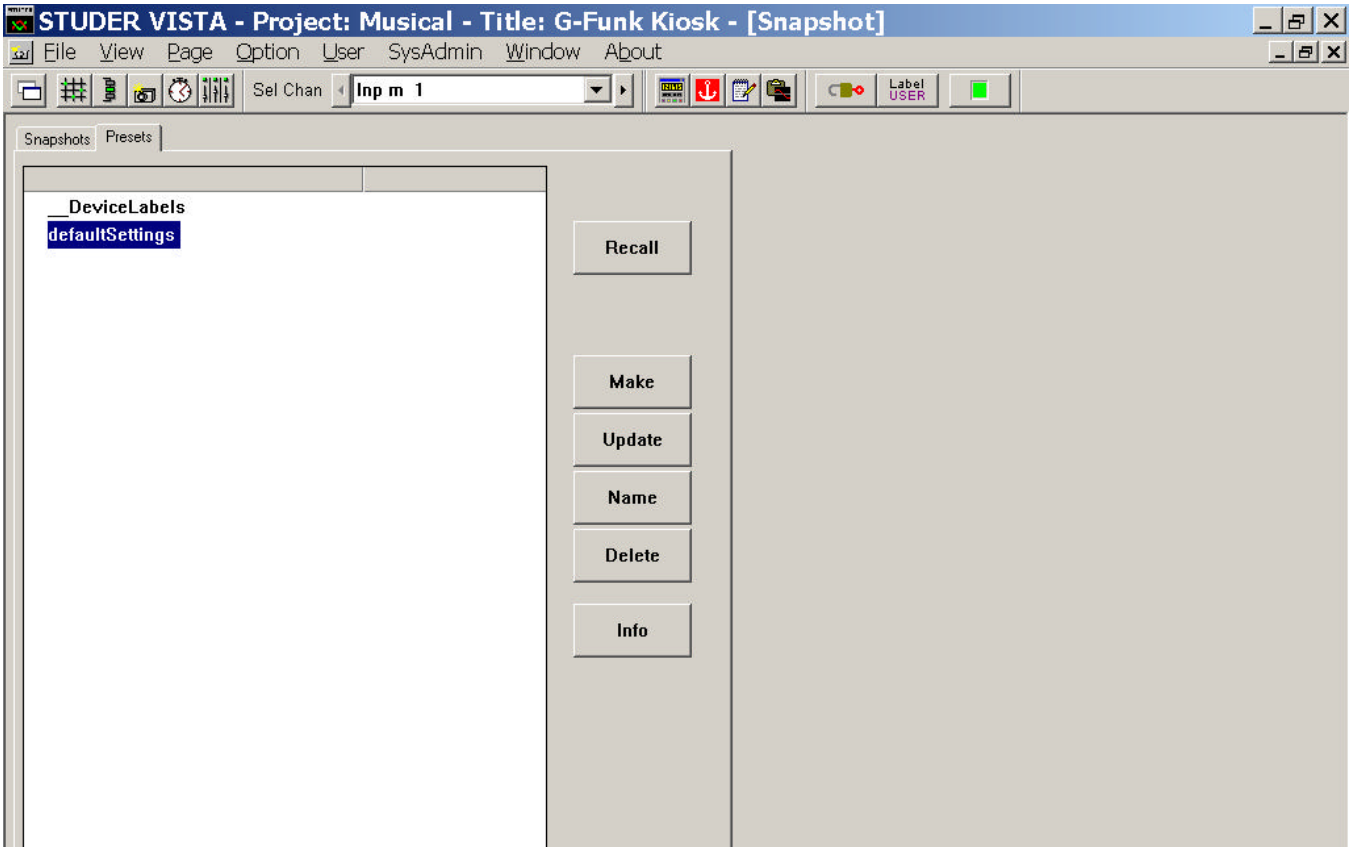
Presets are exactly the same as Snapshots. However, they normally can only be recalled but not edited; so their main purpose is to represent – as the name implies – a number of starting console setups that can be recalled, used to build particular refinements from there, and then stored as normal Snapshot files.

To access Presets from the Snapshot Page, click on the Presets tag. Presets are stored with the Session Configuration, because it is assumed that they may be valid for more than one Title.
The file extension is `*.pre`.

If the System Administration mode (refer to chapter 4.7) is activated (by entering the appropriate System Administrator password), Presets can be edited exactly in the same way as Snapshots.

4.4.4.9 Default Settings

In the Preset List, there is always one line labeled *defaultSettings*. This is a Preset that is automatically generated for every Session Configuration, but no file will be found in the corresponding Session Configuration directory (as would be the case for other Presets).
When recalled, the *defaultSettings* will reset the console to the defaults – it functions much like a Total Reset.



DefaultSettings *cannot* be edited, renamed, deleted or updated.

4.4.4.10 Files and Backup

Snapshots and Presets are stored as Windows-compatible files.

Usually, Snapshots are stored in the current Title directory, with a `*.snp` file extension.

Usually, Presets are stored in the Session Configuration directory, with a `*.pre` file extension.

All the Snapshot and Preset files can be copied and/or moved to and restored from a backup medium using the Make Backup facility (refer to chapter 4.6.1.3).

4.4.5 Cue List Page

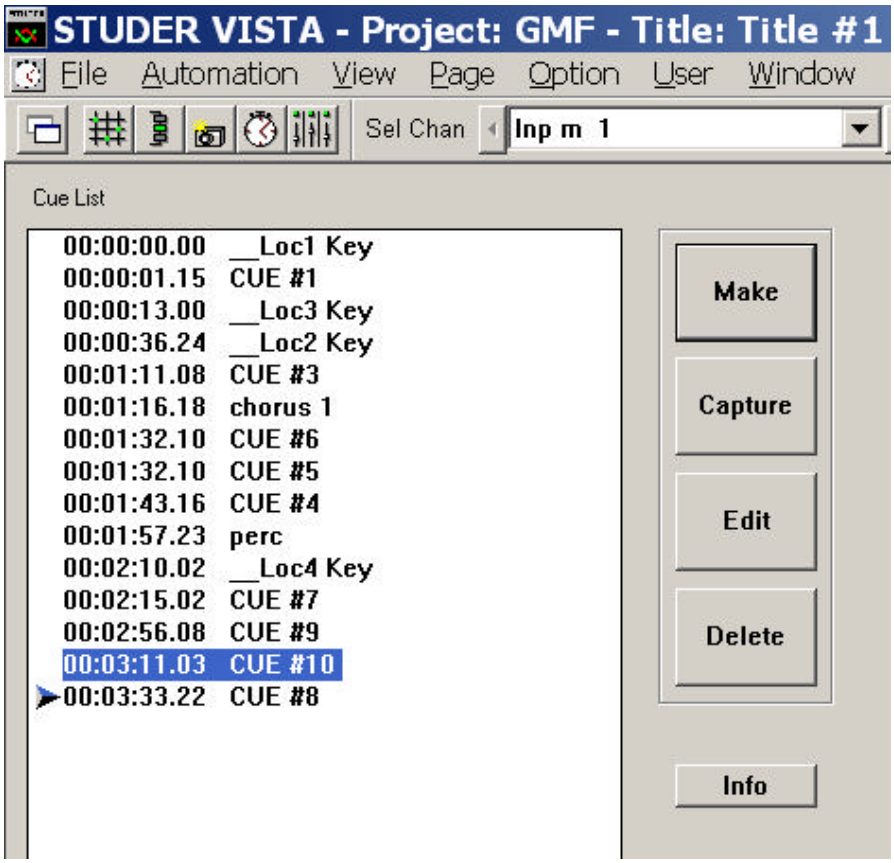
The Cue List page of the Graphic Controller can be called up in three different ways:

- From the Page menu, by clicking on the appropriate menu item;
- Using Page icons, by clicking on appropriate icon in the Toolbar;
- Using the **CUE** function key on the control surface keyboard – which is probably the fastest way.

The Cue List is only available if the optional AutoTouch+ Dynamic Automation and the TC2 or TC3 time code options are installed on your D950/Vista. The Cue List helps to deal with parts of a musical piece or film you want to keep track of in time. That could be an Intro, Chorus A, Bridge, Chorus B, the End of a song, or a scene from the film you might want to (auto-) locate to. An unlimited number of Cues can be stored.

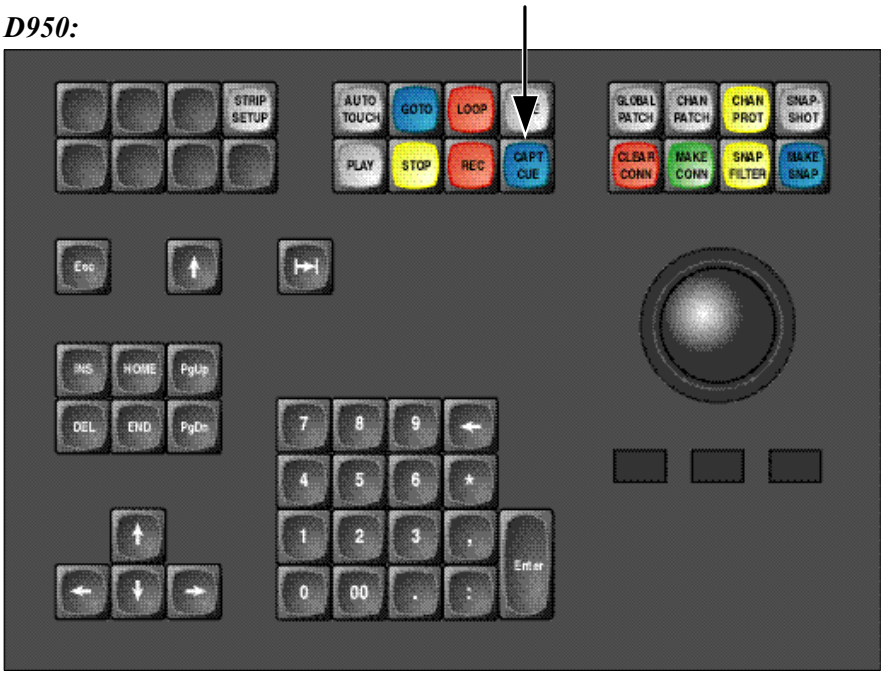
Each Cue in the Cue List has a timecode stamp and a name. The names are generated and numbered automatically when you make a cue, they can be edited at any time along with the TC stamp. The cues in the Cue List are automatically sorted by increasing TC. If you make a new cue, it will be inserted into the list according to its TC stamp.

When the running TC passes a cue point existing in the List, a small triangle will appear next to the cue to indicate that this particular cue has been reached. The triangle will remain there until the next cue in the list is reached, and so on.

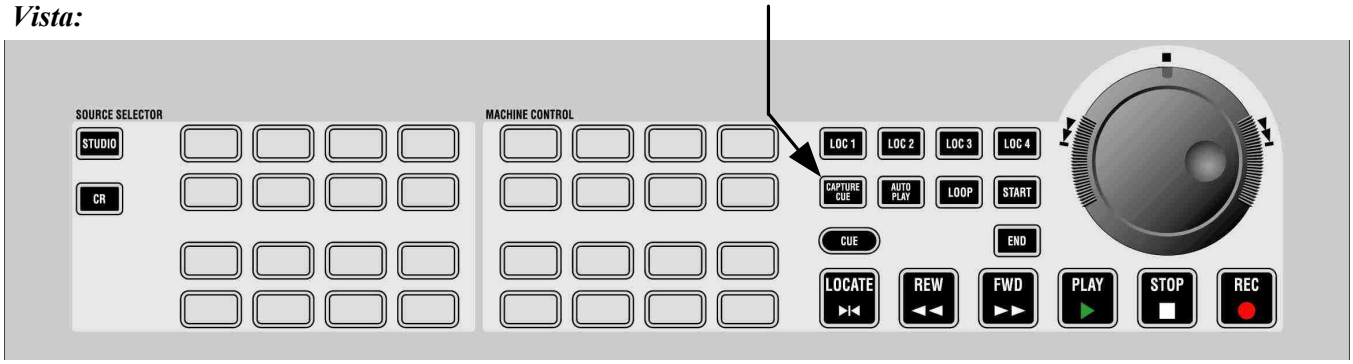


Capture: To quickly make a Cue and edit the name and/or timecode stamp later (if necessary), press **CAPT CUE** on the console when you hear the audio event to be marked:

D950:



Vista:

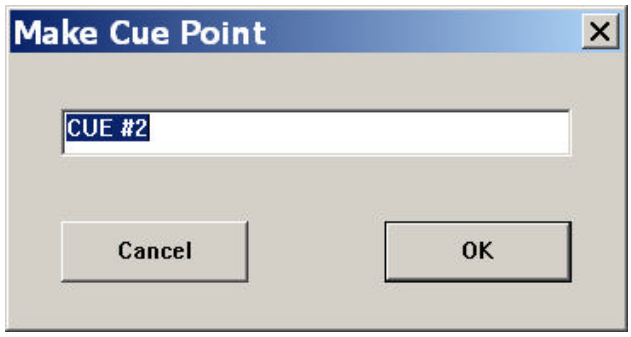


It is also possible to use the Capture button in the Cue List. In both cases, a Cue point will be generated, automatically numbered, and stamped with the current timecode address at the moment you pressed the button.

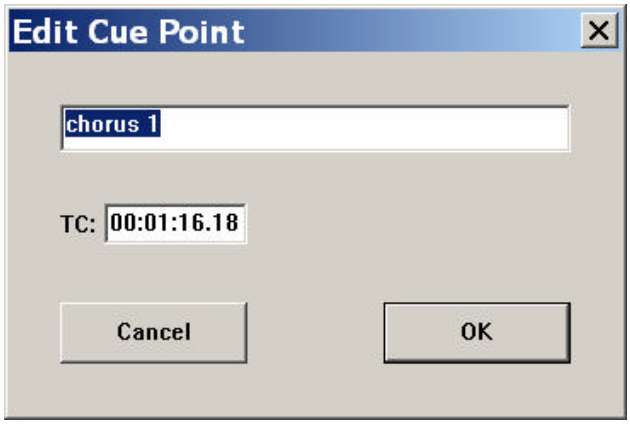
Make: To make a Cue means:

- First enter a name within the edit window that appears when you click the Make button
- Wait for the right audio event to occur, and click the on-screen OK button, or press the **Enter** key on the control surface keyboard

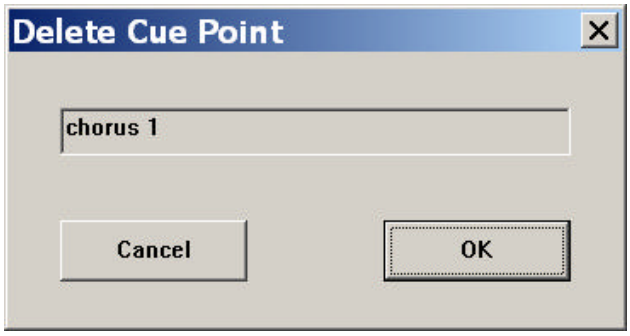
A Cue point with the entered name will be generated and stamped with the current timecode as soon as you click OK or press **Enter**. You can edit both name and TC stamp later, if necessary.



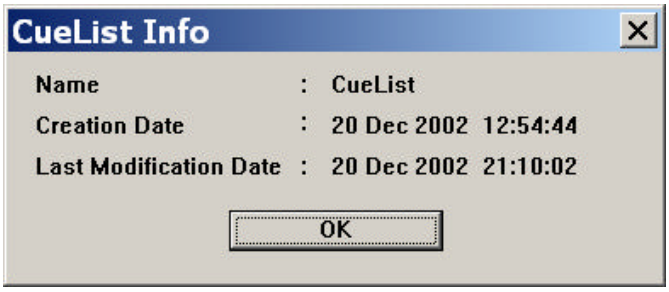
Edit: Opens an edit window that allows changes to be made to the name and the timecode stamp of a selected Cue from the Cue list.



Delete: Opens an edit window that allows one or more Cues to be deleted from the List. Select a Cue in the list by clicking on it, or select any number of Cues from the List using the familiar Windows multiple-selection techniques. (Drag trackball or press **Shift**, and select with the cursor). Click on the Delete button. This action will bring up a window allowing you to confirm the Delete operation.



Info: Calls up Cue Info:
Click on the Info button, an action that will bring up a window displaying
- Cue List name;
- Cue List creation date and time;
- Cue List last modification date and time.



☞ **Tip** To enter timecode values, use the control surface keyboard's numeric keypad. The keypad features a double-zero key (00) to speed up the process. You do not have to enter any punctuation marks – i.e., no colons or commas between hour, minute, second, and frame values – since they will be added automatically.

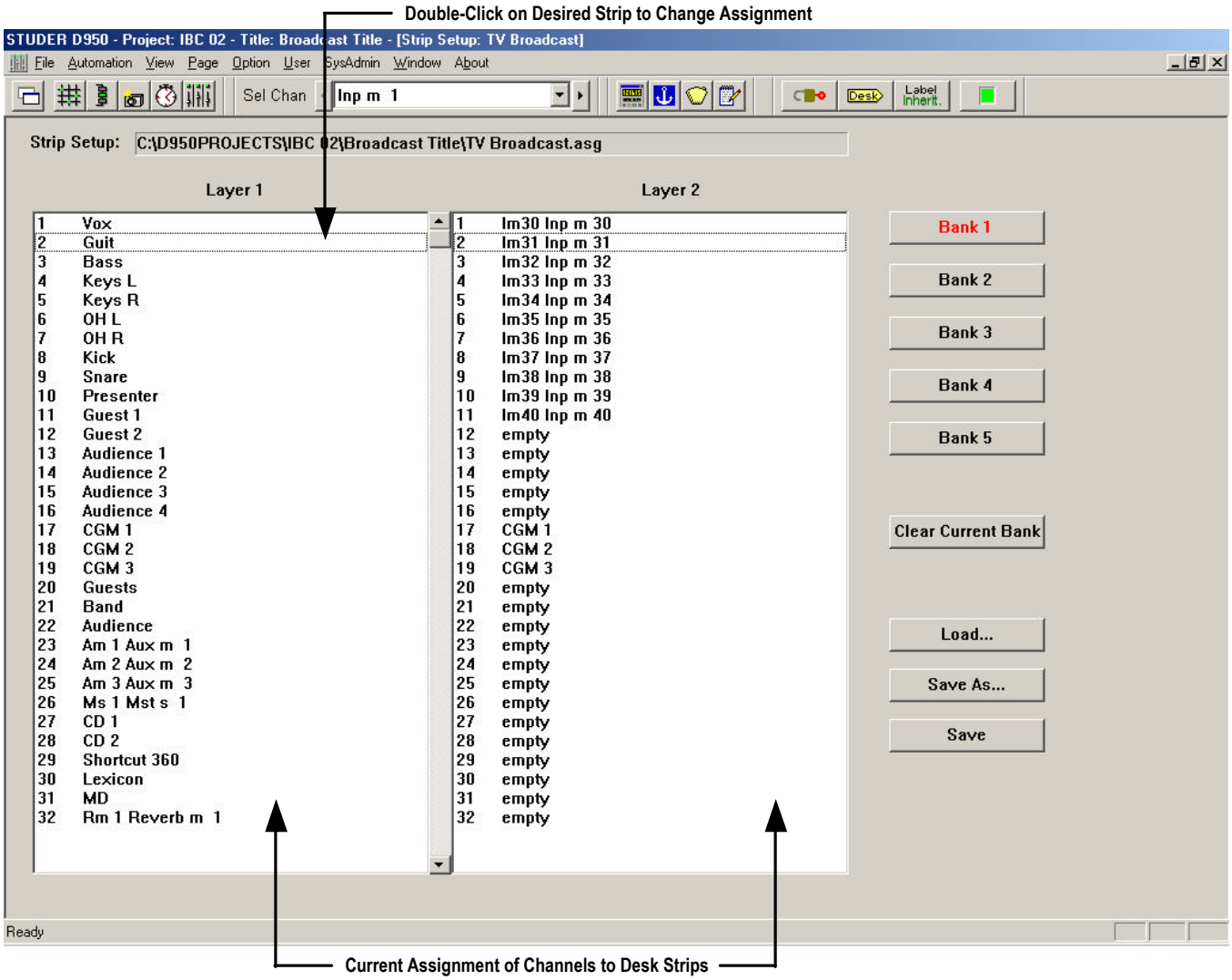
TC Scroll Mode: This is an alternate method for fast timecode entries. It is initiated by the left trackball button, followed by a vertical trackball move.
Please note that the common TC entry shortcuts apply; for information on this subject refer to chapter 5.23.

4.4.6 D950 Strip Setup *(for Vista Strip Setup, refer to chapter 4.4.7)*

The Strip Setup page of the Graphic Controller can be called up in three different ways:

- From the Page menu, by clicking on the appropriate menu item;
- Using the Page icons, by clicking on the appropriate icon in the tool-bar;
- Using the **STRIP SETUP** function key on the control surface keyboard, which is probably the fastest way.

The Strip Setup page allows the user to adapt the layout of the Channel Strips. Using this utility, all the audio channels of various types can be assigned (or re-assigned) to the Channel Strips in five Banks, each with two layers. It shows the currently active Desk Bank with its two layers, and layout of the channels.



4.4.6.1 Background of the D950 Strip Setup Principle

Because the D950 User Interface Desk is fully assignable, *any* DSP channel can be assigned to *any* Channel Strip at *any* time. In fact, the same channel may be assigned to multiple desk locations (while it may be controlled from many locations, there is only one audio path). Likewise, a channel may not be assigned to the desk at all (although there is no control from the desk, it will still function). The Strip Setup can be used to adapt the Channel Strip's layout to match your personal preferences, or to better suit a particular session application.

Strip Setup files are stored within Titles. When a new Title is created, a copy of the current Strip Setup file (if any) is automatically stored along with the other Title data. If a new Session Configuration is loaded, either an existing Strip Setup file must be loaded or a new file must be created and then saved.

If an existing Strip Setup has been modified, a window will appear giving you the option of saving the edited Strip Setup file, either when another file is opened, when the Title is closed, or when a new Title is created from an existing one.

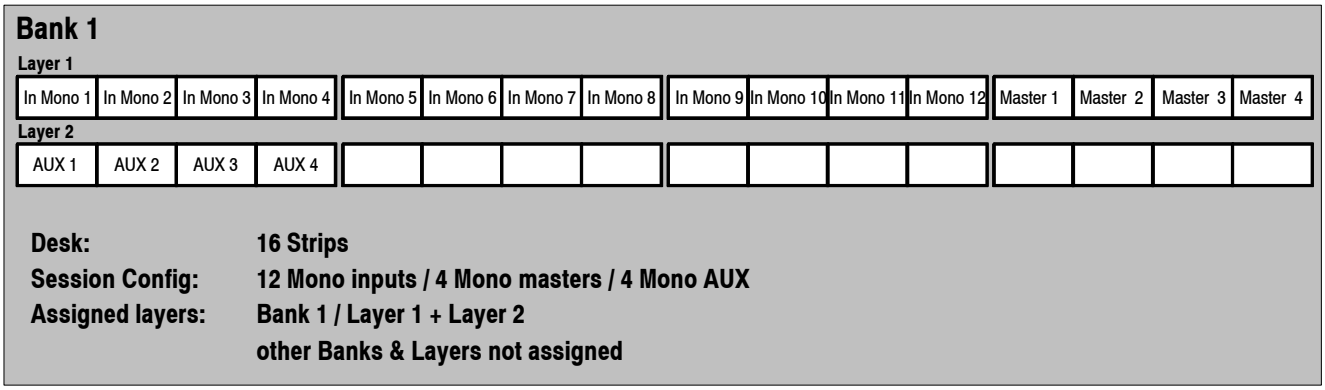
Multiple Strip Setup files can be stored within a single Title. This is accomplished by editing the current file and using the "Save as..." button. The new file can be saved in the current Title or elsewhere using the familiar Windows save box. The Strip Setup file that was last used will be loaded the next time the Title is opened if the file has been stored with the Title.

A Strip Setup file from other Titles (or elsewhere) can be loaded using the "Load..." button, but should be stored within the current Title if it is to be used with that Title again in the future.

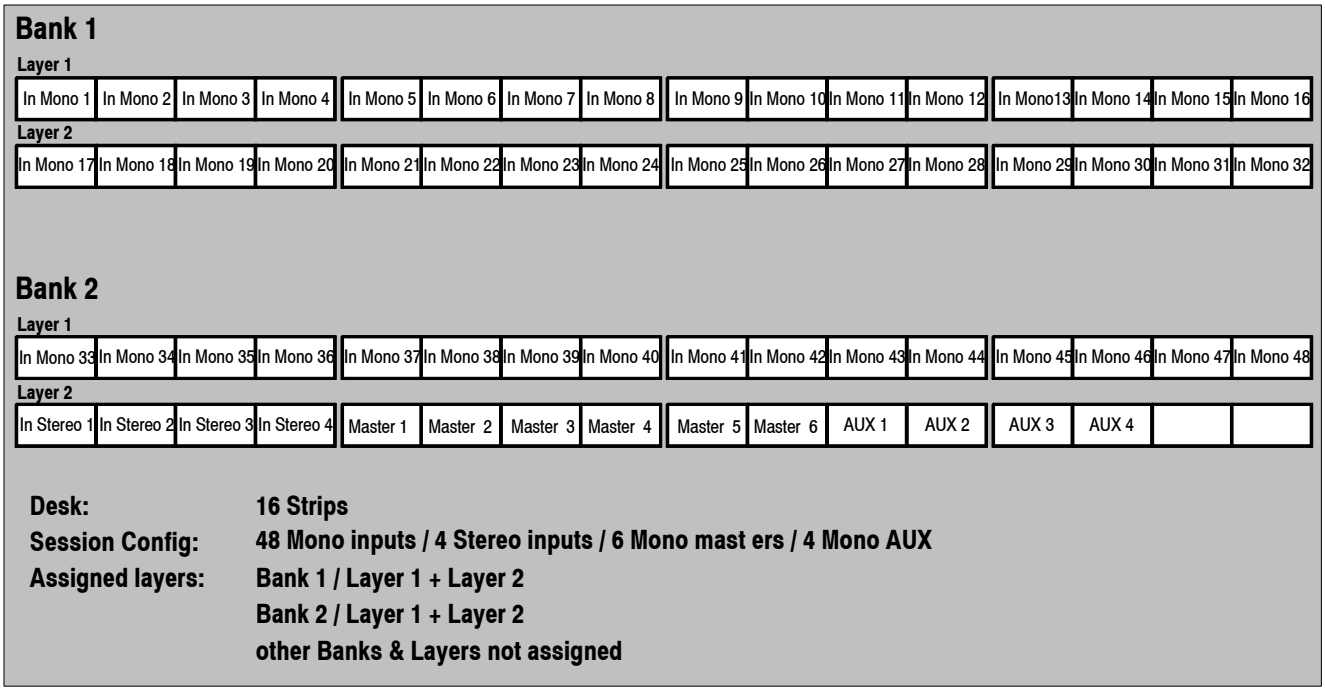
Strip Setup files have an `*.asg` file extension.

The following is an example of the ways in which a D950 Desk with 16 Channel Strips may be assigned for two very different Session Configurations:

Example #1:



Example #2:



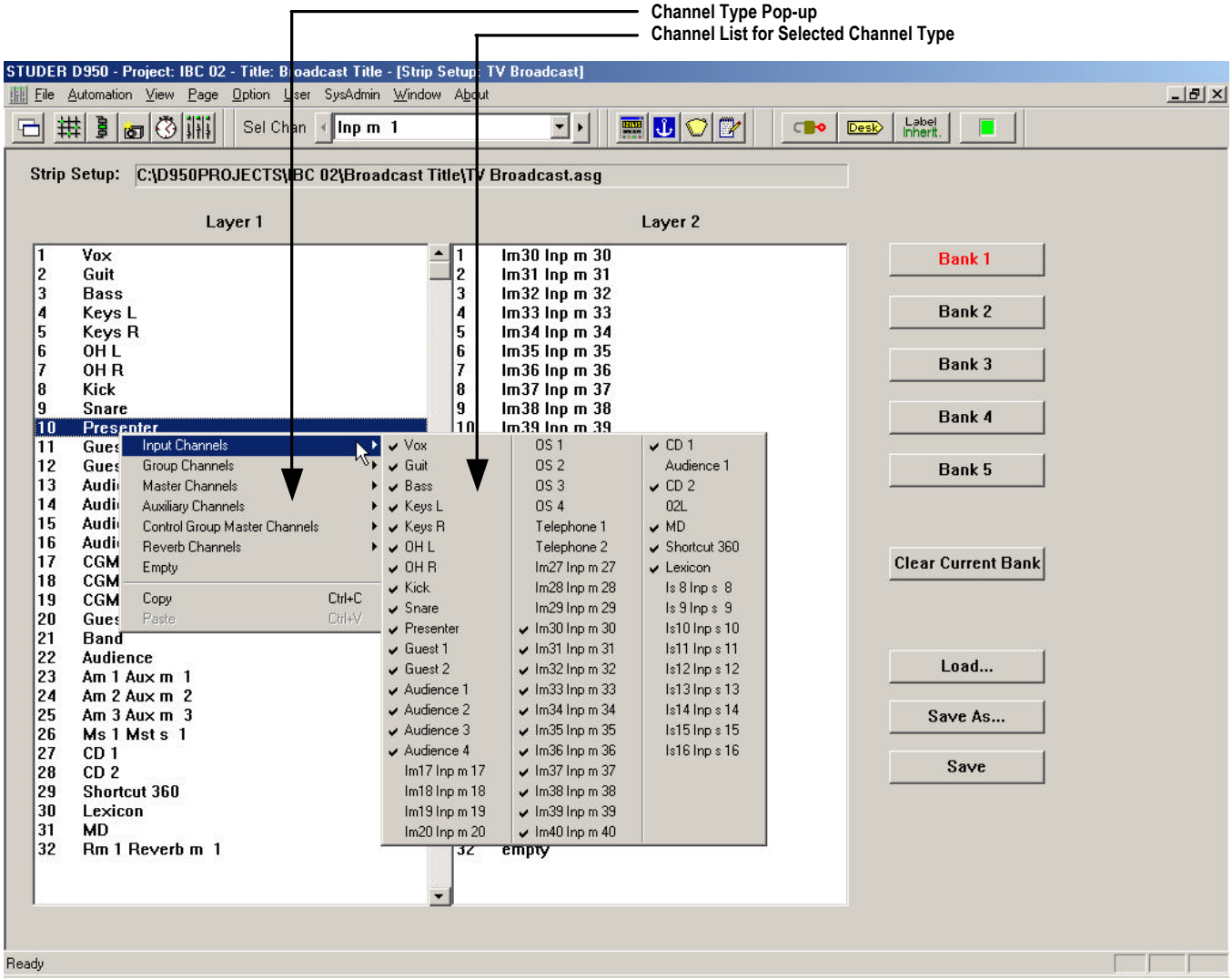
Such a Strip Setup forms the starting point for using a new Session Configuration, and can be adapted at any time (as shown below).

This powerful concept allows almost any D950 Desk to function with any D950 Session Configuration (even if the console size is different) without a problem.

4.4.6.2 How to Use D950 Strip Setup

To create a new Strip Setup or to adapt an existing Strip Setup – regardless whether it belongs to a new Title, or has already been edited – first call up the Strip Setup page. *Note that the Strip Setup window displays the label type of the console active at the time when opening the window.*

Bank 1...5: First, use one of the Bank buttons to select the Bank to be edited. This will display the two Layers of that particular Bank, and the current Strip Assignment. Banks can also be selected using the Bank 1 through 5 keys of the Bank Select Unit (BSU) in the center section of the console control surface.



The Clear Current Bank button clears the assignments to both Layers within the selected Bank.

Click on the Layer and Strip you want to assign or re-assign (the selected Strip will be highlighted in blue), and click on its name with the right-hand trackball key. A pop-up menu will appear with a list of all the configured channel types. If you select a channel type, a list of all *configured* channels for that channel type will be shown. To assign, click on the desired channel.

You can also select “empty” if you do *not* wish to assign a channel to a particular Strip.

Multiple Channel Strips can be selected in several ways:
- By double-clicking on any Strip will select the entire Layer;
- by holding down the left-hand trackball key and dragging the cursor over the desired Strips;
- By clicking on the first Strip in a series, holding down the **Shift** key and clicking on the last desired Strip will select all the Strips within that range;
- By clicking the center trackball key on the first Strip in a series and dragging the cursor over the desired range;
- By holding down the **Ctrl** key and then clicking on the desired Strips.

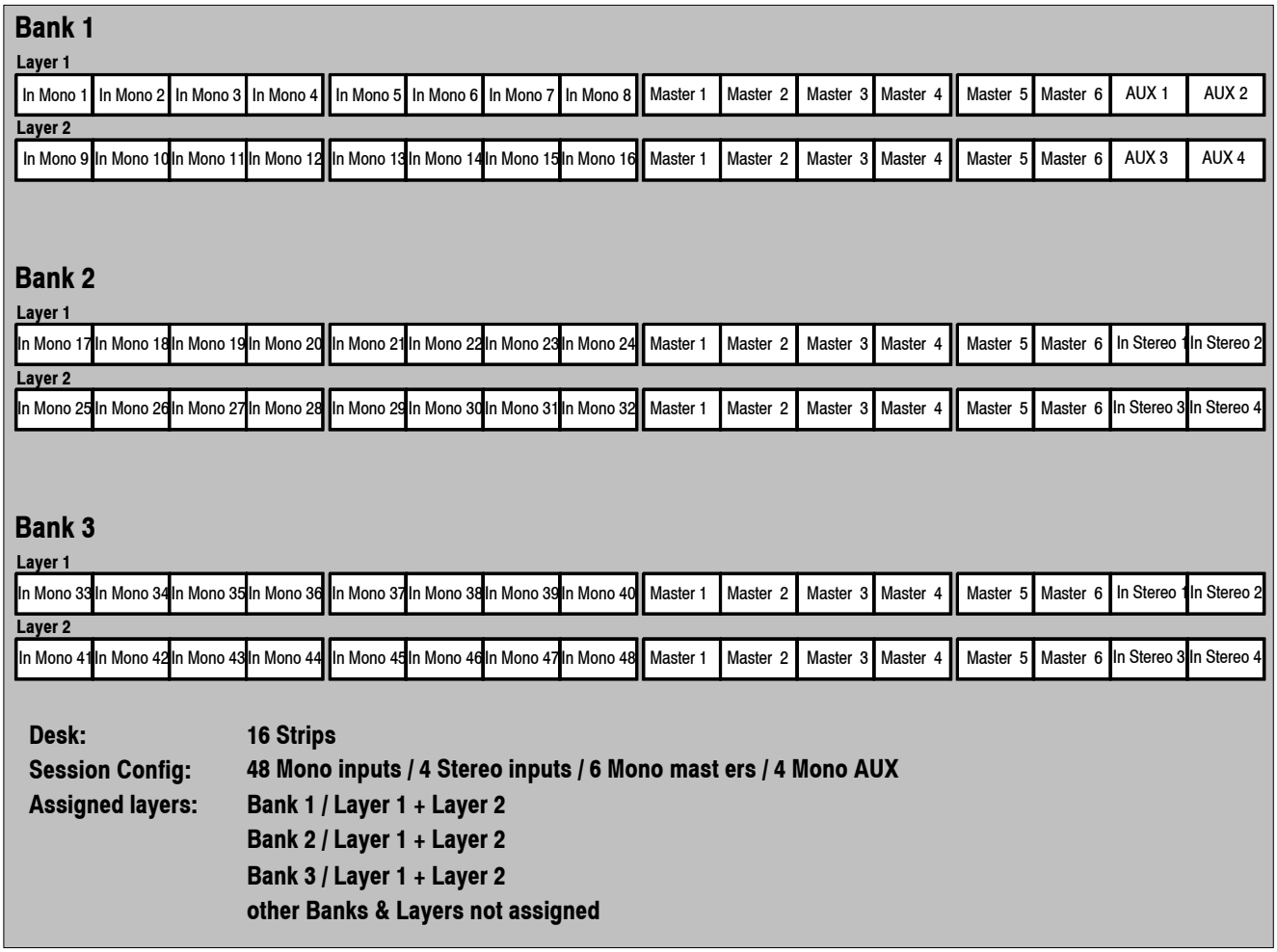
When multiple Strips have been highlighted, channels will be assigned staring with the first one selected and continue in order over the range of highlighted Strips or until the remaining channels of that type have been assigned.

Channels that have been assigned will be indicated by a checkmark to the left of the channel name in the pop-up menu.

Channel assignments can be copied to a clipboard by highlighting a Strip or a range of Strips and clicking Copy from the channel selection menu (right-hand trackball key). These assignments may then be pasted to other Strip locations. This is accomplished by highlighting the destination Strip(s) and clicking Paste in the channel selection menu. The same clipboard may be pasted to multiple locations if desired. Keyboard shortcuts are provided for these clipboard functions: Copy (**Ctrl+c**); Paste (**Ctrl+v**).

Here are some useful facts about the process:
- *Any* channel can be assigned to *any* Channel Strip on *any* Layer of *any* Bank;
- Any channel can be assigned more than once to several different Channel Strips, on any Layer, of any Bank – a feature that allows a configuration in which Masters Channels, for example, always are on top layer(s);
- It is not necessary to assign all channels available in a configuration, however, control of these channels will be limited to the CAS.
- Regardless of how you assign the signal sources to channel strips, there is *no* change in audio signals within the console – you can perform this modification at any time.

So, after you have edited it, the Session Configuration from Example #2 (*above*) may be laid out in a different way:



In the example above, it is clearly visible that the six Masters have been assigned to all layers of the first three Banks.

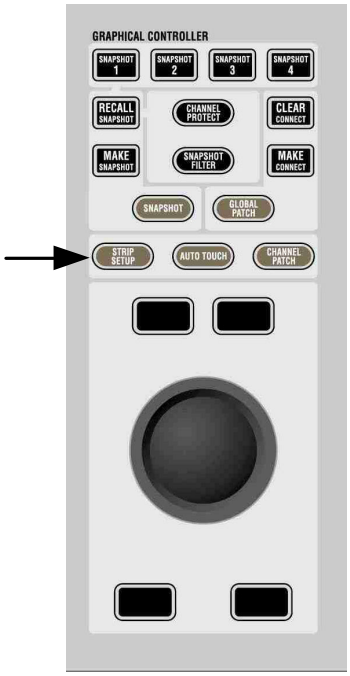
In other words: The Masters are always directly accessible, no matter which of the first three Banks/Layers is currently selected.

☞ **Tip** In addition to Strip Setup, the Desk Channel Swap function can be used to temporarily assign channels to the Channel Strips to suit your requirements.

4.4.7 Vista Strip Setup *(for D950 Strip Setup, refer to chapter 4.4.6)*

The Strip setup page can be called up in 3 different ways:

- From the Page menu
- Using the Page Icons
- Using the **STRIP SETUP** function key in the Control Bay of the Vista surface.



The Strip Setup page has a number of functions. Primarily, the “Strip Setup” window allows the user to assign DSP Channels onto the Vista surface. It also, however, gives a very good overview of the console and may be used during general operation of the console to help the user navigate around the console.

Please refer to chapter 1.1.5 for information on navigation philosophy.

The “Strip Setup” page (see below) provides a representation of the six sections of the Vista “virtual surface”. Although the concept of navigation is based on scrolling in a horizontal plane, the representation of the six sections is displayed in a vertical plane because of the logistics of screen space. The navigation system allows the user to decide which area of the virtual console the Control Surface will represent. The number of bays within a section will automatically be identical to the number of physical bays of the control surface. In the example shown below, the Control Surface will have five fader bays – a total of 50 faders. The total number of virtual channel strips available to represent DSP channels is 6 x 50 = 300 in this example.

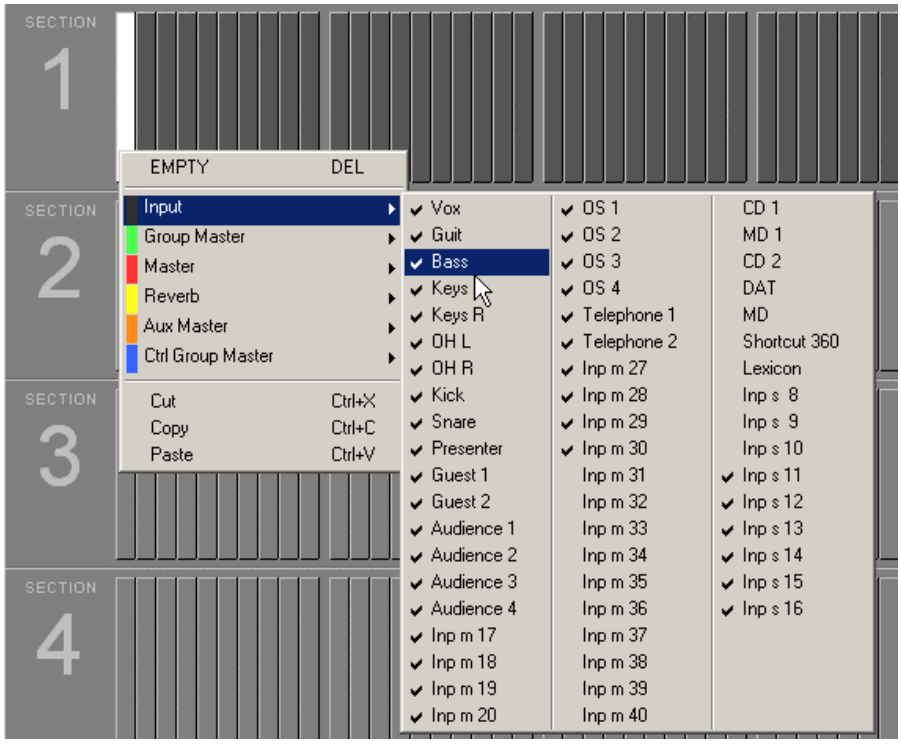
Color is also used to aid the user in channel identification. The colors relate to the channel type being shown and these are consistent with the use of color for channel identification on the screens of the fader bays.

4.4.7.1 How to Use Vista Strip Setup

To create a new strip setup or to adapt an existing strip setup, first call up the strip setup page (see above).

4.4.7.1.1 Assigning a Single DSP Channel to a Single Channel Strip

To assign a channel to one of the virtual channel strips, right-click on the virtual channel strip that the DSP channel is to be displayed on. This will highlight the chosen channel and a selection menu will appear, listing all the categories of channel types. These are submenus that contain a list of the available DSP channels in the loaded Session Configuration. Move the cursor to the drop-down menu of the desired channel type and select the desired channel from the list to assign it to the highlighted channel strip.



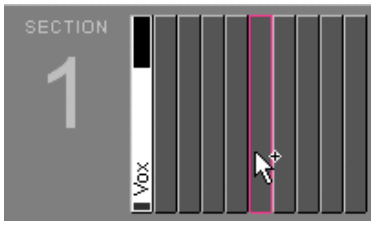
4.4.7.1.2 Assigning Multiple Channels in one Single Action

It is possible to assign consecutive DSP channels onto consecutive channel strips in one action. First use the hold and drag function of windows to select a number of consecutive channel strips. This will highlight the selected channel strips. Right-click on any of the highlighted channels to open the channel selector menus. Select the first channel of the consecutive channels to be assigned. Consecutive DSP Channels will now be pasted to fill the number of highlighted strips.

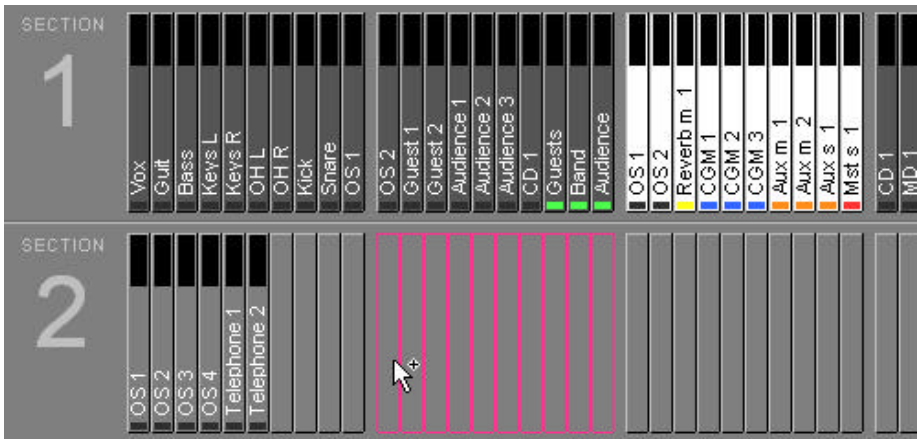
☞ **Tip** By double-clicking on a single channel, the complete bay of 10 strips that the channel strip resides is selected. Three clicks on a single channel will select all channel strips within the complete Section.

4.4.7.1.3 Moving Already Assigned DSP Channels to Other Channel Strips

If a DSP channel is already assigned to a channel strip, it is extremely easy to change the channel strip on which it is shown. Simply click-and-hold the left trackball button on the desired channel and drag-and-drop it onto any other channel strip. This will remove it from its present position and place it in the new channel strip. Whilst the left trackball button is held with a selected channel, a "ghost" view will appear to aid navigation to its newly selected channel strip. If it is dropped onto a channel strip which is already displaying a channel, the new channel will replace the existing one.



It is also possible to move numerous consecutive channels in one block by highlighting a number of channels. Click-and-hold the left trackball button and drag-and-drop the channels to the new location. A "ghost" view of the selected channels appears to help navigation.



☞ **Tips** By holding the **Ctrl** key whilst dragging-and-dropping channels, the DSP channels will be copied to the selected destination, instead of being moved from their original position. Standard Windows Copy/Paste functionality (**Ctrl+c** for copy, **Ctrl+v** for paste, **Ctrl+x** for cut) is possible once channel strips are highlighted.

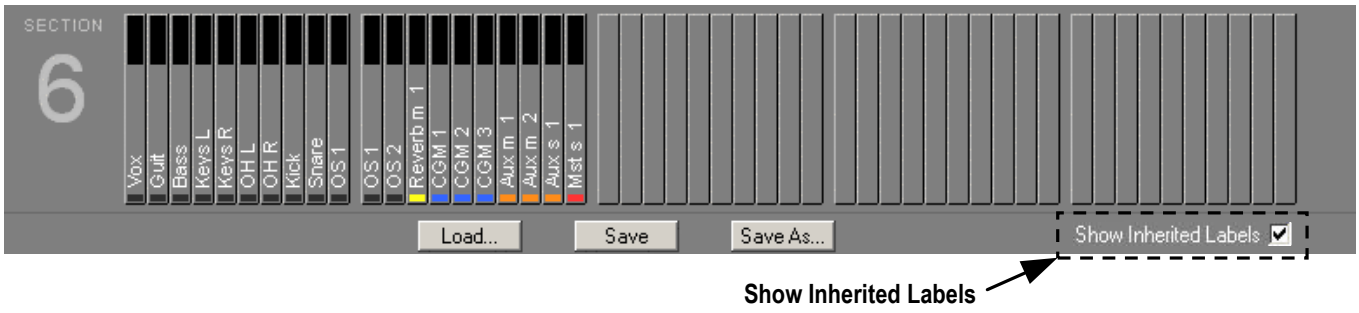
Note: If ten channel strips are copied or cut, and only five channel strips are highlighted to paste the DSP Channels into, then only the first five DSP channels of the copied ten will be pasted.

4.4.7.1.4 Useful Information

- Any DSP Channel can be assigned to any Channel Strip on the virtual control surface.
- Any DSP Channel can be assigned more than once to several different Channel Strips on any Section.
- It is not necessary to assign all DSP Channels available in the loaded configuration; however, there will be no control of these channels from the control surface.
- Assigning DSP Channels to Channel Strips has no affect on audio. It is purely a viewing function, and therefore changing the strip setup can be done at any time whilst operating the console.
- An indication is provided to highlight which bays are currently displayed on the physical console. These displayed bays are in dark gray.

4.4.7.1.5 Labels in Strip Setup

The most useful label type to show in strip setup is the “Inherited Label”. This is the session label of the source that is patched to a DSP channel and also relates to the large label in the channel strip display. See chapter 4.4.2.6 for more information regarding the Vista labeling system. For this reason, a checkbox is provided which locks the label type view of Strip Setup to show the “Inherited labels” (see below). Check the “Show Inherited Labels” box to always show Inherited Labels in the Strip Setup window.



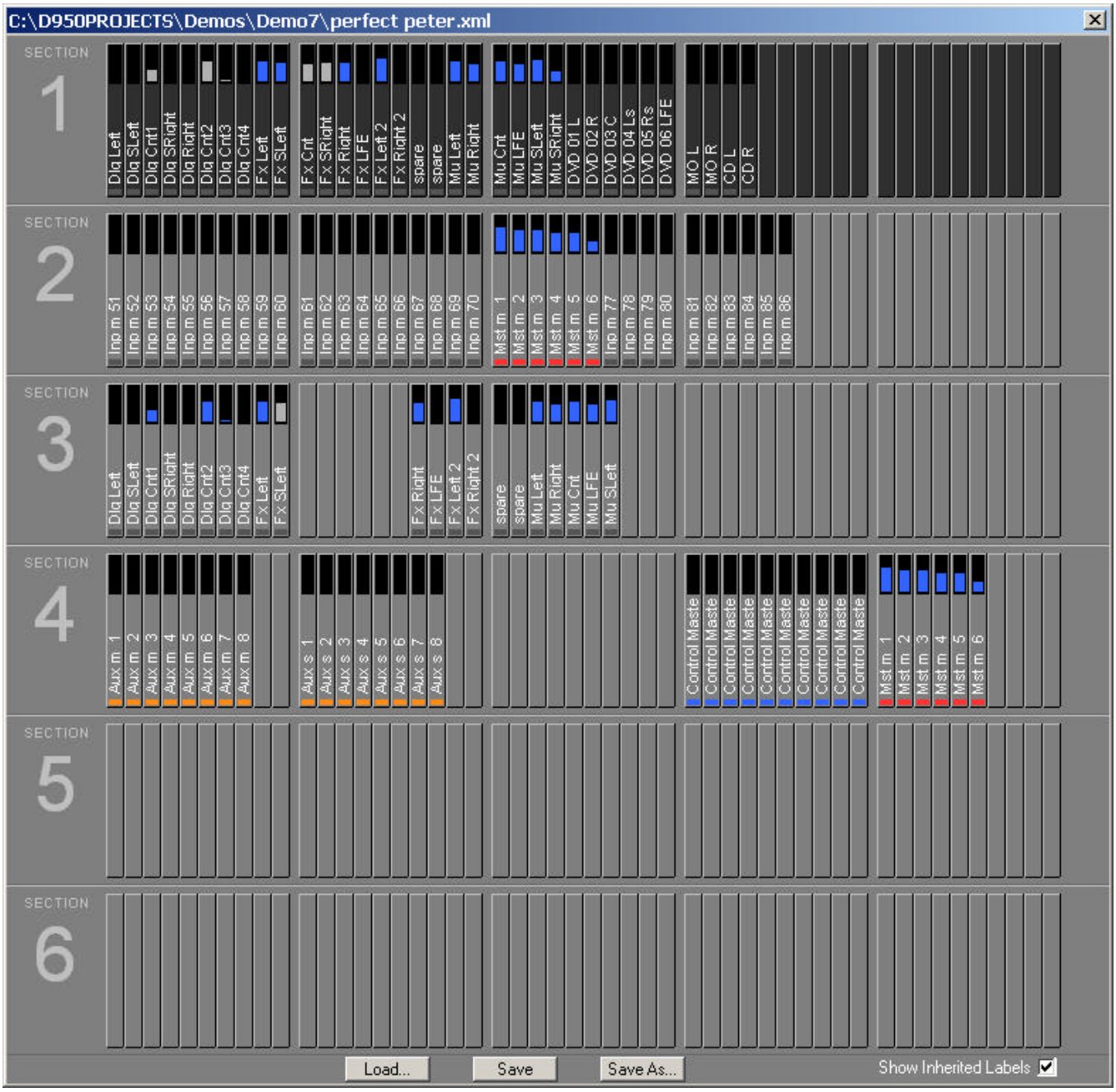
Show Inherited Labels

If the “Show Inherited Labels” box is not checked, the label type shown in the Strip Setup will follow the choice of label which is displayed by the smaller label in the Channel Strips. See chapter 4.4.2.6.2 for a description of this label.

4.4.7.1.6 Meters

The Strip Setup page provides an excellent overview of the meter activity of the channels on the virtual console.

Every channel displayed on the virtual console surface has a *slow* meter which is a slow indication of signal activity at this channel's input. Furthermore, by use of color the user can identify whether the channel fader is open and whether the channel is switched on. If the meter signal shown in the Strip Setup window is blue, this means that the DSP channel has its fader open and channel on. If the meter signal is gray, then the channel has a signal associated with it, but either the channel fader is closed or the channel is muted. If the meters are red, they are currently in Overload status.



4.5 Second Level of Operation: The Toolbar Functions

The toolbar contains a number of short-cut icons for the most important D950/Vista system functions. There are four (or five) individual parts of the toolbar:

- Page Selection
- Channel Selection
- Tools
- System Functions
- *Multidesk Groups (if configured).*

Each of the toolbar parts can be switched on and off individually. The easiest way to do so is the View menu, item "toolbar" (refer to chapter 4.2.1):

4.5.1 Page Selection

There are five main Graphic Controller pages, each of them dealing with a different D950/Vista operating function:

- General Patch Page
- Channel Patch Page
- Snapshot Page
- Cue List Page
- Strip Setup Page

General Patch:
This action brings up the General Patch page (also refer to chapter 4.4.2).

Channel Patch:
This action brings up the Channel Patch page (also refer to chapter 4.4.3).

Snapshot:
This action brings up the Snapshot page (also refer to chapter 4.4.4).

Cue List:
This action brings up the Cue List page (also refer to chapter 4.4.5).

Strip Setup:
This action brings up the Strip Setup page (also refer to chapter 4.4.6 *[D950]* or 4.4.7 *[Vista]*).

If multiple-page display is selected, this will only affect the currently selected page.

☞ **Tip** The Graphic Controller's main pages can also be called up as follows:

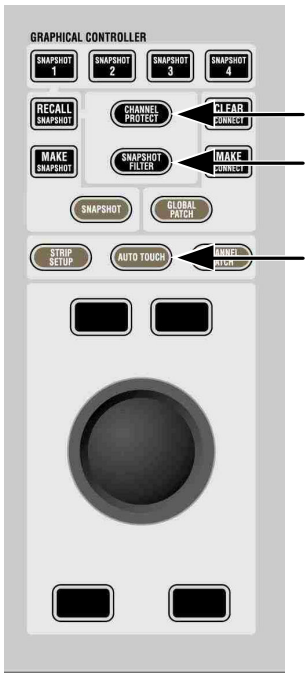
- From the Page menu, by clicking on the appropriate menu item;
- Using the Page icons, by clicking on the appropriate icon in the toolbar;
- Using function keys on the control surface keyboard – which is probably the fastest way.

4.5.2 Tools

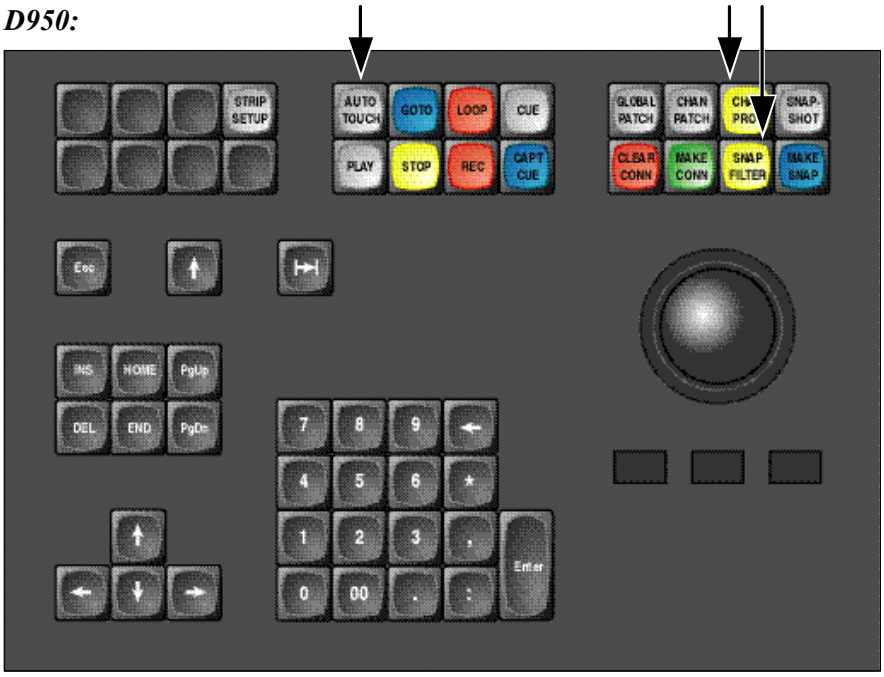
The various control panels from the Tools section of the toolbar can be called up or hidden in three different ways:

- Via the View menu;
- Using the toolbar icons, by clicking on the appropriate icon;
- Using the function keys (**CHANNEL PROTECTION, SNAPSHOT FILTER,** and **AUTOTOUCH**) on the control surface – which is probably the fastest way:

Vista:



D950:

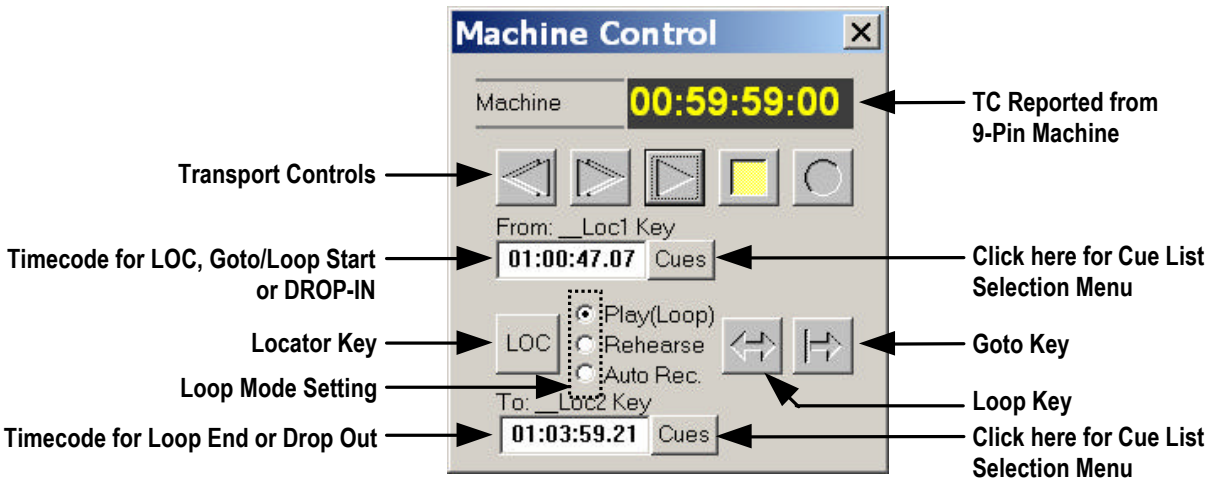


4.5.2.1 Tools: Machine Control Window

The Machine Control window can only be displayed if the TC2 or TC3 timecode options are installed.
Click on this icon to open the machine control window.

The Machine Control window allows simple machine control functions to be operated from the GC screen. The basic machine control functions are also available from the Control Surface panel *(except for Vista 6)*.

The Machine Control window is always positioned on the top level of display of the windows of the GC. Much of the window's operation is depending on the settings of the Options/TC-Reader/Generator menu. Refer to chapter 4.5.2.1.1 for details.



4.5.2.1.1 Machine/TC Generator Control

The settings and functions are:

Machine Control buttons: Consist of Rewind, Fast Forward, Play, Stop, Record, Locate, GoTo and Loop buttons. For added convenience, Play, Stop, Record, GoTo and Loop are also featured on the control surface keyboard. The Machine Control keys can be configured in the Option/TC-Reader/Generator Menu for:

- *None*: Both Machine Control key/button sets are disabled.
- *9-pin serial control*: Both Machine Control key/button sets control the one 9-pin port.
  This setting may be used to serially control a single transport, or to control the optional multi-machine Motion Controller system.
- *Generator Control*: Both Machine Control key/button sets control the TC2 or TC3 Timecode Generator. This setting is used for pre-striping tapes with timecode data, or to control machine transports in TC chase mode.

Locate Mode: *Loc*: The connected 9-pin machine will locate to the selected *From* timecode address.

Loop Mode: The Loop, Rehearse, and Drop-In (Auto Rec) selection operates in conjunction with the Loop button:

- *Loop*: The machine will play in an endless loop, starting with the *From* timecode setting, and ending with the *To* timecode value.
- *Rehearse*: The machine will play in an endless loop, starting with the (*From – Pre-roll*) timecode setting, and ending with the (*To + Post-roll*) timecode value. In addition, any machine tracks set to Ready will go into a *simulated* Record function, starting with the *From* timecode setting, and ending with the *To* timecode value.
- *Auto Rec*: The machine will play in an endless Loop, starting with the (*From – Pre-roll*) timecode setting, and ending with the (*To + Post-roll*) TC value. In addition, any machine track set to Ready will enter Record mode, starting with the *from*, and ending with the *to* TC value.

Pre-roll time: (A value set in the Option/TC-Reader/Generator Menu). This action allows the operator to enter a Pre-roll time in timecode format. The controlled audio or video machine will be parked *before* the actual drop-in point given by the value "x" = Pre-roll time, and then synchronized in Play mode (usually, Pre-roll is set to values from 3 to 5 s).

Post-roll time: (A value set in the Option/TC-Reader/Generator Menu). This action allows the operator to enter a Post-roll time in timecode format. The controlled audio or video machine will be kept in synchronized Play mode *after* the actual drop-out point for the value "y" = Post-roll time (usually, post-roll is set to about one second).

From/To Control: This action allows the user to enter a start-timecode address (*From*) and an end-timecode address (*To*) for the Locate, Loop, and GoTo functions. The timecode values can be entered manually, using the control surface keyboard. You can also select any of the existing Cue Points by clicking on the *Cue* button.

Note: *Rehearse and Auto-Rec modes are depending on the connected machine. The feature has been tested with common Sony VCR machines. Studer cannot guarantee proper function with all 9-pin machines being currently on the market. However, some options exist for system administrator use to adapt the 9-pin behavior of the D950/Vista to some machines (refer to the Service Manual).*

4.5.2.2 Tools: Title Memo

The Title Memo editor page allows any relevant Title information to be kept for later use. There is one Memo per Title. Its contents can include Studio name, Producer Name, Engineer Name, Artist Name, plus a free-form Memo pad. The Title directory location and modification date/time are displayed at the top of the Title Memo page.

To open the Title Memo use:

- The  "notepad and pencil" icon in the toolbar
- The View menu, by clicking on the appropriate menu item.

Note: The Title Memo does not have a function key on the control surface keyboard.

4.5.3 Channel Selection Tool

This tool allows one console Channel to be selected for control of various centralized functions on the Graphic Controller, such as Channel Patch. There are three arrow buttons:

Selects the *previous channel* from the list;

Selects the *next channel* from the list;

Opens the *full Channel List* to select a channel. Labels are displayed according to the selected Label Mode (refer to chapter 4.3.3).

4.5.4 System Functions

4.5.4.1 System Functions: Protect/Unprotect SysAdmin Mode

This action allows the system user mode to be toggled from Standard to System Administration. The System Administration mode allows access to some system functions that are not needed in normal operation.

Accessing the System Administration mode can be accomplished in two ways:

- Clicking the  padlock icon in the toolbar;
- Selecting SysAdmin… in the User menu.

From *Standard Mode* (closed padlock icon): Click on the padlock icon, or select SysAdmin… in the User menu. You will be asked to enter the System Administration Password.

After complying with the request, an additional menu item – SysAdmin – will appear in the menu bar.

From *System Administration mode* (open padlock icon): Click on the padlock icon or select Protect in the User menu to exit this mode.

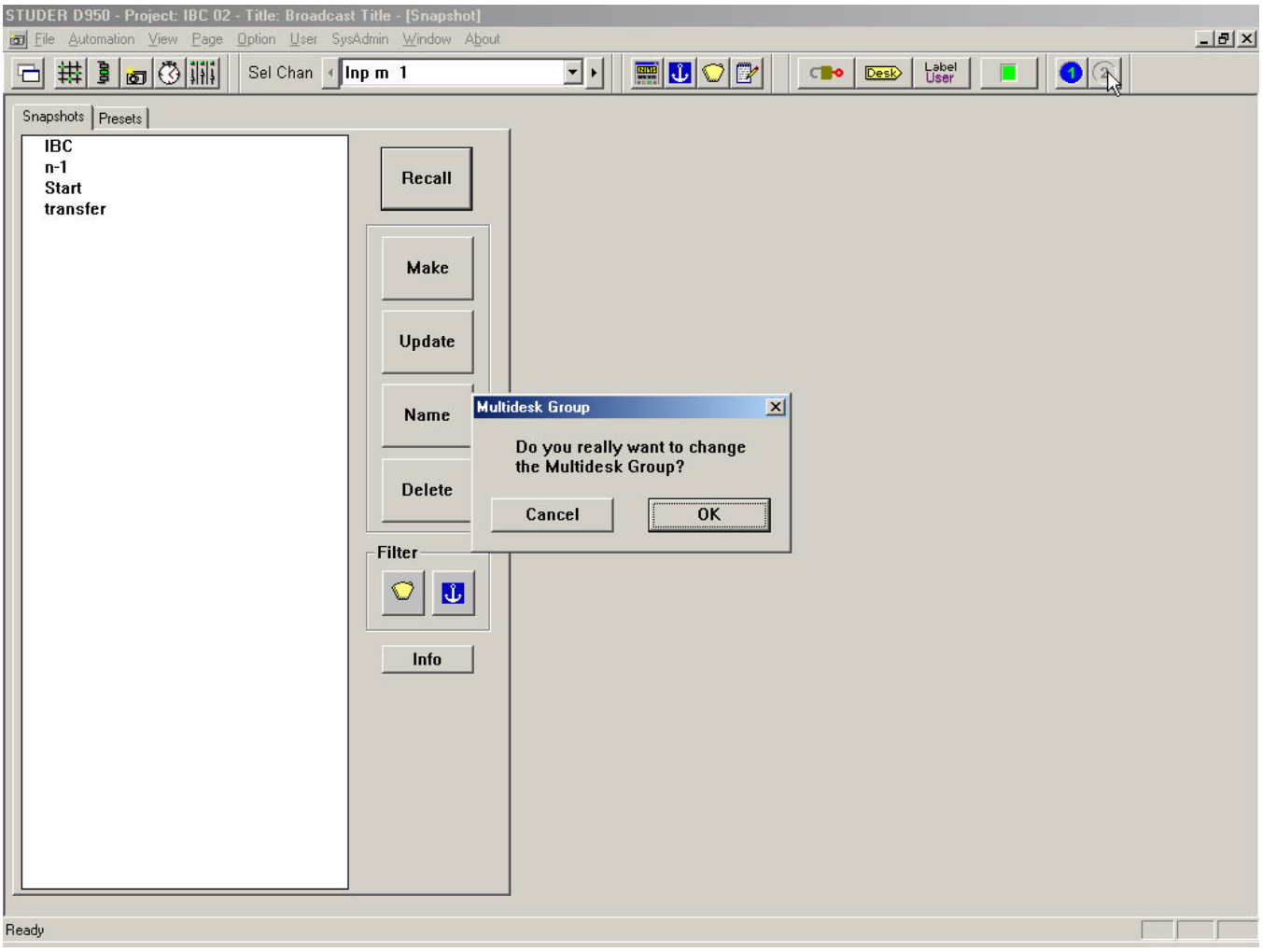
For more details on the User/Protect menu and the System Administration menu, refer to chapters 4.6.6 and 4.7.

4.5.4.2 System Functions: Toggle Control Group *(D950 only)*

The concept of Control Groups is used for MultiDesk operation, where:

- Several independent operators work at the *same* time on the *same* desk;
- Several desks are supported by *one* DSP Core and Control System.

Control Groups are defined within the Session Configuration Tool (see chapter 7.4.3.4.1) and set up according to the requirements of a particular studio. During this configuration process, several mostly independent Workspaces for the GC and the Desk Surface are defined. To move from one Workspace to the next, click on the corresponding Control Group icon.



When you click on a Control Group icon, you will need to confirm this action by clicking the OK button before the Workspace is toggled to the desired Group.

Control Groups may be configured to have:

- Independent Desks;
- Independent areas in the Patch;
- Control over different console Channels;
- Separate and independent Titles, Snapshot Lists, Cue Lists, User Preferences, etc.

4.5.4.3 System Functions: Follow Desk *(D950 only)*

This icon allows the Desk Channel Select Mode to be set. It is particularly convenient to utilize the **SEL** key on a channel strip to select one console Channel for various centralized functions on the Graphic Controller, such as Channel Patch.

The Desk Channel Select Mode has two status levels:

Follow Desk Icon is not crossed out, which means that Follow Desk mode is active, and that the **SEL** key will select the same channel for both the Desk and the Graphic Controller.

Follow Desk Icon is crossed out, which means that Follow Desk mode is deactivated. In this mode, the channel **SEL** key will function for control surface operations, but will not affect the Graphic Controller.

In both cases the Channel Selector in the toolbar (chapter 4.2.1) can be used.

4.5.4.4 System Functions: Label Mode Selector

This icon allows the Label Mode for both Desk Labels and the Source/Target Labels to be set at the same time.

Label Mode is toggled through to display:

Fixed Labels (labels created according to the Session Configuration);

User Labels (labels entered by the user in the General and Channel Patch);

Inherited/Device Labels (General Patch Source labels used on the control surface).

Refer to chapter 4.3.3 for more information on Labels.

4.5.4.5 System Functions: The Surveyor

The Surveyor button keeps the operator informed about general system status. The button's icon changes to indicate the overall condition of the D950/Vista. These indications are as follows:

Yellow triangle: Loading. System is booting, look at the Status Bar;

Green square: OK. Everything is fine;

Green square with yellow diamond: Not Found. A system element cannot be found. This is sometimes seen when a Session Configuration is loading. Other time it may indicate a problem.

Red circle: Error: Something is wrong. Open the Surveyor to see what is malfunctioning.

Grey circle: Not Used. A system element is defined but is not in use.

You can view more details about the System Status by clicking on the Surveyor button, which will then open the Surveyor page.

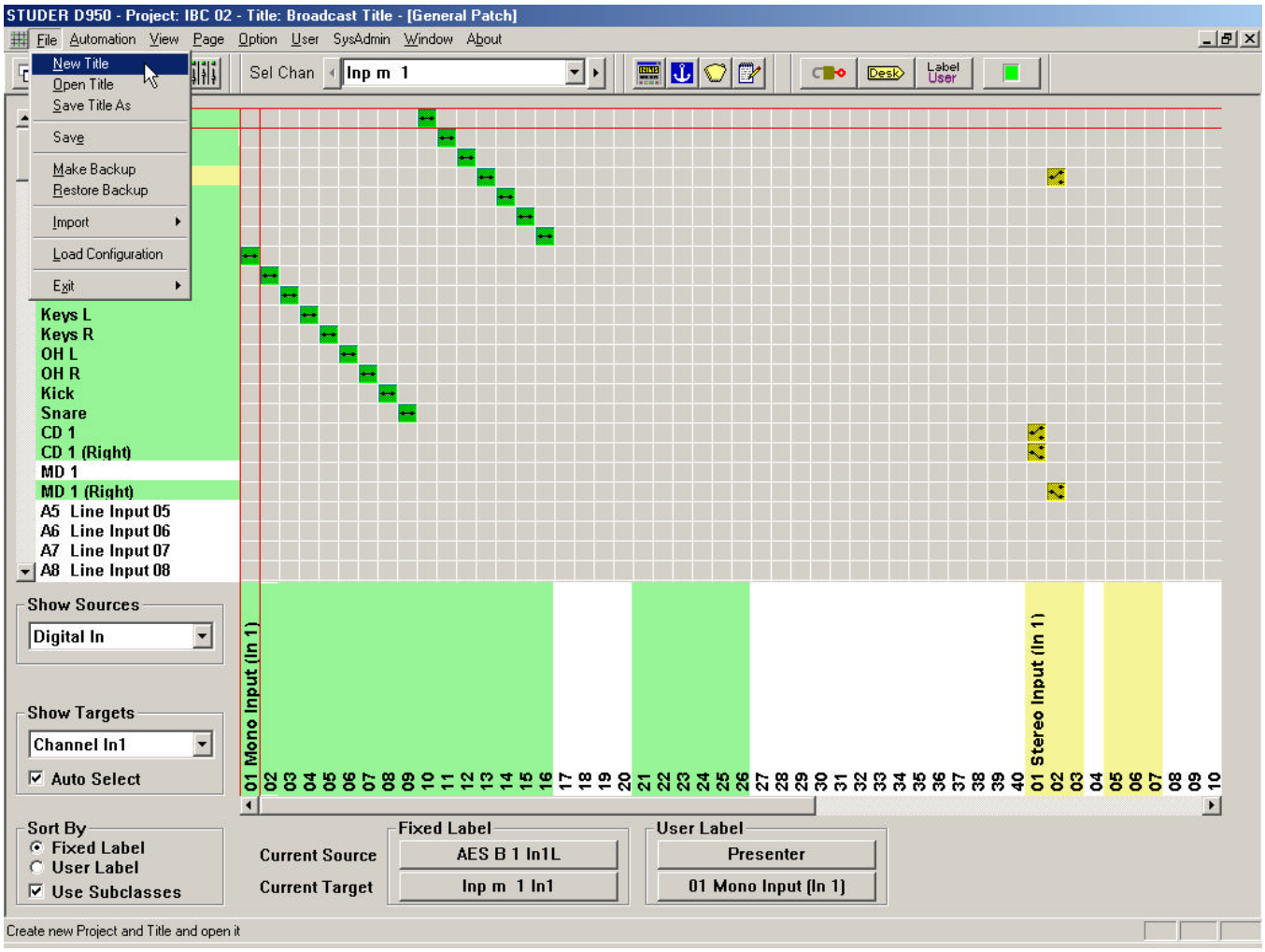
☞ **Tip** If you wish to determine which Session Configuration is currently loaded, also click on the Surveyor button. Other current system files (such as monitor files) may be found within the Surveyor, but may be nested within subdirectories.

For more information on the Surveyor refer to chapter 4.8.

4.6 Third Level of Operation: Menu Items

4.6.1 The File Menu

The File menu contains most of the D950/Vista system's bookkeeping functions. Management of Projects, Titles, and Mixes, access to Session Configurations, Backup and Import functions, and the Exit menu are controlled from here.

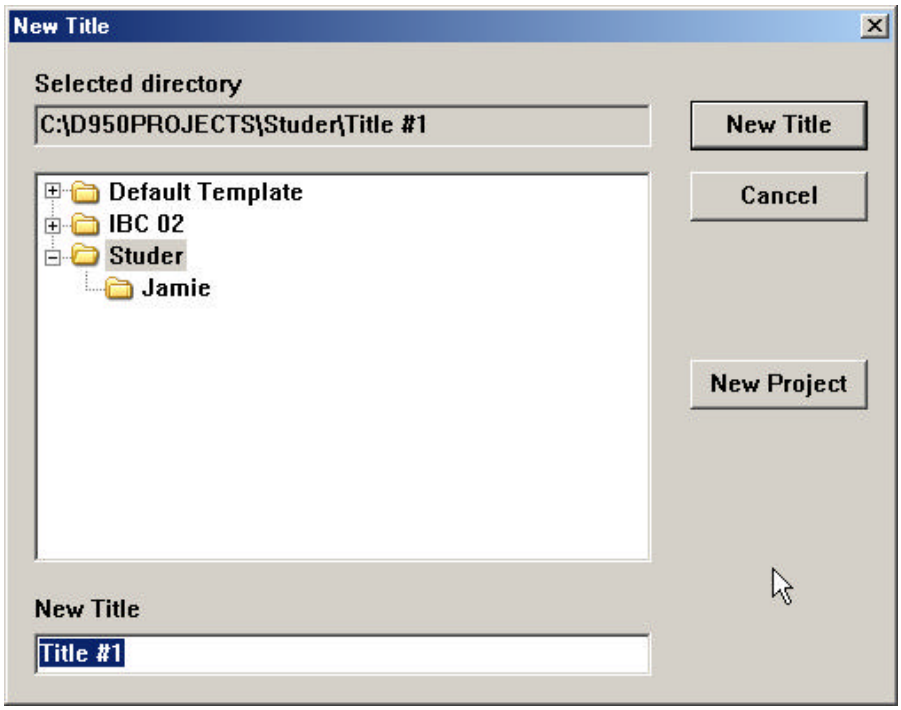


4.6.1.1 Titles and Projects

The *Title* is the main container for all the session data. Titles contain all Snapshot, Mix, Cue List, Title Memo, and other files that relate to each session. Titles also contain pointers that recall the appropriate Session Configuration, Monitor file, and so on.

Titles are found in a Project folder. Project folders may be created along with a new Title. For example, a Project folder might be created at the start of an album project when the Title for the first song was made. Subsequent Titles could be created for each of the other songs and placed in that album's Project folder. Projects are located in the `D950PROJECTS` folder.

New Title: This action opens a dialog box that enables the creation and selection of a name for a new Project and/or Title. You can freely create any number of Projects and Titles.
Let us assume you wanted to create a new Project and Title in the Subdirectory `D950PROJECTS`. Click on File in the Menu bar, select New Title, and you'll end up with a familiar Windows box:



Click on the New Project button and a name entry box will appear. Type in a new Project name – for example, *CITY TV1* – and click OK. A new folder with the name you just entered will appear in the list. It will be highlighted in gray, indicating that it has been selected to receive new Titles. The New Title name entry field (at the bottom of the box) will now automatically display *Title #1* (or the next available number). This will be highlighted in blue, indicating that it is ready to be over-written with a proper name, for example, *BLUES CITY*. Once a new Title name has been entered, click the New Title button or press the Enter key. The above actions will perform the following:

- Creating a new Project subdirectory (`C:\D950PROJECTS\CITY TV1`);
- Creating a new Title subdirectory (`BLUES CITY`) within the `CITY TV1` project folder (`C:\D950PROJECTS\CITY TV1\BLUES CITY`);
- Creating the necessary Title-oriented files, which are stored within this Title subdirectory;
- Display of the current Title name in the Title Bar.

If you do *not* create a new Title, all your subsequent data will be stored in whichever Title is currently open. If a Title is not currently open (as is the case after loading a Session Configuration), you will be prompted to open or create a new Title before data can be saved.

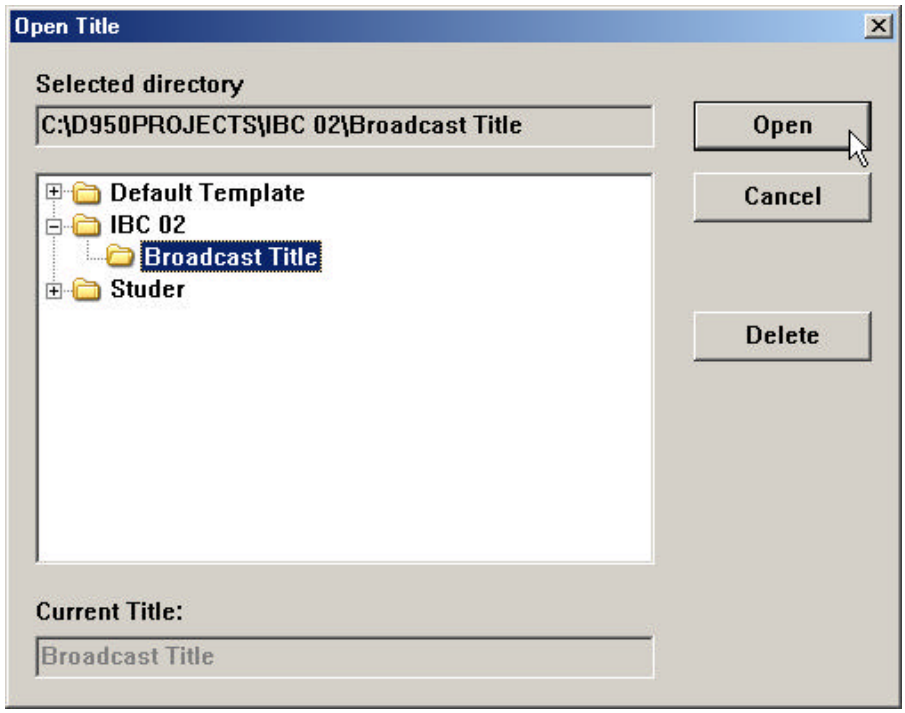
☞ **Tip** You should generally organize your Subdirectories in such a way that `C:\D950PROJECTS` remains the *parent* directory, because the system automatically searches for that particular directory while opening Projects, Titles, etc. After several weeks of using the D950/Vista system, your directory structure may create something like this:

Parent	Your projects	Your titles	Your data
C:\D950\Projects	\SuperProductions_1	\FirstSong	\FirstSong.tit \Snap1 \Snap2
		\SecondSong	\SecondSong.tit \Snap11 \Snap12 \Mix1 \Mix2
C:\D950\Projects	\SuperProductions_2	\EveningShow	\EveningShow.tit \SnapBaby \SnapBaby_new \Mix
C:\D950\Projects	\SuperProductions_3	\MorningShow	\MorningShow.tit \CoffeSnap_1 \CoffeSnap_2 \MyNewMix

...and so on.

Open Title: This action opens the list of Project folders from the `D950PROJECTS` directory. This enables the selection and opening of an existing Title from a selected folder. Titles can also be deleted from this menu item.

To open an existing Title, first double-click on the desired Project Subdirectory, an action that will move you into its Subdirectory:



The desired Title can now be opened by double-clicking on the Title folder or by highlighting it and clicking the Open button. This action will perform the following:

- Make the new Title the *current* Title, making available all snapshots, mixes, etc;
- Indicate the Current Title name in the Title Bar.

A Title can be deleted by highlighting a Title's name (while in Open Title) and clicking on the Delete button. You will be asked to confirm this action. You cannot directly delete a Project folder using this technique. However, if you delete the last Title from within a Project folder, you will be notified that the empty folder will be automatically deleted.

Note: Titles are color-coded according to the status of the Session Configuration that was in use during their creation. Black, blue, and red Title names indicate the following:

Black: The Session Configuration needed for this Title is currently loaded;

Blue: The Session Configuration needed for this Title is not currently loaded. You will have the option of loading the needed configuration (if it is available on the PC), converting the selected Title to work with the currently loaded configuration, or canceling;

Red: *The Session Configuration needed for this Title is no more available on the PC.*

Save Title As...: Opens a Windows dialog box allowing to select a new name and to store the current Title's data under a new name. The process is similar to "New Title" because it creates a new Title under a new name. The difference is that it also copies all the snapshots, mixes, etc., from the current Title into the new Title. So, it will do the following:

- Create a new Title subdirectory with the new name;
- Copy all data from the Current Title into this subdirectory;
- Make the new Title the *current* Title;
- Indicates the Current Title in the Title Bar.

To save a current Title under a new name:

- Select Save Title As... from the File menu;
- Highlight the desired Project Folder;
- Type an appropriate Title name in the entry box;
- Click on the Save button or press the keyboard Enter key.

4.6.1.2 Save

Selection of the Save menu item will save all Title oriented information to the currently opened Title.

Since this happens automatically when changing to an other title or when leaving the application, this button possibly may never be used.

4.6.1.3 Make/Restore Backup

The D950/Vista provides a powerful and easy-to-use data backup utility. This feature enables the creation of a Backup subdirectory that contains a copy of all files from the Title folder and all pertinent Session Configuration and system files needed to recreate the session on this or another D950/Vista. These Backup files can be used for data protection and easy transportation of Titles between D950/Vista equipped facilities.

Backup directories can be made on any storage media of sufficient size. While a floppy disk is too small, a 100 MB Zip disk or a CD-R can contain several D950/Vista Backup directories.

Backup directories can be used to restore all of the files and information needed to recreate the Title at a later date or on a different D950/Vista.

Make Backup: This action opens the Create Backup window, where a destination for the Backup directory is selected. Backup directories are automatically named by the utility. After the `BCK_D95Ø_BACKUP…` portion of the title, names include the Title name and dates of modification and origination.

To create a Backup directory for the current Title:

- Select Make Backup from the File menu;
- Select the destination for the Backup directory;
- Click the OK button or press **Enter** on the keyboard

These actions will perform the following:

- Creation of a new Backup directory at the desired location;
- Name and date the directory.

Restore Backup: This action opens the Restore Backup window entitled, where a Backup directory is selected for reloading.

To restore a Backup directory:
- Select Restore Backup from the File menu;
- Highlight the desired Backup directory;
- Click the OK button or press **Enter** on the keyboard;

A pop-up dialog box will appear giving you the option of Replacing the Existing Title, Saving the Restored Title as a new Title, or Canceling the Backup. If you select "Replace the Existing Title", you will not be able to replace the Session Configuration if it is currently loaded and will be given the option to continue. You will also have the opportunity to replace the Monitor file if it also exists. Choosing "Restoring the Title As" will result in the normal Window's save screen.

Notes: Regardless of the method used to create it, after a Backup has been restored, the resulting Title must be opened before use.
If you move production data between different consoles, it is advisable not to restore certain files onto the destination console, since it may have different hardware. This is valid in particular for the `monitoring.ini` files. You will be asked whether you want to restore these files as well; in this case answer negative if the two consoles are not identical in terms of monitoring.

4.6.1.4 Import

Using the Import utility in the File menu, Snapshots, Presets, Mixes, and Titles can be imported.

Import: This action is used to select the type of data you wish to Import. Once the type of data is selected, an open window appears allowing to select the data source. The following rules apply when using the Import utility:
- Snapshots and Mixes can only be imported into an open Title;
- Imported Presets will be stored with the current Session Configuration;
- Items can be renamed as the are imported;
- A Title will need conversion if it is imported for use with a different Session Configuration.

Note: Importing a Snapshot, Preset, Mix, and/or Title will not make it current. For example, a Snapshot will not be applied to the console upon being imported, it must be recalled using the Snapshot page.

4.6.1.5 Load Session Configuration

If there is more than one Session Configuration on your D950/Vista system, you may need to access this menu item in order to load a different Session Configuration. Since Titles will automatically open the correct Session Configuration (if its not already loaded), using the Load Configuration menu item is only necessary when loading a Session Configuration without opening a Title. Regardless of how a Session Configuration is recalled, this process takes 20 to 30 seconds to complete, and mutes the console during loading.

Note: Keep in mind that all Titles contain pointers that enable the loading of the proper Session Configuration and other appropriate files. If the Title's Session Configuration is different from the one that is currently loaded, you will be asked to either confirm the loading of the correct Configuration or to convert the Title for use with the current one. Therefore, during routine operation, it is not necessary to use the Load Configuration menu unless the user has created or modified a Session Configuration during that session. Typically, the Load Configuration menu item should only be used by the facility's System Administrator or by advanced users.

Session Configuration subdirectories reside in the `C:\D950SYSTEMBD` subdirectory. These subdirectories contain the following files:

- Virtual Mixing Console (VMC) files: These files (with `*.vmc` extensions) are created by the Session Configuration Tool. They contain all the Configuration data needed for the Session Configuration Tool to create a core file;
- Core files: These files (with `*.cor` extensions) are created by the Session Configuration Tool. They contain the actual code used by the DSP core;
- Preset files: These files (if any exist) are created within Titles but are stored with Session Configurations so they can be used with any Title that uses a particular Configuration. Preset files have .pre extensions.

Session Configuration: This action opens a dialog box that allows the selection and opening of an existing Session Configuration. A list of available Session Configurations for selection will be displayed.

☞ **Tip** You should generally organize your Session Configurations in such a way that `C:\D950SYSTEMDB` remains the parent directory, because the system automatically searches for that directory during opening of a Title or Session Configuration.

To load a configuration, double-click on it, or highlight it and click the Open button. This will do the following:

- Mute the console's audio paths (including the monitoring section);
- Load the appropriate VMC data (core file) into the system, and check their validity;
- Erase the old Session Configuration DSP software from the Flash EPROM in the DSP Core, and load the new DSP software;
- Reload the control surface desk (the Channel Strips will go blank for a few moments);
- Load the appropriate Monitor Configuration file;
- Activate the last used preferences belonging to the newly loaded Session Configuration.

Notes: When a Session Configuration is loaded via the Load Configuration menu, the currently open Title will be closed; no new Title will be opened. Before any data can be stored using the newly loaded Configuration, an existing Title must be opened or a new one must be created.
If a Session Configuration is displayed in red this means that this Configuration has not been compiled properly by the Session Configuration Tool. Either run the tool again or delete this Configuration.

4.6.1.6 Exit D950/Vista Application

There are three possible ways of quitting the D950/Vista Software application. It is recommended to use the File menu's *Exit* item.

Exit GC This action will close the Graphic Controller (D950/Vista System application) while simultaneously muting all monitoring outputs, and returning to the Windows NT operating system. All other programs and applications continue to run.

Exit System This action will close the Graphic Controller (D950/Vista System application) while simultaneously muting all monitoring outputs. It also quits all other running applications and the Windows operating System. The controller PC will then be ready to be switched off.
In case the standard UPS (Un-interruptible Power Supply) is installed, and the associated PowerChute utility is configured to do so, this will also turn off the UPS/PC combination automatically after a pre-set time period.

Using Main Window Control It is also possible to quit the D950/Vista application by clicking on ☒ main window control. There is no confirm box in this case, and the application is terminated immediately.

It could be potentially dangerous for your session if you click on ☒ main window control, because the application will be terminated, and audio will no longer pass. However, the data that was in use will be written to the "last known session" and "shutdown" files and will not be lost.

Note: It is possible for an expert to adjust settings in order to make the ☒ close box disappear.

4.6.2 The Automation Menu

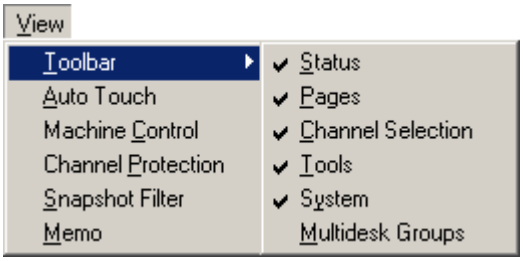
This menu is described in detail in chapter 5.

4.6.3 The View Menu

The View Menu contains commands for opening various Pages and Tools, and defining the appearance of the toolbar (refer to chapter 4.2.1).

View/Toolbar: This action displays the various items of the Toolbar/Status Bar to be checked. The toolbar contains a number of short-cut icons for accessing the D950/Vista's most important functions. When checked, the following icon groups are displayed:

- Status Bar
- Page Selection
- Channel Selection
- Tools
- System functions
- Multidesk Groups (if configured).



View/AutoTouch: This action toggles display of the optional AutoTouch Control Panel (refer to chapter 5).

View/Channel Protection: This action toggles display of the Channel Protection Panel (refer to chapter 4.5.2).

View/Snapshot Filter: This action toggles display of the Snapshot Filter Panel (refer to chapter 4.4.4.5).

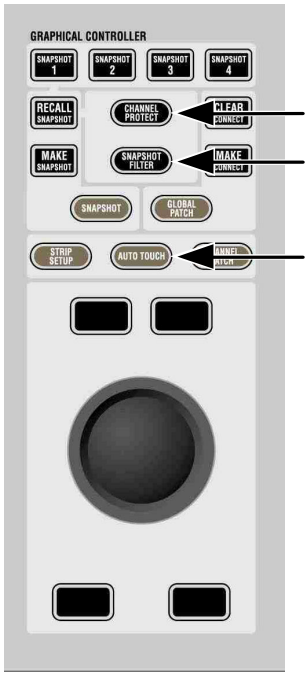
View/Memo: This action toggles display of the Title Memo Panel (refer to chapter 4.5.2.2).

View/Clipboard Library: This action opens the Clipboard Library window (*Vista:* refer to chapter 2.5).

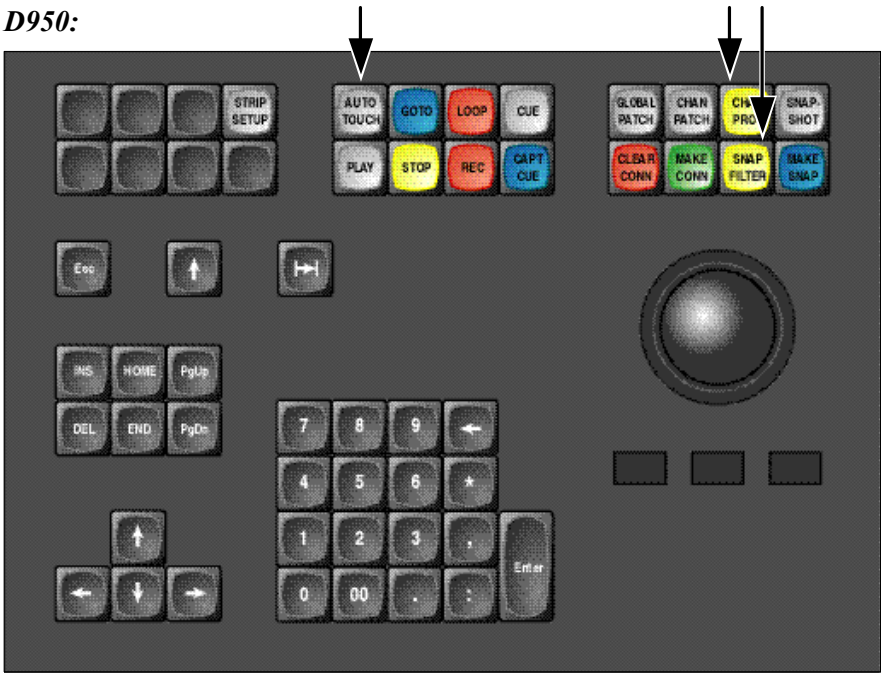
The various Graphic Controller windows can be called up or hidden in three different ways:

- Via the View menu;
- Using the toolbar icons, by clicking on the appropriate icon;
- Using the function keys (**CHAN PROT**, **SNAP FILTER** and **AUTO TOUCH**) on the control surface keyboard – which is probably the fastest way.

Vista:



D950:



4.6.4 The Page Menu

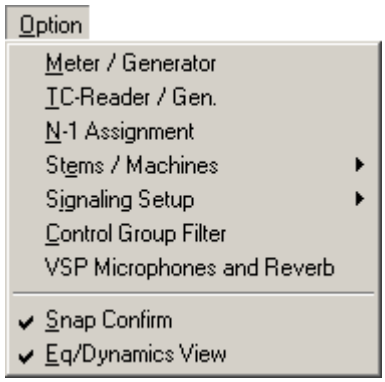
There are five main Graphic Controller pages, each of them dealing with a different operating part of the D950/Vista system.

This menu has been described in detail in chapter 4.4.1.

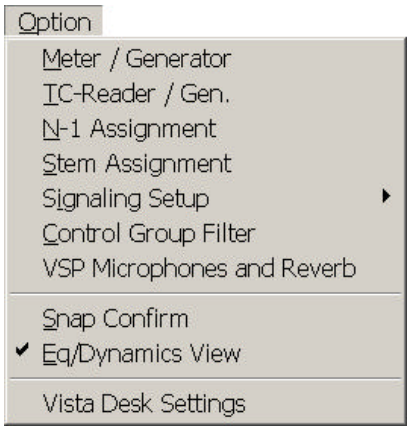
4.6.5 The Option Menu

The Option Menu is used to set up various operating modes, preferences, and options. It consists of several items, some of which may not be available if the appropriate D950/Vista option is *not* installed. Items in the upper part will generally bring up a screen for selection of settings and operating modes; the lower part contains two items that can be directly checked from the menu.

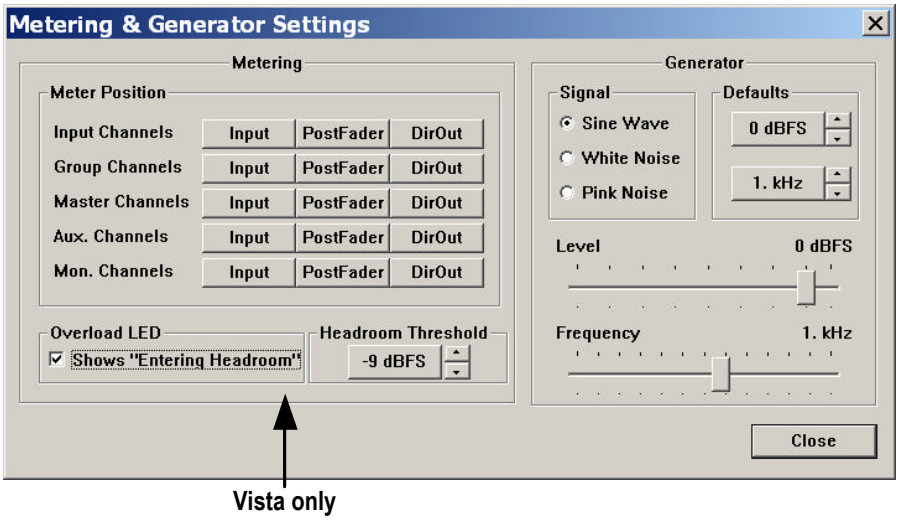
D950:



Vista:



4.6.5.1 Option: Meter/Generator



The Meter/Generator page is used for adjusting various settings of the desk channel strip metering and test generator. Generator defaults are automatically stored in the `D950system\shutdown.pfc` file when quitting the system, so that the *last used* defaults are available after the next start of your system.

Metering/Meter Position: This action globally sets the metering signal source for all the channels of the same type to the same point within the signal path. It is usual to set the Input Channel and Monitor Channel meter sources to Input and those of the Group, AUX and Master Channels to the Post-Fader position. Meter positions can be changed on a channel-by-channel basis and stored with Snapshots and Presets.

Generator/Level: This action sets the test signal generator's level to the desired value. Levels can be set to off and, in 1 dB steps, from –90 to +10 dB_{FS}. The Generator Level can be turned off by moving the Level slider all the way to the left.

Generator/Frequency: This action sets the test signal generator's frequency (sine wave only) to the desired value. The generator frequency can be set in $1/12^{th}$ octave steps from 19.95 Hz to 19.95 kHz.

Generator/Signal: This action selects the waveform of the test signal generator, from Sine Wave, White Noise, and Pink Noise.

Generator/Defaults: This action sets the test signal Generator's level and frequency defaults by using the arrow buttons to adjust the default values.
To quickly apply a level or frequency default, rather than to adjust it manually, click on the appropriate Defaults button. Default levels can be set in 1 dB steps, from –90 to +10 dB_{FS}. The Generator Level cannot be turned off from the Defaults controls. Default frequencies can be set in $1/12^{th}$ octave steps from 19.95 Hz to 19.95 kHz.

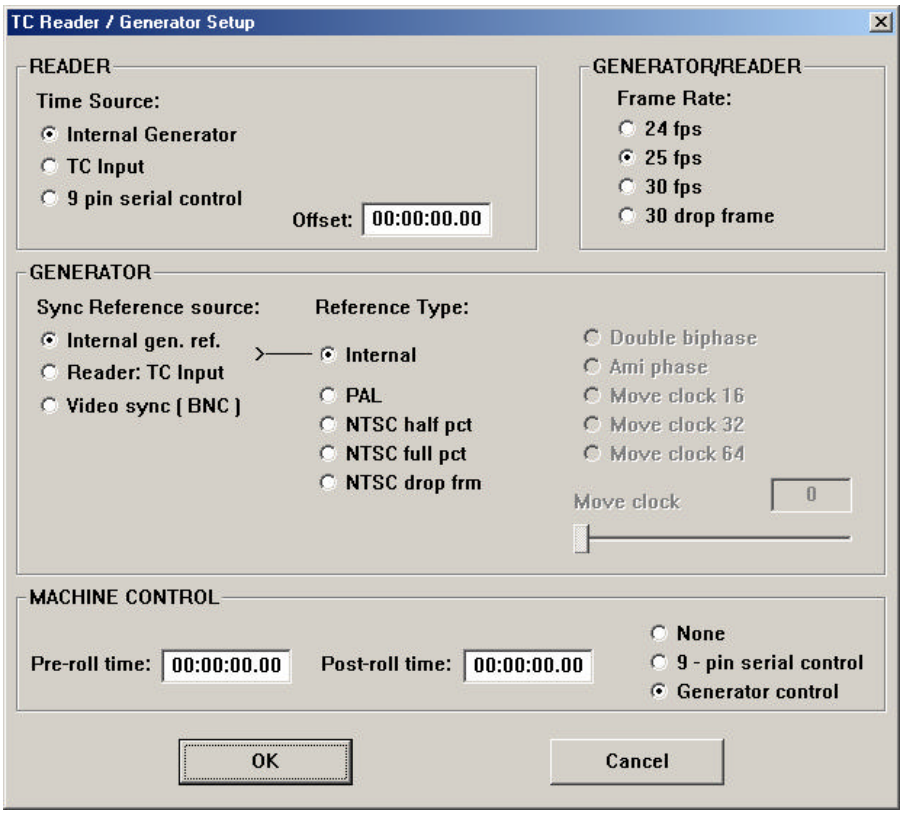
☞ **Tip** By default, the Test Signal Generator is patched to GEN (third channel input) of all channels. It also appears as a signal source in the General Patch and can be patched to any target from there.

4.6.5.2 Option: TC Reader / Gen.

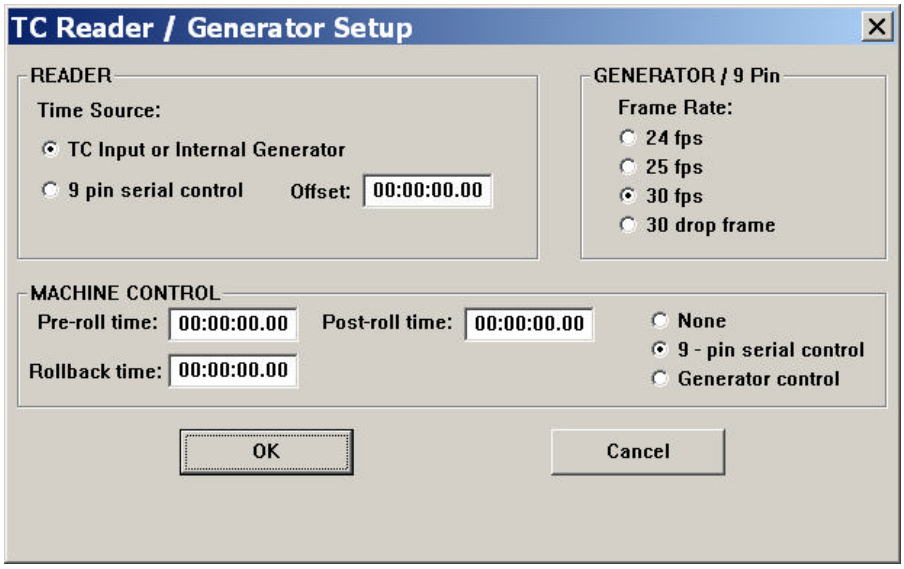
The TC (Timecode) Reader/Generator Setup page is only available in two cases:

- If the full AutoTouch+ Dynamic Automation system is installed, or
- If the TC2 or TC3 Reader/Generator option is installed.

TC2 Setup Window:



TC3 Setup Window:



The setup page allows setting of the different TC Reader/Generator options and defaults for three different sections of the TC unit:

- Reader
- Generator
- Machine Control.

TC Reader/Generator settings are automatically stored when quitting the system, so that the last-used defaults are available after the next system start. To actually control the TC2/TC3 Reader/Generator, use the Machine Control keys on the control surface keyboard and the Machine Control keys in the AutoTouch+ Panel (refer to chapter 5).

4.6.5.2.1 TC2 Reader Settings

The READER settings have to be set according to actual incoming SMPTE/EBU time code format. The settings are:

Time Source: Select from the following options:

- Internal Generator = Internal D950/Vista TC Generator (TC 2);
- TC Input = External TC from the TC Input;
- 9-pin serial control = External TC from the 9-pin interface.

Setting the D950/Vista to Internal allows the AutoTouch Automation system to run from the internal TC Generator, for instance, while testing. The normal system setting, while using a tape machine, for example, would be TC Input or 9-pin serial control.

Frame Rate: Select from 24/25/30/30 drop frame formats of the incoming TC signal.

Offset: This introduces an offset in the TC format, expressed by Reader TC Value/Incoming TC Value.

- Positive offset = Mix data will be *later* than the actual incoming TC;
- Negative offset = Mix data will be *before* the actual incoming TC.

☞ **Tip** A flashing **READY** LED on the desk's Automation Control Panel can indicate a mismatch of incoming timecode and Reader Frame Rate setting.

4.6.5.2.2 TC3 Reader Settings

Most of the READER settings are automatically set by the system.

Time Source: Select the timecode source for the automation system (master timecode, used for locate points etc.). If linear timecode (LTC) or the TC3 internal generator is used, set the source to "TC Input or Internal Generator". If 9-pin is used as a TC source, set the source accordingly.

Frame Rate: Supported frame rates are: 24/25/30/30 drop frame. The incoming format is automatically detected. However, if working with 9-pin TC, the format may be selected in the "Generator / 9-pin" section.

Offset: This introduces an offset in the TC format, expressed by Reader TC Value/Incoming TC Value.

Note 1: If it is critical to have quarter-frame accuracy in the dynamic automation system, it is not recommended to use 9-pin as a timecode source. Technically, the LTC input is much more accurate whereas the 9-pin input is likely to jitter due to technical specification of the interface (mostly: max. 1 frame). However, for most applications using of the 9-pin input may be sufficient. It gives the additional advantage of not having to care about slow motion automation.

Note 2: If working in slow motion or requesting the automation to show correct values even when the system is not in play speed, the following conditions must be met by the connected TC source:

1. If the TC source is set to "TC Input or Internal Generator", the connected LTC source must provide "standing timecode", also called "stationary timecode". This means that the source is delivering LTC even when in stop or slow motion. Please refer to the manual of your TC source in order to check this condition.
2. If working with 9-pin as the master timecode source, there is normally no problem with machines not providing the current timecode position while being in stop. Most of the machines will provide their position at any speed and time. However, please refer to Note 1 (above) concerning accuracy of the provided timecode.

4.6.5.2.3 TC2 Generator Settings

The GENERATOR settings have to be set according to the desired time code format to be generated. The settings are:

Frame Rate Select from 24/25/30/30 drop frame formats for the generated TC signal.

Sync Reference source Select the Synchronization reference source for the TC2 Generator from the following options:

- Internal Generator Reference (Internal gen. ref.);
- Reader: TC Input;
- Video sync (BNC).

Usual settings are Internal gen. ref or Video sync.

Reference Type Once the Sync Reference has been selected, the type can be set here, selecting from:

Reference type	Select from
Internal/Reader: TC Input	Internal
Video	PAL NTSC half picture NTSC full picture NTSC drop frame
Double bi-phase	Double bi-phase Ami phase
Move Clock	Move Clock 16 (pulses per second) Move Clock 32 (pulses per second) Move Clock 64 (pulses per second)

Move Clock For the move clock input, the clock rate can be set to predefined values of 16, 32 or 64 (see above), or it can be adjusted using the slider or by entering numerical values. The range is 1 through 2048 pulses per second.

4.6.5.2.4 TC3 Generator Settings

The GENERATOR settings have to be set according to the desired time code format to be generated. Set the TC reader settings to “TC Input or Internal Generator” in order to activate the TC3 generator as your timecode source. The settings are:

Frame Rate: Select from 24/25/30/30 drop frame formats for the generated TC signal.

Note: The TC3 internal generator has no ability to jog/shuttle nor fast rewind or forward.

4.6.5.2.5 Machine Control Settings

For information on machine control settings please refer to chapter 4.5.2.1.1.

4.6.5.3 Option: N–1 Assignment

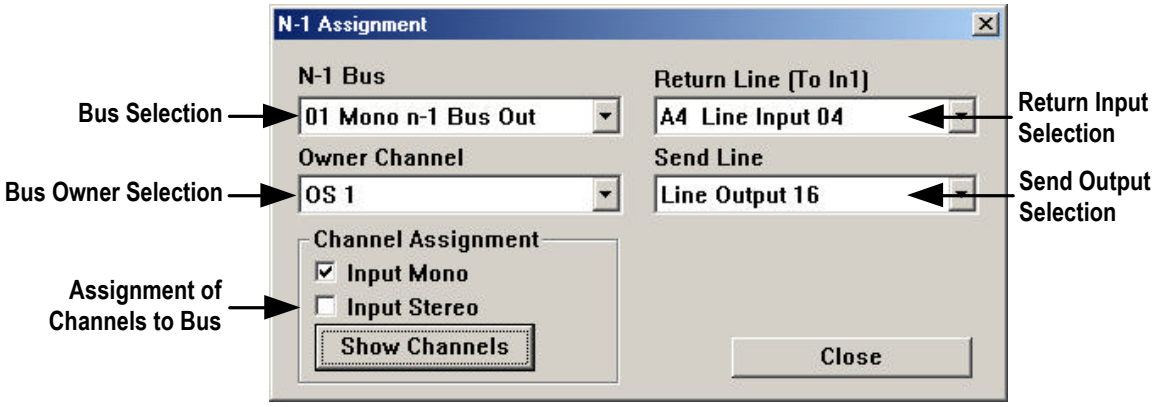
The N–1/Mix-minus Assignment window allows the setup and configuration of the N–1/CleanFeed/Mix-minus structure.
The principle of N–1 is summing; i.e. all desired channels (N) get summed to a bus except the "minus one" (–1).

The N–1/Mix-minus bus is a special bus that sums the contributions of channels other than the Bus Owner of the Channel, thus performing the N–1 summation. Any number of Mono and/or Stereo N–1 buses can be configured in a Session Configuration.

The Bus Owner channel is the channel which:
- Does not contribute to the N–1 bus
- Contains the N–1 bus output level and Talkback controls on the physical channel strip assigned to it
- Has an N–1 indication on the assigned channel strip.

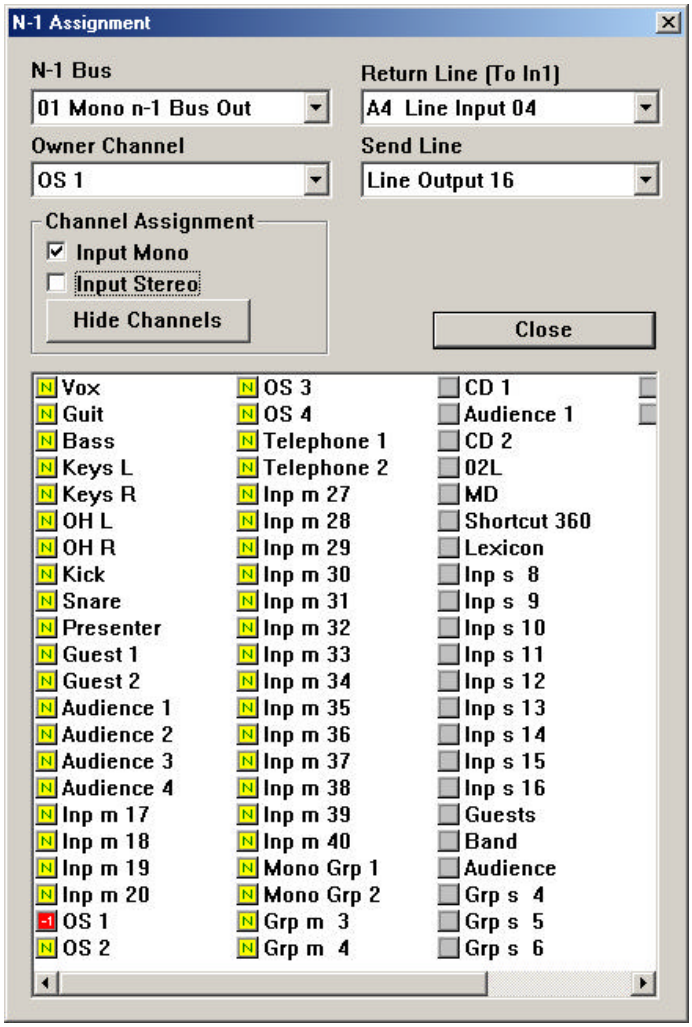
The setup and assignment of the N–1 has a number of processes.
1 A Bus Owner (–1 channel) must be assigned to an N–1 bus.
2 The N–1 Send Line (Physical Output) and Return Line (Physical Input) must be patched in the General Patch
3 The channels which are to be sent to the –1 must be assigned to the bus.

The N–1 Assignment window allows fast setup of this process.



Setup is as follows:
1 First choose the N–1 bus to be used with the drop-down menu, and the Bus Owner Channel which will be the –1 channel.
2 Use the drop-down menus to select the Return Line (Physical Input) and Send Line (Physical Output) to which the Outside Source (–1) is connected to the console. This is essentially making cross-points in the General Patch without having to go to the General Patch page. Selections made using these drop-down menus will change any previous patching of the Outside Source. *Please note that the label type shown is taken from the General Patch.*
3 The two Channel Assignment check boxes allow fast allocation of all Input Channels to the chosen N–1 bus. If only Mono inputs are chosen, then *all* Mono input channels in the system (*except the Bus Owner channel*) are routed to the chosen bus. If specific channels need to be routed instead of *all* Mono or Stereo input channels, the

Show Channels button should be clicked. This will extend the window as shown below, to allow individual assigning of the channels within the Session Configuration to the chosen N–1 bus.



The chosen Bus Owner channel is shown in the list as -1 OS 1

Any assigned channels to the bus are shown in the list as N Guest 1

Clicking on individual channel boxes will either select or deselect a channel; this makes the N–1 bus in fact being an N–x bus. It is also possible to mark a number of channels to be assigned by left-clicking and dragging across a number of channels for speed.
It is also possible to assign channels to a configured N–1 bus by using the dedicated bus assignment panel *(D950)* or bus assign window *(Vista)* on the control surface.
The talkback and N–1 bus level control will be displayed in the assigned channel strip for the N–1 Bus Owner Channel (see chapter 3.3.3).

Vista Only: The right-hand bargraph channel meter for the Bus Owner Channel will automatically show the N–1 bus level output.

☞ **Tip** The N–1 settings are stored within snapshots.

4.6.5.4 Option: Control Group Filter

This feature is described in detail in chapter 4.7.7.

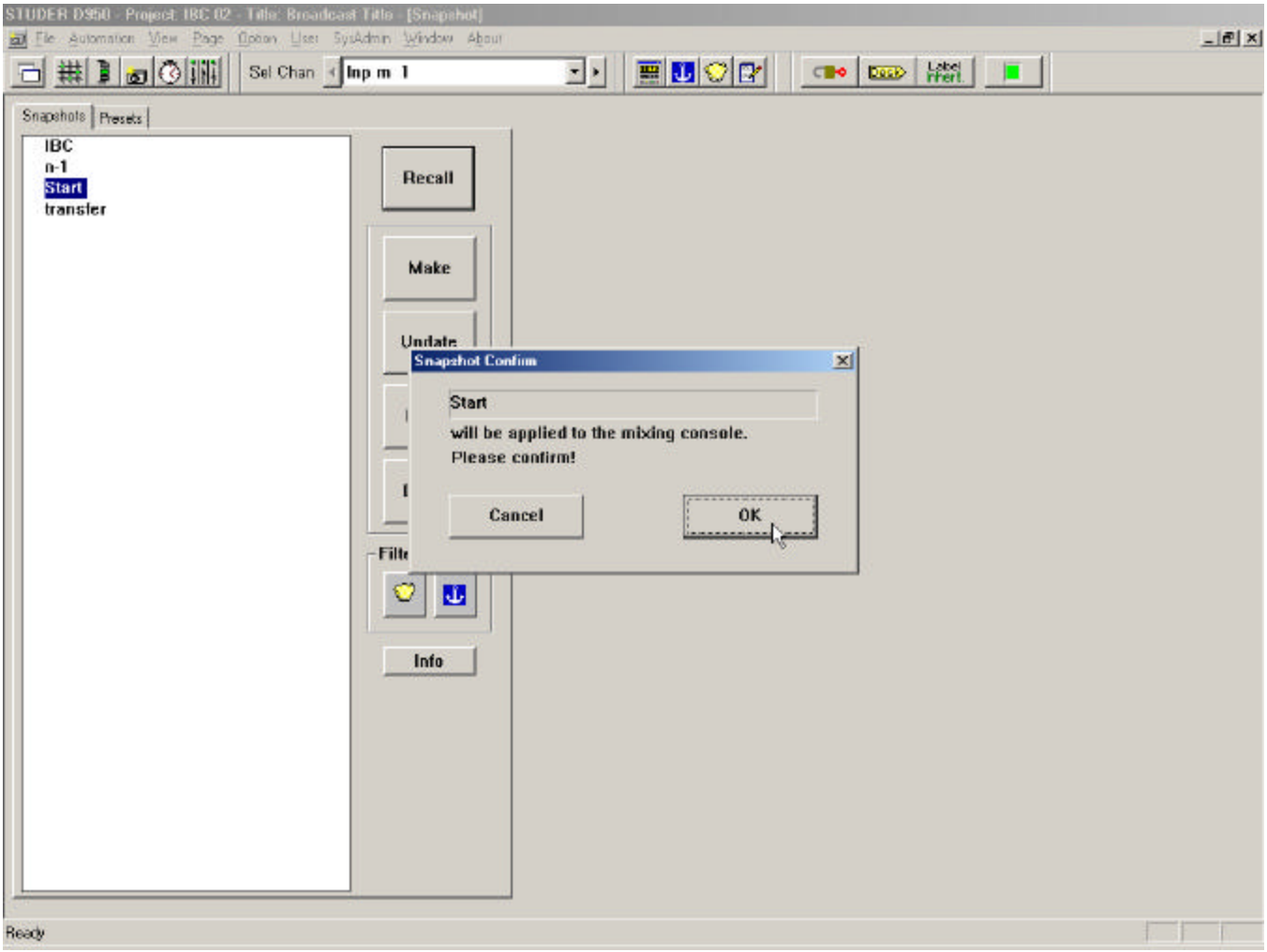
4.6.5.5 Option: VSP Microphones and Reverb

This feature is described in chapter 3.6 *(Vista)*.

4.6.5.6 Option: Snap Confirm

The Snap Confirm option can be checked or unchecked:

- If *checked*, the Snapshots/Presets can only be recalled with user confirmation (the user must click OK or press **Enter** to finally recall the Snapshot/Preset, or click Cancel to cancel the Snapshot/Preset Recall).
- If *unchecked*, the Snapshots/Presets will be applied to the console immediately, and parameter settings not already saved will be lost.

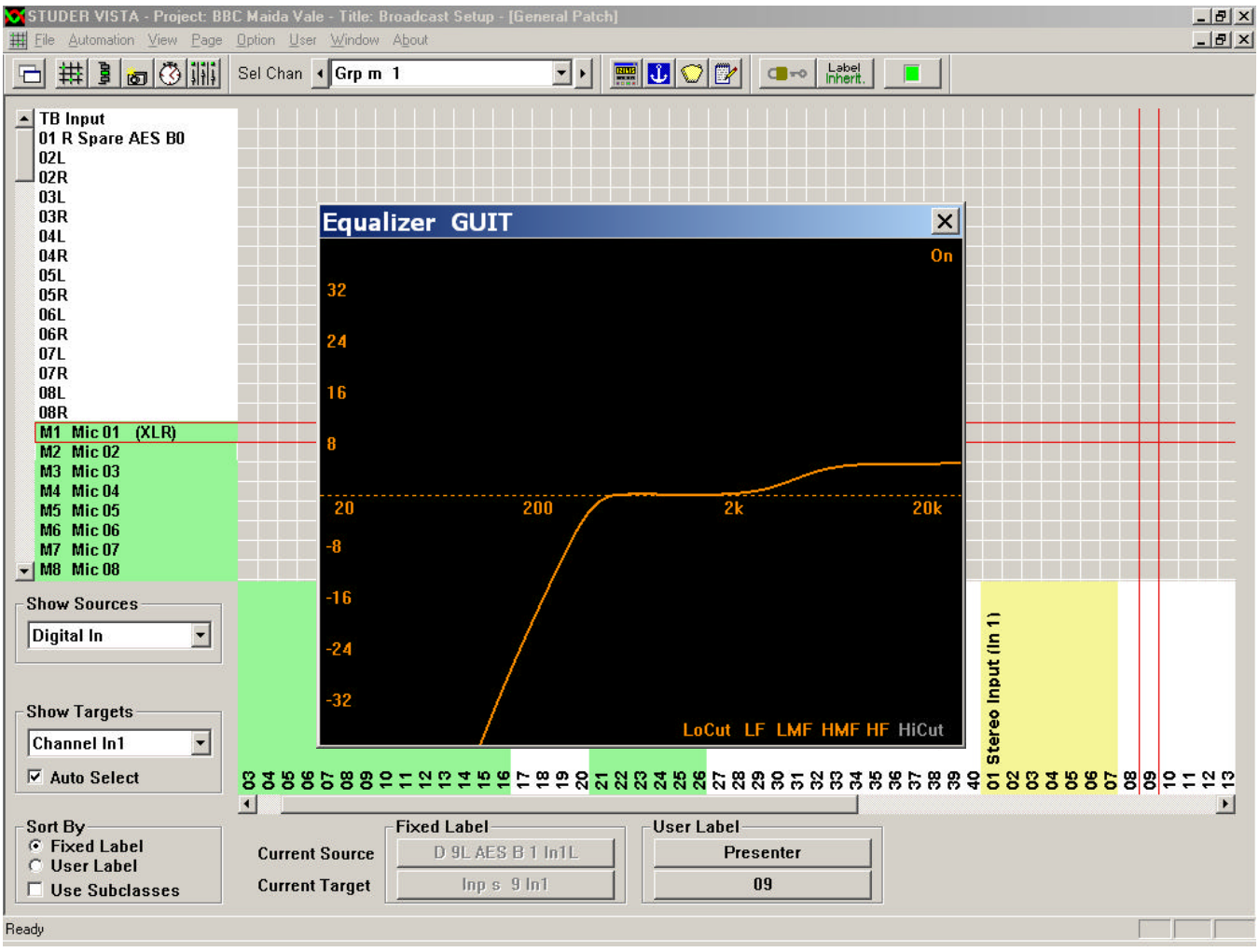


Notes: It may be advisable to leave Snap Confirm checked until fluency with Snapshots/Presets is achieved.
Snap Confirm applies to both Snapshots *and* Presets.

4.6.5.7 Option: EQ/Dynamics View

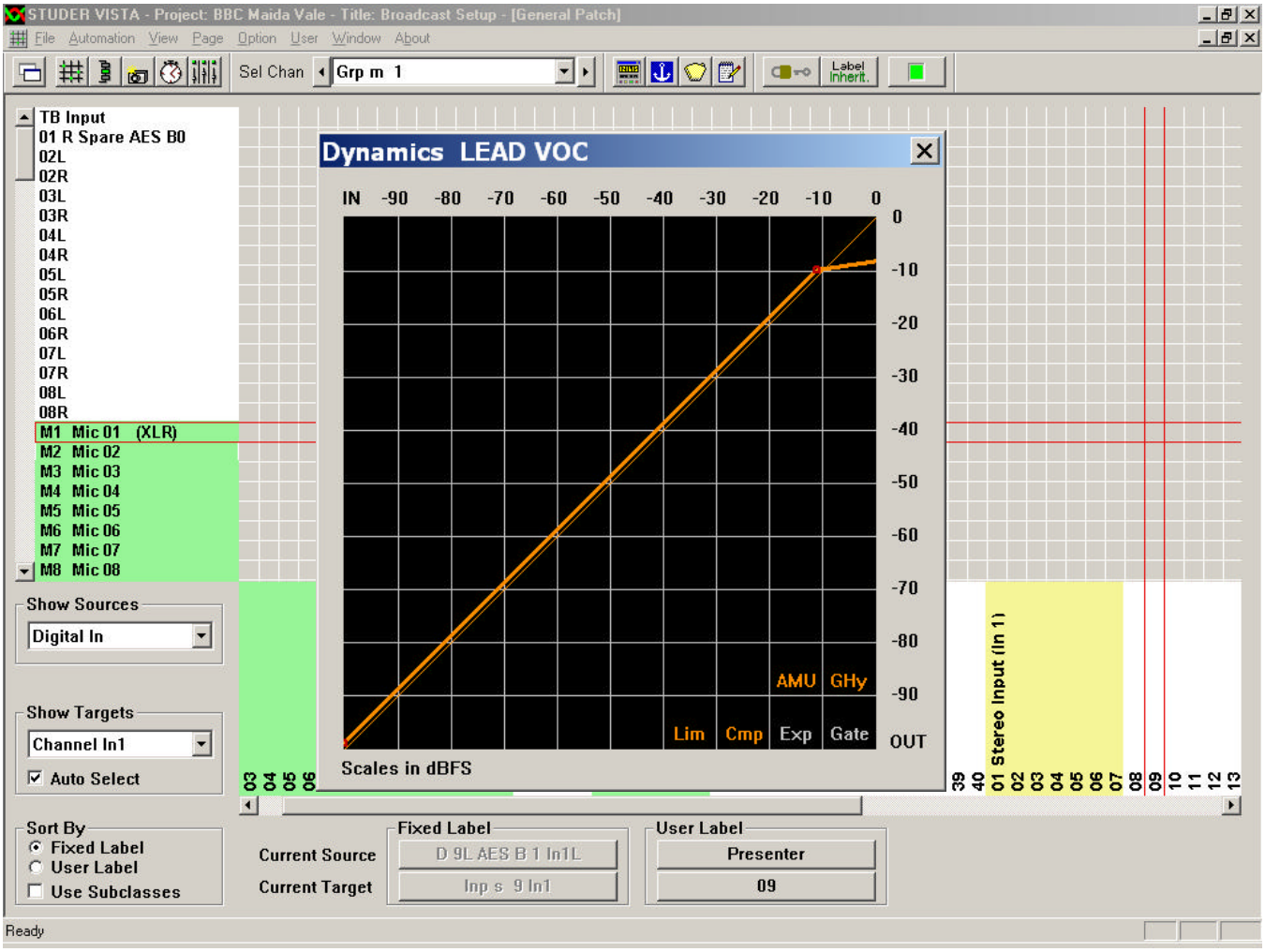
The EQ/Dynamics View option can be checked or unchecked. If *checked*, the Graphic Controller will display an EQ and/or a Dynamics screen.

EQ Screen: The EQ screen is displayed for the channel on which any of the rotary encoders is touched or operated while the channel's controls are in the EQ/Filter page. Please note that the EQ screen will appear when any EQ/Filter control is touched. However, for the EQ screen to be displayed, *EQ/Filter must be engaged* in the channel.



The EQ screen is time-limited and will automatically disappear several seconds after the last touch, or when pressing **Esc**. It is always on top of any other screens/pages.

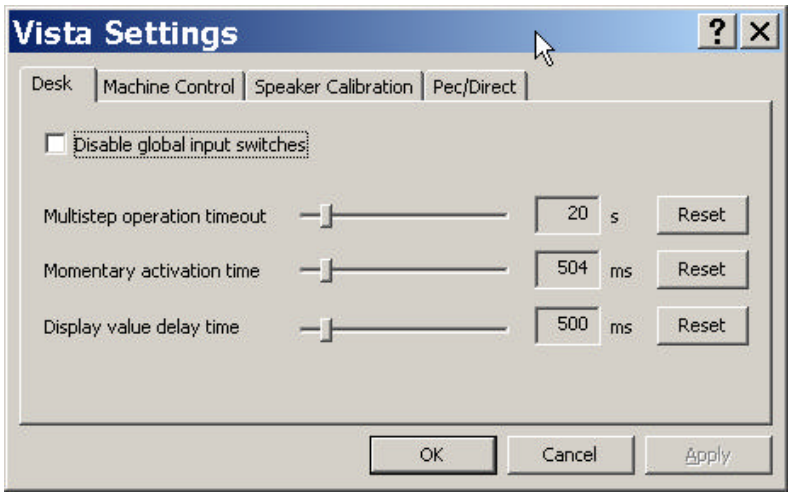
Dynamics Screen: The Dynamics screen will appear when any Dynamics control is touched. However, for the Dynamics screen to be displayed, *one of the LIM, COMP, EXP, or GATE functions must be engaged in the channel*.

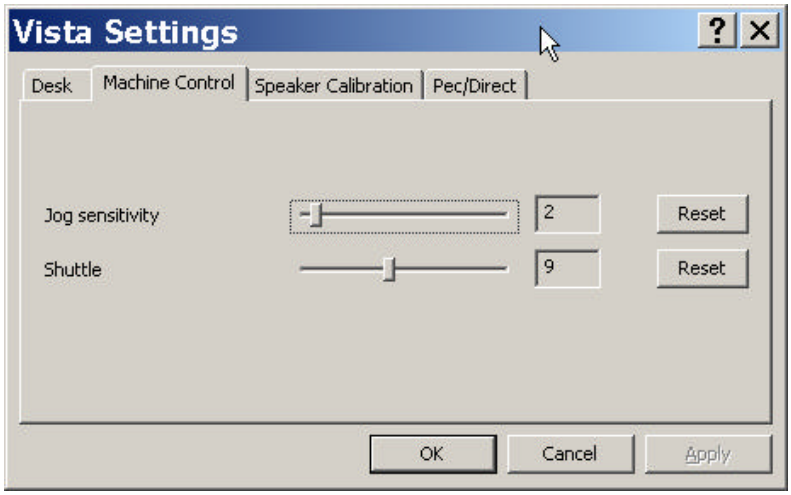


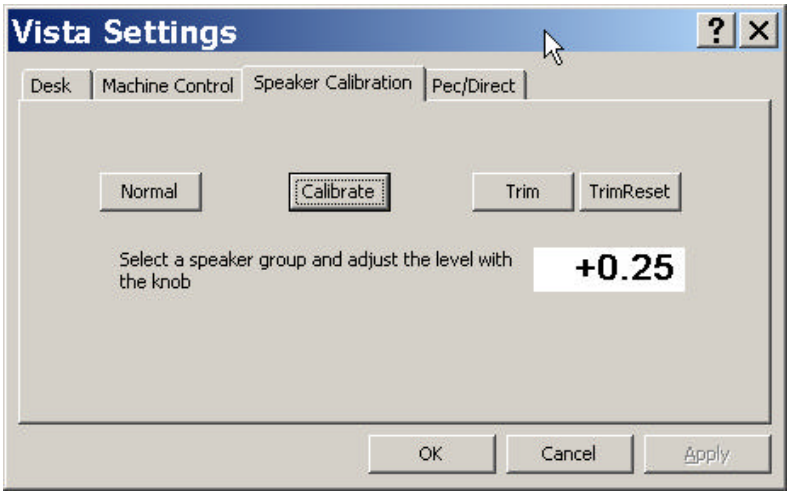
The dynamics screen is time-limited and will automatically disappear several seconds after the last touch, or when pressing **Esc**. It is always on top of any other screens/pages.

4.6.5.8 Option: Vista Settings *(Vista only)*

The Vista Settings window allows different adjustment; there are four tabs for selection of Desk (timeout and delay time settings), Machine Control (jog/shuttle sensitivity), Speaker Calibration, and Pec/Direct settings.





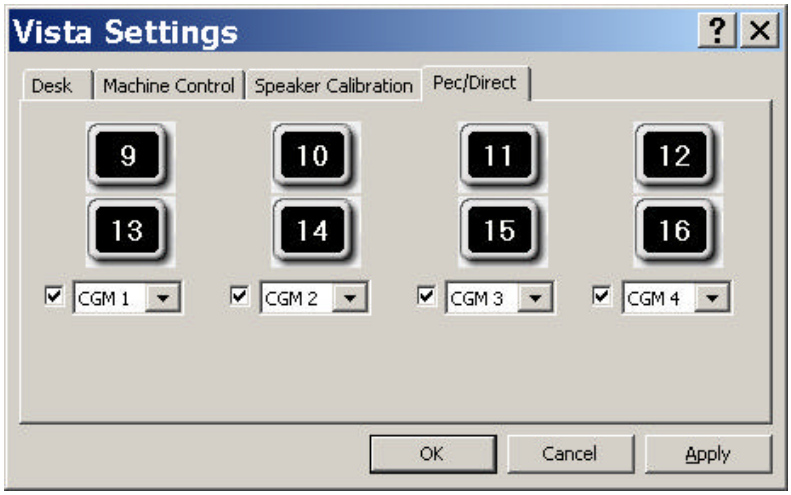


Speaker Calibration

To allow access to the speaker calibration, the Enable Setup function must be enabled. Please refer to chapter 4.7.5.

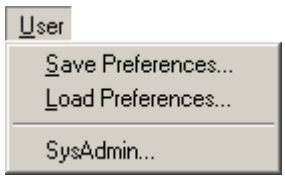
Calibrate Mode: Calibrate mode allows setting a level offset for a whole monitor group (**MAIN**, **ALT** or **NEARFIELD**) relative to the other two. To activate this mode, click the "Calibrate" button and select a monitor group on the control surface monitoring section. The offset range is from –20 dB to +10 dB. The current calibration offset will be displayed in the display box. The calibration offset can be changed in steps of ¼ dB.

Trim Mode: Trim mode allows setting an offset for a single loudspeaker relative to others in a group. The offset range is ±10 dB. Trim mode is selected by clicking the "Trim" button. Select the monitor group (**MAIN**, **ALT** or **NEARFIELD**) and **SOLO** the speaker to be offset on the on the control surface monitoring section. The current Trim value of the selected speaker will be displayed in the window. The Trim offset can be changed in steps of ¼ dB. To clear all Trim offsets within the selected monitor group, click the "TrimReset" button.



4.6.6 The User Menu

The User menu allows the users to individually store various preferences including page layout, size, and position of various windows.



User – Save Preferences...: This action opens a dialog box that allows selection of a name for a new Preference file, and to create a new Preference file. You can freely create any number of Preferences. The dialog box will usually display the `C:\D950SYSTEMDB` directory with all the available Session Configurations. The User Preference files are best stored together with the current Session Configuration in the Session Configuration directory, because they will probably change only when the users change, and not with every Production/Title.

Enter a name for the new Preference file, or select an existing Preference file to be overwritten, and then click Save to finish.
The User Preference files have the extension `*.pfc`, which is added automatically; you do not have to type it.

☞ **Tip** If you forget to save your preference, don't worry. The system will store the last-used screen layout at shutdown. When you restart the system, the screen will come up exactly as you left it.

User – Load Preferences...: This action opens a dialog box that allows selection of a User Preference file for loading. The dialog box will usually display the `C:\D950SYSTEMDB` directory with all the available Session Configurations.

Enter the desired Session Configuration directory, and select the Preference file to open. Click Open or double-click on the file to load.

User – Protect (or SysAdmin): This action allows the system mode to be toggled from standard to System Administration mode. The System Administration mode allows access to some system functions which are not needed in normal operation.

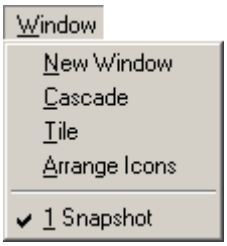
From Standard Mode: Click on SysAdmin to enter the System Administration mode. You will be asked to enter the System Administration Password. After completing that, an additional SysAdmin menu item will be placed in the menu bar.

From System Admin mode: Click on Protect to exit the System Administration mode.

Refer to chapters 4.2.1 (toolbar) and 4.7 (System Administration menu) for more details.

4.6.7 The Window Menu

This menu helps with the organization of the Graphic Controller screen, and works in the same way as with most Windows-compatible applications.
If multiple windows/pages are active, the lower part of this menu allows to make a particular page the current page (put on top). A checkmark (✓) near a particular page indicates that this page is currently on top.



Window – New Window: This action opens the New Window dialog box, and allows selection of an additional (new) window to be displayed on the Graphic Controller. For more details on working with multiple windows, refer to chapter 4.4.1.2.

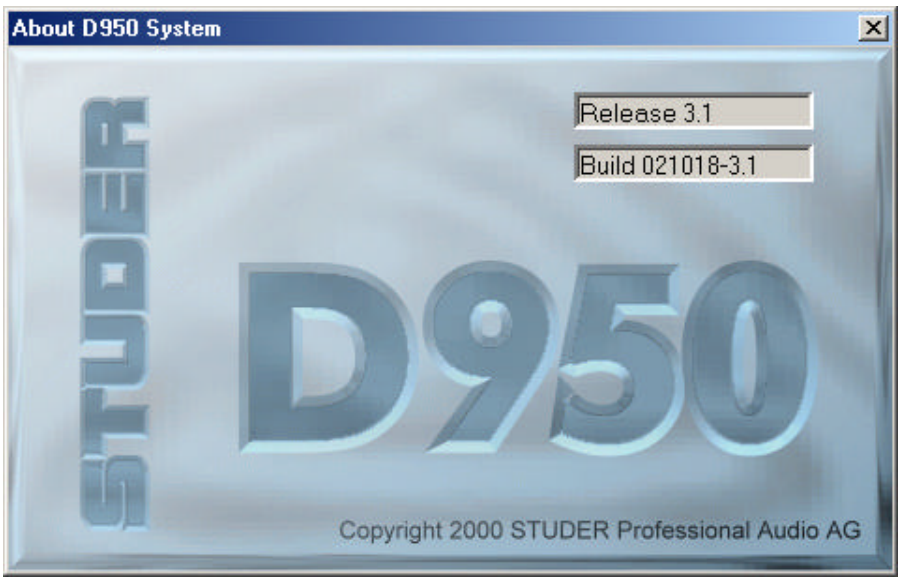
Window – Cascade: This action arranges all active screens/pages in a cascaded layout on the screen.

Window – Tile: This action arranges all active screens/pages in a tiled layout on the screen.

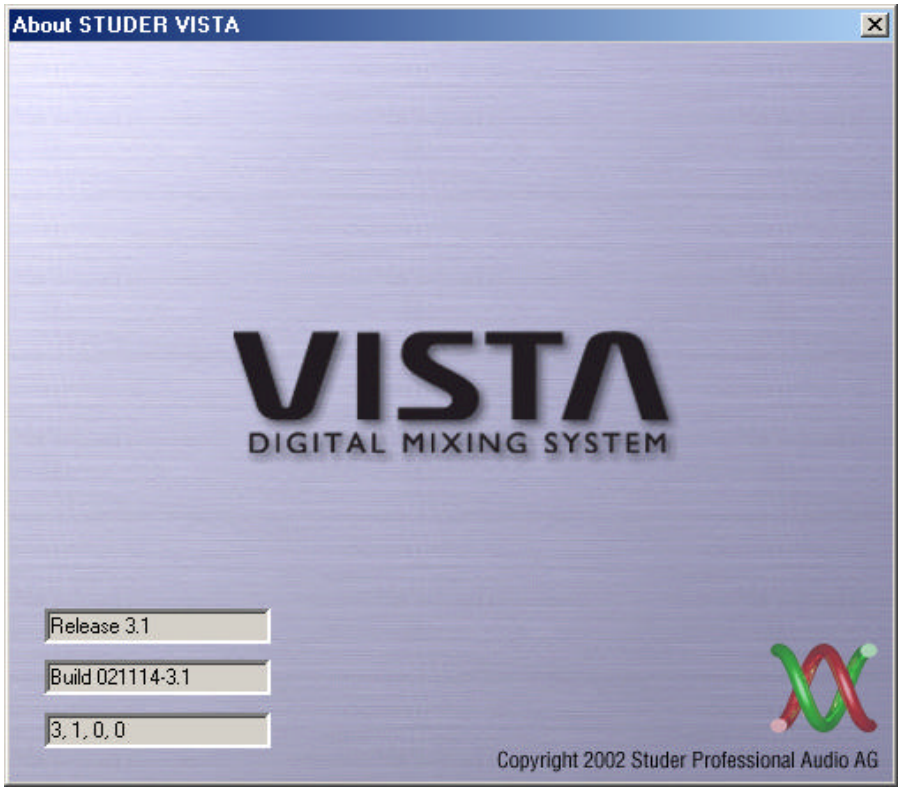
Window –Arrange Icons: No function.

4.6.8 The About Menu

D950:



Vista:



When selected, this menu item displays information pertaining to that specific D950 or Vista installation. This includes the software Release Number (version), the Build Number, and the Copyright notice.

4.7 Fourth Level of Operation: SysAdmin Menu

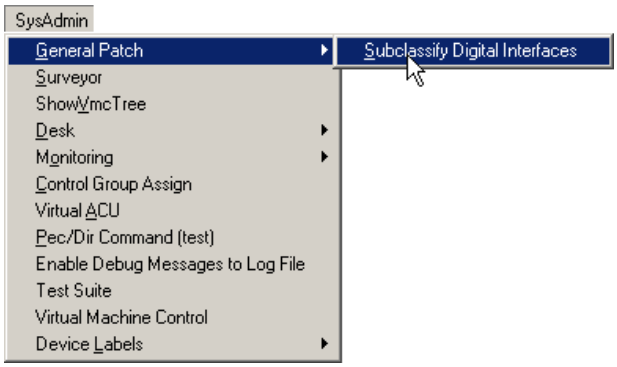
The SysAdmin (System Administration) menu is normally hidden from view within the Console's standard operating mode, because it contains functions that are only useful during building the console and setting it up for operation. The menu contains various test and configuration possibilities that are not required during normal operation.

Nevertheless, some of the functions from the SysAdmin menu will be explained here, since they may be useful if the console is radically reconfigured, the Monitoring or Signaling systems are expanded, or some detailed troubleshooting is required.

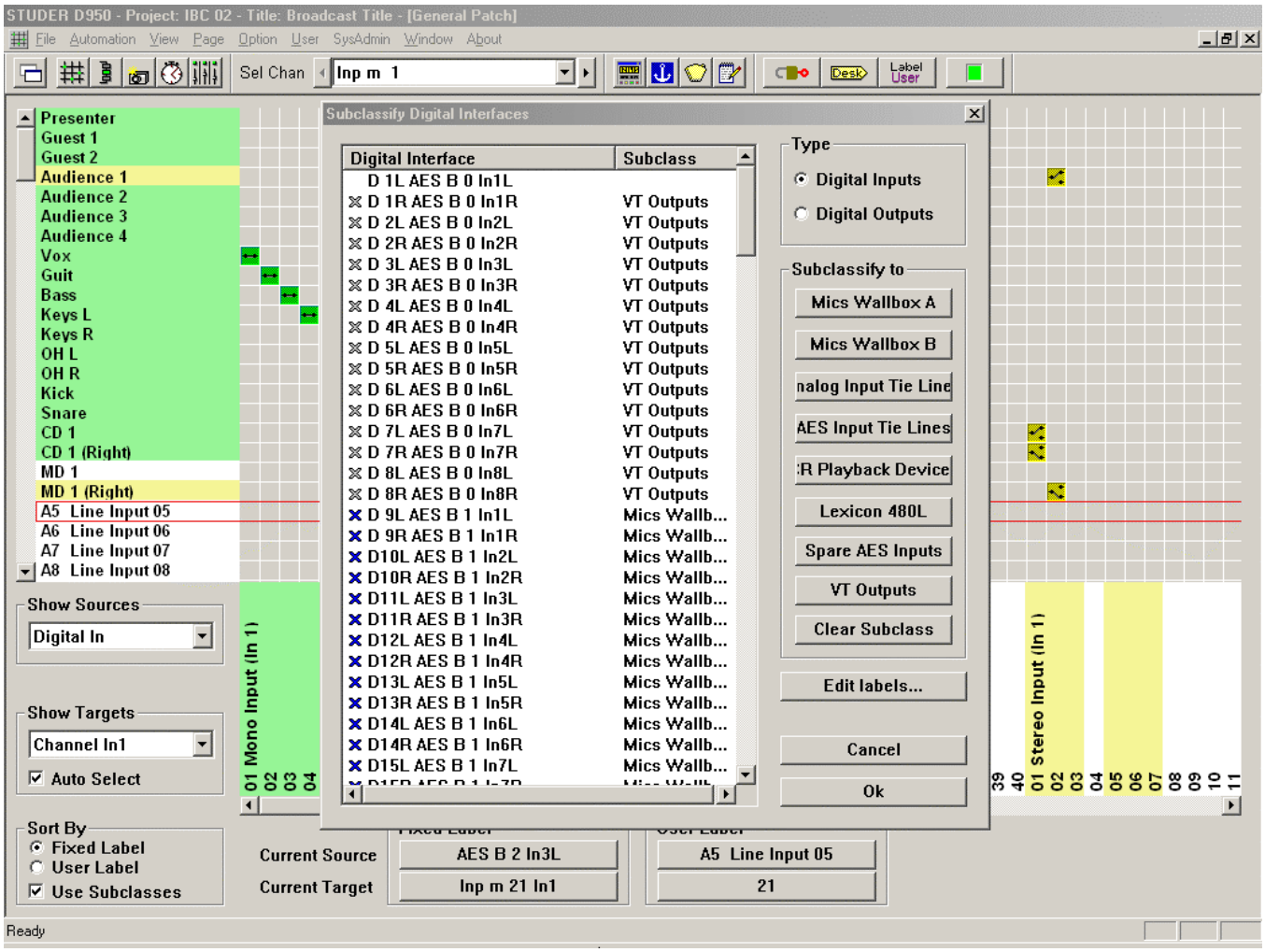
How to activate the SysAdmin Mode from Standard Mode:
Click on the closed padlock icon in the toolbar. You will be asked to enter the System Administration Password. After completing that, an additional SysAdmin menu item will be placed in the menu bar.

4.7.1 SysAdmin: General Patch/Subclassifying the Digital I/O Sections

There is only one accessible item in this menu: Subclassifying the Digital In and Digital Out Interface Sections of the Patch.



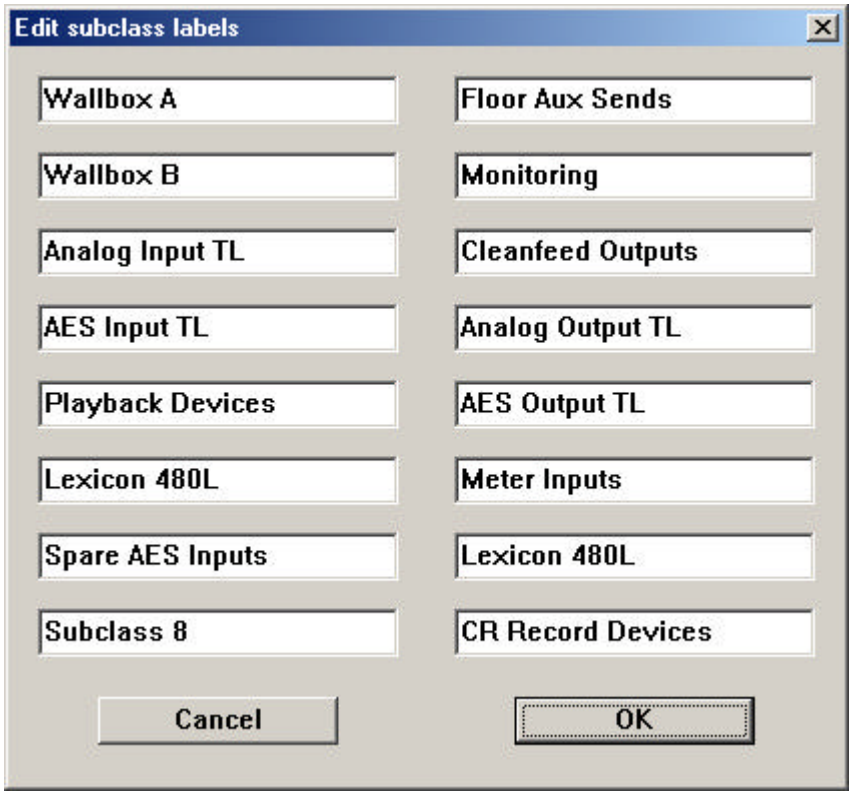
For more information on Subclasses refer to chapter 4.4.2.3.



The Digital Inputs and Digital Outputs Patch Sections can be subclassified into eight subclasses each. Subclasses 1 through 8 belong to the Digital Inputs, and Subclasses 9 through 16 to the Digital Outputs.
The process of Subclassifying is usually done by the facility's system administrator. You need to adapt the Subclass information *only* if there are changes in the interfacing due to a system upgrade or rewiring.

4.7.1.1 Setting the Subclass Labels

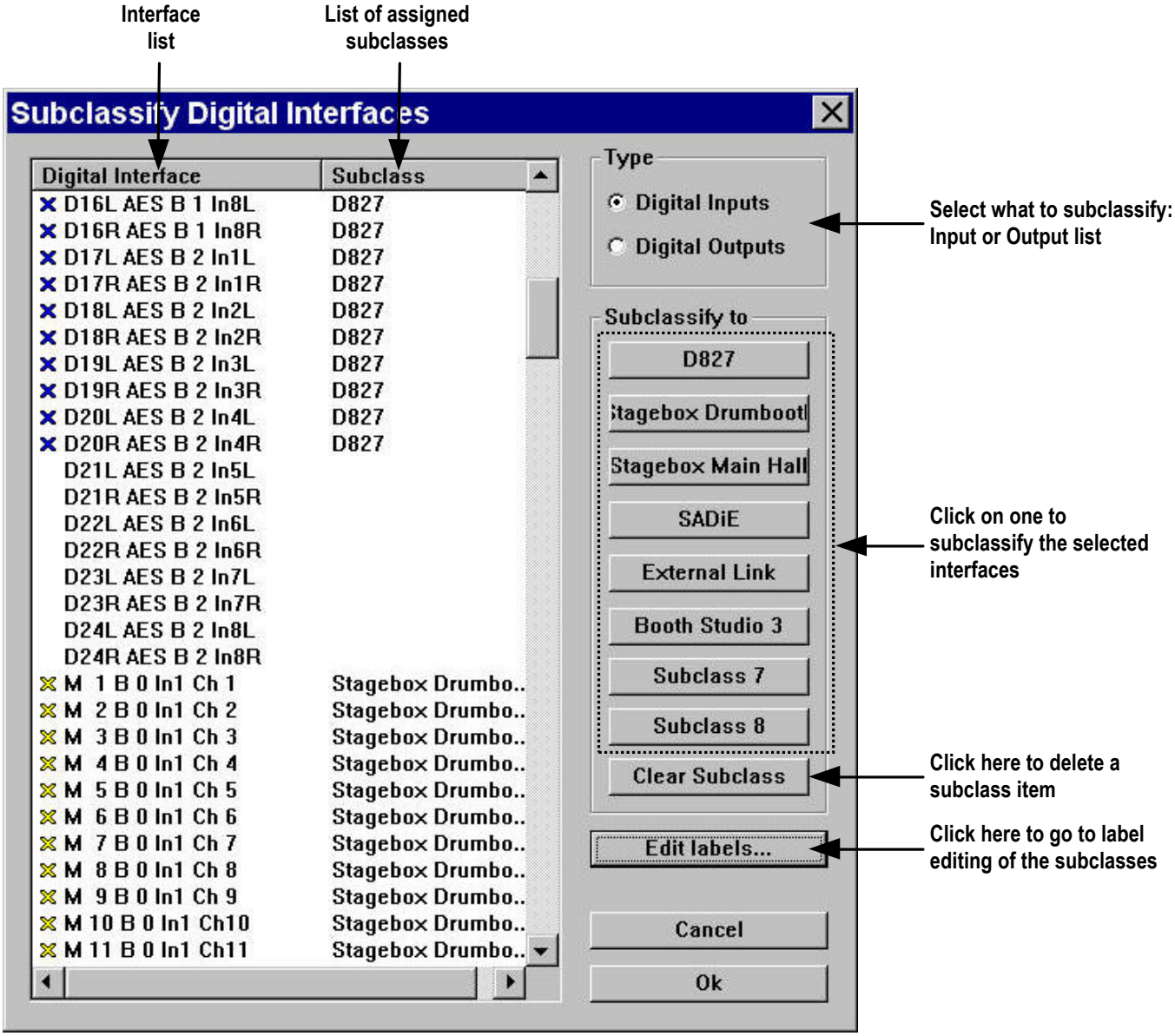
Click on the “Edit labels...” button to open the Subclass Label editor.



Within the editor page, enter the names you wish to appear for each of the Subclasses in the Patch Lists. Confirm with OK, otherwise any changes will be lost.

4.7.1.2 Assigning Sources and Targets to Subclasses

To initiate the process of assigning, first select the interface type you want to assign: Digital Inputs, or Digital Outputs.



On the left-hand side, the Digital Interface list is displayed. Some of the Sources and/or Targets may already be assigned to certain subclasses. This is visible from the Subclass column.

To assign, select the desired Sources or Targets from the list. Individual selection can be done simply by clicking on a Source or Target. Multiple selection can be done by the Windows drag technique. **Ctrl** + click technique can be used to select items from the list that are not contiguous.

Once all items are selected, click on one of the Subclass buttons to assign the selected Sources or Targets to a Subclass. The list will reflect your new assignment.

A Source or Target can be assigned to any of the Subclasses, but *only to one Subclass at a time*.

To reassign an item or items from a Subclass, use the same selection techniques as above. Then you can:

- Click on the Clear Subclass button to remove the selected items from the Subclass. This will return the selected items to the Digital Input or Digital Output Patch Section;
- Click on a different Subclass button to directly re-assign the selected items from the current Subclass to another Subclass.

The result of this process is that the subclassified sections are now visible in the Patch lists and can be directly accessed using the right trackball button. For details, refer to chapter 4.4.2.3.

Notes: Subclass names are stored and recalled with User Preferences.
Assignment of individual interfaces to subclasses is stored in each Snapshot Preset and can therefor vary from Snapshot to Snapshot.

4.7.2 SysAdmin: Surveyor

Surveyor: This action will open the Surveyor, which is used to check the status of the D950/Vista system. Refer to chapter 4.8.

4.7.3 SysAdmin: Show VMC Tree

This feature is primarily used in troubleshooting and typically does not have a use in normal operation.

Show VMC Tree: This action will bring up the VMC tree View. This page will display a list of all channels, inputs, outputs, buses, and other system elements that are defined within the current Session Configuration. Double-clicking on one of these items will display the contents of that item's branch. Opening of subsequent branches will take further and further inside the VMC tree. If the item has a changeable parameter, such as EQ high frequency, that parameter may be controlled directly from the VMC tree.

4.7.4 SysAdmin: Desk *(D950 Only)*

The Desk menu item contains several functions regarding the control desk:

Message to Desk Node: This function will bring up the Desk Common Msg entry box;

Reset Desk Nodes: This function will re-initialize the desk's control nodes and then reload the data needed for operation;

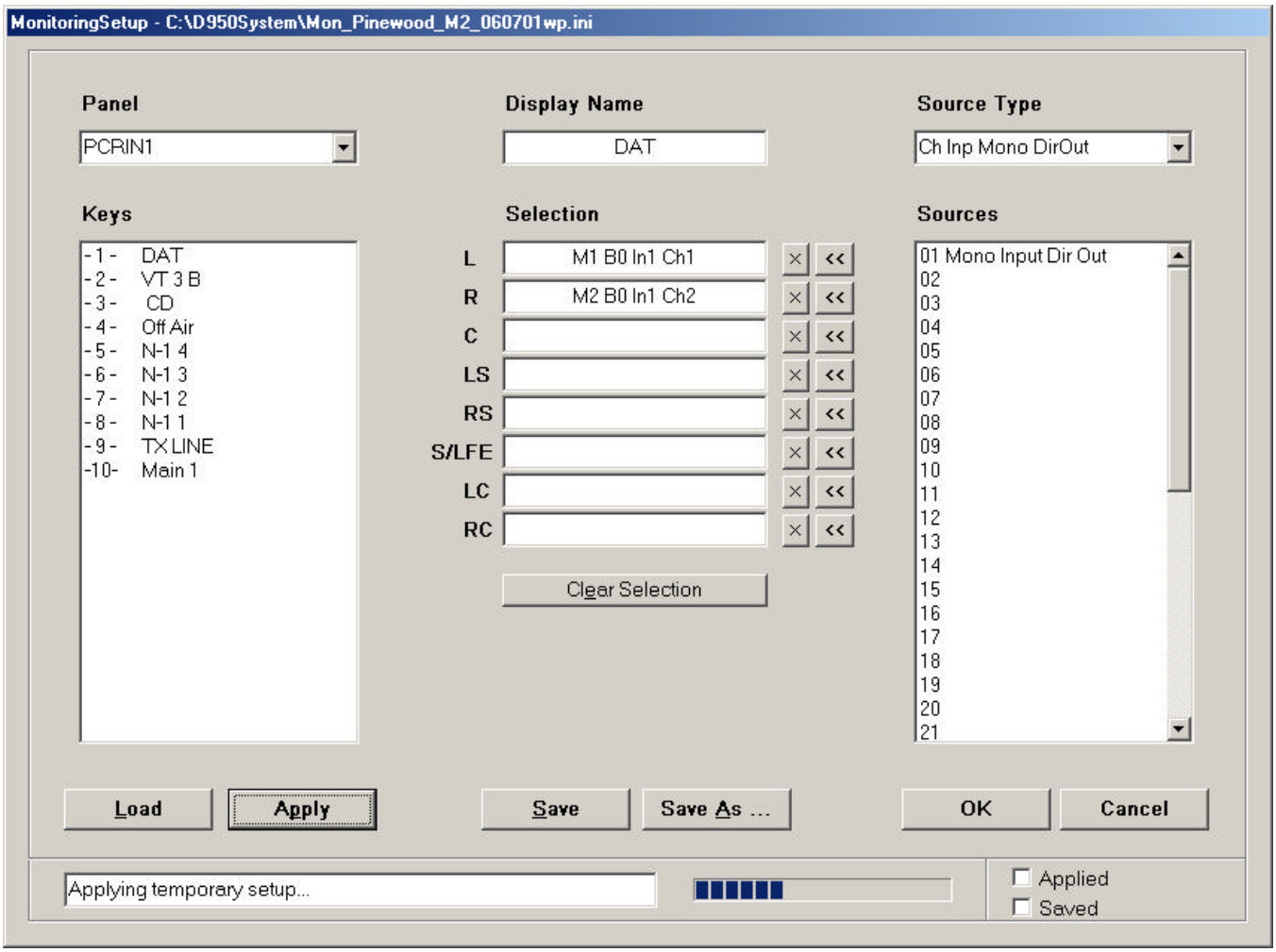
Reload Desk Nodes: This function will reload data for the desk's control nodes without re-initialization;

Update Desk Display: This function will refresh the desk's display with the current data from the PC.

4.7.5 SysAdmin: Monitoring

The Monitoring menu item contains several functions regarding the D950/Vista loudspeaker control:

Edit Monitor File: This action brings up the Monitoring Setup editing utility. The title bar will display the name and location of the currently loaded Monitor Configuration file.



The Monitoring Setup page contains the following fields and controls:

Panel Selection box: This box provides a pop-up menu used to select a control room or studio Assignable Source Selector panel installed in the control surface for editing. The Source Selector keys for the selected panel will be displayed in the Keys box, where they can be selected for editing. The name of the panel may also be edited using this box.

Note (Vista only): *The four subpanels popping up on the screen upon activated option (experts only!) show up as individual panels with 12 source selectors each.*

Key Selection box: This box is used to select a specific Monitor Source Selector key for editing.

Display Name entry box: This is a name entry box for the selected Source Selector key. It will display the name of the selected key, which can be edited. The name that appears in this box will be shown on the D950 Monitor Source Selection

panel(s) with LED displays, once the Monitor Configuration file is applied. Please note that only the first eight characters can be displayed on the control surface panel(s).

Speaker/Source Selection entry boxes: These fields are used to connect a digital audio source (such as a direct output) to a specific loudspeaker feed (such as left, right, center, etc.). This is accomplished by highlighting a source from the Source Selection list and assigning it to the desired loudspeaker feed using the appropriate double-arrow button (<<). When such an assignment is made, the source name will appear in the selected loudspeaker field. Selections may be cleared using the X buttons.

Clear Selection button: This button will clear all Speaker/Source selections made for that Monitor Source Selector key.

Source Type Selection box: This box provides a pop-up menu used to select the type of digital source for assignment (such as a mono master direct output or an AES interface). Once an item has been selected, all the sources of that type will be displayed in the Sources list below.

Source Selection box: This box displays a list of digital sources of a specific type that are available for assignment to loudspeaker feeds.

Load button: This button brings up a familiar Windows box from which an existing Monitor Configuration file can be loaded.

Apply button: This button applies the current Monitor Configuration file to the D950/Vista. This is handy when testing a recently edited file or recalling a previously stored file.

Save and Save As... buttons: The Save button allows a previously stored Monitor Configuration file to be updated after editing. The Save As... button allows a new file to be named and created.

OK and Cancel buttons: The OK button accepts the current Monitor setup and closes the window. Clicking OK does *not* apply or save the Monitor Configuration file. The Cancel button exits the Monitor Setup screen.

Monitor File Name entry box: This field is used to enter a name for a new Monitor Configuration.

Application Progress indicator: This meter displays the progress of the loading of the Monitor Configuration file when it is applied to the console.

Applied and Saved Status boxes: These boxes display the status of the current Monitor Configuration file. If checked, the current file is applied to the console and/or saved.

To create a new Monitor Configuration file:

- First open the Monitoring Setup utility from the Monitor section of the SysAdmin menu.
- Select the desired Assignable Source Selector panel and key, using the lists on the left.
- Select a source type and source from the lists on the right.
- Highlight the selected source and click on the double-arrow (<<) button next to the desired loudspeaker feed in the Selection boxes. The source name will appear in the selected location. Once a key is selected, its name may be changed using the Display Name field.
- Repeat these steps to complete the necessary assignments. Once finished, the new file can be saved and applied to the console.

Please note that the edited file must be applied to the console before it takes effect.
Existing Monitor Configuration files can be edited by recalling them with the Load button and using the procedures described above.

Note (D950 only): Only digital monitor sources can be assigned using the Monitoring Setup utility. Source Selections with external analog sources can only be assigned via a direct manipulation of the Monitor Configuration Initialization file. This is usually done in the factory during the initial software setup. *It is strongly recommended that direct modification of this file should be performed only by qualified personnel* (the friendly folks at Studer, for example). If an analog source is assigned to a Selector key, the loudspeaker selection fields will be "grayed-out" and no source selection will be possible using the Monitoring Setup utility.

Enable Setup Mode: *(D950 only; for Vista, see "Option – Vista Settings", chapter 4.6.5.8)*
This action enables the monitor setup mode. Checking this menu item allows the **SETUP** key on the desk's (multi-format) monitor panel to function. When illuminated, a level offset may be applied to each of the installed speaker systems. Offsets may be applied over a range from –20 through +10 dB in 1 dB and 0.5 dB increments. The monitor panel will display the offset in dB.
To use this facility:

- First enable the Monitor Setup mode from the Monitor section of the SysAdmin menu;
- Then engage the **SETUP** key on the monitor panel and select the monitor system to receive the offset;
- Enter the desired offset value for each system;
- Complete the process by disengaging the **SETUP** key and deactivate the Monitor Setup mode.

Config Dump: This action will create a copy of the current Monitor Configuration file and place it in the `D950SYSTEM` directory. The copied file will be named `MONCONFIGDUMP.DAT` and is useful for troubleshooting. In this status this file is not executable since it does not have a `*.ini` extension. However, it does contain all the parameter settings and other information.

Reinitialize: This action will reinitialize the monitor system and reload the last used Monitor Configuration file. The monitors will mute during this operation.

Test Command: *This menu item is only used in the factory for testing the communication between the work-surface, the control PC, and the monitoring racks.*

4.7.6 SysAdmin: Signaling Setup

The Signaling Setup Menu allows on-line assignment of available Signaling relays to functions, such as Red Light activation or Fader Start of remote systems. It also allows Save and Load of such assignment configurations for later use.

Output Signaling is always related to the Patch Sources. The D950/Vista console is fully assignable, meaning that:

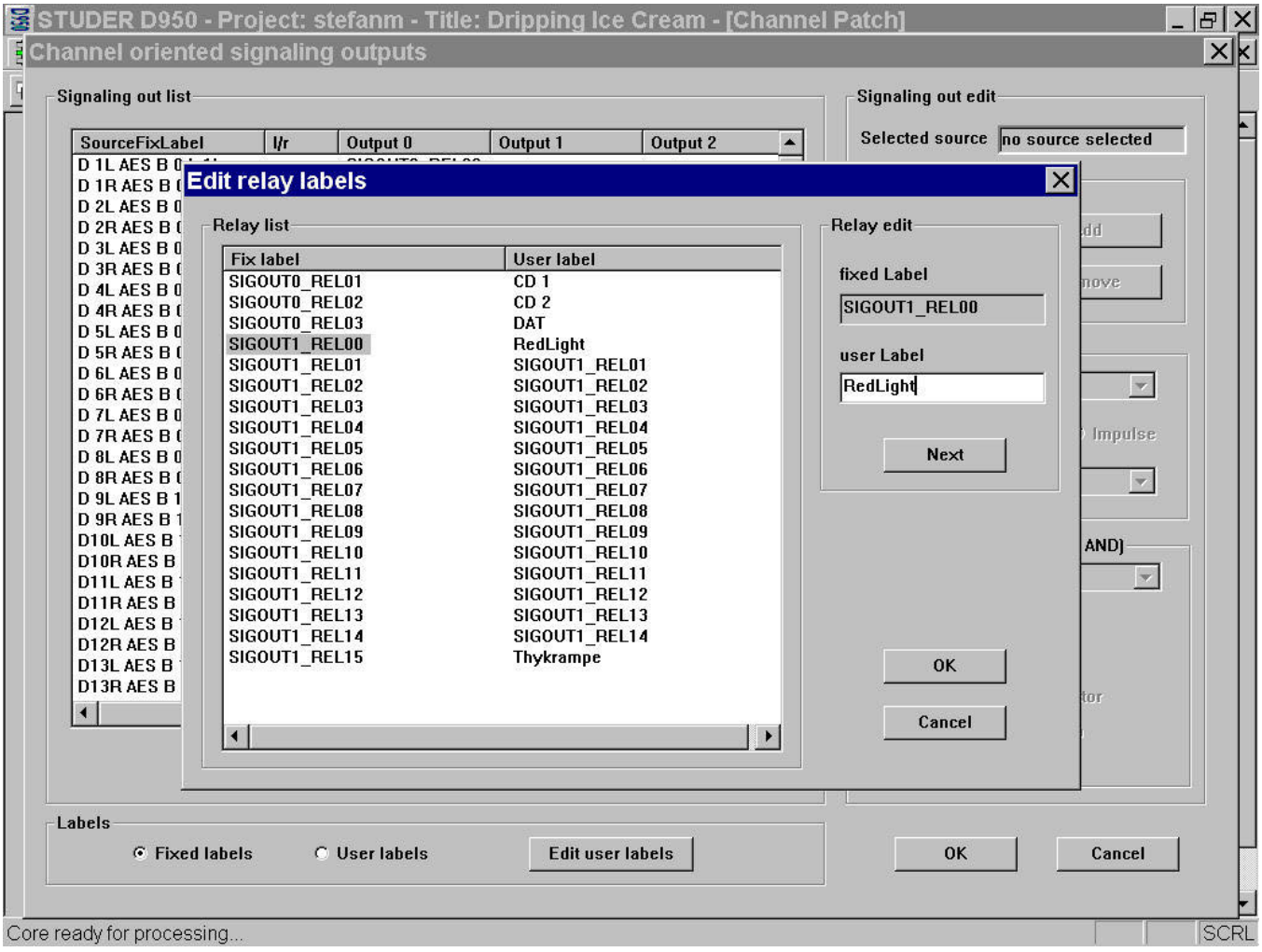
- A channel can be assigned to *any* channel strip;
- An audio Source (for example, a CD Player) can be patched into *any* channel and be accessed via *any* fader;
- A Snapshot can change the *entire* Patch settings.

For these reasons, it is impossible to assign an output Signaling device, such as a Fader Start relay, to a *specific* fader. Instead, it has to be assigned to the Patch source which, in turn, is assigned to a fader via the Patch. In this way, the system logic is able to activate, for example, the correct relay when a fader is opened. All output Signaling always follows the Sources, and the Signaling Assignment itself also is Source-oriented.

The D950/Vista system automatically knows how many Signaling relays are available by accessing that information from the configuration and `*.ini` files. The available Sources are read from the Session Configuration. The Signaling Configuration is all about assigning the right relay to the right source, as we will see next.

4.7.6.1 Editing the Relay Labels

First, the System Administrator needs to determine how the relays will be connected to peripheral equipment (machine-transport controls, lamps, etc.). Then, the fixed relay labels can be edited to reflect their functions. For this action, select the Edit User Labels button from the Signaling Output or Red Light menu pages:



This action will open the Edit relay labels page and first allow selection of the desired relay, and then to enter a User Label for each relay. Be sure to click OK when finished; otherwise all changes will be lost.

The fixed relay labels have been automatically generated by the D950/Vista
system. They have the format **SIGOUT0_REL01,** where **SIGOUT0, SIGOUT1**, etc. define the relay card number, and **REL01**, **REL02**, etc. define the relay number on a particular card.

There are 16 relays per card. Some of the physically present relays may be assigned to internal system functions and may therefore not be available for the Signaling Configuration.

Source labels can be edited in the Patch pages; refer to chapters 4.4.2 and 4.4.3.

4.7.6.2 Signal Out Configuration

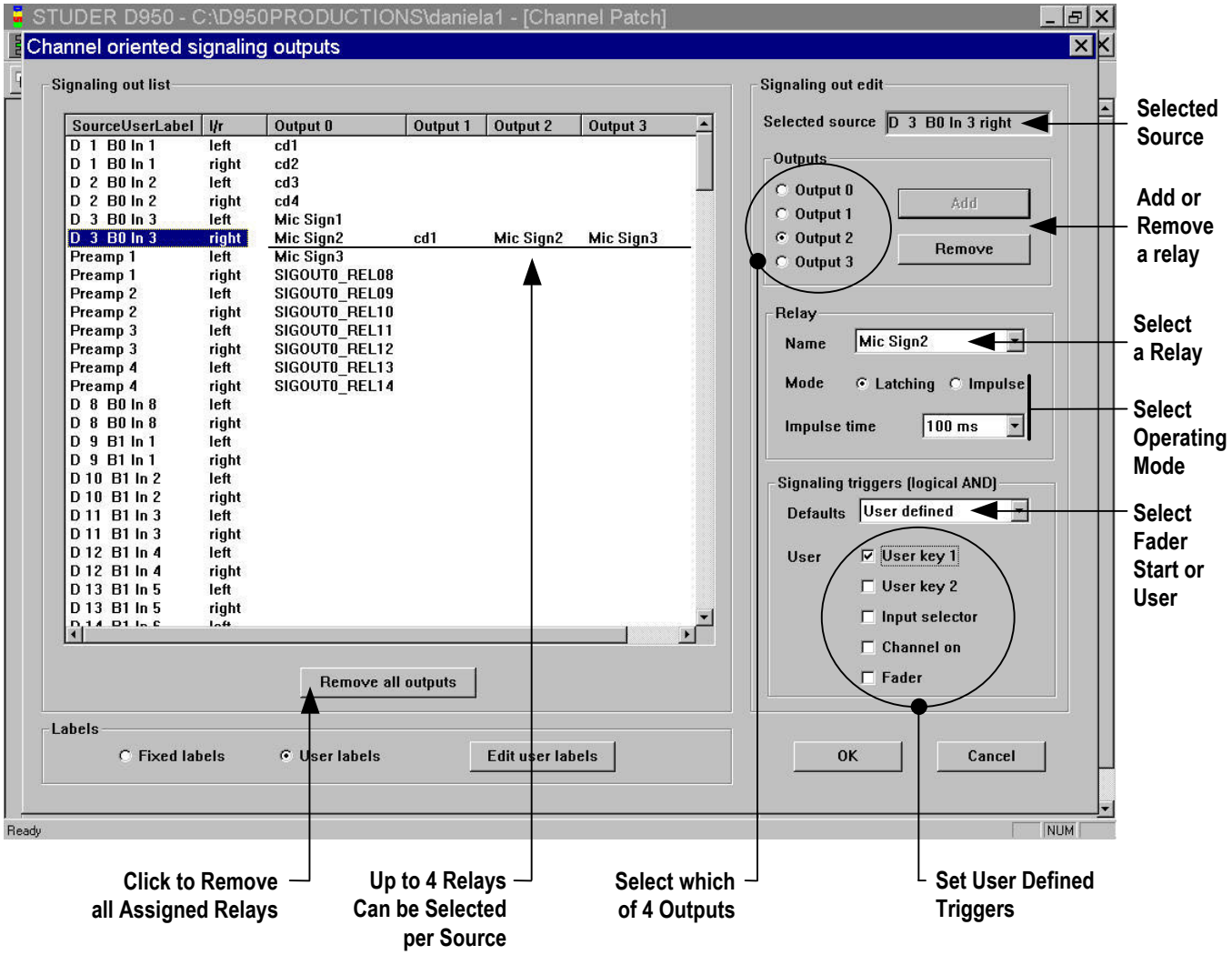
Signaling Outputs are generally relays installed in the Monitoring frame. They may be used for various purposes, such as:

- Fader Start;
- Microphone ON actions (loudspeaker muting, etc);
- Parallel Record/Ready mode of tape-machine tracks.

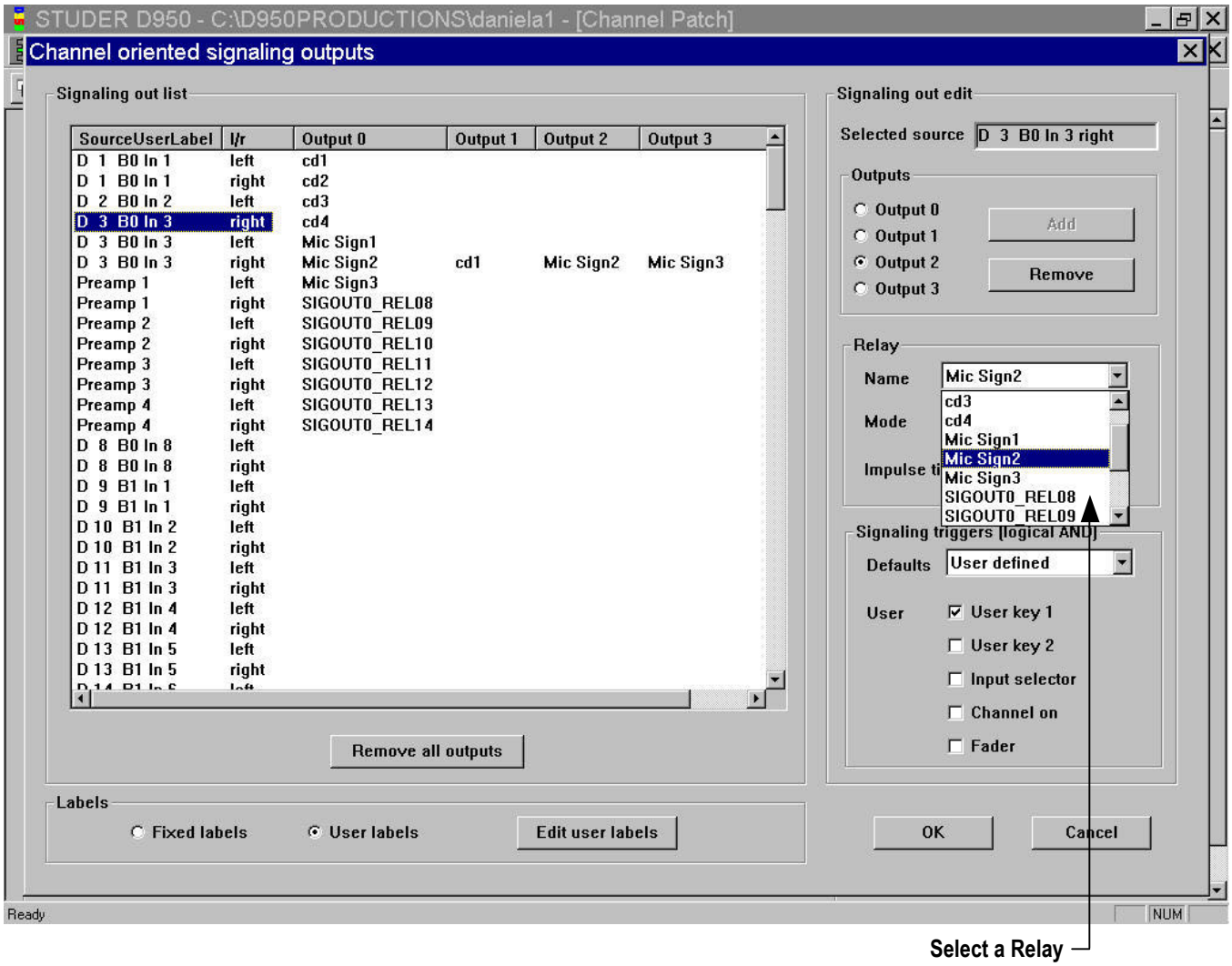
Up to four different relays may be configured for each source. They may feature different Trigger Setups (see later). For each relay, Latching or Impulse operation modes can be selected.
Multiple sources can be configured to one single relay, forming a logical OR combination.

There are four steps in the Signaling Configuration:

1. To configure the Signaling, first select a source in the Signaling Out List,
2. Within the Signaling Out Edit window, select the desired output 0 to 3. In most cases the correct Output (the next one that is unassigned) will be selected automatically. Now you can add or remove a relay to/from this source.



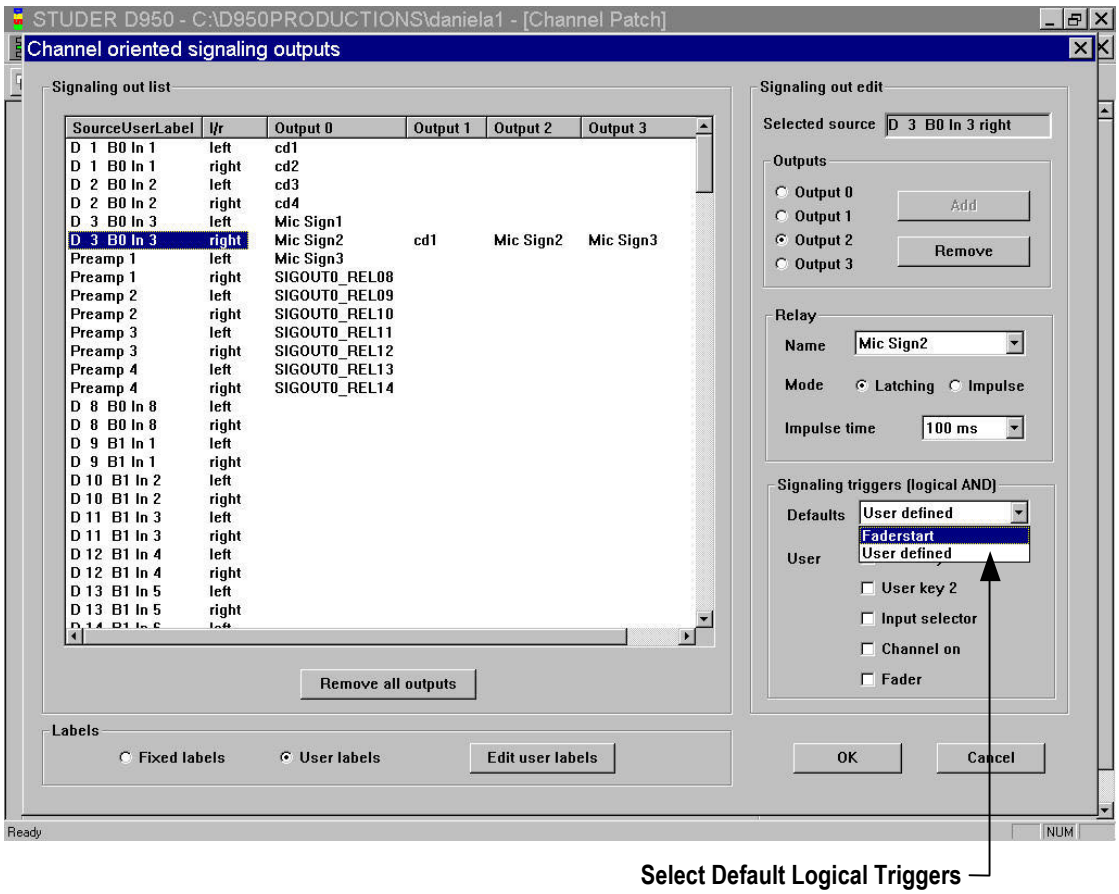
3. Now you need to select the desired relay (use the arrow button to open a list of relays), and to determine its mode of operation to either latching (contact closed when trigger conditions are fulfilled) or impulse (contact closed for a short time when trigger conditions are fulfilled, and then opened again). Impulse mode closure time can be set to 100 or 200 ms.



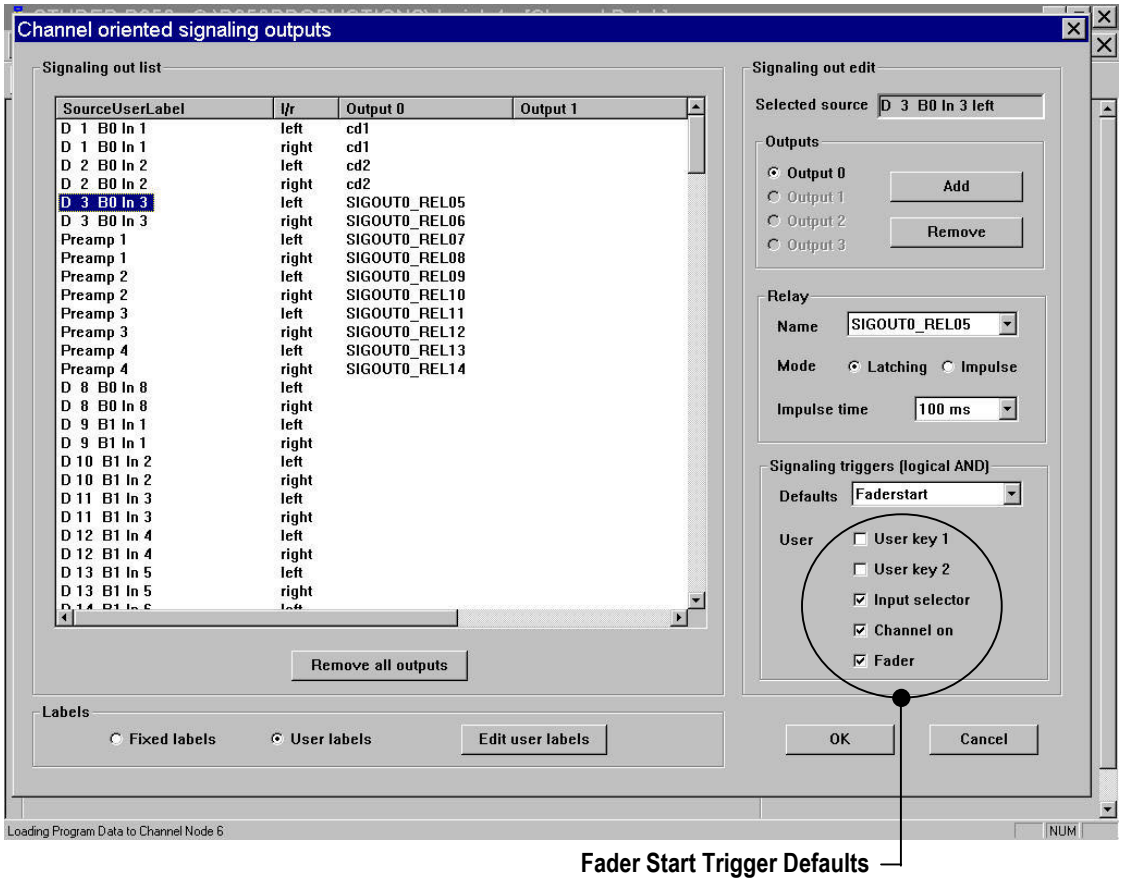
4. The Triggers have to be set according to the application of the selected relay. All Triggers always work in a logical AND fashion:
   - The desired Source must be patched into the appropriate Channel (implicitly understood and done in the Patch), and

   There is the possibility to check up to five other Triggers to finally trigger the relay:
   - User key 1, *and*
   - User key 2, *and*
   - Input Selector, *and*
   - Channel On (MUTE), *and*
   - Fader open.

   Any combination of the five possibilities above can be used. It is also possible to select from a default list of pre-configured Trigger combinations:
   - Fader start, *or*
   - User Defined.



Typical fader start setup for two stereo sources (D1 and D2):



The typical Fader Start Trigger combination is:
- Input selector, *and*
- Channel on (MUTE), *and*
- Fader (open).

You can also remove all assigned relays from the list by clicking on the Remove all outputs button.

☞ **Tip** For a typical stereo source, such as a CD player, the same relay should be configured for both the left and the right signal part, as shown in the example above for D1 (relay *cd1*) and D2 (relay *cd2*). This action ensures that the CD player will start even if it is connected to two Mono Input Channels, and only *one* of the faders is opened.

4.7.6.3 Red Light Configuration

Generally, Red Light Outputs are relays installed within the Monitoring frame. Usually only one relay is used for the global Red Light Signaling, but several relays can be configured independently if more than one Studio exists.

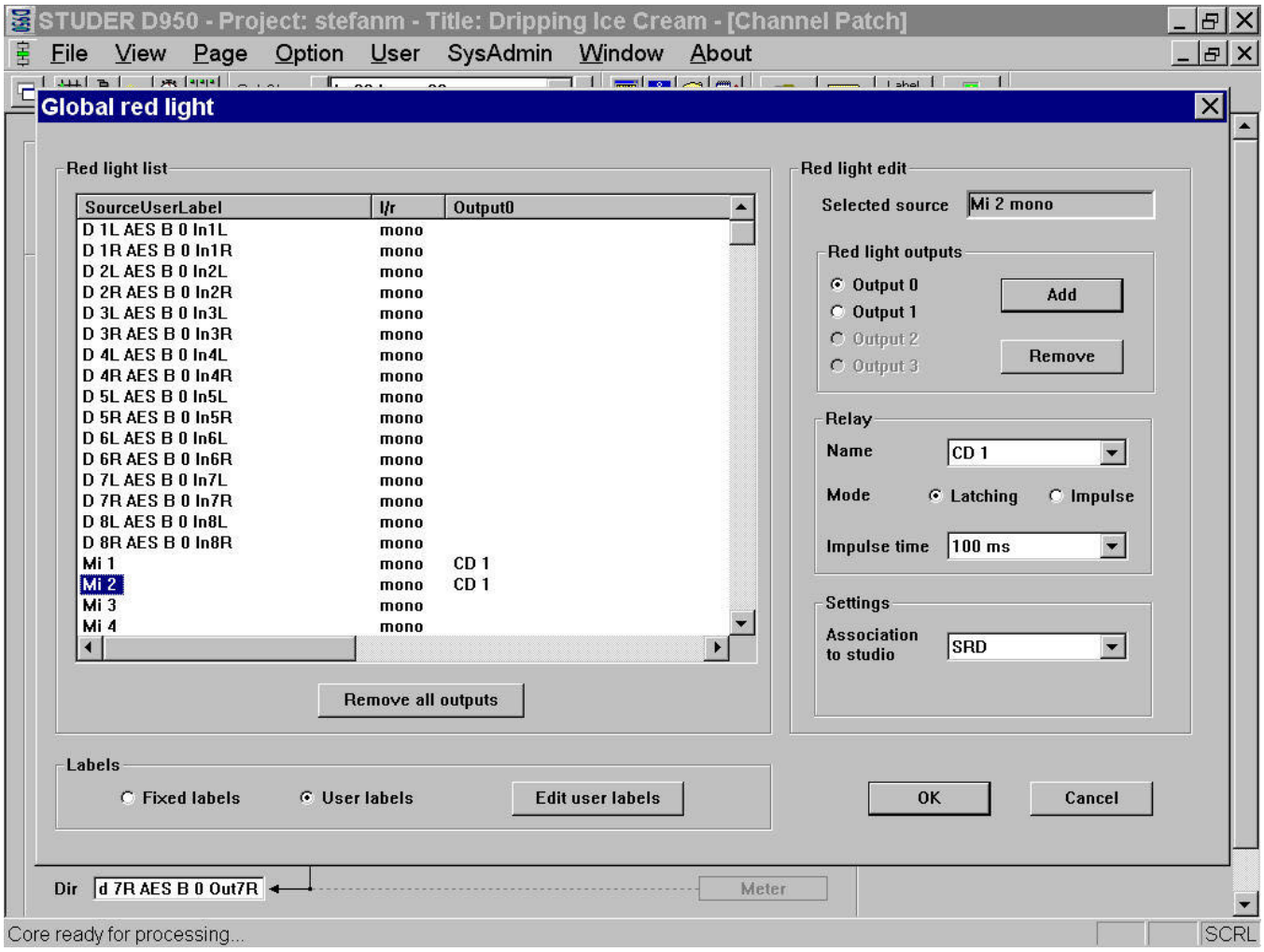
The Trigger conditions for a Red Light relay to be activated are fixed to the following:
- A Source configured for Red Light is patched to a Channel, *and*
- The Input Channel Input Selector is set to the above Source, *and*
- The Input Channel Fader is open, *and*
- The Input Channel ON (MUTE) is open, *and*
- The Input Channel is routed to at least one Master Bus, *and*
- The Master Channel Input Selector is set to the above Source, *and*
- The Master Channel Fader is open, *and*
- The Master Channel ON (MUTE) is open.

In other words, the audio signal has a fully open path from the Source to the Master Channel output. If an Input Channel is routed to a group only, then the Group has to be routed to a Master, etc., to fulfill the Trigger conditions.

Multiple sources are usually configured to one single relay – they form a logical OR. For instance, all Mic Inputs from the same room would be configured to the same Red Light relay.

There are four steps in the Red Light Configuration:

1. To configure the Red Light, first select a source in the Red Light List;
2. You can then add or remove a relay to/from this source in the Red Light Edit window.



3. Now you have to select the relay itself (use the arrow button to open a list of relays), and to determine its mode of operation to either latching (contact closed when trigger conditions is fulfilled) or impulse (contact closed for a short time when trigger conditions is fulfilled, and then opened again). Impulse mode closure time can be set to 100 or 200 ms. Obviously, the actual relay that is externally wired for Red Light must be selected.
4. In the Settings window, an association to a Studio can be set. Usually, only one Studio is being used. If, however, more than one Studio should be present, each may require its own Red Light relay and its configured Sources. In this case, several relays can be configured independently. To select a Studio, click on the arrow button, and select a studio from the list. If a Studio is associated, the Red Light will also be shown on the Desk's Studio Monitor Unit.

   You can also remove all assigned relays from the list, by clicking on the Remove all outputs button.

4.7.6.4 Load Signaling Configuration

This action opens a window that allows selection from existing Signaling Configurations to load into the D950/Vista. The `C:\D95ØSYSTEMDB` directory will usually be displayed first, and a Session Configuration must be selected. The Signaling Configuration files have a `*.sig` extension. This process will load all stored relay assignments for both the Signaling Out and the Red Light Configurations, and the relay User Labels.

4.7.6.5 Save Signaling Configuration As

This action opens a window that allows entry of a new name for the Signaling Configurations to be saved. The `C:\D95ØSYSTEMDB` directory will usually be displayed first, and a Session Configuration must be selected. The Signaling Configuration files have a `*.sig` extension. This process will save all relay assignments for both the Signaling Out and the Red Light Configurations, and the relay User Labels. Any number of such Configurations can be stored and loaded at a later date.

Note: Each title contains at least one `*.sig` file that holds the signaling settings of the time when the title was closed or saved manually.

4.7.7 SysAdmin: Control Group Assign

4.7.7.1 Control Group Basics

A Control Group is a group of console channels controlled by a Control Group Master (CGM), similarly to the VCA groups in analog consoles.

Control Group Master

The Control Group Master is a dedicated channel of a special type. The sole purpose of the Control Group Master is to control the audio functions of its Members.

Up to 32 Control Group Master channels can be defined in the Session Configuration. The number of each Control Group Master is shown on the 7-segment display in the channel strip of each CGM, following the rule:

Control Group No.	Display
1	0
2	1
...	...
10	9
11	A
12	b
13	C
14	d
15	E
16	F
17	0.
18	1.
...	...
26	9.
27	A.
28	b.
29	C.
30	d.
31	E.
32	F.

The Control Group Master channel controls the audio functions of the Members. Master channels can be assigned to desk strips in the same way as any other console channel. The desk strip to which a Control Group Master is assigned will display the following:

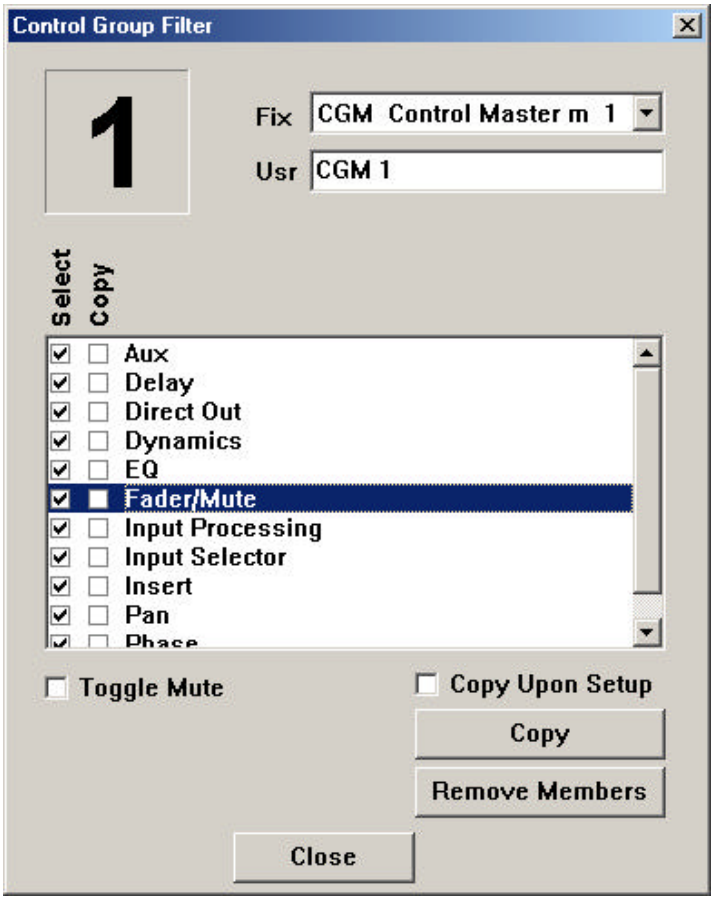
- Control Group Master numbers in the seven-segment display next to the fader: 0 through 9, characters A through F (and, for numbers above 16, the same but followed by a decimal point, as shown in the table above);
- The Fixed Label is set to CGM (Control Group Master), but can be set to display user labels such as DRUM, LVOX, BVOX, RTHM, etc. in the Control Group Filter dialog box in the GC.

Control Group Members

Control Group Members can be selected to and deselected from a Control Group during the console operation. This is done in a special Control Group Edit mode. Any console channel can be selected as a member in a Control Group. The members can be “stolen” from one Control Group to another.

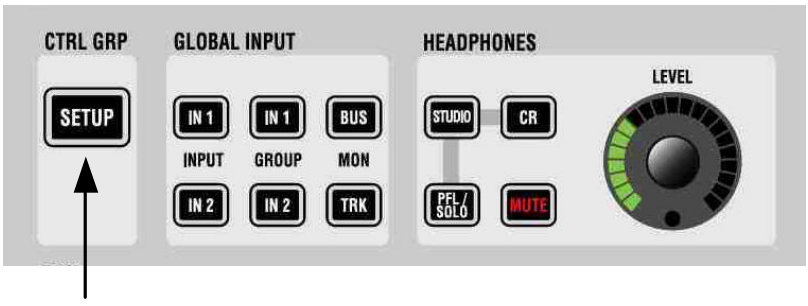
When a channel is selected as a member in a Control Group, its channel strip displays the Control Group in the seven-segment display next to the fader in the same manner as described above.

Operating an audio parameter on the Control Group Master influences that parameter on all members (if that parameter has been selected in the Control Group Filter Dialog Box during Control Group Edit mode). It offsets the member value by the move amount of the Master. Operating the parameter on the member influences only that member's parameter.

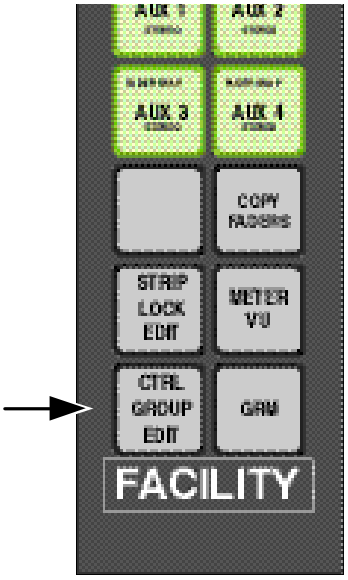


Control Group Setup The Control Groups are edited in the Control Group Setup Mode. This mode is activated through the **CTRL GRP: SETUP** key *(Vista)* or the **CTRL GROUP EDIT** key *(D950)*.

Vista:



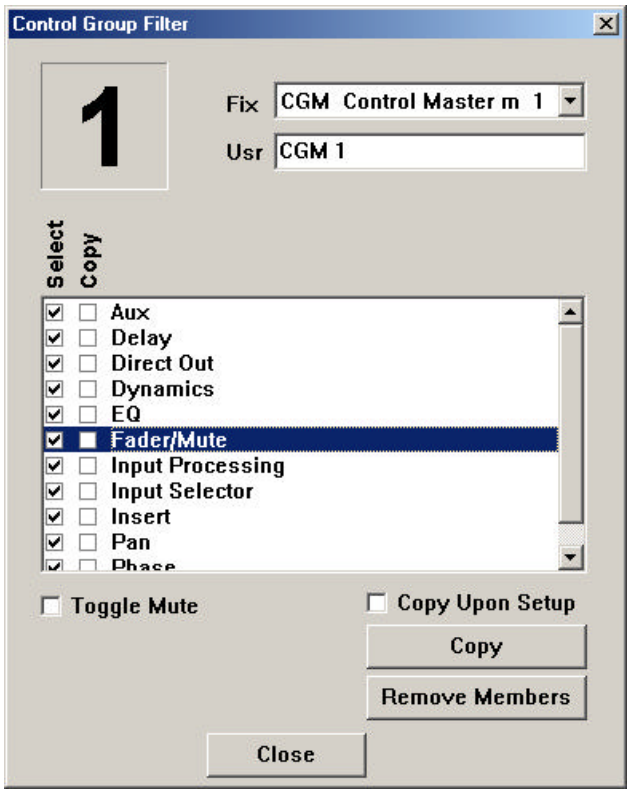
D950:



On first press, the **CTRL GRP SETUP / EDIT** key is lit to show that an activity has been started but not yet finished. All **SEL** *(D950)* or **LINK/SEL** *(Vista)* keys of Control Group Master channels are half-lit. Pressing one of these enables setting up the corresponding Control Group. The **LINK/SEL** keys of the Control Group members are lit, the ones of non-members are half-lit. The Graphic Controller automatically activates the Control Group Filter dialog (see above) for the selected Control Group.
When a Control Group is selected for editing, member channels can be added or removed from the Control Group by using their **LINK/SEL** keys. If the **MULTI SEL** key *(Vista only)* is deactivated, all members are cleared upon pressing any **LINK/SEL** key, similar to creating a gang. During editing, the Control Group is not active, i.e. the setting of the Control Group Master can be changed without influencing the members. This can be used to adjust the offset between the Master and the Members if required.
Editing a control group can be terminated either by pressing the **LINK/SEL** key of the master, or by exiting setup mode by pressing the **CTRL GRP SETUP/EDIT** key in the control bay. If you now want to proceed with editing of another control group, first deselect (using the **LINK/SEL** key) the Control Group Master you have just finished with, and then select the new one that you wish to edit.

Control Group Filter

When Control Group Editing is activated, the Graphic Controller automatically activates the Control Group Filter dialog box for the selected Control Group:



In the Control Group Filter dialog, the user can define functions to be grouped or not. To group the desired function, the appropriate Select checkbox must be checked. If Select is unchecked, the functions' control can be moved freely without influencing the members. Normally, when the members are grouped, their local values of Fader/Mute are left untouched

when the group is formed – they are grouped in a relative way. If absolute grouping is desired, values can be copied from the master to the members:

- By checking the Copy Enable checkbox and clicking on Copy;
- By completing the editing of a group while the Copy Upon Setup checkbox is checked.

There is also a context menu available, called up by right-clicking within the edit dialog:

- If the cursor is placed over the Select items, the menu allows to check or clear all select boxes;
- If the cursor is placed over the Copy column, the menu allows to check and clear all copy parameters;
- and if it is placed over a white space, it does both.

Note: The Control Group Filter dialog box can also be started by clicking on the Control Group Filter item on the Options menu of the Graphic Controller. Clicking on the Close button does *not* terminate the Desk editing mode.

Absolute/Relative Faders are implicitly controlled in a relative way. This means that all the members will remain in relative positions to each other when the Master Fader (or other control) is moved. The member Faders can be forced to match the Master Fader using the Copy function in the Control Group Filter dialog, see above.
Muting can be controlled absolutely and relatively. The relative (Toggle) mode for the Mutes can be selected by the user in the Group Filter dialog. If selected, the Mutes can be set to On or Off on the members and will be toggled when the Master Mute is used. If Toggle is not selected, all Mutes on the members will be forced to the same status as the Master Mute the next time the Master Mute is used, regardless of their original status.

Member Behavior When a new member is added to a Control Group, it keeps its values until a change is made in the Control Group Master. At that moment, the change is transferred to all members. When a member is separated from a Control Group it keeps its current setting which includes the Master offset(s) that have been applied along the way. Member values can be changed locally at any time, without affecting the status of the other members or of the Control Group Master.

Over-Range All controls can have an over-range. The over-range condition can occur if the Member Fader has reached its top or bottom position while the Master Fader is still moving. During over-range, the relative levels of the members are kept intact, even if the Fader (and the audio level) can not move anymore.
Over-range can be positive or negative. The maximum value of over-range can be twice the normal working range of the Fader (100 dB) in both up and down directions.
The over-range of a Member can be zeroed easily. Simply move the Fader of a Member in over-range by a bit, and the over-range will be zeroed.

Note: This will, however, clear the initial relative level of that particular Member with respect to the other Members.

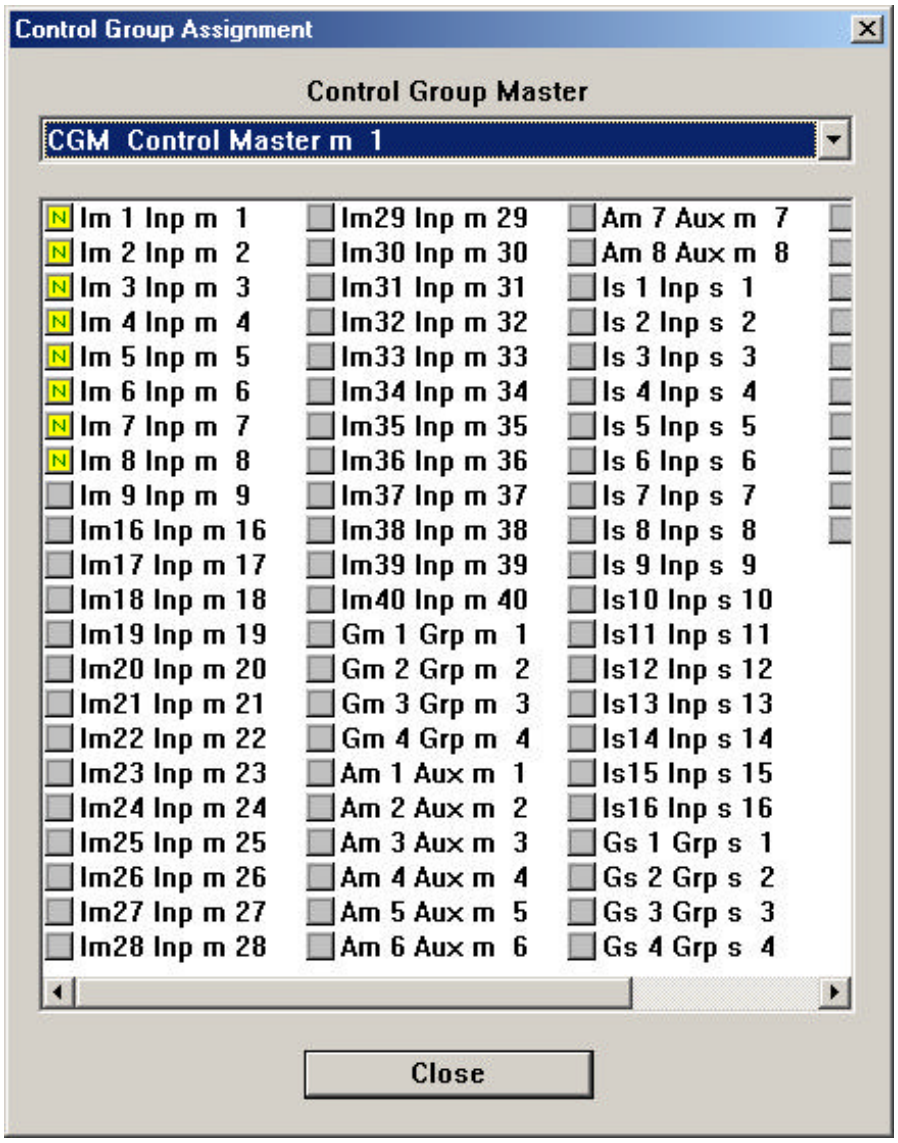
Snapshots Control Groups are part of the snapshot. Their data comprise three parts:

- Members of a Control Group (which channels are Members in a Control Group);
- Control Group settings (filter and Copy settings);
- Parameter values of the Control Group Masters.

4.7.7.2 Control Group Assignment

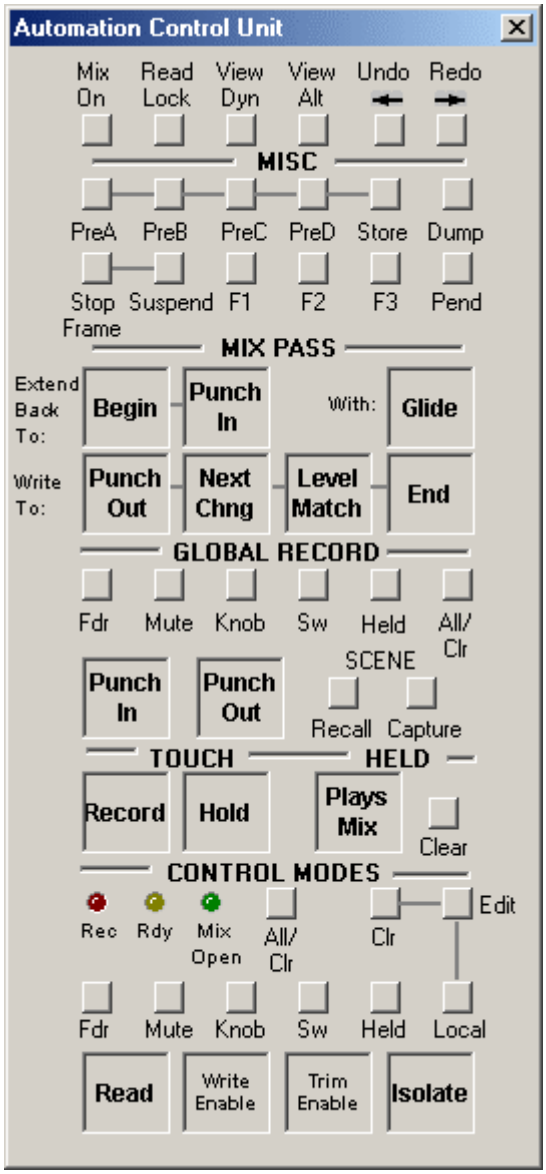
A Control Group Assignment dialog window can be started from the Sys-Admin (System Administration) menu in the Graphic Controller. This window allows to view the members for a selected Control Group and to edit the members by clicking or dragging them graphically on the screen. Selection of the control group to be edited is not synchronized with the Desk selection – so two different control groups can be viewed at a time.
The Control Group Assignment window serves a similar function as the **CTRL GROUP SETUP / EDIT** key on the control surface, except assignments are made via software, and the Control Group Filter window does not open.

To assign a channel to a Control Group, select a Control Group Master using the pop-up menu in the field at the top of the window. Channels can be assigned or de-assigned by double-clicking the channel's name. Keep in mind that a channel can belong to only one Control Group at a time. If assigned, a yellow N will appear in the box to the left of the channel name, and the number of the Control Group will be displayed in the channel's fader. Control Group Assignments are stored within Snapshots and Presets.

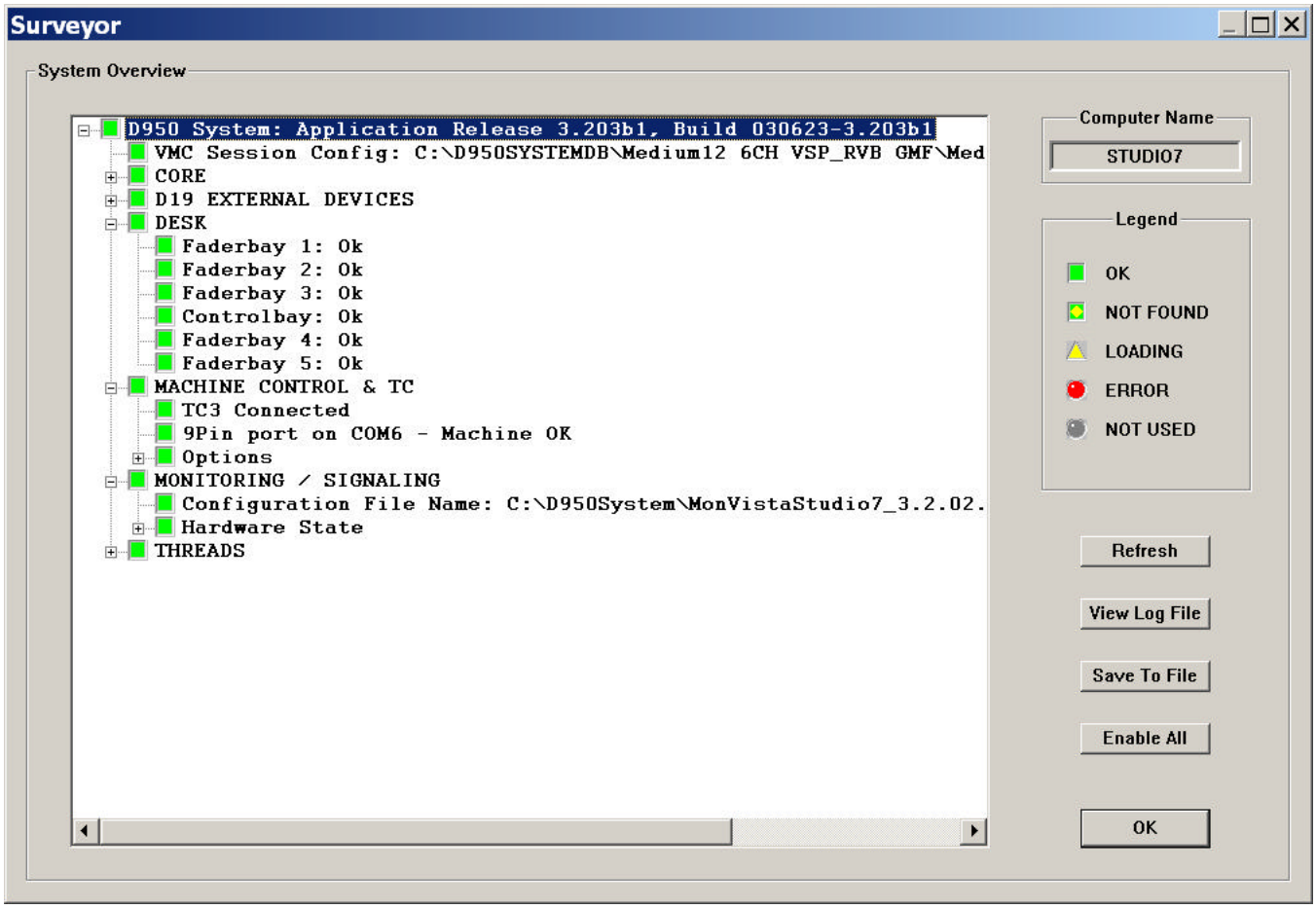


4.7.8 SysAdmin: Virtual ACU

Virtual ACU: This action brings up the Virtual Automation Control Unit. This screen duplicates the controls and indicators found on the control surface Automation Control Unit panel. This provides PC control of the AutoTouch+ Dynamic Automation system (if installed) when troubleshooting from a remote location, or when the control surface is not available.



4.8 Fifth Level of Operation: The Surveyor



The D950/Vista constantly monitors the status of all major hardware and software systems. This information is provided to the user via the Surveyor. The Surveyor is also the primary diagnostic tool used for troubleshooting and fault finding.

The Surveyor displays its information in two ways:

- The icon shown on the Surveyor Button in the Toolbar;
- The Surveyor page.

The Surveyor Button: When enabled, the Surveyor button is located in the Toolbar. It is intended to keep the operator informed about general system status. The button's icon changes to indicate the overall condition of the D950/Vista. These indications are as follows:

Yellow triangle: Loading. The system is booting (look at the Status Bar);

Green square: OK. The console will operate normally;

Green square with yellow diamond: Not Found. A system element cannot be found. This is sometimes seen as a Session Configuration is loading. If this icon remains on, a problem is indicated. The status bar will prompt you to check the system's status;

☞ **Tip** Sometimes an element cannot be found just because it has not been switched on.

Red circle: Error. An error, fault, or failure is detected in the system. This is sometimes seen as a Session Configuration is loading. If this icon remains on, a problem is indicated. The status bar will display "Check Status;"

Grey circle: Not Used. A system element is defined but is not in use.

Surveyor Page: The Surveyor Page may be opened from the SysAdmin menu or by clicking on the Surveyor button. The main window contains all the major system elements displayed as a directory tree. The status icon at the start of each directory indicates the general status of its contents. These icons utilize the same indication system as the Surveyor button (see above).

If all elements display the OK icon (green square), the system will operate normally. If any of the directories display the Error icon, it can be opened to determine which of its contents has a problem. Since some system elements have many subsystems, several nested subdirectories might be contained within the main directories. As with the typical Windows directory system, directories that contain subdirectories have a "+" symbol on the left of the status icons. To open these directories either click on the "+" symbol or double-click the directory name or status icon. It might be necessary to open several directories to find the specific element that is having a problem.

Surveyor Tools: The Surveyor features several tools to enhance its operation. These are available as buttons on the Surveyor Page:

- *Refresh*: Real-time updates of system element icons are not provided when the Surveyor Page is open. If a fault is corrected during troubleshooting, the system must be re-interrogated before the Surveyor Page will display the result. Clicking the Refresh button will survey the entire system and display the current the status of all elements.
- *View Log File*: This tool allows the D950/Vista Log Files to be viewed from within the Surveyor.
- *Save Log File*: This button saves the current D950/Vista Log File.
- *Enable All*: It is possible to tell the Surveyor to ignore some problems by right-clicking on one of the red symbols. This will make the main symbol in the task bar remain green, even if there is an error reported

in some sub-area. “Enable All” clears these exceptions and makes the Surveyor work as usual. *Inactivated sub-areas are always re-activated upon system startup for safety reasons.*

- *OK*: Clicking this button will close the Surveyor Page.

Surveyor Information: When it is initially opened, the Surveyor displays some information without the need to open any directories or subdirectories:

- *Computer Name*: This field displays the name of the PC that is being used to control the D950/Vista system;
- *D950/Vista System*: This is the main directory in the Surveyor, which contains all of the other system element subdirectories. It’s name displays the D950/Vista software Application Release number (version) and the Build number. This directory will always be open to show the primary system element subdirectories (and their status) when the Surveyor is opened;
- *VMC Session Config*: This item displays the currently loaded Session Configuration file in a directory name format, such as: `C:\D950SYSTEM\VMC` directory `name\VMC name.vmc`.

☞ **Tip** Other current system files (such as monitor files) may be found within the Surveyor, but will be nested within subdirectories.

CHAPTER 5

5 AUTOTOUCH+ DYNAMIC AUTOMATION

5.1 Getting Started Quickly

This short introduction to the AutoTouch+ Automation is meant to give the user an easy entry point in order to start working with the dynamic automation. For simplicity some facts are not totally accurate and may have exceptions. Also it is possible to modify the behavior of AutoTouch+ automation very much by varying option settings. In order to get a detailed overview of all available functions, please refer to chapters 5.2 and up.

For Beginners: We recommend to set the automation to factory default settings. This is done by exiting the Vista/D950 application and deleting the `C:\D950system\D950ofla.mop` file. After restarting the application, you have the factory default settings applied.

5.1.1 Basics

The operation is based on the individual channel strip as well as on the AutoTouch+ panel, located near the center of the console.

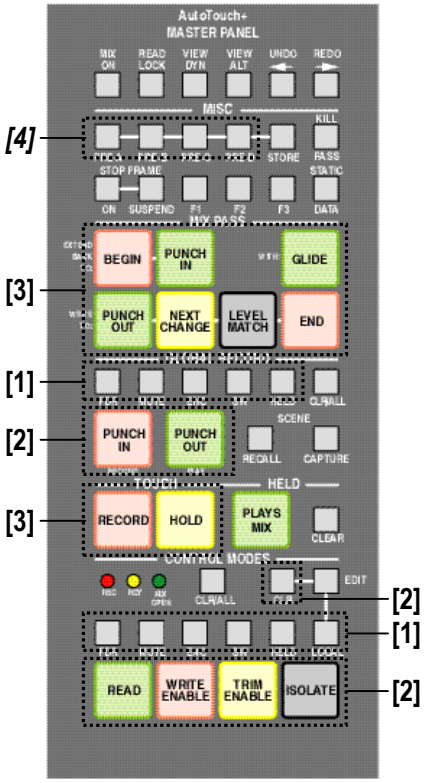
Definitions:

Objects: An "object" in the context of the AutoTouch+ automation is any channel parameter, such as a fader, a key (for e.g. switching an EQ on and off), or a knob (for adjustment of anything like gain, etc.).

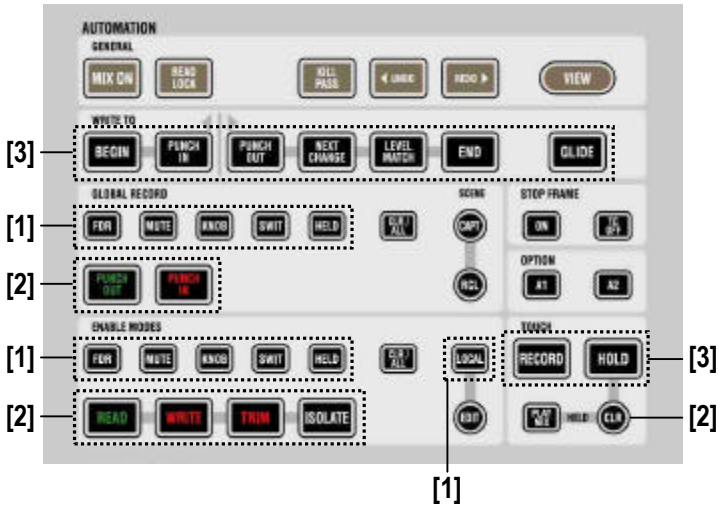
"Held" Objects: This is an object being touched with a finger (or an object after being un-touched, but with the un-touch suppressed by a special mode). Held objects are indicated by underlined values *(Vista)*, displayed fader values in dB *(Vista)* or an associated LED being lit *(D950)*.

5.1.2 The AutoTouch+ Panel

D950:



Vista:



Most keys on these panels can be roughly divided into three or four groups, respectively:

[1] Pre-selector keys
[2] Action keys
[3] Mode keys
[4] *Setup keys (D950 only)*

Pre-selector Keys [1] These keys select the group of functions that will be influenced by the action keys located below them: **FDR**, **MUTE**, **ENC / KNOB**, **SW / SWIT**, or all current **HELD** objects. The pre-selectors for faders, mutes, encoders/knobs, and switches influence the whole console, not only specific channels.

Action Keys [2] These keys perform an immediate action when pressed, e.g.:

- **PUNCH IN**, **PUNCH OUT**
- Set objects into **READ**, **WRITE** , **TRIM** , or **ISOLATE** mode
- **CLR** (clear) the "held" state of all held objects

Mode Keys [3] These keys put the automation into a specific mode, influencing its behavior for the next time the corresponding event occurs, e.g.:

- **GLIDE** will switch on or off the glide mechanism for *upcoming* punch-outs.
- **HOLD** will suppress the *detection* of the physical un-touch of an object. The object will therefore stay in a "held" state.

Note: This key will only influence *future* physical un-touch of objects.

- **RECORD** tells the system whether it should punch-in when (upcoming) touches are being detected. If this switch is off, the automation is in an "audition" or "rehearse" mode.

- **WRITE TO: LEVEL MATCH**, **NEXT CHANGE**, **END**, and **PUNCH OUT** will write the value *at the time of punch-out* possibly further ahead, rather than immediately stop recording. The neutral setting is **PUNCH OUT**. This will record no more after punch-out.
- **EXTEND BACK TO:** *(D950)* / **WRITE TO:** *(Vista)* **BEGIN**, **PUNCH IN:** These keys can only be activated *before* starting a mix pass. They will write the value at the time of punch-out as a constant value back to the begin (setting **BEGIN**) or back to the point where the user punched in (setting **PUNCH IN**).

Application Examples:

In **WRITE** *mode:*

1 Correcting a constant value throughout a mix (**WRITE TO: BEGIN**)

2 In a music mix, when a solo is played: For finding a value while listening and applying the final value to the whole passage (**WRITE TO: PUNCH IN**).

In **TRIM** *mode:*

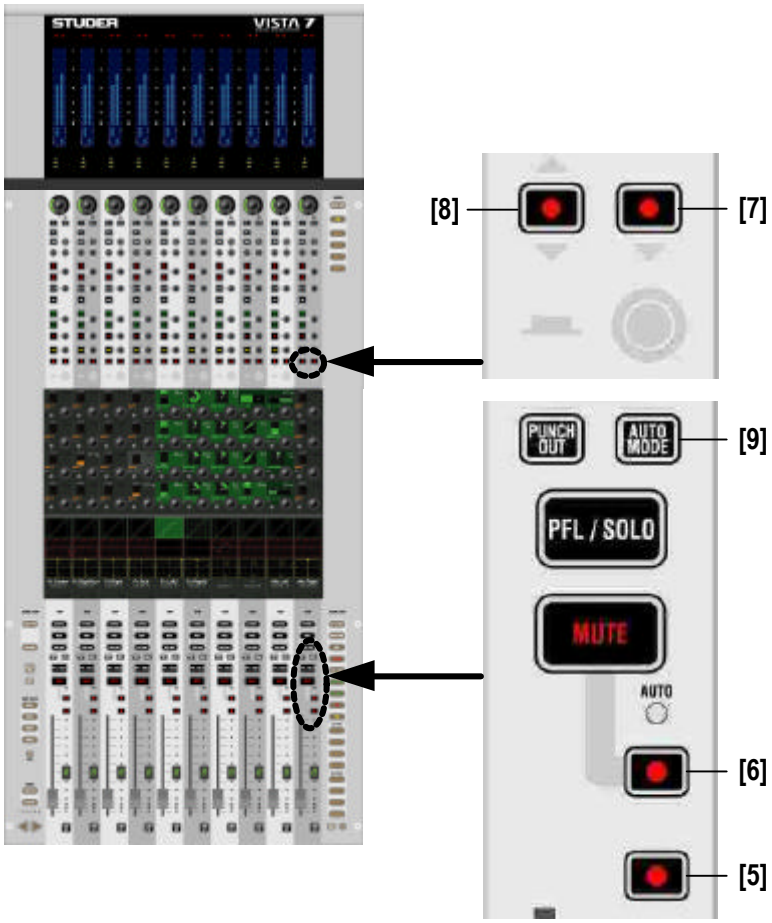
1 Trim an object back to the beginning of a mix while keeping its movements (**WRITE TO: BEGIN**)

2 Trim an object by a constant value between punch-in and punch-out point, while keeping the movements (**WRITE TO: PUNCH IN**).

Setup Keys [4] (D950 only): *For storing or recalling mix option settings which define the behavior of the automation system. Such a preset contains all option settings and can either be assigned to specific keys or just stored in files.*

5.1.3 Automation Keys on the Channel Strips

Vista:



Punch IN/OUT: Four keys are representing the recording state of its member objects:

[5] Fader

[6] Mute

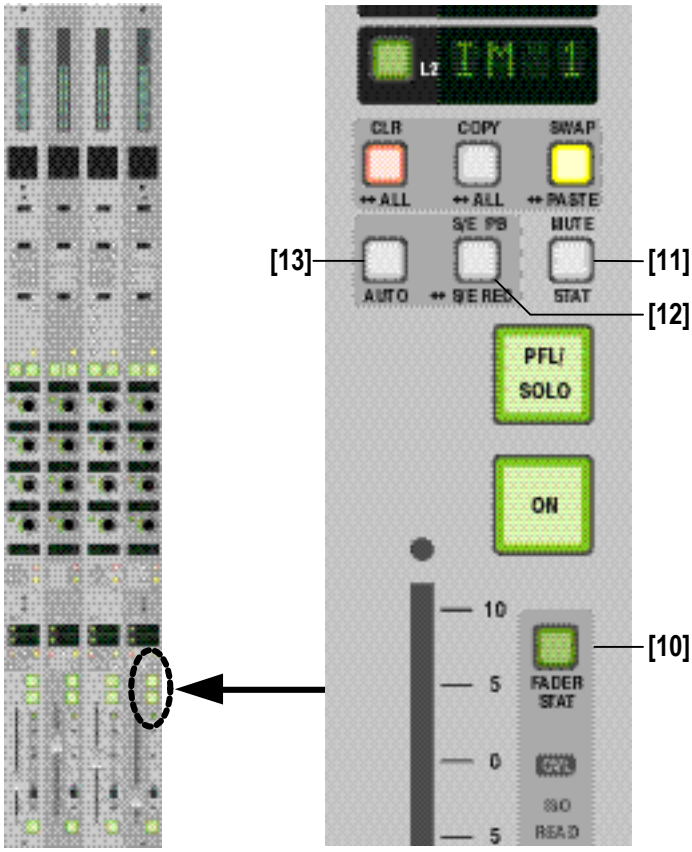
[7] Knob

[8] Switches

AUTO MODE [9]: Toggles between different automation modes: READ, WRITE, TRIM, ISOLATE. As a standard, only the objects selected in the "pre-selector area" of the AutoTouch+ panel (e.g. FADER) are toggled, but not the whole channel.

This key has also the important function to suppress the detection of a physical touch or un-touch of any objects. It is therefore possible to modify a value without putting the object into "held" mode. Or – vice versa – it is possible to physically un-touch an object so that the automation doesn't detect the un-touch (object is still considered as "held"). This is the reason why this key is sometimes referred to as "modifier key".

D950:



Punch IN/OUT: Three keys are representing the recording state of their member objects:

[10] FADER STAT

[11] MUTE STAT

[12] S/E PB, S/E REC (S/E stands for switches and encoders/knobs)

AUTO [13]: Toggles between different automation modes: READ, WRITE, TRIM, ISOLATE. As a standard, only the objects selected in the "pre-selector area" of the AutoTouch+ panel (e.g. FADER) are toggled, but not the whole channel.

This key has also the important function to suppress the detection of a physical touch or un-touch of any objects. It is therefore possible to modify a value without putting the object into "held" mode. Or – vice versa – it is possible to physically un-touch an object so that the automation doesn't detect the un-touch (object is still considered as "held"). This is the reason why this key is sometimes referred to as "modifier key".

If this key is lit, the fader is in "held" state.

5.1.4 Mix Passes

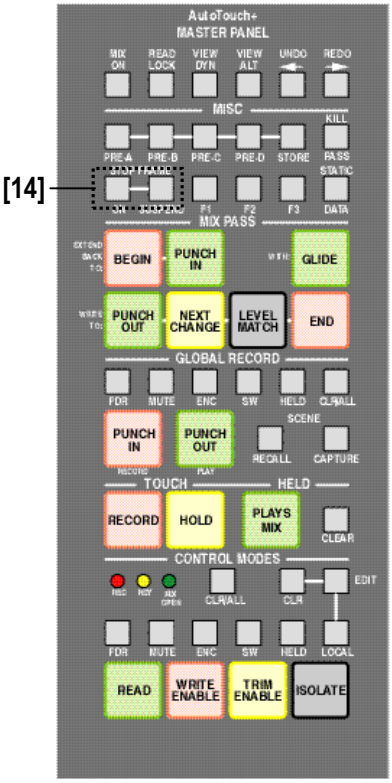
Normally a new mix pass is automatically being created when play speed of incoming timecode is detected. A mix pass finishes upon detection of non-play speed.
In order to record slower than play speed (slow motion) or even write automation data between two locate points, it is necessary to start and stop a mix pass manually.

Note for D950 Users: *Recording in slow motion is only possible when using the Studer TC3 timecode reader or newer.*

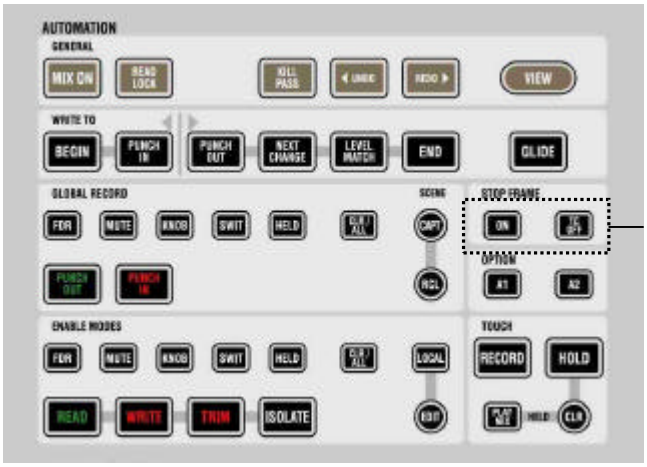
A mix pass is manually started by switching Stop Frame automation on using the **STOP FRAME** keys [14]. It is finished when this key is switched to off again.

Note: The automation cannot record backwards; the automation records data up to any incremented timecode value. Therefore it is not possible to erase data by going backwards using the jog wheel.
In order to locate precisely to a certain frame without "overshooting", it might be useful to suspend the reading of timecode while searching for that specific frame. This can be done by activating the **TC OFF** *(Vista)* or **SUSPEND** *(D950)* key.

D950:



Vista:



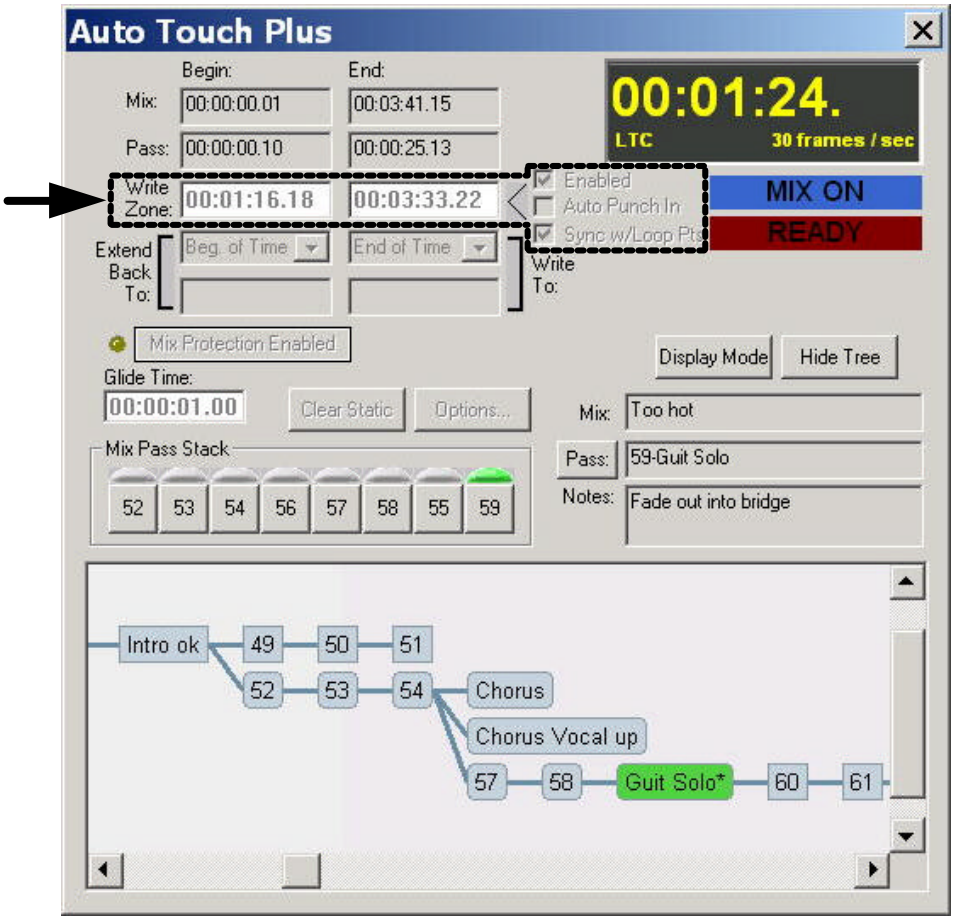
Example: The user wants to write data between 1:00:01:00 and 1:00:09.20, using the jog wheel to locate both points precisely.
Procedure:

1. Find the starting point with the jog wheel.
2. Start a mix pass by switching **STOP FRAME** on.
3. Punch-in requested objects.
4. Activate **TC OFF** *(Vista)* or **SUSPEND** *(D950)*.

5 Locate the end point 1:00:09:20 using the jog wheel (the user can freely jog around this point and even overshoot in order to locate precisely). It is possible to use locate commands as well.
6 Deactivate **TC OFF** *(Vista)* or **SUSPEND** *(D950)*. ⇒ Automation data is written up to the current timecode value.
7 Finish the mix pass by switching **STOP FRAME** off.

5.1.5 Write Zones

In order to protect any passages from being overwritten by automation data, it is possible to define a write zone in the graphical controller. If activated, it is not possible to write any data outside that zone. When working together with machine control (looping), it is possible to synchronize this write zone constantly with the set In and Out points of the machine control.



5.1.6 How to...

...put the whole console into write mode?

Activate pre-selector keys **FDR**, **MUTE**, **KNOB/ENC**, **SWIT/SW** (or press the **ALL/CLR** key) and press automation mode **WRITE** (make sure you have **TOUCH RECORD** active in order to record any changes against timecode).

...put all faders into write mode?

Select **FDR** as pre-selector and press **WRITE** underneath in order to put all faders into write mode (make sure you have **TOUCH RECORD** active in order to record any changes against timecode).

<**Option**> There is an optional setting (see menu "Automation Options…", "Control Modes", "Mode Enable sets non-selected to READ", also refer to chapter 5.21.2) which determines whether the non-selected functions (e.g. **MUTE**, **KNOB / ENC**, **SWIT / SW**) will change their state to READ or whether they don't change their automation state when putting the faders into WRITE.

...put a group of faders into write mode? ***(Vista)***

Select **FDR** as pre-selector (section **ENABLE MODES)** and create a gang of the channels that should change their automation mode to Write. Then toggle through the automation modes by pressing the **AUTO MODE** key on any of the linked channels several times, until the automation state indication on the TFT says "W" (make sure you have **TOUCH RECORD** active in order to record any changes against timecode).

...use "Rehearse" mode?

Basically you just have to switch off the **RECORD** key. This will prevent all upcoming touches from switching into recording. To rehearse some settings, you will normally have **HOLD** on, since you want your settings to stay when you physically un-touch an object. In this way you will see all objects you changed in order to rehearse some alternate settings indicating "held" state, either by underlined values (Vistonics module) or in the fader case by the displayed dB values. You can now stop the tape, rewind, and all objects will stay "held". Now you activate the **HOLD** key from the pre-selectors of the section **GLOBAL RECORD** (**PUNCH IN / PUNCH OUT**) and play the tape again. When you press the **PUNCH IN** or **PUNCH OUT** key, you will now put all your rehearsed objects in and out of recording.

Note: If objects are moved in rehearse mode, you will always hear what you see. However, if you want to switch over and hear the underlying original mix, simply activate the **PLAY MIX** key.

...correct a mix pass and let the automation take over whenever the level matches?

Select **WRITE TO...: LEVEL MATCH**. Please note that these **WRITE TO...** keys will only affect automated objects *after* they are punched out. This is to prevent unwanted punch-outs while you are still touching an object and doing corrections. In order to move e.g. a fader manually over the point of level match and make it punch-out upon level match, you need to punch-out first and afterwards touch the fader again "without the automation detecting the touch". This means you will have to hold down the **AUTO MODE** modifier key when touching the fader again. Now you can move the fader towards the point of expected level match. As soon as this level is reached, this fader will stop recording.

There is also an alternate way of suppressing the detection of the touch: Switch **TOUCH RECORD** off and then touch the fader, followed by a manual movement over the point of matching levels.

...activate a glide on one channel while another one shouldn't glide back?

As stated above, **GLIDE** is a mode key and does only influence upcoming punch-outs. You can switch this key while mixing.
E.g.: **GLIDE** is off and you punch-out channel 8. It will punch-out without gliding. Then you switch **GLIDE** on and punch-out channel 9. Since **GLIDE** mode is now activated, channel 9 will punch-out and glide back to the value of the last mix pass.

...keep an object in "held" mode while another one should not be held?

There are two easy ways for this. The first one is similar to activating and deactivating **GLIDE**: Switch **HOLD** on and physically un-touch an object – it will stay "held". Change the **HOLD** state to off, and the next time you physically un-touch an object it will also come out of "held" state.
A second way is to hold down the **AUTO MODE** modifier key while releasing an object. This will invert the **HOLD** state for that specific event.

Note: The behavior of the modifier key can be defined in the automation options (Misc, Modified Un-touch Inverts) whether **TOUCH RECORD** or **TOUCH HOLD** will be modified.

...make an object louder for the entire mix while keeping its movements?

In the **MIX PASS** *(D950)* or **WRITE TO** *(Vista)* section, activate **EXTEND BACK TO / WRITE TO BEGIN** and **WRITE TO END.**
Select **TRIM** mode for the desired objects (section **ENABLE MODES / CONTROL MODES**, use pre-selectors). Start a mix pass and move the desired objects by the amount you want them to be corrected.
In this case the movements of the objects will be kept, only the "offset" will be written to the new mix pass.

Note: When **TRIM** mode for faders is selected, the faders will jump to the 0 dB position and therefore indicate the correction level rather than the real fader values.

Vista: The real values will still be displayed in the touch-screen area. On rotary controls, Vista will display the amount of corrections in digits while displaying the real values graphically.

...erase all movements of an objects on the entire mix? Or, how to...
...turn a "dynamic object" back into a "static object" again?

In the **MIX PASS** *(D950)* or **WRITE TO** *(Vista)* section, activate **EXTEND BACK TO / WRITE TO BEGIN** and **WRITE TO END.**
Select **RECORD** mode for the desired objects (section **ENABLE MODES / CONTROL MODES**, use pre-selectors). Start a mix pass and set the desired objects to the value you want to have for the entire mix. This will write the level at the time of punch-out to the time between **END** and **BEGIN**.

Note: The exact meaning of **END** and **BEGIN** can be defined on the graphical controller screen, but defaults to "begin of mix" and "end of mix".

5.2 Now the Details: Introduction

Welcome to the AutoTouch+ dynamic automation system for Studer D950 and Vista digital mixing consoles. For new D950 and Vista users, AutoTouch+ provides a powerful and comprehensive automation system that is easy and efficient to use. For current D950 users, V3.0 AutoTouch+ is a major revision to the previous AutoTouch system (V2.5 or earlier). While maintaining many of the V2.5 operations, AutoTouch+ provides a multitude of refinements, new features, and options. All users will find the flexibility to work in the way most appropriate for the task at hand without overly complicated procedures. Users will also find the power to efficiently create and fine-tune the optimal mix.

AutoTouch+ allows any control defined within a VMC file to be automated. This includes faders, encoders, switches, and bus assignments. Connections made within the new and improved General Patch, audio oriented objects in the Channel Patch, and select Graphic Controller (GC) menu items may also be automated.

5.2.1 About this Chapter

Assumptions: This chapter is designed to explain the operation of the Studer AutoTouch+ dynamic automation system. It will prepare the reader for basic to advanced operation of the system. It assumes the user will have basic D950 familiarity and operational proficiency. The full understanding of many of the terms and concepts depends on this familiarity. Refer to the Console Operation chapters of the D950 and Vista manuals as necessary.

Redundant Information: In several chapters information is repeated. This is to accommodate those who will use this document as a reference, only going to the chapter(s) in which help is needed. Redundant chapters will become obvious to those who will read this document as a text, and may be skipped as desired.

Conventions: Automation in V2.5 software and earlier software is known as AutoTouch. In V3.0, it is known as AutoTouch+. The similarities of the names may be confusing, so for the purposes of this document, older versions of AutoTouch may be referred to as V2.5 and AutoTouch+ as V3.0.

Disclaimer: The information provided in this document is as accurate as possible at the time of its creation. Minor difference may be present in the final release version and in subsequent releases.

This document is designed to provide information to those new to D950 and Vista, as well as long time D950 users. Basic information is sometimes presented and is not intended to offend advanced users.

5.2.2 Description

AutoTouch+ is a software and hardware package that is fully integrated into Studer D950 and Vista digital audio mixing systems.

Software: AutoTouch+ is part of the V3.0 software package. V3.0 represents a major revision to the D950/Vista system software and in addition to the overhaul of the automation, it contains other new features and bug fixes that address other parts of the system. There is also a set of ancillary software (much of which is new) that supports system operations.

The AutoTouch+ portion of the V3.0 software provides a clear and easy to use human interface. Its intuitive and uncluttered windows have control and display elements whose labels and screen positions are obvious to their purpose.

Hardware: AutoTouch+ requires a new Automation Master Panel. For current D950 users, the new panel will replace the old AutoTouch panel in both M2 and Classic work surfaces. The panel is an integral part of the Vista desk surface.

The Automation Master Panel integrates the software and work surface aspects of the system. It also provides a logical and ergonomic interface for the user.

User Release Notes: For details of the V3.0 package, please refer to the Studer D950 Version 3.0 User Release Notes. This document provides information regarding the installation and use of the V3.0 software set. Details of AutoTouch+ is provided in this document.

5.2.3 V2.5 vs. V3.0

AutoTouch+ is an evolution of the original D950 AutoTouch system. Because of this, operation of AutoTouch+ is very similar to V2.5 automation. If desired, AutoTouch+ may be set up to emulate the operation of previous versions.

Being a major revision, AutoTouch+ also goes well beyond the capabilities of V2.5 or earlier systems. It permits the most complex automation tasks to be carried out within a clear and logical workflow while remaining straightforward and simple to operate.

5.2.3.1 New Features

There is an impressive array of new features built into AutoTouch+. A summary of these features follows.

New Mix Management: Automation Mix files are managed via a new Mix Tree System (MTS). The MTS will work in conjunction with the expanded Mix Pass Stack (8 Mix Passes). Each and every Mix Pass will be automatically saved and archived within the Mix Tree. Multiple Mix Trees can be created within a Title. Any previous mix can become the Active Pass (or Read Mix Pass) for a subsequent Record Mix Pass. The MTS is maintained between sessions, so that when a mix is recalled days or weeks later, the entire Mix

Tree will be available to the new session. The Mix Tree may also be hidden so that all mix management can be done within the Mix Pass Stack. At any time the Mix Tree may be made fully visible again. Mix Passes may be named and comments may be added. A full mix link history is maintained.

Static Objects: When a mix is first created (when a Mix Tree is first opened) all automatable controls are Static Objects. Static objects act just like manual controls except that their final setting is remembered by the automation. All controls remain Static until a Dynamic move is recorded.

Any switch, fader or rotary control (automation objects) may be classified as a Static object. They may be adjusted at any time during the mix process without needing to put them into a WRITE or RECORD automation mode (similar to mixing on an analog console). The value of all static objects is maintained on a pass-by-pass basis. This simplifies the "tweaking" of the hundreds of controls within a mix session that must be adjusted, but will never change at timecode locations. Should a Dynamic move be required for a Static object, the move can be simply written into the mix, and the object is transformed automatically into a Dynamic automation object. This simple and effective system will greatly enhance the mix process and dramatically improve mix efficiency.

Independent Automation Modes: Different channels may be in different automation Control Modes. For example some channels may be in WRITE while others may be in TRIM. In addition, different controls (objects) within channels may be in different modes. For example the fader may be in TRIM, while the mute is in WRITE, and the rotaries are in READ. Any combination is possible.

Touch Record Function: Touch Record allows an enabled control to enter RECORD when touched. With Touch Record turned off, a control be auditioned before it is punched-in to Record. With Touch Record engaged touching a Held enabled control will permit an intentional "jump level" punch-ins if the Audition value is different from the Read Mix value.

Touch Hold Function: With Touch Hold engaged, the setting of a touched control will be maintained when it is released. If Touch Record was enabled before the control was touched, it will stay in RECORD upon release. Touch Hold can function for faders, rotaries, and switches and can work in READ, WRITE, and TRIM modes.

Held Plays Mix: This feature allows the read mix to be heard, even though one or more objects are being held in an audition state awaiting a punch-in. This allows true emulation of the resultant mix, while the mix pass is being run.

Mix Pass Control: Full flexibility is allowed for how a new Mix Pass automatically merges with the Active Pass Read Mix data. The setting of a control when it is punched out may be written to the punch-out point; the next data change in the read mix; when a level match occurs (auto-takeover); or the end of the mix, the end of time (23:59:59:2x), or a fixed cue point. In addition, the setting at the punch-out point may be extended back to the punch-in point, the beginning of the mix, the beginning of time (00:00:00.00), of a fixed cue point.

Enhanced Glide Control: When the Glide function is active, every transition between the Read Mix data and the new pass will Glide from one to the other according to the current glide time. In addition, some Glide transitions may be optionally set to "back time" the Glide so that they are completed at the desired edit

point, rather than started there. Also, specific Glide transitions may be suppressed while others are allowed.

Scene Capture: Any specific set of controls, their settings, and automation modes can be saved in the Scene buffer. This allows the exact settings of those controls to be punched into the mix at a later time when the scene occurs again.

Read Lock: This forces the automation system to playback the current Active Mix and ignore any and all key and control changes. This ensures a perfect audition playback or layback to the final master record machine.

Real Time Switch Editing: Switch data may be edited in real time allowing the movement of the in-point and or the out-point, as well as adding or deleting Mutes and Ins or Outs.

Event List Editor: All automation events may be edited (moved, copied, or deleted) offline using the Event List Editor.

Full Offline Editing: The D950 OFLA application is integrated in AutoTouch+. Mix data comprising the entire mix, or any specified objects for any specified time range may be changed, merged, or copied with other mixes or itself.

Protection: Any set of controls may be placed in a protected status. Protected controls playback their recorded moves, but are prevented from being enabled for Write or Trim operations. This is useful for protecting channels or controls that have already been written, while working on other aspects of the mix.

Write Zone: A Write Zone may be specified so that no data can be written outside the time range specified. This is useful for working on a specific scene or section while protecting the rest of the mix from accidentally writing into it. This will also facilitate the automatic punch-out (with or without glide) at the end of the Write Zone.

Auto-Punch: When Auto-Punch is active the system will automatically punch Write Enabled controls into RECORD at the beginning of the Write Zone.

Stop Frame Automation: The Stop Frame automation feature makes it possible to write specific control values between timecode locations. The user can stop timecode playback at a specific location, set any number of controls to desired values, and move to the next location forward in time where values may again be adjusted. The initially set values will be recorded between the timecode locations.

New Automation Master Panel: A new Automation Master Panel is required to run AutoTouch+. It will replace the existing Master Panel in both Classic and M2 versions of the D950 work surface. (V3.0 software will run on the D950 without the new panel, but the automation system will be inoperative.)

5.2.4 Operational Philosophy

The automation system follows the paradigm that there is audio under each control. It is as if this were a conventional analog moving fader system, in which case the fader position *always* represents the audio level. This is referred to as WYSIWYH ("What You See Is What You Hear"). However, in order to enhance the operation of the system, this rule is broken from time to time. Those cases will be noted and they are the exception. The general rule is WYSIWYH.

Formula Based System: In order to make a very powerful system, that is also easy to understand, the system is based on a set of consistent Rules that pertain to the behavior of each mode or function. It is the consistency of these Rules, that allow the system to be simple to understand, yet very deep and powerful.

To these Rules, Conditions and Options may be imposed that further define the behavior of the basic modes or functions. It is these Conditions and Options that add extra facility and flexibility to the system.

Options essentially "fine-tune" the functionality or operation of specific areas of the system.

The combination of Rules, Conditions, and Options allows the user to start using the system in a basic and easy to use manner. As familiarity increases (and based on the needs of the production), more complex operations may be carried out by applying the appropriate Conditions and/or Options. The system also provides extreme flexibility so operation may be essentially "customized" to the task at hand and/or the working style of the user. The net result is a powerful and flexible automation system, that is easy to use, but can address even the most complex needs of any production.

Rules: Rules define the basic behavior(s) of a control, function, or feature. The basic Rules are simple and straightforward. In the simplest form, these Rules will dictate the basic functionality of the system. In this regard, Rules mostly apply to the basic modes of operation, but it should be noted that all aspects of the system have their own set of rules.

In some cases the Rules will be broken or modified depending and the exact function will be determined by a given set of Conditions and Options.

Conditions: Conditions further define the behavior(s) of a control, function, or feature. They are imposed by the selection of combinations of modes/features and in some cases by way in which controls are operated. Conditions may be influenced by the selected set of Options.

Options: Options apply operational or functional details to specific areas of the system. Options further define the behavior of the associated mode, control, feature, or function. In some cases, Options may influence the system independently of the Rules and Conditions being applied. Options are set by selecting the appropriate tab on the Mix Options page. They are indicated throughout this document within brackets, i.e. **<Option>**.

Operational Formula: The essential aspect to understanding the system is the following formula:
Rules + Conditions + Options = Exact Function
The key to efficient operation is knowledge of this formula and the elements within. Rules provide the basis of operation and functionality, Conditions further define behaviors, and Options provide specific parameters to the various elements being used.

In some instances (such as Switch and GC automation), the operation of the control will also influence its functionality. However, in the majority of cases the formula above will apply.

Document Note: *When appropriate this document will organize information with the operational formula in mind.*

Functional Formula: Three basic areas should be kept in mind when conducting most AutoTouch+ operations:

- Selected Control Mode: Basic operating modes (READ, WRITE, TRIM, and ISOLATE). Refer to chapter 5.6.
- Selected Touch and Hold Functions: Determine the effects of touching a touch-sensitive control or operating a switch. Refer to chapter 5.7.
- Transition of data: How the data transitions between previously recorded data and newly recorded data. Refer to chapter 5.9.

If these areas are considered, especially when learning the system, logical and predicted results will routine.

5.3 Essential Concepts

In addition to the various Rules, Conditions, and Options, there is a small set of "essential concepts" that must be understood when operating Auto-Touch+. An explanation of these concepts follows.

5.3.1 Static and Dynamic Objects

One of the primary tenants of the AutoTouch+ system is the concept of Static and Dynamic controls. By definition, the value of a Static control is remembered by the system, but does not change during the course of a Mix Pass. Dynamic controls are defined by having one or more changes recorded at specific timecode locations within a Mix Pass.

Note: The terms "objects" and "controls" may be used interchangeably.

5.3.1.1 Static Objects

The addition of Static (objects) controls allows mixes to be created in much the same way as mixes would be made on an analog console with fader/mute automation, but with the power to automate any audio control as needed (not just faders and mutes). Once set to the desired values, the vast majority of controls will not need to be automated. However during the course of a mix, the engineer may need to periodically adjust the settings of these controls (such as "tweaking" an EQ). As with an analog console, the new values will be applied with the expectation that settings will be retained from Mix Pass to Mix Pass. In AutoTouch+, Static controls will perform in this manner and allows the user to work in a very familiar and intuitive fashion.

Static Objects: A Static object is defined as any automatable control that has no dynamic changes recorded within the Mix Pass. Therefore, Static objects retain one value throughout a Mix Pass. Any switch, fader, rotary control and some GC items (automation objects) may be classified as a "Static object." Static objects act just like manual controls except that their final setting is remembered by the automation. They may be adjusted at any time during the mix process without needing to put them into a WRITE or RECORD automation mode or needing to update the Mix Snapshot. The value of all Static objects is maintained on a pass-by-pass basis. This simplifies the "tweaking" of the hundreds of controls within a mix session that must be adjusted, but will never move against timecode.

All objects are Static until a dynamic move is recorded. Should a dynamic move be required for a static object, the move can be simply written into the mix, and the object is transformed automatically into a Dynamic automation object.

Note: If a control is put into Isolate, it's static value will not change. If changed while in Isolate, the control's current value will be heard, but its Static value will not be updated in subsequent Mix Passes.

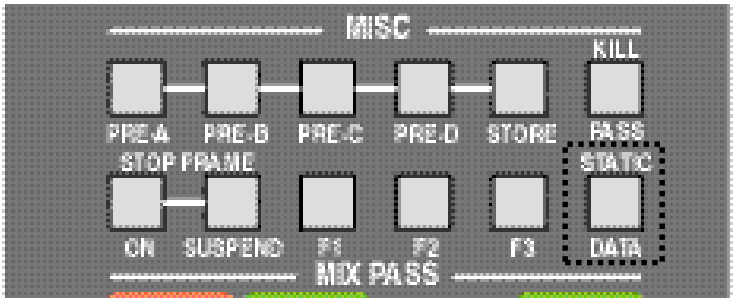
Changing Static Values: When a new mix (Mix Tree) is first opened, the Static value for every control is stored in the first Mix Pass. The stored Static values will be the current values of all controls at the time the new Mix Tree was created.

This value will be retained in subsequent passes unless the Static value is changed.

Any time a control is adjusted (without being in RECORD), its Static value will change. In other words, Static values may be changed as long as RECORD is not engaged for the control.

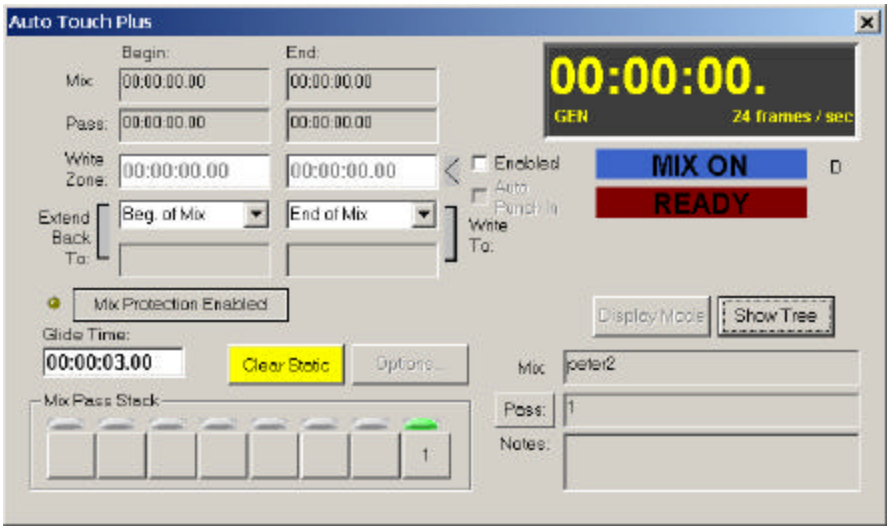
Static Data Buffer: Changed Static values are temporarily stored in the "Static Data Buffer." The next time a new Mix Pass is created (usually by recording a Dynamic change on another control), the contents of the Static Data Buffer will be stored in the new pass. The old Static values will be retained in the previous pass. The new values will be retained in any new Mix Passes made from the just created pass. The Static Data Buffer may be cleared by clicking the Clear Static button in the AutoTouch+ window. D950 users may also use the **STATIC** key on the Automation Master Panel. In this way, Static Values may be "Auditioned".

D950:



Clear Static Button: The Clear Static button in the AutoTouch+ window (and the **STATIC DATA** key on the D950 desk AutoTouch+ Panel) has two functions:

- When lit, the Clear Static button indicates there is information in Static Data Buffer and there is a difference between the current Static values and those stored within the Active Mix Pass.
- Pressing/clicking the Clear Static button clears the values in the Static Data Buffer and restores those stored within the Active Mix Pass. Clearing the Static Data Buffer cannot be undone.



Notes: There is no **STATIC** key on the Vista work surface.
Static data may also be cleared by clicking the Clear Static button in the AutoTouch+ window.

When the first Static object is changed within a Mix Pass, the **STATIC** key illuminates. As mentioned above, this indicates that there is data in the Static Data Buffer. The values in the Static Data Buffer will be retained and the button will remain lit until one of two things occur:

- A new Mix Pass is created;
- The **STATIC** key is pressed.

Note: Static values can only be cleared on a global basis and cannot be cleared individually.

When a new Mix Pass is created, the current Static values are written to the new pass and the Static Data Buffer clears. When the Static Data Buffer is cleared with the **STATIC** key, the temporary Static values are erased and the Static values stored in the current pass (Active Pass) are restored. In either case the **STATIC** key goes out.

Note: Static objects are new in V3.0.

<Option> In the Automation Options... menu, item Misc (also refer to chapter 5.21.8), static objects can be protected under certain circumstances.

5.3.1.2 Dynamic Objects

A Dynamic object is defined as any automatable control whose value changes at one or more timecode location within a Mix Pass. Any switch, fader, rotary control, and some GC items (automation objects) may be classified as a “Dynamic object”. All moves applied to a Dynamic object are remembered by the automation and replayed at the corresponding timecode location.

Dynamic controls may be adjusted at any time during the mix process and recorded to a new Mix Pass using WRITE or TRIM automation modes. In this way, the value of selected Dynamic objects is updated from pass to pass. Dynamic controls may also be Auditioned and/or “pre-set” before a punch-in.

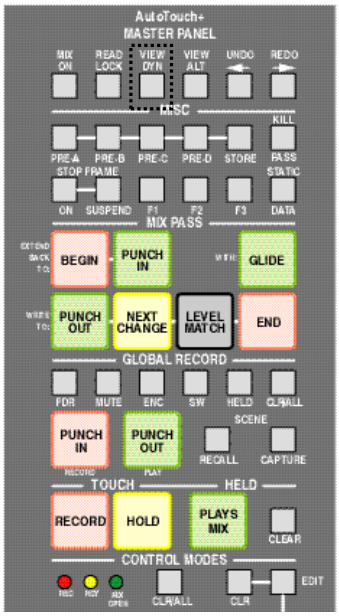
All objects will remain static until a move is recorded. Once a move is recorded, the object becomes a dynamic control. A dynamic control may be made static by erasing all recorded moves for that control for the entire pass.

The majority of this document discusses the automation of Dynamic controls.

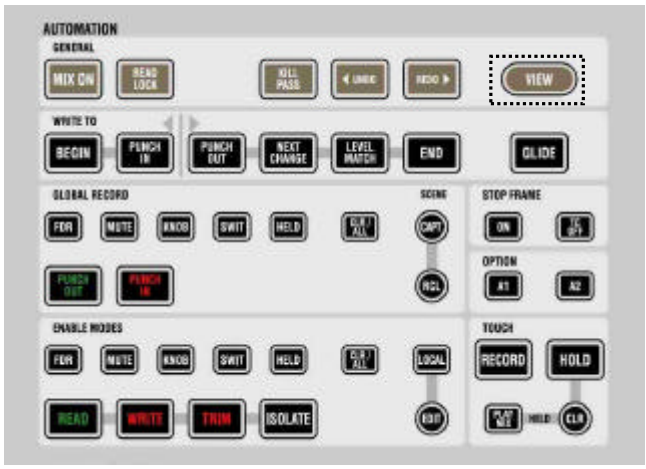
VIEW / VIEW DYN key

Pressing **VIEW** *(Vista)* or **VIEW DYN** *(D950)* will cause the lights for all dynamic controls currently on the work surface to illuminate. This provides a very quick and easy means of identifying dynamic controls.

D950:



Vista:



5.3.1.3 Mix Snapshot

The Mix Snapshot contains two types of data:
- The values for Static objects.
- The initial values for Dynamic objects from the beginning of the Mix Pass up to the first recorded change.

Every Mix Pass has a Mix Snapshot. When a Mix Tree is first opened, a Mix Pass is created that contains a Mix Snapshot with a Static value for each control. The Static value stored in the Mix Snapshot is the current value of the control at the time the Mix Tree was first opened. As a mix progresses the following operations occur:
- Changes to Static values are written directly to the Mix Snapshot each time a new Mix Pass is created.
- Changes made to Dynamic objects are written to timestamps (timecode locations) within the Mix Pass.

When changes are made to Static Objects, the Mix Snapshot is automatically updated when the next Mix Pass is generated.

The Mix Snapshot for Dynamic objects may be updated in two ways:
- Using the “Extend Back To Begin” Mix Pass function. The value of the control at the time of a punch-out will be written back to the beginning of the Mix Pass (essentially updating the Mix Snapshot).
- Performing a “Update Mix Snap” edit using the OFLA offline mix editor.

In normal V3.0 operation, use of the Mix Snapshot is mostly transparent to the user and there is no need for manual updates.

5.3.2 Touch & Un-touch Events

Another crucial, but easy to understand concept is that of Touch and Un-touch. AutoTouch+ is a very tactile system and relies on physical actions for efficient operation. Faders and encoders are touch-sensitive and can be made to respond in different ways depending on the mode and operation being performed. Switches and automatable GC items are not sensitive to physical touch, but their actuation can generate similar messages as faders and encoders.

Touch Events: The physical touching of a fader or encoder produces a "Touch Event." Actuating an automatable switch or GC item may also generate a Touch Event, depending on the current mode.

Un-touch Events: The physical release of a fader or encoder produces an "Un-touch Event." Automatable switches and GC items may also generate an Un-touch Event, depending on the current mode.

Events and AutoTouch+: In most cases, Events come in Touch and Un-touch pairs…that is a Touch followed by an Un-touch. An example would be touching a fader, moving it for a short period of time, and then releasing it. When the fader was first touched, a Touch Event will be sent and when released an Un-touch will be sent. AutoTouch+ will either use both Events, ignore both Events, or suppress one or the other. Details of how these events are used and the operations this makes possible are discussed throughout this document.

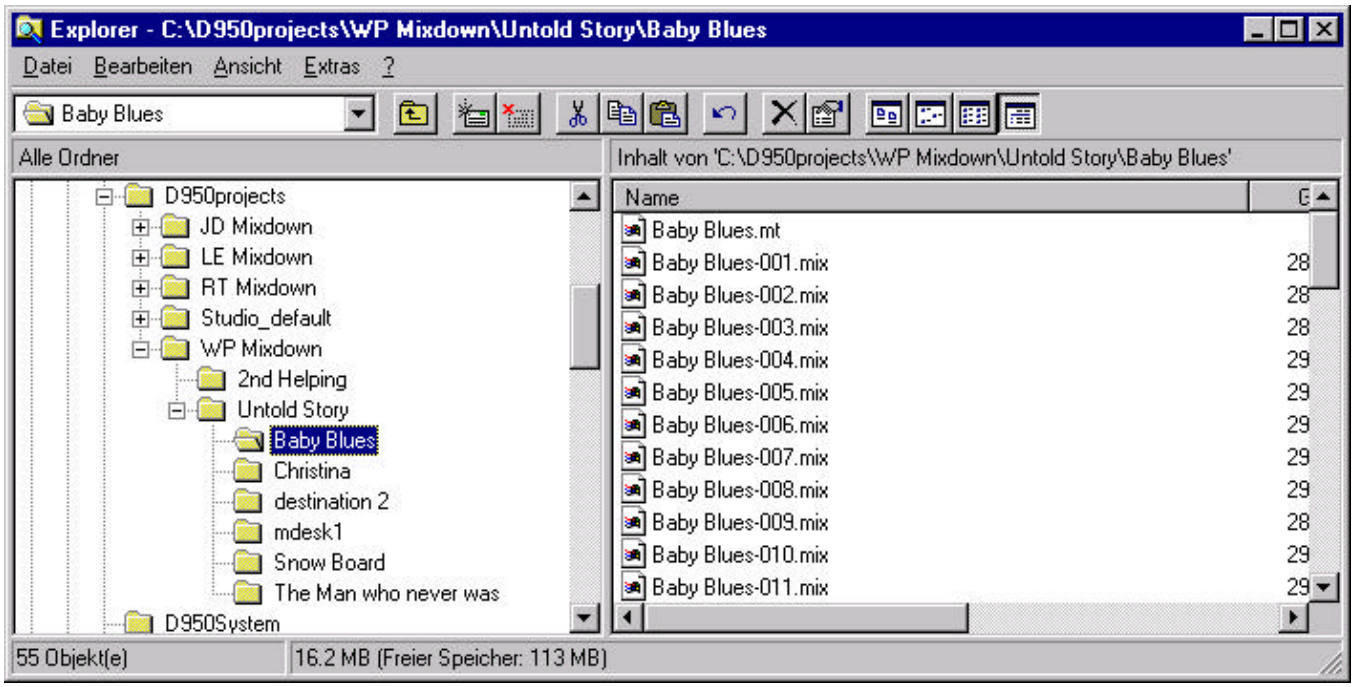
5.4 File Management

Mix File Structure: There may be multiple mixes within each Title. Each Mix has its own name and a folder in which its files are kept. There is one Mix Tree for each Mix. A Mix Tree is a collection of Mix Passes, along with a Mix Tree file. Each Mix Tree and its files are kept in the Mix Folder. So unlike V2.5 where all mixes for a given Title were just stored within the Title directory, in V3.0 each Mix has its own folder within the Title. This really eliminates clutter within the Title folder because no matter how many Mix Passes are stored, they are all within their own separate folder.

Mix File Organization: The files and folders created and used by AutoTouch+ are identified as follows:

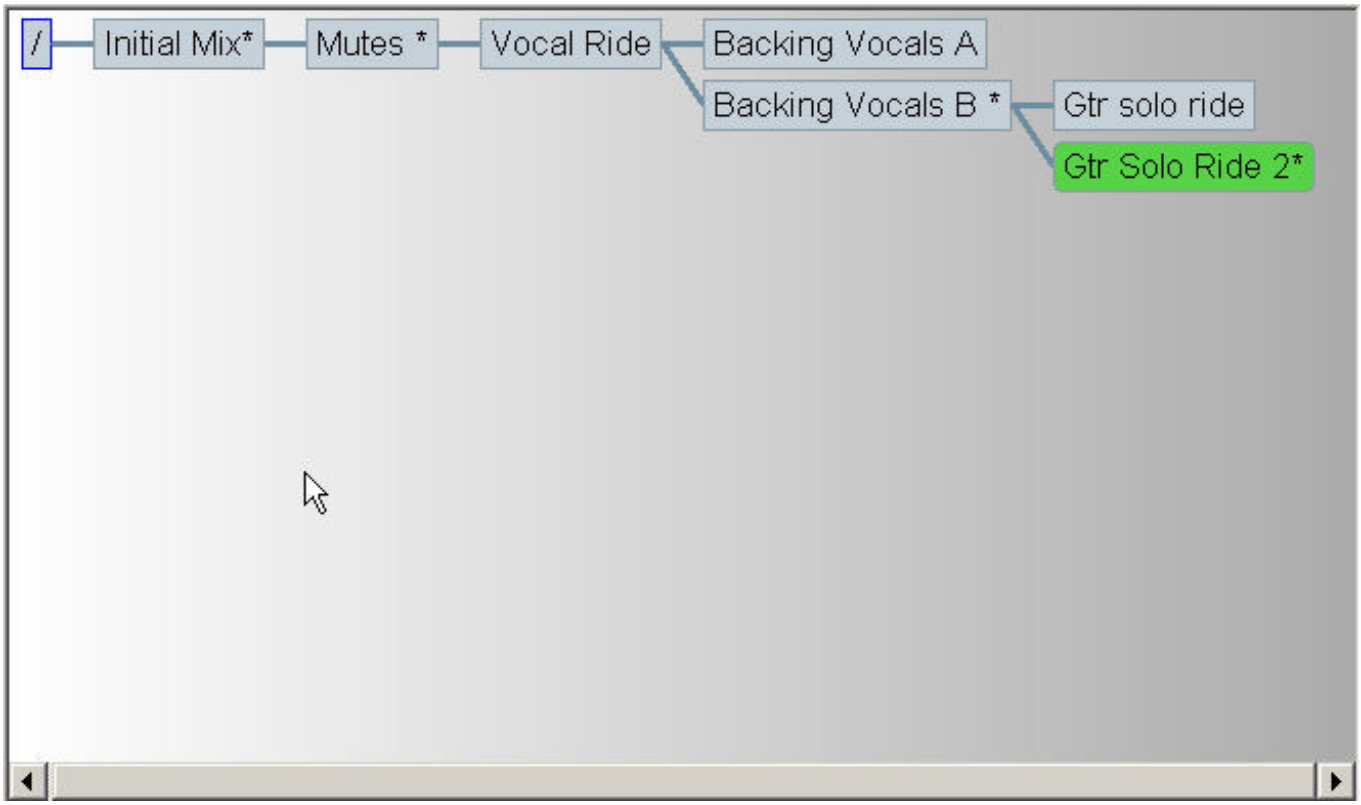
- The Mix tree database file has an .mt extension (filename.mt);
- Each Mix Pass ends in the pass number with a .mix extension (filename-004.mix);
- The folder that the mix tree file and mix pass files resides in is the name of the mix (filename).

The following example shows the file structure for a Mix named “Baby Blues”:
D950Projects (Main D950 projects folder)
---WP Mixdown (Project folder)
-----Untold Story (Title folder)
--------Baby Blues (Mix folder)
----------Baby Blues.mt (Mix tree)
----------Baby Blues-001.mix (Mix passes)
----------Baby Blues-002.mix
----------Baby Blues-003.mix
----------Baby Blues-004.mix
----------Baby Blues-005.mix
etc.



5.4.1 Mix Tree

Automation Mix files are managed via the Mix Tree System (MTS). Each and every Mix Pass is automatically saved and archived within the Mix Tree.



Used in a linear fashion, the Mix Tree will have no branches. If at some point a previously written Mix Pass becomes the Active Pass, a new branch of the Mix Tree will start growing as new passes are generated. In this way, the Mix Tree provides a graphic representation of the evolution of all Mix Passes. See above.

Each Mix Pass is displayed as well as its linked history (the branch of the Mix Tree from which the pass evolved). Working in conjunction with the Mix Pass Stack, the Mix Tree provides an efficient means of organizing the multiple Mix Passes that are created during the course of a mix. This is particularly useful when creating several final versions of a mix.

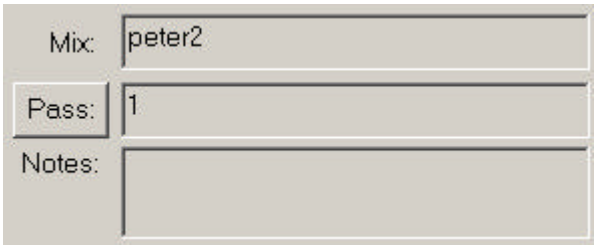
The MTS is maintained between sessions, so that when a Mix is recalled days or weeks later, the entire Mix Tree will be available to the new session. All Mix Passes will be recalled and placed in their proper positions when the Mix Tree is opened. The last Active Pass used will be loaded to the top of the Mix Pass Stack and becomes the Active Pass. (The Mix Pass Stack is not maintained when the Mix Tree is closed.)

Any number of new Mix Passes may be generated. Any existing Mix Pass from any Title may be added to the Mix Tree.

5.4.1.1 Passes in the Mix Tree

Mix Pass Info: Each completed Mix Pass has the following information:

- Assigned Mix Pass Number
- Mix Pass Name
- Mix Pass Notes



Assigned Mix Pass Numbers: Assigned Mix Pass Numbers are used by the system to identify each Mix Pass. For example, a Mix Pass is identified only by its number when it's part of the Mix Pass Stack.

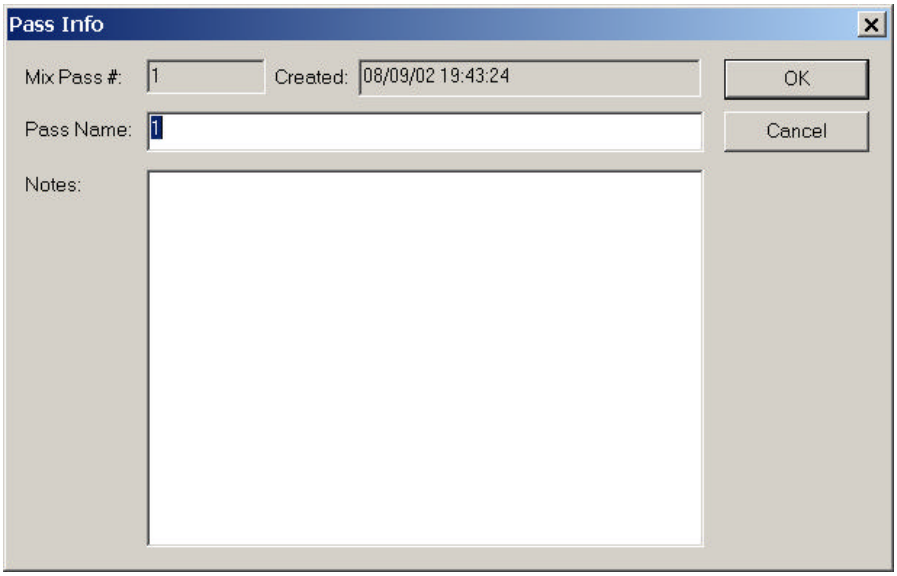
As Mix Passes are added to the Mix Tree, an Pass Number is automatically assigned to each. Mix Pass numbers are assigned in the order in which passes were added to the Mix Tree. For a new Mix Pass, the assigned number will serve as a temporary Mix Pass Name unless an new one is entered. For an existing Mix Pass, the assigned number will be displayed before the stored pass name as it appears in the Mix Tree.

Mix Pass Names: As mentioned above, the assigned Mix Number will serve as a temporary Mix Pass Name for new Mix Pass. This name will persist until the current Mix Tree or Title is closed (or a new Mix Tree or Title is opened). If no name is entered, the assigned pass number will appear as the Mix Pass Name in the Mix Tree. The resultant stored file name will be the name of the Mix Tree and pass. For example, if a name is not entered, "Dulcimer-002.mix" would become the stored file name for the second Mix Pass in the Mix Tree named "Dulcimer." The next time this Mix Tree is opened, this Mix Pass would appear as the second Mix Pass in the Mix Tree and have the pass name "2." If this same Mix Pass was loaded in another Mix Tree, it would appear as "Dulcimer_Pass_002" with the number of its position within the current Mix Tree.

Editing Mix Pass Name: A Mix Pass must be the Active Mix Pass before it's name can be entered or edited. To enter or change a Mix Pass Name, use the following procedure:

1 Make the Mix Pass to be named or renamed the Active Mix Pass by clicking its icon on the Mix Pass Stack or double-clicking its icon in the Mix Tree.

2 Click the "Pass:" button next to the current Mix Pass Name (to the right of the Mix Pass Stack). The Pass Info entry box will appear with the Pass Name highlighted.



3 Type the new name for the pass and click the "OK" button. The new Mix Pass Name will appear in the Pass Name field and in the Mix Tree.

Mix Pass Notes: A set of notes can be entered and stored for each Mix Pass. Combined with the Mix Pass Name, this can greatly benefit the organization of a large number of passes.

Editing Mix Pass Notes: A Mix Pass must be the Active Mix Pass before notes can be entered or edited. To enter or change Mix Pass Notes, use the following procedure:

1 Make the desired Mix Pass the Active Pass if it is not already. (Click its icon in the Mix Pass Stack or double-click its icon in the Mix Tree.)

2 Click the "Pass:" button next to the current Mix Pass Name (to the right of the Mix Pass Stack). The Pass Info entry box will appear. See #2 above.

3 Type the new notes in the "Notes:" field and click the "OK" button. The first few lines of the new Mix Pass Notes will appear in the AutoTouch+ window whenever that Mix Pass becomes active. If the notes are lengthy, the complete set may be viewed by opening the Pass Info entry box.

5.4.1.2 Active Pass

The Active Mix Pass provides the Read Mix data for subsequent RECORD Mix Passes.

When a Mix Pass becomes Active the following events occur:

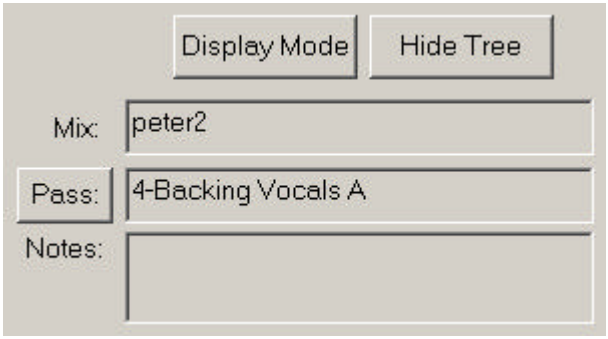
- In the AutoTouch+ window:
  - The name and assigned number of the Mix Pass appears in the "Pass:" field
  - The name of the Mix Tree appears in the "Mix:" field
  - Any notes belonging to the pass appears in the "Notes:" field
  - The Green Light illuminates above the associated position in the Mix Pass Stack
- In the Mix Tree window:
  - The Mix Pass is highlighted in green

The Active Mix is normally the mix on the top of the stack. Refer to chapter 5.5.1 for details regarding the Mix Pass Stack.

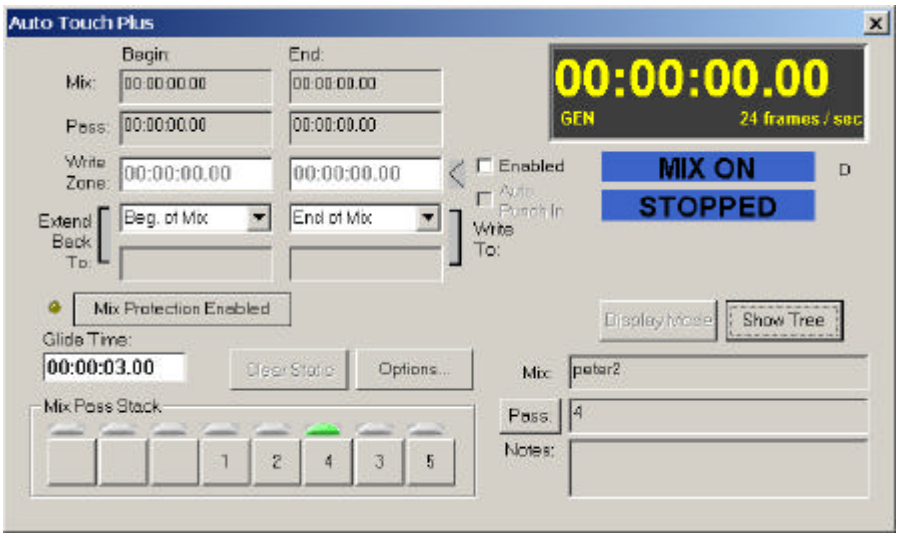
5.4.1.3 Mix Tree Display Modes

Hide Tree/Show Tree Button:

AutoTouch+ may be operated with or without the Mix Tree displayed. The Mix Pass Stack will be available in either case and can be used without the Mix Tree if desired (as in V2.5). To facilitate working without the Mix Tree, it may be hidden so that all Mix management can be done within the Mix Pass Stack. The Mix Tree is hidden by clicking the **Hide Tree** button in the AutoTouch+ window.



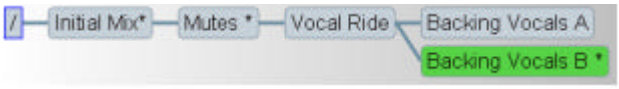
The Mix Tree will disappear as indicated below and the **Hide Tree** button changes to **Show Tree**. At any time, the Mix Tree may be made fully visible again by clicking the **Show Tree** button.



Whether or not the Mix tree window is displayed, the Mix Pass number, name, and notes are always displayed for the currently selected Active Mix. See above.

Mix Pass Display Modes: Within the Mix Tree, Mix Passes are displayed in one of three ways:

- Pass Name:

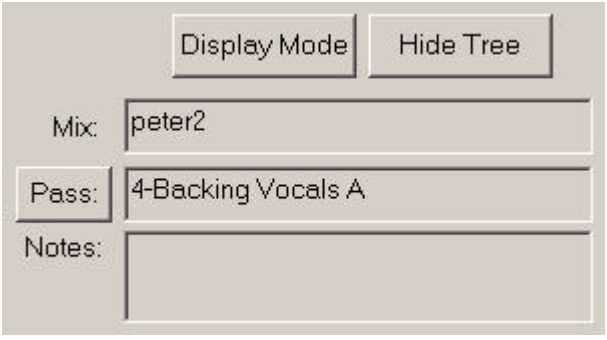


- Pass Number:

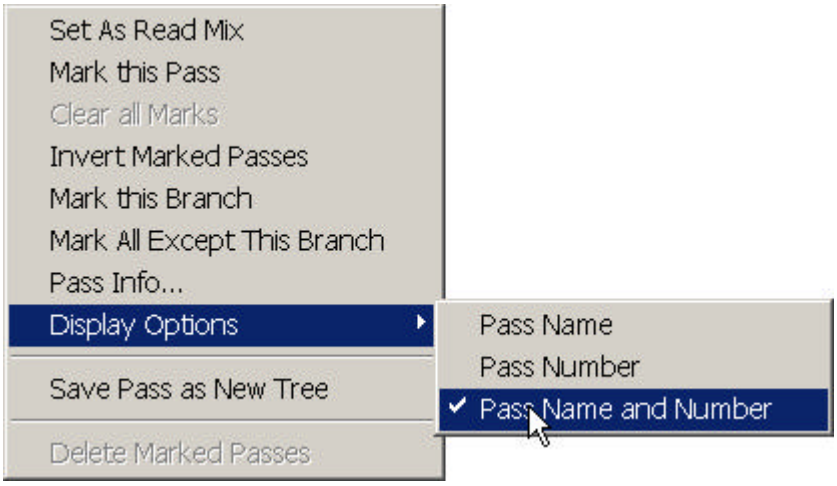
- Pass Name and Number:

Changing the Display Mode: There are two methods to change the Mix Pass display modes:

- **Display Mode** button: Clicking the **Display Mode** button will cycle through the three display modes. The **Display Mode** button is located in the AutoTouch+ window.



- "Display Options" menu: Right-clicking within the Mix Tree window will bring up the Mix Tree menu. Selecting "Display Options" from this menu will open a context menu which contains the three display modes. The desired mode can be selected from this menu.



Note: Until a Pass Name is entered, the name defaults to the pass number. The system detects this and when the display mode is set to display the name AND number, if they match, only the number is displayed.

Note: The Mix Pass number, name, and notes for the Active Mix are always displayed in the AutoTouch+ window.

Round and Square Corners: Mix Passes within the Mix Tree have either rounded or squared corners. Rounded corners indicate the Mix Pass is part of the Mix Pass Stack. Squared corners indicates it is not. See graphic below.

Green Highlight: The Active Mix Pass is highlighted in green in the Mix Tree and by a green LED symbol in the Mix Pass Stack.

Asterisk: An asterisk will appear in the Mix Tree icons for all Mix Passes that contain Mix Pass Notes. This condition will persist regardless of the chosen Display mode. See graphic below.

5.4.1.4 Mix Tree Click Functions

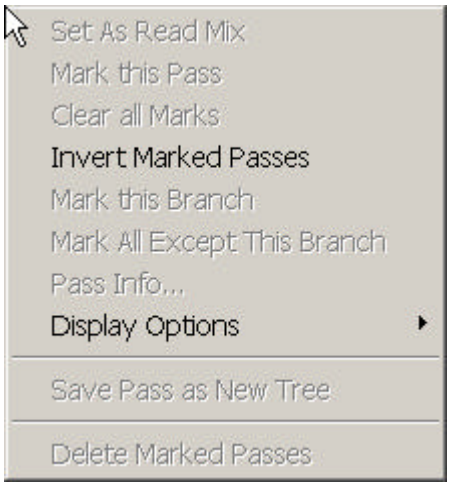
A variety of "click functions" are available within the Mix Tree. These functions range from

Left-Click Functions:

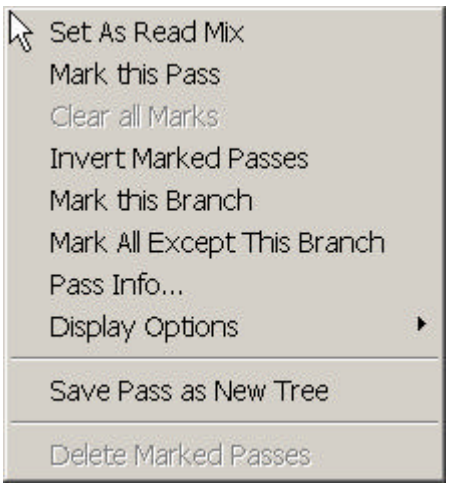
- Single-clicking a Mix Pass within the Mix Tree will "mark" that pass by highlighting it in red. Clicking a marked pass will "unmark" it and remove the red highlight. Only one mix at a time may be selected using this method.
- Control-clicking (holding the **Ctrl** key and single-clicking) allows individual Mix Passes anywhere within the Mix Tree to be marked or unmarked. Any combination of passes may be marked.
- Shift-clicking (holding the Shift key and single-clicking) two Mix Passes allows these passes and those in-between to be marked or unmarked. The passes must be within the same branch or root-branch of the Mix Tree. In this way, multiple passes may be marked. More importantly, the link history of these passes is maintained.
- Double-clicking a Mix Pass adds it to the top of the Mix Pass Stack and makes it the Active Pass. The Active Pass will be highlighted in green in the Mix Tree.

Right-Click Functions:

- Right-clicking within the Mix Tree will open the Mix Tree Menu. Only the items that don't pertain to individual passes or branches are shown.



- Right-clicking a Mix Pass within the Mix Tree will open the Mix Tree Menu with all available items shown.



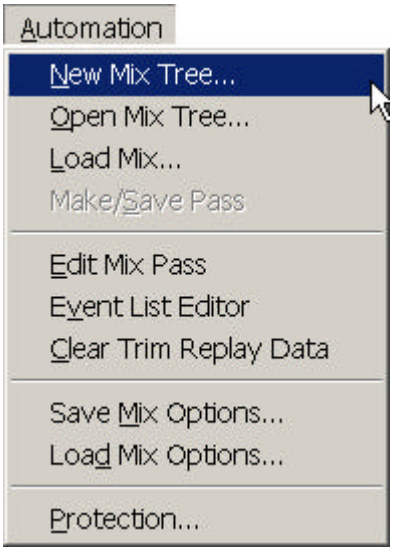
The Mix Tree menu items function as follows:

- Set As Read Mix: Makes the selected Mix Pass the Active Pass (this is the same as double-clicking a Mix Pass in the Mix Tree)
- Unmark This Pass: Unmarks the selected Mix Pass
- Clears All Marks: Unmarks all marked Mix Passes (always available when any passes are marked)
- Invert Marked Passes: Reverses which Mix Passes are marked and which are unmarked. (always available)
- Mark This Branch: The selected Mix Pass and all subsequent passes made from this pass will be marked
- Mark All Except This Branch: All branches except the one in which the selected Mix Pass is a member will be marked. Selecting a Mix Pass in the middle of a branch will prevent any member of that branch from being marked whether they were made before or after the selected pass. All other branches will be marked.
- Pass Info…: Opens the Pass Info entry box for the selected Mix Pass. The selected pass does not need to be the Active Pass in order to open the Pass Info entry box in this way.
- Display Options: Opens the context menu for Mix Tree Display modes. Name, Number, and Name & Number may be selected. (always available)
- Save Pass As New Tree: Creates a new Mix Tree with the selected Mix Pass loaded as the first pass. This function is only available for the Active Pass. The newly created Mix Tree will not automatically open, but may be opened as needed.
- Delete Marked Passes: Any marked passes will be deleted. Because this action is not undoable, the user will be prompted to verify this action.

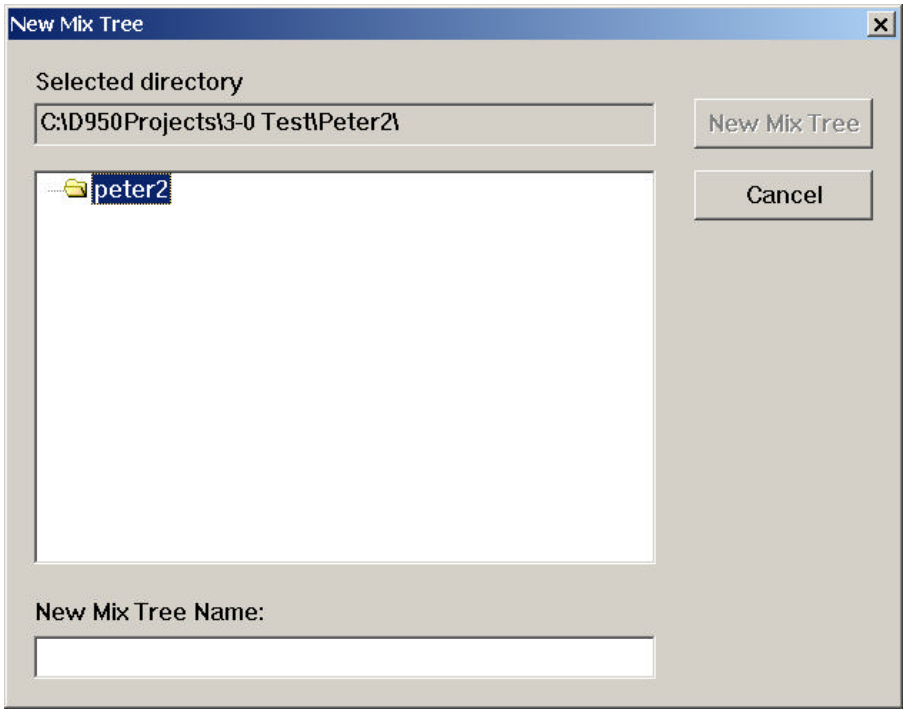
5.4.2 Creating a New Mix

New Mixes: To create a new Mix use the following procedure:

1. Select "New Mix Tree…" from the Automation menu in the GC.



The "New Mix Tree" box will open and a display of existing Mixes will be shown.



2. Enter a name for the Mix in the "New Mix Tree Name:" entry field. *Please note that the selected directory is given by the opened Project and Title and cannot be edited.*

3. Click the "New Mix Tree" button. A new Mix folder, Mix Tree file, and first Mix Pass file will be created in the Title folder.

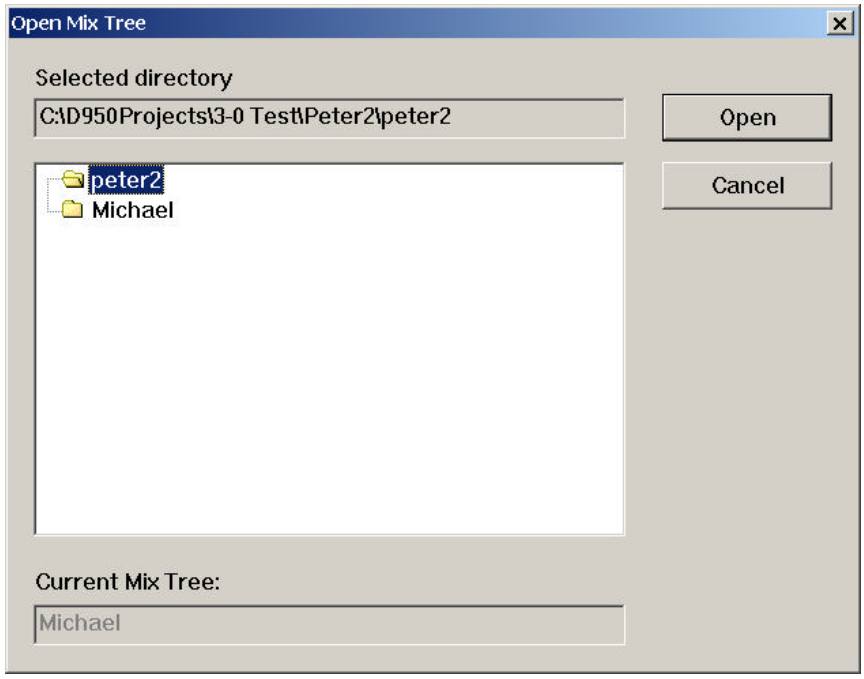
A new Mix Tree will appear on the screen underneath the AutoTouch+ window. A Mix Pass (#1) will be at the start of the tree and will be the Active Pass in the Mix Pass Stack.

5.4.3 Loading an Existing Mix

Existing Mixes: Previously created Mixes from both V3.0 and V2.5 automation systems may be used with AutoTouch+. Any previous Mix Pass can be loaded into the Mix Pass Stack and become the Read Mix pass (Active Mix Pass) for a subsequent Mix Pass. Mixes are accessed via the Automation menu on the GC.

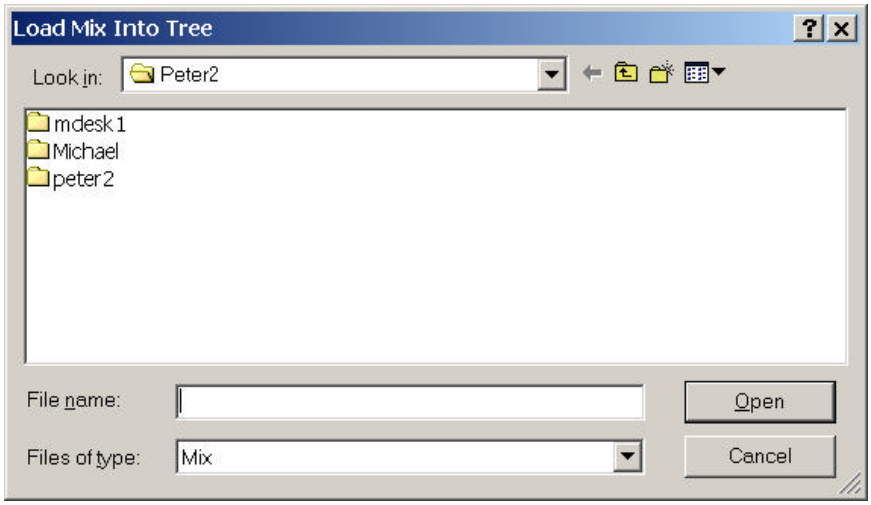
V3.0 Mixes: Existing Mix Trees and Mix Passes made with V3.0 software may be loaded by selecting the following from the Automation menu:

- "Open Mix Tree…:" Loads an entire Mix Tree. A directory of existing Mix Trees within the current Title will be displayed.



Double-clicking the desired Mix Tree (or selecting it and clicking Open) will load that tree. The last used Mix Pass will be loaded in the top position of the Mix Pass Stack and becomes the Active Mix.

- "Load Mix…:" Loads a single Mix Pass into the current Mix Tree. A directory of existing Mix Trees within the current Title will be displayed.



Double-clicking the desired Mix Tree folder will open that tree and the Mix Passes within will be displayed. The desired Mix Pass may be loaded by double-clicking its name or icon. The newly loaded Mix Pass will be loaded in the top position of the Mix Pass Stack and becomes the Active Mix. Mixes may also be loaded from other Titles.
Use the Import function (menu File – Import – Mix), select the Mix Pass in the desired Project/Title/Mix Tree, and click Open.
Now you can select the Project/Title/Mix Tree folder to save the selected Mix Pass. It is even possible to rename the Mix Pass if required.
Use the Load Mix function to load the Mix Pass into the current Mix Tree.

Notes: Whenever a single Mix Pass is loaded (whether V2.5 or V3.0) it starts a new branch at the start of the Mix Tree.
The Mix Pass Stack is not maintained after the Mix Tree is closed. However, the last Active Mix Pass is loaded at the top of the Mix Pass Stack when an existing Mix Tree is opened.

V2.5 Mixes: Existing Mixes made with V2.5 or earlier software are fully compatible with V3.0 software. However, a Mix Tree must be open in the current Title before a Mix Pass can be loaded. Once a Mix Tree is open, V2.5 Mix Passes may be loaded by selecting the following from the Automation menu:

- "Load Mix…:" Loads a single Mix Pass into the current Mix Tree. Locate the desired V2.5 Mix Pass within the Title to which it belongs using the "Look In" pull-down menu at the top of the box. Once located, the desired Mix Pass may be loaded by double-clicking its name or icon. The newly loaded Mix Pass will be loaded in the top position of the Mix Pass Stack and becomes the Active Mix.

Notes: When using V3.0 software, a new Mix Tree must be added to any Title created with V2.5 software before any existing Mix Pass (V2.5 or V3.0) can be loaded. Since V2.5 software doesn't create Mix Trees and since the "Open Mix Tree…" menu item only looks in the current Title, opening an existing Mix Tree is not possible.
Whenever a single Mix Pass is loaded (whether V2.5 or V3.0) it starts a new branch at the start of the Mix Tree.

5.5 Mix Pass

A Mix Pass contains a set of records for each dynamic control, fader Trim Replay Data if any, and a set of values for static controls.

Creating a Mix Pass: A new Mix Pass is created whenever any of the following occur:

- A change in a dynamic control is recorded (such as using Touch Record or Global Punch-in/Out);
- "Make/Save Pass" is selected from the GC Automation menu;
- An offline edit is performed with either OFLA or the Event Editor

In all cases above, the new Mix Pass is added to the Mix Tree and to the top of the Mix Pass Stack. It also becomes the Active Mix Pass.

As part of the Mix Tree, each new Mix Pass is stored to the hard drive. Because of this, every Mix Pass created is retained by the system unless purposely deleted. Refer to chapter 5.4, File Management.

Notes: Mix Tree folders or Mix Passes need to be deleted in the Windows Explorer.
Making changes to Static controls or using Audition modes will not generate a new Mix Pass.

5.5.1 Mix Pass Stack

There is an eight-position Mix Pass Stack which holds up to eight Mix Passes in memory for immediate use. Mix Passes can only be played back from the Mix Pass Stack. The Mix Pass Stack is located on the AutoTouch+ screen on the D950 GC.

Organization: The eight positions of the Mix Pass Stack are represented by eight Mix Pass boxes arranged horizontally. The number of the Mix Pass will appear within the Mix Stack position (box) in which it is stored. A Mix Pass can appear only once within the Mix Pass Stack.

The box the furthest to the right is the position where Mix Passes are added to the stack. As Mix Passes are added, any existing passes shift to the left. When the Mix Pass Stack is full and a new pass is added, the Mix Pass in the last position (far left position) will be deleted from the stack as one to its right is shifted down.

In the example above, only three Mix Passes are loaded into the Mix Pass Stack and the #5 pass is Active.

Adding a Pass to the Stack: Mix Passes are added to the Mix Pass Stack in the following ways:

- Creating a new Mix Pass: The newly created Mix Pass will be added to the top of the Mix Pass Stack and becomes active. See "Creating a New Mix Pass" above.

- Double-clicking a Mix Pass in the Mix Tree: The selected Mix Pass will be added to the top of the Mix Pass Stack and becomes active.
- Right-clicking a Mix Pass in the Mix Tree: The Mix Tree Right Click menu will open. Selecting "Set As Read Mix" will cause the selected Mix Pass to be added to the top of the Mix Pass Stack and become active.

Active Mix Pass: The "Active Mix Pass" is the one played back and will be the basis for a new Mix Pass if any changes are made. It contains the "Read Mix Data" that is used as new passes are created. The Active Mix Pass is indicated by a green light above the active position and the box containing the pass number is highlighted.

The Active Mix Pass may also be referred to as the Active Pass or Read Mix Pass.

Selecting an Active Mix Pass: The Active Mix Pass is selected from the Mix Pass Stack in one of three ways:

- Clicking a Mix Pass in the Mix Pass Stack: That Mix Pass will become active.
- Double-clicking a Mix Pass in the Mix Tree: If that Mix Pass is already in the Mix Pass Stack it will become active. If it is not already in the stack, the selected Mix Pass will be added to the top of the Mix Pass Stack and becomes active.
- Creating a new Mix Pass: The newly created Mix Pass will be added to the top of the Mix Pass Stack and becomes active.
- Right-clicking a Mix Pass in the Mix Tree: The Mix Tree Right Click menu will open. Selecting "Set As Read Mix" will cause the selected Mix Pass to be added to the top of the Mix Pass Stack and become active.

Conditions: The Active Mix Pass cannot be changed while RECORD is engaged.

5.5.1.1 Mix Comparison

One of the unique features of AutoTouch+ is the ability to compare Mix Passes while the mix is running. Any Mix Pass in the Mix Pass Stack can be accessed at any time, even while a mix is being played back.

Comparing Mix Passes: Mix Pass comparisons can be performed in one of two ways:

- Clicking a Mix Pass in the Mix Pass Stack: The clicked Mix Pass will become active after a short processing delay. Using this method, passes in the Mix Pass Stack can be activated in any order.
- **UNDO/REDO** keys: The **UNDO/REDO** keys activate adjacent Mix Passes in the Mix Pass Stack (see below).

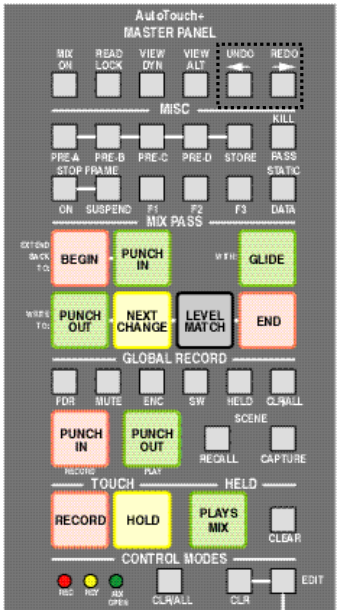
Conditions: Mix comparison is disabled once RECORD has been entered.

Note: A fair amount of processing must take place when switching between Mix Passes. Due to the time it takes to perform this processing a slight delay is normal.

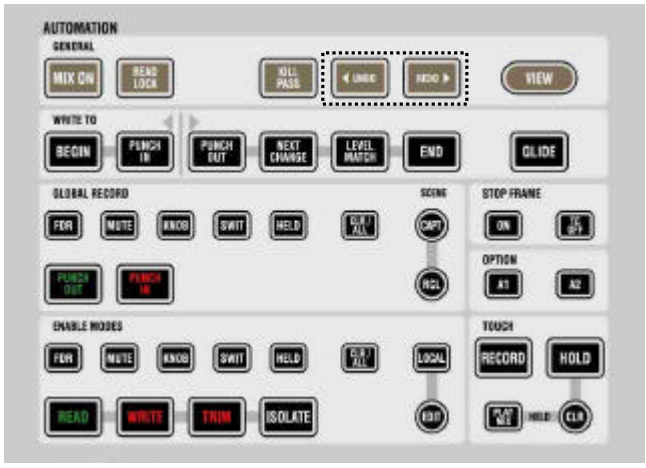
5.5.1.2 Undo/Redo

UNDO and **REDO** keys are located in the top row of the Automation Panels. They allow the user to essentially "undo" and "redo" changes as they are made within the course of a mix. They also provide a method for real-time mix comparison.

D950:



Vista:



Using these keys activates adjacent Mix Passes within the Mix Pass Stack with **UNDO** moving backward through the stack and **REDO** moving forward.

Note: The **UNDO** and **REDO** keys move consecutively through the Mix Pass Stack. The order of passes heard while using the **UNDO** and **REDO** keys may not necessarily be in numeric order, depending on the order in which passes were added to the stack.

UNDO / REDO: The precise functions of the **UNDO** and **REDO** keys are as follows:

- **UNDO:** Pressing the **UNDO** key will activate the most previous Mix Pass in the Mix Pass Stack from the currently active position. In other words, pressing **UNDO** will allows the previous adjacent Mix Pass to be activated.
- **REDO:** Pressing the **REDO** key will activate the next Mix Pass in the Mix Pass Stack from the currently active position. In other words, pressing **REDO** will allows the next adjacent Mix Pass to be activated.

Consecutive presses of either key will continue through the Mix Pass Stack in the direction the key indicates (**UNDO** = backward or to the left, **REDO** = forward or to the right). If the first pass in the Mix Pass Stack is the Active Pass, the system provides eight levels of undo/redo.

Conditions: **UNDO** and **REDO** are disabled once RECORD has been entered.

Notes: Since all Mix Passes are stored in the Mix Tree, it is always possible to retrieve any Mix Pass at anytime. However, passes must be in the Mix Pass Stack to be played. In addition, the **UNDO / REDO** keys do not apply to the Mix Tree and activate only the passes in the Mix Pass Stack.
The **UNDO / REDO** keys only allows activation of adjacent passes within the Mix Pass Stack. The order of passes may or may not follow the

branches of the Mix Tree. This is depending on the order in which Mix Passes were added to the Mix Pass Stack.

Using UNDO / REDO:

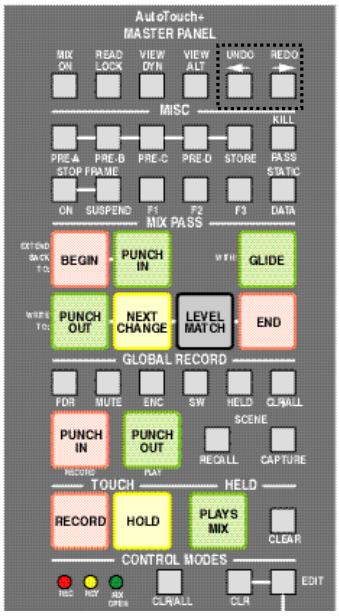
- Discarding an Undesired Pass: If a new Mix Pass was just completed, the new pass will be at the top of the stack and will become active. If it contains unsuccessful moves, going back to the previous pass is as easy as pressing **UNDO.** When **UNDO** is pressed, the previous Mix Pass will become active and therefore the basis for the next new pass. In this regard, consecutive presses of **UNDO** will allow the user to "back up" to a Mix Pass that provides a suitable point from which to restart.
- Real-time Mix Comparison: Pressing **UNDO / REDO** while a Mix Pass is being replayed, adjacent passes in the Mix Pass Stack may be compared in real-time.

5.5.1.3 Kill Pass

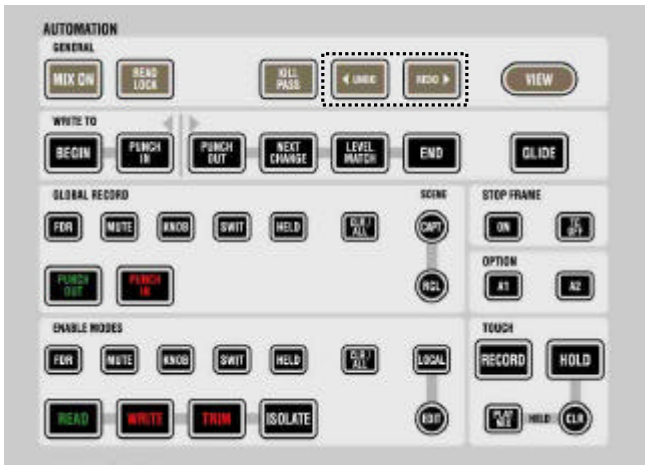
The “Kill Pass” function prevents a new pass from being written if flaws are detected while a new Mix Pass is being created. This is useful if a mistake is made during a RECORD pass and the resultant pass would not be worth keeping.

The **KILL PASS** key is located next to the **UNDO** / **REDO** keys in the Automation Panels.

D950:



Vista:



Killing a Mix Pass: If **KILL PASS** is engaged when timecode is stopped, the new mix pass will not be written. To prevent a new Mix Pass from being written, press the **KILL PASS** key *before* playback of timecode stops.

Note: **KILL PASS** may be engaged and disengaged at any time while timecode is being played back. This allows the user to kill a pass and then change his or her mind before the timecode is stopped. As long as timecode hasn’t stopped, Kill pass may be toggled on an off at will. The Kill Pass state that exists when timecode is stopped will dictate the fate of the Record Mix Pass

KILL PASS will always disengage at the end of a Mix Pass.

Conditions: **KILL PASS** functions only when RECORD passes are in progress.

<Option>

- With <Protect Static From Kill Pass> checked on the Misc Options page, changes made to Static controls are retained when **KILL PASS** is used; also refer to chapter 5.21.8.

Note: The Mix Options window is opened by clicking the Options… button in the AutoTouch+ window. Clicking the appropriate Tab will open the corresponding page.

5.6 Control Modes

There are four Control Modes used in the AutoTouch+ mix system:

- **READ**
- **WRITE ENABLE**
- **TRIM ENABLE**
- **ISOLATE**

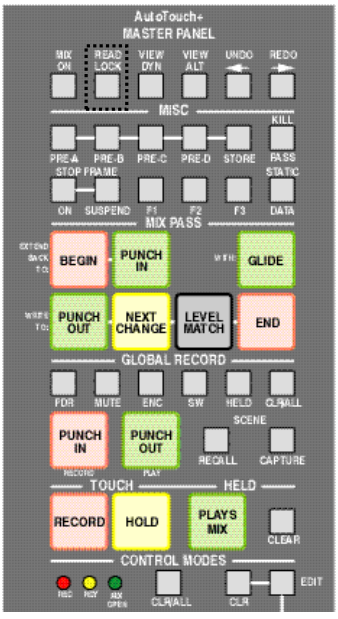
Each automatable control within the system is always in one of these four modes.

Rule-Based System: As mentioned before, the system is based on a set of consistent rules that pertain to the behavior of each mode or function. It is the consistency of these rules that allows the system to be simple to understand, yet very deep and powerful. The key to using the system is simply to learn the rules. The rules define how an control or feature will function under a given set of conditions.
The conditions that define the exact function of each mode are determined by the selection of other functions, selected options, and record status. With this in mind, it may be helpful to think about Control Mode as the primary function which maybe modified to yield the precise operation the user desires.
In a few cases the basic rules will be broken, but these will be clearly noted.

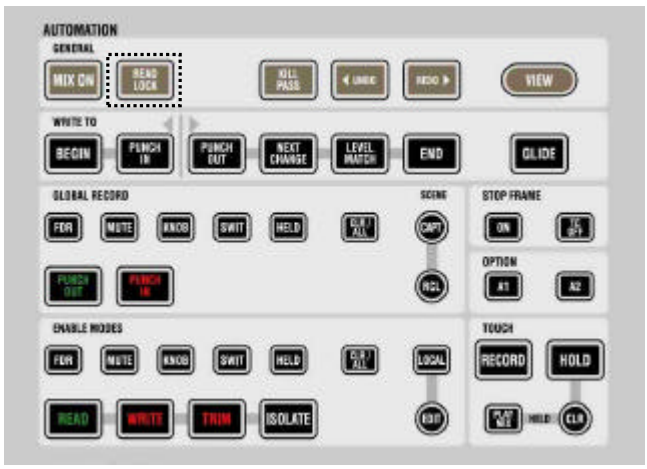
Independent Control Modes: Different channels may be in different automation modes. For example, some channels may be in **WRITE** while others may be in **TRIM**. In addition, different controls within channels may be in different modes. For example the fader may be in **TRIM**, while the mute is in **WRITE**, and the rotaries are in **READ**. Any combination is possible.

READ LOCK With **READ LOCK** engaged, all controls are placed in **READ** mode. All mode changes are locked out, Audition mode is defeated, and only written values will be heard. In this regard, **READ LOCK** over-rides Control Mode selections.

D950:



Vista:



Note: In describing the behavior of each Control Mode it is assumed that the **MIX ON** function is active and timecode is running. If **MIX ON** is not active then all controls behave as if there were in **ISOLATE** mode.

Document Note: The next several chapters will provide a set of basic rules for each Control Mode. A set of conditions and options that further define the mode's operation will also be provided. The most pertinent conditions and options for each mode will be discussed, but it would be impractical to list every permutation. Some system conditions and options will be discussed as stand alone elements and their effects upon other areas will be noted.

5.6.1 Read

READ is the data replay mode of the system. Controls in **READ** mode will playback changes written in the Mix Pass.

READ Rules:

Record Off:

- REPLAY: The control plays back the mix data to timecode.
  - Static controls will be set to the value stored within the Mix Pass. (Static values are not timecode stamped.)
  - Dynamic controls will be set to their stored values and subsequent changes will be replayed.
- AUDITION: If the control is moved or prevented from following written changes, the audio changes to reflect the "audition" level.
  - When released the control will snap back to its written value
  - A new Mix Pass is not generated when controls are auditioned.

Record On:

- A control in **READ** cannot be placed into record.

Conditions:

- If touched, the control will enter AUDITION for the duration of the touch. When released (un-touched) the control snaps back to its written value.
- With **TOUCH HOLD** engaged, the control will enter AUDITION when touched and holds the audition value when released (un-touched).

<Option>

- With <Read Safe> checked on the Misc. Options page, AUDITION mode is defeated for controls in **READ** and only written values will be heard.

Static Controls: Changes may be made to Static controls while AutoTouch+ is in **READ** (or any other mode). Changes to Static values are temporarily stored in a global memory buffer (Static Buffer). If a new Mix Pass isn't written, changes to Static controls will be retained in the buffer over time. For example, a section of a song might be looped while adjustments to EQ, Pans, and other controls are made. Changes to these Static controls will accumulate in the Static buffer until a new Mix Pass is generated or the Static Buffer is cleared. The values in the Static Buffer will saved as part of the next Mix Pass created.

5.6.2 Write

WRITE is the primary data recording mode of the system. Controls in **WRITE ENABLE** are armed for recording and those in **WRITE RECORD** will write changes to a new Mix Pass.

WRITE Rules:

Record Off:

- **WRITE ENABLE**: The control acts the same as if it were in **READ** (re-playing the mix Read data), but is armed to go into **WRITE RECORD**.
  - A new Mix Pass is not generated unless **RECORD** is engaged.

Record On:

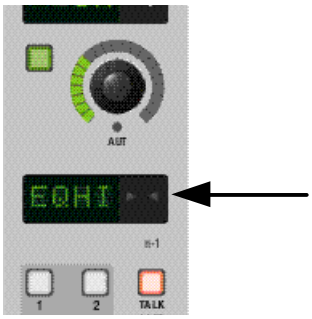
- **WRITE RECORD**: The absolute value (level) of the control is written into a new Mix Pass.
  - Read mix values are overwritten.
  - At the end of a pass in which at least one control was in **WRITE RECORD**, a new Mix Pass is generated based upon the Active Mix Pass and the newly recorded data.

Note: **WRITE RECORD** is a destructive mode in regard that previously written data is overwritten. However, mix data is never lost because a new Mix Pass is generated at the end of every **RECORD** pass. All Mix Passes are retained in the Mix Tree unless purposely deleted.

***D950* Null Indications**

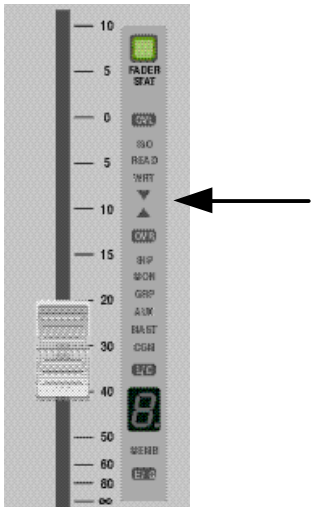
When a control is being written, a Null indication is provided. In basic terms, the null indication provides information regarding the difference between the current value of a control and its Read Mix value.
Write mode null indications are handled the same for faders and encoders, however null indications are given only for the last encoder used.

Rotary Null Indicators:



For the last knob touched... Always shows the difference between the rotary value and the effective read value. En exception is to show the offset form the trim null point when in **TRIM** mode (this is always the absolute position of the rotary from 0 dB or the center value).

Fader Null Indicators:



Always shows the difference between the fader value and the effective read value. En exception is to show the offset form the trim null point when in **TRIM** mode (this is always the absolute position of the fader from 0 dB).

When a fader or encoder is placed in **WRITE RECORD** and is moved from its Read Mix value, an arrow will illuminate to indicate which way the control must be moved to match the Read Mix value. If it is the first time the control is put into **WRITE RECORD**, its Read Mix value is the same as its Static value.

Vista Null Indications

The Vistonics™ concept allows to display the current and replay values of rotary and fader controls in a very clear and comfortable way.

Rotary Values: Current and replay value of the rotary control: If the current value is different from the one within the last mix pass, a pink colored element indicates the value of the last mix pass, while the main display is indicating the current value.

Fader Values: Current and replay value of the fader: If the current value is different from the one in the last mix pass, a pink colored element indicates the value within the last mix pass, while the main display is indicating the current value.

Conditions:

- If touched and not in **RECORD**, the control will enter AUDITION for the duration of the touch. The control will snap back to its Read value upon release.
- With **TOUCH RECORD** engaged, the control will enter **WRITE RECORD** (Punch-in) when touched and return to **WRITE ENABLE** (Replay) when released (Punch-out). When released the control will snap back to its Read value unless **GLIDE** is engaged. If glide is engaged the control will glide back to its Read value.
- With **TOUCH HOLD** engaged, the control will enter AUDITION mode when touched and holds the audition value when released.
- With **TOUCH RECORD** and **TOUCH HOLD** engaged, the control will enter **WRITE RECORD** (Punch-in) when touched and stays in **WRITE RECORD** when released. The control will stay in **WRITE RECORD** until punched out or the Mix Pass has ended.

Note: Refer to chapter 5.7.5.1 for information regarding HELD PLAYS MIX.

Entering WRITE RECORD: Controls in **WRITE ENABLE** can change to **WRITE RECORD** using any of the following three methods:

1. Local Touch (Touching the control on the Channel Strip), CGM Touch *(or, for D950 only: CAS Touch)*. **TOUCH RECORD** engaged or the **AUTO MODE** modifier key must be used.
2. (*for D950 only*) Local punch-in using the Channel Strip **STAT** (record punch) key or the appropriate CAS controls.
3. Global punch-in via **GLOBAL RECORD PUNCH IN** key or Auto-Punch or GPI (see chapter 5.8.5).

5.6.3 Trim

TRIM is the update mode of the system. Controls in **TRIM ENABLE** are armed for recording offsets and allows Trims to be Auditioned. Those in **TRIM RECORD** will apply the offset to previously written mix data and the resultant values will be written to a new Mix Pass.

Faders vs. Other Objects **TRIM** is handled slightly different for faders than for other automation objects. In both cases, Trim offsets are applied to the Read Mix Data for the Active Pass, and a new Mix Pass is generated. The Read Mix data in the new pass contain the values of the previous Active Pass plus the Trim offset. In addition, for faders, the Trim offset values are stored separately as Trim Replay Data.

Trim Replay Data For faders not only is the Trim offset applied to Read Mix data to generate a new Mix Pass, but the offset is stored within the new pass as Trim Replay Data. Trim Replay Data are absolute values that are used to offset fader Read Mix values. Since the Trim Replay Data is separate from the Read Mix Data, it may be manipulated as an independent entity. This means that Trim Replay Data can be rewritten, modified, disabled from replay, and cleared.

Notes: Since the trimmed fader values are merged with the Read Mix data in the new Mix Pass, the new pass has integrity even if the Trim Replay Data is disabled or cleared.
While mixes created on earlier versions of D950 software are compatible with AutoTouch+, mixes made on V2.5 or earlier versions do not contain Trim Replay Data. However, Trims made with older versions are incorporated into Read data at the end of each Trim Pass. An older mix may be played back using AutoTouch+ and Trim Replay Data may be added. Mixes created using V3.0 software can be played back on systems using earlier D950 software versions. The net results of all Trims will be heard and the mix will playback perfectly. However, in V2.5 and earlier software, the Trim Replay Data will be ignored and is not displayed by the fader.

Null Indications When a control is being trimmed, a Null indication is provided. In basic terms, the null indication provides information regarding of the Trim offset value. However, null indications are handled differently for faders than for other controls.

Faders: The first time a fader is placed in TRIM, the null point is 0 dB and the fader will snap to this position. It should be noted that the fader is showing the null value rather than the Read Mix values and in this case it is 0 dB. As the pass is played, the changes in the Read Mix values will be heard

with a 0 dB offset and the fader will not move. When the fader is moved from 0 dB, an offset equivalent to the amount of the move will be applied to the Read Mix data and the net result will be heard.
On the D950 desk, the amount of the offset will be indicated in the Null display and an arrow illuminates to indicate which way the fader must be moved to match the Trim Replay value.
On the Vista desk, the offset is displayed by a pink bar (replay value) and a gray bar (current value).

When a recorded Trim is played back with TRIM enabled, the fader will move to indicate the Trim offset from 0 dB. If the value of the Trim Replay Data is recorded at –3 dB and then moves to –5 dB, the fader will move
–3 dB and then to –5 dB at the appropriate time. The underlying Read Mix data will be heard with the Trim offset applied. The Trim Replay Data may be updated using TRIM RECORD techniques, thus allowing Trims to be modified.

It should be noted that faders in TRIM do not follow the WYSIWYH (What You See is What You Hear) paradigm. The recorded moves plus Trim offsets will be heard, but only the Trim Replay values will be shown by the fader.

Encoders: Any time an encoder is placed in TRIM, the null point will be 0 dB and the encoder will "auto-null" to this value. Since there is no Trim Replay Data for encoders, the null value can show only the offset of Read Mix values from 0 dB. The null point for encoders is always a 0 dB offset from the Read Mix value.

Whenever an encoder is put in TRIM, a 0 dB offset will be used. When a recorded Trim is played back with TRIM enabled, the encoder will move to indicate the Trim offset from 0 dB. As the pass is played, the changes in the Read Mix values will be heard with a 0 dB offset and the encoder will not move. When the encoder is moved from 0 dB, an offset equivalent to the amount of the move will be applied to the Read Mix data and the net result will be heard.
On the D950 desk, an arrow will illuminate to indicate which way the encoder must be moved to match the Read Mix value.
On the Vista desk, the pink-colored bar or dot (replay value) is used to match the current value to the replay value

TRIM Rules: **Record Off:**

- TRIM ENABLE: The control is armed to go into TRIM RECORD.

  Faders move to their Trim Replay values and both the Read Mix Data and Trim Replay Data are replayed. The Read Mix values plus the Trim offset will be heard. Any changes made to the Trim value (+/- from the nominal Trim Replay value), will offset the Trim Replay value by that amount. The first time TRIM ENABLE is used, faders will display a nominal Trim value of 0 dB. Since the default offset value is 0 dB, the Read Mix Data will be heard unaltered if the control is not moved. While Read Mix data will be heard, it will not be indicated by the fader's position.

  Encoders display a nominal Trim value. The nominal value will vary depending on the control (i.e. 0 dB for levels/gains, center for stereo panner, etc.). Read Mix Data (Written changes plus any previous

Trims) is played back. Any changes made to the Trim value (+/- from the nominal Trim value), will offset the Read Mix values by that amount.
On the D950 desk, read Mix data will be heard; no be indication by the control's position.
On the Vista desk, the Read Mix (replay value) is roughly indicated by a pink-colored element.

- If the control is moved while in TRIM ENABLE (no Touch modes engaged), the Trim value will be AUDITIONED. The Trim values will offset the Read Mix Data and the net result will be heard. In other words, if the control is moved, the audio reflects the sum of the Read Mix Data plus the offset from the nominal Trim value of the control. So, if the Read Mix Data had a moving value, you will hear that same moving value, except it will be offset by the amount that the control has been moved from the nominal trim value.
- If changes to Trim values have been previously written, faders in TRIM will normally replay the Read Mix Data (which incorporates the previous Trim values) and the Trim Replay values will be shown on the faders and null indicators. Other controls will replay the Read Mix Data (which incorporates the previous Trim values). Changes to Trim values will be displayed by the control.

Record On:

- TRIM RECORD: Everything is the same as with Record Off, except that the Trim values are written into a new Mix Pass. For all controls, the Trim offset is combined with the Read Mix data in the new pass. The Trim Replay data is also modified for faders.
  - Previous Trim values are updated (modifying a trim).
  - At the end of a pass in which at least one control was in TRIM RECORD, a new Mix Pass is generated that contains the previous Mix Pass Read data plus the Trim offset. For faders, the newly recorded Trim Replay Data is generated as well.

Note: TRIM RECORD is a destructive mode in regard that previously written Trim data is updated. However, Trim data is never lost because a new Mix Pass is created at the end of every Trim RECORD pass. All Mix Passes are retained in the Mix Tree unless purposely deleted.

Conditions:

- If touched and not in RECORD, the control will enter TRIM AUDITION for the duration of the touch. The control will snap back to its Trim value upon release.
- With TOUCH RECORD engaged, the control will enter TRIM RECORD (Punch-in) when touched and return to TRIM ENABLE (Replay) when released (Punch-out). When released the control will snap back to its Trim value unless GLIDE is engaged. If glide is engaged the control will glide back to its Trim value.
- With TOUCH HOLD engaged, the control will enter TRIM AUDITION mode when touched and holds the audition value when released.
- With TOUCH RECORD and TOUCH HOLD engaged, the control will enter TRIM RECORD (Punch-in) when touched and stays in TRIM RECORD when released. The control will stay in TRIM RECORD until punched out or the Mix Pass has ended.

<Option>

- With <Disable Trim Replay> checked on the Misc Options page, the offset of fader Read Mix Data using Trim Replay Data is defeated and untrimmed audio is heard (also refer to chapter 5.21.8).

Automation Menu:

- Selecting "Clear TRIM Replay Data" from the Automation menu in the GC deletes the fader Trim Replay Data and creates a new Mix Pass with 0 dB recorded as the new Trim Replay value.

Entering TRIM RECORD:

Controls in TRIM ENABLE can change to TRIM RECORD using any of the following 3 methods:

1. Local Touch (Touching the control on the Channel Strip), CGM Touch, or *(D950 only)* CAS Touch. TOUCH RECORD engaged or the **AUTO MODE** modifier key must be used.
2. Local punch-in using the Channel Strip STAT (record punch) key.
3. Global punch-in via Global Record Punch In key, or Auto-Punch, or GPI (refer to chapter 5.8.5).

5.6.4 Isolate

ISOLATE is the system's manual mode. Controls in ISOLATE neither responds to or creates new mix data. In other words, the control is essentially removed from the automation system is becomes strictly a manual control.

Note: A control in ISOLATE mode differs from a Static control in regard that changes in an Isolated control's position are not written to Mix Passes. Likewise, Static values are not applied to Isolated controls.

ISOLATE Rules:

Record Off:

- ISOLATE: The control acts like a manual control and is unaffected by any previously written Read and Trim Replay data.
  - The audio follows the control position

Record On:

- A control in ISOLATE cannot be placed into record.

5.6.5 Control Mode Entry

Controls may be put into the various Control Modes using one of four methods:

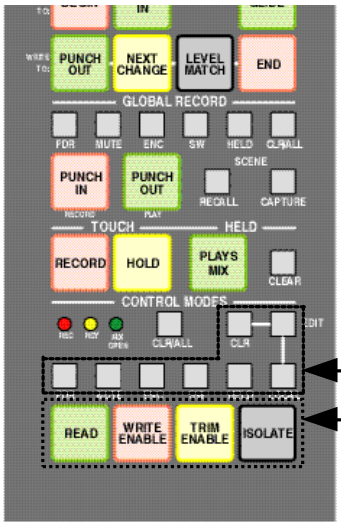
1. Globally using the Global Control Mode Activator keys and other controls on the Master Automation Panel.
2. Locally using the channel strip **AUTO MODE** key.
3. Remotely from the CAS using Control Mode Activator keys.
4. When AutoTouch+ is turned On using the **MIX ON** key on the Automation Master Panel. Activating the system will engage the Control Mode selected on the Panel Presets Options page.

Note: Multiple Control Modes may be active on the console simultaneously.

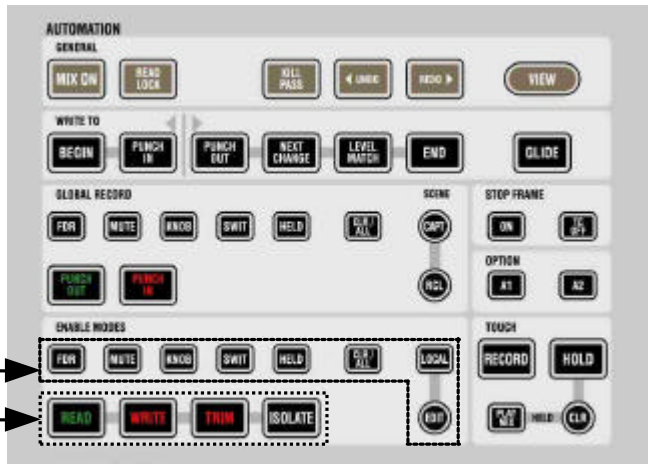
5.6.5.1 Global Mode Entry

Global Control Mode Entry: The primary method to enter automation Control Modes is using the Control Mode section of the Master Automation Panel. Controls that are to enter the mode are "Pre-Selected" using Control Mode Pre-Selector keys. The Pre-Selected controls are then entered into the desired mode using the Global Mode Activator keys.

D950:



Vista:



Pre-Selectors

Global Mode Activators

Global Mode Activators: There is an activator key for each Control Mode. Pressing one of these keys puts the Pre-Selected controls on all channels **<Option>** into that mode. The controls affected are filtered by the Pre-Selectors that are currently active. For example, when only the **Fader** Pre-Selector is active and the **Write Enable** activator is pressed, only the faders on all channels will change to WRITE ENABLE. Any other Control Modes that were set on controls other than faders will retain their mode state **<Option>**.

Note: When a Global Mode Activator key is lit, it indicates the Control Mode for all channels. Mode changes made on individual channels will cause the light to go out. Resetting all the Control modes to match on the local level will not cause Global Mode Activators to re-light.

Pre-Selectors: Control Mode Pre-Selectors determine which controls are selected when a new Control Mode is activated. Multiple Pre-Selectors may be active at one time. Any and all combinations are allowed. Pre-Selectors will illuminate when activated.

The following describes the control classifications as defined by the Control Mode Pre-Selectors:

- **FDR** (Fader): The fader of all channel types
- **MUTE** (Mute): The Mute of all channel types
- **ENC / KNOB** (Encoders): All continuous controller type encoders (knobs or rotaries). This does *not* include knobs that control "selectors" such as pan format, or phase inversion (for example).
- **SW / SWIT** (Switches): All switches (keys) and selectors (keys and knobs)
- **HELD** (Held Controls): All controls that are currently in a "Held" status (this could be any combination of faders, mutes, switches, and encoders). Refer to chapter 5.7.3, Touch Hold.
- **LOCAL, LOCAL EDIT, LOCAL CLR**: Not implemented.

Note: If no Pre-Selectors are active, then no controls will be put into the mode of the pressed Mode Activator.

Clear/All:

- **CLR / ALL**: Permits the changing of all of the Pre-Selectors at once. This key functions as follows:
  - If one or more Pre-Selectors are active, then pressing **CLR / ALL** clears all of the Pre-Selectors.
  - If no Pre-Selectors are active, then *all* Pre-Selectors become active.
  - Holding **CLR / ALL** and pressing a Control Mode activator will bypass the Pre-Selector and select all controls.

This is very handy as follows. If the user wants to set only the fader to a Control Mode and some Pre-Selectors are active, it is not necessary to manually disengage each of the currently lit selections. Pressing **CLR / ALL** followed by **FDR**, will clear all active Pre-Selectors and then select fader. This will save several key strokes and improve efficiency.

Another Shortcut: If the user wishes to set all of the controls into a specific Control Mode the following method may be used. Rather than pressing **CLR / ALL** until all the pre-selectors are active, just hold down **CLR / ALL** and press the Global Mode Activator for the desired Control Mode. *All* control types will be set into that mode and the Pre-Selectors will remain in the state that they were.

Other Control Mode Entries: Control Modes may entered as part of other automation operations. These operations are as follows:

- Turning Automation on for the First Time: Control Modes are entered based upon the options selected on the Panel Presets Options page. See Options below.
- Setting the Mix Status to on: Control Modes are entered based upon the options selected on the Control Mode Options page. See Options below.
- Loading a Panel Preset *(D950 only)*: Control Modes are entered based upon the options selected on the Panel Presets Options page. See paragraph <Options> below.
- Recalling a Scene: Controls that have been stored within the Scene Buffer are set to WRITE ENABLE and come back in a Held state. The stored values are also reset upon recall.

- Engaging **READ LOCK**: All controls are placed in READ mode. All mode changes are locked out, AUDITION mode is defeated, and only written values will be heard.

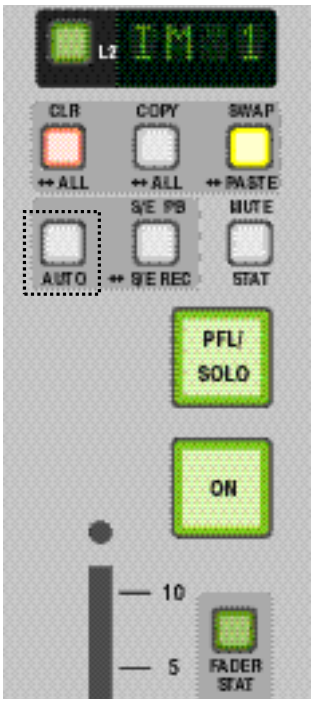
<Option>

- <When Mix Status is Set to on> (also refer to chapter 5.21.2): Radio buttons on the Control Modes Options page allow the selection of one of the following options to take effect when Mix Status is set to on (after the first time AutoTouch has been turned on for the first time):
  - <Maintain Object Modes>: When the **MIX ON** key on the Automation Master Panel is turned off, all controls are isolated from automation and operate as manual controls. With <Maintain Object Modes> selected, knowledge of the Control Mode for each control is maintained. When the system is turned back on, the Control Mode of all controls is restored.
  - <Set All to Read>: Turning the **MIX ON** key on, after having turned it off, will set all controls to READ.
  - <Set Pre-Selector Objects to WRITE>: Any controls that are selected in the Global Control Modes Pre-Selector will be set to WRITE. All others will be set to READ.
  - <Set Pre-Selector Objects to TRIM>: Any controls that are selected in the Global Control Modes Pre-Selector will be set to TRIM. All others will be set to READ.
- With <Mode Enable sets non-selected to READ> checked on the Control Modes Options page, all controls not pre-selected are placed in READ when a new Control Mode is enabled. In other words, only the controls that have been Pre-Selected will enter the new mode and all others change to READ.
- <First Time Automation is Turned ON> *(D950 only)* (also refer to chapter 5.21.6): Radio buttons on the Panel Preset Options page allow the selection of one of the following options to take effect when AutoTouch+ is turned on for first time:
  - <Load Preset A>: Control Modes are entered according to the options that determine what happens when a Panel Preset is loaded. Maintaining current modes, setting all to READ, and loading the Mode stated stored within Preset A are possible.
  - <Use Last Setting>: The last used Control Modes are entered.
- <When Loading a Preset>: Radio buttons on the Panel Preset Options page allow the selection of one of the following options to take effect when a Panel Preset is loaded:
  - <Maintain Object Modes>: Loading a Panel Preset will not change the control modes of any of the controls in the console. Current modes will be retained.
  - <Set All to Read>: Loading a Panel Preset will set all controls to READ.
  - <Apply Stored Control Mode>: The Control Modes and Pre-Selectors stored within the recalled Preset will be applied.

5.6.5.2 Local Mode Entry

Local Control Mode Entry: The **AUTO / AUTO MODE** key on the channel strip can be used to enter the various Control Modes on a channel-by-channel basis.

D950: ***Vista:***



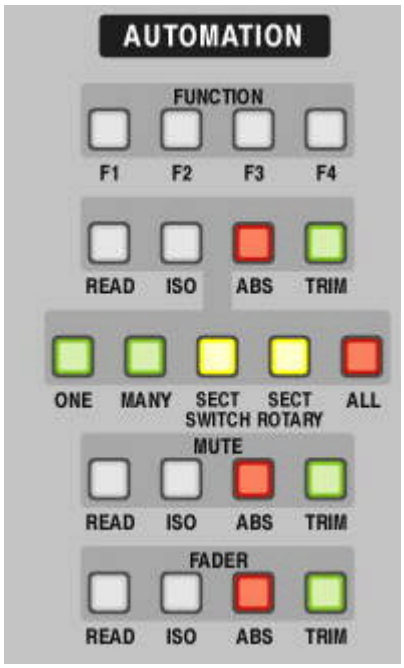
Pressing the **AUTO / AUTO MODE** key will cycle through the available Control Modes. The order and availability of Control Modes that can be entered is determined by the options selected in the Channel Auto-Mode Button section of the Control Modes Options page. The selection of local controls that enter the selected Control Mode is also determined at this location.

<Option> Options for the **AUTO / AUTO MODE** key are set in the Channel Auto-Mode Button section of the Control Modes Option page (also refer to chapter 5.21.2):

- <Order>: There are 4 positions that can be accessed via consecutive presses of the **AUTO / AUTO MODE** key.
  - The assignment for each position is made using the four pull-down menus in the <Order> section.
  - The top menu represents the first position.
  - Any Control Mode can be selected at any position or none can be selected.
  - If <None> is selected, that position is not included when cycling the **AUTO / AUTO MODE** key.
- <Affects…>: The selection of controls that enter the selected Control Mode is determined in the <Affects…> section. Radio buttons allow the selection of 1 of the following options:
  - <Pre-Selector Objects>: Local controls that correspond to the active Control Mode Pre-Selectors on the Master Automation Panel.
  - <Fader>: Fader only
  - <Mute>: Mute only
  - <Fader & Mute>: Fader and Mute only.

5.6.5.3 CAS Mode Entry *(D950 only)*

CAS Control Mode Entry: The Control Mode for the channel assigned to the CAS can be selected using the controls in the **AUTOMATION** section of CAS.



It should be noted that the CAS automation mode will follow those made at the channel strip or globally.
The CAS Control Mode Activators are organized in three groups of keys:

- Fader
- Mute
- Switches and Encoders (rotaries)

Each group of activators has a key for each Control Mode:

- READ: READ
- ISO: ISOLATE
- ABS: WRITE ENABLE (ABS is a legacy of AutoTouch 2.5)
- TRIM: TRIM ENABLE

Switches and Encoders within the channel can be independently Pre-Selected for entry into the desired mode. For details, refer to chapters 5.19.1.2, CAS Controls, and 5.10, Switch Automation.

5.6.5.4 Vista Mode Entry

Vista Control Mode Entry: Control Mode entries on the Vista work surface is accomplished using the same local and global methods as used on the D950 M2 and Classic desks and the same conditions and options apply.

Local Control Mode Entry: Refer to chapter 5.6.5.2

Global Control Mode Entry: Global Control Mode entry is made as described above. However it should be noted that the Global Mode Activators are located in the “Enable Modes” section of the Vista automation panel.

5.6.6 Control Mode Indicators *(D950)*

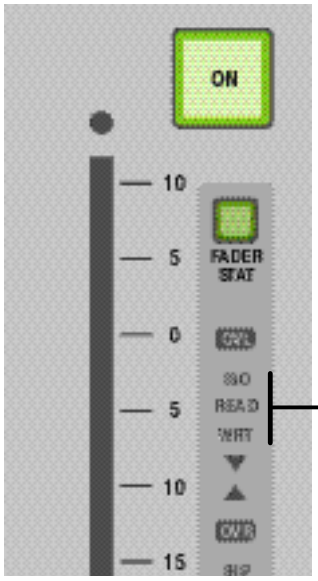
Control Mode Display:

Control modes are displayed on the D950 desk on the channel strips and the CAS in the following manner:

Fader:

Channel Strip:

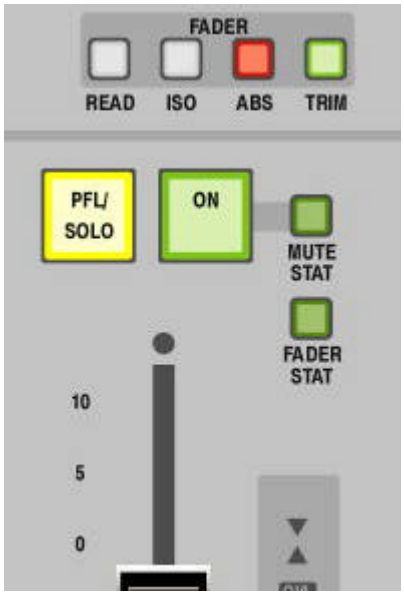
- READ: **READ** is lit next to the fader
- WRITE ENABLE: **WRT** is lit next to the fader. The **FADER STAT** key lights (flashes when in RECORD).
- TRIM ENABLE: **READ** and **WRT** are lit next to the fader strip. The **FADER STAT** key lights (flashes when in RECORD).
- ISOLATE: **ISO** is lit next to the fader strip.



Displays for Fader Automation Enable Status:
ISO = Isolate
READ = Read
WRT = Absolute Enable
WRT + READ = Trim Enable

CAS:

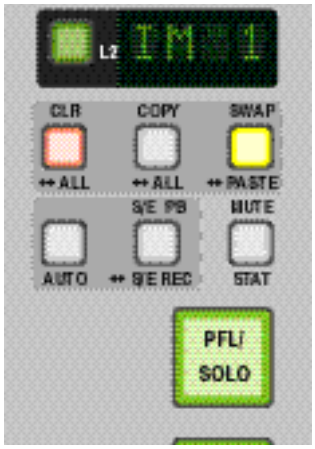
- READ: The **FADER READ** Control Mode Activator is lit.
- WRITE ENABLE: The **FADER ABS** Control Mode Activator is lit. The **FADER STAT** key lights (flashes when in RECORD).
- TRIM ENABLE: The **FADER TRIM** Control Mode Activator is lit. The **FADER STAT** key lights (flashes when in RECORD).
- ISOLATE: The **FADER ISO** Control Mode Activator is lit.



Mute: **Channel Strip:**

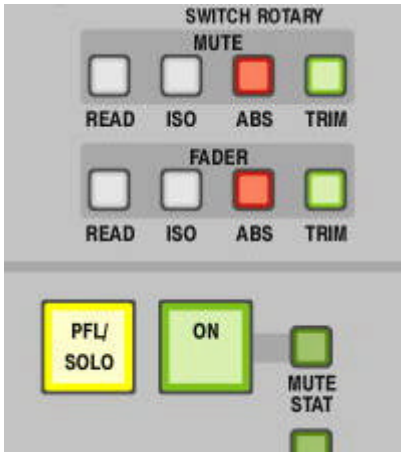
Control Modes for Mutes are not shown in a unique fashion on the channel strip. It is not possible to determine the exact status by viewing the **MUTE STAT** key locally. The unique status is shown on the CAS.

- READ or ISOLATE: **MUTE STAT** key is not lit.
- WRITE ENABLE: **MUTE STAT** key is lit (flashes when in RECORD)
- TRIM ENABLE: **MUTE STAT** key is lit (flashes when in RECORD)



CAS:

- READ: The **MUTE READ** Control Mode Activator is lit.
- WRITE ENABLE: The **MUTE ABS** Control Mode Activator is lit. The **MUTE STAT** key lights (flashes when in RECORD).
- TRIM ENABLE: The **MUTE TRIM** Control Mode Activator is lit. The **MUTE STAT** key lights (flashes when in RECORD).
- ISOLATE: The **MUTE ISO** Control Mode Activator is lit.

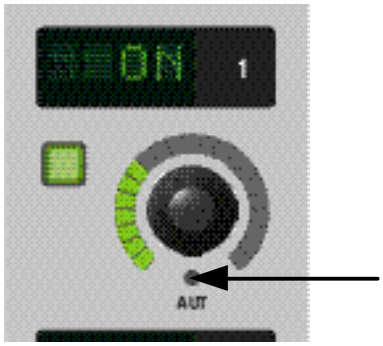


Encoders (Knobs):

Channel Strip:

The Control Mode of each of the four Encoders on the channel strip is indicated by the associate **AUT LED**.

- READ or ISOLATE: **AUT LED** is not lit. The **S/E REC** key is not lit.
- WRITE ENABLE: **AUT LED** is lit in red (flashes red when in RECORD). The **S/E REC** key lights (flashes when in RECORD).
- TRIM ENABLE: **AUT LED** is lit in green (flashes green when in RECORD). The **S/E REC** key lights (flashes when in RECORD).

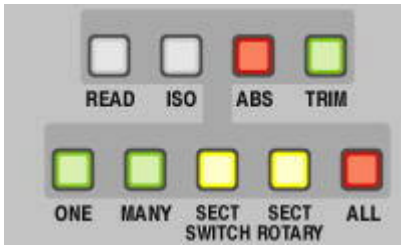


(The graphic above is that of a channel strip, but the Control Mode indications of the **AUT** LED are the same as on the CAS.)

CAS:

The **SECT ROTARY** Pre-Selector key will light for all Encoder Control Mode indications.

- READ: The Switches and Encoders **READ** Control Mode Activator is lit.
- WRITE ENABLE: The Switches and Encoders **ABS** Control Mode Activator is lit (**SECT ROTARY** Pre-Selector key flashes when in RECORD).
- TRIM ENABLE: The Switches and Encoders **TRIM** Control Mode Activator is lit (**SECT ROTARY** Pre-Selector key flashes when in RECORD).
- ISOLATE: The Switches and Encoders **ISO** Control Mode Activator is lit.



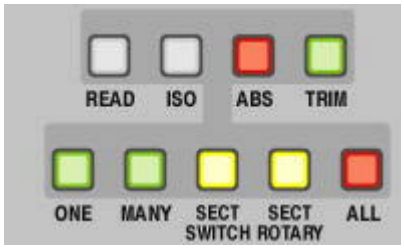
Switches:

Channel Strip:
Control Modes for Switches are not shown in a unique fashion on the channel strip. It is not possible to determine the exact status by viewing the **S/E STAT** (**S/E PB**, **S/E REC**) key locally. There are also no Control Mode indications for individual Switches. The unique status is shown on the CAS. Switch Control Modes are indicated in the channel strip as follows:

- READ or ISOLATE: The **S/E STAT** key is not lit.
- WRITE or TRIM ENABLE: The **S/E STAT** key lights when one or more Switch or Encoder is enabled.
- WRITE or TRIM RECORD: The **S/E STAT** key flashes when one or more Switch or Encoder is in RECORD.

CAS:
The **SECT SWITCH** Pre-Selector key will light for all Encoder Control Mode indications.

- READ: The Switches and Encoders **READ** Control Mode Activator is lit.
- WRITE ENABLE: The Switches and Encoders **ABS** Control Mode Activator is lit (**SECT SWITCH** Pre-Selector key flashes when in RECORD).
- TRIM ENABLE: The Switches and Encoders **TRIM** Control Mode Activator is lit (**SECT SWITCH** Pre-Selector key flashes when in RECORD).
- ISOLATE: The Switches and Encoders **ISO** Control Mode Activator is lit.



Channel Strip S/E STAT Key:

The **S/E STAT** (**S/E PB**, **S/E REC**) key gives partial Control Mode indications for both Switches and Encoders

- **S/E STAT** key *on*: One or more Switch(es) or Encoder(s) is/are in either WRITE ENABLE or TRIM ENABLE mode.
- **S/E STAT** key *flashing*: One or more Switch(es) or Encoder(s) is/are in either WRITE ENABLE or TRIM ENABLE mode.
- **S/E STAT** key *off*: All Switches and Encoders are in either READ or ISOLATE mode.

5.6.7 Control Mode Indicators *(Vista)*

In automation mode, the channel strips hold additional indications for detailed display of the current status.
This chapter shows all possible indications of automation status and explains their meaning.

First, there are some record indicators integrated within the recording keys:

[A] Recording overview for switches. If half-lit: One or more switches are armed (i.e. in TRIM or WRITE enable mode). If fully lit: One or more switches are recording.
Pressing this key will either punch-in the held objects, or punch-out the switches currently recording.

[B] Recording overview for rotary encoders. If half-lit: One or more rotaries are armed (i.e. in TRIM or WRITE enable mode). If fully lit: One or more rotaries are recording
Pressing this key will either punch-in the held objects, or punch-out the rotaries currently recording.

[C] Current and replay value of the channel mute. If the current value is different from the one in the last mix pass, this LED indicates the value within the last mix pass, while the main red LED within the key indicates the current value.
This LED is also used for mute indication, if "solo in place" is active.

[D] Recording of the channel mute. If half-lit: Channel mute is armed (i.e. in TRIM or WRITE enable mode). If fully lit: Channel mute is recording.
Pressing this key will either punch-in the current MUTE status, or punch it out of recording.

[E] Recording of fader. If half-lit: Fader is armed (i.e. in TRIM or WRITE enable mode). If fully lit: Fader is recording.
Pressing this key will either punch-in the current fader status, or punch it out of recording.

The meaning of the different Vistonics indicators is as follows:

Displayed Value

The *displayed value* (e.g. "–7.6 dB") is always the current value, except when the control is in TRIM mode. Then it shows the offset from TRIM null point.
It is underlined whenever the control is touched ("hold" in automation).

Rotary Value

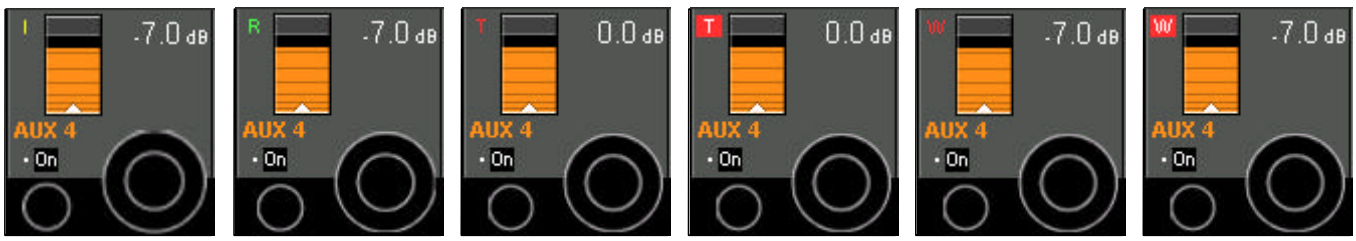
Current and replay value of the rotary control. If the current value is different from the one within the last mix pass, a pink colored element indicates the value of the last mix pass, while the main display is indicating the current value.

Fader Value

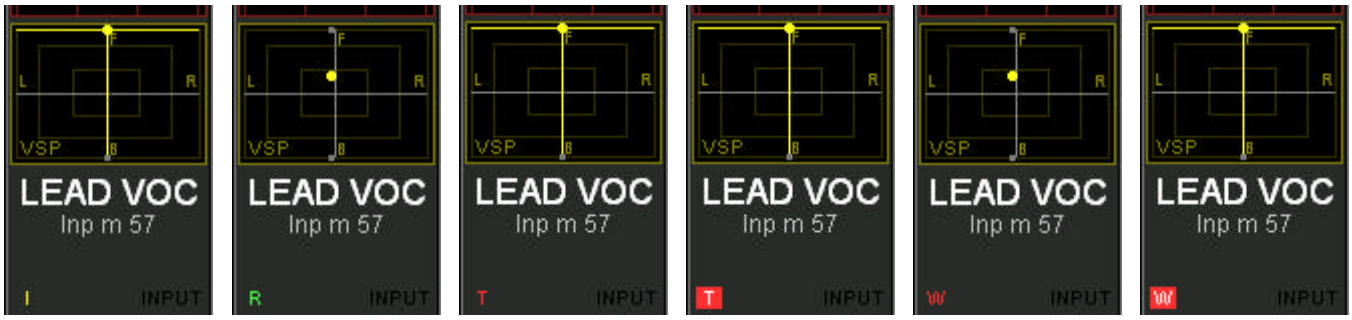
Current and replay value of the fader. If the current value is different from the one in the last mix pass, a pink colored element indicates the value within the last mix pass, while the main display is indicating the current value.

Recording

Recording and recording mode indicator: This always refers to the associated control.
Characters without a frame indicate the status of the rotary control (I = Isolate, R = Read, T = Trim, W = Write).
A red frame behind the "W" or "T" indicates that the rotary control is currently recording.



Recording *Recording mode of the fader (in the Vistonics generic display area):*
Characters without a frame indicate the status of the fader (I = Isolate, R = Read, T = Trim, W = Write).
A red frame behind the "W" or "T" indicates that the fader is currently recording.



n–1 x *n–1 x* indicates that the channel is the owner of an n–1 bus, together with its bus number - e.g. "m 1" for "mono 1".

.

Rotary Dynamic/Static *Dynamic/static view of the rotary control*:
When pressing the **VIEW** key in the dynamic automation panel, this display changes to DYN, if this control contains dynamically automated elements

Fader Dynamic/Static *Dynamic/static view of the fader:* When pressing the **VIEW** key in the dynamic automation panel, this display appears and indicates "FADER DYN", if the fader is dynamically automated.

5.7 Touch and Hold

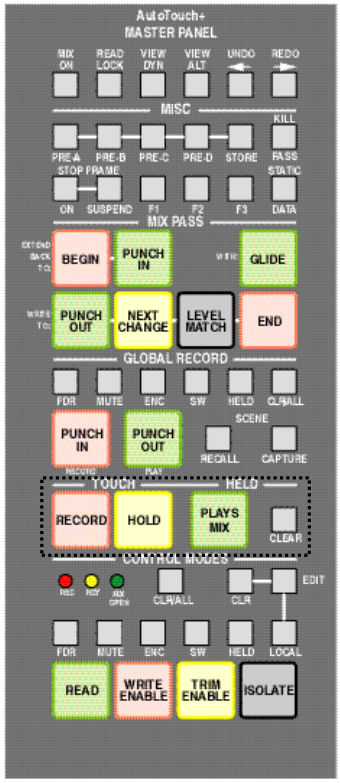
Touch and Hold functions are key aspects of understanding the Auto-Touch+ system. Knowledge of these functions and their permutations is essential to the operation of the system. As with Control Modes, there are rules, conditions, and options that determine the precise function of these features.

Faders and Encoders on the channel strip and the *(D950)* CAS are touch-sensitive. Switches are touch-sensitive in regard that touch events are recognized by the system when a Switch is actuated.

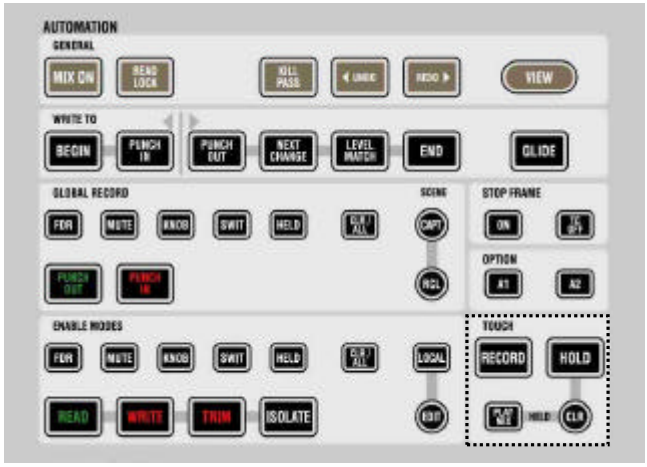
Note: *This chapter will emphasize how touch events relate to Faders and Encoders. Switch automation information will be included, but for complete information regarding Switch automation refer to chapter 5.10.*

The activator keys for Touch and Hold functions are found in the **TOUCH / HELD** section of the AutoTouch+ Panel.

D950:



Vista:



5.7.1 Touch and Un-touch

Touch/Un-touch Events: Touching a Fader or Encoder is registered by the system as a "Touch" event. Releasing the control is registered as an "Un-touch" event. Auto-Touch+ uses these events to trigger various operations and to toggle between states.

Switches: Switches present a special case. This chapter discusses Touch and Un-touch events as they apply to faders and encoders. Please refer to chapter 5.10 for Switch Automation details.

Note: It is important to recognize that Touch and Un-touch events are separate and independent events and are used by AutoTouch+ in different ways. However, Touch and Un-touch are often linked during many operations.

Examples of possible operations that can be triggered by Touch and Un-touch events:

- Touch
  - Enter the enabled mode for that control (i.e. Audition)
  - Punch-in that control (i.e. Enable to Record)
- Un-touch
  - Exit the enabled mode for that control (i.e. Audition)
  - Punch-out that control (i.e. Record to Enable)

Touch-sensitivity is *always* active on the work surface, even if **TOUCH RECORD** and/or **TOUCH HOLD** are not active. It should also be noted that when necessary, Touch and Un-touch events can be suppressed to facilitate specific functionality.

Basic Touch/Un-touch Events: Touch/Un-touch events can be registered without **TOUCH RECORD** or **TOUCH HOLD** engaged. These events perform the following functions when dynamic controls are in the Control Modes indicated:

- READ: Touch/Un-touch will toggle the control in and out of AUDITION. The control will change from READ to AUDITION when touched and will snap back to recorded values (READ) when released.
- WRITE ENABLE: Touch/Un-touch will toggle the control in and out of AUDITION
- TRIM ENABLE: Touch/Un-touch will toggle the control in and out of TRIM AUDITION
- ISOLATE: Touch/Un-touch events of Isolated controls are not recognized by AutoTouch+.

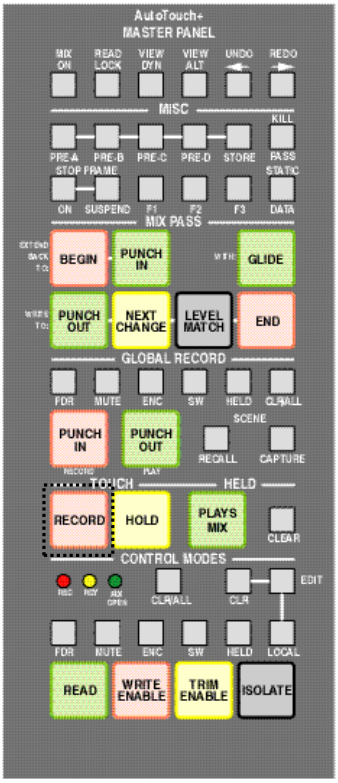
<Option>

- With <Read Safe> checked on the Misc Options page, AUDITION mode is defeated for controls in READ and only Read Mix values will be heard (also refer to chapter 5.21.8).

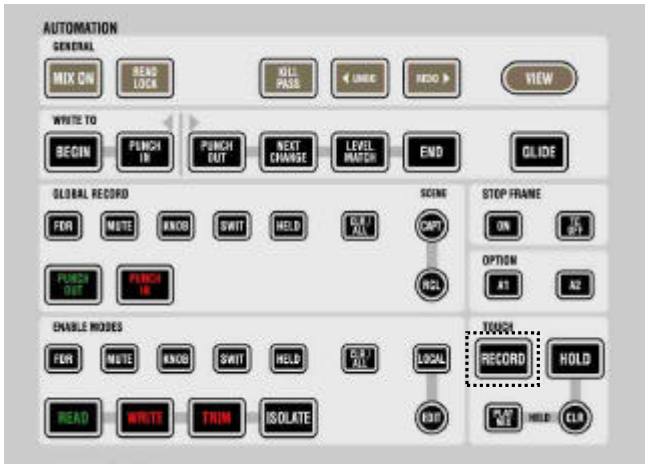
5.7.2 Touch Record

With **TOUCH RECORD** engaged, touching a Write or Trim enabled control will change it from ENABLE to RECORD. This will effectively perform a "Punch-In" for that control. Touching a control in READ will change it to AUDITION.

D950:



Vista:



When released, a control in RECORD will change back to ENABLE, effectively "Punching-Out" (if **TOUCH HOLD** is not engaged). Subsequent Touch/Un-touch events will to toggle that control in an out of RECORD. Likewise a control in AUDITION will revert to READ when released.

To sum it up, if **TOUCH RECORD** is used alone (without **TOUCH HOLD**) controls will change to either RECORD or AUDITION for the duration of the human contact with the control.

Touch Record: With only **TOUCH RECORD** engaged (without **TOUCH HOLD**), Touch/Un-touch events perform the following functions when dynamic controls are in the Control Modes indicated:

- READ: Touch/Un-touch will toggle the control in and out of AUDITION.
- WRITE ENABLE: Touch/Un-touch will toggle the control in and out of RECORD. The control will change from WRITE ENABLE to WRITE RECORD when touched and will snap back to recorded values (WRITE ENABLE) when released. The control will glide back if **GLIDE** is engaged.
- TRIM ENABLE: Touch/Un-touch will toggle the control in and out of RECORD. The control will change from TRIM ENABLE to TRIM RECORD when touched and will snap back to recorded Trim values (TRIM ENABLE) when released. The control will glide back if **GLIDE** is engaged.
- ISOLATE: Touch/Un-touch events of Isolated controls are not recognized by AutoTouch+.

Note: The examples above assume that **WRITE TO PUNCH OUT** is active. Refer to chapter 5.9.1.

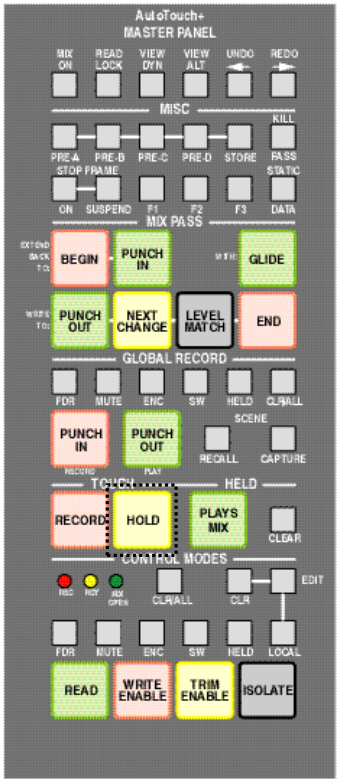
<Option>

- With <Read Safe> checked on the Misc. Options page, AUDITION mode is defeated for controls in READ, and only written values will be heard.
- The **TOUCH RECORD** key may be overridden by checking options on the <Master Panel Overrides> section of the Master Panel Options page. Faders and Encoders can have **TOUCH RECORD** set to <ON>, <OFF>, or to follow the Master Panel <Follows Panel>. **TOUCH RECORD** for Switches can also have <ON> and <OFF> overrides or be set to follow the Master Panel <Follows Panel>.

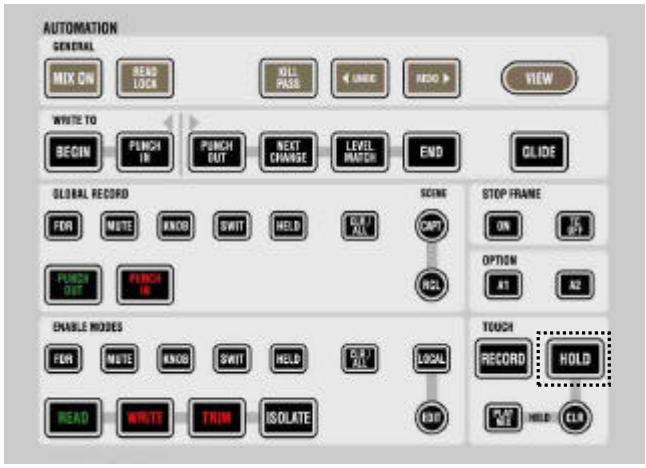
5.7.3 Touch Hold

With **TOUCH HOLD** engaged, touching a control will change it to being in a "Held" state.

D950:



Vista:



Held Controls: Controls that are in Held status have specific functional qualities:

- They maintain their current status when physically released (Un-touched)
- They may be selected as a group (Held Objects) for additional automation operations (such as a Pre-Selector set).

When **TOUCH HOLD** is activated the Touch event is registered by the system and the Un-touch event is suppressed. Touching a control will change it to the next mode available. More importantly, the control will "hold" that mode when it is released.

When released, a control in RECORD will not punch-out and change back to ENABLE, it will stay in RECORD. Likewise a control in AUDITION will not revert to READ when released.

To sum it up, if **TOUCH HOLD** is used alone (without **TOUCH RECORD**) controls will change to their AUDITION modes and stay there when released.

Touch Hold: With only **TOUCH HOLD** engaged (without **TOUCH RECORD**), Touch events perform the following functions when dynamic controls are in the Control Modes indicated (remember Un-touch events are suppressed):

- READ: Touch will change to and stay in AUDITION.
- WRITE ENABLE: Touch will change to and stay in AUDITION.
- TRIM ENABLE: Touch will change to and stay in TRIM AUDITION.
- ISOLATE: Touch/Un-touch events of Isolated controls are not recognized by AutoTouch+.

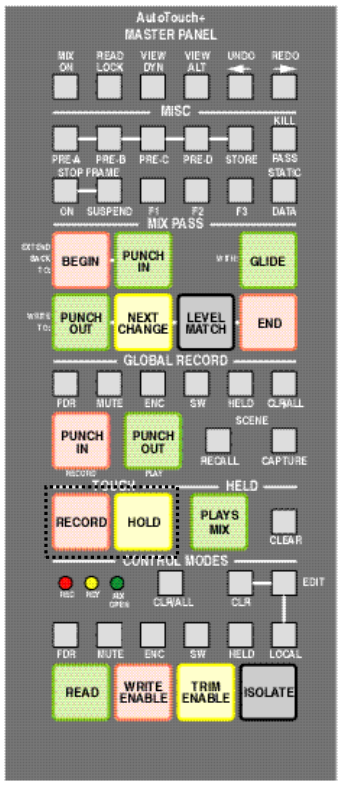
<Option>

- With <Read Safe> checked on the Misc Options page (see chapter 5.21.8), AUDITION mode is defeated for controls in READ, and only written values will be heard.
- The **TOUCH HOLD** key may be overridden by checking options on the <Master Panel Overrides> section of the Master Panel Options page (see chapter 5.21.5). Faders and Encoders can have **TOUCH HOLD** set to <ON>, <OFF>, or to follow the Master Panel <Follows Panel>. **TOUCH HOLD** for Switches can also have <ON> and <OFF> overrides or be set to follow the Master Panel <Follows Panel>.

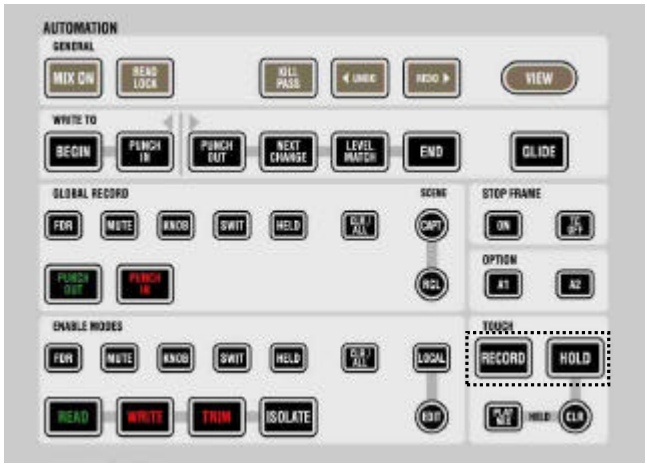
5.7.4 Touch Record + Touch Hold

TOUCH RECORD and **TOUCH HOLD** can be used together to create a condition where controls will change to RECORD (if enabled) or AUDITION (if in READ) when touched and stay in that mode when released.

D950:



Vista:



With both **TOUCH RECORD** and **TOUCH HOLD** engaged, touching a control will change it from its current state to the next mode available and then will "hold" that mode (remember, when **TOUCH HOLD** is activated, the Touch event is registered by the system and the Un-touch event is suppressed).

When released, a control in RECORD will not punch-out and change back to ENABLE, it will stay in RECORD. Likewise a control in AUDITION will not revert to READ when released.

Touch Record + Touch Hold: With both **TOUCH RECORD** and **TOUCH HOLD** engaged, Touch events perform the following functions when dynamic controls are in the Control Modes indicated (remember Un-touch events are suppressed):

- READ: Touch will change to and stay in AUDITION.
- WRITE ENABLE: Touch will change the control from WRITE ENABLE to WRITE RECORD and stay in WRITE RECORD when released.
- TRIM ENABLE: Touch will change the control from TRIM ENABLE to TRIM RECORD and stay in TRIM RECORD when released.
- ISOLATE: Touch/Un-touch events of Isolated controls are not recognized by AutoTouch+.

<Option>

- With <Read Safe> checked on the Misc Options page (see chapter 5.21.8), AUDITION mode is defeated for controls in READ, and only written values will be heard.
- The Master Panel **TOUCH RECORD** and **TOUCH HOLD** keys may be overridden by checking options on the <Master Panel Overrides> section of the Master Panel Options page (see chapter 5.21.5). Faders and Encoders can have **TOUCH RECORD** and **TOUCH HOLD** set to <ON>, <OFF>, or to follow the Master Panel <Follows Panel>. **TOUCH RECORD** and **TOUCH HOLD** for Switches can also have <ON> and <OFF> overrides or be set to follow the Master Panel <Follows Panel>
- The Un-touch function of either **TOUCH RECORD** or **TOUCH HOLD** may be changed by using the **AUTO MODE** modifier key. For details, refer to chapter 5.7.6.

5.7.5 Held Controls

A control that is touched with **TOUCH HOLD** engaged becomes a "held" control. Held controls are also known as "Held Objects." Controls that are held not only stay in their Touched mode when released, they are identified by the system as being held.

Held Controls Buffer: As controls are placed into a held status, they are added to a list of controls stored in the "Held Controls Buffer." The **CLR HELD** key in the **HELD** section of the AutoTouch+ Panel will light if one or more control is held.

The Held Controls list is used as a filter for the **HELD** pre-selectors in the Control Modes and Global Record sections of the Automation Master Panel.

Clearing Held Controls: *Clear Held Controls Buffer:* Pressing the **CLR HELD** key will take all Held controls out of Hold. It will also clear the list of controls in the Held Controls Buffer.
Clear Held Controls Modes: Controls may be taken out of hold in the following ways:

- When **TOUCH HOLD** is turned OFF **<Option>**
- Upon Punch-Out **<Option>**
- At the end of a Mix Pass **<Option>**

<Option>

- With <When Touch Hold Turned Off> checked in the <Clear Held Objects> section of the Hold Options page (also refer to chapter 5.21.7), all held controls are cleared when **TOUCH HOLD** is turned Off.
- With <Upon Punch-Out> checked in the <Clear Held Objects> section of the Hold Options page, any Held control is cleared upon punch-out.

- With <Held Objects> checked in the <End of Pass Clears> section of the End of Pass Options page, all held controls are cleared at the end of each Mix Pass.

Note: The **TOUCH HOLD** key on the AutoTouch+ Panel may be overridden by checking options on the <Master Panel Overrides> section of the Master Panel Options page (also refer to chapter 5.21.5). Faders/Encoders and Switches can have **TOUCH HOLD** set to <ON> as an default option. When using this option, care should be taken not inadvertently place controls into Hold.

5.7.5.1 Held Plays Mix

When the **HELD PLAYS MIX** key is engaged, all Held controls play their Read Mix data when not in RECORD, but the controls can be set to different physical positions.

The Read Mix data is heard, even though one or more controls are being held in AUDITION. This allows a held control to be pre-positioned while awaiting a punch-in. The result is true emulation of the resultant mix, while the Mix Pass is being run.

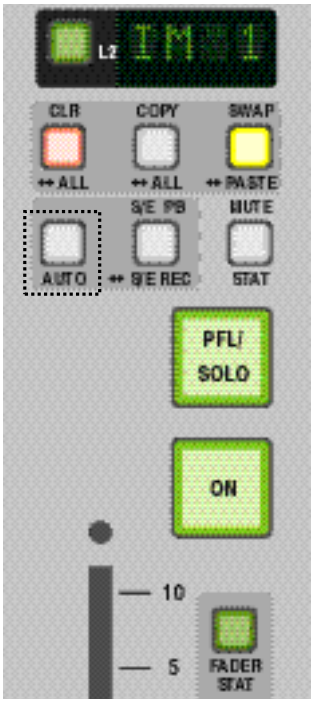
<Option>

- With <Disabled While Touched> checked in the <Held Plays Mix> section of the Hold Options page (also refer to chapter 5.21.4) and **HELD PLAYS MIX** engaged, all held controls that are touched will change to AUDITION for the duration of the touch. The AUDITION value will be heard while the control is being touched. Upon release held controls revert to playing the Read mix. This is useful when pre-positioning the control before the punch. This “TOUCH AUDITION” mode allows the Punch-In value to be determined by touching and moving the control to the desired position and releasing it to return to hearing the Read mix. The control retains it’s AUDITION value awaiting Punch-In while the Read mix is heard.

5.7.6 Auto Mode Key Function

Auto Mode Key: The channel strip **AUTO / AUTO MODE** key is also known as the "modifier key."

D950:



Vista:

Auto Mode Key Function: Holding the **AUTO / AUTO MODE** key down temporarily reverses the state of the Master Panel Touch Record key on a local basis. For example, if Touch Record is activated on the AutoTouch+ Panel, holding down the **AUTO / AUTO MODE** key will deactivate Touch Record on that channel as long as the key held down. If Touch Record is not active, holding the **AUTO / AUTO MODE** key will activate it for that channel.

Using the Auto Mode Key: The **AUTO / AUTO MODE** key may be used as follows:

- Global Touch Record Active:
  - Holding the **AUTO / AUTO MODE** key will deactivate Touch Record for that channel. This will allow enabled controls to be auditioned on a local basis without being punched-in.
  - Touching an enabled control will punch it in and holding it will keep it in RECORD. Pressing and holding the **AUTO / AUTO MODE** key before the control is released will deactivate Touch Record. When it is released, the control will not punch-out and will stay in RECORD in a Held state.
- Global Touch Record Inactive:
  - Holding the **AUTO / AUTO MODE** key will activate Touch Record for that channel. This will allow enabled controls to be punched-in on a local basis.
  - Holding the **AUTO / AUTO MODE** key and releasing a control that is in RECORD will punch that control out. In this case, the control may be touched at any time, but the **AUTO / AUTO MODE** key must be pressed at the time of release for a punch-out to occur.

Note: To achieve the function mentioned above when Global Touch Record is inactive, the "Modified Untouch Inverts" option (radio button "Touch Record") must be selected (also refer to chapter 5.21.8).

5.7.6.1 Modified Un-touch Inverts

As an option, the Touch Record or Touch Held may have their modified Un-touch function inverted. In other words, if the **AUTO / AUTO MODE** key is held down when a control is Un-touched (released) the normal Un-touch function of Touch Record or Touch Hold will be reversed.
Either Touch Record or Touch Hold may be selected for Un-touch inversion, but not both.

<Option>

- Either the <Touch Hold> or <Touch Record> function may be selected for Modified Un-touch Inversion when the **AUTO / AUTO MODE** key is held. This selection is made by clicking the desired radio button in the <Modified Un-touch Inverts> section of the Misc Options page (also refer to chapter 5.21.8).

5.7.6.1.1 Option Modified Un-Touch Inverts <Touch Record>

***Both* Global Touch Record *and* Global Touch Hold *inactive*:**

1a - Holding the **AUTO / AUTO MODE** key when an enabled control is touched, will punch that control in RECORD. As long as the **AUTO / AUTO MODE** key is held down, a touched control will be in RECORD. Un-touching the control will return the status from RECORD to ENABLE.

1b If the control is touched and the **AUTO / AUTO MODE** key is released before the control is physically un-touched, the control will remain in RECORD even if the control is physically un-touched.
Even if the control remains in RECORD, the un-touch information is suppressed.

1c - A control being in RECORD can be punched out by holding the **AUTO / AUTO MODE** key, and touching and un-touching the control while the **AUTO / AUTO MODE** key is being pressed. The control changes from RECORD to ENABLE when the control is physically un-touched.

Global Touch Record *active*, Global Touch Hold *inactive*:

2a - While pressing the **AUTO / AUTO MODE** key, touching of a control that is in ENABLE mode will not punch it into RECORD.

2b - Touching the control (causing it to change from ENABLE to RECORD) and pressing the AUTO MODE key while still touching the control, then releasing the control while still pressing the **AUTO / AUTO MODE** key will cause the control to remain in RECORD and HELD status.

Global Touch Record *inactive*, Global Touch Hold *active*:

3a - Keep the **AUTO / AUTO MODE** key pressed. Touching and untouching a control in ENABLE mode will punch the control in and out of RECORD. *Please note that the control is in HELD status, regardless whether it is in RECORD or not.*

3b - Keep the **AUTO / AUTO MODE** key pressed and touch a control that is currently in ENABLE mode. Keep the control touched and release the **AUTO / AUTO MODE** key. The control will remain in RECORD.

3c - A control being in RECORD mode can be punched out by keeping the **AUTO / AUTO MODE** key pressed, then touching and untouching the con-

trol. At the moment the control is released, it punches out of RECORD but remains in HELD status.

***Both* Global Touch Record *and* Global Touch Hold *active*:**

4a - While keeping the **AUTO / AUTO MODE** key pressed, touching a control in ENABLE mode will not punch into RECORD. The control will remain in HELD status.

4b - A control being in RECORD status can be punched out by keeping the **AUTO / AUTO MODE** key pressed, then touching and untouching the control. At the moment the control is released, it punches out of RECORD while remaining in HELD status.

5.7.6.1.2 Option Modified Un-Touch Inverts <Touch Hold>

***Both* Global Touch Record *and* Touch Hold *inactive*:**

5a - While keeping the **AUTO / AUTO MODE** key pressed, touching a control in ENABLE mode will switch it to RECORD and HELD status. When releasing the control it will remain in RECORD and TOUCHED.

Global Touch Record *active*, Touch Hold *inactive*:

6a - While keeping the **AUTO / AUTO MODE** key pressed, touching a control in ENABLE mode will switch it to HELD but not to RECORD status, if the control is released before the **AUTO / AUTO MODE** key.

6b - While keeping a control in ENABLE mode touched, press the **AUTO / AUTO MODE** key. Then release the control before releasing the **AUTO / AUTO MODE** key, causing the control to switch to RECORD and HELD status.

Global Touch Record *inactive*, Touch Hold *active*:

7a - While keeping the **AUTO / AUTO MODE** key pressed, touching a control in ENABLE mode will switch it to RECORD but not to HELD mode, if the control is released before the **AUTO / AUTO MODE** key.

***Both* Global Touch Record *and* Touch Hold *active*:**

8a - While keeping the **AUTO / AUTO MODE** key pressed, touching a control in ENABLE mode will not punch the control into RECORD. When releasing the control while the **AUTO / AUTO MODE** key is still pressed, the control will not jump back to the replay value.

8b - A control being in RECORD can be punched-out by pressing the **AUTO / AUTO MODE** key, then touching the control and releasing it while the **AUTO / AUTO MODE** key is still pressed. At the same time the control's HELD status is cleared.

Ref.	Step	Global Touch Record	Global Touch Hold	AUTO MODE Key Action	Control Action	Control Status Condition/Reaction
1a		OFF	OFF			ENABLE
	1	OFF	OFF	Press + Hold		ENABLE
	2	OFF	OFF	Hold	Touch	RECORD
	3	OFF	OFF	Hold	Un-touch	ENABLE
1b		OFF	OFF			ENABLE
	1	OFF	OFF	Press + Hold		ENABLE
	2	OFF	OFF	Hold	Touch + Hold	RECORD
	3	OFF	OFF	Release	Hold	RECORD
	4	OFF	OFF		Un-touch	RECORD
1c		OFF	OFF			RECORD
	1	OFF	OFF	Press + Hold	Touch	RECORD
	2	OFF	OFF	Hold	Un-touch	ENABLE
2a		ON	OFF			ENABLE
	1	ON	OFF	Press + Hold		ENABLE
	2	ON	OFF	Hold	Touch	ENABLE (no change)
2b		ON	OFF			ENABLE
	1	ON	OFF		Touch + Hold	RECORD
	2	ON	OFF	Press + Hold	Hold	RECORD
	3	ON	OFF	Hold	Un-touch	RECORD + HELD
3a		OFF	ON			ENABLE + HELD
	1	OFF	ON	Press + Hold		ENABLE + HELD
	2	OFF	ON	Hold	Touch	RECORD + HELD
	3	OFF	ON	Hold	Un-touch	ENABLE + HELD
3b		OFF	ON			ENABLE
	1	OFF	ON	Press + Hold		ENABLE
	2	OFF	ON	Hold	Touch + Hold	RECORD
	3	OFF	ON	Release	Hold	RECORD
3c		OFF	ON			RECORD
	1	OFF	ON	Press + Hold		RECORD
	2	OFF	ON	Hold	Touch	RECORD
	3	OFF	ON	Hold	Un-touch	ENABLE + HELD
4a		ON	ON			ENABLE
	1	ON	ON	Press + Hold		ENABLE
	2	ON	ON	Hold	Touch	ENABLE + HELD
4b		ON	ON			RECORD
	1	ON	ON	Press + Hold		RECORD
	2	ON	ON	Hold	Touch	RECORD
	3	ON	ON	Hold	Un-touch	ENABLE + HELD
5a		OFF	OFF			ENABLE
	1	OFF	OFF	Press + Hold		ENABLE
	2	OFF	OFF	Hold	Touch	RECORD + HELD
	3	OFF	OFF	Hold	Un-touch	RECORD + HELD

Ref.	Step	Global Touch Record	Global Touch Hold	AUTO MODE Key Action	Control Action	Control Status Condition/Reaction
6a		ON	OFF			ENABLE
	1	ON	OFF	Press + Hold		ENABLE
	2	ON	OFF	Hold	Touch	ENABLE
	3	ON	OFF	Hold	Un-touch	ENABLE + HELD
6b		ON	OFF			ENABLE
	1	ON	OFF		Touch + Hold	RECORD
	2	ON	OFF	Press + Hold		RECORD
	3	ON	OFF	Hold	Un-touch	RECORD + HELD
7a		OFF	ON			ENABLE
	1	OFF	ON	Press + Hold		ENABLE
	2	OFF	ON	Hold	Touch	RECORD
	3	OFF	ON	Hold	Un-touch	RECORD (not HELD)
8a		ON	ON			ENABLE
	1	ON	ON	Press + Hold		ENABLE
	2	ON	ON	Hold	Touch	ENABLE
	3	ON	ON	Hold	Release	ENABLE
8b		ON	ON			RECORD
	1	ON	ON	Press + Hold		RECORD
	2	ON	ON	Hold	Touch	RECORD
	3	ON	ON	Hold	Release	ENABLE (not HELD)

5.8 Global Record

Controls can be “punched in and out” on a global basis. Global punch-ins and punch-outs are accomplished in one of three ways:

1. Manually: Using the **PUNCH-IN** and **PUNCH-OUT** activator keys on the **GLOBAL RECORD** section of the AutoTouch+ Panel
2. Automatically: Enabling the Write Zone and “Auto Punch-In/Out” in the AutoTouch+ window of the Graphic Controller (GC). Refer to chapter 5.8.4, Auto Punch In/Out.
3. Automatically via GPI input (refer to chapter 5.8.5).

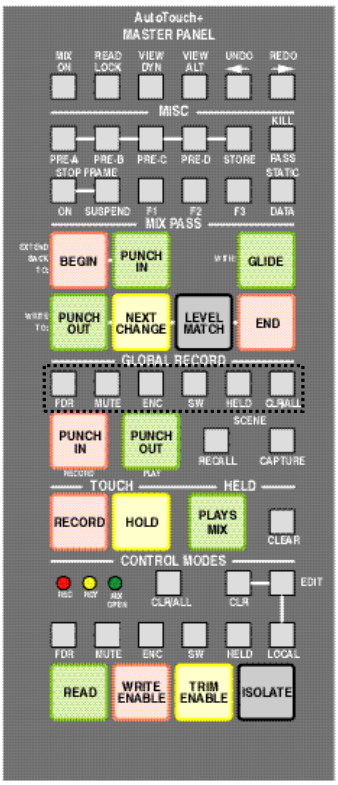
Conditions: If no controls of the type chosen of the Global Record Pre-Selector are enabled, Global punch-in has no affect. Likewise, if no controls of the type chosen of the Global Record Pre-Selector are in RECORD, Global punch-out has no affect.

Note: Individual controls can be punched in and out independently of the Global Record functions. This is done locally on the channel strip or on the D950 CAS.

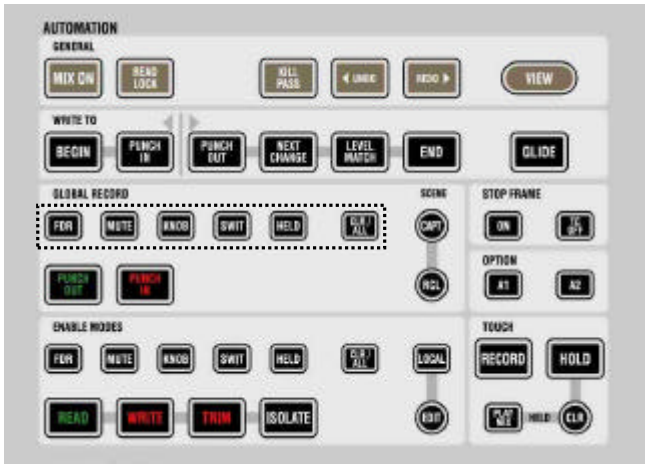
5.8.1 Pre-Selectors

Pre-Selectors: Regardless of the punch method used, the Global Record Pre-Selectors determine which controls are affected when a global punch-in occurs.

D950:



Vista:



Multiple Pre-Selectors may be active at a time. Any and all combinations are allowed. Pre-Selectors will illuminate when active.
The following describes the control classifications as defined by the Global Record Pre-Selectors:

- **FDR** (Fader): The fader of all channel types
- **MUTE** (Mute): The Mute of all channel types
- **ENC / KNOB** (Encoders/Knobs): All continuous controller type encoders (knobs or rotaries). This does *not* include knobs that control “selectors”, such as pan format, or phase inversion (for example).
- **SW** (Switches): All switches (keys) and selectors (keys and knobs)
- **HELD** (Held Controls): All controls that are currently in a “Held” status. (This could be any combination of faders, mutes, switches, and encoders). Refer to chapter 5.7.3.

Note: If no Pre-Selectors are active, then no controls will be punched-in or out.

Clear/All:

- **CLR / ALL**: Permits the changing of all of the Pre-Selectors at once. This key functions as follows:
  - If one or more Pre-Selectors are active, then pressing CLR/ALL clears all of the Pre-Selectors.
  - If no Pre-Selectors are active, then ALL Pre-Selectors get active.
  - Holding **CLR / ALL** and pressing **PUNCH-IN** or **PUNCH-OUT** will by-pass the Pre-Selector and select all controls.

5.8.2 Manual Punch-In/Out

The manual **PUNCH-IN** and **PUNCH-OUT** activators are located in the Global Record section of the Automation Master Panel. As described above, the controls to be punched in and out are chosen using Global Record Pre-Selectors and then manually "punched in and out" of RECORD using the **PUNCH-IN** and **PUNCH-OUT** activator keys.

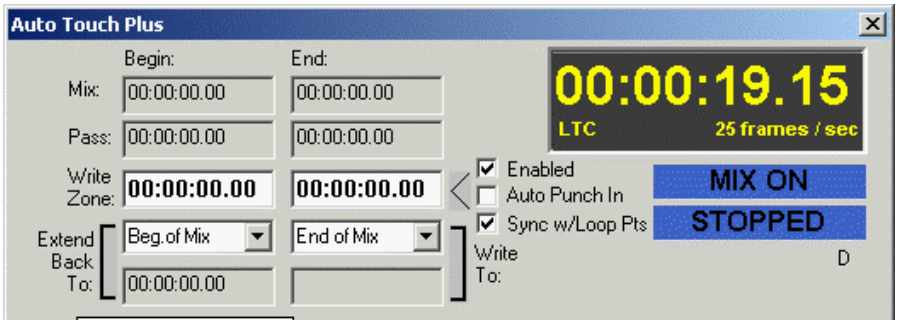
Punch-in/Out Activators:

- **PUNCH IN**: Pressing **PUNCH IN** puts the Pre-Selected controls on all channels **<Option>** into RECORD (if enabled). As with Control Mode entries, the controls affected are filtered by the Pre-Selectors that are currently active.
- **PUNCH OUT**: Pressing **PUNCH OUT** takes the Pre-Selected controls on all channels **<Option>** out of RECORD (if enabled). As with Control Mode entries, the controls affected are filtered by the Pre-Selectors that are currently active.

Note: Whenever any control is in RECORD the **PUNCH IN** and **PUNCH OUT** keys are lit.

5.8.3 Write Zone

The Write Zone is a region between two user-specified timecode locations. When the Write Zone is enabled, recording may take place only within that timecode region.



Write Zone Functions:

When the Write Zone is enabled, the following conditions are in place:

- Record is locked out before the Write Zone Begin Time.
- Record is locked out after the Write Zone End Time.
- Recording is allowed only between the Write Zone Begin and End Time.
- Any controls in RECORD will punch-out at the Write Zone End Time if timecode is played through the End Time (with or without Auto Punch-In engaged).
- If Auto Punch-In is engaged, enabled controls will punch-in at the Write Zone Begin Time if timecode is played through the Begin Time.

Enabling the Write Zone: The Write Zone is enabled by checking the "Write Zone Enabled" box in the AutoTouch+ window. If this box is unchecked the Write Zone has no affect.

Write Zone Begin Time: The Write Zone Begin Time is the timecode location before which recording is locked out, assuming the Write Zone is enabled. Recording is allowed only after the Write Zone Begin Time, but only up to the Write Zone End Time.

Auto Punch-In: If Auto Punch-In is engaged, a punch-in will occur for enabled controls when the Write Zone Begin Time is encountered.

Write Zone End Time: The Write Zone End Time is the timecode location after which Recording is locked out, assuming the Write Zone is enabled. Recording is allowed only before the Write Zone End Time, but only after the Write Zone Begin Time.

Sync w/Loop Pts: Checking the "Sync with Loop Points" function allows to set the Write Zone In an Out points, according to the selected cue points in the AutoTouch+ window.

Any controls in RECORD will punch-out when the Write Zone End Time is encountered. This happened whether Auto Punch-In is engaged or not.

Write Zone Begin/End Time Entry: The Write Zone Begin and End times may be entered in the following ways:

- Highlighting all or part of the Begin or End Time entry field and typing in the new time;
- Highlighting all or part of the Begin or End Time entry field and rolling the time up or down using click/drag methods
- Highlighting all or part of the Begin or End Time entry field and using the up or down arrow keys
- Selecting a time from the Right-Click menu
- Pressing + or – followed by a numeric value
- Using the "Sync with Loop Points" function.

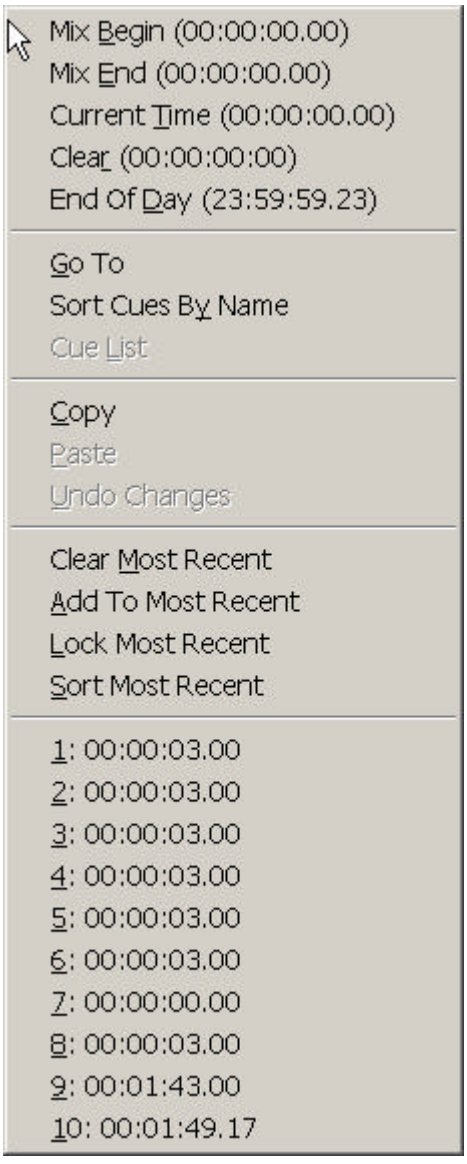
The Write Zone must be enabled before Begin/End Time entry is permitted.

Hot Keys: Hot Keys are provided to aid in the entry of fixed Begin and End timecode locations. A complete description of Hot Key functions is provided in the Appendix.

Entry Field Right-click Menu: Right-clicking either Write Zone entry fields will open the Entry Field Right-click menu.

This menu contains several items that assist the user in quickly entering timecode values. These items are organized in five basic areas:

- Significant System Times: Mix Begin, Mix End, Current Time, Clear (00:00:00.00), and End of Day (23:59:59.2X)
- Cue List Times: Allows access to the Title Cue List and provides the means to sort and go to cues
- Copy/Paste/Undo Changes: Entry field clipboard functions
- Most Recent: A list of the most recently used timecode locations is maintained by the system. Timecode locations from this list many be selected for the entry field value. The most recent timecode (current value) may be locked as the entry field value, to prevent it from being changed. A timecode may be manually added to the list. The list may be sorted and deleted.

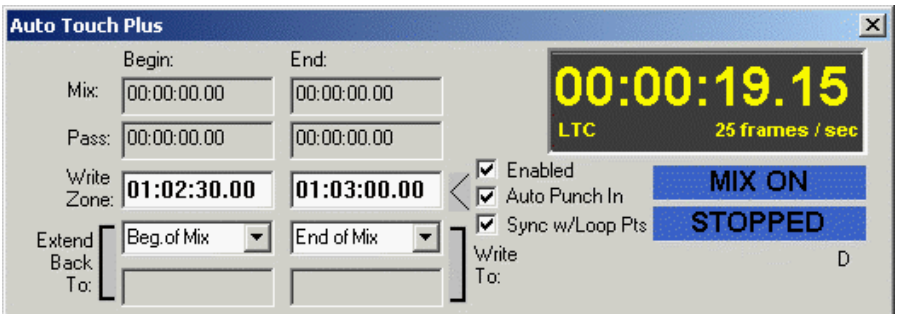


5.8.4 Auto Punch-In/Out

Automatic punch-in/punch-out is controlled via the AutoTouch+ screen of the D950 GC.

Write Zone: To set up an Auto Punch-in/Out, a "Write Zone" with a "Begin" and "End" time must first be established. These will be the In and Out point for the Auto Punch-in. The times displayed were the last In and Out times used by the system. Direct entry of Begin and End times is possible once the Write Zone is enabled. Refer to chapter 5.8.3 for details.

Auto Punch-in: To activate the Auto Punch-in feature, the Write Zone must first be enabled, which is done by checking the "Enable" box next to the End time field. Once the Write Zone is enabled, it is then possible to enable the Auto Punch-in facility. This is accomplished by checking the "Auto Punch In" box located below the Write Zone Enable box.



Performing the Punch: Once Auto Punch-In is enabled and the desired controls are enabled, play back timecode (media). During the pre-roll before the Begin Time, the affected controls will act as if in RECORD ENABLE, but will not punch-in until the Write Zone Begin time.

At the Begin time, the system will automatically punch-in and the any enabled controls will change to RECORD. Recording will continue until the End time is reached, where the controls are automatically punched out.

Note: It is possible to punch-out any individual control at any time within the Write Zone using the **AUTO MODE** key. Global punch-outs may also take place before the end of the Write zone. It is not possible to punch-in before the Begin time or after the End time when the Write Zone is enabled.

Note: Glide functions may be used with Auto Punch-In/Out. Since changes to the Read Mix are prohibited after the Write Zone End time, the Backtime Glide function must be used if Auto Punch-out is used.

5.8.5 Auto GPI In/Out

Global Punch-Ins and Punch-Outs can also be done via the GPI input. This will basically make the Punch-In and Punch-Out key available to external systems or external keys.
If such functionality is required, the `Signaling.ini` file needs to be adapted accordingly. Please contact Studer Service & Support to do the necessary changes in that file.

5.9 Data Transition Behaviors

Data Transitions: In simplest terms, a Data Transition takes place whenever new data meets old data. In more formal terms, a data transition is where Record Mix Data transitions to Read Mix Data and vice versa. This means a transition takes place when Read Mix Data transitions to Record data (such as at a punch-in) and when the Record Data transitions to Read Mix Data (such as a punch-out).

Note: Data Transitions are not limited to punch-in and punch-out locations.

Last Recorded Value: The Last Recorded Value is always the current value of the control at the time it is punched out. However, it should be noted that this value might have been set well before the actual punch-out. In this case, the location of the Last Recorded Value is earlier than the punch-out location.

By definition, the Last Record Value is a Dynamic value. However, it should be noted that it is a singular, non-moving value.

Understanding Behaviors: One of the key aspects to AutoTouch+, is understanding where the Last Recorded Value transitions to and from Read Mix data and how it makes the transitions.

The "where" behavior is determined in two ways:
- Write To: Where Record Data transitions to Read Mix Data
- Extend Back To: Where Read Data transitions to Record Data

The Last Recorded Value may be applied up to or beyond the punch-out point. It may also be applied back to the punch-in point or before. These behaviors will be discussed below.

The "how" behavior is determined by whether the Glide function is On or Off and the Glide Options enabled.

5.9.1 Write To:

The choice of Mix Pass "Write To:" function determines where the Record Data to Read Mix Data transition takes place. In essence, the concept is as follows:
"Take the last recorded value and write it to: _____!"

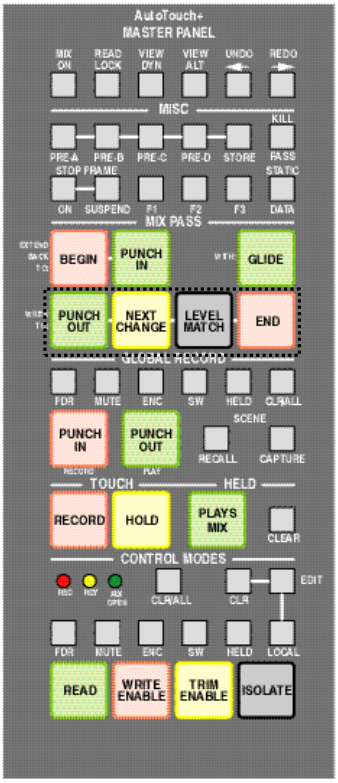
The blank can be filled in with one of following "Write To:" locations:
- Punch-out: Apply the last recorded value to the punch-out location
- Next Change: Apply the Last Recorded Value to the location of the next recorded change
- Level Match: Apply the Last Recorded Value until the it matches the Read Mix value
- End: Apply the Last Recorded Value to the specified End Time.

These locations are also known as "Write To: Functions."

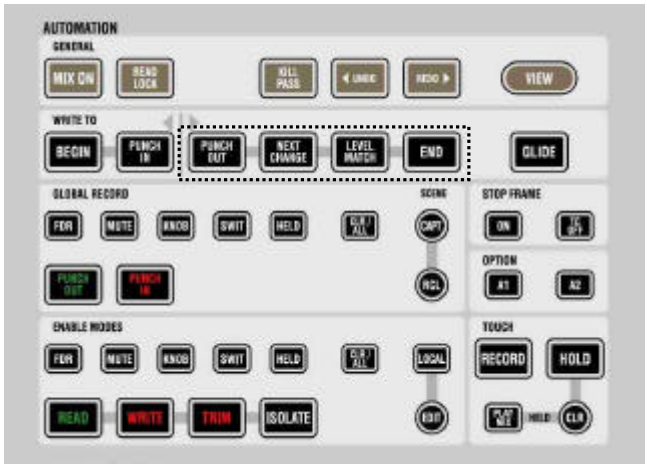
Note: Unlike other automation systems, the transition from Record Data to Read Mix Data does not necessarily have to take place at the punch-out location. In fact, selecting "Write to Punch Out" is the only time that both happen simultaneously.

Write To Keys: The Mix Pass **WRITE TO:** keys determine the point at which the transition from Record Data to Read Mix Data will take place. As noted above, there are four different **WRITE TO:** functions, one of which must be selected. The selected function key will illuminate when that function is active. Only one function can be active at one time.

D950:



Vista:



The four **WRITE TO:** functions behave as follows:

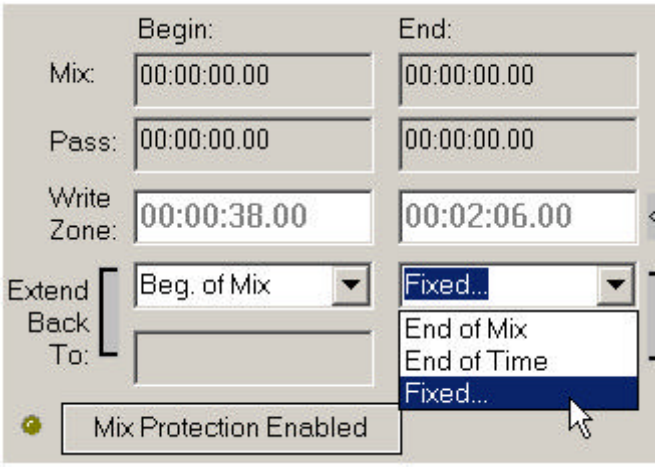
- **PUNCH OUT**: The Last Recorded Value (punch-out value) will be applied until the Punch-out point. At the punch-out point, the Record Data will transition to the Read Mix Data. **PUNCH OUT** is the default **WRITE TO:** function.
- **NEXT CHANGE**: The Last Recorded Value will be applied until the next recorded change in the Read Mix Data. At that point, the Record Data will transition to Read Mix Data.
- **LEVEL MATCH**: The current value of the control (by definition the Last Recorded Value) will be written until it matches the Read Mix Data. At this point, the Record Data will seamlessly transition to the Read Mix Data and a punch-out will occur. If a punch-out occurs without the level being matched, the control will not actually punch-out until the levels match. Any moves that are made before the levels match will be recorded. Matching level may be accomplished by either moving the control to match the Read Mix value or positioning the control where the Read Mix values will intercept the physical position.
- **END**: The Last Recorded Value will be applied until the user-specified End Time. All previously recorded values between the Last Recorded Value (typically Punch-out) and the End Time will be erased.

  The End Time is defined in three different ways:
  - End of Mix: The Last Recorded Value will be applied until the End Time of the Active Mix.
  - End of Time: The Last Recorded Value will be applied up to the last possible timecode location (i.e. 23:59:59.2X). The number of frames will be determined by the selected timecode frame rate.
  - Fixed…: The Last Recorded Value will be applied up to a “fixed” user-selected End Time. See Setting a Fixed End Time below.

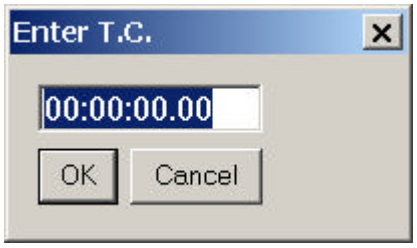
Post Pass Processing: **NEXT CHANGE**, **LEVEL MATCH**, and **END** transitions do not have to be performed in real-time. The active "Write To:" function will take place even after timecode playback has stopped at the end of Record Pass. This saves time by eliminating the need to perform complete real-time passes when a control's value can be written to a known location. This also means it is possible to overwrite mix data in locations that have not been heard. Care is suggested while using "Write To:" functions.

Important Note: **WRITE TO: NEXT CHANGE**, **LEVEL MATCH**, and **END** are destructive functions in the regard that they will overwrite existing mix data until transitioning at their respective **WRITE TO:** locations. Even though previous Mix Passes are retained, for efficient operation care should be taken when using these functions.

Setting a Fixed End Time: Fixed End Times are set using the Write To End Time pull-down menu in the AutoTouch+ window of the GC. The pull-down menu will allow the selection of an End Time definition (End of Mix, End of Time, or Fixed…).

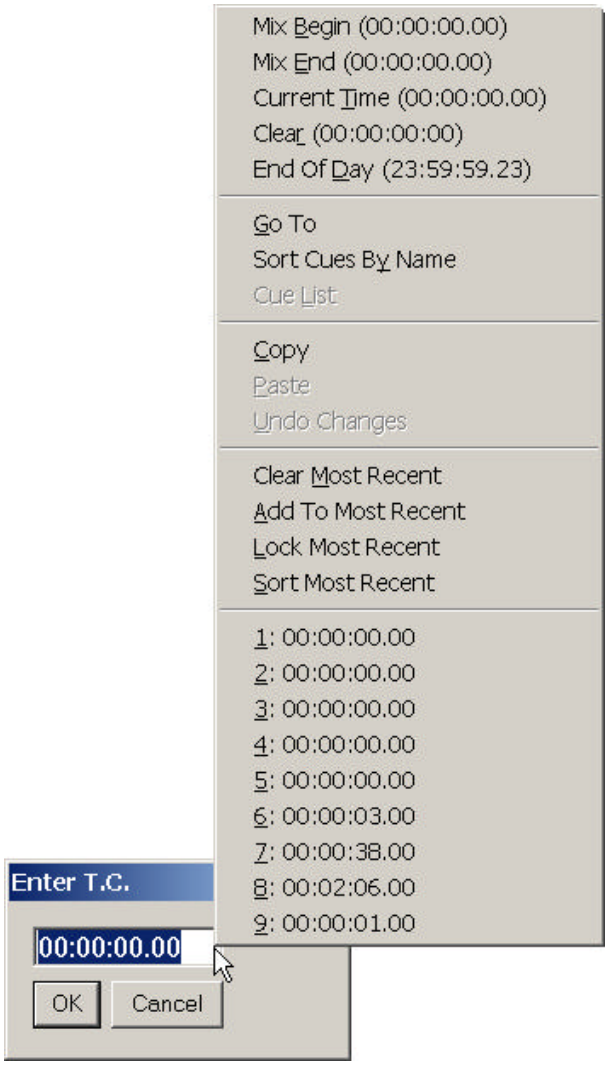


The End of Mix time is predetermined by the End Time of the Active Mix Pass and cannot be altered via this field. End of Time is always the last possible timecode location (i.e. 23:59:59.2X) and cannot be altered. When Fixed End Time is selected a T.C. Entry box appears.



The desired Fixed End Time may be entered via this box by typing in a timecode location or using the roller method (timecode locations cannot be pasted into this field) and clicking OK. When Fixed End Time is selected, the entered timecode location will be shown in the display field directly below the End Time pull-down menu. Changes or direct entries are not allowed using this field. To edit the Fixed End Time, Fixed must be selected from the pull-down menu.

Right-clicking in the Enter T.C. field will open the Entry Field Right-click menu. This menu contains several items that assist the user in quickly entering timecode values.



These items are organized in five basic areas:

- Significant System Times: Mix Begin, Mix End, Current Time, Clear (00:00:00.00), and End of Day (23:59:59.2X)
- Cue List Times: Allows access to the Title Cue List and provides the means to sort and go to cues
- Copy/Paste/Undo Changes: Entry field clipboard functions
- Most Recent: A list of the most recently used timecode locations is maintained by the system. Timecode locations from this list many be selected for the entry field value. The most recent timecode (current value) may be locked as the entry field value, to prevent it from being changed. A timecode may be manually added to the list. The list may be sorted and deleted.

Hot Keys: Hot Keys are provided to aid in the entry of fixed End timecode locations. A complete description of Hot Key functions is provided in chapter 5.23.

<Option> <End of Pass Clears>: The End of Pass options (also refer to chapter 5.21.7) determine the behavior of specific functions when a mix pass is terminated by stopping timecode. The behaviors that take place are determined on the End of Pass Options page. Check boxes allow the selection of the following options:
With <Write To End> checked, the "Write To: End" function is disabled after the end of every Mix Pass and Punch Out is reset as the default state. This ensures that "Write To: End" is only used for one pass without being reset as the "Write To:" function.

5.9.2 Extend Back To:

The choice of Mix Pass "Extend Back To:" function determines where the Read Mix Data to Record Data transition takes place. In essence, the concept is as follows:
"Take the last recorded value and extend it back to: _____!"

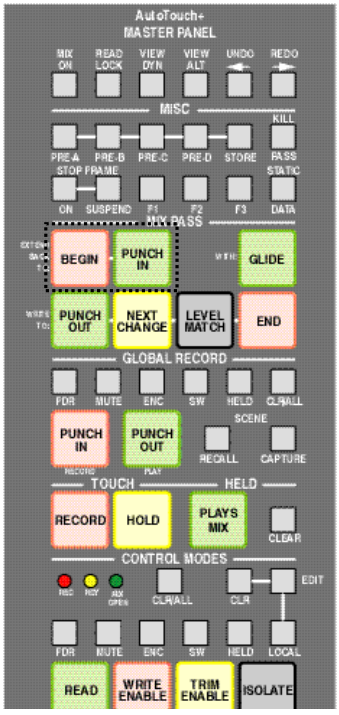
The blank can be filled in with one of two "Extend Back To:" locations:
- Punch-in: Extend the Last Recorded Value back to the punch-in location
- Begin: Extend the Last Recorded Value back to the specified Begin Time.

These locations are also known as **EXTEND BACK TO:** Functions.

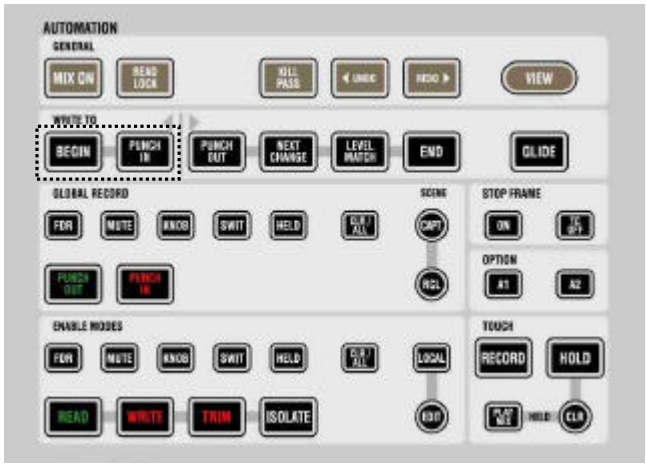
Note: Unlike other automation systems, the transition from Read Mix Data to Record Data does not necessarily have to take place at the punch-in location.

EXTEND BACK TO: keys: The Mix Pass **EXTEND BACK TO:** keys determine the point at which the transition from Read Mix Data to Record Data will take place. As noted above, there are two different **EXTEND BACK TO:** functions. The selected function key will illuminate when that **EXTEND BACK TO:** function is active. Only one function can be active at a time.

D950:



Vista:



Keys for **EXTEND BACK TO:** functions are located on the Mix Pass section of the Automation Master Panel.

The two **EXTEND BACK TO:** functions behave as follows:

- **PUNCH IN**: The Last Recorded Value (typically the value at the time of the punch-out) will be extended back to the punch-in point. At the punch-in point, the Read Mix Data will transition to the Record Data.
- **BEGIN**: The Last Recorded Value will be extended back to the user-specified Begin Time. All previously recorded values between the Last Recorded Value (typically Punch-out) and the Begin Time will be erased.

  The Begin Time is defined in three different ways:
  - Beginning of Mix: The Last Recorded Value will be extended back to the Begin Time of the Active Mix.
  - Beginning of Time: The Last Recorded Value will be extended back to the first possible timecode location (i.e. 00:00:00.00).
  - Fixed…: The Last Recorded Value will be extended back to a "fixed" user-specified Begin Time. See Setting a Fixed Begin Time below.

Post Pass Processing: By definition, **EXTEND BACK TO:** transitions are performed as a post pass process. This also means it is possible to overwrite mix data in locations that have not been heard. Care is suggested while using **EXTEND BACK TO:** functions.

Important Note: **EXTEND BACK TO: PUNCH IN** and **BEGIN** are destructive functions in the regard that they will overwrite existing mix data back to their respective **EXTEND BACK TO:** locations. Even though previous Mix Passes are retained, for efficient operation care should be taken when using these functions.

Setting a Fixed Begin Time: Fixed Begin Times are set using the methods employed to setting Fixed End Times. Refer to "Setting a Fixed End Time" in chapter 5.9.1 above.

Hot Keys: Hot Keys are provided to aid in the entry of fixed Begin timecode locations. A complete description of Hot Key functions is provided in the Appendix.

<Option>

- <End of Pass Clears>: The End of Pass options (refer to chapter 5.21.7) determine the behavior of specific functions when a mix pass is terminated by stopping timecode. The behaviors that take place are determined on the End of Pass Options page. Check boxes allow the selection of the following options:
  - With <Extend Back To Begin> checked, the "Extend Back To: Begin" function is disabled after the end of every Mix Pass. This ensures that "Extend Back To: Begin" is only used for one pass without being reset.
  - With <Extend Back To Punch In> checked, the "Extend Back To: Punch In" function is disabled after the end of every Mix Pass. This ensures that "Extend Back To: Begin" is only used for one pass without being reset.
- With <Extend Back To Punch In Selects Write to Punch Out> checked on the Master Panel Options page (refer to chapter 5.21.5), "Write To: Punch Out" is automatically selected when "Extend Back To: Punch In" is selected. This is convenient since these functions are often used together, especially when Auditioning a level and then using that level between punch-in and punch-out locations.

- The Master Panel **EXTEND BACK TO: PUNCH IN** and **BEGIN** keys may be overridden by checking options on the <Master Panel Overrides> section of the Master Panel Options page. Faders and Encoders can have **EXTEND BACK TO: PUNCH IN** and/or **BEGIN** set to <OFF> or to follow the Master Panel <Follows Panel>. **EXTEND BACK TO: PUNCH IN** and/or **BEGIN** for Switches can also be set to <OFF> or be set to follow the Master Panel <Follows Panel>.

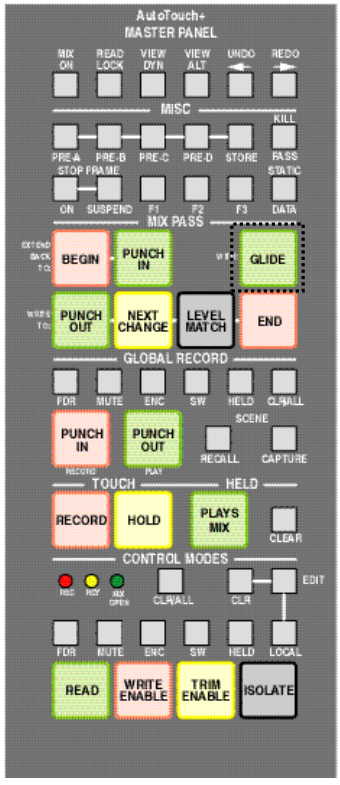
5.9.3 Glide

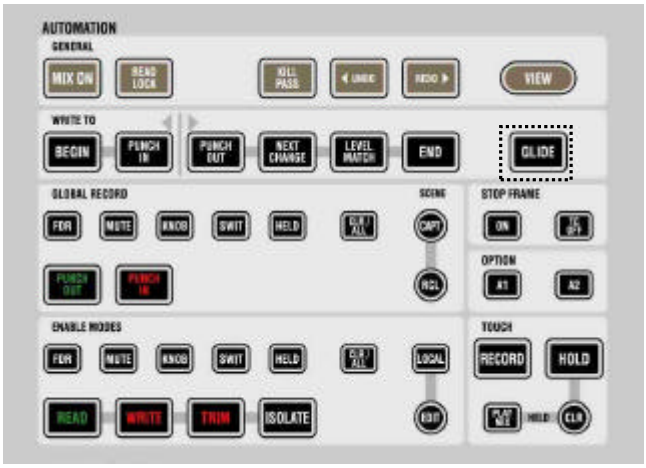
AutoTouch+ provides extensive "Glide" functions. Glide determines how the new data transitions to old data and vice versa. The behavior of the Glide functions are determined by the specified Glide Time and the enabled Glide options.

Glide allows Record Data to transition to and/or from Read Mix Data over a user-specified period of time. Controls can "glide" from their Record values back to their Read Mix values at the desired "Write To:" location. Unlike many other automation systems, controls can also Glide from the Read Mix value to the Record values at the desired "Extend Back To:" location.

Real-time/Post Process Glides: Glide operations may take place in real-time or as a post Record pass process. Refer to the "Write To:" or "Extend Back To:" paragraphs above.

Glide functions are engaged by pressing the **GLIDE** key in the Mix Pass section of the AutoTouch+ Panel. When Glide is active the **GLIDE** key will illuminate.





Note: If no Glide Options are selected in the Glide Options page, then no glide functions will take place within the system even if the **GLIDE** key is active.

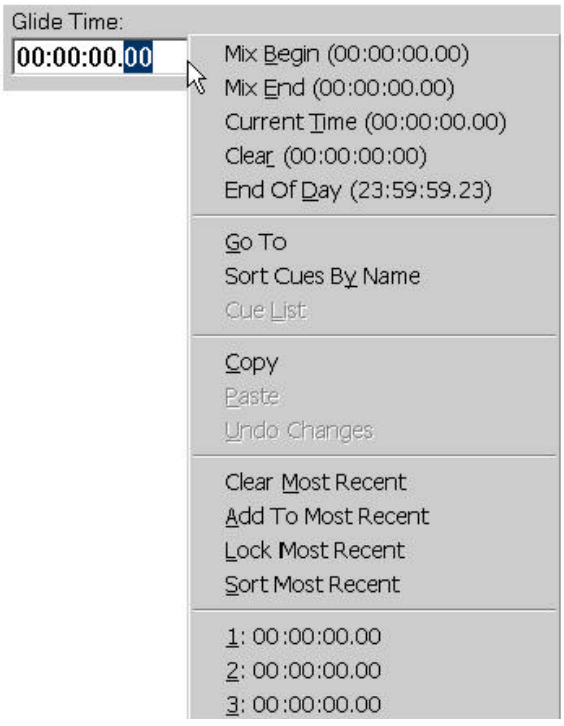
Glide Behaviors: Glide can be set to operate before or after the "Write To:" transition points **<Option>**. Glide will always operate after the "Extend Back To:" transition points when enabled.

Glide behaviors at transition points are described below:

- Glide After Transition Point:
  - "Write To:" At the Record Data to Read Mix Data transition, Glide functions will start at the transition point and continue until the Read Mix Data values have been restored. Glide will take place after the Punch-out, Next Change or Fixed End location (if possible).
  - "Extend Back To:" At the Read Mix Data to Record Data transition, Glide functions will start at the transition point and continue until the Record Data values have been reached. The Glide will take place after the Punch In or Begin location.
- Glide Before Transition Point (Back Time enabled **<Option>**): This feature is only available for "Write To:" data transitions and at the end of the Write Zone when AutoPunch is used.
  - "Write To:" At the Record Data to Read Mix Data transition, Glide functions will start before the transition point by the amount of the Glide Time. The Glide will continue until the Read Mix Data values have been restored (at the specified transition point). The Glide operation will be completed by the Next Change or End location. For example, if a three second Glide is applied with "back time" enabled, the control will start gliding back to its Read Mix data three seconds before its "Write To:" transition point.

Setting the Glide Time: The Glide Time period of time it takes for controls to glide from their Record values to their Read Mix values. This time can be any value between 00:00:00.00 and 23:59:59.2x and is specified via the Glide Time entry field on the AutoTouch+ screen on the D950 GC. Glide times can be typed in or entered using the roller method.

Right-clicking the Glide Time entry field will open the Entry Field Right-click menu. This menu contains several items that assist the user in quickly entering timecode values.



These items are organized in five basic areas:

- Significant System Times: Mix Begin, Mix End, Current Time, Clear (00:00:00.00), and End of Day (23:59:59.2X)
- Cue List Times: Allows access to the Title Cue List and provides the means to sort and go to cues
- Copy/Paste/Undo Changes: Entry field clipboard functions
- Most Recent: A list of the most recently used timecode locations is maintained by the system. Timecode locations from this list many be selected for the entry field value. The most recent timecode (current value) may be locked as the entry field value, to prevent it from being changed. A timecode may be manually added to the list. The list may be sorted and deleted.

Hot Keys: Hot Keys are provided to aid in the entry of glide times. A complete description of Hot Key functions is provided in the Appendix.

<Option> Glide can be applied to all transition points used within the system. The affected points are selected by checking the options on the Glide Options page (also refer to chapter 5.21.3).
<Apply Glide to the following transition points when Glide is ON:>

- <Write To:> Glide will be applied to the following “Write To:” transition points:
  - <Punch Out>
  - <Next Change>
  - <End>
  - <Write Zone End (Auto Punch Out)>
- <Extend Back To:> Glide will be applied to the following “Extend Back To:” transition points:
  - <Begin>
  - <Punch In>
- <Back Time Glide (End and Write Zone End Only)>: Glide will “back time” from the transition point. The Glide will start before the transition point by the amount of the Glide Time. The Glide will finish at the transition point. This feature does not apply to “Extend Back To:” transition points.

5.10 Switch Automation

Switch automation using AutoTouch+ is both easy to use and flexible enough to facilitate numerous functions and modes of operation.

Real-time Switch Editing: The location of switch state changes may be edited in real-time. Adding or deleting switch events may also be easily accomplished.

In general, the following types of switch events may be created and edited:
- Mute On/Off: Turns the channel Mute on and off
- Process In/Out: Engages and disengages the configured processes
- Process Control Switches: Performs switch functions within configured processes

Refer to chapter 5.19.1.1 for details regarding channel strip switches, and chapter 5.19.1.2 for details regarding CAS switches.

Note: Channel Mute operates within AutoTouch+ as a switch, but since it has its own Status key some Mute functions are performed differently as other switches. These differences in operation will be noted where needed.

Other system controls that are seen by AutoTouch+ as “switches” but have alternative means of control. These controls are discussed in detail elsewhere in this document, but warrant mention here:
- Selectors: Choosing the routing of audio or audio processor functions (Channel Input Selector or Filter Slope for example). See below.
- General Patch Connections: Making or breaking General Patch Connections. Refer to chapter 5.11.1, General Patch.
- Channel Patch Direct Out Tap: Changing the location from where the channel Direct Output is derived. Refer to chapter 5.11.2, Channel Patch.
- Channel Patch Meter Tap: Changing the location from where the channel Meter feed is derived. Refer to chapter 5.11.2, Channel Patch.
- Channel Patch Processor Order: Changing the location of processor blocks within the channel. Refer to chapter 5.11.2, Channel Patch.

<Option>
- With <Read Safe> checked on the Misc Options page (refer to chapter 5.21.8), AUDITION mode is defeated for controls in READ and only Read Mix values will be heard.

5.10.1 Switch Classifications

The multiple switches on the channel strip and on the D950 CAS can be defined as being either VMC oriented or control oriented. The classification of the switches (and other controls) is determined by whether or not they are defined in VMC file. If they are not defined by the VMC, they are control oriented by default.

- VMC Oriented Controls: By definition, the objects (controls in this case) that appear in the VMC are audio oriented. These objects directly affect the audio and/or its routing.
- Control Oriented Controls: By definition, these controls have an operational orientation and do not directly affect audio. These controls carry-out system oriented functions.

VMC Switches: VMC oriented switches can be automated using AutoTouch+. These switches are as follows:

- Channel Strip:
  - Mute: Channel Mute
  - Encoder Parameter Switches: The switch associated with each of the four channel strip rotary encoders.
  - Rotary Selectors: This also includes rotary encoders that are used as Selectors. (See Selectors below)
  - Processor Block In/Out Switches: **EQ, FILT, COMP/LIM, EXP/GATE, INSERT, DELAY, OPT,** and **PAN**
  - Auxiliary In/Out Switches: **MONO 1...4 and STEREO 1...4**
  - Direct Out Switch: **DIR OUT**
  - Input Selector Switches (See Selectors below): **IN 1, IN 2, GEN**

Note: Mono and stereo auxiliaries 5 and above may be engaged via the CAS or CAU (Central Assignment Unit).

- CAS:
  - Mute: Channel Mute
  - Output Switch: DIR OUT, MT Bus Trim/N-1
  - Input Selector and Parameter Switches (See Selectors below): **IN 1, IN 2, GEN**
  - Processor Block In/Out and Parameter Switches: **EQ, FILT, COMP/LIM, EXP/GATE, INSERT, DELAY, OPT,** and **PAN**
  - Rotary Selectors: This also includes rotary encoders that are used as Selectors. (See Selectors below)
  - Auxiliary In/Out and Pre Switches: **MONO** and **STEREO**

Note: A process must be included in the VMC in order for it to be automated. A process has not been assigned to the OPT processing block position in V3.0 or previous software.

Control Switches: Switches that are control oriented are outside the AutoTouch+ system and therefore cannot be automated. Switches outside of the control of Auto-Touch+ are as follows:

- Channel Strip:
  - **SEL** Key: Channel Select key
  - **PFL/SOLO** Key:
  - Automation Switches: **AUTO MODE, S/E PB – S/E REC, MUTE STAT, FDR STAT**
  - Layer Switches: **L1** and **L2**
  - Clipboard Control Switches: **CLR/••ALL, COPY/••ALL, SWAP/••PASTE**
  - **PAGE** Switches: **1, 2, 3, 4**
  - **TALK**
  - **LAST/••FREEZE**
  - User Keys: **USER 1, USER 2**
  - **ASN SEL** key: Assignment Select key (**ASN ENC** on D950 M2)
- CAS:
  - Channel Selection Controls:
  - **PFL/SOLO** key:
  - Automation Switches:
  - Clipboard Control Switches: **CLR/••ALL, COPY/••ALL, SWAP/••PASTE**
  - Auxiliary/Master/Panner Selection Controls:

- In Process Listen Keys: **INPUT LISTEN, SC/DYN LISTEN, EQ LISTEN, INSERT LISTEN**
- User Keys: **USER 1**

Note: While clipboard functions are not automatable, the affects of their use may affect control values. Because of this, the results of clipboard operations may be recorded as automation events.

Selectors: Selectors are a special group of controls that typically use the encoder knobs as a means of physical control, but function as "switches" within AutoTouch+. This differs from switches that operate as "toggles," and alternate between two states.

Selectors perform one of two functions:
- Audio Routing: Input Selector, Direct Out tap location, Meter tap location, Processor Block Order, etc.
- Processor Parameter Selector: Input Function, Filter Slope, etc.

Selectors may be assigned to switches, knobs, or to the Channel Patch for a means of control. However, they may only be pre-selected using the **SW** (**SWIT**) Pre-Selectors.

Note: The Channel Input Selector is a special case in regard that it has a key for each input on the channel strip. However, these keys function collectively as a Selector. The input may also be selected from the Channel Patch.

Note: Press and Hold operations may not apply to all selectors.

5.10.2 Switch Control Modes

Since switches and selectors are not continuous controllers like faders or encoders, Control Modes affect switches in a unique manner.

Switch operations will perform the following functions when dynamic switches are in the Control Modes indicated:

READ: The Read Mix data will determine the switch state. AUDITION mode is available.
- Press and Release Actuation:
  - Without Touch Hold engaged, Switch Press will toggle the switch state and put the switch in Audition. The switch state will toggle back at the next recorded change of state.
  - With Touch Hold engaged, Switch Press will toggle the switch state and put the switch in Audition in a Held state. The switch will hold its alternate state and stay in Audition until Held controls are cleared.
- Press and Hold Actuation:
  - Switch Press will toggle the switch state and put the switch in Audition. The switch will exit Audition when released. If its state does not match the Read Mix state, it will toggle to match upon release.

WRITE: While in RECORD previously written switch states will be overwritten. WRITE AUDITION mode is available.

- Press and Release Actuation:
  - Without Touch Record or Touch Hold engaged, Switch Press will toggle the switch state and put the switch in Audition. The switch state will toggle back at the next recorded change of state.
  - With Touch Hold engaged, Switch Press will toggle the switch state and put the switch in Audition in a Held state. The switch will stay in Audition until Held controls are cleared.
  - With Touch Record engaged, Switch Press will toggle the switch state and punch the switch into RECORD. The switch will hold its alternate state and stay in RECORD until Held controls are cleared.
- Press and Hold Actuation:
  - Without Touch Record, Switch Press will toggle the switch state and put the switch in Audition. The switch will exit Audition when released. If its state does not match the Read Mix state, it will toggle to match upon release.
  - With Touch Record engaged, Switch Press will toggle the switch state and punch the switch into RECORD. The switch will punch-out when released. If its state does not match the Read Mix state, it will toggle to match upon release.

TRIM: While in TRIM previously written switch states may be edited. TRIM AUDITION mode is available.

- Press and Release Actuation:
  - Without Touch Record engaged, Switch Press will toggle the switch state and put the switch in Audition. The switch state will toggle back at the next recorded change of state.
  - With Touch Record engaged, Switch Press will toggle the switch state and punch the switch into RECORD. The switch will hold its alternate state and stay in RECORD until the next recorded change of state. The switch state will toggle to its Read Mix state and will punch-out at the next recorded change of state.
- Press and Hold Actuation:
  - Using Press and Hold actuation on Trim Enabled switches yields the same results as if the switches were Write Enabled.

The Trim of a switch cannot persist past the next recorded change of state for that switch.

ISOLATE: State changes of Isolated switches are not recognized by AutoTouch+.

Note: All Mix Pass “Write To:” and “Extend Back To:” conditions apply as appropriate.

5.10.3 Switch Operation

Switches and Touch-sensitivity: Switches are not “touch-sensitive” in the same regard as faders or encoders. Mere physical contact with a switch is not sufficient enough to be registered by the system. For switches to have an effect within the system, they must be pressed.

Unlike faders and encoders (knobs) switches are “touch-sensitive” only when engaged and disengaged. Because of this, and the toggle function of most switches (all switches except Selectors), the automation of switch

functions differs from faders and encoders. The differences are operational mostly in nature and will be described in this chapter.

Switch Functions: Pressing a switch performs two basic functions:
- Audio Function: The switch state is toggled to its alternate position.
- Automation Functions:
  - Switch Press
  - Switch Release

Under normal circumstances, a Switch Press produces a Touch event. However, unlike faders and encoders, switches do not produce a Un-touch event when they are released. The Switch Press audio toggle (switch state toggle) event may be suppressed by holding down the **AUTO MODE** modifier key when the switch is actuated.

AutoTouch+ recognizes Switch Press and Switch Release as separate and independent events. The Touch event produced by a Switch Press serves a separate from the Switch Press itself. This system allows the user to determine what will take place when a key is pressed and also when it is released.

This independence allows switches to take on different behaviors depending on which functions Switch Press and Switch Release are allowed to perform. The result is the ability for switches to operate in different modes depending on the needs of the user.

Switch Operating Modes: Switches may operated using the following modes:
- Press and Release: Momentary Press and Release; Pressing the key and immediately releasing it.
- Press and Hold: Pressing and holding the key down beyond a predetermined time threshold.
- Modified Press Function: Holding the **AUTO MODE** key will suppress the audio toggle function, but produces the Touch event when a key is pressed. This mode allows the switch to be punched-in without toggling its state.

Each of these functions are described below. The Modified Press Function may be used with either Press and Release or Press and Hold operations.

Document Note: *The next three chapters make the assumption that the switches actuated are in the proper enabled Control Mode as operations are carried out.*

5.10.3.1 Press and Release

Press and Release is defined as using switches in a momentary manner. To perform a Press and Release operation, press a work surface key and immediately release it. The key is not held down any longer than it takes to toggle the switch state.

Press and Release operations perform the following functions:
- Switch Press:
  - Toggles the switch state
  - Produces a Touch event
- Switch Release:
  - An Un-touch event is not produced.

With Press and Release operations, switches toggle to their alternate state when pressed and then hold that state until one of several conditions is met. The behaviors that occur as the result of a Press and Release switch operation is dependent on the switch's Control Mode and whether Touch Record and/or Touch Record is engaged. Refer to chapter 5.10.2.

Note: If a switch is held down too long, it will change to Press and Hold operation. The length of time a switch may be held down is determined by the Switch Press and Hold Threshold in the `D950desk.ini` file in the `D950System` folder.

5.10.3.2 Press and Hold

Press and Hold is defined as using switches in a temporarily sustained manner. To perform a Press and Hold operation, press a switch and hold it down for a period of time before releasing it. AutoTouch+ senses how long the key is down and its mode of operation changes if it is held down longer than a specified period of time (typically 500 ms or so). The function becomes similar to touching a fader, keeping a finger on it, and then releasing it later.

Press and Hold operations perform the following functions:
- Switch Press:
  - Toggles the switch state
  - Produces a Touch event
- Switch Release:
  - Punch-out

With Press and Hold operations, switches toggle to their alternate state when pressed and then hold that state as long as the key is held down. When the switch is released, it may or may not toggle depending on the state recorded in the Read Mix Data at the time of release.

If Touch Record is engaged, the switch will punch-in as well as toggle its alternate state when it is pressed. The switch will stay in that state and in RECORD as long as the switch is held down. Upon release, the switch will punch-out. It may or may not toggle states depending on the state recorded in the Read Mix Data at the time of release. The change of state may Written or Trimmed depending on the selected Control Mode.

The behaviors that occur as the result of a Press and Hold switch operation is dependent on the switch's Control Mode and whether Touch Record and/or Touch Record is engaged. Refer to chapter 5.10.2, Switch Control Modes.

Press and Hold Threshold: Whenever a work surface key is pressed, AutoTouch+ monitors the duration the key is held down. If the time a key is held down is longer than the Switch Press and Hold Threshold value, Press and Hold becomes active. If the hold duration is less than the threshold time the Press and Release functions are maintained.

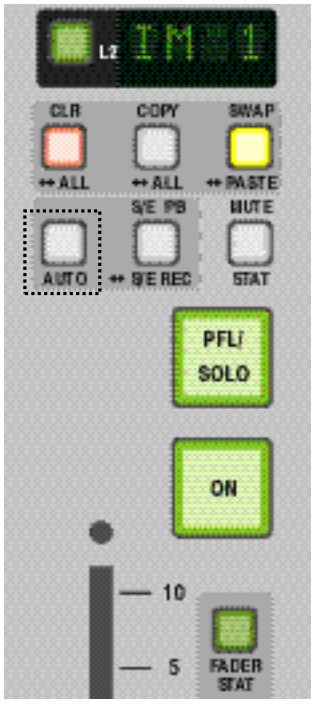
5.10.3.3 Modified Press Function

It is possible to suppress the toggle function when a switch is pressed, but still allow the Touch event to be produced. This allows a punch-in or Audition to be performed by pressing a switch without toggling its state. This "Modified Press Function" is very useful when the punch-in switch state matches the Read Mix state.

This Modified Press Function is available for both Press and Release and Press and Hold operations.

The key press may be modified by holding down the **AUTO MODE** key as a work surface key is pressed. In this regard, the **AUTO MODE** key functions as a modifier key.

D950:



Vista:

Example: With Touch Record engaged, press and hold the **AUTO MODE** key, then press and hold a record-enabled key. When the key is pressed, it will punch-in but its status will not toggle. If the **AUTO MODE** key is released before the key is, toggle suppression is turned off. Now when the key is released, it will toggle its status, and the key release will cause the control to punch-out.

5.11 Graphic Controller Automation

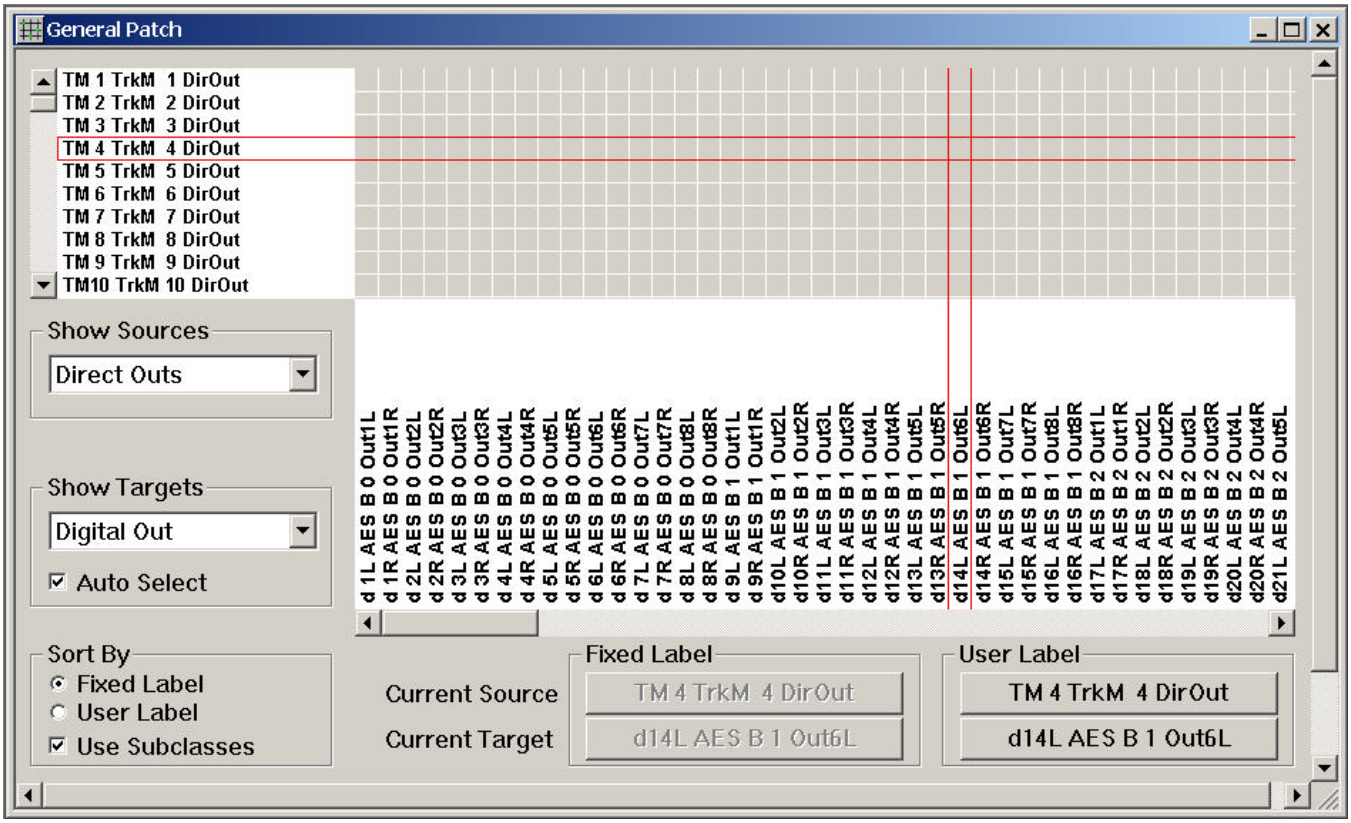
As discussed in the Switch Automation chapter, controls that are defined in the VMC may be automated. While most of these controls are work surface oriented, some controls are found only in the Graphic Controller.

Automated Items: Automatable items in the Graphic Controller are as follows:

- General Patch Connections
- Channel Patch:
  - Input Selector
  - Processor Block Order
  - Dynamic Sidechain Link Setup
  - Dynamic Sidechain Link Enable
  - Dynamic Key Input Routing
  - Direct Output Tap Location
  - Meter Feed Tap Location

5.11.1 General Patch

Connections within the General Patch may be automated. Both “Make Connection” and “Break Connection” operations may be stored as Static objects or recorded as Dynamic objects. All types of General Patch connections may be recorded.



Connection Behavior: The General Patch does not have dedicated automation controls. The current global automation modes apply to the General Patch. The **SW / SWIT** Pre-Selector must be used to select global modes.

General Patch connections follow the rules of a Press and Release switch operation. Refer to chapter 5.10.3.1.

As with any control, changes to General Patch connections may be Auditioned.

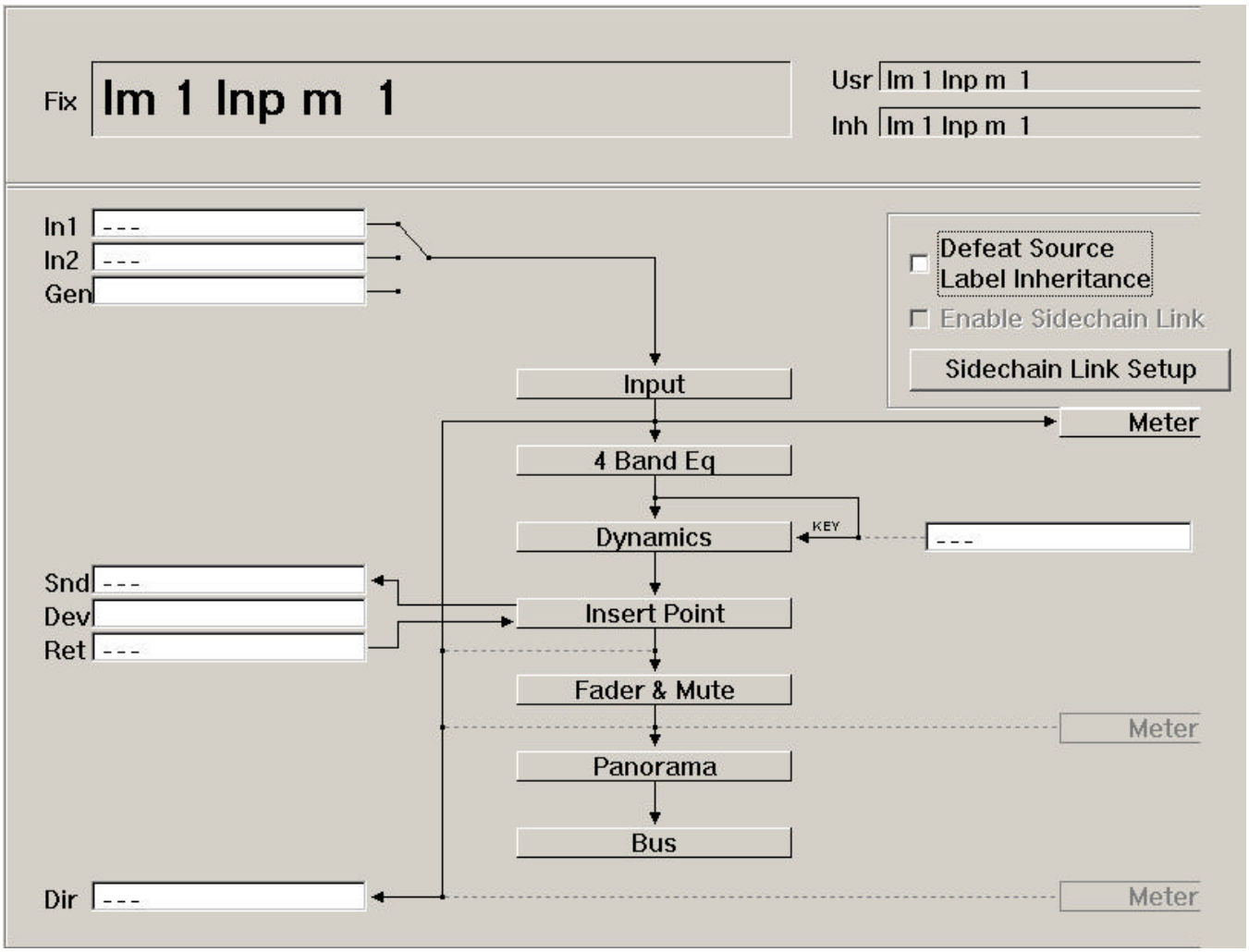
Record a General Patch Change: To automate a connection in the General Patch, use the following procedure:

1. Select the desired global Control Mode. Write will overwrite previous changes, both location and connection type.
2. Select **TOUCH RECORD**.
3. Select the desired "Write To:" and "Extend Back To:" functions.
4. Open the General Patch if it is not already open.
5. Select the connection point to be automated (single click at the desired location).
6. Make/break the desired connection as follows:
   - To make a simple mono-to-mono connection, press the **MAKE CONNECT** function key above the trackball. (Double-clicking the connection location will bring up the connection menu where a mono-to-mono connection may be made.)
   - To make a complex connection (mono-to-stereo, stereo-to-stereo, stereo-to-mono), double-clicking the connection location will bring up the connection menu where the desired connection may be made.
   - To break any connection, press the **BREAK CONNECT** function key above the trackball. (Double-clicking the connection location will bring up the connection menu where a connection may be broken.)
7. Upon the selection of the desired connection type, AutoTouch+ will punch-in. Following the rules for Press and Hold, the new connection state will persist until the "Write To:" conditions are met or a Global Punch-out occurs.
8. When timecode is stopped, a new Mix Pass will be generated.

Note: Like any other object within AutoTouch+, all General Patch connection points are Static objects until a change state is recorded in the system. Therefore, General Patch connections may be updated in the same manner as any other Static control.

5.11.2 Channel Patch

There are several items within the Channel Patch that may be automated. These items may be stored as Static objects or recorded as Dynamic objects.



The following Channel Patch items may be automated:

- Input Selector: Changes to the selected channel input may be automated (In1, In2, Gen)
- Processor Block Order: Changes to the order of the channel processor blocks may be automated (EQ, Dynamics, Insert, Delay, and Fader)
- Dynamic Sidechain Link Setup: The addition of channels to the Dynamic Sidechain Link Setup may be automated
- Dynamic Sidechain Link Enable: The **Enable Sidechain Link** button may be automated (Enable/Disable)
- Dynamic Key Input Routing: The selection of the Dynamic unit Key Input may be automated (Channel/External)
- Direct Output Tap Location: The location from where the channel Direct Output is fed may be automated (Post Input, Pre Fader, Post Fader)
- Meter Feed Tap Location: The location from where the channel Meter is fed may be automated (Post Input, Post Fader, Direct Out Assignment)

Note: Like any other object within AutoTouch+, all Channel Patch items are Static objects until a change state is recorded in the system. Therefore,

Channel Patch items may be updated in the same manner as any other Static control.

Note: The following Channel Patch items have switches on the channel strip that duplicate the Channel Patch functions:
- Input Selector
- Dynamic Sidechain Link Enable
- Dynamic Key Input Routing

Note: The channel Meter location can be set globally using the controls in the "Meter/Generator" item in the GC Options menu (not the AutoTouch+ Options selector).

Item Behavior: The Channel Patch does not have dedicated automation controls. The current global automation modes apply to the Channel Patch.

The following Channel Patch items operate as Selectors:
- Input Selector
- Processor Block Order
- Dynamic Key Input Routing
- Direct Output Tap Location
- Meter Feed Tap Location

The SW (SWIT) Pre-Selectors are used to select global modes.

Press and Release Selectors: Some Channel Patch Selectors operate as Press and Release switches and therefore follow Press and Release switch operation rules. Refer to chapter 5.10.3.1.

The following Channel Patch items operate as Press and Release Selectors:
- Input Selector
- Dynamic Key Input Routing
- Meter Feed Tap Location

Note: The channel Input Selector may be operated via the Channel Patch or by using the keys on the channel strip. Since input selection is controlled with a Selector, Press and Hold operations are not possible.

One Shot Selectors: Other Channel Patch Selectors operate as "One Shot" switches. One Shot selectors operate as true momentary switches. The user has no control over the duration of the held down state and release is immediate. A One Shot operation produces both a Touch and a Un-touch event. In TOUCH RECORD, when a One Shot switch is operated, punch-in and punch-out is almost immediate. Under normal circumstances this could produce an audible glitch, depending on the operation being completed. However, functions assigned to One Shot Selectors will persist in their changed state after punch-out. All Mix Pass "Write To:" and "Extend Back To:" conditions apply, except "Write To : Punch Out."

The following Channel Patch items operate as One Shot Selectors:
- Processor Block Order
- Direct Output Tap Location

These items follow the rules for One Shot Selectors as described above.

Channel Patch Operations: Channel Patch items are operated as follows:

- Input Selector: Place the cursor on or near the Input Selector icon. Each trackball click will cycle the selector through the inputs. A Touch event will be produced for each click.
- Processor Block Order: Click and hold the processor block to be moved, drag it to the new location, and release the trackball button (click and drag). A Touch event will be produced when the trackball is released.
- Dynamic Sidechain Link Setup: Clicking Sidechain Link Setup will open the Sidechain Link window where channels may be added to the available Sidechain Links. A Touch event will be produced when the ADD button is clicked.
- Dynamic Sidechain Link Enable: Clicking the Check Box will toggle the switch state. A Touch event will be produced when the box is checked or unchecked.
- Dynamic Key Input Routing: The route with the solid line is the current state. Clicking the dashed line will select that route and a Touch event will be produced.
- Direct Output Tap Location: The route with the solid line is the current state. Clicking the dashed line will select that route and a Touch event will be produced.
- Meter Feed Tap Location: Clicking the alternate location (shown grayed-out) will select that location and a Touch event will be produced.

Channel Patch Switches: Two Channel Patch items operate as toggle Switches:

- Dynamic Sidechain Link Setup
- Dynamic Sidechain Link Enable

From the Channel Patch, these switches follow the rules of Press and Release switch operations. However, if these functions are accessed via the channel strip keys, they may use either Press and Release or Press and Hold operations. Press and Hold functions are not available via the GC.

As with any control, changes to Channel Patch items may Auditioned.

Record a Channel Patch Change: To automate an item in the Channel Patch, use the following procedure:

1. Select the desired global Control Mode. Write will overwrite previous changes, both location and connection type.
2. Select TOUCH RECORD.
3. Select the desired “Write To:” and “Extend Back To:” functions.
4. Open the Channel Patch if it is not already open.
5. Perform the desired operation within the Channel Patch.
6. At the time the desired operation is performed, AutoTouch+ will punch-in. The new item state will persist until the “Write To:” conditions are met or a Global Punch-out occurs.
7. When timecode is stopped, a new Mix Pass will be generated.

5.12 Other Automated Functions

There are several ancillary functions that may be automated. These functions are described below.

5.12.1 Bus Assignments

Bus Assignments may be automated. Both “assignment” and “de-assignment” operations may be stored as Static objects or recorded as Dynamic objects.

Central Assign Unit (CAU*; D950 only*):

The CAU does not have dedicated automation controls. The current global automation modes apply to the Bus Assignments. The **SW** Pre-Selector must be used to select global modes.

Bus Assignments follow the rules of a Press and Release or Press and Hold switch operation. Refer to chapter 5.10. All Mix Pass “Write To:” and “Extend Back To:” conditions apply, except “Write To : Punch Out.”

As with any control, changes to Bus Assignments may Auditioned.

Record a Bus Assignment:

To automate a Bus Assignment, use the following procedure:

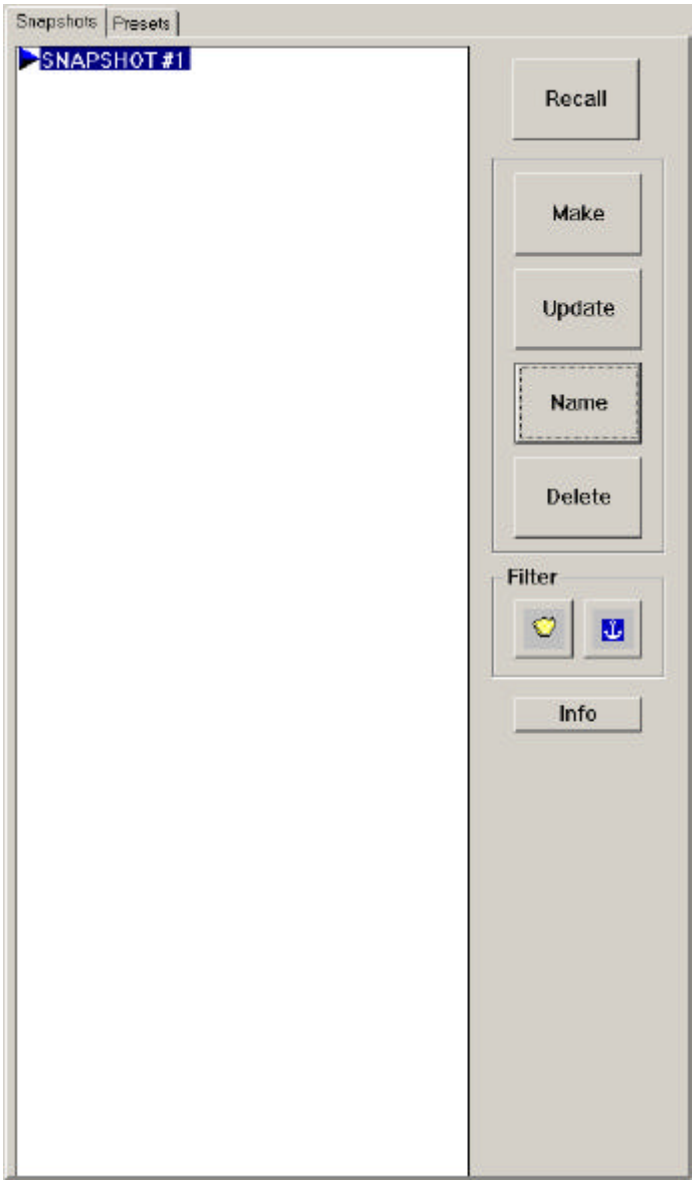
1. Select the desired global Control Mode. Write will overwrite previous changes, both location and connection type.
2. Select **TOUCH RECORD**.
3. Select the desired “Write To:” function.
4. *D950:* Select the channel to be assigned to the desired bus by either pressing the **SEL** key on the channel strip or using the Channel Selector on the CAU.
   Vista: Activate **BUS ASN** in the Touch Screen Area below the Vistonics™ section.
5. *D950:* On the CAU, select the bus type to be assigned.
6. Press the desired bus number to make the assignment.
7. Press and Release or Press and Hold switch rules will apply depending on how the switch is operated.
8. When timecode is stopped, a new Mix Pass will be generated.

Note: Like any other object within AutoTouch+, all Bus Assignments are Static objects until a change state is recorded in the system. Therefore, Bus Assignments may be updated in the same manner as any other Static control.

5.12.2 Snapshots/Presets

VMC Snapshots and Presets may be recalled while AutoTouch+ is in use. The control values contained within Snapshots and Presets maybe applied to the console while AutoTouch+ is in operation, but only for controls that have been properly enabled. All Mix Pass “Write To:” and “Extend Back To:” conditions apply.

Snapshot and Preset control values may be recalled and stored as Static values by recalling the desired Snapshot/Preset without engaging Write or Trim enable. The Static values will be updated and stored the next time a Mix Pass is written.



Recall Behavior: The Snapshot page does not have dedicated automation controls. The current global automation modes apply when Snapshots or Presets are recalled. Any Pre-Selector may be used to select global modes, depending on the controls/functions the user wishes to enable.

Switches and Selectors recalled using Snapshots or Presets will follow the rules of a Press and Release switch operation. Refer to chapter 5.10.3.1.

Since values are being applied to VMC controls, the affects of recalling Snapshots or Presets may Auditioned.

Record Recalled VMC Values: To record Snapshot or Preset values to controls, use the following procedure:

1. Select the desired global Control Mode.
2. Select **TOUCH RECORD**.
3. Select the desired "Write To:" function (Trim will default to "Next Change").
4. Open the Snapshot page in the GC if it is not already open.
5. Recall the desired Snapshot or Preset.
6. Global conditions will apply to the controls that were enabled.
7. When timecode is stopped, a new Mix Pass will be generated.

Note: Recalling the channel strip clipboard has the same affect as recalling a Snapshot or Preset, except values are only applied on one channel at a time. Recording recalled clipboard values may be done as described above.

5.12.3 GC Menu Items

Some operational GC menu items may be automated. During normal operation, these items are found in the GC Option menu. However, since all VMC objects are available in the ShowVMCTree menu (In the SysAdmin menu), these menu items may be automated as well.

Automatable Option Menu Items: The following Option menu items contain automatable controls:

- Meter/Generator: Global channel Meter locations and Generator parameters may be automated. Changes made to these items will produce Touch/Un-touch events.
- N–1 Assignments: N–1 Assignments may automated. Changes made to these assignments will produce Touch/Un-touch events.
- Control Group Filter: Changes made within each Control Group may be automated. Changes made within a Control Group will produce Touch/Un-touch events.
- VSP Microphones and Reverb: Changes made Reverb Bus Assignments and Microphone Characteristics (polar pattern and placement) may be automated. Changes made within the VSP Microphones and Reverb menu items will produce Touch/Un-touch events.

Menu Item Behavior: The GC menus do not have dedicated automation controls. The current global automation modes apply to the automatable GC menu items. For an Option menu item use either the SW (SWIT) or ENC (KNOB) Pre-Selectors to select global modes, depending on item to be automated. For "ShowVMCTree" items, any Pre-Selector may be used, depending on the controls/functions the user wishes to enable.

Menu item switches and selectors will follow the rules of a Press and Release switch operation, refer to chapter 5.10.3.1. All Mix Pass "Write To:" and "Extend Back To:" conditions apply.

As with any control, changes to menu items may be auditioned.

Record a Menu Item Change: To automate a menu item, use the following procedure:

1. Select the desired global Control Mode. Write will overwrite previous changes, both location and connection type. Trim will allow the locations of changes to be moved without changing connection types.
2. Select **TOUCH RECORD**.
3. Select the desired "Write To:" function.
4. Open the appropriate GC menu and select the desired item.
5. Perform desired operations to be automated.
6. At the time the desired operation is performed, AutoTouch+ will punch-in. The new item state will persist until the "Write To:" conditions are met or a Global Punch-out occurs. (*trimmed* status will persist until the Next Change by default.)
7. Upon punch-out a new Mix Pass will be created.

Note: Like any other object within AutoTouch+, menu items are Static objects until a change state is recorded in the system. Therefore, menu items may be updated in the same manner as any other Static control.

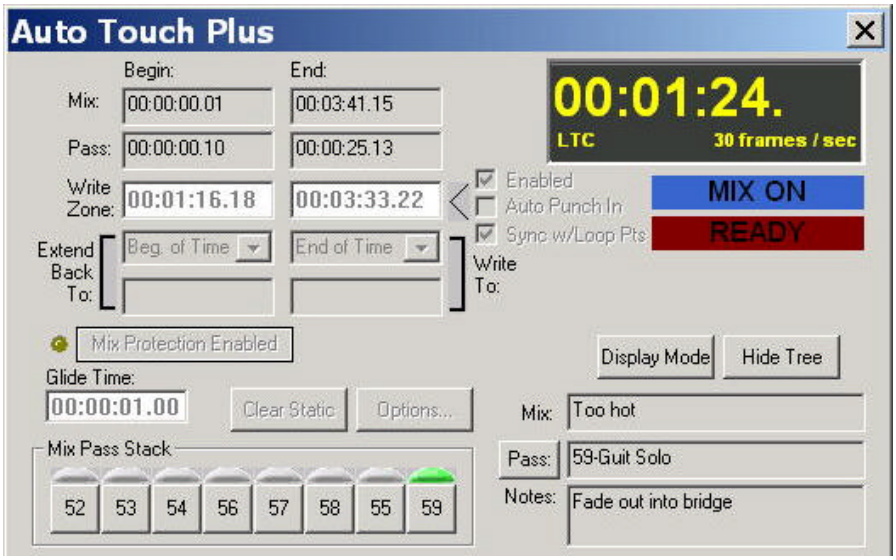
5.13 Mix Protection

Mix Protection allows individual controls or sets of controls to be “Protected” or locked out from changes. Mix Protection may also be applied to the General Patch.

When Protected, a control is essentially in a “read only” mode. The Read Mix data for the Active Pass will be heard for all Protected controls. All the READ LOCK conditions apply to Protected controls (just not on a global basis).

Controls and the General Patch may also be isolated from the mix using Mix Protection techniques.

Mix Protection Enabled Button: The Mix Protection Enabled button opens the “Automation Protection” window. The yellow LED symbol to the left of the button illuminates when any controls are in a Protected State. The Mix Protection Enabled button is located in the AutoTouch+ window.



The Automation Protection window can also be opened by selecting “Protection” from the GC Automation menu.

<Option>

- With <Protect Static For Protected Controls> checked on the Misc Options page (also refer to chapter 5.21.8), the values of Static controls are replayed, but changes to those values are not allowed.

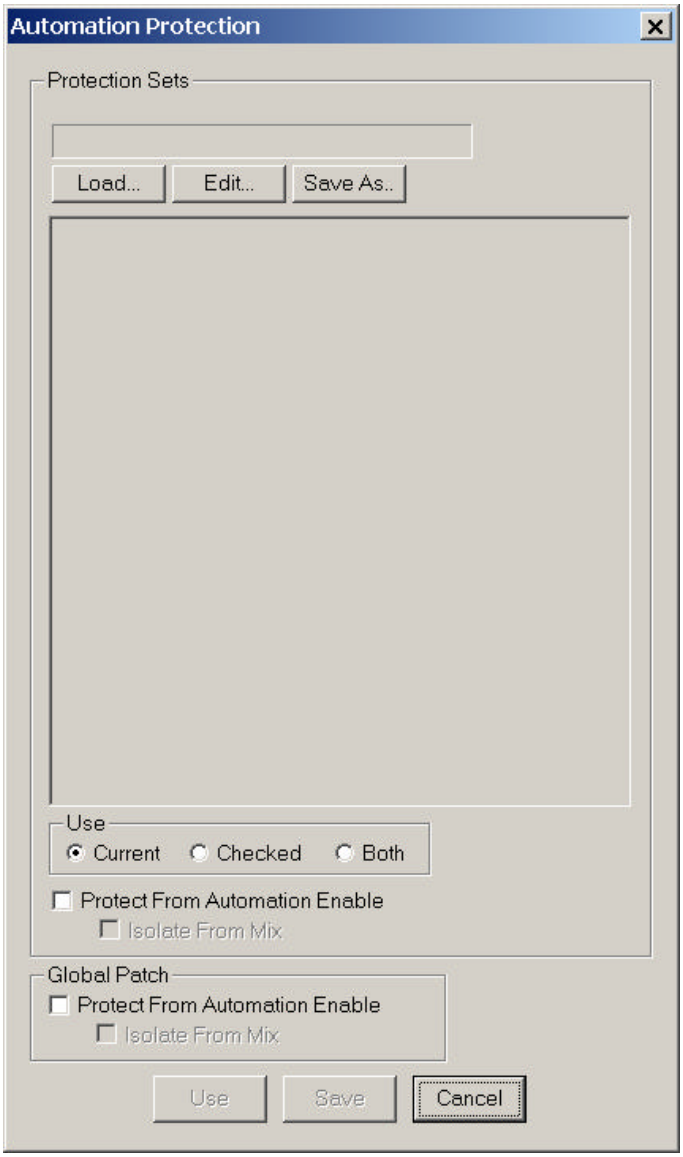
5.13.1 Protection Sets

Protection Sets: Any combination of controls on any combination of channels may be organized into "Protection Sets." These may be created, saved, and recalled as needed. Any number of Protection Sets may be created and stored. Protection Sets are available to any Mix Pass within the Title.

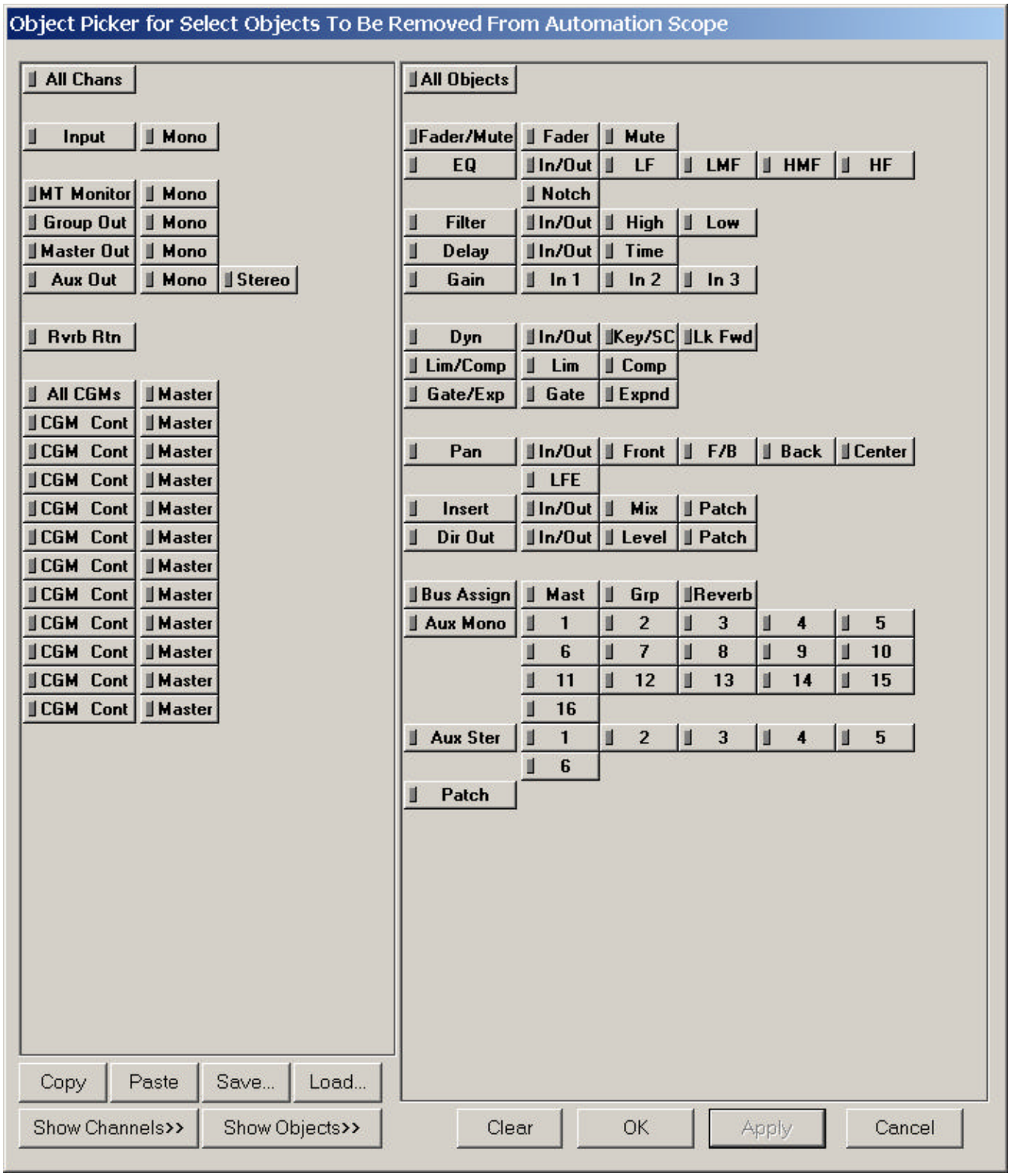
5.13.1.1 Creating Protection Sets

To create a Protection set, execute the following procedure:

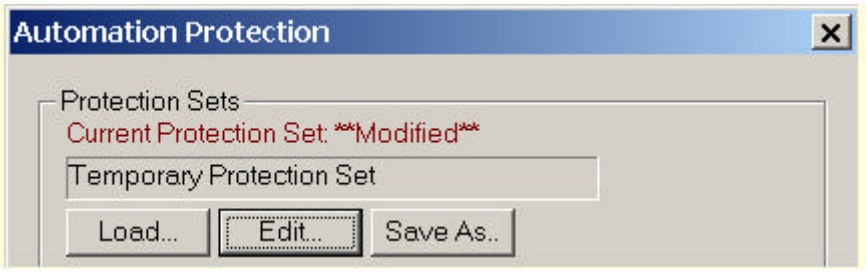
1. Click the **Mix Protection Enabled** button to open the "Automation Protection" window. The first time it is opened no Protection Sets will be available and the various fields will be blank.



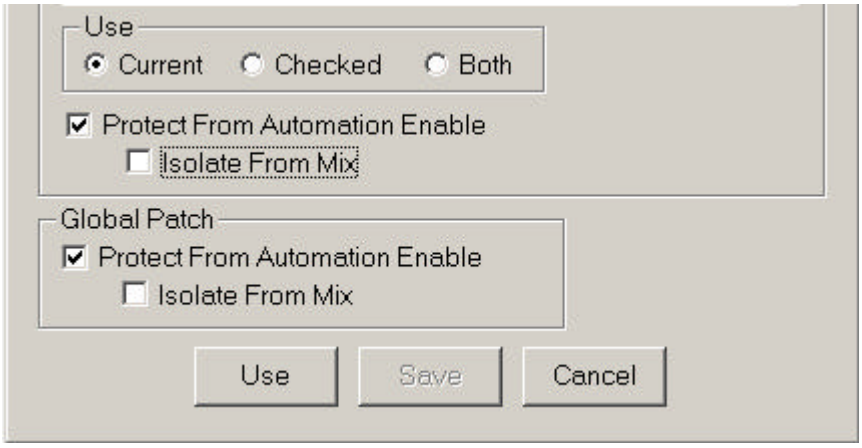
2. Click the Edit… button. The "Object Picker for Select Objects to be Removed From Automation Scope" will open. Using this "picker," controls may be selected for Protection. For example, Mutes on channels 1...12 may be selected as a Protection Set. Refer to chapter 5.16.2.1 for information regarding the operation of the Object Picker.



3. Once controls have been selected for Protection, click “Apply” or “OK” at the bottom of the object picker (OK will close the picker, Apply will keep it open). A temporary Protection Set will be created and made the current set. “Current Protection Set **Modified**” will appear in red above the current set field to indicate changes have been made to the current set. (As in the previous example, the Mutes on channels 1-12 would constitute the **Modified** set.)



4. Check “Protect From Automation Enable” for the selected set of controls and/or the General Patch. Click the **USE** button to enable Protection for the selected Protection Set.



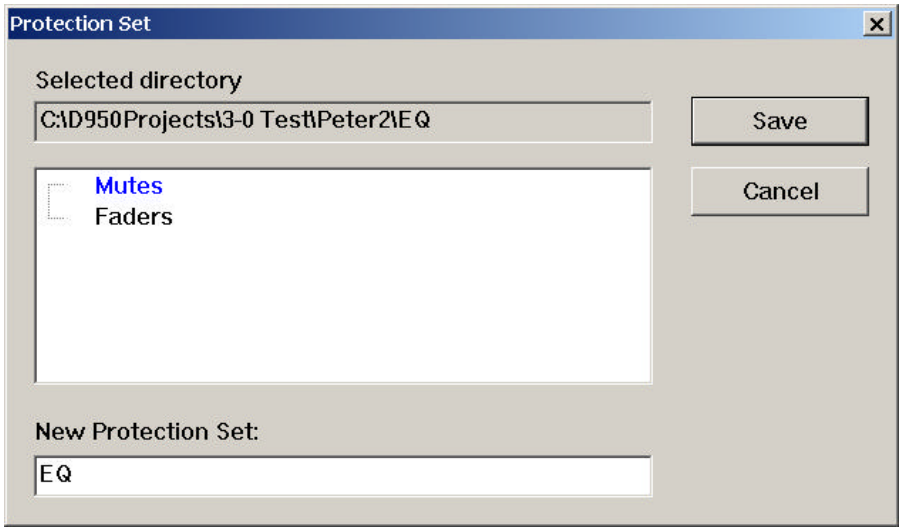
Note: Either the “Current” or “Both” radio button in the “Use” section of the Automation Protection window *must* be selected to enable the Edit button.

5.13.1.2 Saving Protection Sets

Any number of Protection Sets may be created and saved. A temporary Protection Set will persist in the system unless it is overwritten, even if the Mix Tree and Title are closed. Temporary and modified sets may be saved at anytime.

Using the following procedure, Protection Sets may be saved:

1. Once a Protection Set has been created or modified, click the “Save As…” button. The Protection Set save box will open.



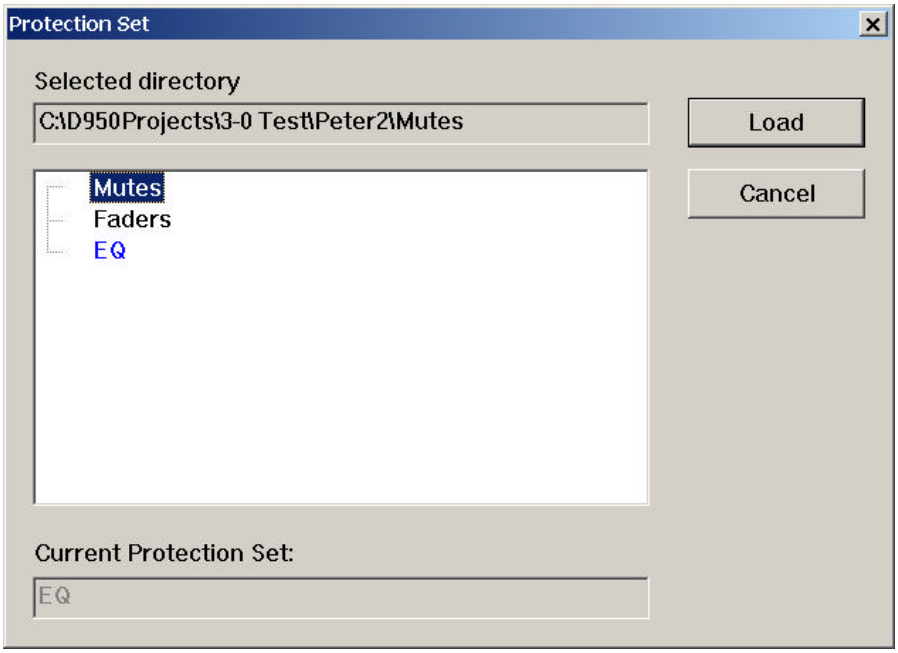
2. Enter a name for the new set in the “New Protection Set:” field. Click “Save” and the new set will be created and assigned the entered name. The newly saved set will become the current Protection Set and will be added to the list of available sets (which appears in the Protection Set section of the Automation Protection window).

5.13.1.3 Loading Protection Sets

To make a Protection Set the current set, it must be Loaded unless it was the last set used or saved.

Using the following procedure, previously created Protection Sets may be loaded:

1. Click the Mix Protection Enabled button to open the Automation Protection window if it is not already open.
2. Click the “Load…” button and a selection box containing the available Protection Sets will be displayed. The current Protection Set will be displayed at the bottom of the box in the “Current Protection Set:” field. The current set will also be shown in blue in the Protection Set list. All others will be in black.



3. Double-click the desired Protection Set or click it and “Load”. The selected set will become the current set and the selection box will close.

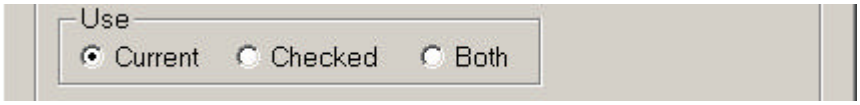
Note: Protection Sets cannot be loaded from other Titles. Protection Sets made within a Title are only available to that Title. Protection Sets made within a Title are available to all Mix Passes within that Title.

5.13.2 Applying Mix Protection

One or more Protection Sets may be applied simultaneously. This affords multiple layers of protection, which may be built up during the course of a mix. These layers of protection may be quickly applied and removed as needed. If a Title is being used as a production template, the saved Protection Sets may be used with any Mix Pass created using that template.

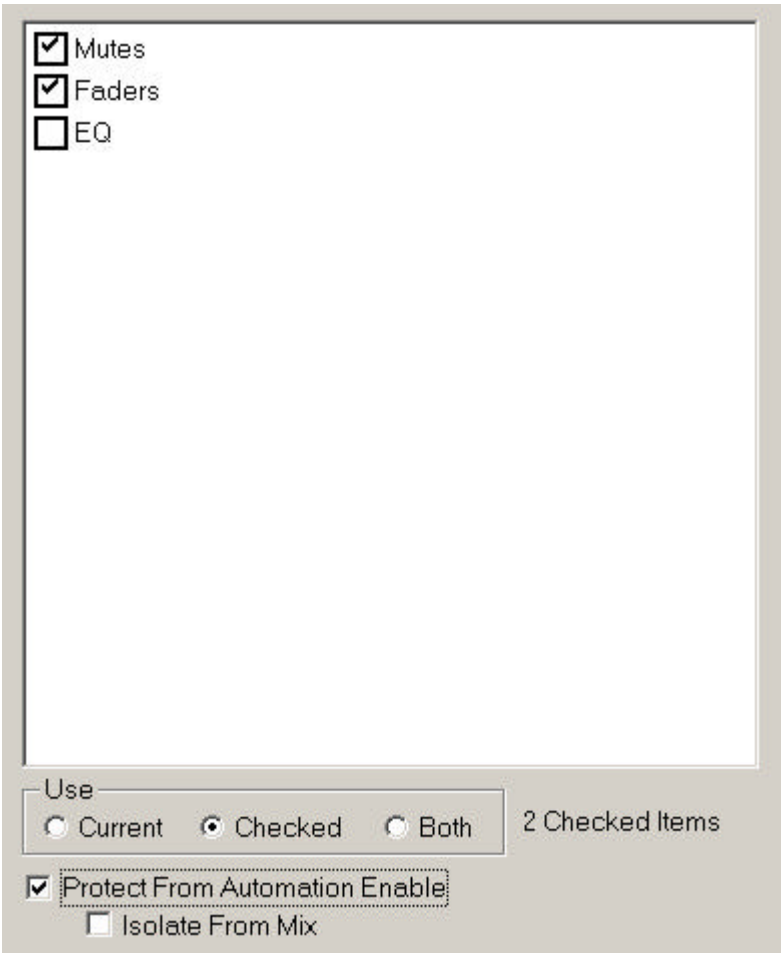
Important Note: When Mix Protection is enabled, Protection is applied to the Active Pass. All protected controls will be protected regardless of which Mix Pass is made active.

Selecting Protection Sets: How Protection Sets are selected is determined by selecting the desired radio button in the "Use" section of the Automation Protection window.

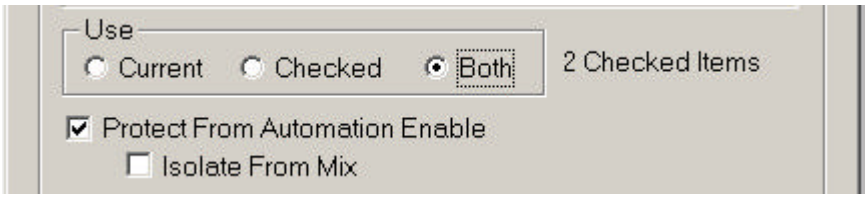


These radio buttons allow the selection of Protection Sets one of three ways:

- Current: The current Protection Set will be selected.
- Checked: The checked Protections Sets will be selected. A list of Protection Sets is displayed in the Protection Set section of the Automation Protection window. Each Protection Set has a box which may be "checked" to include that set in the list of checked sets. The current Protection Set is not selected.



- Both: The current Protection Set and any checked sets will be selected.



Applying Protection Sets: To apply one or more Protections Sets, use the following procedure:

1. Click the Mix Protection Enabled button to open the Automation Protection window if it is not already open.
2. Click "Current, Checked, or Both" in the "Use" section as appropriate. If "Checked" or "Both" are selected, check the needed Protection Set(s).
3. Check the "Protect From Automation Enable" box in the "Protection Set" section to apply Protection to the selected set(s) (Mutes on channels 1-12 per the example).
4. If desired, check the Global Patch "Protect From Automation Enable" box to apply Protection to the General Patch.
5. Click the **Use** button at the bottom of the window. The window will close and Protection will be applied to the controls included within the Protection Set (Mutes on channels 1-12 in the example). The "Mix Protection Enabled" LED will illuminate.

Note: If neither Protection Set or Global Patch "Protect From Automation Enable" box is checked, Protection will not be applied.

5.13.3 Removing Protection

Just as Protection may be applied in layers, it may be removed in layers or entirely.

To remove one or more Protection Sets, use the following procedure:

1. Click the Mix Protection Enabled button to open the Automation Protection window if it is not already open.
2. Click "Current, Checked, or Both" in the "Use" section as appropriate. If "Checked" or "Both" are selected, uncheck the unneeded Protection Set(s).
3. If desired, uncheck the Global Patch "Protect From Automation Enable" box to remove Protection from the General Patch.
4. Click the Use button at the bottom of the window. The window will close. Any selected Protection Sets will remain active and those deselected will be removed. Protection will be removed from the controls included within the deselected Protection Set (Mutes on channels 1-12 in the example). The Mix Protection Enabled LED remains lit if any controls remain Protected.

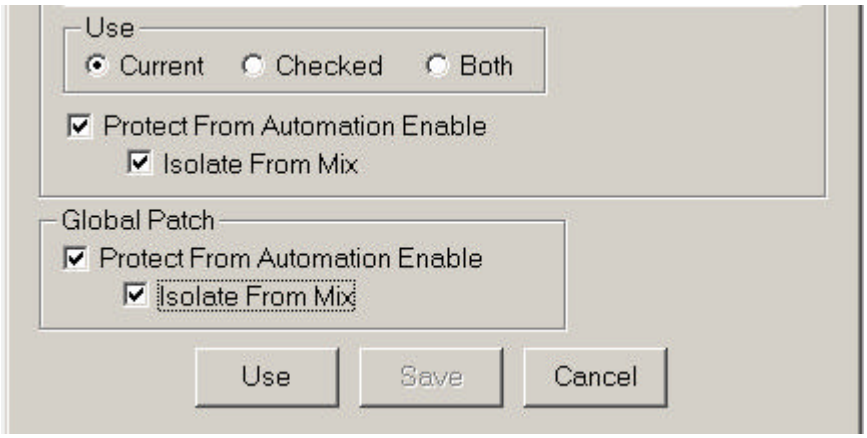
Shortcuts: To quickly remove Protection from all controls, uncheck the "Protect From Automation Enable" box in the Protection Sets section of the Automation Protection window and click the Use button.

To quickly remove Protection from the General Patch, uncheck the "Protect From Automation Enable" box in the Global Patch section of the Automation Protection window and click the Use button.

5.13.4 Isolate via Protection

Controls and the General Patch can be forced into ISOLATE using the Mix Protection selection methods. This is different from selecting the ISOLATE Control Mode in that Isolation persists only as long as the Protection Isolation is applied. This provides a convenient method of temporarily Isolating controls in any Mix Pass without creating new passes.

To apply Isolation via Protection, the same methods are used as when creating and applying Protection Sets. The only difference is “Isolate From Mix” is checked for either Protection Sets, Global Patch, or both before Protection is applied.



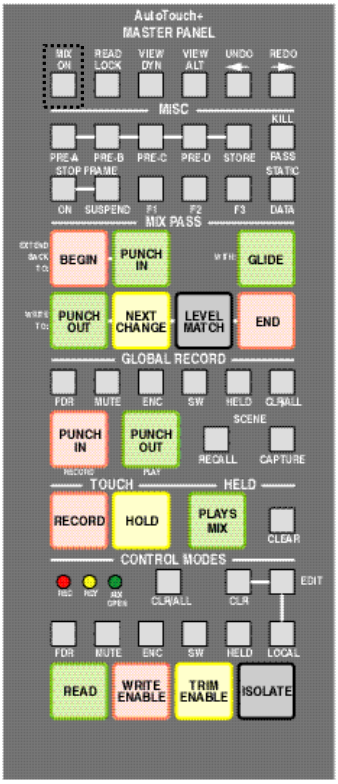
5.14 Miscellaneous Controls/Modes

A variety of controls and modes that are not explained elsewhere are described below.

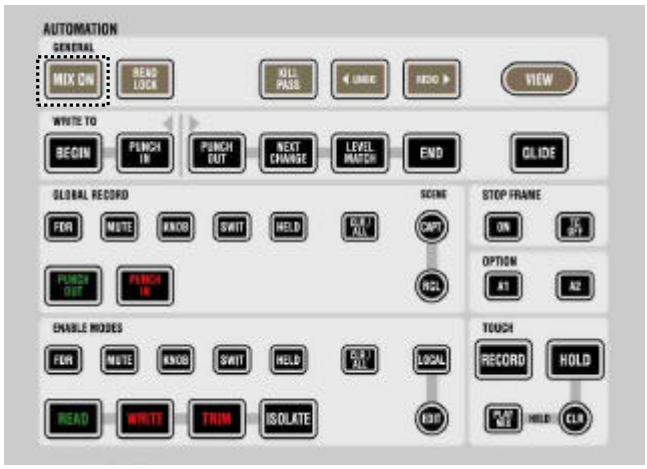
5.14.1 Mix On

Engaging the **MIX ON** key activates the AutoTouch+ system. A Mix Tree must be open before the system may be turned On. When the system is On, the **MIX ON** key illuminates.

D950:



Vista:



5.14.2 View Dynamic

Pressing **VIEW DYN / VIEW** will cause the lights for all dynamic controls currently on the Work surface to illuminate. Static controls will not light. This provides a very quick and easy means of identifying which controls have Dynamic moves recorded and which are Static controls. See Graphic above.

5.14.3 View Alt

Not implemented – for future use.

5.14.4 AutoTouch+ Panel Presets

AutoTouch+ Panel settings may be stored and recalled as needed (D950 only). All switch states may be stored in any of four AutoTouch+ Panel "Presets." This is helpful when the same settings are used frequently. Presets may also be programmed to emulate V2.5 Automation Panel settings.

Storing AutoTouch+ Panel Preset: AutoTouch+ Panel Presets may be stored as follows:

1. Set all AutoTouch+ Panel controls to the desired state.
2. Hold the **STORE** key and press the desired Preset key (**PRE A, PRE B, PRE C,** and **PRE D**).

Recalling AutoTouch+ **Panel Preset:** AutoTouch+ Panel Presets may be recalled as follows:

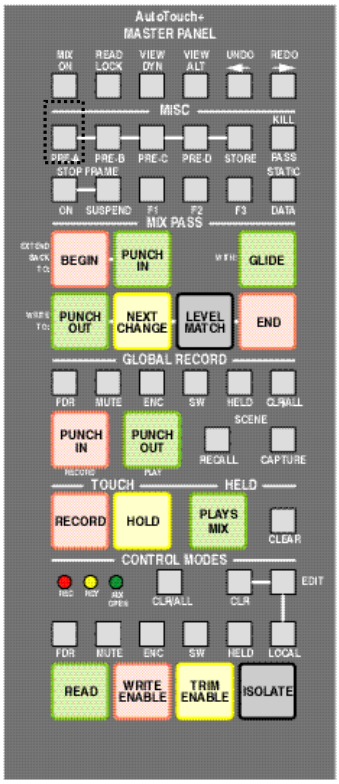
1. Press the Preset key (key (**PRE A, PRE B, PRE C,** and **PRE D**) for the Preset to be recalled.

Long Term Storage: The contents of all AutoTouch+ Panel Presets, along with the current settings, may be stored as part of a User File. Refer to chapter 5.17.

5.14.5 Function Keys

Function keys **A1** and **A2** (Vista) or **F1...F3** (D950) are not implemented (for future use).

5.14.6 Static Data *(D950 only)*



The **STATIC** key on the D950 AutoTouch+ Panel has two functions:

- When lit, the **STATIC** key indicates that Static Data Buffer is active and there is a difference between the current Static values and those stored within the current Mix Pass (Active Pass).
- Pressing the **STATIC** key clears the current Static values and those stored within the current Mix Pass (Active Pass). This function cannot be undone.

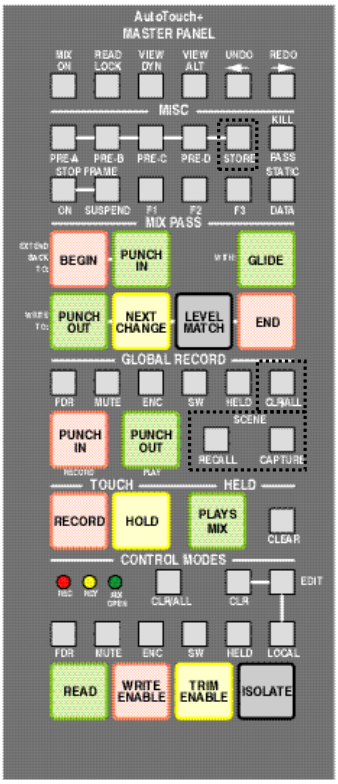
Notes: Static data may also be cleared by clicking the Clear Static button in the AutoTouch+ window.
In the "Automation Options – Misc" menu (also refer to chapter 5.21.8), static objects can be protected under certain circumstances.

5.14.7 Scene Capture/Recall

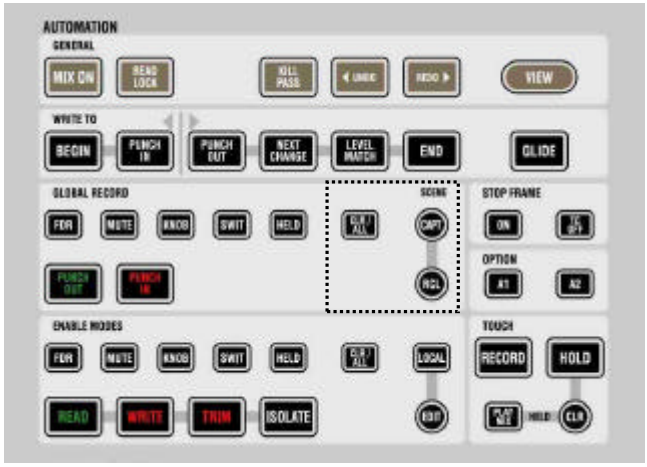
A Scene is a global “snapshot” of the automation status of each control within the system. There are two buffers in which Scenes may be stored. Scenes will be stored and can recalled during subsequent sessions.

Note: The term “snapshot” is not the same as a Snapshot in the GC. Snapshot in this regard refers to a picture of the automation status console-wide.

D950:



Vista:



Scene Capture: Holding the **STORE** key and pressing the **SCENE CAPTURE** key *(D950)* or just **CAPT** *(Vista)* will “capture” a Scene in the first buffer. Holding the **AUTO MODE** and **STORE** keys and pressing the **SCENE CAPTURE** key *(D950)* or **AUTO MODE** and **CAPT** *(Vista)* will “capture” a Scene in the second buffer.

The **SCENE RECALL / RCL** key will illuminate when a Scene has been captured in the first buffer. There is no indication of the status of the second Scene buffer.

The following controls will be stored within a Scene:

- Controls in RECORD
- Controls that are Held
- Controls that are being touched when the Scene is captured

Note: If no controls are in the states listed above, the existing Scene buffer will remain intact.

A list of controls and their values will be stored when a Scene is captured.

Scene Recall: Pressing the **SCENE RECALL / RCL** key will "recall" the Scene stored in the first buffer. Holding **AUTO MODE** modifier key and pressing the **SCENE RECALL / RCL** key will recall the Scene stored in the second buffer.

When a Scene is recalled, the controls on the list come back Held and WRITE Enabled. The values for the controls in the buffer will be reinstated as well. If Touch Record is active, the controls in the list will punch-in to RECORD upon Scene Recall

Clearing a Scene Buffer: Holding the Global Record **CLR / ALL** key and pressing the **SCENE RECALL** key *(D950)* or **CLR / ALL** and **RCL** *(Vista)* will "clear" a Scene in the first buffer. Holding Global Record **CLR / ALL** and **AUTO MODE** and pressing **SCENE RECALL / RCL** will clear the second Scene buffer.

Note: The data in the Scene Buffer is *not* saved as part of a Mix Pass, Mix Tree, or Title. Therefore, it will *not* persist from session to session.

5.15 Special Operating Modes

AutoTouch+ offers a series of special operating modes and features to accommodate specific production requirements and working styles.

5.15.1 Stop Frame Automation

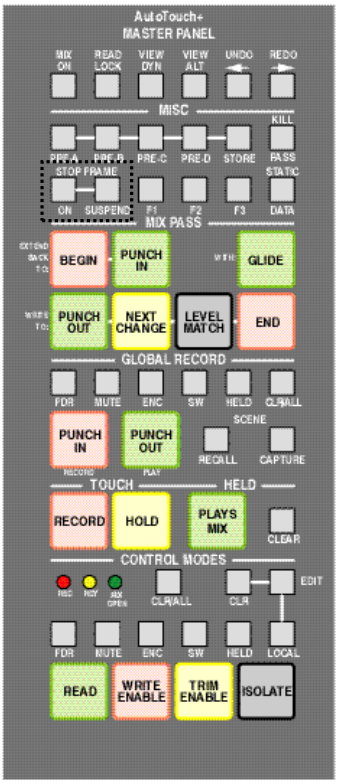
The Stop Frame automation feature makes it possible to write specific control values between timecode locations. The user can stop timecode playback at a specific location, set any number of controls to desired values, and move to the next location forward in time where values may again be adjusted. The initially set values will be recorded between the timecode locations.

Stop Frame automation may also be used with the internal timecode generator and **LOCATE** key when working with an EDL (Edit Decision List). This allows automation data to be recorded in a "pseudo offline" fashion without the work media.

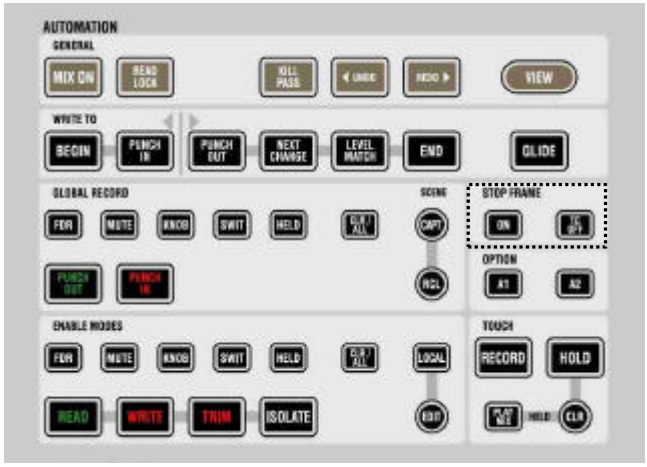
Stop Frame Automation may be enabled at any point. After control values are written at a specific location, the media can be moved forward to the next location, and the next set of values can be written. If locations are not known, Stop Frame may be "suspended" as the media is searched.

Stop Frame Controls: There are two keys on the AutoTouch+ Panel associated with Stop Frame automation.

D950:



Vista:



STOP FRAME keys perform the following functions:

- **STOP FRAME ON**: When engaged, all enabled controls will switch to their active RECORD state. The values of these controls will be recorded at the current timecode location. If timecode is advanced, these values will be recorded to each consecutive location. At any time, the user may stop timecode playback and make further adjustments to the controls. The new values will be recorded at the current location and any consecutive ones if the media is moved forward. It is important to note that control values will not be recorded if the timecode is moved backward.

- **STOP FRAME SUSPEND / STOP FRAME TC OFF**: When engaged, Stop Frame recording is suspended. This allows timecode to be moved backward or forward so a the next timecode location may be found. No control values will be written while **SUSPEND** or **TC OFF** is engaged.

Using Stop Frame Automation: The procedures for using Stop Frame Automation are as follows:

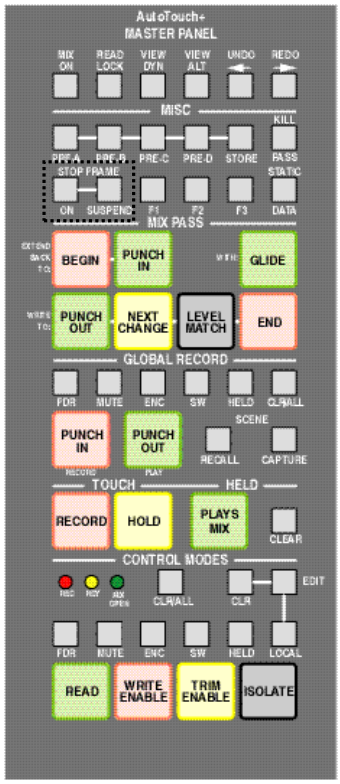
1. Select **WRITE ENABLE** or **TRIM ENABLE** and the desired Pre-Selector(s).
2. Engage **TOUCH RECORD** so that touched, enabled controls change to RECORD. Also engage **TOUCH HOLD** so controls won't snap back to previously written values when un-touched.
3. Move the media forward and stop media at a desired timecode location.
4. Enable Stop Frame by pressing the **STOP FRAME ON** key, if it is not already on. The **STOP FRAME ON** key will illuminate and record status will change to "Ready."
5. Adjust enabled controls to the desired values while sitting at that location. Any touched control will enter RECORD and its value can be set. The final value for each control will be recorded at that location and every consecutive timecode location played into the system. This is typically to the next Stop Frame location, but transitions will be applied according to the chosen "Write To:" function.
6. Pressing the **SUSPEND** or **TC OFF** key will release Stop Frame from timecode. This allows the media to searched forward *and backward* in order to find the next timecode location.
7. Once values have been recorded at all desired locations, turn Stop Frame off, by disengaging the **STOP FRAME ON** key. A new Mix Pass will be created and added to the Mix Tree and Mix Pass Stack.

5.15.2 Read Lock

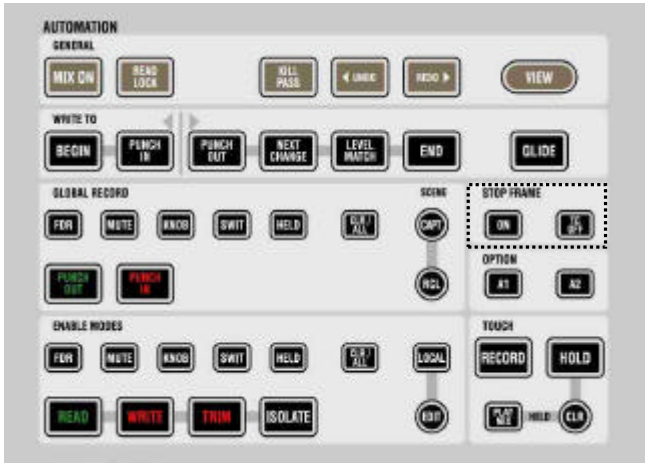
Read Lock forces all controls into Read and locks out all changes. While in this mode, playing back the Read Mix data from the Active Pass is the only operation possible. This assures the Active Pass will be played back exactly as saved, which can be quite useful when printing a final mix or layback.

The **READ LOCK** key is located at the top-left of the AutoTouch+ Panel and will illuminate when engaged.

D950:



Vista:



Conditions: With **READ LOCK** engaged, the following conditions exist:

- All controls are placed into the READ Control Mode and then locked in READ. Only the stored values of the Active Pass will be heard. Changes to control values are not possible. All controls are Protected.
- Changes may not be made to Static controls, the Channel Patch, or the General Patch
- Control Mode changes are locked out
- Controls may not be placed in a Held state (**TOUCH HOLD** defeated)
- All Record functions are defeated (**TOUCH RECORD**, **GLOBAL RECORD PUNCH IN/OUT**)
- All Audition functions are defeated
- **SCENE RECALL / RCL** is defeated

5.16 Offline Mix Editing

There are two methods of offline editing of Mix Passes:

- Event List Editing: The location of automation records may be moved or "slipped in time." Automation records may also be deleted. Control values may not be edited.
- OFLA Editing: Allows the value of automation records to be changed within a timecode window. Controls can also be reset to their default values or have their values frozen or spread across the timecode window. Controls can be made Static and Mix Passes may be merged.

Together, these methods provide powerful and easy to use means of fine tuning Mix Pass data or working with Edit Decision Lists. Each Method of editing is described below.

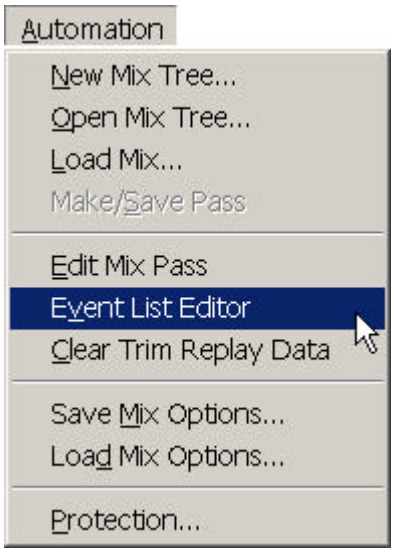
5.16.1 Event List Editing

Automation data may be edited using the Event List Editor within AutoTouch+. Being fully integrated within AutoTouch+, the Event List Editor provides quick and easy means of moving the location of automation records (Events). Automation events can also be deleted.

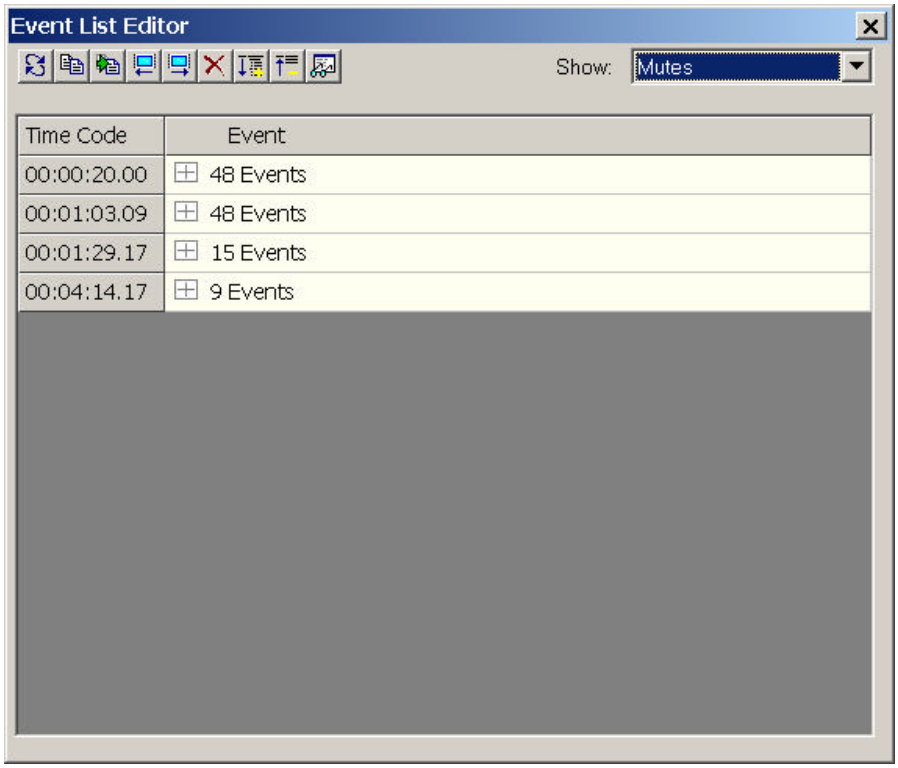
The Event List Editor is new in V3.0 software.

Accessing the Event List Editor:

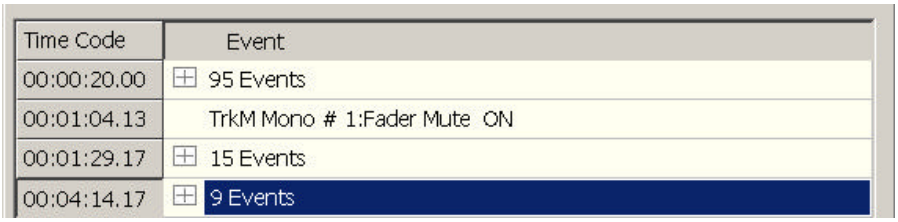
The Event List Editor is available by selecting "Event List Editor" from the GC Automation menu.



This action will open the Event List Editor window.



Events and Event Lists: As a mix progresses, Events (automation records) are recorded at timecode locations within a Mix Pass. These Events are organized by timecode and displayed in the Event List Editor. If more than one Event is recorded at the same timecode location, an Event List is created at that location. The Event List will contain all Events recorded at that location.



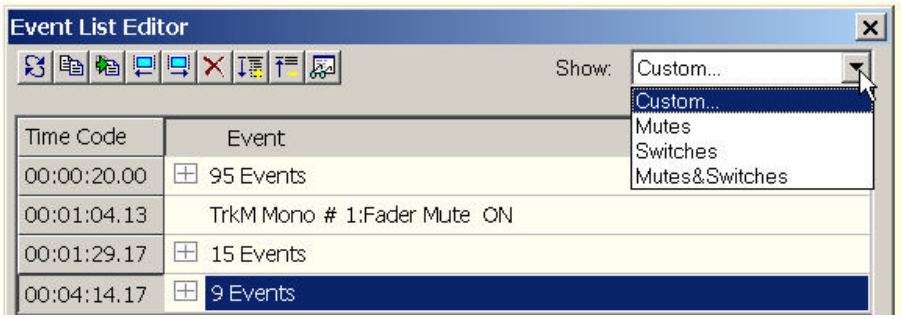
Only the timecode location of an Event may be edited. Events may copied to new locations or be deleted from the new Mix Pass.

Important Note: Control values may not be changed using the Event List Editor.

Displayed Events: Since a vast number of Events may be generated during a mix, Event Lists become both very numerous and very large. In a large or complex project, the number of events can grow to be overwhelming. To solve this problem, the Events to be displayed may be selected in one of two ways:

- Show Menu Selections: The Event Editor will display only the items selected in this menu
- Event List Filter: The Event Editor will display only the items selected by the Event List Filter

Show Menu: Selecting an item from the “Show:" pull-down menu will select the Events for that item’s controls to be displayed in the Event List Editor.

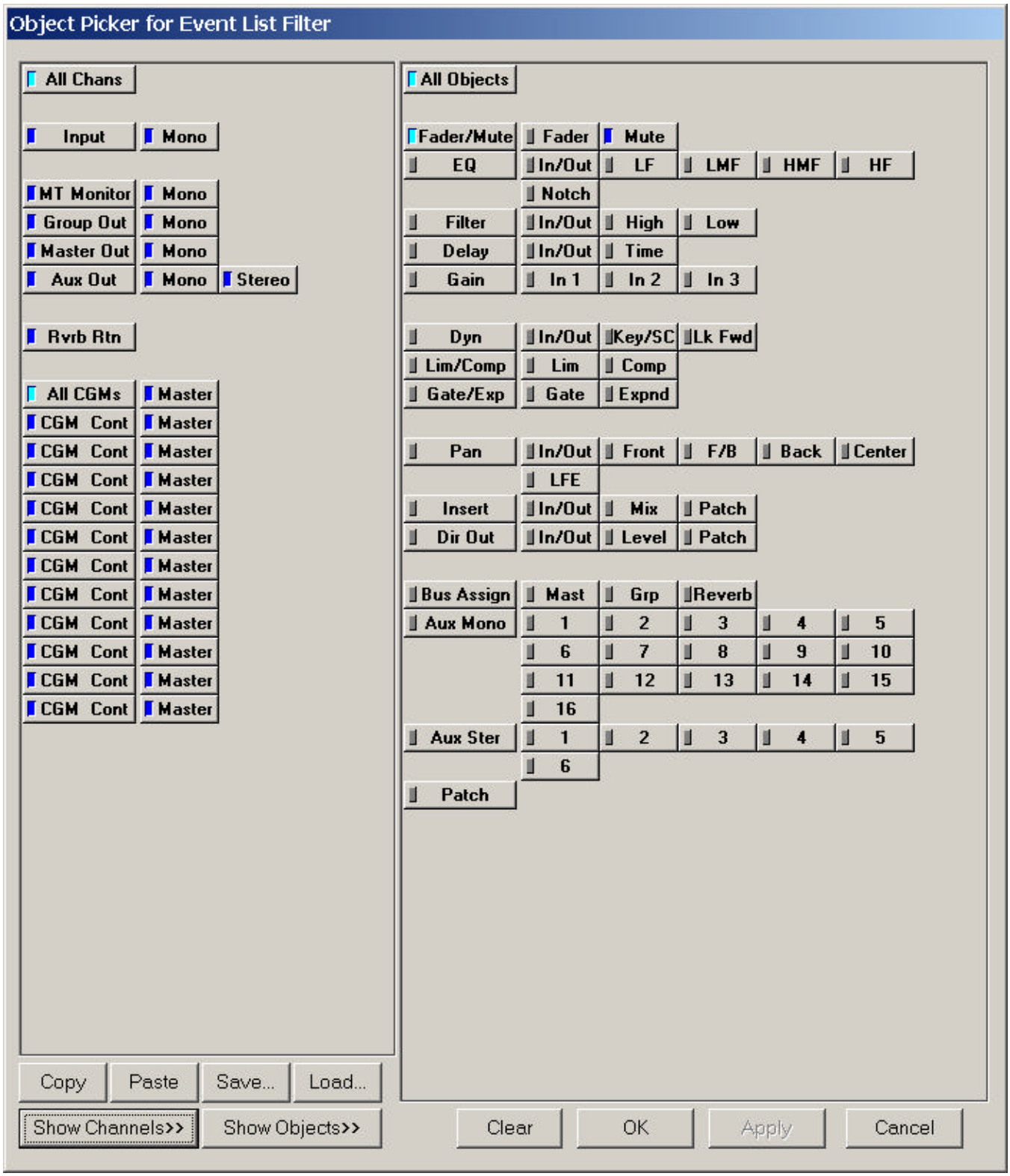


The following sets of Events are available in the “Show:” menu:

- Custom…: Allows a customized set of Events to be displayed. Selecting this item will open the Event List Filter where an exact set of Events may be chosen for display (see below). If a set of custom set of Events has already been selected, choosing “Custom…” will display the Events within that set.
- Mutes: Only Mute Events will be displayed in the Event List Editor
- Switches: Only Switch Events will be displayed in the Event List Editor
- Mutes & Switches: Only Mute and Switch Events will be displayed in the Event List Editor

Event List Filter: Using the Event List Filter, Events for specific controls can be selected for display in the Event column of the Event List Editor window.

To access the Event List Filter, click the  button.



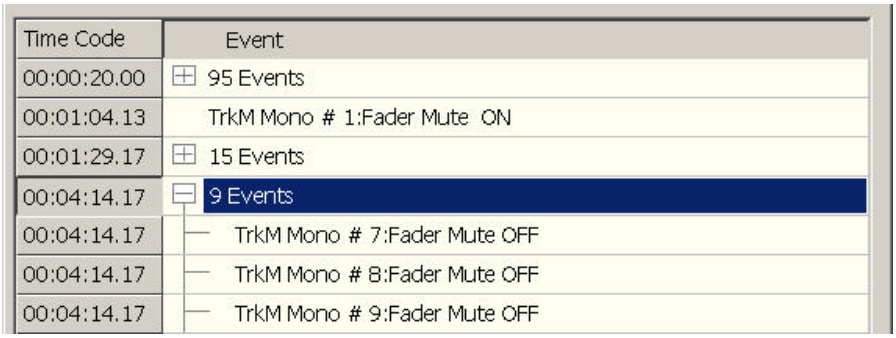
The Event List Filter provides the means to select desired controls within desired channels for display within the Event column. This set of Events is not limited to Mutes and Switches. Any combination of channels and controls is possible. Using the Object Picker for the Event List Filter, it is possible to select an exact set of controls for which Events will be displayed. For example, to edit Mute locations, only the Events for Mutes on selected channels may be chosen for display. This will remove all other Events from view and provide an efficient means of performing Mute Event edits.

Note: Automated Graphic Controller items are not selectable using the Object Picker for the Event List Filter.

Note: If objects are selected for display that do not have recorded Events, the Event List will be empty.

Event List Display: Selected Events may be displayed in a number of ways.

- Individual Events: Individual Events will be displayed next to their timecode location. The Event label contains the channel type, channel number, control, and control value. Timecode locations are always shown for each individual Events.
- Consolidated Event Lists: Only timecode locations with recorded Events are displayed. If only a single Event is recorded, it will be displayed. If multiple Events have been recorded at the same timecode location, an Event List header will be shown, but the contents will not be displayed. The header label will indicate the number of Events in the list and contains a + button. Clicking the + button will expand the list, its contents will be displayed, and the + button changes to a – button. Clicking the – button will close the list.
- Expanded Event Lists: All Events are shown individually. If an Event is part of an Event List, the header will be the first item for that particular timecode location.



Using the display modes listing above, any combination of displays may be accomplished.

Important Note: The use of the term “Mute” is used literally in the Event List Editor. If the Mute is listed as “ON” in the Event List, the post fader channel output will be cut. Muting will be activated. The associated key on the work surface will not be illuminated (channel **MUTE** key on Vista and channel **ON** key on D950). This may be a source of confusion for D950 users because the channel is “off” and the **ON** key is not lit when the Event List indicates the mute is “On.”

Note: The Event List Editor only shows a subset of all the events stored within a Mix Pass. Making an edit can change what is shown and depending on the edit performed, some events may drop off the list.

Note: Timecode locations without recorded Events will not be displayed in the Event List Editor.

Selecting Events to be Edited: From the Events chosen for display, single Events, an entire Event List, or a selected group of Events and/or Event Lists may be chosen for editing.

Use the following procedures to select Events and/or Event Lists may be chosen for editing:

- Individual Events: Individual Events may be selected by clicking the Event label or the associated timecode. To select individual Events from an Event List, the list must first be expanded.
- Event Lists: Individual Event Lists may be selected by clicking the Event List header or the associated timecode.
- Selected Events and/or Event Lists: A group of selected Events and/or Event Lists may be chosen using any of the following methods:
  - Click and Drag: Click and hold on an Event or Event List and drag the cursor over the desired items. This allows adjacent items to be selected.
  - Control-clicking (holding the **Ctrl** key plus single-clicking): Allows selection of individual Events and/or Event Lists anywhere within the Event List Editor. Items may be selected regardless of location, so non-adjacent items may be chosen.
  - Shift-clicking (holding the Shift key and single-clicking): Allows selection of a range of Events and/or Event Lists. Clicking a pair of items while holding down the Shift key will select those items and the ones in-between.

Event List Editor Operations: The following operations may be performed using the Event List Editor:


Redisplay Event List Near Current Timecode: Opens the Event List closest to the current or selected timecode location.


Copy Event(s) to New Timecode: The selected Events and/or Event Lists are copied and pasted to a new timecode location. When selected, a timecode entry box will open.


Move Event(s) to New Timecode: The selected Events and/or Event Lists are moved to a new timecode location. When selected a timecode entry box will open.


Move Event(s) One Frame Earlier: The selected Events and/or Event Lists are moved one frame earlier. The selected items are “nudged backward.”


Move Event(s) One Frame Later: The selected Events and/or Event Lists are moved one frame later. The selected items are “nudged forward.”


Delete Selected Events: The selected Events and/or Event Lists are deleted from the resultant Mix Pass. Caution: No warning prompt is given. See Note below.


Expand and Show Each Event at a Timecode: All Events Lists are opened and each Event is displayed with its timecode location.


Consolidate Multiple Events at Each Timecode: Only Events Lists are shown at each timecode location. Individual Events will be shown only if they are the only Event at that timecode location.


Filter Which Events to Display: Opens the Object Picker for the Event List Filter.

Each time an Event List edit operation is performed, a new Mix Pass is created.

Note: Deleting an Event or Event List is a destructive operation. However, the original Active Pass on which the edit is to be performed is retained and a new Mix Pass is created without the deleted item. In this regard, deleting an item is a non-destructive operation.

Perform an Event List Edit: To perform an Event List edit, use the following procedure:

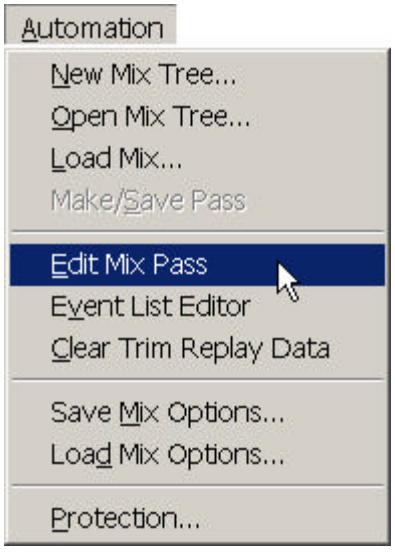
1. Make the Mix Pass to be edited the Active Pass if it is not already.
2. Select "Event List Editor" from the GC Automation menu. The Event List Editor window will open.
3. Click the **Edit List Filter** button to open the Object Picker for the Event List Filter. Using this picker will allow Events for the desired controls on selected channels to be chosen for editing. Once selected, click either the **Apply** button (if more edits will be performed) or the **OK** button (if no more objects need to be selected). Events for the controls in the picker will be selected for editing and will appear in the Event column of the Event List Editor window.
4. Click the desired edit operation. If moving or copying Events and/or Event Lists, enter the new timecode location and click **OK**. The selected edit will be performed.
5. A new Mix Pass is written that contains the edited values.

5.16.2 OFLA Editing

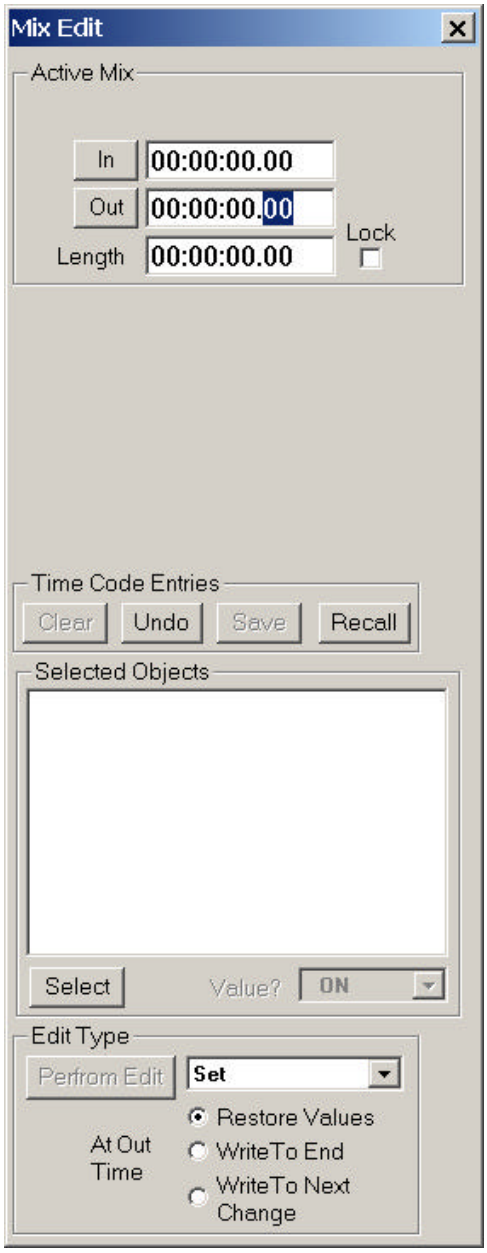
AutoTouch+ data may be edited using the OFLA offline mix editor. OFLA is stand alone mix editor that may be used with or without AutoTouch+. Being fully integrated with AutoTouch+, OFLA provides quick and easy comprehensive Mix Pass editing when used in a session environment. When used in an offline capacity OFLA is equally efficient.

OFLA allows the values of automation records to be edited within a timecode window. Objects can also be made Static using OFLA.

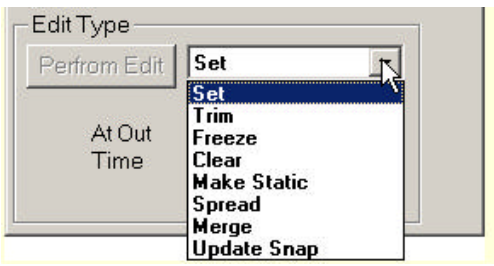
Accessing OFLA: OFLA is available by selecting "Edit Mix Pass" from the GC Automation menu. This is different from V2.5 where OFLA is accessed via the "Edit Mix" button in the GC Automation window.



This action will open the Event List Editor window:



OFLA Edit Types: There are eight different Edit Types available. It should be noted that all Edit Types are not available for all control types (for example, the value of a mute or switch cannot be trimmed).



The following edit operations may be applied to selected controls using OFLA:

- Set: Sets a fixed control value within the timecode window.

- Trim: Offsets the previously written control values by a fixed amount within the timecode window. Switches may not be Trimmed.
- Freeze: The control value at the OFLA In time will be retained for the duration of the timecode window.
- Clear: Controls will be reset to their default values within the timecode window.
- Make Static: Controls will be made Static. All automation records other than the Static value will be erased for the entire Mix Pass.
- Spread: Control values at a specific point in a source mix (Active or Mix Tree) may be applied throughout the timecode window.
- Merge: Control values a timecode window within a source mix (Active or Mix Tree) may be applied throughout the timecode window.
- Update Snap: Updates the Mix Snapshot. This applies the current control values from the beginning of the Mix Pass to the first recorded record.

Each time an OFLA edit is performed, a new Mix Pass created.

Edit a Mix Pass with OFLA: To edit a Mix Pass with OFLA, use the following procedure:

1. Make the Mix Pass to be edited the Active Pass if it is not already.
2. Select "Edit Mix Pass" from the GC Automation menu. The basic Edit Mix window will open.
3. Click the **Select** button to open the Object Picker for Edit Object Selector. Using this picker will allow the desired controls on selected channels to be chosen for editing. Once selected, click either the **Apply** button (if more edits will be performed) or the **OK** button (if no more objects need to be selected). The controls in the picker will be selected for editing and will appear in the Selected Objects section of the Edit Mix window.
4. Select the Edit Type from the Edit Type pull-down menu.
5. Enter the new control value if necessary (depending on Edit Type).
6. Enter the Spread Source Mix or Merge Mix if Spread or Merge edit types are used. The Mix Passes in the current Mix Tree are available.
7. Enter the timecode locations for edit In and Out points if necessary (depending on Edit Type).
8. Click on the appropriate radio button to select the "At Out Time" function. These functions mostly mirror the "Write To" functions found in AutoTouch+, but have some difference. See below.
9. Click **Perform Edit** to perform the edit. A new Mix Pass is written that contains the edited values.

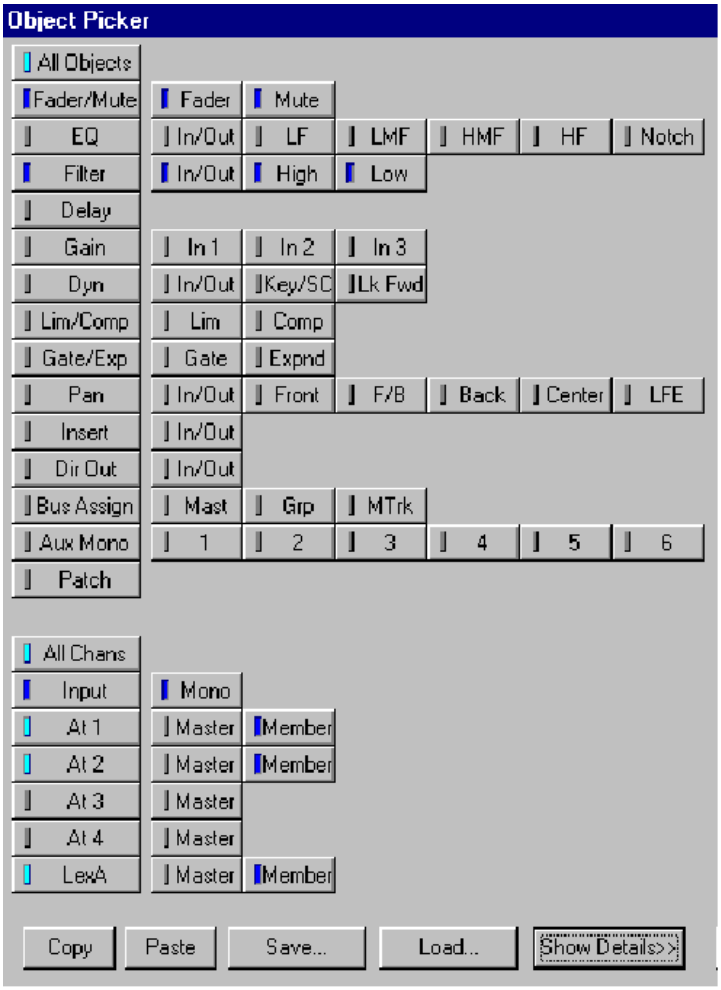
Note: Automated Graphic Controller items are not selectable using the Object Picker for Edit Object Selector.

At Out Time Functions: The select "At Out Time" function will determine how the edit data transitions back to Read Mix data.

At Out Time selections function as follows:

- Restore Values: This is the equivalent to "Write To: Punch-Out". Read Mix control values will be restored at the OFLA Out Time. Glide functions are not available.
- Write to End: This is the equivalent to "Write To: End" except the edit control values will be written to the end of the Mix Pass. To use a fixed end time select Restore Values as the At Out Time function. "Write To: End Of Time" is not available.
- Write to Next Change: This is the equivalent to "Write To: Next Change". Read Mix control values will be restored when the next record is encountered. Glide functions are not available.

5.16.2.1 Object Picker

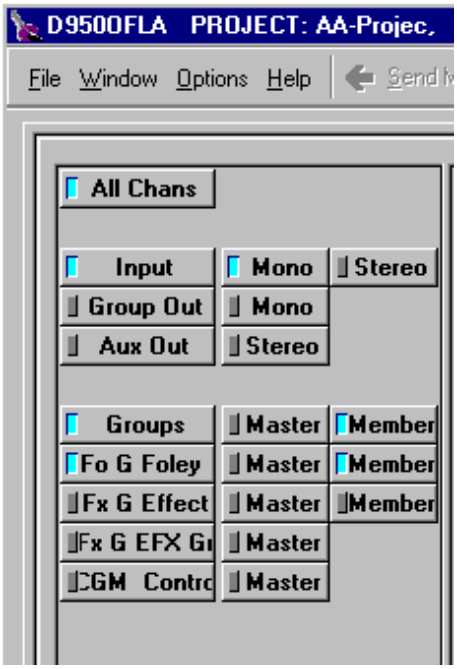


The Object Picker is used to select the elements within a mix you wish to edit. These elements are organized into channels and objects within channels. Selection of elements can be as specific as an individual parameter value, within a particular object, within a single channel, and as broad as all parameters, within all objects, within all channels.

Note: It is important to realize that the channels and objects displayed in the picker are the same as contained within the VMC used to create the title and mix. If a different VMC is loaded, the channels and objects will change accordingly. In other words, the elements that appear in the Object Picker are determined by the console configuration that was in use when the data was created.

There are five main sections in the Object Picker:
- Channel Selector panel;
- Object Selector panel;
- Channel/Object Tree display area;
- Function controls;
- Open Mix Selector Tabs.

5.16.2.2 Channel Selector Panel



This panel contains buttons that correspond with the channels that are present within the active mix. Using these buttons, channels can be selected for editing as follows:

All Chans: selects all channels for editing;
Input: selects all Input channels for editing;
MT Input: selects all Multitrack Input channels for editing;
MT Monitor: selects all Multitrack Monitor channels for editing;
Group Out: selects all Group Output channels for editing;
Master Out: selects all Master Output channels for editing;
Aux Out: selects all Auxiliary Output channels for editing.

Activating the left-hand button at the beginning of each row will select all channels of that type. If both mono and stereo versions of a particular channel type are included in the VMC, just the mono or stereo channels may be selected by clicking on the appropriate button. Channel types and/or versions may be de-selected after a large selection (such as All Chans) has been made.

In addition to channel selection, buttons are included that allow editing of group assignments and Control Group Masters. Channels that contribute to each group may be also selected for editing *as a group*, via these controls. These buttons function as follows:

Group: selects all items associated with the group (group members, Control Group Masters, and group assignments) for inclusion in the edit;
Master: selects Control Group Masters for inclusion in the edit;
Member: selects group members and group assignments for inclusion in the edit.

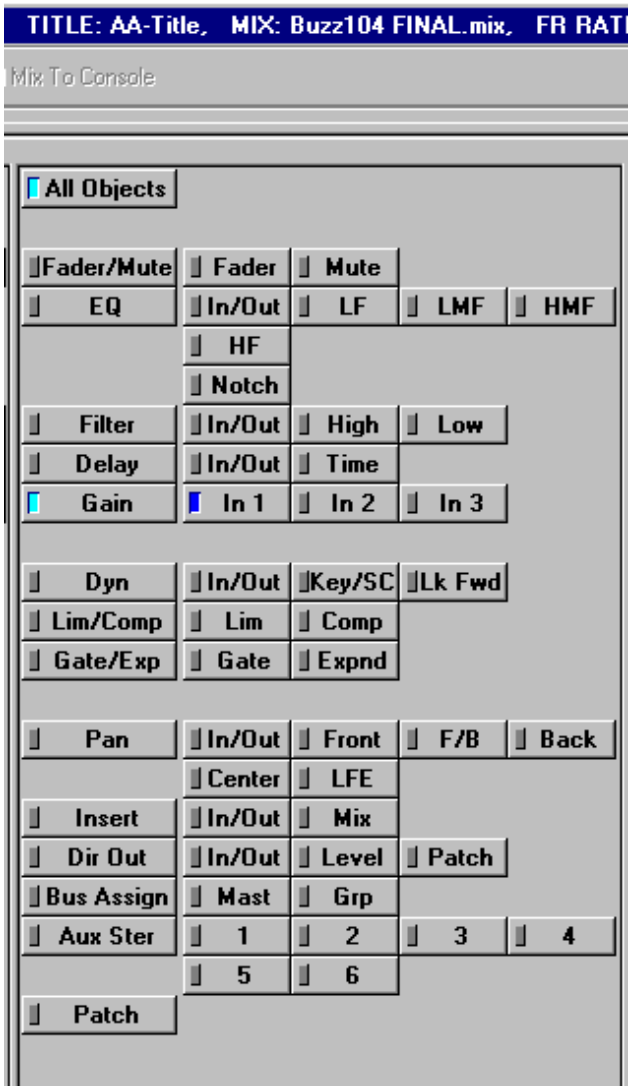
A set of “Group”, “Master”, and “Member” buttons is provided for each group. The top row of buttons act as global selectors for the group controls below.

The assignments of channels as group members are stored as part of the mix data and may be unique to each mix. Therefore, only groups that have channels assigned as members will have “Member” buttons available with

the group. In other words, whether or not the “Member” buttons appear in the Channel Selector Panel is determined by the loaded mix/snapshot.

Notes: User Labels can be displayed on “Group” buttons by selecting “User Labels on Group Buttons” from the Options menu.
The buttons on the Channel Selector Panel select channels and groups on a global basis. If individual (or subsets of) channels/groups are to be selected for editing, the “Show Channels>>” facility must be used.

5.16.2.3 Object Selector Panel



This panel contains buttons that correspond with the elements (or objects) that are contained within the channels.

Note: It is important to realize that the Object Selector Panel will display *all* elements that are included in the VMC. While an object might appear on the panel, it might not be configured within the selected channel(s). Objects not included anywhere in the VMC will not appear on the Object Selector Panel.

Using these buttons, objects can be selected for editing as follows:

All Objects: selects all objects for editing;
Fader/Mute: selects all fader and mute parameters for editing;
EQ: selects all EQ parameters for editing;
Filter: selects all filter parameters for editing;
Delay: selects all delay parameters for editing;
Gain: selects all input gain parameters for editing;
Dyn: selects all limiter/compressor *and* gate/expander parameters for editing;
Lim/Comp: selects all limiter/compressor parameters for editing;
Gate/Exp: selects all gate/expander parameters for editing;
Pan: selects all pan parameters for editing;
Insert: selects all insert parameters for editing;
Dir Out: selects all direct output parameters for editing;
Bus Assign: selects all bus assignments for editing;
Aux Mono: selects all mono auxiliary parameters for editing;
Aux Stereo: selects all stereo auxiliary parameters for editing;
Patch: selects all patch assignments for editing

Selection of an object will select all objects of that type for editing. For example, if all four EQ types have been configured in the VMC (mono, stereo, mono with notch, and stereo with notch), all four EQ types will be selected when the "EQ" object button is clicked.

Each object contains an appropriate set of parameters for that object's functions. Several parameters may be selected by clicking a single button. For example, if Filter/High is clicked, then HP on/off, HP slope, and HP frequency will all be selected.

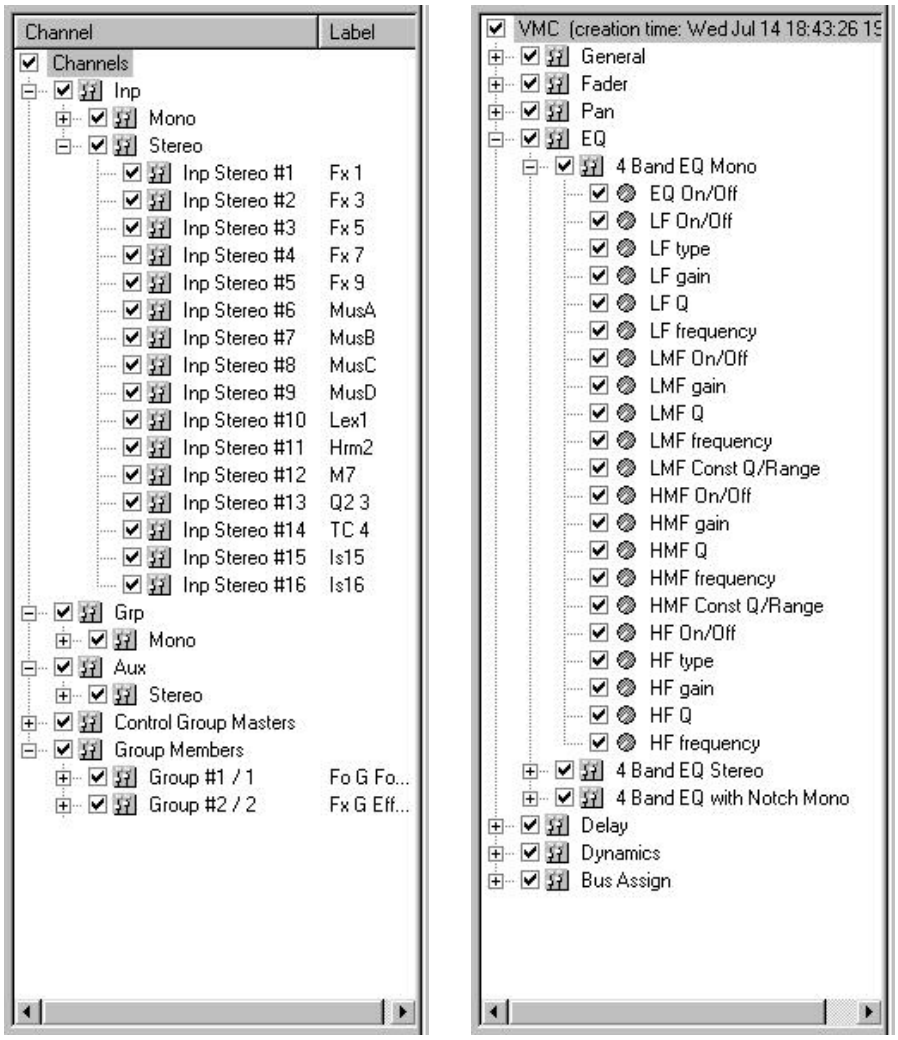
Activating the left-hand button at the beginning of each row will select all parameters for that object. Objects and/or their parameters may be de-selected after a large selection (such as All Objects) has been made.

Note: The buttons on the Object Selector Panel select objects and parameters on a global basis. If individual or subsets of parameters are to be selected for editing, the "Show Objects>>" facility must be used.

5.16.2.4 Channel/Object Tree Display Area

All channels and objects may be displayed in a tree format. This provides the means to select specific channels and/or objects on an individual, subset, or global basis. This display area is located to the right of the Object Selector Panel and will be blank if both trees are hidden.

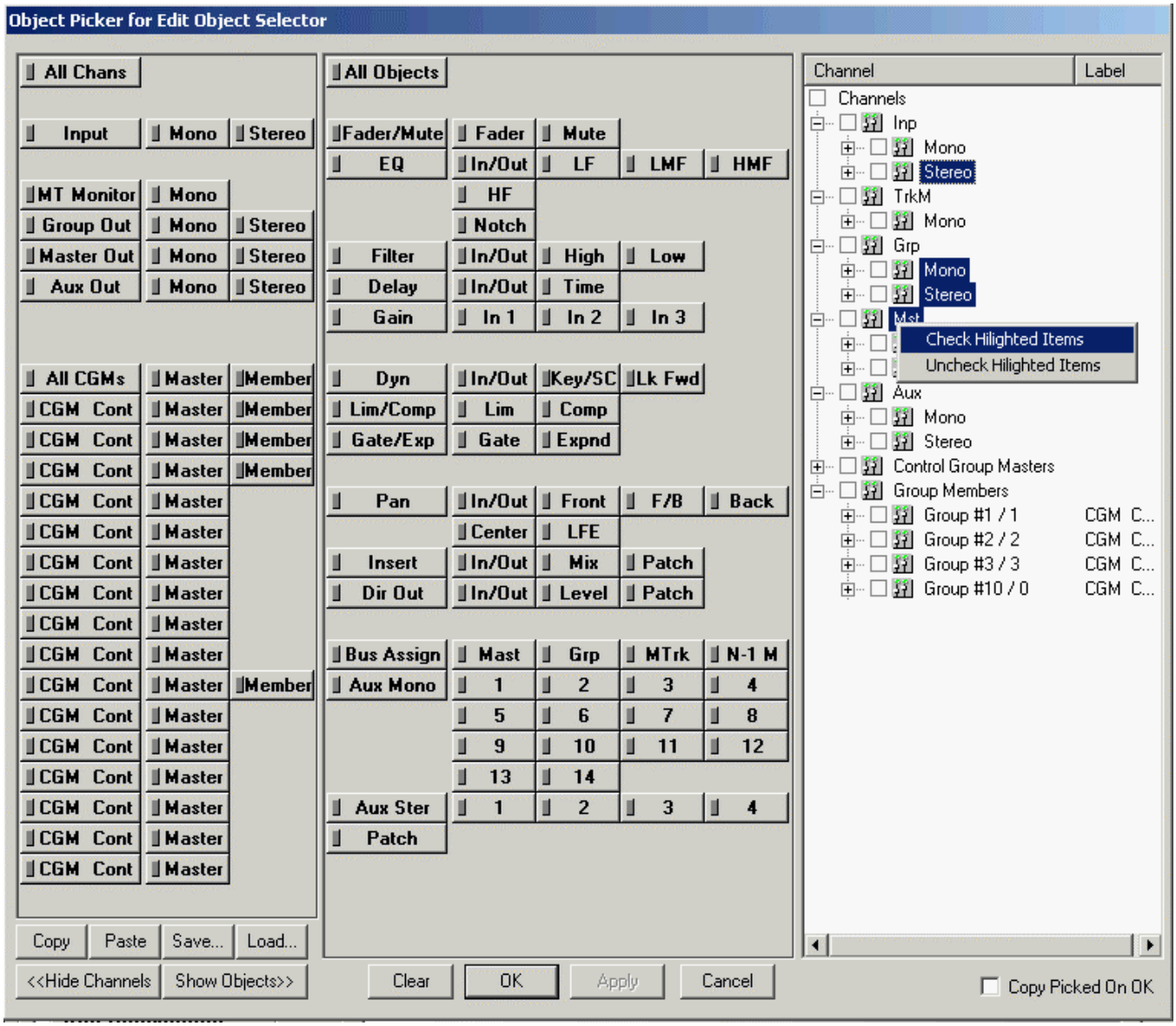
To view the Channel Tree, click the "Show Channels>>" button located under the Channel Selector Panel. All the channels included in the VMC, along with their User Labels, will be contained in the tree (left part of the picture below).
To view the Object Tree, click the "Show Objects>>" button. All objects included in the configuration will be included within the tree. Only one tree can be displayed at any one time (right part of the picture below).



Once a tree has been chosen, all of the individual elements it contains may be viewed by opening the displayed folders and folders within folders (click the "+" icons to open folders and the "–" icons to close them). Like the channel/object selectors, only elements contained within the VMC are displayed.

Items can be selected for editing by checking any combination of folders and/or individual elements within the tree. Using this method, an exact set of elements, either simple or complex, can be chosen. Because of this high

resolution, a much more precise set of elements may be selected than what is possible using the channel/object selector panels.
An item can be checked or unchecked by clicking on the box next to its name. Several items may be selected by highlighting the item labels using the familiar Shift-click and Ctrl-click methods. Once the labels have been highlighted, Right-clicking will open a pop-up menu that allows the group to be checked or unchecked.



Notes: When all items within a channel/object section have been chosen, the associated selector button(s) will illuminate with a dark blue light and the associated tree elements will be indicated with a black check. If only part of a section is chosen, the associated selector buttons will illuminate in light blue and the tree elements will be checked in gray.
Notice the relationship between the channel/object selector panels and the tree displays. When an element is chosen using a selector panel, the corresponding element is checked on the tree. Likewise, if an item is checked on the tree, the corresponding selector button is illuminated.

5.16.2.5 Function Controls

A set of function controls are provided below the Channel/Object Selector panels. These function buttons are as follows:

Copy: copies the Selected Objects Set to the PC clipboard;

Paste: pastes the contents of the PC clipboard (copied Selected Objects Set) to the Object Picker;

Save…: saves the Selected Objects Set as a file;

Load: allows saved object files to be reloaded;

Clear: clears the selection of all objects;

Apply: selects the objects chosen in the Object Picker for editing;

Copy Picked on OK: if checked, the Selected Objects Set is copied to the clipboard when the "Apply" button is clicked;

Cancel: cancels changes made to the Selected Objects Set since the last set was applied, saved, loaded, copied, or pasted.

Once an object or set of objects has been selected in the Object Picker, they are then selected for editing by clicking the "Apply" button. The selected objects from the selected channels will be displayed in the "Selected Objects" window. Those are the only objects that will be affected when edits are performed.

Note: If an object has been chosen but a channel has not, the object will not be selected for editing when the "Apply" button is clicked.

Open Mix Selector Tabs: A set of tabs, each of them representing a mix, are located at the bottom of the Object Picker window (bottom left in the picture above). Every mix that is currently open in the OFLA has its own tab. When the mix selector menus are set to "Selected Mix", these tabs are used to choose a mix by simply clicking on the appropriate tab.

5.16.3 Mix Controls

All edits are based upon an existing mix, known as the Active Mix. Depending on the type of edit selected, data may be needed from another mix or snapshot. The controls for the necessary mixes appear in the combo boxes to the right of the Object Picker or Mix Viewer window.

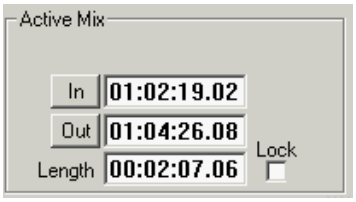
5.16.3.1 Active Mix

The Active Mix provides the primary data set that is used during editing. Every edit is based upon the selected Active Mix, the channels/objects selected within the mix, the portion of the mix to be altered, and the type of edit applied. In other words, the data (parameter values) from the selected Active Mix objects is altered according to the chosen Edit Type and Edit Region when the edit is performed. Previously existing and altered data are combined and saved as a new mix.

Most Edit Types (Set, Trim, Freeze, and Clear) need data from only the Active Mix for an edit to be performed. Spread, Merge, and Update Snap edits all require data from other mixes. When an additional data source is needed to perform an edit, an additional mix combo box (containing the appropriate controls) will appear when the corresponding Edit Type is chosen.

Each mix needed for an edit has a combo box that contains the necessary controls for that mix and edit type.

The Active Mix combo box has a primary control set:
- *Timecode Entry Fields*, used to select the Edit Region.



Timecode Entry Fields: For most edit types to be performed, an Edit Region must be established within the Active Mix using timecode addresses (Update Snap does not use an Edit Region). The Edit Region can be as short as a single frame or as long as an entire mix.

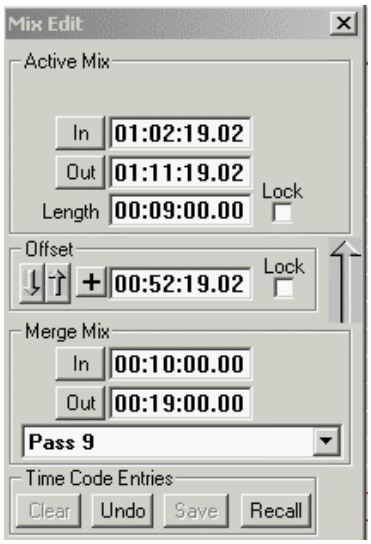
Edit Regions are defined using Timecode Entry Fields. The Active Mix includes three Timecode Entry Fields:

In Time: Starting point for the edit; the timecode address from which data is altered;

Out Time: Ending point for the edit; the timecode address from which data is no longer altered;

Length: Duration of the edit; the total time of the Edit Region;

Length Lock: Freezes the value of the Length field.



Timecode addresses may be entered into all three fields in the following ways:

- Capture the current timecode address using the “In” or “Out” buttons (if provided);
- Highlight all or part of the entry field and type in the address;
- Highlight all or part of the entry field and click/drag (roll) the value up or down;
- Press the “+” or “–“ key from the computer keyboard, and an additional Timecode Entry Field will appear. The value entered into this field will be added (+) or subtracted (–) from the existing timecode value.
- Right-Click any part of the entry field and a menu of timecode address selections from which to choose will appear;

Note: Refer to chapter 5.16.4 for additional details regarding timecode entries.

The In Time and Out Time entry fields are equipped with buttons that allow the capture of the current timecode address while the mix is stopped or running. Clicking on these buttons will enter the current address into the appropriate field.

Changes made to one of the entry fields may effect the address(es) of one or both of the other fields. For example, changes made in the In Time or Out Time fields will change the value of the Length time. Changes made in the Length field will change the value of the Out Time.

The Length field may be frozen by checking the Lock box to its right. When the Length field is locked, its value remains constant when changes are made in the other fields. Changes made to the In Time will change the Out Time and vice versa. It is important to note that the Length value may be edited even when it’s locked.

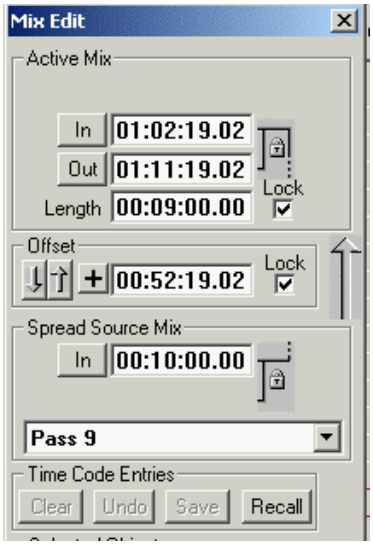
Note: Timecode Entry Fields do not appear in the Active Mix box when Update Snap is selected as the Edit Type.

5.16.3.2 Spread Source Mix

The Spread Source Mix allows external mix data from a single point In Time (Data Point) to be applied to the Active Mix. The data from the selected point in an external mix (Spread Source Mix) is applied to the selected objects, on the selected channels, in the Active Mix during the Edit Region.

The Spread Source Mix combo box has two primary control sets:
- *Mix Selection Menu:* used to select the Spread Source Mix;
- *Timecode Entry Fields:* used to select the Data Point from the Spread Source Mix.

In addition, an Offset combo box is provided, so that the Active Mix and the Spread Source Mix *In Times* can be easily offset from each other.



Mix Selection Menu: This pop-up menu box provides a list of mixes available to become the Spread Source Mix. This list contains the same mixes available to the Active Mix and functions using the same selection techniques.

Note: The Spread Source Mix is typically different from the Active Mix. However, it can also be the same mix as the Active Mix.

Timecode Entry Field: For a Spread Edit to be performed, a Data Point (a single timecode address) must be selected from within the Spread Source Mix.

The Data Point is defined using a Timecode Entry Field. The Spread Source Mix has one Timecode Entry Field:

In Time: Point from which the Spread Source Mix data originates, i.e. the timecode address of the Data Point.

The In Time from the Spread Source Mix is selected using the same techniques used for selecting the Active Mix timecode addresses.

Notes: The In Time selects the Data Point (a specific frame) from the Spread Source Mix. This fixed data is applied throughout the entire Edit Region in the Active Mix.
Refer to chapter 5.16.4 for additional details regarding timecode entries.

Offset Controls: An Offset combo box is provided for easy control of offsets between the Active and Spread Source Mix In Times.

The Offset combo box for the Spread Source Mix contains the following controls:

Down Arrow: Moves the Active Mix In Time to the Spread Source Mix In Time;
Up Arrow: Moves the Spread Source Mix In Time to the Active Mix In Time;
+/– Box: Toggles the Offset Value between positive (+) and negative (–); "+" is the default value;
Offset Value: Difference between the Active Mix and Spread Source Mix In Times (00:00:00:00 is the default value);
Offset Lock: Freezes the Offset value.

The relationships between the Active Mix and Spread Source Mix In Times and the Offset Values are as follows:

- If the Active Mix and Spread Source Mix In Times are identical, the Offset Value will be 00:00:00:00.
- If the Active Mix In Time is 10 seconds greater than the Spread Source Mix In Time, the Offset Value will be +00:00:10:00.
- If the Active Mix In Time is 10 seconds less than the Spread Source Mix In Time, the Offset Value will be –00:00:10:00.
- Changing either In Time will cause a corresponding change in the Offset Value unless it is locked.
- Locking the Offset field will freeze its value. When locked, its value remains constant when changes are made in the other fields. Changing either In Time will then cause a corresponding change in the other In Time. It is important to note that the Offset Value may be edited even when it's locked.

Note: It is possible to lock both Length and Offset fields.

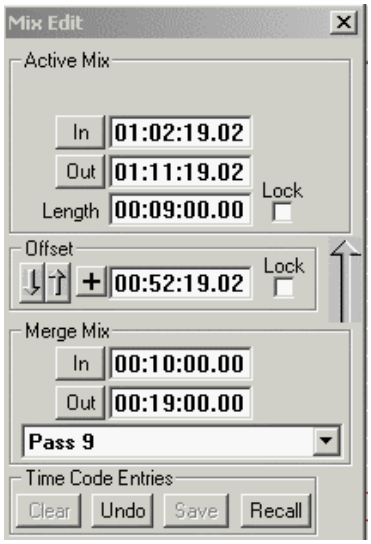
5.16.3.3 Merge Mix

The Merge Mix allows mix data from a region of an external mix to be applied to the Active Mix. The data from the selected region in an external mix (Merge Mix) is applied to the selected objects, on the selected channels, in the Active Mix during the Edit Region.

The Merge Mix combo box has two primary control sets:

- *Mix Selection Menu:* used to select the Merge Mix;
- *Timecode Entry Fields:* used to select the source region of the Merge Mix.

In addition, an Offset combo box is provided so the Active Mix and Merge Mix *In Times* can be easily offset from each other.



Mix Selection Menu: This pop-up menu box provides a list of mixes available to become the Merge Mix. This list contains the same mixes that are available to the Active Mix and functions using the same selection techniques.

Note: The Merge Mix may be the same mix as the Active Mix.

Timecode Entry Fields: For a Merge edit to be performed, a Data Region from within the Merge Mix must be selected.

The Data Region is defined using Timecode Entry Fields. The Merge Mix has the following Timecode Entry Fields:

In Time: This is the starting point of the Data Region from the Merge Mix;

Out Time: This is the ending point of the Data Region from the Merge Mix.

The Merge Mix timecode entries are selected using the same techniques as used for selecting the Active Mix timecode addresses.

Notes: The Data Region from the Merge Mix is applied to the Edit Region of the Active Mix. Therefore, the Data Region and Edit Regions must be the same length. Because of this, the Length field in the Active Mix box works in concert with the In Time or Out Time in both the Active and Merge Mix boxes. Changing the Length field will change the values in the Active Mix *and* Merge Mix boxes. Changing the Merge Mix In Time or Out Time will change the Active Mix In Time or Out Time values, as well as the Length value. Locking the Length field will affect the functions of the In Time or Out Time in both the Active Mix and Merge Mix sections.
Refer to chapter 5.16.4 for additional details regarding timecode entries.

Offset Controls: An Offset combo box is provided to facilitate easy control of offsets between the Active Mix and Merge Mix In Times.

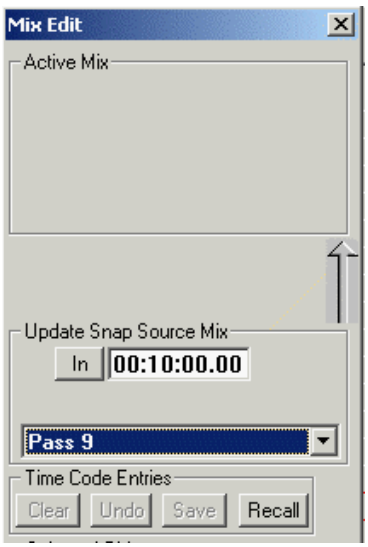
The Merge Mix Offset controls function the same as the Spread Source Mix Offset controls.

5.16.3.4 Update Snap Source Mix

The Update Snap Source Mix allows external mix data from a single point In Time (Data Point) to be applied to the Active Mix. The data from the selected point in an external mix (Spread Source Mix) is applied to the selected objects, on the selected channels, in the entire Active Mix. It performs the same basic function as “Update Mix Snapshot” from the D950 System Mix Options menu.

The Update Snap Source Mix combo box has two primary control sets:

- *Mix Selection Menu:* used to select the Update Snap Source Mix;
- *Timecode Entry Field:* used to select the Data Point from Update Snap Source Mix.



Mix Selection Menu: This pop-up menu box provides a list of mixes available to become the Update Snap Source Mix. This list contains the same mixes that are available to the Active Mix and functions using the same selection techniques.

Note: The Update Snap Source Mix may be the same mix as the Active Mix.

Timecode Entry Field: For an Update Snap edit to be performed, a Data Point (a single timecode address) must be selected from within the Update Snap Source Mix.

The Data Point is defined using a Timecode Entry Field. Update Snap Source Mix has one Timecode Entry Field:

In Time: This is the point from which the Update Snap Source Mix data originates; the timecode address of the Data Point.

The In Time for the Update Snap Source Mix is selected using the same techniques used for selecting the Active Mix Timecode addresses.

Notes: The In Time selects the Data Point (a specific frame) from Update Snap Source Mix. This fixed data is applied throughout the entire length of the Active Mix. Therefore, the Active Mix does not contain any Timecode Entry Fields (In, Out, or Length) when Update Snap is selected as an Edit Type.
Refer to chapter 5.16.4 for additional details regarding timecode entries.

5.16.4 Timecode Controls

5.16.4.1 General Information

All timecode values are expressed as positive numbers and are limited by the number of timecode addresses available. Times cannot be less than 00:00:00:00 or greater than 23:59:59:29 (in 30 non-drop). Only Offset fields can have both positive and negative time values.

Timecode Entry Fields are interactive. Changes made to an entry field may effect other fields' values. For example, changes made to the In Time or Out Time fields in the Active *or* Merge Mix boxes will change the value of the Length time. Changes made in the Length field will change the value of the Out Time of both the Active and Merge Mixes. Changes made to the Offset field may effect In Times, and so on.

It is possible for the In Time and Out Time to be equal in value. When using the click/drag method of timecode entry, it is possible scroll the Out Time downward until it matches the In Time. In that event, the Length time will be 00:00:00:00. Additional reduction of the Out Time value will also reduce the In Time value. Returning the Out Time to its original value will increase the In Time until it matches its original value.

The current system timecode is displayed in the upper right-hand corner of the OFLA screen when the Mix Viewer is enabled.

5.16.4.2 Editing Timecode Entries

Timecode Entry Fields: A variety of Timecode Entry Fields are provided for the definition and control of Edit Regions, Data Regions, Data Points, and Offsets.

Timecode Entry Fields function as follows:

In Time: The starting point for an Edit Region (Active Mix), the starting point for a Data Region (Merge Mix), or the timecode address for a Data Point (Spread Source Mix or Update Snap Source Mix);

Out Time: The ending point for an Edit Region (Active Mix) or a Data Region (Merge Mix);

Length: The duration of the edit; the total time of the Edit Region;

Offset: The difference between In Times of the Active Mix and Spread Source or Merge Mixes.

The In Time and Out Time entry fields are equipped with buttons that allow the capture of the current timecode address while the mix is stopped or running. Clicking on these buttons ("In" or "Out") will enter the current address into the appropriate field.

Timecode addresses may be entered into any field using the following methods:

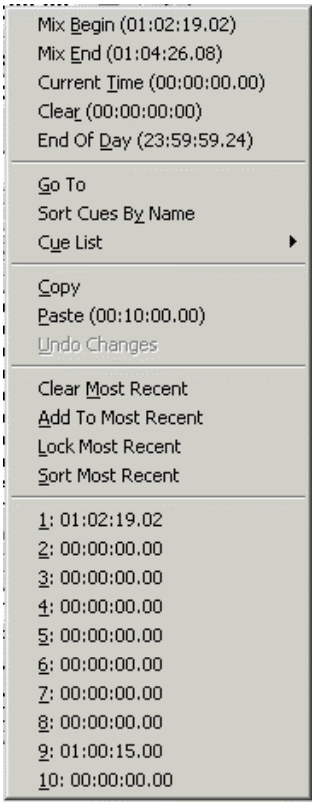
Timecode Capture: Capture the current timecode address by clicking the "In" or "Out" buttons (if provided); at the point the "In" or "Out" button is clicked, the current timecode address is entered into the corresponding field; Timecode addresses can be captured when the mix is running or stopped.

Highlight and Type:
- Highlight all or part of the entry field (hours, minutes, seconds, and frames may be selected individually or as a group);
- Type in the desired timecode value (colons are not necessary when typing);
- Press Enter.

Highlight and Roll:
- Highlight all or part of the entry field;
- Click and drag (roll) the value up or down; an upward trackball motion will increase the timecode value, and a downward motion will decrease the value;
- Stop at the desired value and press Enter.

+/– From Existing Time:
- Press the + or – key from the computer keyboard, and an additional Timecode Entry Field will appear;
- Using one of the highlight methods above, enter a timecode value;
- Press Enter. The math to add (+) or subtract (–) the entered value to/from the existing timecode will be applied. The result of the math will be entered as the new timecode address.

Right-Click Menu Selection:
- Right-click any part of the entry field;
- A menu of timecode address selections from which to choose will appear;
- Use the click/drag method to select a timecode address included in the menu.



The items contained within the Right-Click Timecode Menu are as follows:

Mix/Timecode Items:
- *Mix Begin:* This is the first timecode address within the selected mix (the selected mix is the open mix that has been chosen with the tabs at the bottom of the Object Picker or Mix Viewer); clicking the "In" button while holding the **AUTO MODE** key performs the same function.

- *Mix End:* This is the last timecode address within the selected mix; clicking the "Out" button while holding the Shift key performs the same function.
- *Current Time:* This is the current D950 timecode address.
- *Clear:* This clears the timecode entry for the selected field and resets the value to 00:00:00:00. *The Backspace key will also clear entries, however, it resets* all *timecode fields.*
- *End of Day:* This will enter the last possible timecode address available. For 30 frame non-drop timecode, this value will be 23:59:59:29.

Cue List Items:

- *Go To:* This is a transport control used when the Mix Viewer is enabled.
- *Sort Cues By Name:* This sorts the Cue List items alphabetically by name. Items are usually displayed chronologically by timecode address. This function may be toggled On/Off, with On being indicated by a check next to the menu item.
- *Cue List:* This displays the contents of the Cue List (if one exists) from the currently opened Title. Timecode addresses from the Cue List items may be selected using the click/drag method.

Function Controls:

- *Copy:* This allows the timecode address from the selected field to be copied to the PC clipboard.
- *Paste:* This allows the timecode address from the PC clipboard to be pasted to the selected field.
- Undo Changes: This restores the previous timecode value to the selected field after a change has been made.

Most Recent Address Controls:

- *Clear Most Recent:* This clears all items from the Most Recent timecode address list.
- *Add to Most Recent:* This adds a timecode address to the Most Recent List. Timecode addresses are also added to the Most Recent list whenever a value is entered into any field (unless Lock Most Recent is enabled).
- *Lock Most Recent:* This prevents changes from being made to the Most Recent timecode address list. This menu item may be toggled On/Off. A locked Most Recent list is indicated by a check next to this menu item. When the Most Recent list is locked, the Clear Most Recent menu item is not available.
- *Sort Most Recent:* This sorts the Most Recent list chronologically by timecode address. Most Recent list items are usually displayed in the order in which they were entered. Sort Most Recent will re-arrange the list items with the lowest value first. This menu item may be toggled On/Off. If left On (indicated by a checked menu item), new entries to the Most Recent list will be automatically sorted as they are entered.

Most Recent Address List:

- *List Entries:* This displays the contents of the Most Recent timecode address list (if one exists). Timecode addresses from this list may be selected using the click/drag method. The Most Recent list is available to all Timecode Entry Fields.

5.16.4.3 Timecode Entry Controls

Timecode Entries: Controls are provided that allow timecode fields to be set to zero, reset to the previous values, stored, and restored on a global basis. When these controls are used, the values for all present Timecode Entry Fields are effected. As discussed previously, the fields that are present are determined by the Edit Type selected.

The timecode entry controls (labeled Timecode Entries) are as follows:

Clear: Resets all timecode values to 00:00:00:00; the Backspace key on the computer keyboard performs the same function;

Undo/Redo: Toggles between Undo and Redo modes of operation; Undo resets the timecode fields to the values that were in use before changes were made; Redo restores the most recent changes;

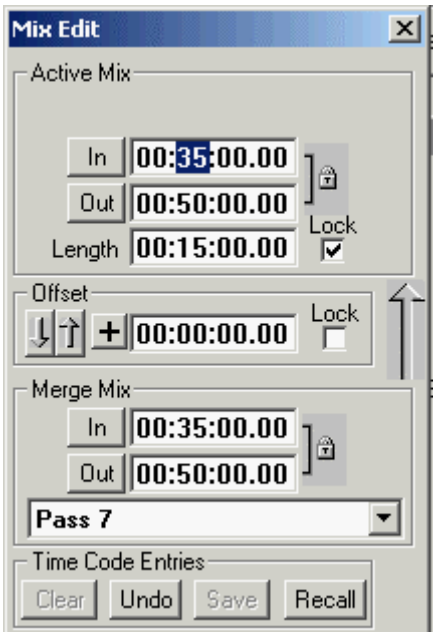
Save: Copies all timecode values to the PC clipboard;

Recall: Copies the saved timecode values from the PC clipboard to the Timecode Entry Fields.

5.16.4.4 Locking Timecode Fields

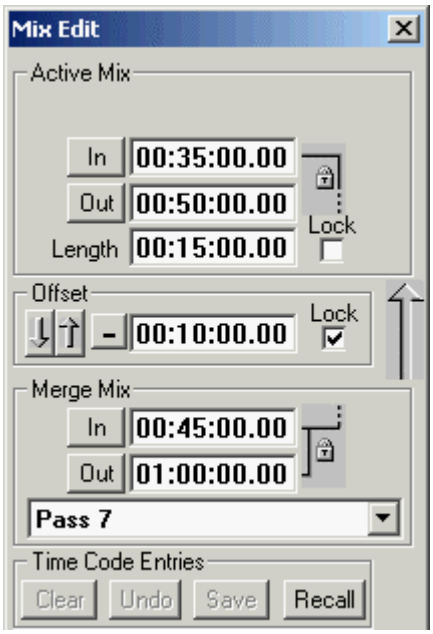
Timecode Field Locks: Timecode values may be locked in the Length (in the Active Mix box) and the Offset fields (used with Spread Source Mix and Merge Mix). This allows the values in the locked field(s), which might otherwise change, to remain constant when the values in other fields are changed. Locking the Length or Offset field is accomplished by checking the Lock box to the right of the field.

Locking the Length Field: Locking the Length field is useful when the duration of an Edit Region needs to maintain its total time, but the In or Out Times must change. Changes made to the In Time will create corresponding changes to the Out Time and vice versa, while the Length field remains the same. Changes made to the Length field will change the Out Time field. *It is important to note that the Length field's value may be edited even when it's locked.*

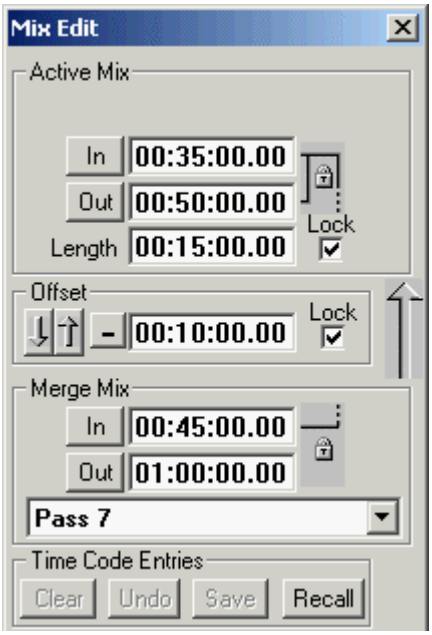


Locking the Offset Field: Locking the Offset field is useful when it is desired to maintain a constant difference In Time (offset) between the In Time of the Active Mix and the In Time of a Spread Source Mix or Merge Mix. This allows fields (other than Offset), including In Time, to be changed while preserving the offset value between the mixes.

When the Offset field is locked by itself, it is possible to change its value by ± one increment only. If the entire entry field is highlighted, its value can be changed + or – by only a single frame only. If only the seconds portion of the entry field is highlighted, the value can only be changed by ± one second only, and so on.



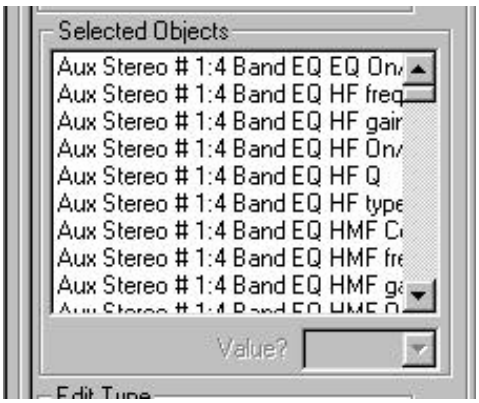
Locking the Length/Offset Fields: Both the Length and Offset fields may be locked simultaneously. This allows the Edit Region *and* Offset to remain constant when other fields are altered. In this case, it is possible to change the Offset field by more than ± one increment.



Notes: To fully understand the relationships between the various entry fields and their locking capabilities, experimentation with a variety of conditions is strongly suggested.
Remember that Timecode Entry Fields are interactive, so changes to fields in one box (such as Merge Mix) may affect changes in other fields (such as Active Mix).

5.16.5 Selected Objects Display

Selected Objects Window: Once channels/objects have been selected and applied using the Object Picker, a list of the chosen objects is displayed in the Selected Objects window. It is the parameter values of these objects that will be affected when the edit is performed.



Note: Selected Objects (objects and parameter values) cannot be further defined using the Selected Objects window. Channels, objects, and parameter values can only be chosen using the Object Picker.

Value Entry Field: A Value Entry field is located in the lower right-hand corner of the Selected Objects combo box. It is used to enter the value to be applied when Set and Trim Edit Types are performed. This value is applied as follows:

Set: Parameters selected for editing will be set to the entered value for the duration of the Edit Region;

Trim: The values of the parameters selected for editing will be offset by the entered value for the duration of the Edit Region.

Note: The Value Entry Field is only available in Set and Trim Edit Types.

The type of value is determined by the type of parameter(s) selected for editing. Some parameters will have specific labels for the Value Entry Field. For example, if Fader values were selected from a group of Input channels, the Value Entry Field will be expressed in dB. Likewise, if a group of EQ frequency parameters were selected, “freq” would represent the Value Entry Field. Other parameters without specific labels will be labeled simply as “Value.”

Note: An arrow will appear at the right of the Value Entry Field when like parameters of certain types are selected for editing. Clicking on this arrow (or anywhere in the Value Entry Field) will cause a scroll box to appear that contains a list of the possible values for that parameter. For example, if Input Gain #1 is selected, the scroll box will contain values ranging from –24 to +24 dB in 1 dB increments. A value can be selected from this list by highlighting the desired item.

Parameters of the same type (such as Direct Out Level) may be chosen from several different channel types, such as Input, Group, Auxiliary Output, and so on. Mono and Stereo channels may be included when objects/parameters are chosen.

Parameters of *similar type* may be selected from *similar types of objects*. For example, ON/OFF parameters may be selected from Filters, EQ, Dynamics, Delay, and other objects that contain ON/OFF switches. However, parameters that are dissimilar may not be chosen for Set and Trim Edit Types.

Note: When incompatible parameters are selected (such as Fader level and Mute), Set and Trim Edit Types are not functional and values cannot be entered. This is indicated by a "Grayed Out" Value Entry Field.

5.16.6 Edit Types

General Information: In order to provide power and versatility, OFLA offers seven distinct Edit Types. Each provides an edit function designed to perform a specific task.

Edit Types can be chosen by clicking the arrow at the end of the display. A list of Edit Types will be displayed. Clicking one of the Edit Types will select it for use. Edit Types can also be selected using click-drag method in the Edit Type window.

Edit Types are as follows:

Set: Parameters selected for editing will be set to the entered value for the duration of the Edit Region;

Trim: Data for the parameters selected for editing will be offset by the entered value for the duration of the Edit Region;

Freeze: Data for the parameters selected for editing will be frozen at the In Time for the duration of the Edit Region;

Clear: Data from the VMC Defaults will be applied to the parameters selected for editing for the duration of the Edit Region;

Spread: Data from a single point in an external mix will be applied to the parameters selected for editing for the duration of the Edit Region;

Merge: Data from a region of an external mix will be applied to the parameters selected for editing for the duration of the Edit Region;

Update Snap: Data from a single point in an external mix will be applied to the parameters selected for editing for the entire mix. This is a function corresponding to "Update Mix Snapshot" in the D950 System Mix Options menu.

At Out Time: Controls are provided that determine what happens to the data (for the parameters selected for editing) that exists after the Edit Region. These radio buttons are contained in the "At Out Time" section of the Edit Type combo box. Only one of these options may be selected.

The functions of these controls are as follows:

Restore Values: The data from the Active Mix that exists after the Edit Region is retained.

Write To End: The data from the last frame of the Edit Region is written to the end of the mix.

Write To Next Change: The data from the last frame of the Edit Region is written for each selected parameter until there is an original value change for that parameter in the Active Mix.

5.16.7 Offline Editing Tutorial

Select Objects:

1. Click the SELECT button on the AutoTouch+ page in the GC.
2. Using the Object Picker, click the channel buttons to choose groups of channels for editing.
3. Using the Object Picker, click the object buttons to choose groups of objects for editing.
4. Click "Apply" to select objects for editing.

OR

1. Click the "Show Channels>>" button.
2. Check items in the Channel Tree to choose individual or groups of channels for editing.
3. Click the "Show Objects>>" button.
4. Check items in the Object Tree to choose individual or groups of objects for editing.
5. Click "Apply" to select objects for editing.

Set an Edit Region:

1. Click the "In" button in the Active Mix box or enter a timecode address manually.
2. Click the "Out" button in the Active Mix box or enter a timecode address manually.
3. Further manipulate the Edit Region as necessary.

Select an Edit Type:

1. Using the Edit Type Menu, select the desired edit function.
2. Enter Set or Trim values if using those functions.
3. Enter the necessary timecode values as required by the selected Edit Type.
4. Click on the desired "At Out Time" option.

Perform Edit:

1. Click "Perform Edit" to complete the process.
2. Repeat as needed.

After Editing: In the mix pass tree, a new Mix Pass will be created after each "Perform Edit" function.

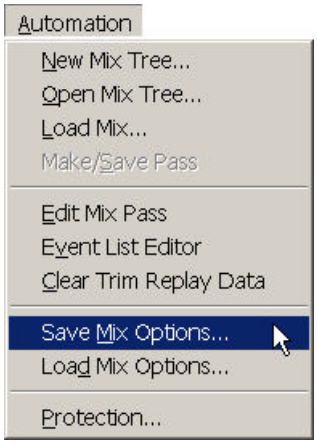
5.17 User Files

To help manage the multiple options available in AutoTouch+, the settings of all Options can be saved in a User File. The current AutoTouch+ Panel settings and presets are also saved within User Files. This allows each engineer to save his or her own preferred settings and recall them at future sessions. This eliminates the process of manually resetting all the AutoTouch+ Options and panel settings, adding to the ease of operation.
Beyond creating custom setups for engineers, User Files can also be used to create automation templates for specific tasks. For example, one User File might be created for music mixing, while another is created for post.

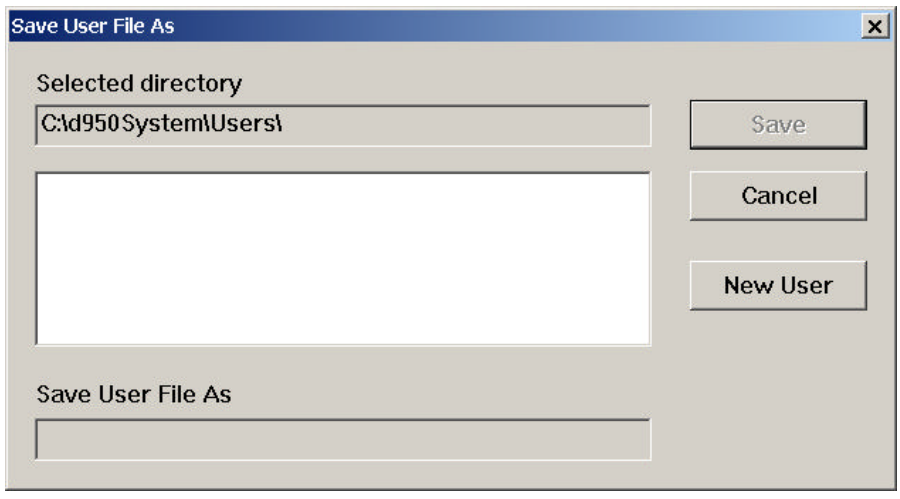
Users: AutoTouch+ supports any number of Users. For each new User a folder is created in the "Users" folder in the D950System directory. The User folder may be named as desired. Any number of User Files may be stored in a User's folder.
Users and User Files are not specific to a particular Mix Tree, Title, or Project. Because of this, any User File in any User's folder is available for use with any Title or any Mix Pass.

Create a New User & User File: Use the following procedure to create a new User and User File:

1. Set all Options as desired.
2. Store all AutoTouch+ Panel Presets, if any (*D950 only*).
3. Select "Save Mix Options…" from the GC Automation menu.



The Save User File As window will open.

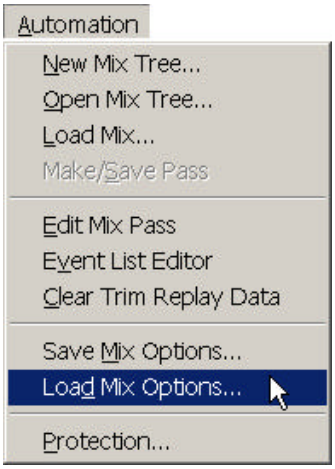


4. Click the New User button. The New User window will open.

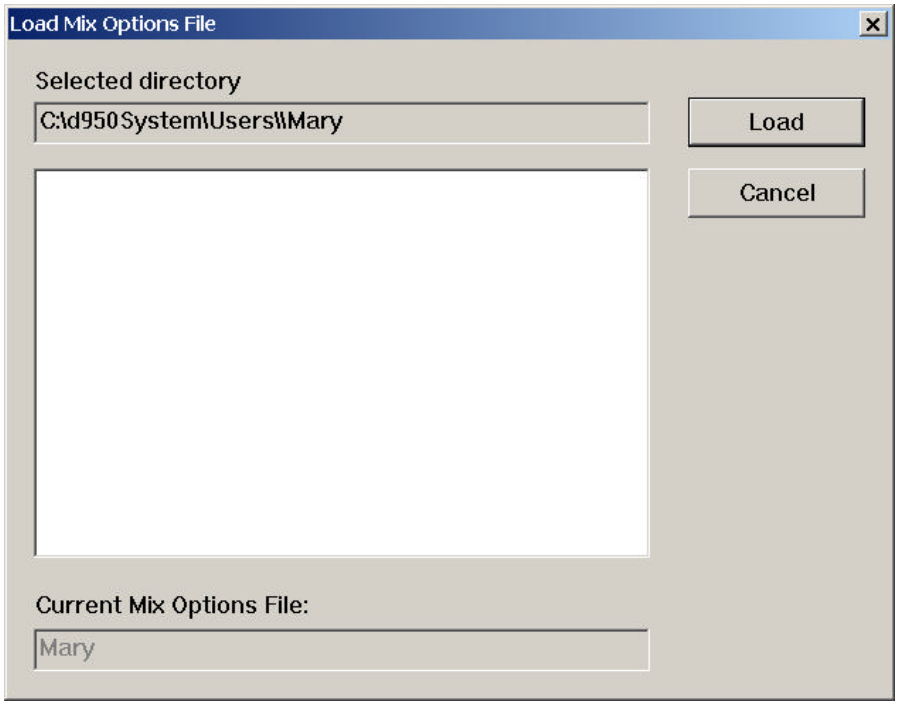
5. Enter a new User name in the field provided and click OK. A new User folder will be created bearing the name entered.
6. Enter the name of the new User File in the Save User File As field and click OK.
7. A new User File bearing the name entered will be created.

Load a User File: Use the following procedure to store a User File:

1. Select "Load Mix Options…" from the GC Automation menu.



The Load User File As window will open.



2. The User folder containing the active User File will be open and the active User File will be indicated in blue letters.
3. If necessary open the appropriate User folder by clicking the + icon for that User or double-click the name. The folder will open and display its contents.
4. Double-click the name of the desired User File or single-click the name to highlight it and then click the Load button.
5. The selected User File will be loaded.

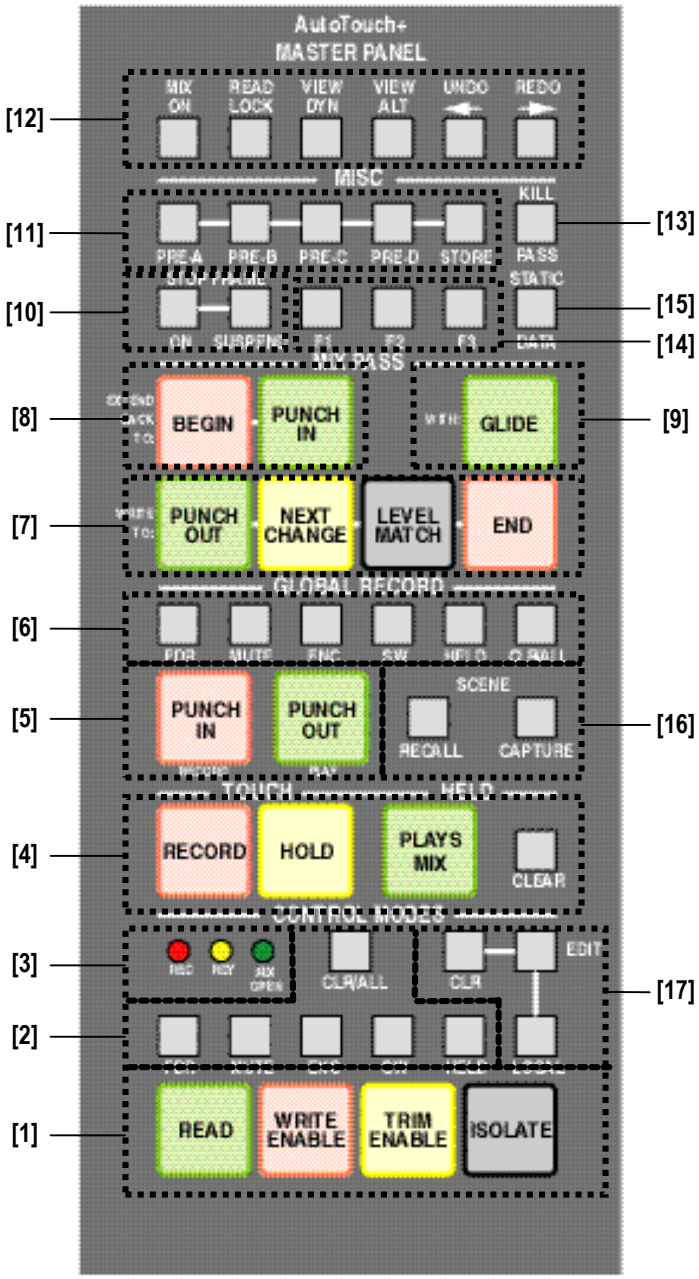
Update a User File: Use the following procedure to update an existing User File:

1. Make changes to Options as desired.
2. Store any changes to AutoTouch+ Panel Presets (if any – *D950 only*).
3. Select "Save Mix Options…" from the GC Automation menu. The Save User File As window will open.
4. Either double-click the active User File (in blue letters) or enter the same User name in the field provided and click OK. A dialog box will indicate a file with the same name already exists and will ask if you wish to replace it.
5. Click YES and the chosen User File will be updated.

Delete a User or User File: Users and User Files may be deleted by removing them from the Users folder in the D950System directory.

5.18 AutoTouch+ Panel

5.18.1 D950



[1] Global **CONTROL MODES** (see also chapter 5.6)

READ – Sets selected objects (depending on the Pre-Selector setting) into Read mode.

WRITE ENABLE – Sets selected objects (depending on the Pre-Selector setting) into Write Enable mode. These parameters are "armed" and can be put into write (record).

TRIM ENABLE – Sets selected objects (depending on the Pre-Selector setting) into Trim Enable mode. These parameters are "armed" and can be put into trim (record).

ISOLATE: Isolates selected objects (depending on the Pre-Selector setting). These objects will not be affected by the automation.

[2] Global Pre-Selectors for Control Modes (see also chapter 5.6.5.1)
Before globally any control mode (Read, Write Enable, Trim Enable and Isolate) can activated, the Pre-Selectors for the desired objects must be activated. These are:
FDR (Fader) – all Faders
MUTE – all Mutes
ENC (Encoders) – all continuous controller type encoders (knobs or rotaries)
SW (Switches) – all switches
HELD (Held controls) – all controls that are currently in a "Held" state. This can be any combination of faders, mutes, encoders and switches. Refer to chapter 5.7.3.
CLR / ALL (Clear/All) – Permits the changing of all Pre-Selectors at once.
If one ore more pre-selectors are active, pressing **CLR / ALL** will clear all pre-selectors.
If none of the pre-selectors are active, pressing **CLR / ALL** will activate all pre-selectors.
If **CLR / ALL** and a global Mode (e.g. **WRITE ENABLE**) is pressed, will select all controls into Write Enable (this is like Pre-Selectors are bypasses).

[3] Automation Indication:
MIX OPEN (green) – Mix is open and automation system is on.
RDY (yellow) – Automation system is ready (e.g. timecode ok).
REC (red) – Automation system is recording.

[4] **TOUCH / HELD** (see also chapters 5.7.1 through 5.7.4)
TOUCH RECORD – If activated, touching a write or trim enabled control element (e.g. fader) will put the touched control into record.
TOUCH HOLD – If activated, touching and releasing a control element (e.g. fader) will simulate a touch and held the object even manually the control has been released.
HELD PLAYS MIX – When this key is engaged (see also chapter 5.7.5.1), all Held controls play back their Read Mix data when not in RECORD, but the controls can be set to different physical positions.
The Read Mix data is heard, even though one or more controls are being held in AUDITION. This allows a held control to be pre-positioned while awaiting a punch-in. The result is true emulation of the resultant mix, while the Mix Pass is being run.
CLEAR HELD – Pressing this key will take all Held controls out of Hold. It will also clear the list of controls in the Held Controls Buffer.

[5] **GLOBAL RECORD** (see also chapter 5.8)
PUNCH IN – Write or Trim Enabled controls are put into record (depending on the **GLOBAL RECORD** Pre-Selector setting).
PUNCH OUT – Control elements which are in record are punched out (depending on the **GLOBAL RECORD** Pre-Selector setting).

[6] Global Pre-Selectors for **GLOBAL RECORD** (see also chapter 5.8.1).
Before globally any control can be punched In or punched out (Record, Play), the Pre-Selectors for the desired objects must be activated. These are:
FDR (Fader) – all Faders
MUTE – all Mutes
ENC (Encoders) – all continuous controller type encoders (knobs or rotaries)
SW (Switches) – all switches
HELD (Held controls) – all controls that are currently in a "Held" state. This can be any combination of faders, mutes, encoders and switches. Refer to chapter 5.7.3.
CLR / ALL (Clear/All) – Permits the changing of all Pre-Selectors at once.
If one ore more pre-selectors are active, pressing **CLR / ALL** will clear all pre-selectors.
If none of the pre-selectors are active, pressing **CLR / ALL** will activate all pre-selectors.
Holding **CLR / ALL** and pressing a Global Record command (Punch-in or Punch-out) will affect all controls (like Pre-Selectors are bypassed).

[7] **MIX PASS WRITE TO:** (also refer to chapter 5.9.1).
WRITE TO: LEVEL MATCH, NEXT CHANGE, END will write the value at the time of punch-out further ahead, rather than immediately stop recording. The neutral default setting is **PUNCH OUT**. This will record no more after punch-out.
WRITE TO: PUNCH OUT – The automation system stays in record until Punch-out is performed.
WRITE TO: NEXT CHANGE – The last recorded data will be applied until the next recorded change in the Read Mix data. At that point the automation will transition from record data to read mix data.
WRITE TO: LEVEL MATCH – The last recorded value will be written until it matches the read mix data.
WRITE TO: END – The Last Recorded Value will be applied until the user-specified End Time. All previously recorded values between the Last Recorded Value (typically Punch-out) and the End Time will be erased.

[8] **MIX PASS EXTEND BACK TO:** (see also chapter 5.9.2).
EXTEND BACK TO: PUNCH IN – Extend the Last Recorded Value back to the punch-in location.
EXTEND BACK TO: BEGIN – Extend the Last Recorded Value back to the specified Begin Time.

[9] Mix Pass **WITH: GLIDE** (see also chapter 5.9.3).
WITH: GLIDE – Activates the Glide function.

[10] **STOP FRAME** (see also chapter 5.15).
STOP FRAME ON – Activates the stop frame automation.
STOP FRAME SUSPEND – Stop Frame recording is suspended. This allows timecode to be moved backward or forward so a timecode location may be found. No control values will be written while Suspend is engaged.

[11] AutoTouch+ Panel Preset Settings (see also chapter 5.14.4).
PRE-A...D – Four locations to store AutoTouch+ Panel settings.
STORE – To store Panel Presets, first set all AutoTouch+ Panel controls to the desired state. Hold the **STORE** key and press the desired Preset key (**PRE-A**, **PRE-B**, **PRE-C**, and **PRE-D**).

[12] **MIX ON** – Turns the Automation system on (see also chapter 5.14.1).
READ LOCK – Forces all controls into Read and blocks out all other controls. Nothing can affect playback of Read Mix (see also chapter 5.15.2).
VIEW DYN – When held, dynamic objects are lit on the surface (see also chapter 5.14.2).
VIEW ALT – *not implemented in V3.2*
UNDO – Sets the Read Mix to the previous pass in the Mix Pass Stack (see also chapter 5.5.1.2).
REDO – Sets the Read Mix to the next pass in the Mix Pass Stack (see also chapter 5.5.1.2).

[13] **KILL PASS** – If engaged when timecode is stopped, the new mix pass will not be written. To prevent a new Mix Pass from being written, press **KILL PASS** before playback of timecode stops (see also chapter 5.5.1.3).

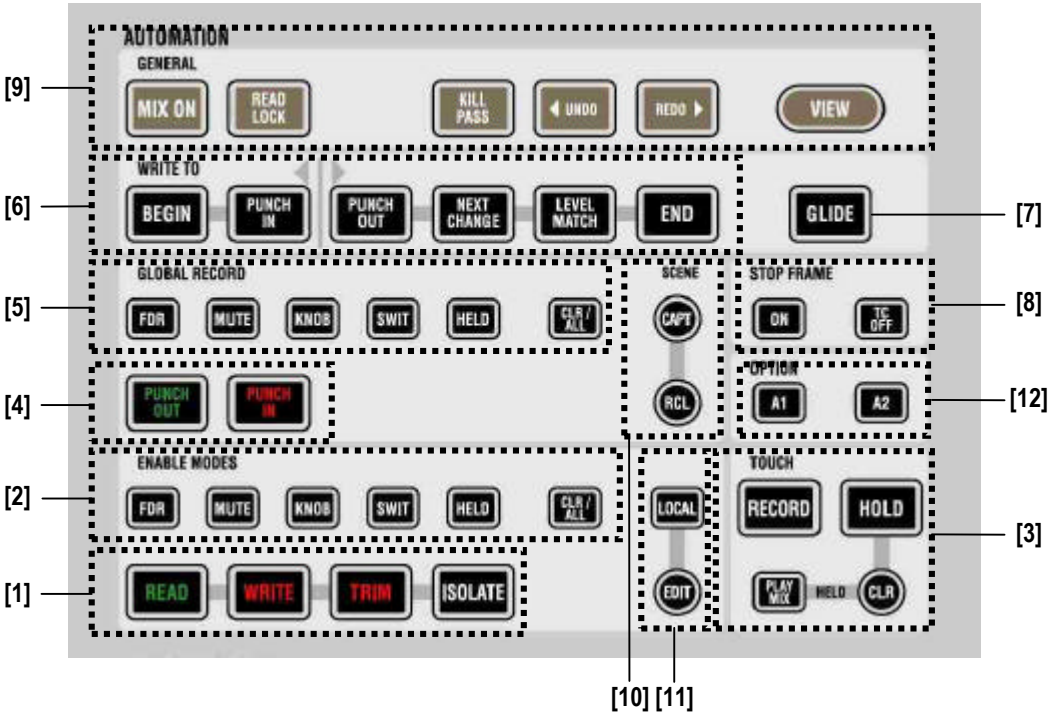
[14] Function keys **F1...F3**: Not implemented.

[15] **STATIC DATA** – When lit, this key indicates that Static Data Buffer is active and there is a difference between the current Static values and those stored within the current Mix Pass (Active Pass).
Pressing the **STATIC DATA** key clears the current Static values and those stored within the current Mix Pass (Active Pass). This function cannot be undone (see also chapter 5.14.6).

[16] **SCENE** (see also chapter 5.14.7).
A Scene is a global snapshot of the automation state of each control within the system. There are two buffers in which Scenes may be stored. Scenes will be stored and can recalled during subsequent sessions.
SCENE CAPTURE – Holding the **STORE** key (see item [11] in the AutoTouch+ Panel description) and pressing **SCENE CAPTURE** will "capture" a Scene in the first buffer. Holding **AUTO MODE** and **STORE** and pressing **SCENE CAPTURE** will "capture" a Scene in the second buffer.
SCENE RECALL – Will illuminate when a Scene has been captured. Pressing **SCENE RECALL** will "recall" the Scene stored in the first buffer. Holding **AUTO MODE** and pressing **SCENE RECALL** will recall the Scene stored in the second buffer.

[17] **LOCAL**, **LOCAL EDIT**, **LOCAL CLEAR** – *Not implemented in V3.2*

5.18.2 Vista



[1] Global **CONTROL MODES** (see also chapter 5.6).
READ – Sets selected objects (depending on the Pre-Selector setting) into Read mode.
WRITE ENABLE – Sets selected objects (depending on the Pre-Selector setting) into Write Enable mode. These parameters are "armed" and can be put into write (record).
TRIM ENABLE – Sets selected objects (depending on the Pre-Selector setting) into Trim Enable mode. These parameters are "armed" and can be put into trim (record).
ISOLATE: Isolates selected objects (depending on the Pre-Selector setting). These objects will not be affected by the automation.

[2] Global Pre-Selectors for Control Modes (see also chapter 5.6.5.1).
Before globally any control mode (Read, Write Enable, Trim Enable and Isolate) can activated, the Pre-Selectors for the desired objects must be activated. These are:
FDR (Fader) – all Faders
MUTE – all Mutes
KNOB (Encoders) – all continuous controller type encoders (knobs or rotaries)
SWIT (Switches) – all switches
HELD (Held controls) – all controls that are currently in a "Held" state. This can be any combination of faders, mutes, encoders and switches. Refer to chapter 5.7.3.
CLR / ALL (Clear/All) – Permits the changing of all Pre-Selectors at once.
If one ore more pre-selectors are active, pressing **CLR / ALL** will clear all pre-selectors.
If none of the pre-selectors are active, pressing **CLR / ALL** will activate all pre-selectors.
If **CLR / ALL** and a global Mode (e.g. **WRITE ENABLE**) is pressed, will select all controls into Write Enable (this is like Pre-Selectors are bypassed).

[3] **TOUCH / HELD** (see also chapters 5.7.1 through 5.7.4).
TOUCH RECORD – If activated, touching a write or trim enabled control element (e.g. fader) will put the touched control into record.
TOUCH HOLD – If activated, touching and releasing a control element (e.g. fader) will simulate a touch and held the object even manually the control has been released.
HELD PLAY MIX – When this key is engaged (see also chapter 5.7.5.1), all Held controls play back their Read Mix data when not in RECORD, but the controls can be set to different physical positions.
The Read Mix data is heard, even though one or more controls are being held in AUDITION. This allows a held control to be pre-positioned while awaiting a punch-in. The result is true emulation of the resultant mix, while the Mix Pass is being run.
CLEAR HELD – Pressing this key will take all Held controls out of Hold. It will also clear the list of controls in the Held Controls Buffer.

[4] **GLOBAL RECORD** (see also chapter 5.8).
PUNCH IN – Write or Trim Enabled controls are put into record (depending on the **GLOBAL RECORD** Pre-Selector setting).
PUNCH OUT – Control elements which are in record are punched out (depending on the **GLOBAL RECORD** Pre-Selector setting).

[5] Global Pre-Selectors for **GLOBAL RECORD** (see also chapter 5.8.1).
Before globally any control can be punched In or punched out (Record, Play), the Pre-Selectors for the desired objects must be activated. These are:
FDR (Fader) – all Faders
MUTE – all Mutes
KNOB (Encoders) – all continuous controller type encoders (knobs or rotaries)
SWIT (Switches) – all switches
HELD (Held controls) – all controls that are currently in a "Held" state. This can be any combination of faders, mutes, encoders and switches. Refer to chapter 5.7.3.
CLR / ALL (Clear/All) – Permits the changing of all Pre-Selectors at once.
If one ore more pre-selectors are active, pressing **CLR / ALL** will clear all pre-selectors.
If none of the pre-selectors are active, pressing **CLR / ALL** will activate all pre-selectors.
Holding **CLR / ALL** and pressing a Global Record command (Punch-in or Punch-out) will affect all controls (like Pre-Selectors are bypassed).

[6] **MIX PASS WRITE TO:** (see also chapter 5.9.1).
WRITE TO: LEVEL MATCH, NEXT CHANGE, END will write the value at the time of punch-out further ahead, rather than immediately stop recording. The neutral default setting is **PUNCH OUT**. This will record no more after punch-out.
WRITE TO: PUNCH OUT – The automation system stays in record until Punch-out is performed.
WRITE TO: NEXT CHANGE – The last recorded data will be applied until the next recorded change in the Read Mix data. At that point the automation will transition from record data to read mix data.
WRITE TO: LEVEL MATCH – The last recorded value will be written until it matches the read mix data.

WRITE TO: END – The Last Recorded Value will be applied until the user-specified End Time. All previously recorded values between the Last Recorded Value (typically Punch-out) and the End Time will be erased.
WRITE TO: PUNCH IN – Extend the Last Recorded Value back to the punch-in location.
WRITE TO: BEGIN – Extend the Last Recorded Value back to the specified Begin Time.

[7] Mix Pass **WITH: GLIDE** (see also chapter 5.9.3).
WITH: GLIDE – Activates the Glide function.

[8] **STOP FRAME** (see also chapter 5.15).
STOP FRAME ON – Activates the stop frame automation.
STOP FRAME TC OFF – Stop Frame recording is suspended. This allows timecode to be moved backward or forward so a timecode location may be found. No control values will be written while **TC OFF** is engaged.

[9] **MIX ON** – Turns the Automation system on (see also chapter 5.14.1).
READ LOCK – Forces all controls into Read and blocks out all other controls. Nothing can affect playback of Read Mix (see also chapter 5.15.2).
KILL PASS – If engaged when timecode is stopped, the new mix pass will not be written. To prevent a new Mix Pass from being written, press **KILL PASS** before playback of timecode stops. (see also chapter 5.5.1.3).
UNDO – Sets the Read Mix to the previous pass in the Mix Pass Stack (see also chapter 5.5.1.2).
REDO – Sets the Read Mix to the next pass in the Mix Pass Stack (see also chapter 5.5.1.2).
VIEW – When held, dynamic objects are lit on the surface (see also chapter 5.14.2).

[10] **SCENE** (see also chapter 5.14.7).
A Scene is a global snapshot of the automation state of each control within the system. There are two buffers in which Scenes may be stored. Scenes will be stored and can recalled during subsequent sessions.
SCENE CAPTURE – Holding the **STORE** key (see item [11] in the Auto-Touch+ Panel description) and pressing **SCENE CAPTURE** will "capture" a Scene in the first buffer. Holding **AUTO MODE** and **STORE** and pressing **SCENE CAPTURE** will "capture" a Scene in the second buffer.
SCENE RECALL – Will illuminate when a Scene has been captured. Pressing **SCENE RECALL** will "recall" the Scene stored in the first buffer. Holding **AUTO MODE** modifier key and pressing **SCENE RECALL** will recall the Scene stored in the second buffer.

[11] **LOCAL**, **LOCAL EDIT**, **LOCAL CLEAR** – *Not implemented in V3.2*

[12] **OPTION A1 / A2** – *Not implemented in V3.2*

5.19 Desk Automation Controls

This chapter is an overview of the channel strip and central automation controls other than those found in the AutoTouch+ Panel. D950 Classic and M2 work surfaces are covered, as well as Vista.

5.19.1 D950 Desk Automation Controls

The D950 Classic and M2 work surface automation controls are virtually identical in function and location. However, there are some minor changes in labels for a few controls. These will be noted as necessary.

5.19.1.1 D950 Channel Strip Controls

Each channel strip has a set of automation controls. These controls are sometimes referred to as "Local Controls." Used in conjunction with the channel's audio controls, automation operations may be carried out with ease. All automation functions are accessed via channel strip keys. Descriptions of the channel strip automation controls follow.

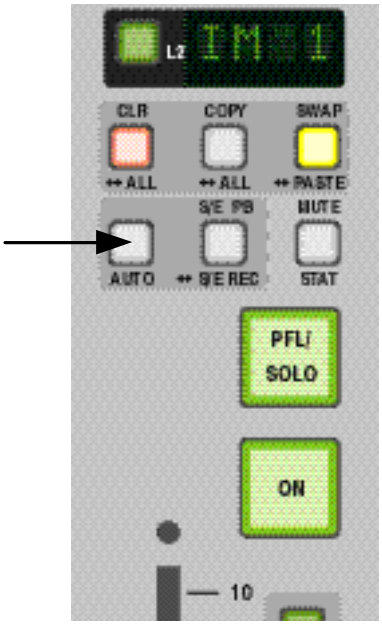
The channel strip automation controls can be broken down into four categories:

- General Controls and Indicators
- Fader Controls and Indicators
- Mute Controls and Indicators
- Switches and Encoders Controls and Indicators

5.19.1.1.1 D950 Auto Mode Key

The primary purpose of the channel strip **AUTO / MODE** key is to cycle through the available AutoTouch+ Control Modes **<Option>**. The modes selected will be for a set of channel controls defined by the user. Also refer to chapter 5.7.6.

The AUTO MODE key lights if the fader is touched or held. Pressing the key toggles the status of the Pre-selected channel sections in the order determined by the AUTO MODE key option setting. When held down, this key acts as a modifier key with the following results while held:
- If a fader or rotary is touched, the effect of Touch Record is inverted
- If a fader or encoder is released (untouched), the effect of Touch Record is inverted (optionally, Touch Hold can be inverted).
- If a switch is pressed, the function will be punched into Record (if enabled) and *not* toggled (the key acts as a Record Punch key for that function).
- If the S/E PB key is pressed, all objects will go to Playback.



Mode Selection: Consecutive presses will select the next available Control Mode for that channel **<Option>**. Which Control Modes are included and the order in which they appear in the cycle is determined by Options selected in the Control Modes Options page (also refer to chapter 5.21.2).

Affected Controls: The channel controls affected by the chosen Control Mode are determined by the settings on the Control Modes Options page. The following Channel Auto-Mode Affects… options may be selected:

- <Pre-Selector Objects>: The controls selected in the global Control Mode Pre-Selectors.
- <Fader>: Fader only
- <Mute>: Mute only
- <Fader and Mute>: Fader and Mute only

The current Control Mode for the fader is indicated to its right.

Other Functions: When held down, the **AUTO / MODE** key serves two additional purposes:

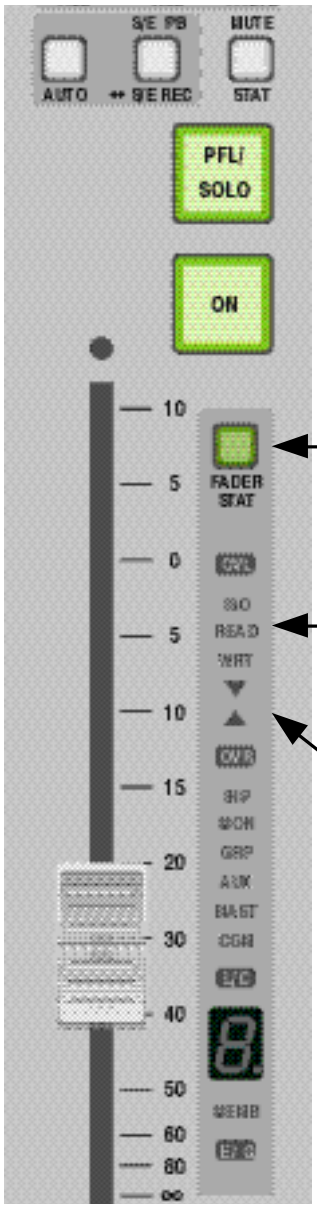
- Punch-In/Out Key for selected encoders and switches: When holding down the **AUTO / MODE** key and actuating an encoder or switch, individual controls within the channel strip may be punched in or out of RECORD. This assumes the controls are properly enabled.
- Modifier Key: When held down, the key:
  - Prevents switches from toggling states
  - Inverts the Touch and possibly the Un-touch functions **<Option>** for Touch Record and Touch Hold.

<Option> Options for the **AUTO / MODE** key are set in the Channel Auto-Mode Button section of the Control Modes Option page (also refer to chapter 5.21.2):

- <Order>: There are four positions that can be accessed via consecutive presses of the **AUTO / MODE** key.
  - The assignment for each position is made using the four pull-down menus in the <Order> section.
  - The top menu represents the first position.
  - Any Control Mode can be selected at any position or none can be selected.
  - If <None> is selected, that position is not included when cycling the **AUTO / MODE** key.
- <Affects…>: The selection of controls that enter the selected Control Mode is determined in the <Affects…> section. Radio buttons allow the selection of one of the following options:
  - <Pre-Selector Objects>: Local controls that correspond to the active Control Mode Pre-Selectors on the AutoTouch+ Panel.
  - <Fader>: Fader only
  - <Mute>: Mute only
  - <Fader & Mute>: Fader and Mute only
- Either the <Touch Hold> or <Touch Record> function may be selected for Modified Un-touch Inversion when the **AUTO / MODE** key is held. This selection is made by clicking the desired radio button in the <Modified Un-touch Inverts> section of the Misc Options page (refer to chapter 5.21.8).

5.19.1.1.2 D950 Channel Strip Fader Controls

Channel Fader: The touch-sensitive channel fader is the primary channel output level control.



Lights constantly when the fader is enabled in either WRITE or TRIM. Flashes when the Fader is in Record. Pressing the key punches the fader in and out of Record, if enabled.

Displays the fader automation enable status.
ISO = Isolate
READ = Read
WRT = Absolute Enable
WRT + READ = Trim Enable

Always shows the difference between the fader value and the effective read value. An exception is to show the offset from the trim null point when in TRIM mode (this is always the absolute position of the fader from 0 dB).

Control Modes: The fader Control Mode may be selected locally by pressing the **AUTO / MODE** key. Repeated presses will cycle the available control modes **<Option>**.

FDR STAT Key: The **FDR STAT** key is the primary control for automating the channel fader.

Single Press Functions:
- A single press punches the channel fader in or out of RECORD if it is enabled.

Status Indications: The **FDR STAT** key provides information on the automation status of the channel fader:
- Steady Illumination: The fader is in WRITE or TRIM enable.
- Flashing: The fader is in RECORD.

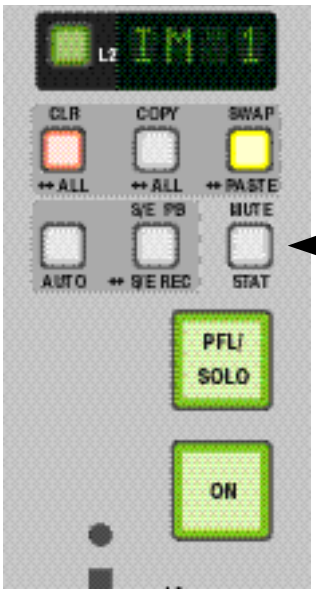
The fader Control Mode is indicated to the right of the fader:
- ISO: Isolate
- READ: Read
- WRT: Write Enable
- WRT + READ: Trim Enable

Null Indicators: Up and down arrow lights indicate the difference between the current fader value and the Active Pass Read Mix data. When the values match both lights are extinguished. An exception is to show the offset from the Trim Null point when in TRIM (this is always the absolute position of the fader from 0 dB). The fader null indicators are located next to the fader.

Fader Value: The current value of the fader is shown in the unused Layer display.

5.19.1.1.3 D950 Channel Strip Mute Controls

ON Key: The channel mute key (**ON** key) is the primary on/off control for the channel's audio output.



Lights constantly when the Mute is enabled in either WRITE or TRIM. Flashes when the Mute is in Record. Pressing the key punches the Mute in and out of Record, if enabled.

Control Modes: The mute Control Mode may be selected locally by pressing the **AUTO / MODE** key. Repeated pressed will cycle the available control modes **<Option>**.

MUTE STAT Key: The **MUTE STAT** key is the primary control for automating the channel mute.

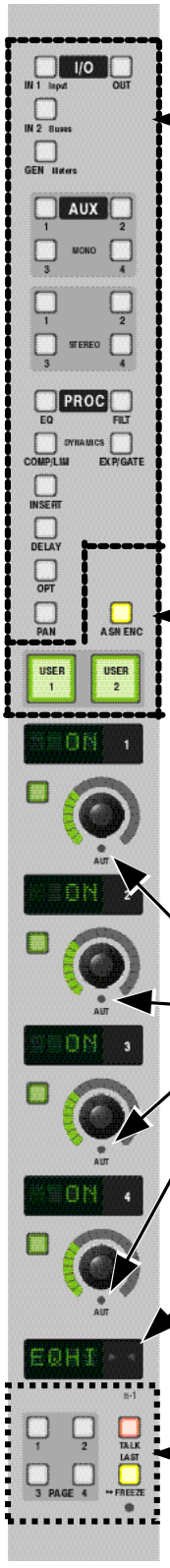
Single Press Functions:
- A single press punches the channel mute in or out of RECORD if it is enabled.

Status Indication: The **MUTE STAT** key provides information on the automation status of the channel mute:
- Steady Illumination: The mute is in WRITE or TRIM enable.
- Flashing: The mute is in RECORD.

5.19.1.1.4 D950 Channel Strip Switch and Encoder Controls

LACP Controls: The four touch-sensitive rotary encoders and their associated switches provide primary parameter control for channel audio processes. The Input Selector, processor block in/out keys, and the first four mono and stereo AUX in/out keys are also automatable.
The **ASN SEL** (**ASN ENC** on D950 M2), **USER1**, **USER2**, **PAGE**, **TALK**, **L1**, **L2**, and **LAST / FREEZE** keys are not automatable.

D950 *M2:*



These keys are fully automated. When enabled, and Touch Record is active, pressing a key toggles the status of the function *and* punches it into Record. If Touch Record is not active, pressing this key just toggles its status.
If the AUTO / MODE key is held, pressing a key punches that function in (if enabled) or out (if recording) of Automation Record.
Press and Hold: If a switch is held, its release will cause a punch-out, if it was in Record prior to its release.

Keys not affected by the Automation System.

Encoder Automation Mode LEDs:
Off = Read or Isolate
Continuous, red = Absolute Enable
Flashing, red = Absolute Record
Continuous, green = Trim Enable
Flashing, green = Trim Record

Null LEDs - for the last knob touched:
Always show the difference between the fader value and the effective read value.
An exception is to show the offset from the Trim Null point when in Trim mode (this is always the absolute position of the fader from 0 dB).

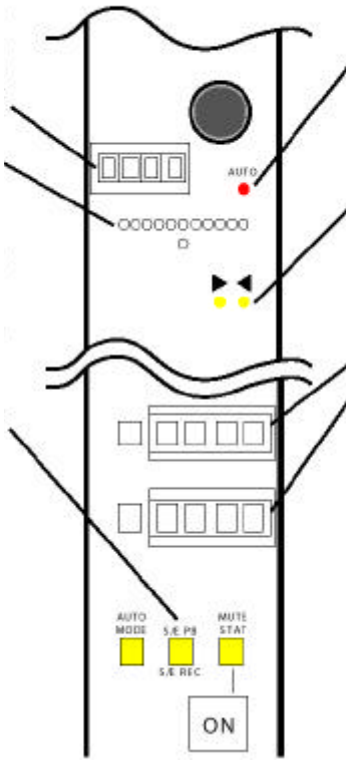
Keys not affected by the Automation System.

D950 *Classic:*

When displaying values, this shows the value according to the mode charts; when the control is in TRIM it shows the offset and direction from the trim null point.

Always shows the current knob position.

Lights when any S/E is in TRIM or WRITE ENABLE. Flashes when any S/E is in RECORD.
• Pressing punches all S/E into Playback.
• Pressing with AUTO MODE held down punches all objects into Playback.
• Pressing twice puts all enabled S/Es into RECORD *or* only enabled S/Es that are touched or held (basing on GC option).



Off = READ or ISOLATE
Cont. red = Absolute ENABLE
Flashing red = Absolute RECORD
Cont. green = TRIM ENABLE
Flashing green = TRIM RECORD

For the last knob touched... Always shows the difference between the fader value and the effective READ value. An exception is to show the offset from the TRIM null point when in TRIM mode (this is always the absolute position of the fader from 0 dB.

When the Fader is in TRIM this shows the offset and direction from the TRIM null point. When a RECORD waiting event is active (punch-out in AT), shows the difference and direction to the match point (the effective READ data).

Control Modes: The switches and encoders Control Mode may be selected locally by pressing the **AUTO MODE** key. Repeated pressed will cycle the available controls modes **<Option>**. See paragraph "Auto Mode" above.

S/E PB, S/E REC Key: The Switches/Encoders Playback (**S/E PB**), Switches/Encoders Record (**S/E REC**) key is the primary control for automating channel switches and encoders.

Single Press Functions:
- A single press will punch-out any switch and/or encoder that is in RECORD.
- A single press while holding down the **AUTO MODE** key will punch-out all objects that are in RECORD.

Double-Press Functions:
- Double-pressing puts any enabled switch and/or encoder that is Touched or Held into RECORD.

Status Indication: **S/E PB, S/E REC** key provides information about the automation status of the channel's switches and encoders:
- Continuously on: One or more switch and/or encoder is in WRITE or TRIM enable.
- Flashing: One or more switch and/or encoder is in RECORD.

Each encoder has its own Control Mode indicator LED:
- Off: READ or ISOLATE
- Continuously, red: WRITE ENABLE
- Flashing, red: WRITE RECORD
- Continuously, green: TRIM ENABLE
- Flashing, green: TRIM RECORD

Encoder Null Indicators: For the last encoder touched, left and right arrow lights indicate the difference between the current encoder value and the Active Pass Read Mix data. When the values match both lights are extinguished. An exception is to show the offset from the Trim Null point when in TRIM (this is always the absolute position of the encoder from 0 dB). The encoder null indicators are located just below the encoders.

Encoder Value: Each encoder has its own four-character LED display that indicates the current value of that encoder.

5.19.1.2 D950 CAS Controls

The D950 Central Assign Section (CAS) has all the automation functions found on the channel strip, plus some added abilities. Some of the AutoTouch+ controls (fader and mute) are exactly as they are on the channel strip, while other sections are expanded in comparison. The result is similar operation with enhanced capability.

The majority of AutoTouch+ controls are found just above the fader in the Automation control section of the CAS. The fader and mute controls are located with the fader. Control Mode indicators are provided for each encoder. Null and value indicators are provided at the top of the CAS.

Organization of Controls: AutoTouch+ controls are organized in groups, according to function, in the Automation section of the CAS.

There are four groups of CAS automation controls:
- Fader
- Mute
- Switches and Encoders
- Function Keys

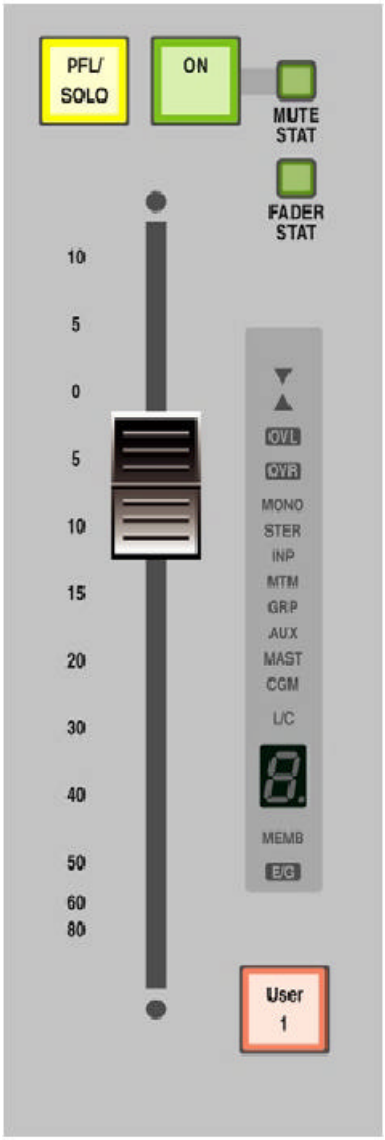
Explanations of each group follow.

Note: The CAS automation mode will follow those made at the channel strip or globally.

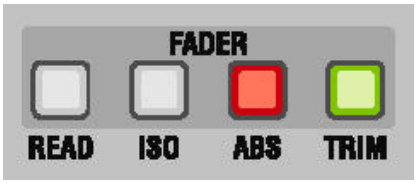
5.19.1.2.1 CAS Fader Controls

CAS fader automation controls include the Fader Control Mode keys, the **FADER STAT** key, and the touch-sensitive fader itself.

CAS Fader: The touch-sensitive CAS fader is the primary output level control for the channel currently assigned to the CAS.



Fader Control Modes: A set of Control Mode activators are provided exclusively for the CAS fader. The CAS fader Control Mode may be selected by pressing the **FADER** Control Mode key for the desired mode. Modes may also be selected globally or locally (via the channel strip for assigned channel).



CAS **FADER** Control Mode Activators:
- **READ**: READ
- **ISO**: ISOLATE
- **ABS**: WRITE ENABLE (**ABS** is a legacy of AutoTouch 2.5)
- **TRIM**: TRIM ENABLE

The Control Mode activator for the current fader mode will illuminate.

FADER STAT Key: The **FADER STAT** key is the primary control for automating the CAS fader.

Single Press Functions:
- A single press punches the CAS fader in or out of RECORD if it is enabled.

Status Indications: **FADER STAT** key provides information about the automation status of the CAS fader:
- Continuously lit: The fader is in WRITE or TRIM enable.
- Flashing: The fader is in RECORD.

The **FADER** Control Mode is indicated by the illuminated Control Mode activator:
- **READ**: READ
- **ISO**: ISOLATE
- **ABS**: WRITE ENABLE
- **TRIM**: TRIM ENABLE

Fader Null Indicators: Up and down arrow lights indicate the difference between the current fader value and the Active Pass Read Mix data. When the values match both lights are extinguished. An exception is to show the offset from the Trim Null point when in TRIM (this is always the absolute position of the fader from 0 dB). The fader null indicators are located next to the fader.

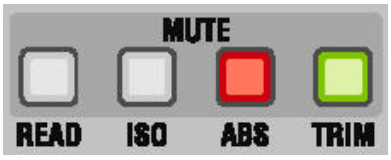
Fader Value: The current value of the last CAS control to be used is shown in the Function Value display at the top of the CAS.

5.19.1.2.2 CAS Mute Controls

CAS mute automation controls include the Mute Control Mode keys, the **MUTE STAT** key, and the **ON** key.

CAS ON Key: The CAS mute key (**ON** key) is the primary on/off control for the channel currently assigned to the CAS.

Mute Control Modes: A set of Control Mode activators are provided exclusively for the CAS Mute. The CAS mute Control Mode may be selected by pressing the Mute Control Mode key for the desired mode. Modes may also be selected globally or locally (via the channel strip for assigned channel).



CAS Mute Control Mode Activators:
- **READ**: READ
- **ISO**: ISOLATE
- **ABS**: WRITE ENABLE
- **TRIM**: TRIM ENABLE

The Control Mode activator for the current mute mode will illuminate.

MUTE STAT Key: The **MUTE STAT** key is the primary control for automating the CAS mute.

Single Press Functions:
- A single press punches the CAS mute in or out of RECORD if it is enabled.

Status Indications: The **MUTE STAT** key provides information about the automation status of the CAS mute:
- Continuously lit: The mute is in WRITE or TRIM enable.
- Flashing: The mute is in RECORD.

The mute Control Mode is indicated by the illuminated Control Mode activator:
- **READ**: READ
- **ISO**: ISOLATE
- **ABS**: WRITE ENABLE
- **TRIM**: TRIM ENABLE

Mute Value: The current value of the last CAS control to be used is shown in the Function Value display at the top of the CAS.

5.19.1.2.3 CAS Switches and Encoders Controls

CAS switches and encoders automation controls include the Switches and Encoders Control Mode keys, the Switch and Encoder selection controls, and all CAS touch-sensitive encoders and audio related switches.

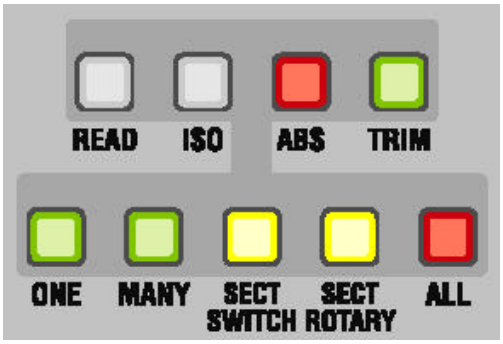
The CAS provides the most precise means of switch and encoder automation control and status indication. It allows the user to select the exact set of controls to be automated.

CAS Switches and Encoders: The touch-sensitive rotary encoders and their associated switches provide primary parameter control for audio processes for the channel currently assigned to the CAS. Other CAS switches control the in/out function of processing blocks.

Note: In the graphic above only the Dynamics section of the CAS is shown.

Switches and encoders may be controlled separately in the CAS. See CAS Controls below.

Switch & Encoder Control Modes: A set of Control Mode activators are provided exclusively for the CAS switches and encoders. The CAS switches and encoders Control Mode may be selected by pressing the switches and encoders Control Mode key for the desired mode. Modes may also be selected globally or locally (via the channel strip for assigned channel).



CAS switches and encoders Control Mode Activators:

- **READ**: READ
- **ISO**: ISOLATE
- **ABS**: WRITE ENABLE (**ABS** is a legacy of AutoTouch 2.5)
- **TRIM**: TRIM ENABLE

Switch & Encoder Controls: The CAS has five keys that support switch and encoder automation. These keys allow a precise set of controls to be easily chosen for automation. They also allow separate control over switches and encoders.

- **ONE:** Allows the creation of a temporary list of controls to be automated. Holding down the **ONE** key and touching the desired controls will select those controls for automation. Touching an encoder will select both the encoder and its associated switches. The list is deleted upon the completion of the automation operation.
- **MANY:** Allows the creation of a list of controls to be automated that may be kept for future use. Holding down the **MANY** key and touching the desired controls will select those controls for automation. Touching the encoder will select both the encoder and associated switches. The **MANY** key will illuminate indicating that a list of controls has been created. Pressing the **MANY** key recalls the list of controls for further automation operations.
- **SECT SWITCH** (section switches): Allows the creation of a temporary list of switches to be automated. Pressing the **SECT SWITCH** key and touching any switch will select (or deselect) the switches for the entire section from the selection list. The list is deleted upon the completion of the automation operation.
- **SECT ROTARY** (section rotaries): Same as the **SECT SWITCH** mode, except for encoders for an entire section.
- **ALL:** Selects all controls, and then individual control status (in the list or not) can be toggled on or off as needed.

Note: When an entire section or the **ALL** function is used, this refers to the visible controls on the CAS. So, for example, if the **ALL** key is used, only the control from the Compressor *or* the Limiter will be included, as only one of those sections can be visible on the CAS at a time. Of course the alternate controls can be added by touching them and adding them to the list. This affects AUX Sends and any other “hidden” controls as well.

Encoder Null Indicators: For the last encoder touched, left and right arrow lights indicate the difference between the current encoder value and the Active Pass Read Mix data. When the values match both lights are extinguished. An exception is to show the offset from the Trim Null point when in TRIM (this is always the absolute position of the encoder from 0 dB). The encoder null indicators are located at the top of the CAS, just below the Function Value display.

Encoder Value: The current value of the last CAS control used is shown in the Function Value display at the top of the CAS.

5.19.2 Vista Desk Automation Controls

In automation mode, the channel strips hold additional indications for detailed display of the current status.
This chapter shows all possible indications of automation status and explains their meaning.

First, there are some record indicators integrated within the recording keys:

[A] Recording overview for switches. If half-lit: One or more switches are armed (i.e. in TRIM or WRITE enable mode). If fully lit: One or more switches are recording.
Pressing this key will either punch-in the held objects, or punch-out the switches currently recording.

[B] Recording overview for rotary encoders. If half-lit: One or more rotaries are armed (i.e. in TRIM or WRITE enable mode). If fully lit: One or more rotaries are recording
Pressing this key will either punch-in the held objects, or punch-out the rotaries currently recording.

[C] Current and replay value of the channel mute. If the current value is different from the one in the last mix pass, this LED indicates the value within the last mix pass, while the main red LED within the key indicates the current value.
This LED is also used for mute indication, if "solo in place" is active.

[D] Recording of the channel mute. If half-lit: Channel mute is armed (i.e. in TRIM or WRITE enable mode). If fully lit: Channel mute is recording.
Pressing this key will either punch-in the current MUTE status, or punch it out of recording.

[E] Recording of fader. If half-lit: Fader is armed (i.e. in TRIM or WRITE enable mode). If fully lit: Fader is recording.
Pressing this key will either punch-in the current fader status, or punch it out of recording.

The meaning of the different Vistonics indicators is as follows:

Displayed Value

The *displayed value* (e.g. "–7.6 dB") is always the current value, except when the control is in TRIM mode. Then it shows the offset from TRIM null point.
It is underlined whenever the control is touched ("hold" in automation).

Rotary Value

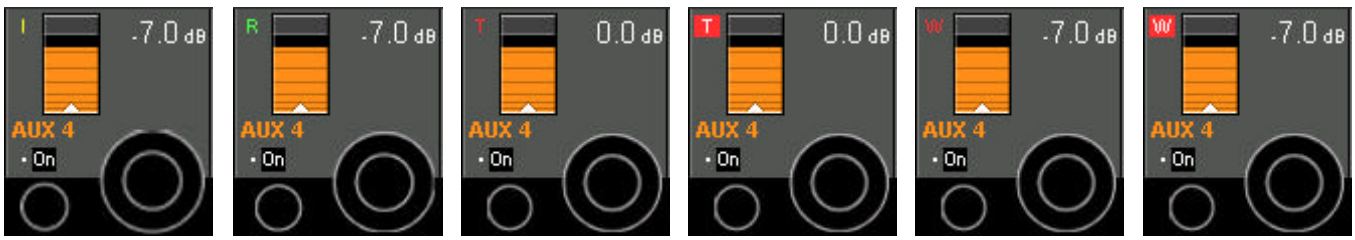
Current and replay value of the rotary control. If the current value is different from the one within the last mix pass, a pink colored element indicates the value of the last mix pass, while the main display is indicating the current value.

Fader Value

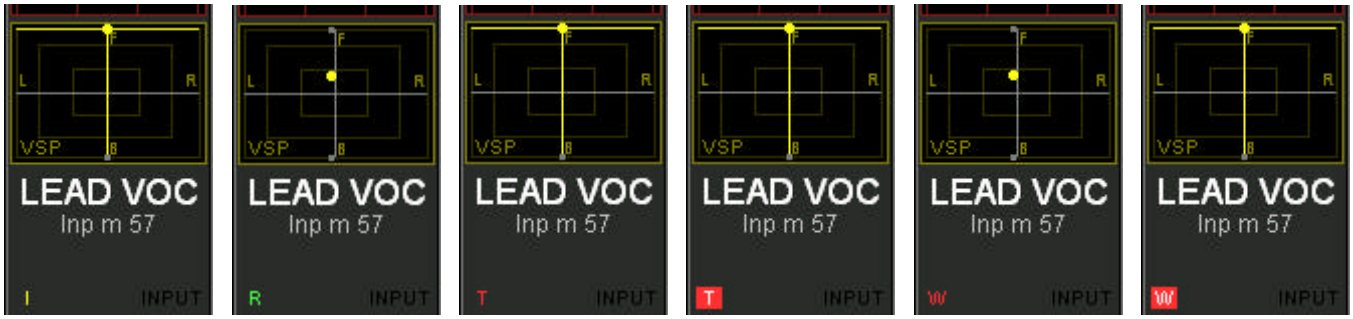
Current and replay value of the fader. If the current value is different from the one in the last mix pass, a pink colored element indicates the value within the last mix pass, while the main display is indicating the current value.

Recording

Recording and recording mode indicator: This always refers to the associated control.
Characters without a frame indicate the status of the rotary control (I = Isolate, R = Read, T = Trim, W = Write).
A red frame behind the "W" or "T" indicates that the rotary control is currently recording.



Recording *Recording mode of the fader (in the Vistonics generic display area):*
Characters without a frame indicate the status of the fader (I = Isolate, R = Read, T = Trim, W = Write).
A red frame behind the "W" or "T" indicates that the fader is currently recording.



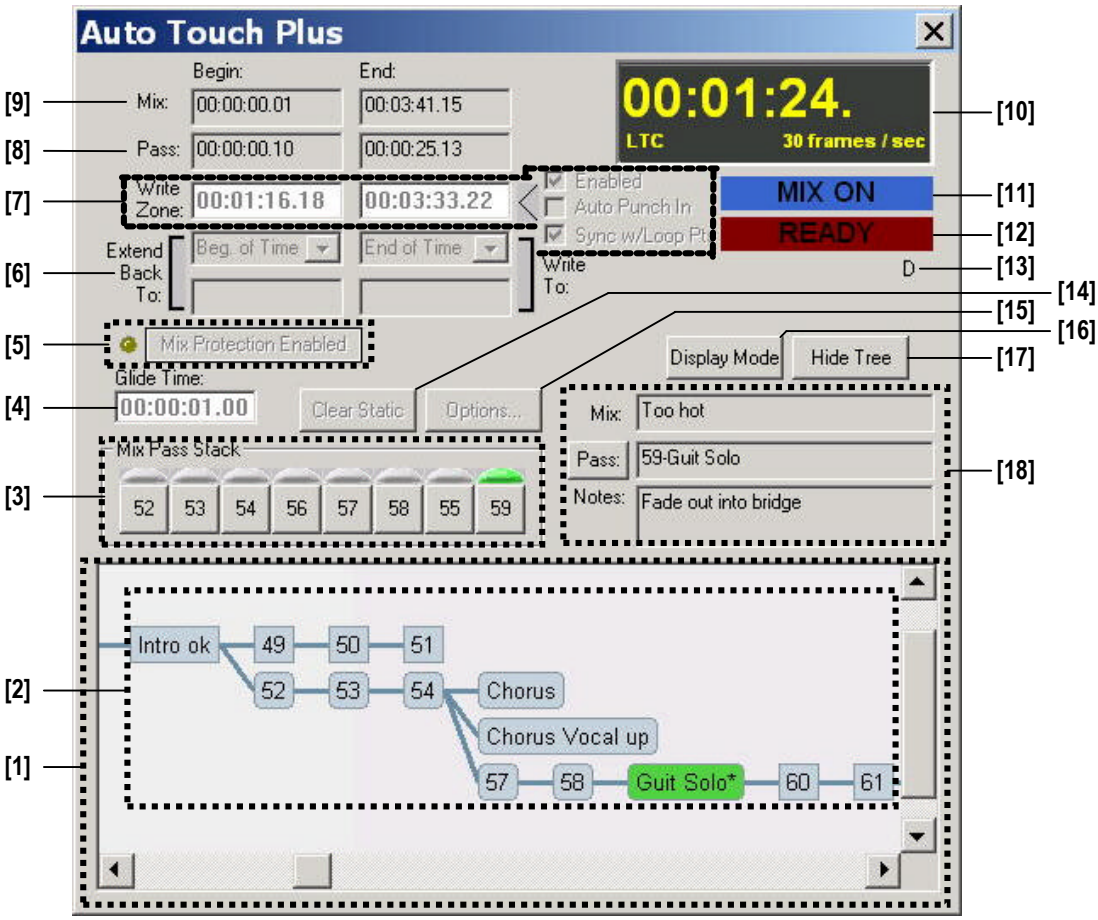
n–1 x *n–1 x* indicates that the channel is the owner of an n–1 bus, together with its bus number - e.g. "m 1" for "mono 1".

.

Rotary Dynamic/Static *Dynamic/static view of the rotary control*:
When pressing the **VIEW** key in the AutoTouch+ panel, this display changes to DYN, if this control contains dynamically automated elements

Fader Dynamic/Static *Dynamic/static view of the fader:* When pressing the **VIEW** key in the AutoTouch+ panel, this display appears and indicates "FADER DYN", if the fader is dynamically automated.

5.20 Auto Touch Plus Window



[1] Mix Tree window. Can be hidden by clicking on the “Hide Tree” button. If hidden, this button turns into “Show Tree”, the “Display Mode” button becomes inactive (refer to chapter 5.4.1 for details).

[2] Several Mix Passes are shown in the Mix Tree window. With the “Display Mode” button the display mode of the mix passes can be changed, and it can be decided if only the Mix Pass number, only the Mix Pass name, or both shall be displayed (refer to chapter 5.4.1.3 for details).

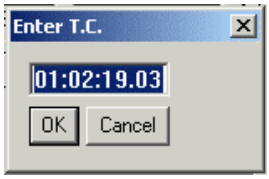
[3] Mix Pass Stack; holds up to eight Mix Passes for immediate use (e.g. direct comparison of Mix Passes (refer to chapter 5.5.1 for details).

[4] Glide Time; defines the length of the glide. To enter a value just click in the box and type the desired glide time, or use the right click menu allowing e.g. to access the Cue list with timecode cue points (also refer to chapter 5.9.3).

[5] Mix Protection allows individual controls or a group of controls to be protected or locked-out from changes (also refer to chapter 5.13). If Mix Protection is on, the yellow LED symbol is on.

[6] Extend Back to / Write to.
In the entry box “Extend Back To:” a Fixed value, the Beginning of Time, or the Beginning of the Mix can be selected. In the entry box “Write To:” a Fixed value, the End of Time or the End of Mix can be defined.

If “Fixed” has been selected, an timecode entry box will be opened. Use the same method to enter a timecode as explained under point [4].



“Extend Back To:” can be activated on the AutoTouch+ panel. Either Extend back to **BEGIN** or **PUNCH IN** can be selected.
Refer to chapter 5.9.2 for more information on “Extend Back To:”.
Selected “Extend Back To:” **BEGIN** (on the AutoTouch+ panel) will be displayed in the GC Auto Touch Plus panel in *red*, to indicate that this function has been activated.

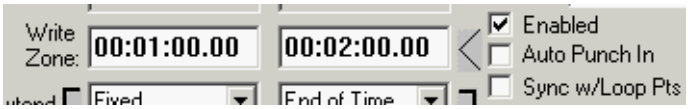
This means that automated parameters will be written back to the selected timecode value (fixed, beginning of time, or beginning of mix) in the next mix pass.
A *green* indication refers to activated “Extend Back To: PUNCH IN”.
The entered timecode value (fixed, beginning of time or beginning of mix) is not activated.

That means that automated parameters will be written back to PUNCH IN time in the next mix pass.

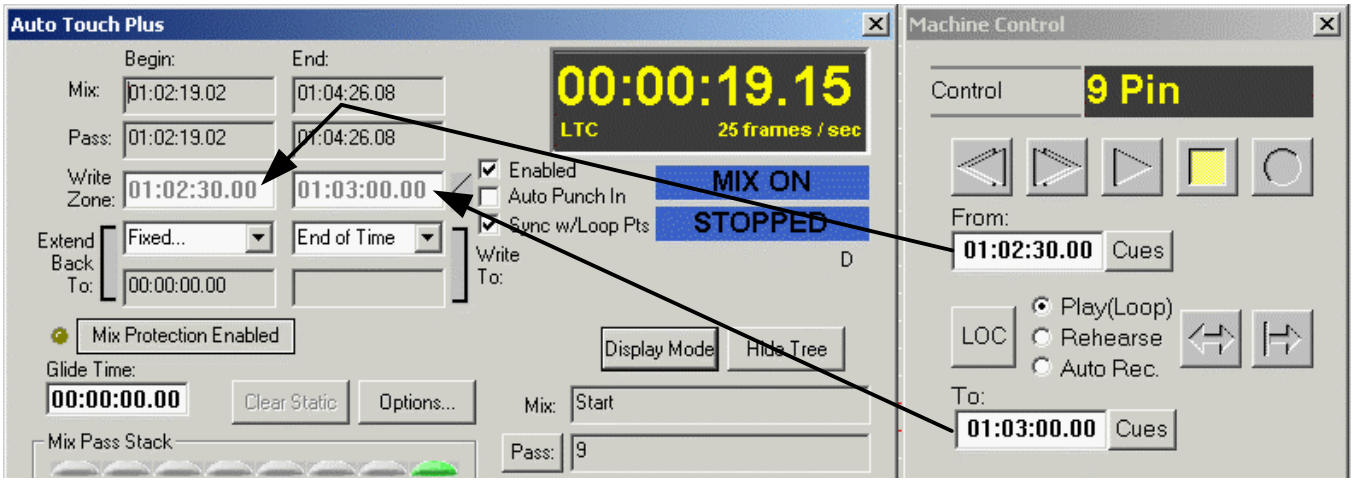
Write to: is *red* and active if **WRITE TO: END** on the AutoTouch+ panel has been selected (also refer to chapter 5.9.1).

Green indicates that Extend Back to: PUNCH IN will be performed and the *red* Write to: shows, that “Write to: END will be performed.

[7] Write Zone is defined by a BEGIN and an END timecode value. If activated, automation data can be written in this zone only.



If "Auto Punch In" is checked, Write enabled parameters will punched in automatically at the write zone beginning and punched out at the write zone end.
If "Sync w/Loop Pts" is checked, the selected locator points in the machine control window will be used as Write zone BEGIN and END points.



[8] Pass; shows the Begin and End time of the current mix pass.

[9] Mix; shows the Begin and End time of the entire mix.

[10] The timecode window displays the current timecode (hh, min, s, frames), the frame rate, and the timecode type. Timecode type can be GEN (internal TC Generator), 9 pin (serial TC), or LTC (external TC).
These settings are made in the Option – TC Reader/Gen menu (also refer to chapter 4.6.5).

[11] MIX ON / OFF indication (**MIX ON** key on the AutoTouch+ panel).

[12] RECORD, READY or STOPPED automation status indication.

[13] Indication if the currently touched parameter is a dynamic (D) or static (S) object (also refer to chapters 5.3.1.1 and 5.3.1.2).

[14] Clear Static; when a non-dynamic parameter has been changed, this button will lit. By clicking on the button the Static Data Buffer will be cleared, otherwise the static information will be written in the next mix pass.

[15] Options...; (only activated if MIX is ON) Click on the this button to access the Mix Options (also refer to chapter 5.21).

[16] Display Mode; mix pass display mode selection: it can be decided if only Mix Pass number, only Mix Pass name or both shall be displayed (also refer to chapter 5.4.1.3 for details).

[17] Hide Tree or Show Tree; will hide or show the Mix Tree window.

[18] Mix Pass information; to activate the PASS INFO dialog box. A name and notes can be entered for the selected Mix Pass (also refer to chapter 5.4.1.3).
Mix: Shows the Mix Tree Name
Pass: Shows the name of the mix pass and allows to enter the PASS INFO dialog box
Notes: Shows the notes.

5.21 Mix Options

On one hand, AutoTouch+ is a relatively simple system to use, on the other hand it has tremendous depth. Creating a system that has both of these attributes is not easy. In addition, when such a large amount of functionality is available, it is difficult to define every single transition from one mode or state to another in a precise and dictated way. There are two reasons for this:

- No two mixers will mix the same way. While one will want a feature to work this way, another equally proficient mixer will want it to work another way.
- Even the same mixer will want different functionality at different times within the mix process or based on different types of projects.

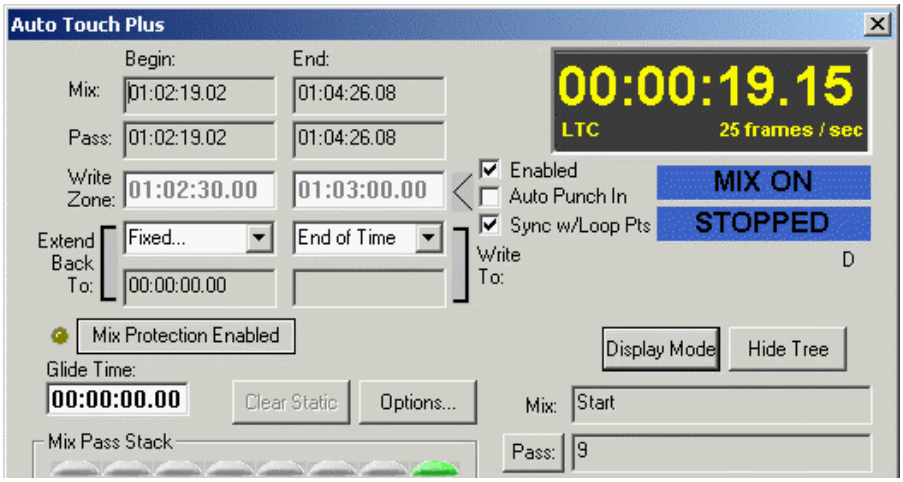
There is no right or wrong way to implement many of the functions in AutoTouch+. There are just different ways. So in answer to the above, there is a large number of options that affect the specific functionality of very specific modes. In total, the option set defines the specific ways in which the system will work. Each individual option, however, allows the system to have another nuance that allows the mixer to best do his or her work, in a creative and efficient manner.

Mix Option Management:

A potential problem with having such a large number of options is the means to manage them all. When a mixer steps up to the console they need to be confident that the system will work in a predetermined way. In other words, they need to have ALL of the options set to a state that they have already pre set for their specific needs of the moment. AutoTouch+ offers a system of Mix management where each mixer can have their own unlimited number of options sets, known as User Files.

Accessing Mix Options:

The **Mix On** button on the AutoTouch+ Panel must be turned on before Mix Options may be accessed. All of the mix options reside in one convenient options dialog box which is accessed by clicking the **Options…** button of the AutoTouch+ window.



When you click the **Options…** button, the “tabbed” Options Dialog window will open. It will be set to the page where it was last left, so the options dialog tab page is said to be “sticky.”

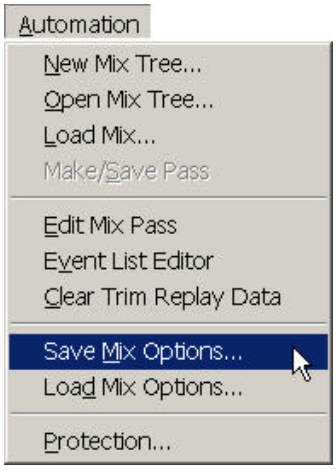
5.21.1 Saving/Loading Mix Options

A set of Mix Options may be saved as part of a User File and recalled at anytime. Only the sections that apply to saving and recalling User Files is presented here. Users and User Files are discussed in detail in chapter 5.17.

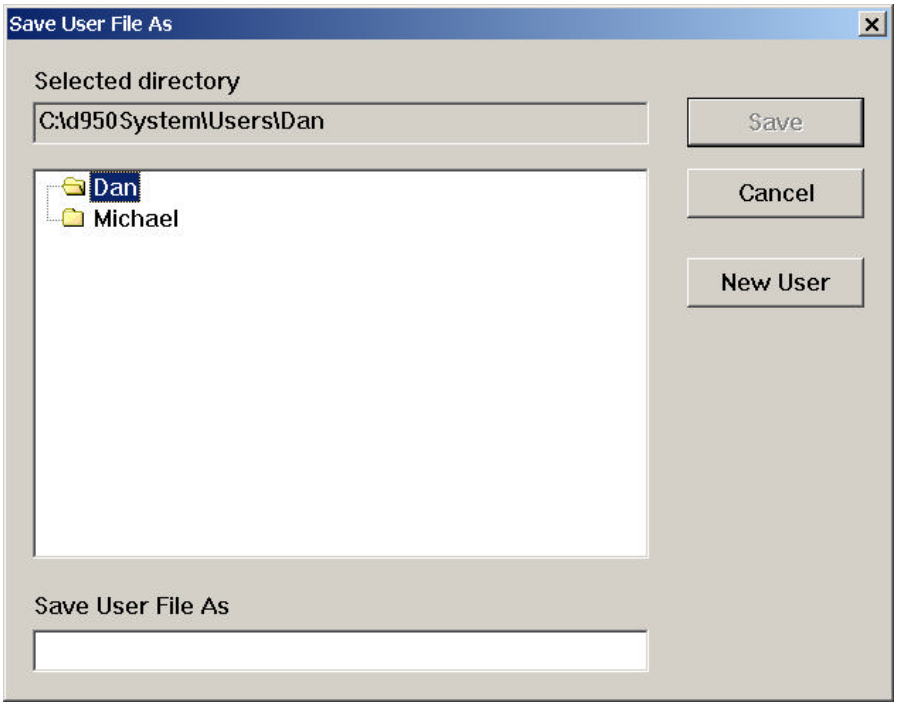
Create a New User & User File:

Use the following procedure to create a new User and User File:

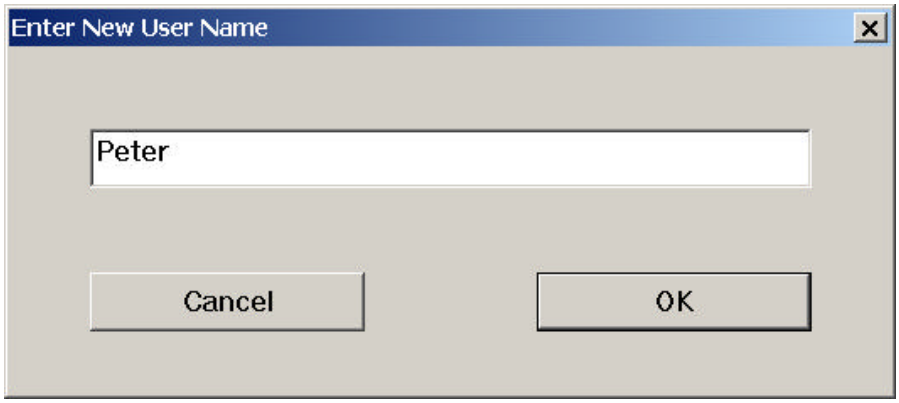
1. Set all Options as desired.
2. Store all AutoTouch+ Panel Presets, if any *(D950 only)*.
3. Select "Save Mix Options…" from the GC Automation menu.



The Save User File As window will open.



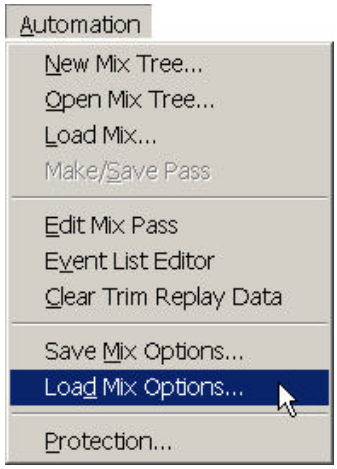
4. Click the **New User** button. The Enter New User Name window will open.



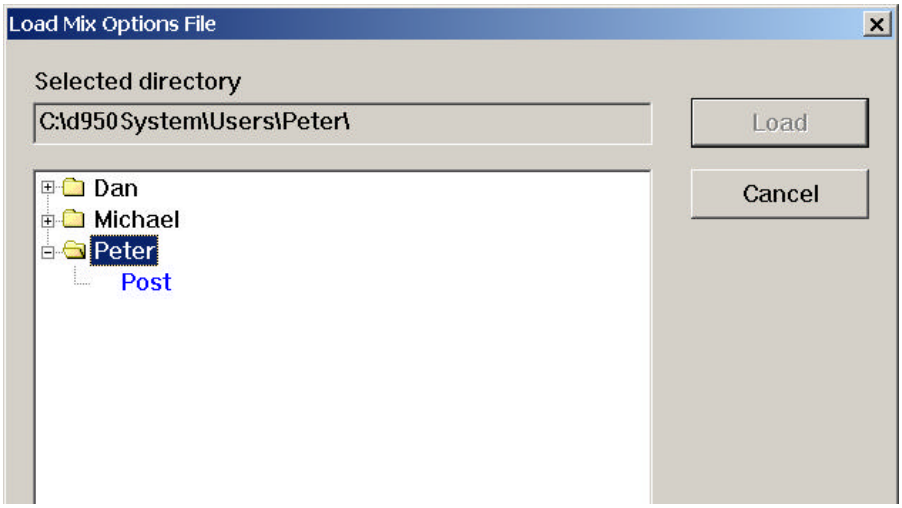
5. Enter a new User name in the field provided and click **OK**. A new User folder will be created bearing the name entered.
6. Enter the name of the new User File in the "Save User File As" field and click **OK**.
7. A new User File bearing the name entered will be created.

Load a User File: Use the following procedure to store a User File:

1. Select "Load Mix Options…" from the GC Automation menu.



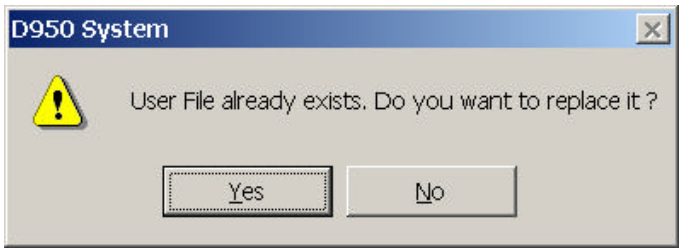
The Load User File As window will open:



2. The User folder containing the active User File will be open and the active User File will be indicated in blue letters.
3. If necessary open the appropriate User folder by clicking the + icon for that User or double-click the name. The folder will open and display its contents.
4. Double-click the name of the desired User File or single-click the name to highlight it and then click the **Load** button.
5. The selected User File will be loaded.

Update a User File: Use the following procedure to update an existing User File:

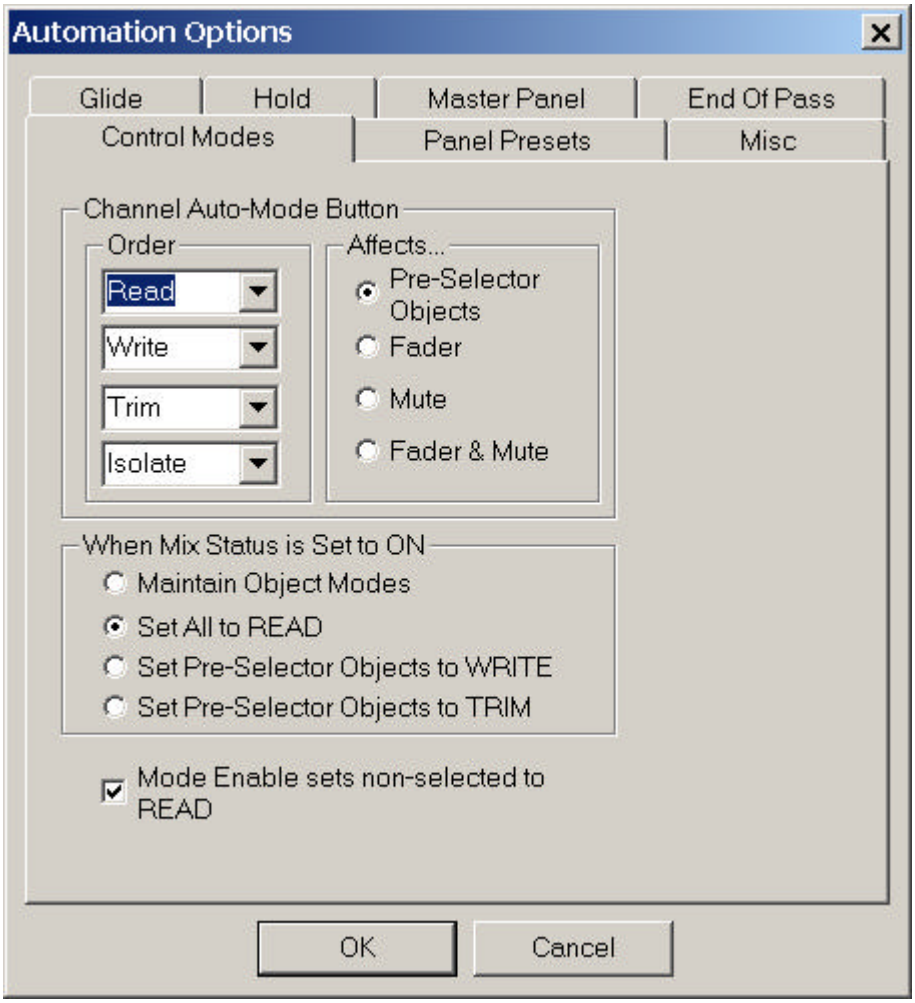
1. Make changes to Options as desired.
2. Store any changes to AutoTouch+ Panel Presets (if any).
3. Select "Save Mix Options…" from the GC Automation menu. The Save User File As window will open.
4. Either double-click the active User File (in blue letters) or enter the same User name in the field provided and click **OK**. A dialog box will indicate a file with the same name already exists and will ask if you wish to replace it.



5. Click **YES** and the chosen User File will be updated.

Delete a User or a User File: Users and User Files may be deleted by removing them from the Users folder in the `D950System` directory.

5.21.2 Control Mode Options



Channel Auto-Mode Button:

<Order>: This list selects which Control Modes will be selected by pressing the **AUTO MODE** key, and in what order. All four Control Modes may be selected or not in whatever order is desired.

<Affects>: This set of radio buttons determines which controls within the channel will be affected by the **AUTO MODE** key when it is used to set Control Modes.

- <Pre-selector Objects>: The state of the Control Mode Pre-Selectors determine which controls will be affected by the **AUTO MODE** key when it is used to set Control modes.
- <Fader>: The **AUTO MODE** key only affects the fader of the channel.
- <Mute>: The **AUTO MODE** key only affects the mute of the channel.
- <Fader and Mute>: The **AUTO MODE** key only affects the fader and mute of the channel.

When Mix Status is Set to On:

This set of radio button controls what happens when the Mix On mode is selected and unselected (turned on and off)…

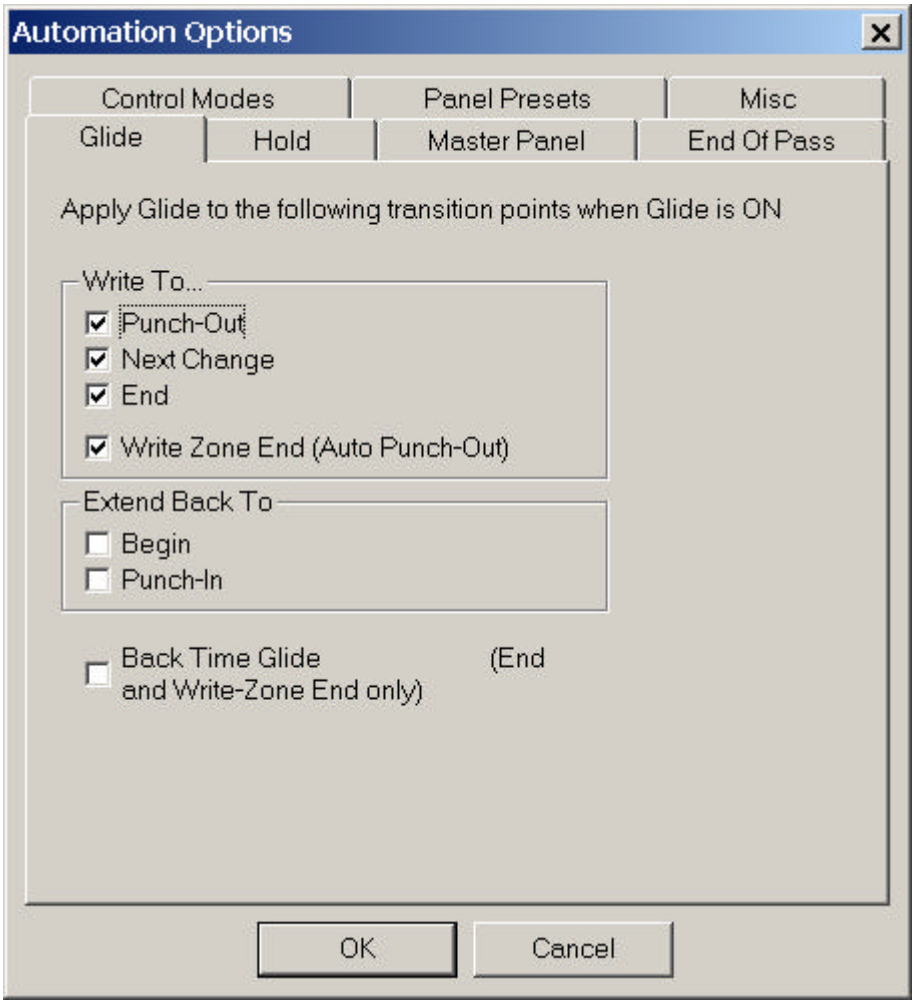
- <Maintain Object Modes>: In this case turning MIX ON, on and off, will not change the control modes of any of the controls in the console.
- <Set All to Read>: In this case turning MIX ON, on, after having turned it off, will set all controls to READ.
- <Set All to Read>: In this case turning MIX ON, on, after having turned it off, will set all controls to READ.

- <Set Pre-Selector Objects to WRITE>: Any controls that are selected in the Control Modes Pre-Selector will be set to WRITE. All others will be set to READ.
- <Set Pre-Selector Objects to TRIM>: Any controls that are selected in the Control Modes Pre-Selector will be set to TRIM. All others will be set to READ.

Mode Enable sets non-selected to READ:

Normally you can use the Pre-Selectors in combination with the Control Mode activators to set various control types into different Control Modes. For example, you could select FDR (only) and hit WRITE and the faders will all go into WRITE. You could then hit CLR and ENCoders and then hit TRIM and the knobs will be in TRIM, while the faders are in WRITE. This is very flexible and useful, but if you want to ensure that only specific controls are in a specific mode (like making sure that the Faders are in WRITE and everything else is in READ), you would have to select all the Pre-Selectors (or Hold down the CLR/ALL key) and hit READ. Then select FDR and Hit WRITE. However, when this option is set, you are always assured that when you hit an Control Mode activator, all control NOT active on the Pre-Selectors will be set to READ when the selected controls are set to the activator mode. For example, if only FDR selected on the Pre-Selector and the TRIM activator is hit, it is assured that every control other than faders will automatically be set to READ mode.

5.21.3 Glide



Glide at Punch-Out: When a control is punched out of Record into Playback the control will glide from the punch-out value to the read mix value over the time period as set by the Glide Time setting. The system attempt to recalculate the glide vector after each frame so an attempt is made to have the actual glide duration match the set glide time as closely as possible. However, if the read data is approaching the gliding control quickly, the glide duration may be shorter than the actual setting. In no cases will the time be longer. This behavior is consistent with good mixing practice.

The punch-out glide will take place if the control is punched out…

- While timecode is running (glide takes place in real-time)
- As a result of Timecode being stopped (glide takes place in the post process)
- And even if timecode is stopped in the middle of the glide (glide takes place partly in real-time and partly in the post process). This is a great feature because there are many times when a machine (TC) is stopped by one mixer just after another mixer has punched out and a glide has begun. In this case the glide will occur unscathed!

Glide at Next Change: When an old Read Mix data record is encountered for this control, a glide begins at that point and extends for the duration of the glide time (of course this assumes that the option is set and that the Master Glide Button is active at the time of the next change).

Glide at End: When the end time occurs (either in real time or as part of the post processing) a glide begins. The glide starts at the end time if set to End of Mix or a Fixed timecode. If the glide takes place during the post process (after the mix pass is ended) then the Master Glide Button must be active at the time that the Mix pass is stopped. If End is set to end of time, no glide occurs. (Also see Back Time option below.)

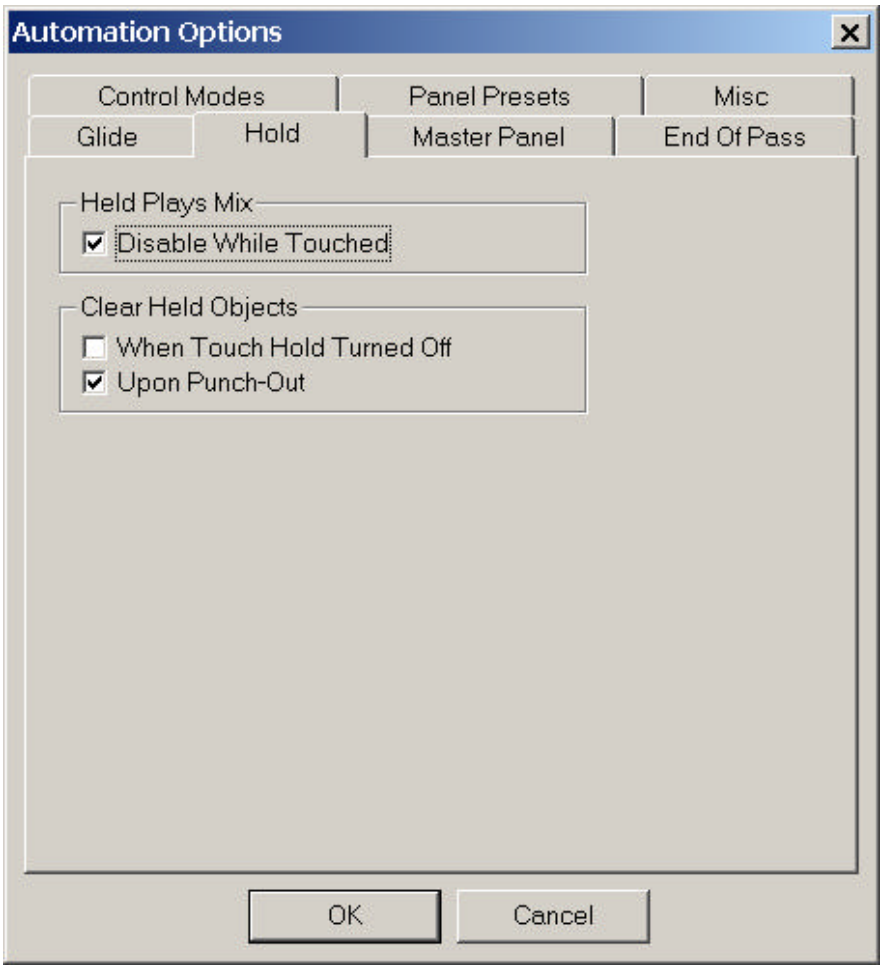
Glide at Write Zone End: If the Write Zone is active then a glide will occur at the Write Zone End time either in real time or as part of the post process (subject to the state of the option and the Master Glide Button. (Also see Back Time option below.)

Glide at Beginning: If the Extend Back To: Begin is active, then a glide will occur at the begin time (beginning of Mix or a user-input TC) as part of the post processing (subject to the state of the option and the Master Glide Button)

Glide at Punch-In: If the Extend Back To: Punch In is active, then a glide will occur at the Punch-in time as part of the post processing (subject to the state of the option and the Master Glide Button at the time of Punch-in).

Back Time Glide (applies to End and Write Zone End only): If this option is set, then the glide will begin such that the glide ENDS at the End or Write Zone End time rather than beginning at that time. This back times the glide so the data beyond the end time (or write zone end time) is perfectly preserved and match BEFORE the transition point.

5.21.4 Hold

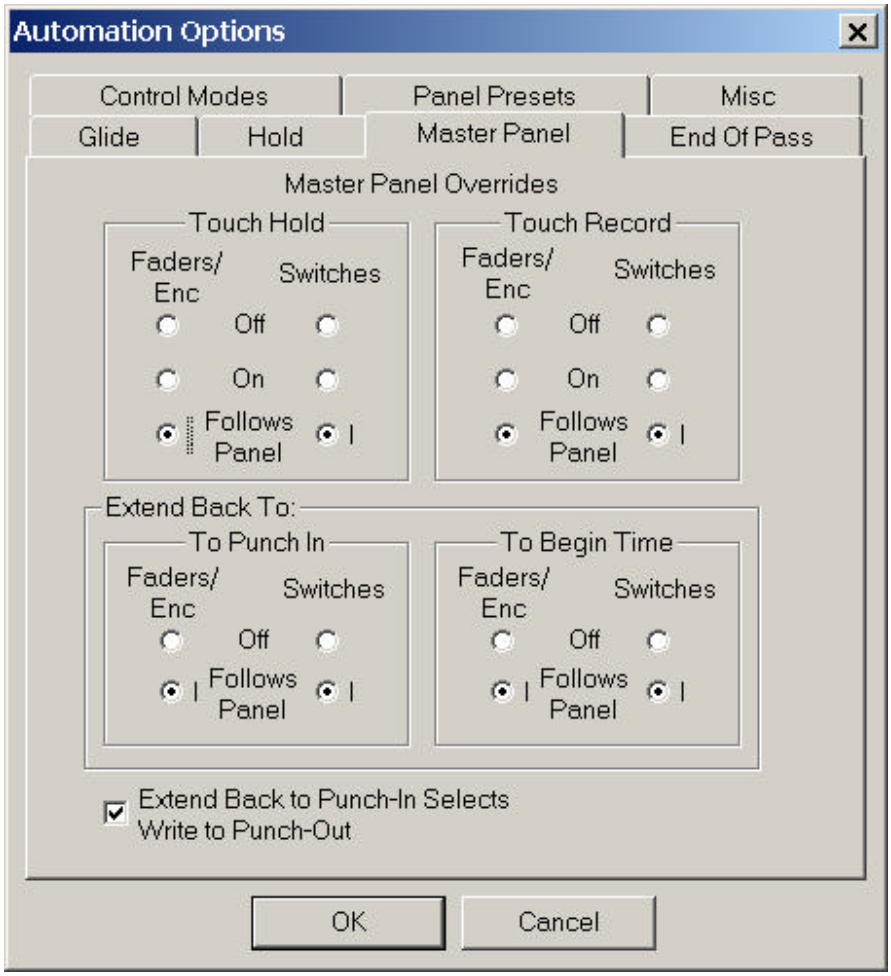


Held Plays Mix: <Disable While Touched>: When **HELD PLAYS MIX** on the AutoTouch+ Panel is active channels that are Held, do not "play" their held auditioned values, but play the Read Mix values instead. When this option is set, touching a control at this time disables this feature and allows a new audition (punch) value to be established by being able to listen to the Audition audio. If this option is unchecked, the Held Plays Mix function is not overridden and the Read Mix continues to be heard.

Clear Held Objects: <When Touch Hold Turned Off>: **TOUCH HOLD** (on the AutoTouch+ Panel) may be turned on and off during the course of a Mix pass. This options affects whether Held controls are cleared of their "held" status when The Touch Hold mode is changed from On (active) to Off. If the option is not selected, then changing the state of Touch Hold will have no effect on Held controls.
<Upon Punch Out>: Touch Hold is used for a variety of purposes. Sometime a write value needs to be held (so that un-touching the control while Touch Record is engaged does not punch it out of record), just until the control is punched out of record. At that point the control would return to playing back the Read Mix. With this option set, that is how the behavior would work. However, sometimes you will want to punch-in to that same held value later in the mix pass, even after you have punched out for this section of the mix. By deselecting this option the behavior will allow for this operation. The held value will remain until it is cancelled by other means. The new Mix Pass will, of course, not be affected.

5.21.5 Master Panel

This option page allows you to over-ride certain settings of the system that are normally controlled by the AutoTouch+ Panel. This allows for the AutoTouch+ Panel to control functions for certain types of controls while allowing other types of controls to remain in specific modes or be blocked by them.



Touch Hold: **Faders/Encoders:**
<Follows Panel>: Faders and Encoders (knobs) will follow the settings of the AutoTouch+ panel in regards to Touch Hold.
<On>: Faders and Encoders (knobs) will always be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.
<Off>: Faders and Encoders (knobs) will never be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.

Switches:
<Follows Panel>: Switches (keys) and Selectors (keys or knobs) will follow the settings of the AutoTouch+ panel in regards to Touch Hold.
<On>: Switches (keys) and Selectors (keys or knobs) will always be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.
<Off>: Switches (keys) and Selectors (keys or knobs) will never be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.

Touch Record:

Faders/Encoders:
<Follows Panel>: Faders and Encoders (knobs) will follow the settings of the AutoTouch+ panel in regards to Touch Record.
<On>: Faders and Encoders (knobs) will always be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.
<Off>: Faders and Encoders (knobs) will never be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.

Switches:
<Follows Panel>: Switches (keys) and Selectors (keys or knobs) will follow the settings of the AutoTouch+ panel in regards to Touch Record.
<On>: Switches (keys) and Selectors (keys or knobs) will always be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.
<Off >: Switches (keys) and Selectors (keys or knobs) will never be in Touch Hold mode regardless of the settings of the AutoTouch+ Panel.

Extend Back To Begin Time:

Faders/Encoders:
<Follows Panel>: Faders and Encoders (knobs) will follow the settings of the AutoTouch+ panel in regards to Extend Back To Begin Time.
<Off>: Faders and Encoders (knobs) will be blocked from entering Extend Back To Begin Time regardless of the settings of the AutoTouch+ Panel.

Switches:
<Follows Panel>: Switches (keys) and Selectors (keys or knobs) will follow the settings of the AutoTouch+ panel in regards to Extend Back To Begin Time.
<Off>: Switches (keys) and Selectors (keys or knobs) will be blocked from entering Extend Back To Begin Time regardless of the settings of the AutoTouch+ Panel.

Extend Back To Punch-In:

Faders/Encoders:
<Follows Panel>: Faders and Encoders (knobs) will follow the settings of the AutoTouch+ panel in regards to Extend Back To Punch-In.
<Off>: Faders and Encoders (knobs) will be blocked from entering Extend Back To Punch-In regardless of the settings of the AutoTouch+ Panel.

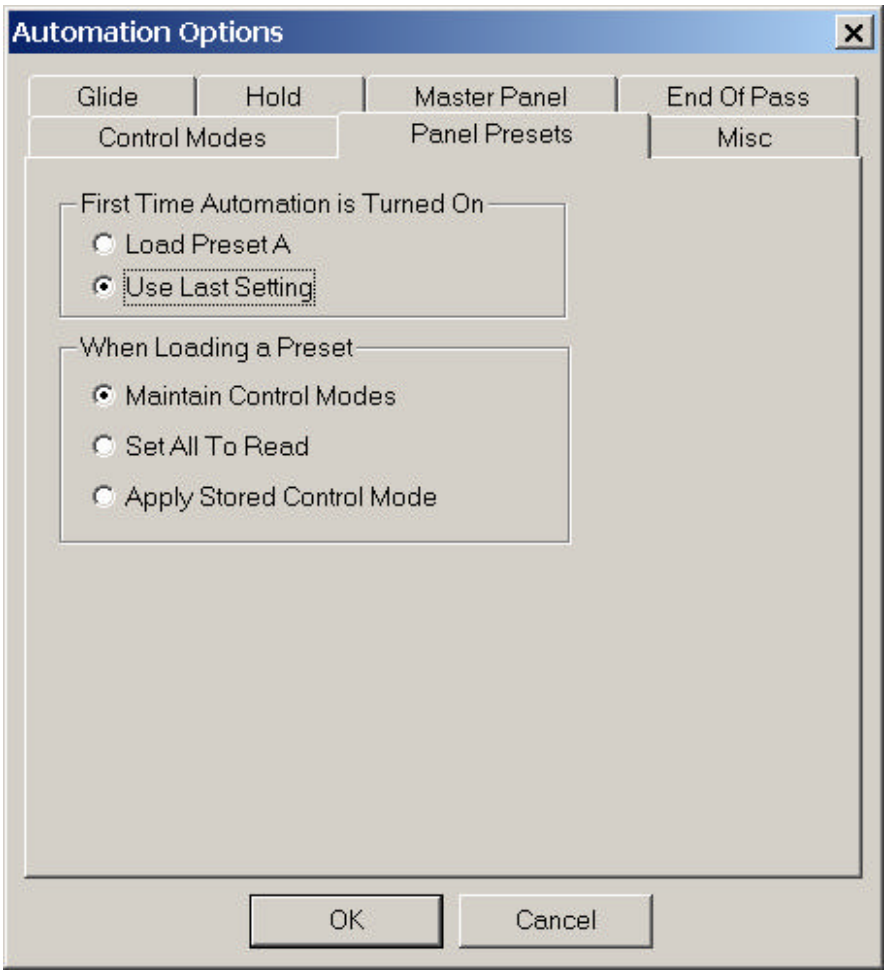
Switches:
<Follows Panel>: Switches (keys) and Selectors (keys or knobs) will follow the settings of the AutoTouch+ panel in regards to Extend Back To Punch-In.
<Off>: Switches (keys) and Selectors (keys or knobs) will be blocked from entering Extend Back To Punch-In regardless of the settings of the AutoTouch+ Panel.

Extend Back To Punch-In Selects Write to Punch-out:

In many cases it is desirable to audition a level and have that final determined level be written from the punch-in to the punch-out time. This is sometimes referred to as writing to a region. In AutoTouch+ this is accomplished by setting both the Extend Back To: Punch-In as well as Write To: Punch Out. Because this combination is selected so often, this options automatically selects Write To: Punch-Out whenever Extend Back To: Punch-In is selected. It is simply a convenience and ensure that when you wish to write to a punch-in/out region it is set properly. If you wish to set Extend Back to Punch-In with a different Write To selection you can simple select a different Write To selection after Extend Back to Punch-In has been selected (or do not set this option).

5.21.6 Panel Presets *(D950 only)*

This option page controls the action of the A through D AutoTouch+ Panel Presets.

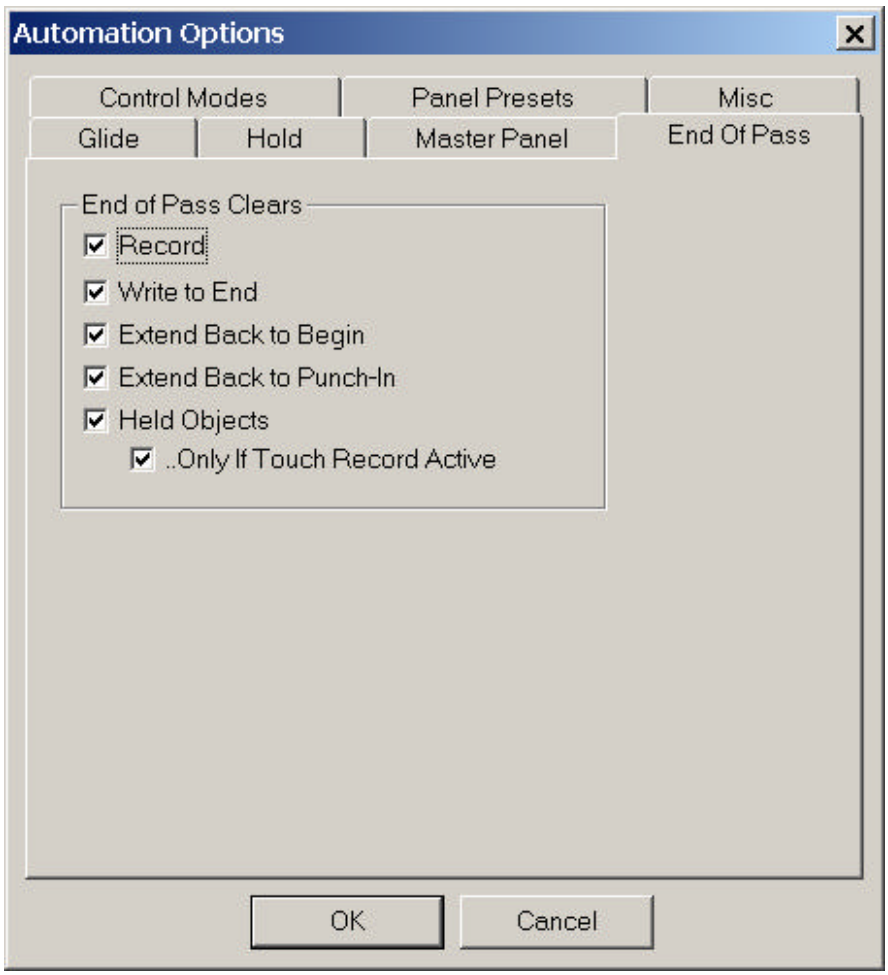


First Time Automation is Turned On: This determines which preset will be loaded when the **MIX ON** key is activated for the first time only. Subsequent cycling of the **MIX ON** key has no affect on the Panel Presets.
<Load Preset A>: When the system is first turned on, AutoTouch+ Panel Preset A is loaded.
<Use Last Setting>: When the system is first turned on, no Preset will be loaded. The AutoTouch+ Panel will be set in the same state as when the system was last shut down.

When Loading a Preset: <Maintain Control Modes>: When a Preset is loaded, do not change any of the Control Modes of the controls in the console.
<Set All to Read>: When a Preset is loaded, set all of the controls in the console to READ.
<Apply Stored Control Mode>: When saving a Preset, one of the Control Mode activators is always lit and stored in the Preset. When this option is set, upon loading the Preset, that stored activator mode will be applied to all controls based on the settings of the Pre-Selector (which were also stored).

5.21.7 End Of Pass

The End of Pass options determine the behavior of specific functions when a Mix Pass is terminated by stopping timecode. At the end of a Mix Pass each of the options control this behavior in the following manner.

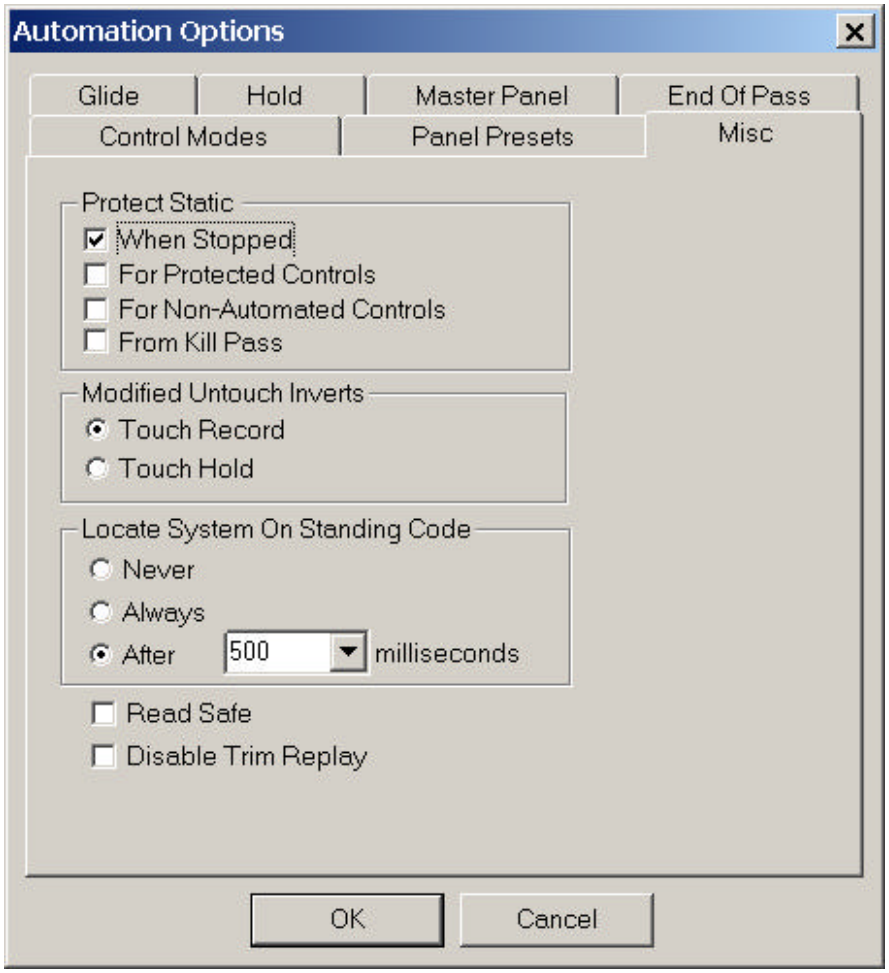


End of Pass Clears:

<Record>: If any controls are in record when the mix pass is ended they will be punched out of record if this option is set.
<Write To End>: Because Write To End is a very destructive feature (although very much used and useful), this option ensures that it is only used for one pass and Write to End Reverts to Punch-In at the end of a Record Pass. There will be no effect by a play pass (which is the case with all of these options).
<Extend Back to Begin>: Like Write To End, this destructive function can be set to be cleared after a Record pass has been written.
<Extend Back to Punch-In>: Same as above.
<Held Objects>: There are times when you want to hold objects (in record or audition) and have them revert to playing the Read Mix data when the next pass is run. And there are time when you want to audition a level and then run the pass again to do the actual record pass. In this case, by unchecking this option the controls can be held across passes.
<…Only if Touch Record Active>: When checked, End of Pass will clear the items above only if Touch Record was active.

5.21.8 Miscellaneous

This option page contains options not addressed elsewhere.



Protect Static: <When Stopped>: Changes to Static objects will be ignored unless the system is "Mixing" (timecode running or stop frame mode).
<For Protected Controls>: When a control is protected (out of scope) changes to the control will not be stored as Static values. They can be auditioned and will return to their stored value when a new Mix Pass is started.
<For Non-Automated Controls>: Changes to Non-Automated objects (like Pan Format) will not be stored as Static values. They can be auditioned and will return to their stored value when a new Mix Pass is started.
<From Kill Pass>: Stored Static values are not affected by Kill Pass operations.

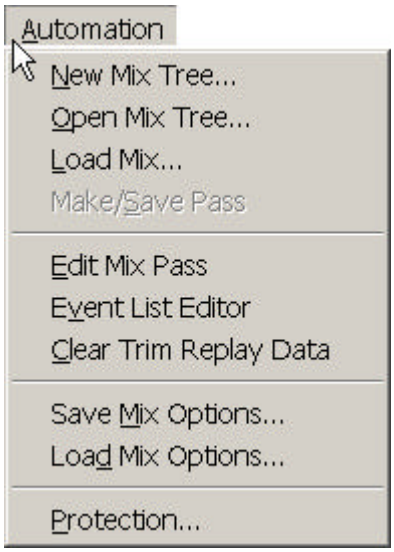
Modified Un-touch Inverts: <Touch Record>: The **AUTO MODE** key acts as a modifier key for certain functions. For example, if the modifier key is held when an enabled control is touched, the control will or won't go into record based on the inverse of the setting of the Touch Record function (of the AutoTouch+ Panel). Normally, when this radio button is selected, when un-touching a control, if the modifier key is held, the Touch Record functionality is again reversed.
<Touch Hold>: By selecting this option, when un-touching a control, the effect of Touch Hold is reversed rather than that of Touch Record.

Locate System on Standing Code: <Never>: AutoTouch+ will never locate to a standing timecode location.
<Always>: AutoTouch+ will always locate to a standing timecode location.
<After>: AutoTouch+ will locate to a standing timecode location after the time specified by the millisecond pull-down menu.

Other Miscellaneous Options: <Read Safe>: Normally when a control is moved its changed value is able to be auditioned, and then it snaps back to the Read Mix value (unless Touch Hold is active). When this option is set, any controls in READ mode will NOT be able to be auditioned, they will always follow the read mix value regardless of the physical or virtual control position
<Disable Trim Replay>: When this option is selected, faders will NOT play back any recorded Trim data. Note that this has no effect on the mix values that are being played from the read mix. Only that the faders will not track the any previous Trim values that were recorded. The Read Mix values already contain the effects of any previously recorded TRIMs. So this only affects how the faders respond when they are in TRIM enable mode. Also note that TRIM replay is only available on faders.

5.22 GC Automation Menu

The GC Automation menu contains several items used in the operation of AutoTouch+. These menu items are referenced throughout this document and are explained briefly below.



New Mix Tree: Selecting "New Mix Tree…" from the Automation menu opens the New Mix Tree dialog window. A new Mix Tree may be created using this window.

Open Mix Tree: Selecting "Open Mix Tree…" from the Automation menu opens the Open Mix Tree dialog window. An existing Mix Tree may be opened using this window.

Load Mix: Selecting "Load Mix…" from the Automation menu opens the Load Mix Into Tree dialog window. An existing Mix from any Title may be loaded into the current Mix Tree using this window.

Make/Save Pass: Selecting "Make/Save" from the Automation will generate a new Mix Pass. This is useful when it's desirable to save updated Static values without having to perform a RECORD pass.

Edit Mix Pass: Selecting "Edit Mix Pass" from the Automation menu opens the OFLA offline mix editor. The Active Mix Pass control values and locations may be edited.

Event List Editor: Selecting "Event List Editor" from the Automation menu opens the offline Event List Editor. The locations of the Active Mix Pass control changes may be edited.

Clear Trim Replay Data: Selecting "Clear Trim Replay Data" clears the Trim Replay Data for the Active Mix Pass.

Save Mix Options: Selecting "Save Mix Options" from the Automation menu opens the Save User File As dialog window. A new User and or User File may be created using this window. User Files contain Mix Options and AutoTouch+ Panel Presets.

Load Mix Options: Selecting “Load Mix Options” from the Automation menu opens the Load Mix Options File dialog window. Any existing User File may be loaded using this window. User Files contain Mix Options and AutoTouch+ Panel Presets.

Protection: Selecting “Protection…” from the Automation menu opens the Automation Protect control window. Protection may be applied to any set of controls using this window.

5.23 Hot Keys

V3.0 software supports a variety of "Hot Keys" (shortcut keys) that improve efficiency when operating the system. These Hot Keys assist in the management of timecode entry and information.

Note: This chapter assumes that the appropriate window or entry box is active. Appropriate fields or sections of fields are highlighted, and/or the cursor is placed appropriately.

Hot Key Functions: Hot Key functions are described in the table below.

Key	Function
Right Arrow	Next Field to the Right
Left Arrow	Next Field to the Left
Shift Right Arrow	Extend Selection one Field to the right
Shift Left Arrow	Extend Selection one Field to the left
B, b	Captures the current mix start time
E, e	Captures the current mix end time
Space, t or T	Captures current system time
G or g	Goto.. locates the system to the time in the control
C or c	Copies the FOD to a special copy buffer
P or p	Pastes the FOD from the copy buffer
R or r	Clears the timecode to 00:00:00:00
M or m	Clears the Most Recently used Timecode List
S or s	Toggles the Sorted view of the most recently used timecodes in the context menu
L or l	Toggles the locking state of the most recently used Timecode List (accept or don't accept further changes taken)
Shift Space	Selects all fields
Home	Selects Hours field
End	Selects Frames field
Shift Home, End	Extends selection appropriately
Single Click	Selects Field
Double Click	Selects All fields
Delete	Zeros out selection
Up Arrow	Bumps Selected Field Up (if more than one field is selected it will bump by the right most field and keep the selection active) Holding Shift puts it into X10 Mode.
Dn Arrow	Bumps Selected Field Down (if more than one field is selected it will bump by the right most field and keep the selection active). Holding Shift puts it into X10 Mode.
Pg Up	Bumps Selected Field Up by 10 (if more than one field is selected it will bump by the right most field and keep the selection active).
Pg Dn	Bumps Selected Field Down by 10(if more than one field is selected it will bump by the right most field and keep the selection active)
Digit	Places the selected fields into edit mode. All unselected fields will be grayed to indicate edit mode. Once in edit mode, all digits entered will shift previous digits to the left. Most non-digit keys and trackball click activity will leave edit mode. When leaving edit mode the new timecode is checked for validity.

Continued...

Key	Function
. (Period)	If in edit mode and the frames field is included in the selection it will try to justify the entered digits to the seconds field if sufficient space is available. Then it will leave edit mode on the previous selection and put the frames field in edit mode. If in edit mode but the frames field was not in the selection it will leave the digits entered as is. Exit enter mode on the previous selected fields and enter edit mode on the frames field. If not is edit mode it will select the frames field.
+/– (on numeric or normal keypad) also = is handled as + so Shift doesn't need to be held.	Used for Offsetting the timecode by another timecode. Brings up a new timecode edit box under and offset from the parent box. The Parent box goes gray. An offset can be entered into the new edit box. All normal editing can be used in the new box (bumping, scrolling etc) except for +,–. The offset can be applied to the original timecode by pressing Enter, + or –. Pressing enter will apply the offset, either adding or subtracting it based on the key used to initiate the process. Pressing + will add it (irregardless of the key used to initiate), pressing – will subtract it (irregardless of the key used to initiate). Pressing esc will cancel the action. Clicking outside the offset entry box will also cancel the action. The offset entry box will allow frames to be entered up to 99 if the HH, MM and SS fields are all 0 for bumping by up to 99 frames.
Ctrl and Left Track-ball Button and Vertical Trackball Move	Enters Scroll Mode. The Control key is the modifier to enter scroll mode. Once in scroll mode the control key can be released. Scrolls the Field clicked on, wrapping into higher order fields. When the field and all higher order fields are 00s or Max Values the scrolling is stopped (i.e. 0 wrap is prevented). Pressing and holding the shift key while scrolling enables 10x scrolling as long as the shift key is held.
Enter	Commits to the Edited Timecode
Esc or U	Cancels all changes to the timecode since the last Commit

Timecode Entry Validation: When free form entry of timecodes is performed, after all digits are entered or the selected field is changed, the entered data is validated. If there are invalid digits for the type of timecode, the highest order invalid field is highlighted and the text color goes red. At this point no operations are allowed until the timecode is corrected. Since the field in error is highlighted direct entry for correction is easy.

Commit/Cancel: The timecode editor keeps two timecodes during editing, the committed timecode and the working timecode. As you bump, offset, enter digits, etc. the working timecode gets changed. Hitting Enter or leaving the edit box (i.e. the edit box loses focus) commits the edits. If after making changes, even in the middle of entering digits or with invalid timecode displayed in red, you can press ESC to cancel the changes and go back to the original timecode.

Up to 99 frame offset: When offsetting, the add/subtract editor window will allow frames to be entered up to 99 if the hh, mm and ss fields are all 0. For example if you wanted to offset the timecode 1.5 seconds at 30 fps you could either press +, 1, 1, 5, Enter for adding 1 second 15 frames, or press +, 4, 5, Enter for adding 45 frames.

Remainder: When converting from FODs to Timecode Strings there is the possibility of a remainder. There are roughly 100 FODs per frame. If an FOD is converted to a string and the string converted back to an FOD, any FOD between the start of the frame and the original FOD would be lost. For example, frame 00:00:00.01 starts at FOD 103. If FOD 105 is converted to

the string 00:00:00.01 and the string converted to an FOD the result would be 103, loosing two FODs in the process. During various operations like bumping or offsetting, the timecode conversion routine keeps track of the remainder automatically. Basically, having a remainder means that the FOD does not exactly equal the beginning of the frame represented by the timecode string. The following table illustrates the rules regarding when remainders are saved and when they are lost.

Action	Remainder
User Enters any Timecode Digits	No, FOD exactly matches string entered
User Captures Current Time	Yes
Offsets	Yes
Bump/Scroll	Yes
Drag/Drop	Yes

Intellibump: When scrolling or bumping drop frame code to an invalid timecode the control automatically adjusts to the next valid timecode. For example, if bumping seconds up two times to achieve a 2 second offset from 00:10:59.00 to 00:11:01.00, the first bump one from will result in 00:11:00.00. This is invalid during drop frame counting so the control automatically sets it to 00:11:01.00. The second bump would normally bump 1 second from the previous value, which would yield 00:11:02.00. This is not what was desired.

The control keeps track of artificial frame bumps required to keep true to the drop frame counting sequence and automatically re-compensates when possible. This re-compensation is attempted until the timecode is committed or some other action besides bumping or scrolling the particular field is performed. In the above example, the second bump performed would actually yield 00:11:01.00 since the control would re-compensate for the two frame bump required to keep the drop frame rules.

CREDITS

Written by: *Daniel Pfeifer*
Associate Professor of Recording Industry
Middle Tennessee State University

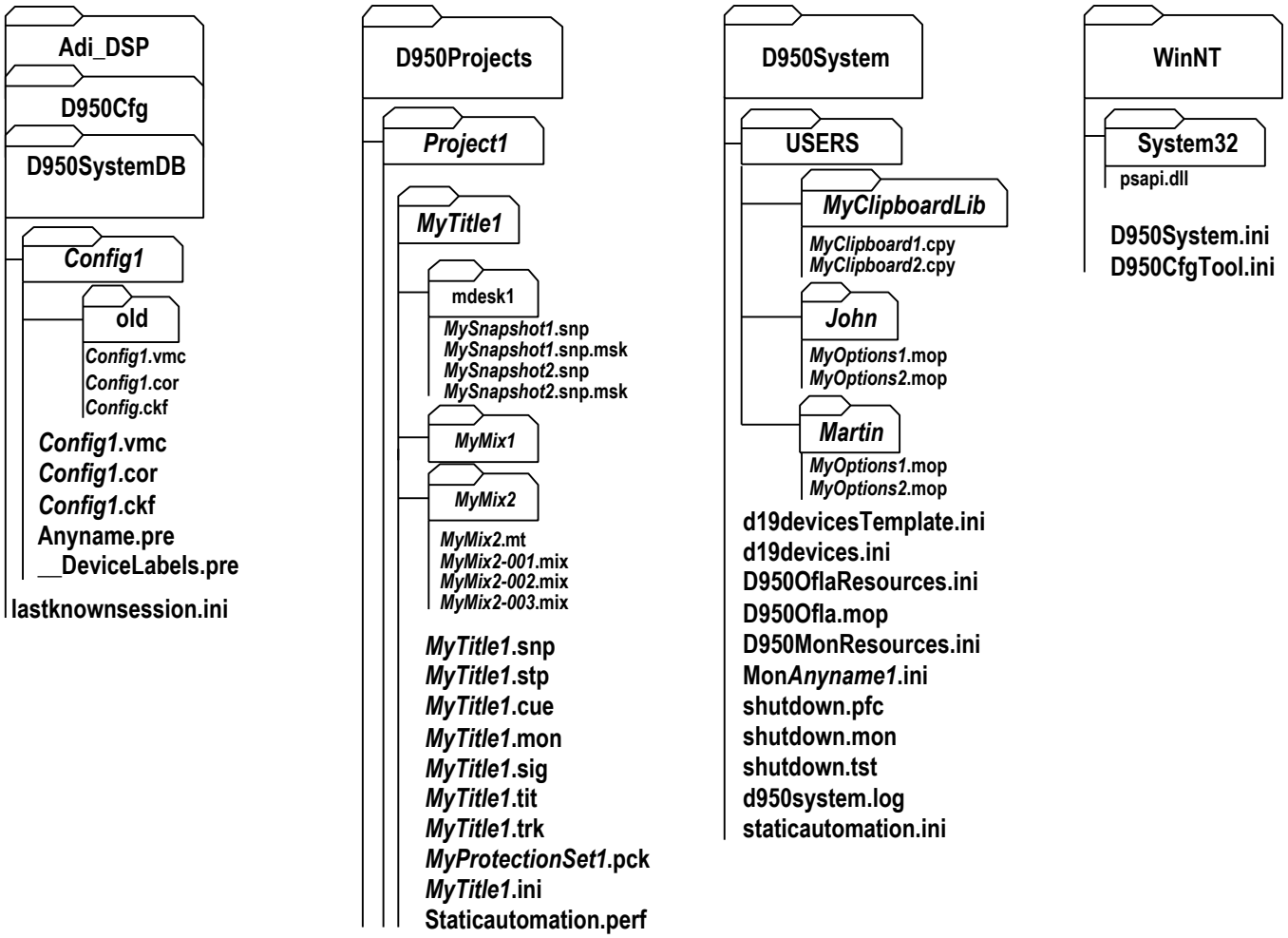
This chapter was written with consultation and direction from *Michael Tapes*. Additional editorial input provided by (in alphabetical order): *Alex Duggan, Jamie Dunn, Stephan Ledergerber, Peter Marone, Tibor Tamas,* and *Tonstudios Z.*

CHAPTER 6

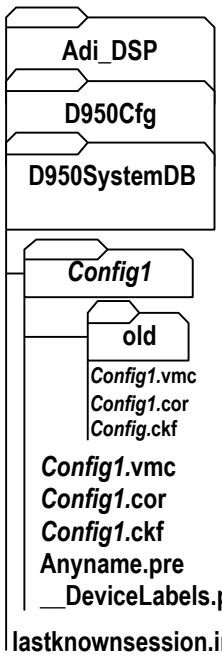
6 SYSTEM ADMINISTRATION

6.1 Managing the Files: Which Files are Where?

Below, you find a short description of the D950 file structure. Amongst others, you will wind the following files and folders on your hard disk C:



6.1.1 Configurations



Adi_DSP: *No user access*. Contains files used to generate new configurations.

D950Cfg: Contains the configuration editor and all its files. Includes a log file.

D950SystemDB: Contains all configurations.

Config1*:** This directory represents a configuration (e.g. ***Config1), using a number of DSP cards to make a predefined console working. Two of the included files are needed in order to run the configuration on a real console: ***.vmc** and ***.cor**.

***Config1*.vmc:** This file describes the structure of the console and all its parameters.

***Config1*.cor:** This file contains the DSP code for the core.

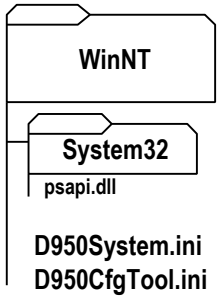
***Config1*.ckf:** This is a text file that can be opened e.g. with the windows "notepad" application. It contains information on which parts of the console are currently running on which DSP card.

Anyname.pre: This is a preset file storing the same information as a snapshot file. However, this file is read-only for the normal user and that it exists once per configuration (therefore it is available across all titles belonging to one configuration). The system administrator has access rights for creating, deleting or modifying a preset file.

_ _DeviceLabels.pre: This is a preset file with a reserved name. It has the format of a standard preset file and basically contains the same information. If the "Use Device Labels" option is switched on, this file is read whenever a title is opened, with its patch USER labels interpreted as DEVICE LABELS. This means: When opening a title with the "Use Device Labels" option activated, the USER label of this file will overwrite the INHERITED labels (device labels) of the opened title.

lastknownsession.ini: Stores information on the last used configuration and title when closing the application software.

6.1.2 WinNT



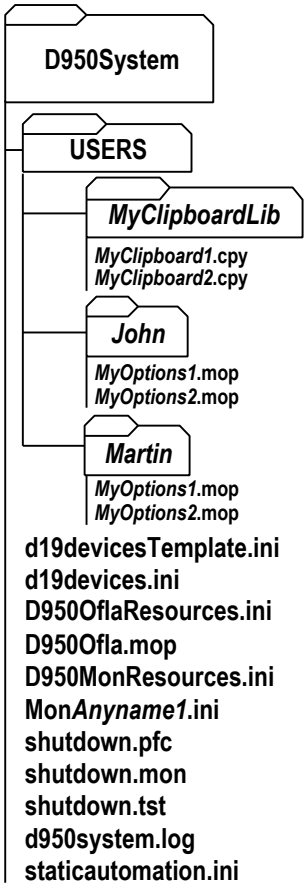
All listed ***.dll** files must be located in the **System32** directory.

D950System.ini Main ***.ini** file. It stores:

- The hardware configuration (which components are present, and which RS422 port is used for what purpose)
- System administrator password
- Maximum mix file size
- 9-pin settings:
  Whether ADR commands should be done by the machine controller internally, or whether the console should do them (risk of being slightly inaccurate)
  Whether the machine should stop looping after having recorded with auto record once
  Whether to send no record commands at all, edit on/off, or "crash record"
  Whether it is allowed to cross the time code address 0:00:00:00 when working with offsets and locating.

D950CfgTool.ini *No user access!*

6.1.3 D950System



USERS: Contains various subdirectories. Each directory represents one user, this user's option files, and possibly his individual clipboard libraries.

***MyClipboardLib*:** Contains multiple sets of clipboard settings for copying to channels. This directory may also be located within the directory of an individual user, depending on where the operator decided to save the library.

***MyClipboard1*.cpy:** Clipboard file containing clipboard data. The following data or combinations of data may be contained within one file: EQ, filters, dynamics, pan, delay, or even a complete channel.

***John*:** Contains various mix option files; can also contain clipboard libraries.

***MyOptions1*.mop:** Mix option file; containing a set of mix options.

d19devicesTemplate.ini: Template file for the **D19devices.ini** file

d19devices.ini: Contains definitions of Studer microphone preamplifiers connected to a specific installation.

D950OflaResources.ini: *No user access!*

D950Ofla.mop: Contains current mix options. *If this file is deleted, the factory default options will automatically be applied!*

D950MonResources.ini: *No user access!*

Mon*Anyname1*.ini: Monitoring file defining the CR monitoring format, studio A/B, digital insert, software pop-up extension for source selectors, as well as the definition of the source selectors and their sources. Dim level is also specified in this file. There can be various versions of this file. Each title remembers which file was loaded when it was closed the last time.

shutdown.pfc: Contains the last preference settings, such as windows or toolbar positions, etc. This file also contains the names of interface subclasses. Included are also:
- TC offsets and reader settings
- "Auto Select" setting of General Patch targets
- Device label option settings, and
- Setting of GC multidesk groups, if present.

This file may exist multiple times with user names and a ***.pfc** extension. Since **Shutdown.pfc** is overwritten each time the application is quit, it is recommended to keep one version with user preferences under a different name.

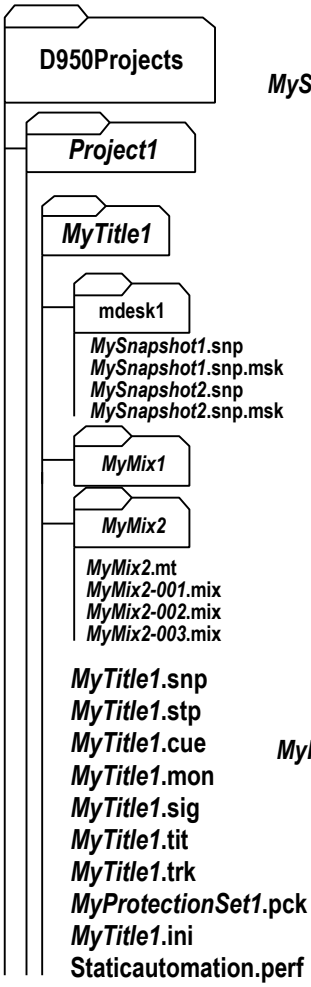
shutdown.mon: Stores the last monitoring settings when the application software is quit.

shutdown.tst: Stores the last time code-related settings when the application software is quit.

d950system.log: Stores a log file with various information used for Studer service & support only.

staticautomation.ini: Stores global static automation options, including:
- Crossfade switch position (at the beginning of, during, or after a crossfade)
- Default snapshot mask
- Trim mode active.

6.1.4 D950Projects



mdesk1: Directory containing all snapshots of a specific title.

***MySnapshot1*.snp:** Stores all audio settings of the desk.

***MySnapshot1*.snp.msk:** Stores a mask dedicated to the snapshot, thus making the snapshot a "partial" snapshot. Also contains snapshot crossfade time of the corresponding snapshot.

***MyMix1*:** A mix directory contains one file with an ***.mt** extension that is storing the structure of the mix tree, and multiple mix pass files. Each mix pass file contains *all* mix data up to that specific pass. It is therefore possible to use one single ***.mix** file to playback a complete mix.

***MyTitle1*.snp:** Stores a snapshot when leaving the title upon shutdown or title change.

***MyTitle1*.stp:** *Historical file, no function.*

***MyTitle1*.cue:** Stores all cue points (time code markers) generated in that title.

***MyTitle1*.mon:** Stores the last monitoring settings when leaving this title upon title change or shutdown of the system.

***MyTitle1*.sig:** Stores specific GPIO settings, such as fader start and red light definitions of that specific title (definitions are done in the GC application).

***MyTitle1*.tit:** Stores the title memo text, and which monitoring file will be loaded when opening this title.

***MyTitle1*.trk:** *Historical file, no function.*

***MyProtectionSet1*.pck:** Object picker file. When doing any set of objects with the object picker (e.g. for protecting certain objects from being dynamically automated), this set can be stored under any name with a ***.pck** extension.

***MyTitle1*.ini:** Stores all kinds of information regarding this title:

- The last active mix tree
- The last active strip setup
- The monitor meter assignments
- Whether the red LED is to indicate clipping or "entering headroom"
- Whether strip setup window shows inherited labels
- The definition of channels that are save from muting when pressing "solo in place"
- The selected PFL/SOLO/SIP mode when leaving this title.

Staticautomation.perf: Stores the current performance mask and protected patch points.

6.2 *.ini Files

The D950 process is inquiring the **D950system.ini** file during startup in order to decide which controller threads should be started in the **D950system.exe** process.

```
[d950systeminfo]
IsUS=No
NetIsUsed=No
HTTPIsUsed=No
IsAutoActive=Yes
IsBridgeActive=Yes
IsTestSystemActive=No
IsDeskActive=Yes
IsD19Active=Yes
IsGcActive=Yes
IsVistaActive=No
IsRegistryActive=Yes
IsMonActive=Yes
LastKnownIniFile=C:\D950SYSTEMDB\lastknownsession.INI
TccApplicationProgram=C:\D950SYSTEM\tcc02898.pgm
DefaultSystemdbDir=C:\D950SYSTEMDB
DefaultProductionDir=C:\D950PROJECTS
DefaultHTTPDir=C:\D950HTTP
MonitoringIniFile=
SysAdminPassword=
VmcTextOutput=No
VmcTextOutputFile=C:\D950SYSTEMDB\vmc.map
LogicalNetDriveName=
NetDriveName=
LogFile=C:\D950SYSTEM\D950system.log
// System stores all important information with this interval. Time in seconds, 1-86400. OFF=0
AutoSaveTime=0

[options]
TC2=Yes
TC3=No
MeterOverNet=No
DynamicAutomation=Yes
// If customer works with big mixes ( >15 MB), this option must be set to reserve memory. If no entry present,
// the value defaults to 10 MB. If value <5MB is entered, it defaults to 10MB.
MixSize=10

// "Yes" if the automatic drop-in should be done directly from D950 software by looking at the
// TC. "No" if the recorder should get IN and OUT points and should do the edits itself.
DO_AUTO_REC_EE=Yes

// If user wants to have REHEARSE and AUTO REC work multiple times when looping, this
// option must be set to "Yes" (Postroll time should be set to 0). Otherwise the machine may go into PLAY after
// having done the edit once.
IssueEditCommandAtLoopEnd=No

// 9Pin Record mode: "CrashRec" or "NoRec" (recording blocked) or "EditOnOff".
9PinRec=EditOnOff

// wrap around 24hours. "No" means that locating will stop at 0 or 23:59:59.ff. "Yes" means
// that yero crossing is allowed when working with offset set in the TC reader.
TC_ZERO_CROSS=No

// enter number of Pec/Dir panels. "0" means no Pec/Dir panel. Max no is "2". In software
// versions newer than 3.0 Pec/Direct panels are not supported anymore.
Pec/Direct=0
```

```
// number of available ports for 9pin (RS422) machine control. "1" means 9Pin control without
// Colin Broad SR3 controller, "4" means a Colin Broad SR3 installed.
// "0" means 9Pin interface not available.
RS422Ports=1

// defines the first available port on a Colin Broad controller. "2" means port A is
// reserved for communication of the CB SR3 controller with D950.
RS422First=1

// Paddle Ready Only. "Yes" means Pec/Dir panel gives no record strobe on the REC paddle switch.
// "No" means Pec/Dir panel adds a record strobe on the paddle switch.
PADDLE_RDY_ONLY=Yes

// display of the rec-ready (armed) state on the REC paddle switch. "Yes" means the record paddle
// is lit if the track is ready or recording. "No" means the record paddle is lit only if the
// track is recording.
PADDLE_DISP_RDY=No

// save at stop for systems with Pec/direct panel installed. "Yes" disarms all armed tracks
// assigned to stems when stop is pressed on either the D950 AutoTouch panel
// or the D950 function keys.
RS422SaveAtStop=Yes

; Syntax: single letters indicate the kind of devices connected to a port
; put square or curly brackets around them
;      {t}:time code port -> port number 2
;      {a}:audio - port with analog audio devices (monitoring)
;      {p}:panels; polling (monitoring)
;      {d}:d19 (MicAds / RS422 controlled equipment)
;      {9}:Sony 9 Pin interface
;      {w}:PCAnywhere -> use port number < 10
;      {c}:PWRChute
;      {n}:not used

[d950SerialPorts]
1= {t} COM2 baud=38400 parity=N data=8 stop=1
2= {p} COM5 baud=115200 parity=N data=8 stop=1
3= {a} COM6 baud=115200 parity=N data=8 stop=1
4= {d} COM7 baud=38400 parity=N data=8 stop=1
5= {n} COM8 baud=115200 parity=N data=8 stop=1
6= {c} COM9 baud=2400 parity=N data=8 stop=1
7= {n} COM10 baud=115200 parity=N data=8 stop=1
8= {n} COM11 baud=115200 parity=N data=8 stop=1
9= {w} COM12 baud=19200 parity=N data=8 stop=1
```

Keywords:

- *IsUS=Yes/No*
  Enable/disable the standard Windows close function in the upper right corner.
- *NetIsUsed=Yes/No*
  If the control threads are distributed on several different PCs, and the D950system.exe is running on each of them, the processes communicate via WINDOWS sockets and Fast Ethernet. If all control threads run on the same PC in one D950system.exe, there is no need to communicate over a network. A thread-to-thread communication via standard thread messages is used instead of sockets. However the API will remain the same for using sockets or standard thread messages.
- *HTTPIsUsed=Yes/No*
  HTTP server is active/inactive for remote control via Netscape.
- *IsAutoActive=Yes/No*
  The Automation threads should be started.

- *IsBridgeActive=Yes/No*
  The bridge threads should be started. It is important that the memnet card and driver are installed properly, else the threads would not start.
- *IsTestSystemActive=Yes/No*
  The test system should be started instead of the bridge thread. The test system is using the COM2 serial interface instead of the memnet card to communicate with the DSP card. Please be careful that not both system are active.
- *IsDeskActive=Yes/No*
  The desk threads should be started. It is important that the hardware and drivers for the desk communication are installed properly, otherwise the threads would not start.
- *IsGcActive=Yes/No*
  The GC part of the D950system.exe is activated as well as the GC control thread.
- *IsRegistryActive=Yes/No*
  The registry thread should be started.
- *IsMonActive=Yes/No*
  The monitor threads should be started. It is important that the serial interface card is installed properly, otherwise the threads would not start.
- *LastKnownIniFile=C:\D950SYSTEMDB\lastknownsession.ini*
  The keyword points to the .ini file which indicates the last used session and last used production/title.
- *TccApplicationProgram=C:\D950SYSTEM\tcc00497.pgm*
  This file is downloaded to the time code card by one of the automation threads.
- *DefaultSystemdbDir=C:\D950SYSTEMDB*
  This path is the starting directory level for the file box in changing a session.
- *DefaultProductionDir=C:\D950PROJECTS*
  This path is the starting level for the file box in opening/saving a title.
- *DefaultHTTPDir=C:\D950HTTP*
- *SysAdminPassword=*
  The password is needed to gain access to the system administration menu on the GC.

6.3 lastknownsession.ini

The **lastknownsession.ini** file is used to save the last used or known session configuration path/name and production/title. Its structure is identical with the ones of the standard profiles. Name and location of the file are part of the standard profile. There is one **lastknownsession.ini** file present in the system. It is updated from the **d950system** application.
If the standard profile is not available, the system searches for:
\D950system\D950SYSTEMDB\LASTKNOWNSESSION.INI.

Keywords:

```
[lastknowndata]
CurrentSession=<session directory name including path>
CurrentMonitoringIniFile=<monitoring config. file name incl. path>
CurrentTitle=<title directory name including path>
```

If no title is open, the `CurrentTitle` string is empty.
If no configuration is available the `CurrentSession` string is empty.

6.4 Shutdown

6.4.1 shutdown.pfc

The **shutdown.pfc** file is automatically stored during the shutdown process. It contains information on the size and placing of the different windows.

6.4.2 shutdown.tst

The **shutdown.tst** file is automatically stored during the shutdown process. It contains all parameters from the "TC reader/generator setup" option.

Notes: The information stored in the **shutdown.pfc** and **shutdown.tst** files is called "User Preferences" and can also be saved under a different name and in a different location by selecting the menu item "User/Save Preferences...". The files are stored as **UserName.pfc** and **UserName.tst**. To load a set of preferences, select "User/Load Preferences...".
Channel Protection settings and Snapshot Filter settings are not stored.

6.5 d950system.log

The **d950system.log** file contains error messages, startup information and general warnings, not all of which appear on the GC screen.
The file is a standard text file and can be viewed with the Surveyor:

```
? ? ?
 Logfile of Studer D950System
?
/ 01/15/98 11:16:50 Initializing Vmc completed
( 01/15/98 11:17:26 Initializing Vmc...
/ 01/15/98 11:17:35 Initializing Vmc completed
/ 01/15/98 12:11:49 Initializing Vmc completed
/ 01/15/98 12:14:00 Initializing Vmc completed
```

Note: The first character in the line is not relevant and has no meaning.

6.6 UPS Control

The UPS (Smart UPS series from APC) are controlled by a software package called “PowerChute plus” by APC. The software warns the user against power problems and shuts down the D950 system smoothly and with all vital data intact, whether an operator is present or not. In order to guarantee proper operation, the PowerChute parameters (**pwrchute.ini** file) should be set according to the following example:

```
[ Ups ]
 SignallingType = Smart
 PortName = COM11
 AutoUpsRebootEnabled = Yes
 CableType = Normal

[ EventLogging ]
 EventLogEnabled = Yes
 EventLogMaxSize = 50000
EventLogName=C:\PWRCHUTE\pwrchute.log

[ DataLogging ]
 DataLogEnabled = Yes
 DataLogMaxSize = 50000
 DataLogInterval = 600
DataLogName=C:\PWRCHUTE\pwrchute.dat

[ ErrorLogging ]
 ErrorLogEnabled = Yes
 ErrorLogMaxSize = 50000
ErrorLogName=C:\PWRCHUTE\pwrchute.err

[ Messaging ]
 MessageDelay = 1
 MessageInterval = 30

[ SelfTests ]
 EnableSelfTests = No
 SelfTestDay = MONDAY
 SelfTestSchedule = At turn on
 SelfTestTime = 12:00 PM

 LastSelfTestDay = 01/26/98
 LastSelfTestResult = Passed
[ Shutdown ]
 ShutdownDelay = 30
 AdminShutdownDelay = 900
 DailyShutdownEnabled = No
 DailyShutdownTime = 6:00 PM
 DailyWakeupTime = 7:00 AM
 WeeklyShutdownEnabled = No
 WeeklyShutdownDay = Friday
 WeeklyShutdownTime = 6:00 PM
 WeeklyWakeUpDay = Monday
 WeeklyWakeUpTime = 7:00 AM

[ Server ]
 Security = No
 HostName =

[ UserInterface ]
 TemperatureUnits = Celsius
 SoundEffects = No
 BARGRAPHType = Battery Capacity
```

```
[ BatteryCalibration ]
 Enabled = No
 BatteryCalibrationDay = Monday
 BatteryCalibrationTime = 07:00 AM
[ AdminShutdown ]

 NotifyType = Some
 NotifyRepeat = Yes

 NotifyUserList = industrie8
[ EventText ]
 100000 = *** PowerChute PLUS Version 4.2.5 Started ***
 100100 = *** PowerChute PLUS Stopped ***
 100200 = Communication established
 100300 = Normal power restored: UPS on line
 100400 = UPS self-test passed
 100401 = Scheduled UPS self-test passed
 100402 = User initiated UPS self-test passed
 100403 = Self-test at UPS passed
 100500 = Administrative shutdown started
 100501 = Administrative shutdown: User initiated
 100502 = Administrative shutdown: Weekly shutdown
 100503 = Administrative shutdown: Daily shutdown
 100600 = Shutdown cancelled
 100601 = User initiated shutdown cancelled
 100602 = Weekly administrative shutdown cancelled
 100603 = Daily administrative shutdown cancelled
 100700 = UPS returned from low battery condition
 100701 = UPS returned from low battery condition: #BATTERY_CAPACITY#
 100900 = UPS batteries no longer need replacing
 101000 = Contact #CONTACT_NUMBER# normal (#NORMAL_POSITION#): #USER_COMMENT#
 101300 = UPS overload condition solved
 101400 = UPS run time calibration initiated
 101500 = UPS run time calibration completed
 101600 = Shutdown started
 101601 = User initiated shutdown started
 101602 = Weekly administrative shutdown started
 101603 = Daily administrative shutdown started
 101700 = UPS returned from bypass
 101800 = Smart Cell signal restored
 110000 = Ambient temperature back within thresholds
 110100 = Ambient humidity back within thresholds

 200000 = UPS on battery
 200001 = UPS on battery: High input line voltage #MAX_VOLTAGE# V
 200002 = UPS on battery: Brownout #MIN_VOLTAGE# V
 200003 = UPS on battery: Blackout #MIN_VOLTAGE# V
 200004 = UPS on battery: Small momentary sag #MIN_VOLTAGE# V
 200006 = UPS on battery: Deep momentary sag #MIN_VOLTAGE# V
 200005 = UPS on battery: Small momentary spike #MAX_VOLTAGE# V
 200007 = UPS on battery: Large momentary spike #MAX_VOLTAGE# V
 200008 = UPS on battery: Simulated power failure
 200100 = System shutdown
 200101 = System shutdown: #INITIATOR# initiated
 200200 = UPS enabling Smart Boost
 200300 = Low battery condition
 200301 = Low battery condition: #BATTERY_CAPACITY#
 200400 = UPS run time calibration cancelled
 200401 = UPS run time calibration cancelled by user
 200402 = UPS run time calibration cancelled by power failure
 200403 = UPS unable to perform run time calibration: Capacity < 100
 201301 = UPS on bypass: user set via software or panel
 201302 = UPS on bypass: user set via rear switch
```

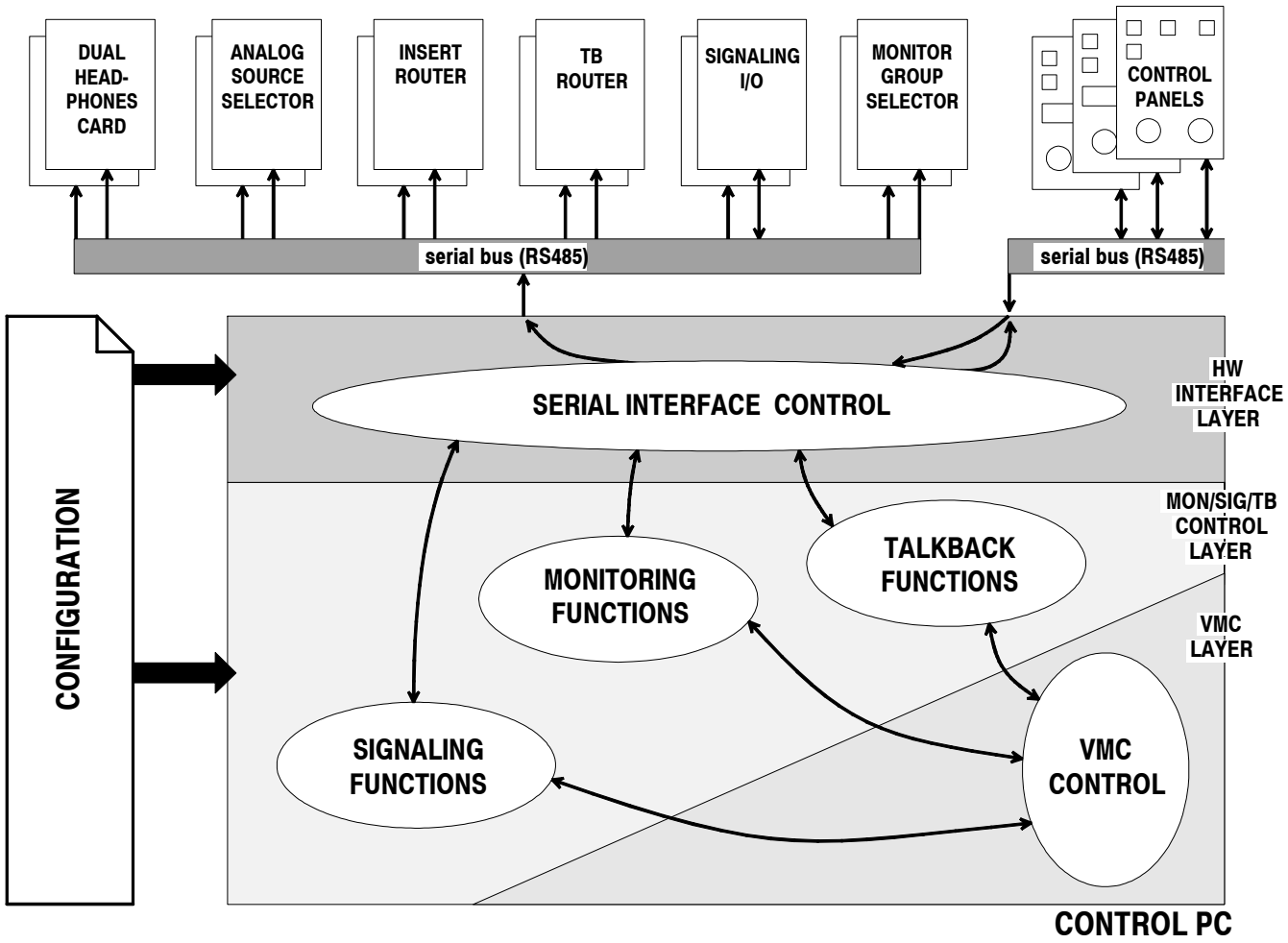
```
 300000 = Unable to communicate with UPS
 300100 = UPS output overload
 300200 = UPS self-test failed
 300201 = Scheduled UPS self-test failed: Bad battery
 300202 = Scheduled UPS self-test failed: Invalid test
 300203 = User initiated self-test failed: Bad battery
 300204 = User initiated self-test failed: Invalid test
 300205 = Self-test at UPS failed: Bad battery
 300206 = Self-test at UPS failed: Invalid test
 300300 = UPS battery is discharged
 300301 = UPS battery is discharged: #BATTERY_CAPACITY#
 300400 = Communication lost while on battery
 300600 = Contact #CONTACT_NUMBER# fault (#CONTACT_POSITION#): #USER_COMMENT#
 301000 = Check installation of Smart Cell signal cable
 301300 = UPS on bypass: internal temp over limit
 301301 = UPS on bypass: battery charger failure
 301302 = UPS on bypass: severe DC imbalance overload
 301303 = UPS on bypass: output voltage outside limits
 301304 = UPS on bypass: top module fan needs repair
 301400 = Base module fan needs repair
 301500 = Base module bypass power supply needs repair
 301600 = UPS battery needs replacing

 310001 = Below lower ambient temperature threshold of #LOW_THRESHOLD#
 310002 = Exceeded upper ambient temperature threshold of #HIGH_THRESHOLD#
 310101 = Below humidity threshold of #LOW_THRESHOLD#
 310102 = Exceeded upper humidity threshold of #HIGH_THRESHOLD#

[ PopupText ]
 1003 = Normal utility power at #HOSTNAME# has been restored.
 1006 = Shutdown of #HOSTNAME# has been cancelled.
 1007 = UPS batteries at #HOSTNAME# are no longer discharged.
 1016 = Shutdown process started.

 2000 = #HOSTNAME# is running on battery power.
 2001 = #HOSTNAME# has been shutdown.
 2003 = Low battery power at #HOSTNAME#.

 3000 = #HOSTNAME# has lost communications with the UPS.
 3003 = UPS batteries at #HOSTNAME# are discharged.

[FlexEventNames]
 1000=PowerChute Started
 1001=PowerChute Stopped
 1002=Communication Established
 1003=Utility Power Restored
 1004=UPS Self-Test Passed
 1005=Administrative Shutdown
 1006=Shutdown Cancelled
 1007=Return From Low Battery
 1009=UPS Battery Replaced
 1010=Contact Normal
 1013=Overload Condition Solved
 1014=Run Time Calibration Started
 1015=Run Time Calibration Finished
 1016=System Shutdown Starting
 1017=UPS Return From Bypass
 1018=Smart Cell signal returned
 1100=Ambient Temp In Range
 1101=Humidity In Range
 2000=UPS On Battery
 2001=System Shutdown Complete
 2002=UPS Enabling Smart Boost
 2003=Low Battery Condition
 2004=Run Time Calibration Aborted
 2013=UPS On Bypass: Maintenance
```

```
 3000=Lost Communication With UPS
 3001=UPS Output Overload
 3002=UPS Self-Test Failed
 3003=UPS Battery Is Discharged
 3004=Comm Lost While On Battery
 3006=Abnormal Contact Position
 3010=Check Smart Cell Signal
 3013=UPS On Bypass: Failure
 3014=Base Module Fan Failure
 3015=Base Power Supply Failure
 3016=Battery Needs Replacing
 3100=Ambient Temp Out Of Range
 3101=Humidity Out Of Range

[ Email ]
 Password =

[ LineFail ]
 NotifyDelay = 1
 NotifyInterval = 60
 NotifyRepeat = Yes
 ShutdownDelay = 300
 Actions =    LUS

 NotifyType = Some
 NotifyUserList = industrie8
[ PrepareForShutdown ]
 NotifyDelay = 0
 ApplicationShutdownEnabled = Yes
 ShutdownDelay = 30

 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ industrie8 ]
 NotificationAddress = industrie8
 EMailAddress = industrie8
 NotificationEnabled = Yes
[ EventUsers ]
 Users = industrie8
[ LineGood ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ SelfTestPassed ]
 Actions = LU
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ LowBattery ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ BatteryDischarged ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ ReturnFromBatteryDischarged ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ CommunicationLost ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ CommunicationLostOnBattery ]
```

```
 NotifyType = Some
 NotifyUserList = industrie8
NotifyRepeat = No
[ CancelShutdown ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ Overload ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ ReturnFromOverload ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ SelfTestFailed ]
 Actions = LU
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ ReplaceBattery ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ DontReplaceBattery ]
 NotifyType = Some
 NotifyUserList = industrie8
 NotifyRepeat = No
[ Modem ]
 DialType = Tone
 PortName = COM11
```

6.7 Signaling & Monitoring Setup

6.7.1 System Overview



Block diagram of the monitoring (signaling and talkback) system

Hardware components:

The user interface of the monitoring system comprises a series of dedicated control panels:

1.950.890 Input selector panel with 20 keys;
1.950.855 Input selector panel with 10 keys and alpha-numeric displays;
1.950.860 CR monitor panel (stereo);
1.950.870 Studio monitor panel (stereo);
1.950.880 Headphones/Talkback/PFL-Solo panel;
1.950.720 Surround panel.

The panels contain controls (keys, potentiometers) and display elements (LEDs, alpha-numeric displays). The control panels, together with the signaling input cards, are capable of producing input to the control system.

The routing and switching of the audio signals is done by a number of audio cards:

- Analog input selector;
- Insert router;
- Monitor group selector;
- Dual headphones card;
- Talkback router.

The concept of the audio cards is modular, so that the same cards are used for systems of various sizes and for different audio formats.

Configuration:

The configuration of the monitoring, signaling, and talkback system is done through a set of initialization files. The definitions of all hardware components (panels and audio cards) are contained in a file called MonResources.ini .

This file is used as a component library. Detailed description of the contents is given in the MonResources.ini file itself. A specific configuration contains references to hardware components defined in this file. During initialization, the **D950system** application looks for the file called **C:\D950SYSTEM\MonResources.ini**. If this file is not found, the monitoring system shall not function.

To configure a specific monitoring system, a second file has to be created. This file has a user-given name (e.g. **MonMySystem.ini**). The full path and name of this file have to be specified in the main initialization file **D950system.ini** under **MonitoringIniFile** (for example: **MonitoringIniFile= C:\D950SYSTEM\MonMySystem.ini**).

This file contains several types of information:
List of all hardware components used in the system – panels and cards with type definition, port, and address;
List of VMC references used in monitoring – patch sources and targets described in a symbolic language;
List of output element groups – displays, activators, and VMC references can be bound in groups, to be used by functions later on;
PFL/Solo configuration settings;
Talkback configuration settings;
Connection table that connects control elements to functions;
Connection table that connects functions to output elements or output element groups.
The configuration data are used during the start up of the application, to build an appropriate SW structure.
During on-line operation it is possible to re-configure the monitoring sources. This can be done only by the system administrator ("SysAdmin/ Monitoring/Edit Monitor File" menu).

6.7.2 Error Handling

Configuration errors:

There is a possibility that errors are found in the configuration files. There are various kinds of errors that can be detected. Generally, if an item is missing or if it has an illegal value, the respective parameter is initialized with the default value if available. If no default setting is defined or if the error causes the loss of a function, an error message shall be logged in a system log file.

Errors during operation:

A possible cause of error during operation is an interruption in the serial communication either between the control PC and the desk (panels) or the control PC and the monitoring rack (audio cards). Communication interruptions are detected by the control system. As soon as normal communication is restored, all the cards and panels are re-initialized with the current status data. Loss of a connection is logged in the system log file as well.

6.7.3 Monitoring/Signaling/Talkback Configuration

HW resources:

The configuration of the monitoring, signaling, and talkback systems is done through a set of initialization files.

All hardware resources are defined in the file named **MonResources.ini**. This file contains definitions of all control panels and audio cards used by the monitoring, signaling, and talk back functions. Each component type (card or panel) is described in detail in this file.

MonResources.ini is a library of hardware resources that can be used in a D950 monitoring, signaling, and talkback subsystem. The file has to be available in the folder **C:\D950SYSTEM**. Otherwise the monitoring, signaling, and talkback subsystem will not function. A part of the **MonResources.ini** file is given below with detailed explanations:

```
[comment]
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!    M O N I T O R I N G   R E S O U R C E S  L I B R A R Y  V 2.0
!!    This version contains the definition of the special talk-back panel for OA5000
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!
!!    FILE NAME: c:\d950system\MonResources.ini
!!
!! This file contains definitions of all cards used in the monitoring (signaling and
!! talk back) system. They are divided in two groups: output cards and input/output
!! cards.
!!
!! 1.2. Card Type Definitions
!! --------------------------
!!
!! 1.2.1. Output Cards
!!
!! A section defining an output card (audio board) has a name of the form: ["CardO_"Type].
!! The section contains some general parameters (OutputStatusLength, NumOfElements)
!! and a specification of each activator on the card.
!! An  activator is described by the type (switch or amp), its position in the card
!! status data (byte and bit numbers or byte number and size) and a short name. The
!! activator short name and a specific card name, defined in the section [CARDS], are
!! used for building the activator identification name (e.g. AID_CRINO_IN2). These names
!! are later used to connect to functions or build groups of activators.
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

[CardO_SignalOutput]

Type=8
OutputStatusLength=3
NumOfElements=16
!!--------type/offset/pos or size/name!!
0=switch/2/5/REL00
1=switch/2/6/REL01
2=switch/1/0/REL02
3=switch/1/1/REL03
4=switch/1/2/REL04
5=switch/1/3/REL05
6=switch/1/4/REL06
7=switch/1/5/REL07
8=switch/1/6/REL08
9=switch/0/0/REL09
10=switch/0/1/REL10
11=switch/0/2/REL11
12=switch/0/3/REL12
13=switch/0/4/REL13
14=switch/0/5/REL14
15=switch/0/6/REL15
```

```
[Card0_InputSelector]

Type=1
OutputStatusLength=4
NumOfElements=24
!!--------type/offset/pos or size/name!!
0=switch/0/0/IN0
1=switch/0/1/IN1
2=switch/0/2/IN2
3=switch/0/3/IN3
4=switch/0/4/IN4
5=switch/0/5/IN5
6=switch/0/6/IN6
7=switch/1/0/IN7
8=switch/1/1/IN8
9=switch/1/2/IN9
10=switch/1/3/IN10
11=switch/1/4/IN11
12=switch/1/5/IN12
13=switch/1/6/IN13
14=switch/2/0/IN14
15=switch/2/1/IN15
16=switch/2/2/IN16
17=switch/2/3/IN17
18=switch/2/4/IN18
19=switch/2/5/IN19
20=switch/2/6/IN20
21=switch/3/4/IN21
22=switch/3/5/IN22
23=switch/3/6/IN23

[Card0_InputSelectorOctober]

Type=1
OutputStatusLength=4
NumOfElements=24
!!--------type/offset/pos or size/name!!
0=switch/3/4/IN0
1=switch/3/5/IN1
2=switch/3/6/IN2
3=switch/2/0/IN3
4=switch/2/1/IN4
5=switch/2/2/IN5
6=switch/2/3/IN6
7=switch/2/4/IN7
8=switch/2/5/IN8
9=switch/2/6/IN9
10=switch/1/0/IN10
11=switch/1/1/IN11
12=switch/1/2/IN12
13=switch/1/3/IN13
14=switch/1/4/IN14
15=switch/1/5/IN15
16=switch/1/6/IN16
17=switch/0/0/IN17
18=switch/0/1/IN18
19=switch/0/2/IN19
20=switch/0/3/IN20
21=switch/0/4/IN21
22=switch/0/5/IN22
23=switch/0/6/IN23
```

```
[Card0_InsertRouter]

Type=3
OutputStatusLength=2
NumOfElements=13
!!--------type/offset/pos or size/name!!

0=switch/0/1/MTR_IN
1=switch/0/2/MTR_RET0
2=switch/0/3/MTR_RET1
3=switch/0/4/MTR_RET2
4=switch/0/5/MTR_RET3
5=switch/0/6/MTR_OUT
6=switch/1/0/INS0
7=switch/1/1/INS1
8=switch/1/2/INS2
9=switch/1/3/INS3
10=switch/1/4/MTR_EXT0
11=switch/1/5/MTR_EXT1
12=switch/1/6/MTR_EXT2


[Card0_OutputSelectorOctober]

Type=2
HwMute=Yes
OutputStatusLength=11
NumOfElements=15
!!--------type/offset/[pos]/name!!
0=switch/0/3/TB
1=switch/0/4/GRP0
2=switch/0/5/GRP1
3=switch/0/6/GRP2
4=switch/1/0/RTOL
5=switch/1/1/RTOR
6=switch/1/2/LTOLR
7=switch/1/3/RTOLR
8=switch/1/6/LPHINV
9=switch/2/5/LTOL
10=switch/2/6/LTOR
11=amp8/3/CALR
12=amp8/5/CALL
13=amp8/7/LVLR
14=amp8/9/LVLL
```

..... see **C:\D950SYTEM\MonResources.ini** file for the rest of the output card definitions.

```
[comment]
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!! 1.2.2. Input/Output Cards (Panels)
!!
!! A section defining an input/output card (panel) has a name of the form: ["CardIO_"Type].
!! The section contains some general parameters (InputStatusLength, NumOfCtrlElements,
!! LedStatusLength, AlphaStatusLength, NumOfDsplElements) specifications of control
!! elements and of display elements on the panel.
!! A control element is described by the type (button or pot), it's possition in the
!! panel status data (byte and bit numbers or byte number and size) and a short name.
!! The short name and a specific card name, defined in the section [CARDS], are used
!! for building the control identification name (e.g. CID_CRIN_IN2). These names are
!! later used to connect to functions.
!! A display element is described by the type (led or alpha), it's possition in the card
!! status data (byte and bit numbers or byte number and size) and a short name. The short
!! name and a specific card name, defined in the section [CARDS], are used for building
!! the display identification name (e.g. DID_CRIN_IN2). These names are
!! later used to connect to functions and build display groups.
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

[CardIO_D19mRcc]

InputStatusLength=1
NumOfCtrlElements=8
!!--------type/offset/pos or size/name!!
C_0=button/0/0/OPT000
C_1=button/0/1/OPT001
C_2=button/0/2/OPT002
C_3=button/0/3/OPT003
C_4=button/0/4/OPT004
C_5=button/0/5/OPT005
C_6=button/0/6/OPT006
C_7=button/0/7/OPT007

LedStatusLength=1
NumOfDsplElements=8
!!--------type/offset/pos or size/name!!
D_0=switch/0/0/IN0
D_1=switch/0/1/IN1
D_2=switch/0/2/IN2
D_3=switch/0/3/IN3
D_4=switch/0/4/IN4
D_5=switch/0/5/IN5
D_6=switch/0/6/IN6
D_7=switch/0/7/IN7



[CardIO_SignalInput]

Type=9
InputStatusLength=4
NumOfCtrlElements=24
!!--------type/offset/pos or size/name!!
C_0=button/0/4/OPT000
C_1=button/0/5/OPT001
C_2=button/0/6/OPT002
C_3=button/1/0/OPT003
C_4=button/1/1/OPT004
C_5=button/1/2/OPT005
C_6=button/1/3/OPT006
C_7=button/1/4/OPT007
C_8=button/1/5/OPT008
C_9=button/1/6/OPT009
C_10=button/2/0/OPT010
C_11=button/2/1/OPT011
```

```
C_12=button/2/2/OPTO12
C_13=button/2/3/OPTO13
C_14=button/2/4/OPTO14
C_15=button/2/5/OPTO15
C_16=button/2/6/OPTO16
C_17=button/3/0/OPTO17
C_18=button/3/1/OPTO18
C_19=button/3/2/OPTO19
C_20=button/3/3/OPTO20
C_21=button/3/4/OPTO21
C_22=button/3/5/OPTO22
C_23=button/3/6/OPTO23


[CardIO_InputSelectorA]

Type=4
InputStatusLength=13
NumOfCtrlElements=20
!!--------type/offset/pos or size/name!!
C_0=button/2/4/IN0/*1*_IN0_SEL
C_1=button/2/5/IN1/*1*_IN1_SEL
C_2=button/2/2/IN2/*1*_IN2_SEL
C_3=button/2/3/IN3/*1*_IN3_SEL
C_4=button/2/0/IN4/*1*_IN4_SEL
C_5=button/2/1/IN5/*1*_IN5_SEL
C_6=button/3/5/IN6/*1*_IN6_SEL
C_7=button/3/6/IN7/*1*_IN7_SEL
C_8=button/3/3/IN8/*1*_IN8_SEL
C_9=button/3/4/IN9/*1*_IN9_SEL
C_10=button/3/1/IN10/*1*_IN10_SEL
C_11=button/3/2/IN11/*1*_IN11_SEL
C_12=button/4/6/IN12/*1*_IN12_SEL
C_13=button/3/0/IN13/*1*_IN13_SEL
C_14=button/4/4/IN14/*1*_IN14_SEL
C_15=button/4/5/IN15/*1*_IN15_SEL
C_16=button/4/2/IN16/*1*_IN16_SEL
C_17=button/4/3/IN17/*1*_IN17_SEL
C_18=button/4/0/IN18/*1*_IN18_SEL
C_19=button/4/1/IN19/*1*_IN19_SEL

LedStatusLength=11
NumOfDsplElements=20
!!--------type/offset/pos or size/name!!
D_0=led/3/2/IN0
D_1=led/3/0/IN1
D_2=led/2/0/IN2
D_3=led/3/4/IN3
D_4=led/7/2/IN4
D_5=led/7/0/IN5
D_6=led/6/0/IN6
D_7=led/7/4/IN7
D_8=led/6/4/IN8
D_9=led/6/2/IN9
D_10=led/5/2/IN10
D_11=led/5/0/IN11
D_12=led/10/4/IN12
D_13=led/10/2/IN13
D_14=led/9/2/IN14
D_15=led/9/0/IN15
D_16=led/8/0/IN16
D_17=led/9/4/IN17
D_18=led/8/4/IN18
D_19=led/8/2/IN19
```

```
[CardIO_InputSelectorB]

Type=7
InputStatusLength=2
NumOfCtrlElements=10
!!--------type/offset/pos or size/name!!
C_0=button/1/0/IN0/*1*_IN0_SEL
C_1=button/1/1/IN1/*1*_IN1_SEL
C_2=button/1/2/IN2/*1*_IN2_SEL
C_3=button/1/3/IN3/*1*_IN3_SEL
C_4=button/1/4/IN4/*1*_IN4_SEL
C_5=button/1/5/IN5/*1*_IN5_SEL
C_6=button/1/6/IN6/*1*_IN6_SEL
C_7=button/0/0/IN7/*1*_IN7_SEL
C_8=button/0/1/IN8/*1*_IN8_SEL
C_9=button/0/2/IN9/*1*_IN9_SEL

LedStatusLength=4
NumOfDsplElements=20
!!--------type/offset/pos or size/name!!
D_0=led/0/4/IN0
D_1=led/0/2/IN1
D_2=led/0/0/IN2
D_3=led/1/4/IN3
D_4=led/1/2/IN4
D_5=led/1/0/IN5
D_6=led/2/4/IN6
D_7=led/2/2/IN7
D_8=led/2/0/IN8
D_9=led/3/4/IN9

AlphaStatusLength=80
AlphaElementSize=4
AlphaElementSequence=19/20/17/18/15/16/13/14/11/12/9/10/7/8/5/6/3/4/1/2
AlphaInitialText=--------STUDER  D950    DIGITAL MIXING  SYSTEM  --------                 --------
!!!!help         12345678901234567890123456789012345678901234567890123456789012345678901234567890
D_10=alpha/0/8/NAME0
D_11=alpha/8/8/NAME1
D_12=alpha/16/8/NAME2
D_13=alpha/24/8/NAME3
D_14=alpha/32/8/NAME4
D_15=alpha/40/8/NAME5
D_16=alpha/48/8/NAME6
D_17=alpha/56/8/NAME7
D_18=alpha/64/8/NAME8
D_19=alpha/72/8/NAME9


[CardIO_MMU]

Type=6
InputStatusLength=10
NumOfCtrlElements=36
!!--------type/offset/pos or size/name!!
C_0=button/2/6/INS_DEC/*1*_INS0_SEL
C_1=button/2/5/ADD
C_2=button/2/4/METR/*1*_MTR5_SEL
C_3=button/2/3/SWAP/*1*_OUT_SWAP
C_4=button/2/0/LPHINV/*1*_OUT_LPHINV
C_5=button/2/1/SETUP/*1*_SETUP_MODE
C_6=button/1/3/FMONO/*1*_OUT_FRMMONO
C_7=button/1/2/FSTEREO/*1*_OUT_FRMSTEREO
C_8=button/1/1/F51/*1*_OUT_FRM51
C_9=button/1/0/F71/*1*_OUT_FRM71
C_10=button/3/6/F424/*1*_OUT_FRM424
C_11=button/3/4/NEARF/*1*_OUT1_SEL
```

```
C_12=button/5/2/ALT/*1*_OUT2_SEL
C_13=button/5/1/MAIN/*1*_OUT0_SEL
C_14=button/0/0/SOLO_L/*1*_OUT_SOLO0/FID_*1*_SPKR_SEL0
C_15=button/1/6/SOLO_LC/*1*_OUT_SOLO6/FID_*1*_SPKR_SEL6
C_16=button/1/5/SOLO_C/*1*_OUT_SOLO2/FID_*1*_SPKR_SEL2
C_17=button/1/4/SOLO_RC/*1*_OUT_SOLO7/FID_*1*_SPKR_SEL7
C_18=button/5/4/SOLO_R/*1*_OUT_SOLO1/FID_*1*_SPKR_SEL1
C_19=button/5/3/UNCAL/*1*_UNCAL_MODE
C_20=button/0/4/MUTE_L/*1*_OUT_MUTE0
C_21=button/0/3/MUTE_LC/*1*_OUT_MUTE6
C_22=button/0/2/MUTE_C/*1*_OUT_MUTE2
C_23=button/0/1/MUTE_RC/*1*_OUT_MUTE7
C_24=button/5/5/MUTE_R/*1*_OUT_MUTE1
C_25=button/4/4/SOLO_LS/*1*_OUT_SOLO4/FID_*1*_SPKR_SEL4
C_26=button/4/3/SOLO_SSUB/*1*_OUT_SOLO3/FID_*1*_SPKR_SEL3
C_27=button/4/2/SOLO_RS/*1*_OUT_SOLO5/FID_*1*_SPKR_SEL5
C_28=button/3/1/MUTE_LS/*1*_OUT_MUTE4
C_29=button/3/0/MUTE_SSUB/*1*_OUT_MUTE3
C_30=button/4/6/MUTE_RS/*1*_OUT_MUTE5
C_31=button/4/0/MUTE/*1*_OUT_MUTE
C_32=button/5/6/DIM/*1*_OUT_DIM
C_33=pot_A/7/7/TRM_NEAR/*1*_OUT2_TRIM
C_34=pot_A/6/7/TRM_ALT/*1*_OUT1_TRIM
C_35=encoder/9/7/LVL/*1*_OUT_LVL/*1*_OUT_CAL_LVL

LedStatusLength=14
NumOfDsplElements=42
!!--------type/offset/pos or size/name!!
D_0=led/9/4/INS_DEC
D_1=led/8/0/ADD
D_2=led/8/2/METR
D_3=led/8/4/SWAP
D_4=led/7/4/LPHINV
D_5=led/7/2/SETUP
D_6=led/10/2/FMONO
D_7=led/10/4/FSTEREO
D_8=led/9/0/F51
D_9=led/9/2/F71
D_10=led/6/0/F424
D_11=led/6/4/NEARF
D_12=led/0/0/ALT
D_13=led/0/2/MAIN
D_14=led/11/0/SOLO_L
D_15=led/11/2/SOLO_LC
D_16=led/11/4/SOLO_C
D_17=led/10/0/SOLO_RC
D_18=led/1/2/SOLO_R
D_19=led/1/4/UNCAL
D_20=led/13/4/MUTE_L
D_21=led/12/0/MUTE_LC
D_22=led/12/2/MUTE_C
D_23=led/12/4/MUTE_RC
D_24=led/1/0/MUTE_R
D_25=led/3/0/SOLO_LS
D_26=led/3/2/SOLO_SSUB
D_27=led/3/4/SOLO_RS
D_28=led/5/4/MUTE_LS
D_29=led/4/0/MUTE_SSUB
D_30=led/4/2/MUTE_RS
D_31=led/2/2/MUTE
D_32=led/2/4/DIM
```

```
AlphaStatusLength=32
AlphaElementSize=4
AlphaElementSequence=5/6/7/8/1/2/3/4
AlphaInitialText=STUDER D950     DIGITAL CONSOLE
!!!!help         12345678901234567890123456789012
D_33=alpha/0/3/SPKR_L
D_34=alpha/3/3/SPKR_LC
D_35=alpha/6/3/SPKR_C
D_36=alpha/10/3/SPKR_RC
D_37=alpha/13/3/SPKR_R
D_38=alpha/17/3/SPKR_LS
D_39=alpha/20/3/SPKR_SSUB
D_40=alpha/24/3/SPKR_RS
D_41=alpha/26/6/LVL



[CardIO_CrMain]

Type=4
InputStatusLength=13
NumOfCtrlElements=11
!!--------type/offset/pos or size/name!!
C_0=button/2/4/GRP1_SEL/*1*_OUT0_SEL
C_1=button/2/5/METR_MON/*1*_MTR5_SEL
C_2=button/2/2/GRP2_SEL/*1*_OUT1_SEL
C_3=button/2/3/IS1_SEL/*1*_INS0_SEL
C_4=button/3/3/CH1_PHASE/*1*_OUT_LPHINV
C_5=button/3/4/SWAP/*1*_OUT_SWAP
C_6=button/3/1/DIM/*1*_OUT_DIM
C_7=button/3/2/MONO/*1*_OUT_FRMMONO
C_8=button/4/0/CH1_CUT/*1*_OUT_MUTE0
C_9=button/4/1/CH2_CUT/*1*_OUT_MUTE1
C_10=pot_A/11/7/LVL/*1*_OUT_LVL

LedStatusLength=11
NumOfDsplElements=10
!!--------type/offset/pos or size/name!!
D_0=led/3/2/GRP1_SEL
D_1=led/3/0/METR_MON
D_2=led/2/0/GRP2_SEL
D_3=led/3/4/IS1_SEL
D_4=led/6/4/CH1_PHASE
D_5=led/6/2/SWAP
D_6=led/5/2/DIM
D_7=led/5/0/MONO
D_8=led/8/4/CH1_CUT
D_9=led/8/2/CH2_CUT
```

..... see **C:\D950SYTEM\MonResources.ini** file for the rest of the input/output card definitions.

Monitoring & Talkback Configuration:

To configure a specific monitoring/talkback system, a second file has to be created. This is the monitoring configuration file. There can be several monitoring configuration files present in the system, but only one is used at a time. The name of a monitoring configuration file is given by the user and can, for example, be: **MonMyStereo.ini** (the prefix **Mon** is recommended, and the extension ***.ini** is mandatory). The name of the currently valid configuration file (with the full path) has to be specified in the **D950system.ini** main initialization file within in the Windows directory. The **D950system.ini** file will, in this case, contain the following record:

```
MonitoringIniFile=C:\D950SYSTEM\MonMyStereo.ini;
```

To explain the contents and use of the monitoring configuration, parts of a typical configuration file are shown below. This is not a complete and functional configuration file, but only parts that can serve as examples. For the complete contents see the **MonTemplate.ini** file in **C:\D950SYSTEM**.

Signaling configuration:

Signaling consists of different parts:

- Global red light,
- Signaling outputs, and
- Signaling inputs.

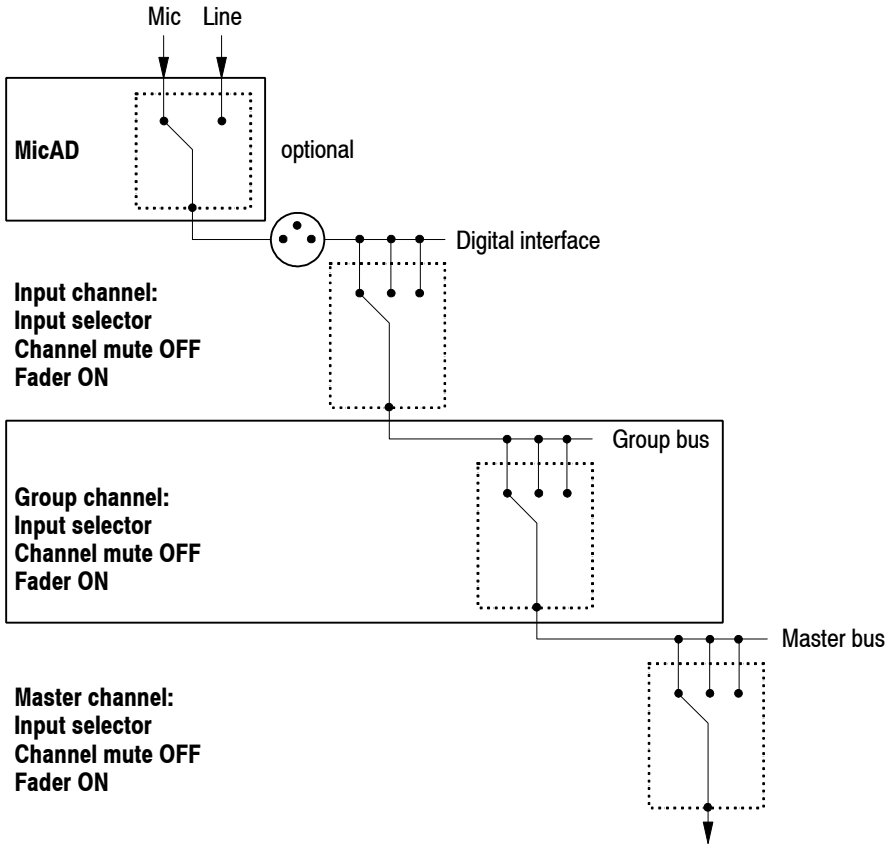
For the user-specific configuration of Global red light and Signaling outputs, there is an on-line editing tool which is part of the GC. The configurations once made can be saved in and loaded from a specific signaling file. Signaling inputs can currently only be configured in a special **Signaling.ini** file.

First, let's have a look at the definitions of global red light and signaling out as they are defined in the D950:

Global red light

Global red light controls the signal flow from an input to a master channel. Valid input sources are AES In, MADI In and MicAD Mic sources.
The red light condition for a source is TRUE if any path from a source to a master channel is open. This means in detail (also refer to the picture below):

1. In case of a MicAD source, the MicAD selector is in the Mic position, and the MicAD output is patched to a D950 patch source (AES or MADI);
2. The patch source is patched to an input, group, or master channel;
3. The input selector of the channel is in the right position, the channel is not muted, and the fader is on. If the channel is not a master channel, it is assigned to a group bus (in case of an input channel) or master bus (input and group channel);
4. If an input channel is assigned to a group bus, the input selector of the group is in the right position, the group is not muted, the fader is on, and the group output is assigned to a master bus;
5. The input selector of the master is in the right position, the master is not muted, and the fader is on.



Different red light sources can be assigned to the same output relay, that is, whenever the red light condition of any of the sources is TRUE, the relay will be switched on (logical OR). To switch off a relay, neither of the paths must be open.
Every red light source can be connected with one of the studio main panels configured in the **monitoring.ini** file. It is then possible to trigger the relay with the manual pushbutton located on the studio main panel.

More information on Signaling Setup can be found in chapter 4.7.6.

6.8 d950deskTemplate.ini

```
Comment=D950DeskHardwareResourcesSpecifications for SW Release V3.2
Comment=23.05.03 by D950 Development Team

; modified sections (JM 23.05.03):
;     new Section Item for Extended HDCL Error messages in D950system.log
; [PHYSICAL_UI]
; ExtendedHdlcErrMessage=

; modified sections (JM 10.02.03):
; [4CH_STRIP_NODE_0]
; new downloadfirmware for 4-channel strips (Classic)
; ApplicationFilename=C:\D950SYSTEM\k940402.pgm
;
; new downloadfirmware for 4-channel strips (M2)
; ApplicationFilename=C:\D950SYSTEM\k950402.pgm
;
; new downloadfirmware for 4-channel strips (Fader Only Modules)
; ApplicationFilename=C:\D950SYSTEM\f950402.pgm
;
; [MPU_0]
; new downloadfirmware for Multiformat Panning Unit
; ApplicationFilename=C:\D950SYSTEM\j950402.pgm
;
; [CCU_0]
; 2nd BSU & 2nd MMS defaults to No (rarely used)
; 2ndBSUPresent=No
; 2ndMMSPresent=No
;
; [BLOCKED_KEYS]
; Blocked keys commented out (rarely used)
; NumberOfBlocked4ChStripKeys=2
; Blocked4ChStripKey0=3
; Blocked4ChStripKey1=10
;
; [LOG_CTRL_GRP_x]
; 1st blank character removed
;
; [LOG_CTRL_GRP_0]
; Logical Desk Control Group represents above definition settings
; NumberOf4ChStrips=4
; NumberOfMpu=1
; 4ChStripNodeAssign0=0
; 4ChStripNodeAssign1=1
; 4ChStripNodeAssign2=2
; 4ChStripNodeAssign3=3
; CCUNodeAssign=0
; MPUNodeAssign0=0
; CASNodeAssign0=0
; IsLeftJoystickActiveOnMPU0=Yes
; IsRightJoystickActiveOnMPU0=Yes
;
;
; modified sections (JM 01.02.02):
;     new Section Items for new Automation V3.0
; [PHYSICAL_UI]
; FaderValueWithoutTouch=      Allows processing of fader values without preceding fader touch
; RotaryValueWithoutTouch=     Allows processing of rotary values without preceding rotary touch
;
;
```

```
; modified sections (JM 13.09.01):
; [CCU_0]
; new downloadfirmware for ccu
; ApplicationFilename=C:\D950SYSTEM\c9503601.pgm
;
; not mandatory if no blocked keys on new AMP required
; [BLOCKED_KEYS]
; NumberOfBlockedAmpKeys=       number of blocked keys in new Automation Master Panel (AMP) V3.0
; BlockedAmpKey0=               inactive key number 0..51



; [PHYSICAL_UI]             actual Desk resources
; NumberOfHDLCMaster=       corresponds HDLC Master controllers installed in the Control PC (1..4)
; NumberOf4ChStrips=        corresponds to 4-channel strips of the whole D950 System
;                           Note:   NumberOf4ChStrips can be smaller than defined below
;                                   ([4CH_STRIP_NODE_x]), but not greater.
; NumberOf4ChBargraph=      corresponds to 4-channel Bargraph of the whole D950 System
; NumberOfCcu=              corresponds to Central Control Units of the whole D950 System
;                           Note:   NumberOfCcu can be smaller than defined below
;                                   ([CCU_x]), but not greater.
; NumberOfMpu=              corresponds to Multiformat Panning Units of the whole D950 System
;                           Note:   NumberOfMpu can be smaller than defined below
;                                   ([MPU_x]), but not greater.
; NumberOfCas=              corresponds to Central Assign Section Units of the whole D950 System
;                           Note:   NumberOfCas can be smaller than defined below
;                                   ([CAS_x]), but not greater.
; IsRotaryResolutionLow=    indicates if new Encoders with 40 instead of 100 cycles per Rotation
;                           are assembled in 4-channel strips (Yes/No dft:No)
; FaderValueWithoutTouch=   Allows processing of fader values without preceding fader touch
;                           (Yes/No dft:No)
; RotaryValueWithoutTouch=  Allows processing of rotary values without preceding rotary touch
;                           (Yes/No dft:No)
; ExtendedHdlcErrMessage=   Allows Extended HDCL Error messages readout in D950system.log
;                           (Yes/No dft:Yes)

[PHYSICAL_UI]
NumberOfHDLCMaster=1
NumberOf4ChStrips=4
NumberOf4ChBargraph=4
NumberOfCcu=1
NumberOfMpu=1
NumberOfCas=1
IsRotaryResolutionLow=No
FaderValueWithoutTouch=No
RotaryValueWithoutTouch=No
ExtendedHdlcErrMessage=Yes

; [4CH_STRIP_NODE_0]    first 4-ch. strip with logical Node No.  (starting with 0)
; MasterAddr=           connected to HDLC Master x (0..NumberOfHDLCMaster-1)
;                                                   HDLC master address 0 = IP module A
;                                    HDLC master address 1 = IP module B
;                                    HDLC master address 2 = IP module C
;                                    HDLC master address 3 = IP module D
; HDLCAddr=             corresponds to Strip Node HDLC address
;                       (starting with 0, 4, 8..60 in decimal)
; LACPPresent=          indicates, if LACP (16 Rotaries, displays etc.) is present (Yes/No dft:No)
; BargraphPresent=      indicates, if 4-ch. Bargraph is present (Yes/No dft:No)
; NewBargraph=                      indicates, if new 2-Sandwich PCB Bargraph is present (Yes/No dft:No)
; BargraphHDLCAddr=     corresponds to Bargraph Node HDLC address
;                       (same as Strip Node Addr., starting with 0, 4, 8..60 in decimal)
; DeskLocation=                     corresponds  to  the  physical  location  on  the  Desk  (Left/Right
;                                   dft:Left)
; ApplicationFilename=  location and name of Application to download (k9404902.pgm for D950 Classic,
;                                                                     k9504902.pgm for D950 M2,
;                                                                     f9504902.pgm for D950 Fader only)
```

```
[4CH_STRIP_NODE_0]
MasterAddr=1
HDLCAddr=0
LACPPresent=Yes
BargraphPresent=Yes
NewBargraph=Yes
BargraphHDLCAddr=0
DeskLocation=Left
ApplicationFilename=C:\D950SYSTEM\k9504902.pgm

[4CH_STRIP_NODE_1]
MasterAddr=1
HDLCAddr=4
LACPPresent=Yes
BargraphPresent=Yes
NewBargraph=Yes
BargraphHDLCAddr=4
DeskLocation=Left
ApplicationFilename=C:\D950SYSTEM\k9504902.pgm

[4CH_STRIP_NODE_2]
MasterAddr=1
HDLCAddr=8
LACPPresent=Yes
BargraphPresent=Yes
NewBargraph=Yes
BargraphHDLCAddr=8
DeskLocation=Right
ApplicationFilename=C:\D950SYSTEM\k9504902.pgm

[4CH_STRIP_NODE_3]
MasterAddr=1
HDLCAddr=12
LACPPresent=Yes
BargraphPresent=Yes
NewBargraph=Yes
BargraphHDLCAddr=12
DeskLocation=Right
ApplicationFilename=C:\D950SYSTEM\k9504902.pgm


; [CCU_0]               first Central Control Unit with logical Node No.  (starting with 0)
; MasterAddr=           connected to HDLC Master x (0..NumberOfHDLCMaster-1)
;                                                  HDLC master address 0 = IP module A
;                                     HDLC master address 1 = IP module B
;                                     HDLC master address 2 = IP module C
;                                     HDLC master address 3 = IP module D
; HDLCAddr=             corresponds to Ccu HDLC address (starting with 240)
; 2ndBSUPresent=indicates, if 2nd Bank Select Unit is present (Yes/No dft:No)
; 2ndMMSPresent=indicates, if 2nd Master Menu Selector is present (Yes/No dft:No)
; 2ndCFUPresent=indicates, if 2nd Central Facilities Unit is present (Yes/No dft:No)
; ApplicationFilename=  location and name of Application to download (c9503601.pgm)

[CCU_0]
MasterAddr=1
HDLCAddr=240
2ndBSUPresent=No
2ndMMSPresent=No
ApplicationFilename=C:\D950SYSTEM\c9503601.pgm
```

```
; [MPU_0]               first Multiformat Panning Unit with logical Node No.  (starting with 0)
; MasterAddr=           connected to HDLC Master x (1..NumberOfHDLCMaster)
;                                                  HDLC master address 0 = IP module A
;                                  HDLC master address 1 = IP module B
;                                  HDLC master address 2 = IP module C
;                                  HDLC master address 3 = IP module D
; HDLCAddr=             corresponds to Mpu HDLC address (starting with 244)
; ApplicationFilename=  location and name of Application to download (j9504902.pgm)

[MPU_0]
MasterAddr=1
HDLCAddr=244
ApplicationFilename=C:\D950SYSTEM\j9504902.pgm

; [CAS_0]               first Central Assign Section  Unit with logical Node No.  (starting with 0)
; MasterAddr=           connected to HDLC Master x (1..NumberOfHDLCMaster)
;                                                  HDLC master address 0 = IP module A
;                                  HDLC master address 1 = IP module B
;                                  HDLC master address 2 = IP module C
;                                  HDLC master address 3 = IP module D
; HDLCAddr=             corresponds to Cas HDLC address
;                       starting with 128 and multiple of 16 (eg. 128 or 144 etc.)
; DeskLocation=         corresponds to the physical location on the Desk (Left/Right dft:Left)
;                       Note: If more than 1 CAS declared with no desk location description,
;                             the multiple CAS work in parallel over the entire desk
; ApplicationFilename=  location and name of Firmware Application to download for update
;                       Note: cas010320.s19 is mandatory if you update to D950 Rel V2.5
;                             The Application file is not mandatory for normal operation,
;                             it is only used for firmware updates on the CAS module.

[CAS_0]
MasterAddr=0
HDLCAddr=128
DeskLocation=Left
ApplicationFilename=C:\D950SYSTEM\cas010320.s19

; [BLOCKED_KEYS]                Blocked (inaktive) key definition section
;                               (for key numbering see KeyNumber.xls)
; NumberOfBlocked4ChStripKeys=2 number of blocked keys on each strip
;                               on every 4ChStripNode
; Blocked4ChStripKey0=3         inactive key number 0..51 ( 3 == Channel ON key)
; Blocked4ChStripKey1=10        inactive key number 0..51 (10 == Clipbpard CLR key)
;
; NumberOfBlockedCauKeys=       number of blocked keys on Central Assign Unit (CAU)
; BlockedCauKey0=               inactive key number 0..79
; ..............
; NumberOfBlockedAcuKeys=       number of blocked keys in old Automation Control Unit (ACU) V2.5
; BlockedAcuKey0=               inactive key number 0..23
; ..............
; NumberOfBlockedAmpKeys=       number of blocked keys in new Automation Master Panel (AMP) V3.0
; BlockedAmpKey0=               inactive key number 0..51
; ..............
; NumberOfBlockedCsuKeys=       number of blocked keys in Central Select Unit (MMS/BSU/CFU)
; BlockedCsuKey0=               inactive key number 0..19 -> MMS;
;                                                   20..39 -> BSU;
;                                                   40..59 -> CFU;
;                               Note: same keys on 2nd MMS/BSU/CFU are inactive,
;                                     if 2nd MMS/BSU/CFU is installed
; ..............
; NumberOfBlockedMpuKeys=       number of blocked keys on each half
;                               on every MpuNode (Joystick)
; BlockedMpuKey0=               inactive key number 0..12
; ..............
; NumberOfBlockedCasKeys=       number of blocked keys on every CasNode
;                               (Central Assign Section)
; BlockedCasKey0=               inactive key number 0..182
```

```
[BLOCKED_KEYS]
; NumberOfBlocked4ChStripKeys=2
; Blocked4ChStripKey0=3
; Blocked4ChStripKey1=10

; [LOGICAL_UI]                  Logical Control Group section
; NumberOfLogicalCtrlGroups=    number of Logical Control Groups (0=1 / 2 / 3 / 4)

[LOGICAL_UI]
NumberOfLogicalCtrlGroups=1


; Logical Control group definition
; [LOG_CTRL_GRP_x]              first Logical control group (starting with 0..30
; NumberOf4ChStrips=            count of 4 ch. strips in control group x
; NumberOfMpu=                  count of MPUs in control group x
; 4ChStripNodeAssign0=          Logical 4 ch strip node numbers (see above)
; 4ChStripNodeAssign1=
; ... ..... .... .
; 4ChStripNodeAssignX=
; CCUNodeAssign=                Logical CCU number (see above)
; MPUNodeAssign0=               Logical MPU number (see above)
; ... ..... .... .
; MPUNodeAssignX=
; IsLeftJoystickActiveOnMPUx=   Left  Joystick of MPU x is active (YES/NO)
; IsRightJoystickActiveOnMPUx=  Right Joystick of MPU x is active (YES/NO)
; CASNodeAssign0=               Logical CAS number (max. 2 CAS per control group)
; CASNodeAssign1=

 [LOG_CTRL_GRP_0]
NumberOf4ChStrips=4
NumberOfMpu=1
4ChStripNodeAssign0=0
4ChStripNodeAssign1=1
4ChStripNodeAssign2=2
4ChStripNodeAssign3=3
CCUNodeAssign=0
MPUNodeAssign0=0
CASNodeAssign0=0
IsLeftJoystickActiveOnMPU0=Yes
IsRightJoystickActiveOnMPU0=Yes

[LOG_CTRL_GRP_1]
NumberOf4ChStrips =
NumberOfMpu=
4ChStripNodeAssign0=
4ChStripNodeAssign1=
... ..... .... .
4ChStripNodeAssignX=
CCUNodeAssign=
MPUNodeAssign0=
CASNodeAssign0=
IsLeftJoystickActiveOnMPU0=
IsRightJoystickActiveOnMPU0=

[LOG_CTRL_GRP_2]
... ..... .... .
... ..... .... .
... ..... .... .
```

```
[LOG_CTRL_GRP_3]
NumberOf4ChStrips =
NumberOfMpu=
4ChStripNodeAssign0=
4ChStripNodeAssign1=
... ..... .... .
4ChStripNodeAssignX=
CCUNodeAssign=
MPUNodeAssign0=
IsLeftJoystickActiveOnMPU0=
IsRightJoystickActiveOnMPU0=


; [LEVELS_dB]           System Level Section
; NominalLevel=         Nominal System level in dB
; Headroom=             Headroom definition in dB (0/3/4/6/9/10/12/15)
; VULead=               Lead of Bargraph VU mode in dB (0/2/3/4/6/8)
; IsVUDecayLow=         Sets VU Decay time to same as PPM Decay time
;                       (Yes/No; dft:no)
; Note:         Clip Level (0 dB FS) = NominalLevel +  Headroom must be 0..26
;               due to external A/D D/A devices (MicAD, MultiDAC etc.)

[LEVELS_dB]
NominalLevel=6
Headroom=9
VULead=4
IsVUDecayLow=No

; [TIMES_ms]            System Times Section
; CasPPMDecay=          CAS L/R Level Bargraph decay time in ms (dft: 2500 ms)
; CasPeakHold=          CAS L/R temporary Peak hold time in ms (dft: 3000 ms)
; CasOVRHold==          CAS L/R temporary OVR Led hold time in ms (dft: 5000 ms)
; Note:         min. time resolution of CAS is 10 ms; finer settings are truncated.
;               CasPPMDecay time is set for the whole bargraph length (51 active Leds);
;               with a min. resolution of 10 ms per segment, only increments of 50*10ms = 0.5 sec
;               make sense;

[TIMES_ms]
CasPPMDecay=2500
CasPeakHold=3000
CasOVRHold=5000
```

6.9 d19devicesTemplate.ini

```
Comment=D950D19DeviceResourcesSpecifications for SW Release V2.03
Comment=03.11.98 by JM

; [PHYSICAL_DEV]        actual D19 resources
; NumberOfCtrlInterface=corresponds to COM ports assigned to D19 Devices in D950System.ini.
; NumberOfMICAD=        corresponds to MicAD resp. MicAD STAGE devices actually present
; NumberOfMP4RC=        corresponds to D19 Stagebox 4 Ch. Preamp Cards (MP4RC) actually present
; Note: If NumberOfCtrlInterface=1, NumberOfMICAD or NumberOfMP4RC must be in the range between
;       0 and 16 for MicADs and between 0 and 15 for MP4RCs.
;       NumberOfMICAD resp. NumberOfMP4RC can be smaller than defined below ([MICAD_x] resp [MP4RC_x),
;       but not greater. MicAds & MP4RC have to be connected separate control interfaces.

[PHYSICAL_DEV]
NumberOfCtrlInterface=2
NumberOfMICAD=6
NumberOfMP4RC=2

; [MICAD_x]             first MicAD with logical Micad device No.  (starting with 0)
; CtrlInterface=        connected to control interface x (1..NumberOfCtrlInterface)
; CtrlChannel=          corresponds to CTRL CH selected on the MicADs frontpanel (1..16)
; LinePresent=          indicates, if Line Interface is present (Yes/No)
; MCHDigitalOutPresent= indicates, if ADAT output is present (Yes/No)

[MICAD_0]
CtrlInterface=1
CtrlChannel=1
LinePresent=Yes
MCHDigitalOutPresent=Yes

[MICAD_1]
CtrlInterface=1
CtrlChannel=2
LinePresent=Yes
MCHDigitalOutPresent=Yes

[MICAD_2]
CtrlInterface=1
CtrlChannel=3
LinePresent=Yes
MCHDigitalOutPresent=Yes

[MICAD_3]
CtrlInterface=1
CtrlChannel=4
LinePresent=Yes
MCHDigitalOutPresent=Yes

[MICAD_4]
CtrlInterface=1
CtrlChannel=5
LinePresent=Yes
MCHDigitalOutPresent=Yes

[MICAD_5]
CtrlInterface=1
CtrlChannel=6
LinePresent=Yes
MCHDigitalOutPresent=Yes
```

```
; [MP4RC_x]             first MP4RC with logical MP4RC device No.  (starting with 0)
; CtrlInterface=        connected to control interface x (1..NumberOfCtrlInterface)
; CtrlChannel=          corresponds to CTRL CH related to cardslot in D19 Frame (1..15)

[MP4RC_0]
CtrlInterface=2
CtrlChannel=1

[MP4RC_2]
CtrlInterface=2
CtrlChannel=2
```

6.10 TCP/IP Binding Process

The TCP/IP binding process takes a human-readable host name, service name, and protocol, then maps it to a binary address. How the mapping is done depends on the underlying TCP/IP implementation. Some versions use database files; by convention, these are called *hosts* and *services*. Other implementations use a Distributed Name Server (DNS), where the address translation requires a network exchange. NT supports either scheme. The D950 application uses local hosts and services files. The host name is fetched from the host's file:
(%SystemRoot%\SYSTEM32\DRIVERS\ ETC\HOSTS).
The **gethostbyname()** socket function maps the name to an Internet address.

Example file:

```
# Copyright (c) 1993-1995 Microsoft Corp.
#
# This is a sample HOSTS file used by Microsoft TCP/IP for Windows NT.
#
# This file contains the mappings of IP addresses to host names. Each
# entry should be kept on an individual line. The IP address should
# be placed in the first column followed by the corresponding host name.
# The IP address and the host name should be separated by at least one
# space.
#
# Additionally, comments (such as these) may be inserted on individual
# lines or following the machine name denoted by a '#' symbol.
#
# For example:
#
#      102.54.94.97     rhino.acme.com          # source server
#       38.25.63.10     x.acme.com                 # x client host

192.1.0.218       localhost
```

The **getservbyname()** socket function takes a service name and protocol and returns the corresponding port number. In a file based TCP/IP implementation like ours, this information is fetched from the service file ***(%SystemRoot%\SYSTEM32\DRIVERS\ETC\SERVICES)***. This file is quite long; it has entries for all the standard TCP/IP services. The portion describing ports and protocols used by the D950 is shown below:

```
# Copyright (c) 1993-1995 Microsoft Corp.
#
# This file contains port numbers for well-known services as defined by
# RFC 1060 (Assigned Numbers).
#
# Format:
#
# <service name>  <port number>/<protocol>  [aliases...]   [#<comment>]
#

autoctrl          20000/udp         # D950 service
vmcctrl           20001/udp         # D950 service
deskctrl          20002/udp         # D950 service
monctrl           20003/udp         # D950 service
gcctrl            20004/udp         # D950 service
regctrl           20005/udp         # D950 service
bridgectrl        20006/udp         # D950 service
```

CHAPTER 7

7 SESSION CONFIGURATION TOOL (OPTION)

The Studer D950 and Vista Digital Mixing Systems may be easily reconfigured using the optional Session Configuration Tool. Whereas the ability for reconfiguration is a great feature of the Studer D950/Vista, it is important for an operator to fully understand the Session Configuration Tool and its functions. There is no safeguard functionality to prevent someone from configuring a console without e.g. the summing buses – and in such a case, the console may not function properly.

Functions, features, and appearance of the Session Configuration Tool may be changed by modifying the software. For this reason the operation of the tool and its parts as described in this manual may be slightly different from your version.

Information contained in this chapter has been carefully checked and is believed to be correct and complete. But as we all know, everybody makes mistakes, and we are not immune either. If you detect a mistake, please write or send an e-mail to the address printed on the cover. We will be grateful for your feedback. No responsibility is taken for any inaccuracies, errors or omissions, nor is any liability assumed for any loss or damage resulting either directly or indirectly from use of the information contained in the manual and any accompanying documentation.

7.1 Installation

Note A good level of understanding PC basics is assumed for this installation. You may need to copy files between various media and create subdirectories. You will be required to edit a simple .ini file to adjust the environment of your PC. Please have an instruction manual for the Windows version you are using at your disposal if necessary.

Environment The Session Configuration Tool will run under Microsoft Windows 95, 98, 2000, or NT 4.0 environments.

Minimum Requirements The Session Configuration Tool requires the following minimum environment to run properly:

- Windows 95, 98, 2000 or Windows NT 4.0
- Pentium processor, min. 200 MHz recommended
- 32 (preferably 64) MB of RAM
- Display resolution 1024x768

7.1.1 Where to Install

The Session Configuration Tool may be installed on:

- The Studer D950/Vista Control PC
- Any other PC, provided that above requirements are met

We recommend installation on a PC different than the D950 or Vista control PC. The program requires a lot of processor power while it is compiling. Whilst it will run without any problem in a multitasking environment with multiple programs running at the same time, its performance may be considerably slowed down under such circumstances. If speed is essential, we recommend running the Session Configuration Tool alone on a PC.
In some cases, the Studer D950/Vista Digital Mixing System may be delivered with the Session Configuration Tool already installed.

7.1.2 How to Install

Installing from a Compressed File

If you have obtained the Session Configuration Tool in compressed form, you will start by copying the file (usually called `D950Cfg.exe`) into the target directory and then running the self-extracting file. This will decompress the original files and create the necessary directories for you.

You need to extract the original files into a root directory of a drive (C, D, E, ...) on your PC. Please make sure that the "`:\ADI_DSP`" directory has been placed directly under the root of your selected drive as indicated above, otherwise the Configuration Tool may not work properly.
Now please proceed with the instructions found in the paragraph "Check the installation" below.

Check the Installation

Check the Results:

Please use the Windows Explorer to check the results of your work now. The following (or similar) file structure should now be found on your target PC (assuming "C" was selected as the target drive):

```
C:\D950cfg      \tmpFiles\(subdirectory) contains temporary files
                \aryymmdd.ach            DSP Proc. Element architecture file
                \CoreFuncyymmdd.lib      48k DSP source code library
                \CoreFunc96kyymmdd.lib   96k DSP source code library
                \D950CfgTool.exe         the Session Configuration program
                \mnyymmdd.exe            executable used for the core files
                \rtyymmdd.a              DSP RTOS (operating system library)
```

`yymmdd` refers to **y**ear **m**onth **d**ay and indicates the version of the file. This version number varies from release to release. Please refer to the release documentation of your specific release in order to check that the files are correct.

```
C:\ADI_DSP\21K\Bin   \asm21k.exe             Sharc assembler file
                     \go32.exe               Sharc assembler file
                     \ld21k.exe              Sharc assembler file
                     \lib21k.exe             Sharc assembler file

C:\ADI_DSP\21K\Etc   \a21000.exe             Sharc assembler file
                     \cpp.exe                Sharc assembler file

C:\ADI_DSP\21K\Include  \def21060.h          Sharc assembler file
```

Please make sure that the "`:\ADI_DSP`" directory has been placed directly under the root of your selected drive as indicated above, otherwise the Configuration Tool may not work properly.

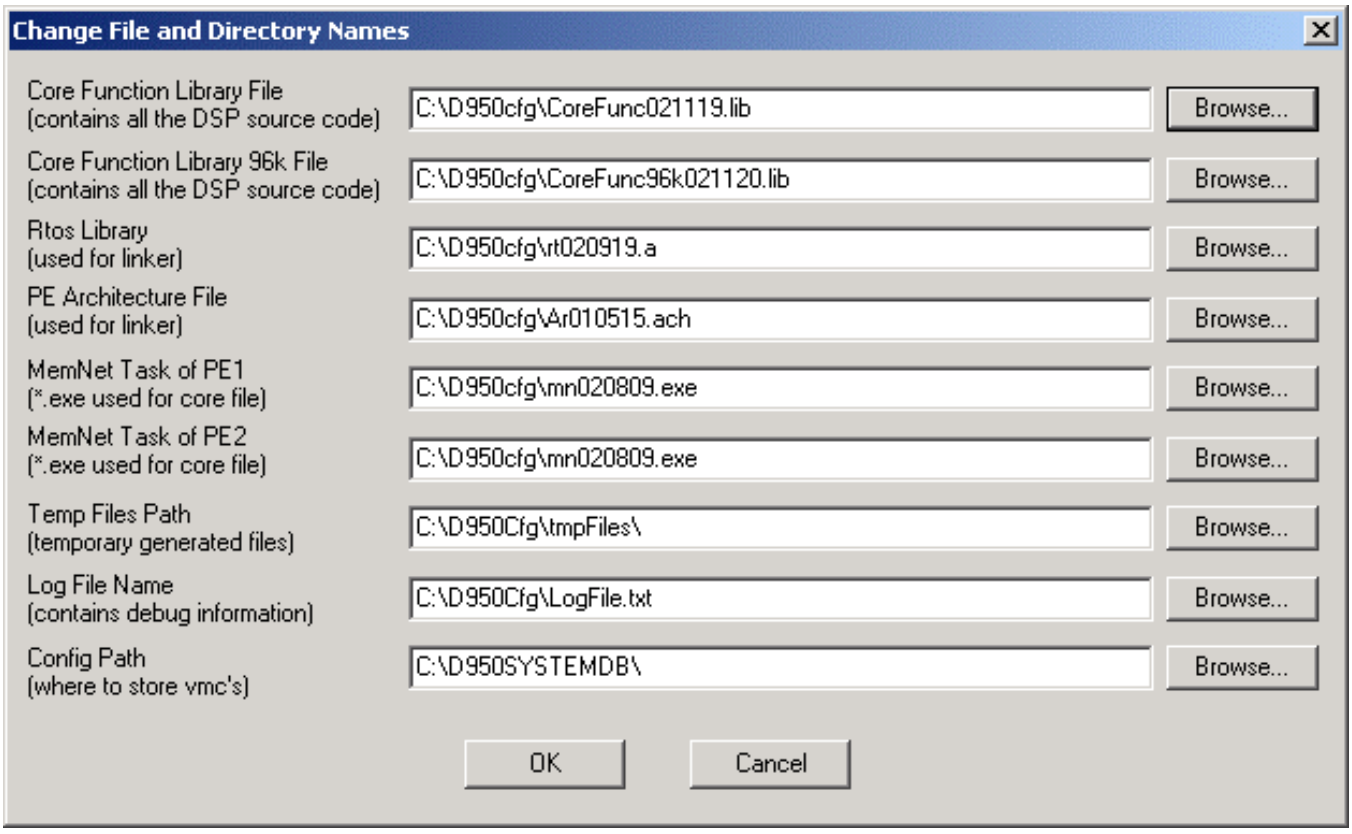
```
C:\D950SYSTEMDB   \YourCfg\(subdirectory)any previously existing Configurations
                   ...
```

The next step will be to create a Shortcut and then to set several options within the Configuration Tool.

Create a Shortcut: Usually the fastest way to use a program is to create a so-called Shortcut on the Windows Desktop. To create a Shortcut for the Session Configuration Tool, please click on the file "`d950CfgTool.exe`" in the Windows Explorer, then use the right trackball button and drag the file to the desktop. Now you are ready to run the Configuration Tool for the first time.

Start the Program: Double-click on the shortcut. There will probably be an error message "`Unable to open file: xxxx`". This is because the `.ini` file options have not yet been set. Quit the message and the Session Configuration Tool screen will appear.

Set the Options: Click on the menu item "Options" and then on "Directories/Files". The following setup screen will appear:



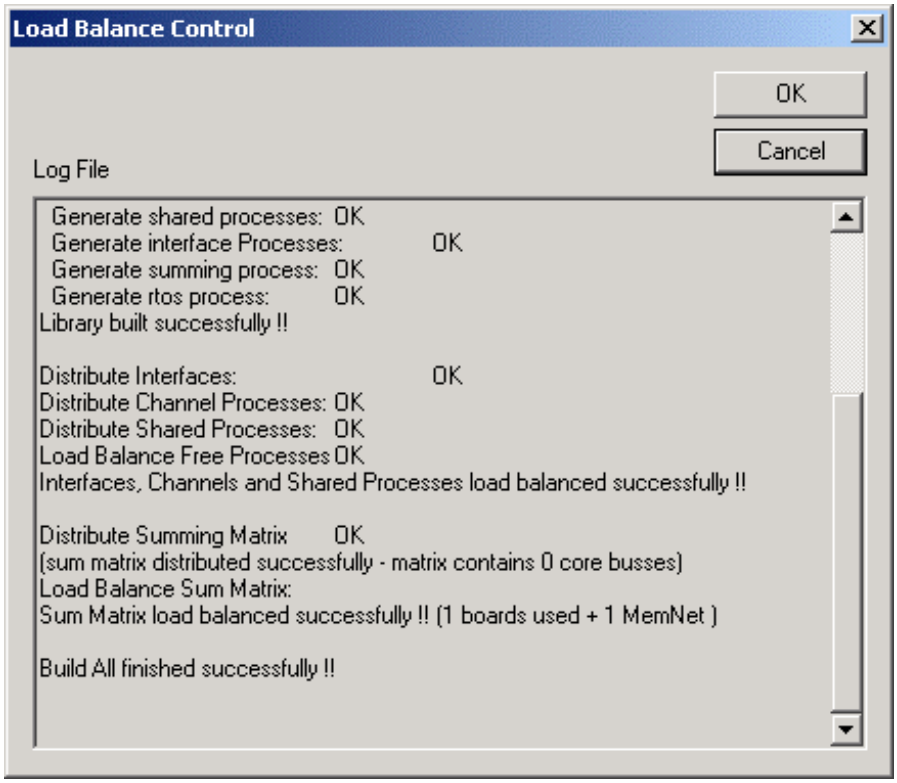
Here the names of directories and appropriate files that you have just copied have to be entered. The above graphic shows the files used for software version 3.1.02. Since those may vary for every installation and software version, you will now need to update these entries by using appropriate file names and paths, as installed on your system. The Browse button can be used to select the appropriate file, except for the following two entries:

- Temp Files Path, and
- Config Path,

for which the appropriate paths must be entered manually; *they must be followed by a backslash (\) sign.*

After making the appropriate entries please click "OK" to finish the preparations and to store the edited "`D950CfgTool.ini`" file automatically. To learn more about the use of the .ini file, please refer to chapter 7.5, Maintenance.

Test the Installation: Now that you have installed all files and set the basic options, you can proceed to test the whole installation, by generating an empty configuration. This empty configuration is loaded per default after starting the application.
Select the menu item "Generate" and then "All". This will start the process of generating the DSP and control software that is needed to run a new Session Configuration on your console. Various messages will be displayed, and after a while, a message similar to the following one should appear:



After the message "Build All finished successfully !!" appears, click on "OK" to finish the successful installation and test procedure.

7.2 Introduction

7.2.1 Features & Benefits

The D950/Vista DSP Concept

The concept of the Studer D950/Vista allows to use multiple DSP processors in a fully scaleable and configurable way. It is possible to specify the power of the DSP core in fine steps in order to fulfil the exact need of an application. It can be said that the Studer D950/Vista has a scaleable DSP resource pool of computing power, which can be used in many different combinations.

Session Configuration

So the concept of the "Session Configuration" was born which allows to create many completely different mixers that can run on the same existing hardware. The operator is now able to choose the ideal mixer for the task he or she wants to work on.
For this, the Session Configurations can be loaded and the Studer D950/Vista console is restarted in a matter of seconds. Each Session Configuration can contain a different console configuration based on the available DSP power. In the ever-changing studio environment, it is now possible to have a "new" mixer every day:

Day 1	Day 2	Day 3
Live Broadcast Configuration	**Multitrack Recording Configuration**	**Mixdown Configuration**
48 Mono Input Channels with – EQ – Delay 24 Stereo Input Channels with – EQ	48 Inline Channels with – EQ in monitor path – Comp/Lim/Exp/Gate in input path – Delay 4 Stereo Input Channels with – EQ	96 Mono Input Channels with – EQ – Delay – Comp/Lim/Exp/Gate – IPL – Surround PAN 4 Stereo Input Channels with – EQ
0 Routing buses	48 Routing buses	8 Routing buses
8 Groups with – EQ	0 Groups	16 Groups
2 Master Outputs with – Output Limiter – EQ	4 Master Outputs	8 Master Outputs
8 Mono Auxiliaries 2 Stereo Auxiliaries	4 Mono Auxiliaries 4 Stereo Auxiliaries	12 Mono Auxiliaries 4 Stereo Auxiliaries
12 Cleanfeed buses	0 Cleanfeed buses	0 Cleanfeed buses

Channel Types

All channels within the DSP core can be configured as Mono or Stereo channels. The number of channels for any channel type is defined through the Session Configuration. Moreover, any channel type can be fitted with the available function blocks from the processing library. So EQ, Delay, or Dynamics can be fitted to Input Channels, but also to Group Channels, Master Channels or Auxiliaries in any number and combination. Any combination of Auxiliary, Cleanfeed, Multitrack Routing, Audio Subgroup and Master Buses can be configured in the system.

DSP Boards

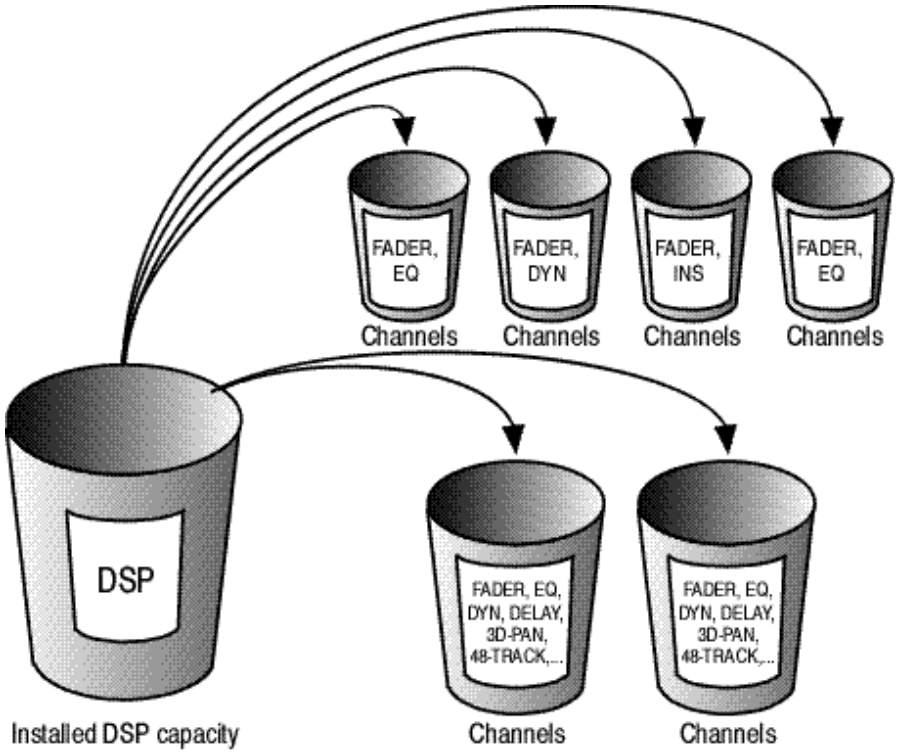
The Studer D950/Vista system can contain 5 board types.

- PE – DSP board with 6 DSP processors
- PEAES – DSP board with 6 DSP processors, 8 AES/EBU inputs (2 of which with SFC) and 8 AES/EBU outputs
- MADI I/O board with 2 MADI inputs and 2 MADI outputs
- PE – D21m board with one D21m input and one D21m output
- MEMNET board for communication and control

The system *must* contain one communication and control board called the MEMNET board.
The total number of boards in any combination can be 21 at the maximum.

System Size & Numbers

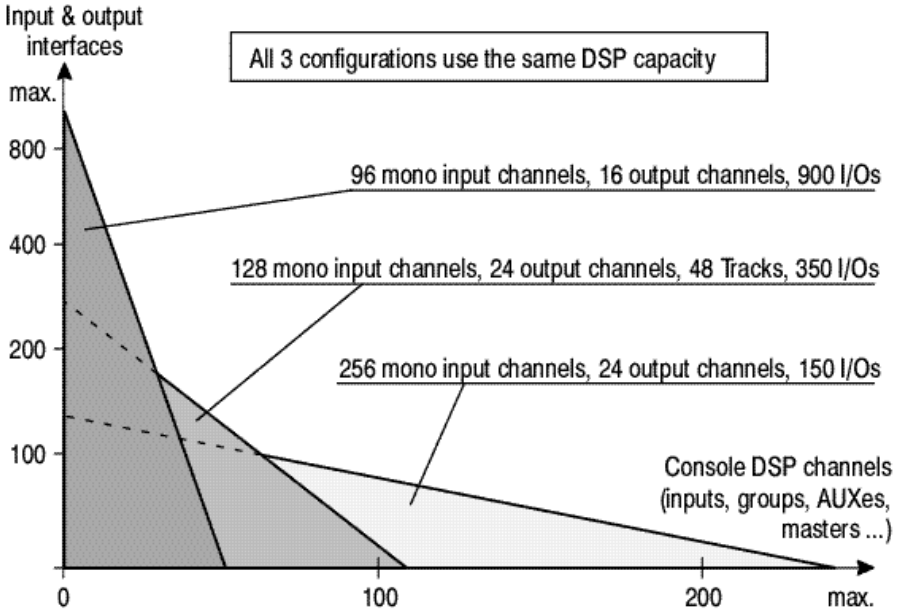
The size and power of the system is defined by the number of DSP processors and I/O boards installed. The total DSP power can be compared to a large bucket full of water (Installed DSP Capacity). The contents of the large bucket can be distributed to four small buckets (channels with fader + EQ) or to only two medium-sized buckets (channels with fader + EQ + Dyn + Delay + 3D-PAN...).



So, the number of available channels depends on two things:

- Total installed capacity (1...20 DSP boards)
- Load required by each of the channel types and their quantity.

To complicate matters slightly, the total number of channels also depends on the number of summing buses and the number of physical I/O interfaces. To illustrate this, we can look at 3 different ways to use the same installed DSP power.



The Session Configuration Tool will tell you exactly how many DSP and I/O boards you will need in order to run a certain configuration defined by the number and type of channels, the number of summing buses, and the number of physical I/O interfaces. As a consequence, there is no finite maximum number of channels on the Studer D950/Vista – the maximum can be anywhere between 100 and 300 channels.

7.2.2 The Concept of a Virtual Mixing Console (VMC)

The Studer D950/Vista Digital Mixing System bases its operation on the concept of a Virtual Mixing Console (VMC). The VMC is a software structure that runs on the Studer D950/Vista control PC and consists of two parts:

- Console configuration (structure)
- Current audio settings of the console (data)

Structure The VMC describes all the parameters of a certain console configuration, such as the number of input channels, the number of multitrack buses, whether there is EQ on each channel, etc.

Data Moreover, the VMC is a real-time data container that keeps the current settings of a console, such as "input channel 13 EQ gain = +12 dB", "master 4 fader = –10 dB", etc. The VMC will only keep data for the channels and console parts that are defined in the structure part of the VMC. Active controls on the console, such as the faders, rotary encoders, pushbuttons and the GC keyboard/trackball control, but also the Snapshot system and the AutoTouch+ Automation system can write data to the VMC. Other console parts, such as lamps, displays, and the GC screen can read data from the VMC and display them. It can generally be said that almost all settings and conditions of the Studer D950 and Vista console are a part of the VMC.

Make and Edit a Configuration The Session Configuration Tool can be used to make a new configuration, or to edit an existing one. This is the first part of the process of preparing a

VMC for the Studer D950/Vista console. That part is done off-line, even if the Configuration Tool is running on the Studer D950/Vista Control PC. The results of this part are:

- A “meta” VMC file (`*.vmc`) – the definition of the console structure
- A DSP core file (`*.cor`) – software that tells the DSP core what to do
- Configuration knowledge file (`*.ckf`) – defines the distribution of the processes among the boards of the core, and stores other configuration relevant information.

Use a Configuration

When we operate the Studer D950/Vista console, we speak of “loading a configuration”. This means loading the “meta” VMC file to the memory of the Studer D950/Vista Control PC. This process will remove the current file from the Studer D950/Vista memory and load a different one. The Studer D950/Vista Control software will then, based on information contained in the new files, run a VMC that corresponds to the information from the “meta” VMC file. It will also remove the current DSP core file, replacing it with a new one, thus activating a new VMC. Now the Studer D950/Vista is ready to work with the new Session Configuration.

There can only be one VMC that is active on the Studer D950/Vista console at any one time, but there can be multiple VMCs configured and stored for later use. For more information on loading a configuration and using the Studer D950/Vista, please consult the Studer D950/Vista Operating Instructions.

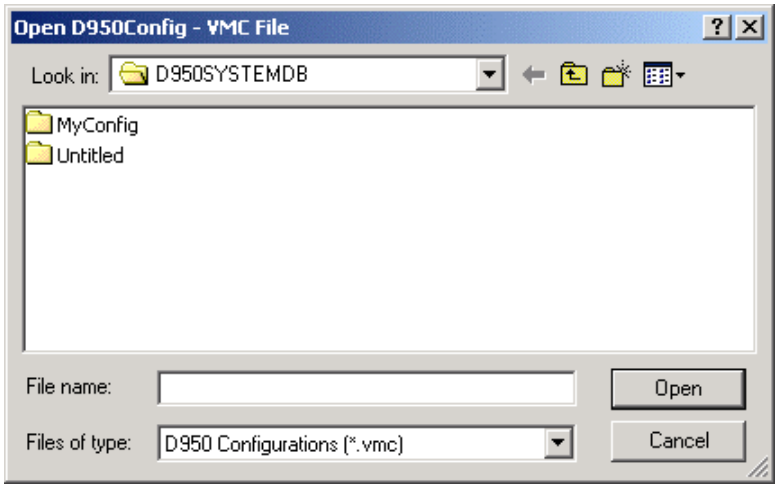
7.2.3 The Practical Side

The purpose of the Session Configuration Tool is to allow creating and modifying "meta" VMC files and generating the DSP files from the information contained in the "meta" VMC file. We call this process "making a Session Configuration". There are always two files that are the result of making a Session Configuration:

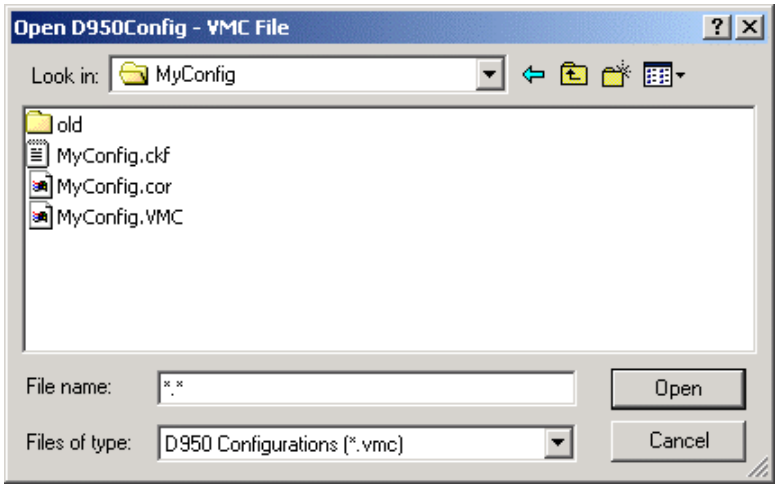
- the "meta" VMC file called `MyConfig.vmc`
- the DSP core file called `MyConfig.cor`
- the configuration knowledge file called `MyConfig.ckf`

The name "MyConfig" stands for any name selected by the user. The endings "`.vmc`", "`.cor`" and "`.ckf`" are mandatory. They are automatically created by the Tool and do not have to be typed.

It is good practice to keep all Session Configurations in the same Windows folder, because both the Session Configuration Tool and the Studer D950/Vista System software can be set to search in this folder automatically. The Configuration Tool will automatically create a subdirectory (folder) with the same name as the Session Configuration, so the folder structure may look similar to this:



Each of the subdirectory folders will contain the following files and folders when the generation process is finished.



When editing a configuration, the "old" folder is generated automatically, in order to store the last configuration.

Both the Session Configuration Tool and the Studer D950/Vista System software should be set to search in the folder `C:\D95ØSYSTEMDB`.

On the Studer D950/Vista System If you are running the Configuration Tool on the Studer D950/Vista System, and the search paths are set as above, there is nothing more you need to do in order to load a configuration. Simply switch to the Studer D950/Vista operating system (the GC) and load a new configuration from the GC File menu.

On a Separate PC If you are running the Session Configuration Tool on a separate PC, you will need to transfer the configuration files to the Studer D950/Vista control PC. Since all files are Windows files, it is a simple matter of using a transfer medium (floppy, ZIP or even a LAN network) to transport the files. Care has to be taken to store the files under the appropriate directory on the Studer D950/Vista control PC as described above. The only files that must be transferred for each configuration are:

- `MyConfig.vmc`
- `MyConfig.cor`

Both files must be in the same subdirectory, otherwise the Studer D950/Vista will not be able to load this configuration. The best practice is to always copy the whole folder `<MyConfig>` with both files inside and paste it to the `C:\D95ØSYSTEMDB` directory.
It is not necessary to copy the `*.ckf` file. It is not used by the Studer D950/Vista. It is generated for maintenance reasons only.

7.2.3.1 Data Compatibility

Studer D950/Vista features such as Snapshot, AutoTouch Automation, etc. use Windows compatible files to store data. Since the contents of such files are dependent on the current configuration, each file is internally stamped with the Session Configuration ID. The configurations may be quite different – the resulting snapshot or automation files will be different, too.
A Snapshot file made under Session Configuration A can not, therefore, be directly recalled under a different configuration B. A function called Import must first be performed using the appropriate controls within the GC. For more information on the Import function, please consult the D950/Vista Operating Instructions.

Import Rules A simple set of rules will apply for the import:

- Unnecessary data are truncated
- Only items of identical type can be imported, e.g. data for mono input channels can only come from mono input channels
- If the source configuration A has 48 mono input channels and the current configuration B has only 32, just the channels 1 through 32 are imported and the rest of the source channels are ignored. When the item is saved it will have 32 channels in it.
- If the source configuration A has 32 mono input channels and the current configuration B has 48, just the channels 1 through 32 are imported and the rest of the current channels are ignored. User can edit and save channels 33-48 manually. When the item is saved it will have 48 channels in it.
- The same rules apply to the existence of processing blocks (EQ, Dynamics, etc.).

7.3 The Fast Lane – Try it!

7.3.1 Do Your Own – Use Existing or Start from Scratch?

7.3.1.1 Use an Existing VMC

Usually the changes that need to be made to a configuration are small. Adding two more AUXes or replacing the mono input channels by stereo input channels may be two examples of such small changes. In such cases, an existing `*.vmc` file can be loaded and modified. For the first try you can use the `*.vmc` file that was delivered with your console as a starting point.

The `*.vmc` files can be treated in a similar way as word processing documents. They can be opened, saved, saved under a different name, moved and deleted.

☞ **Tip** Please be careful to first save the file under a different name in order to keep the Studer D950/Vista basic configuration intact! Use the Save As item in the File menu.

Modifying the `*.vmc` file that had been delivered with your console is the simplest way to create a configuration that will run properly on your existing Studer D950/Vista console. On your console, there are several things that can not simply be changed by editing the configuration:

- All external I/O wiring
- Monitoring wiring and monitoring configuration
- Number of mic preamplifiers and their wiring
- Signaling (fader start, ...) wiring and configuration

It is not very likely that you will be changing any of the above all the time – that is why you will want to use the existing configuration as a starting point for your work, without having to think of configuring the right I/O every time.

☞ **Tip** It could be that you want to change the sampling frequency of an existing configuration. Just hit the according button on the toolbar, and you are done.
The Configuration Tool will prompt you about functions which are not supported under the selected sample frequency. It says, that they are not supported and therefore will be removed automatically.

Functions not supported under 96 kHz:

- All AES interface functions
- All external I/O wiring
- All MADI interface functions
- 240 ms delay

7.3.1.2 Start from Scratch

It is sometimes handy to find out how many DSP boards would be needed for a certain configuration. You can always configure the mixing console of any description by starting with an empty (New) `*.vmc` file. For this, you will use the File/New menu. The approach of starting from scratch will be useful if you do not have to modify an existing console, but are really starting a new project.
The first thing you need to do is selecting the sample frequency. The default value is 48 kHz. The buttons on the toolbar show the selected value.

☞ **Tip** If you want the new configuration to really run on your existing console, you need to be careful to think of all the elements of a configuration – channel numbers and types, summing buses, I/O configuration, shared functions, etc. Otherwise your new configuration may not be able to be loaded properly on an existing console.

7.3.2 Generate the D950/Vista Configuration Files

In this chapter, a simplified but complete configuration exercise is described. The example `*.vmc` file will be used as the starting point and modified. A DSP core file will be generated. You will need to start the Session Configuration Tool first.

Open the File

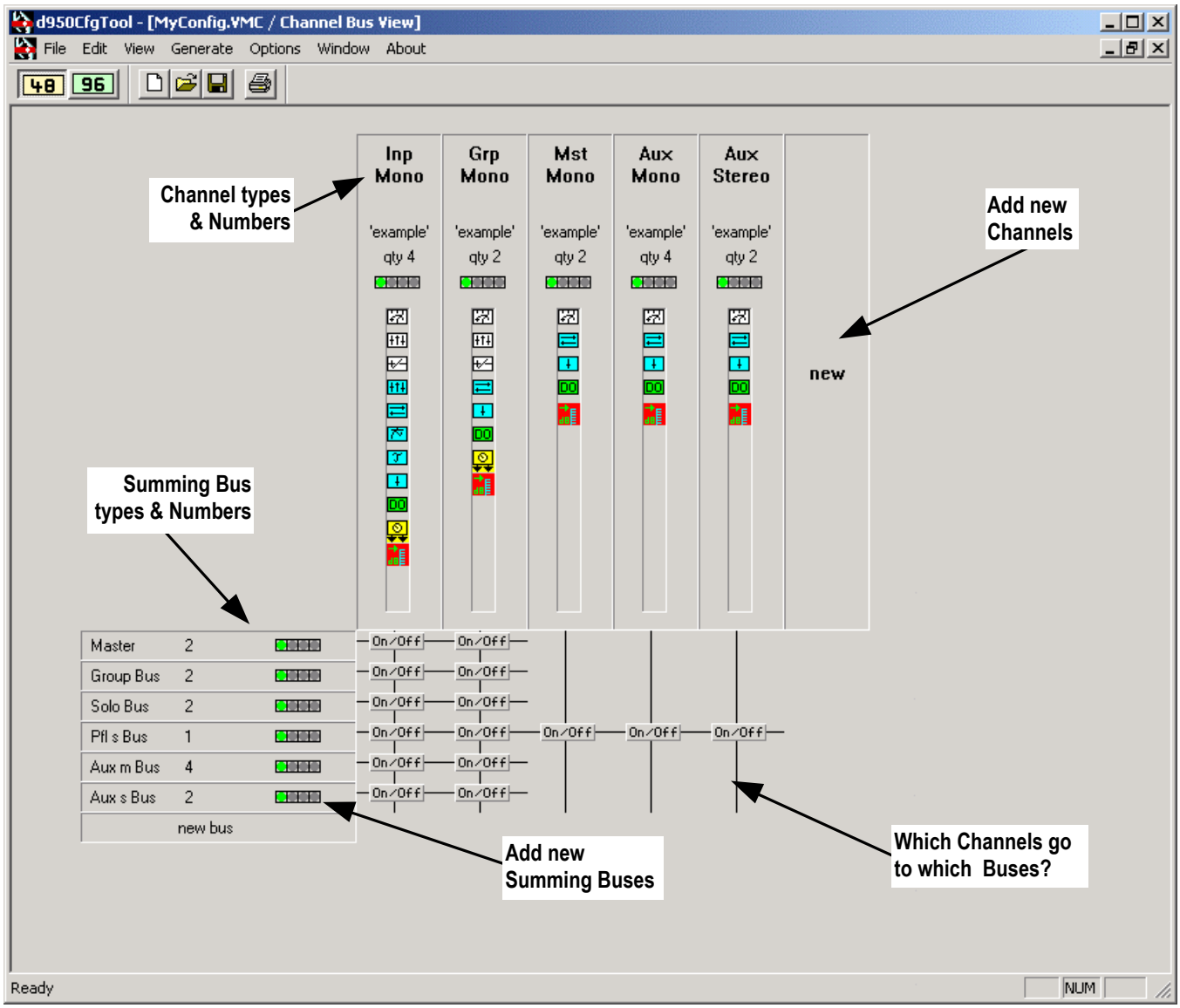
Use the "File/Open" menu or the "open folder" icon in the toolbar to open a `*.vmc` file.

Save VMC as...

To keep the original file intact, use the "Save VMC as..." command from the File menu. Note that you do not have to type the extension `.vmc`. A new folder and a new `*.vmc` file will be automatically created.

View the Configuration

Use the "View/Channel Bus" command from the menu bar to display the configuration contents. You may want to maximise the window in order to see all the components.
This is a display of all the configured channel types and numbers and all the configured summing buses as well as their interconnections:

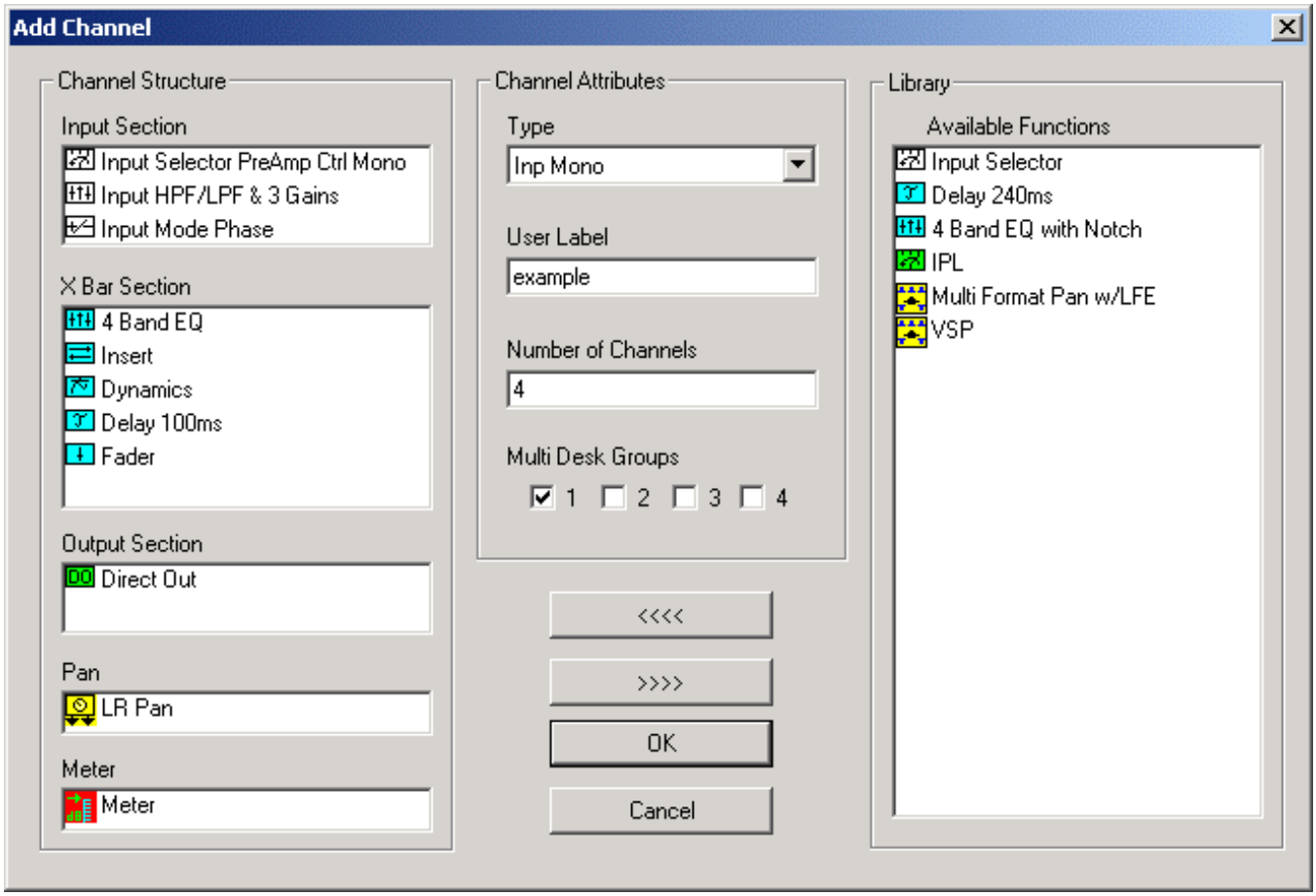


As you can see, this configuration is for a console that has:

- 4 mono input channels
- 2 stereo input channels
- 2 mono groups + 2 group buses
- 2 mono masters + 2 master buses
- 4 mono Auxes + 4 mono AUX buses
- 2 stereo Auxes + 2 stereo AUX buses
- 2 SOLO buses
- 1 stereo PFL bus

Add More Channels

Double-click on the channel area labeled “Input mono”. This will open an editing dialog box which will allow you, among other things, to change the number of mono channels:



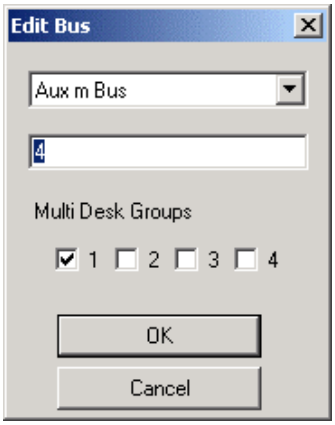
Go to the “Number of channels” area and change the number from 4 to 8. Click on OK. Now you have increased the number of mono input channels to eight.

Edit the Stereo Input Channel

Now we will change the stereo input channel configuration and name. Double-click on the channel area labeled “input stereo”. On the left-hand side, in the area called “X Bar Section”, double-click on “Dynamics” and on “Delay 100 ms”. This will remove those two functions from the stereo input channel. Now move to the area called “Library / Available Functions” and double-click on “Delay 240 ms”. Then go to the “User Label” field and type in “my stereo”. Click on OK.

Add More AUXes

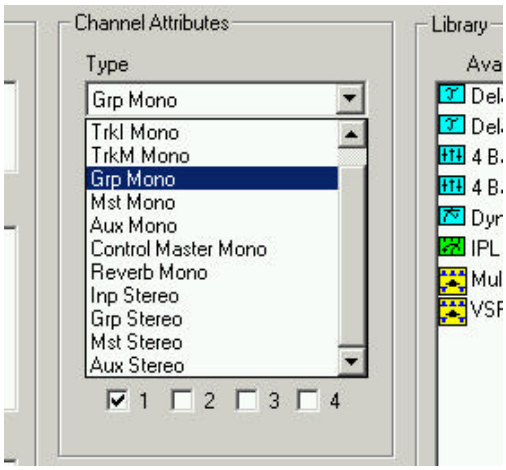
Now we will add two more mono AUX masters. Double-click on the channel area labeled “AUX mono” and change the number of channels to 6. Click on OK.
Now you will have to adapt the number of AUX mono buses to reflect the above change. Double-click on the area labeled “Aux m Bus”.
This will open a dialog that will allow you to set the number of buses to 6, matching the new number of AUX mono channels.



Enter “6” instead of “4” and click on OK. This will add two more AUX mono buses to the system.

Add New Group Channels

Now double-click on the channel area labeled “new”. This will allow you to select a channel type and set its contents and number. Click on “Channel Attributes / Type” and select “Group mono”.



This will select the channel type to mono group. Set the “Number of channels” to 2. Add “4-Band EQ” from the library by double-clicking on this item. Type in “my GRP” in the user label area and click on OK. This will add two more audio groups including EQ to the configuration. Note that you now have two sets of mono group channels with completely different audio processing sections called “my GRP” and “Example”. Note also that the bus connections have been extended with the small “on/off” boxes indicating that the two new groups will have access to Master, Solo, PFL and AUX buses. By clicking on the “on/off” box corresponding to the Master Bus, you can disable access from the new groups to the masters – so they can only be used for direct outputs.

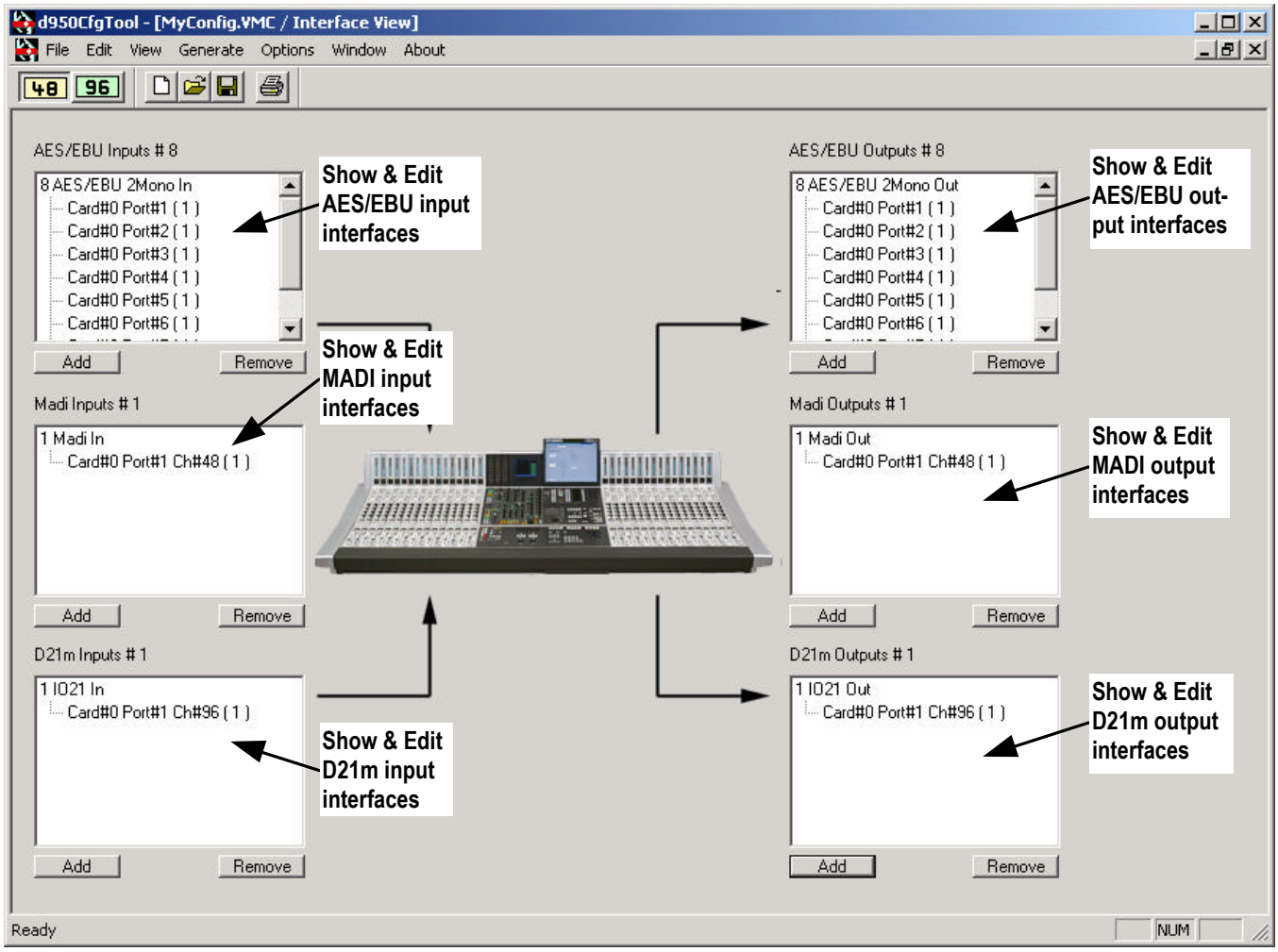
Finished? Not quite. We still have to increase the number of Group Buses to a total of four. Oops - the number is four already! The original configuration had two groups, but it had four group buses.

☞ **Tip** It is legal to have more buses than corresponding channel types, as in the example above. The reason for this is that the buses (unlike in analog consoles) are valid audio signals and can be used as such in the Studer D950/Vista patch. They are simply summation buses which will output the sum of all assigned inputs.

The newly edited configuration now looks as follows:

- 8 mono input channels
- 2 stereo input channels with changed processing
- 2 + 2 mono groups, different processing + 4 group buses
- 2 mono masters + 2 master buses
- 6 mono Auxes + 6 mono AUX buses
- 2 stereo Auxes + 2 stereo AUX buses
- 2 solo buses
- 1 stereo PFL bus

Check the Interfaces We will assume that for this example, the interfacing does not need to be changed. We will only have a look at what interfacing is available in the configuration we just changed. For this purpose, select “Interface” from the “View” menu.

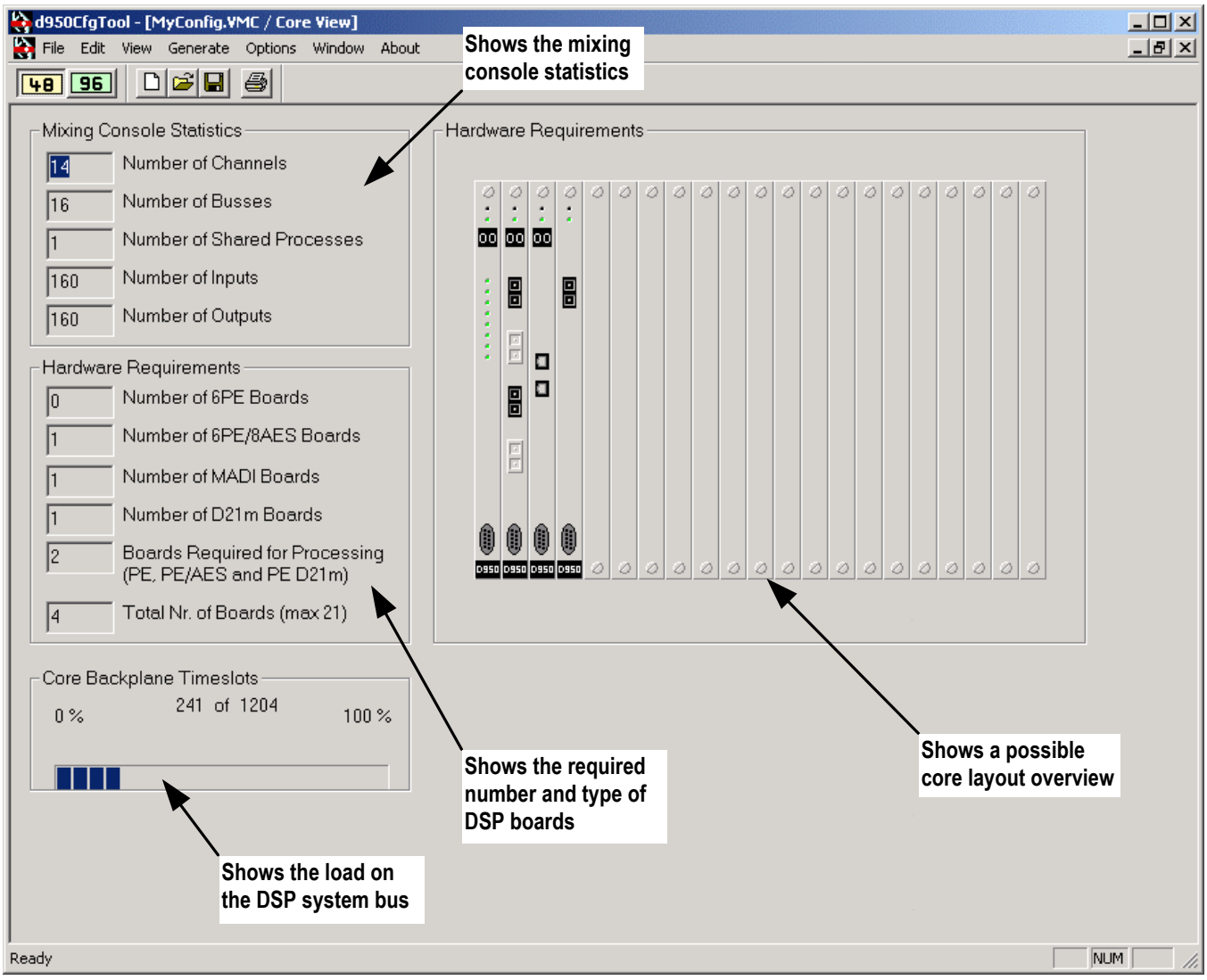


There are eight AES/EBU input interfaces, eight AES/EBU output interfaces, one MADI input with 48 configured channels, one MADI output with 48 configured channels, one D21m input with 96 channels, and one D21m output with 96 channels. This accounts for a total of 160 mono-equivalent inputs and 160 mono-equivalent outputs.

☞ **Tip** Although we have been through many actions and have edited the original configuration quite a bit, we did not yet touch on all possibilities of the Configuration Tool. Please read on and acquaint yourself with all the details before you attempt to make a configuration and load it on your console.

7.3.2.1 Does my Console Have Enough Power?

In order to see the console statistics, now select "Core" in the "View" menu. This will display the statistics of the channels, buses and I/Os, as well as the occupancy of the DSP core.



When generating a new or editing an existing configuration, the core view displays a rough estimation of the required DSP power, instead of the actual requirements for a previously generated configuration.

When you edit a configuration and see that it requires more boards than your existing core has, there are three possibilities to continue.

Generate Core and Check Again

To get to the real number of boards, the full Generate Core process has to be done first, as will be explained in the next chapter. Once this is finished, it may happen that the requirements are less then estimated, and that your newly edited configuration could fit on the existing core.

☞ **Tip**

It is always recommended to run the Generate process before deciding whether a desired configuration will fit on a given DSP core.

Reduce the Requirements

If you do not have enough installed DSP power, you can either reduce your configuration slightly, by reducing the number of channels or by removing some Dynamics or EQs you do not really need, or by reducing the number of I/Os, until the configuration matches your actual board number.

Add More Power

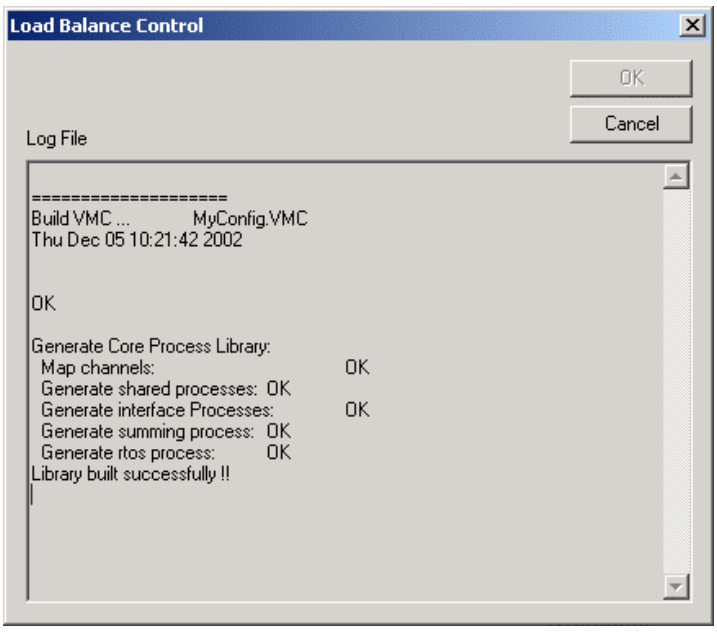
The other way is, of course, to plug in the additional required number of PE or PEAES cards into the DSP rack and load your new configuration. You can even do this with power on. You may need to add some I/O wiring on the back of the DSP rack if you are expanding the number of physical I/Os.

7.3.3 Generate the Core File

To generate the core file for your new configuration, simply click on the "Generate / All" menu item. This starts an automatic process which will end up with a core file being saved in the same folder as the `*.vmc` file.
A fairly complicated procedure called Load Balancing will try to compress all the required components of the new configuration into as few DSP boards as possible, and, at the same time, try to distribute the workload evenly across all necessary DSP boards.
You can follow what is happening on the screen. Most of the information shown on screen will also be stored into a LOG file for later viewing.

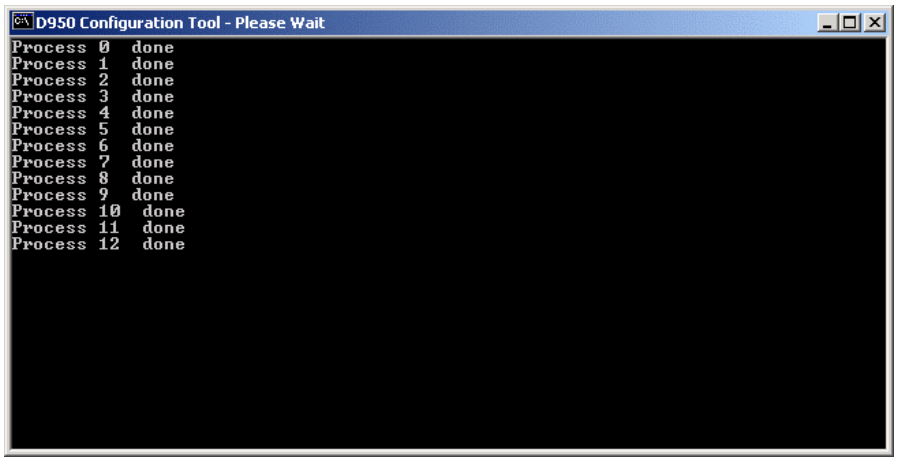
Build VMC and Processes

The Load Balancer first generates the VMC structure and then checks the channels, shared processes, buses, and builds a DSP library.



Compile Processes

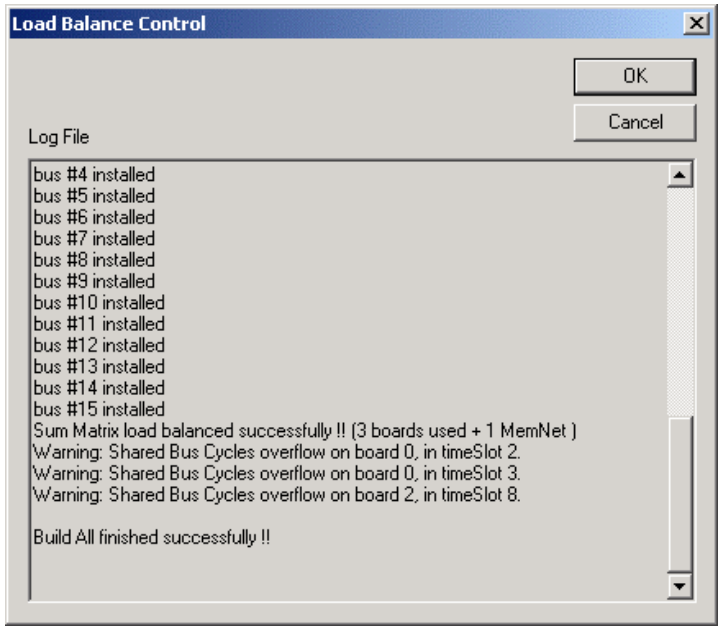
A DSP compiler/assembler generates all the individual DSP files needed to perform EQ, Dynamics, Summing, etc.



First all channels and then all the summing buses are allocated to the required DSP board processors. Then the final core file is assembled from individual components:

Finished ...

And finally, the finished core and core knowledge files are automatically stored. You only have to click OK to finish the whole process after the message “Build All finished successfully!”.



☞ **Tip** Please note that if you now display the core View, the lettering "(rough estimation)" will be missing, indicating that the numbers displayed are now the real, load-balanced ones.
The displayed warning does not mean that the configuration will not work. The meaning of the warning will be explained in chapter 7.5.3.1.

7.3.4 Transfer the Files to the Console

The Core file and the "meta" VMC files are now ready to be used on a D950 or Vista console.

On the Studer D950/Vista System If you are running the Session Configuration Tool on the D950/Vista PC and the search paths are set as described before, there is nothing more you need to do in order to load a configuration. Simply switch to the D950/Vista operating system (i.e., the GC) and load a new configuration from the GC File menu.

On a Separate PC If you are running the Session Configuration Tool on a separate PC, you will need to transfer the configuration files to the Studer D950/Vista control PC. Since all files are Windows files, it is a simple matter of using a transfer medium (floppy, ZIP or even a LAN network) to transport the files. Care has to be taken to store the files under the appropriate directory on the Studer D950/Vista control PC as described above. The only files that must be transferred for each configuration in the above example are:

- `MyConfig.vmc`
- `MyConfig.cor`

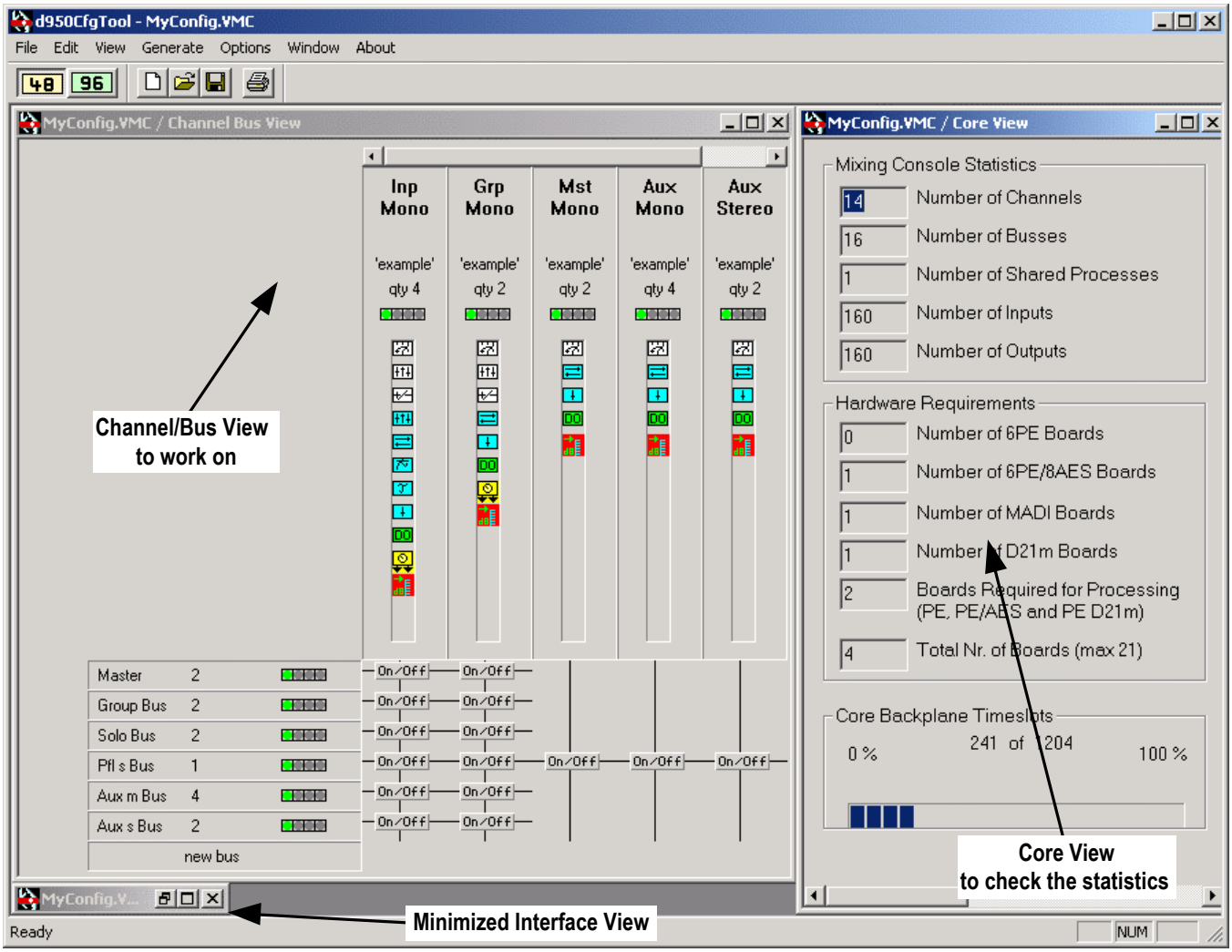
Both files must be in the same subdirectory, otherwise the Studer D950/Vista will not be able to load this configuration. The best practice is to always copy the whole folder `<MyConfig>` containing both files and paste it to the `C:\D950SYSTEMDB` directory.

7.4 Detailed Tutorial

The previous chapter gives a brief run through all the basics needed to configure a Studer D950/Vista console. We recommend reading it before you proceed with the detailed tutorial, found in this chapter.

7.4.1 Set Your own Workspace

The Session Configuration Tool supports multiple windows. Up to now, a single view Window was used to operate the Configuration Tool functions. For a better overview of the configuration process, we recommend using two windows at the same time – the Channel/Bus page alternatively with the Interface page, and the Core page in addition. This allows following the rough estimation of the core requirements on-line, as you edit channels, buses and interfaces.



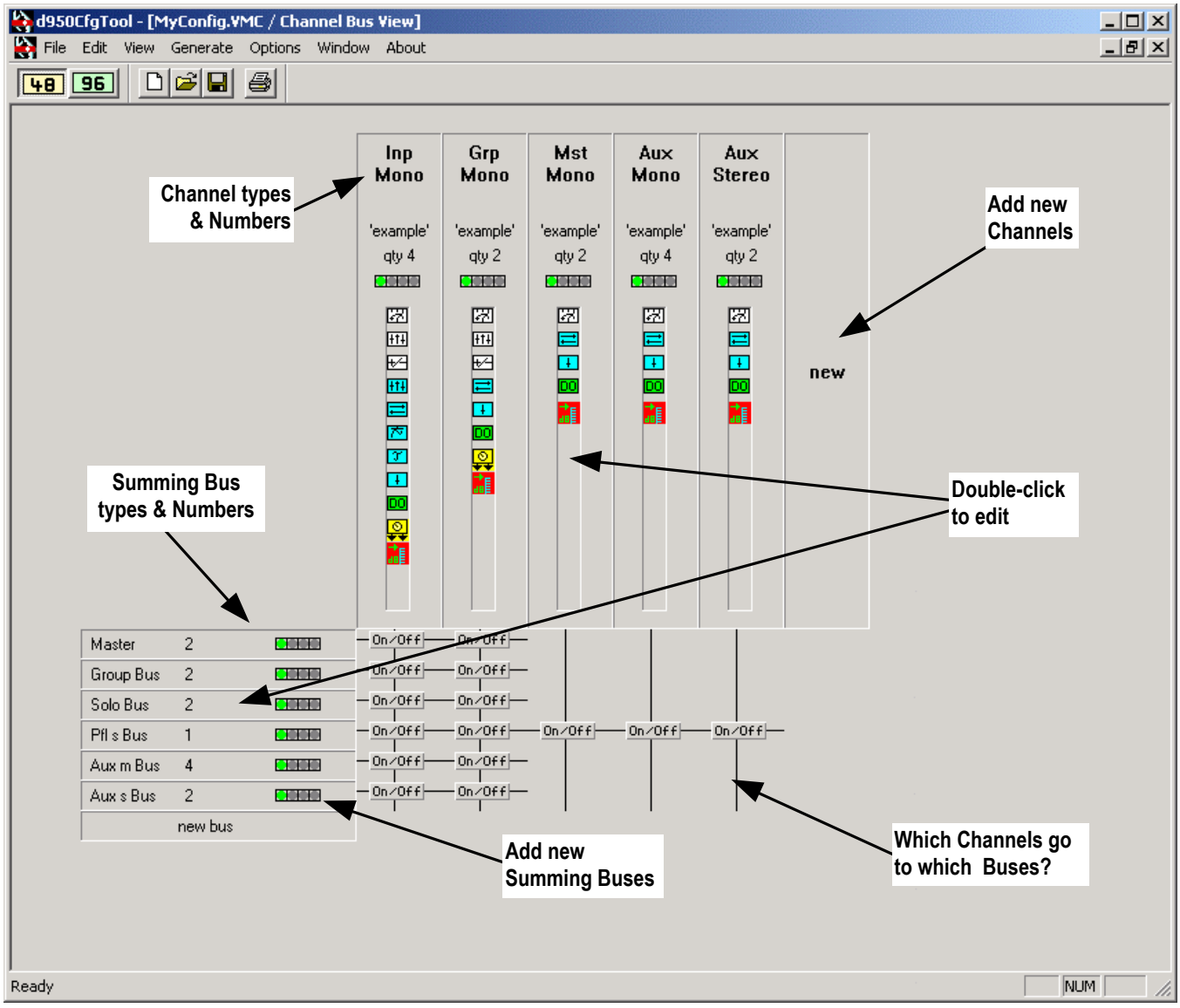
The last used Workspace setup will be stored when you close the Session Configuration Tool, and will be recalled the next time you start the program.

7.4.2 Set the Sampling Frequency

The sampling frequency can be set with the two according buttons on the toolbar (48/96). It may be set anytime during configuration; however, it is wise to do it first thing when editing or generating a new configuration.

7.4.3 The Channel/Bus Page

The Channel/Bus page is the main working area of the Session Configuration Tool. It allows adding new or editing existing channels, buses and their interconnections, displaying the configured console in a matrix arrangement. It displays all the configured channel types and their functions in a condensed way.



How to:

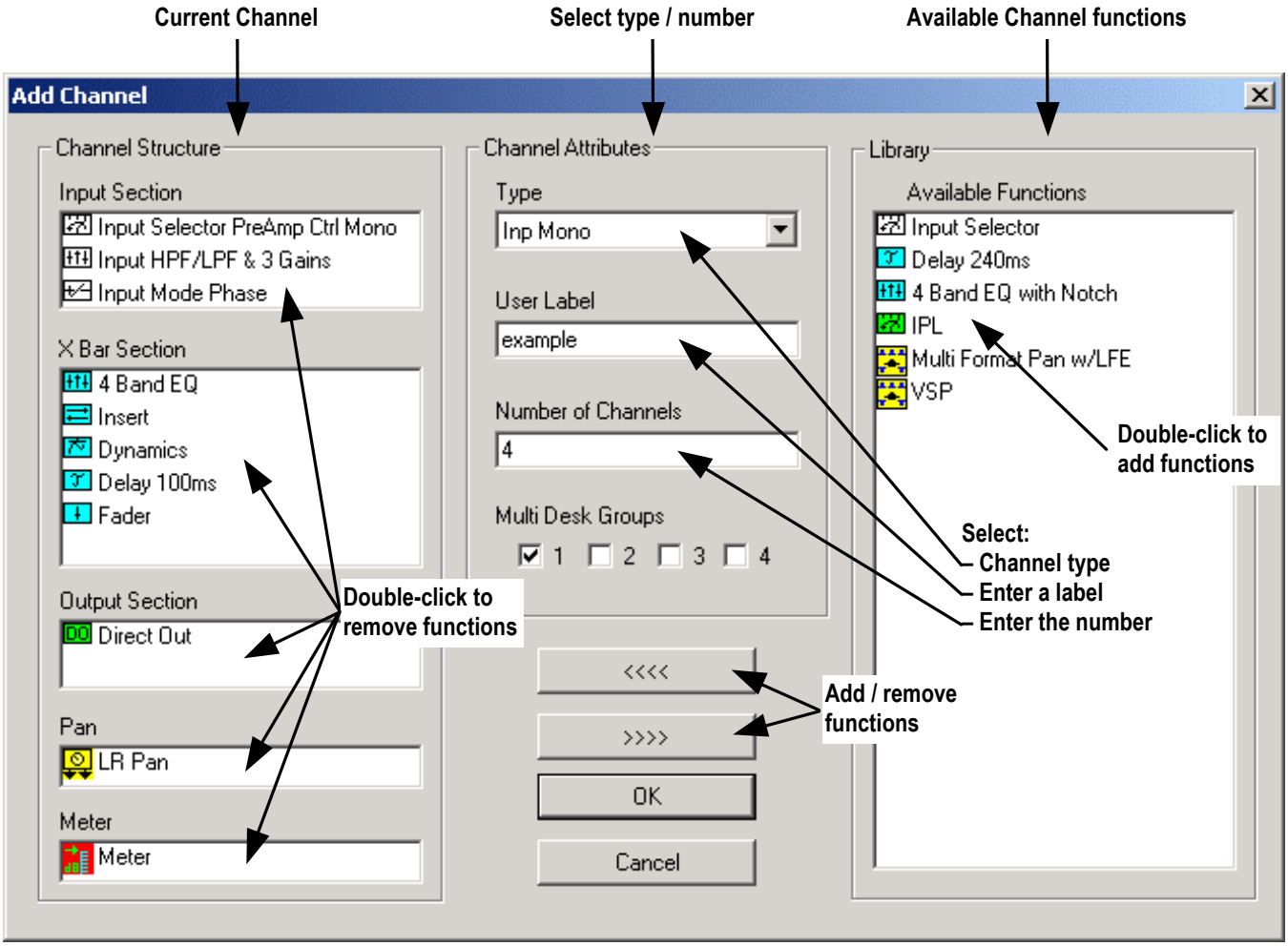
Add new channels	Double-click on “new” in the channel area
Add new buses	Double-click on “new bus” in the bus area
Edit channels	Double-click on an existing channel type in the channel area
Edit buses	Double-click on an existing bus type in the bus area
Assign/Deassign buses	Double-click on the “On/Off” button where the channel and bus cross. All channels of the selected type will have access to all buses of the selected type if the button is set.

7.4.3.1 Add / Edit Channels

Add New Channels Double-click on “new” in the channel area of the Channel/Bus page.

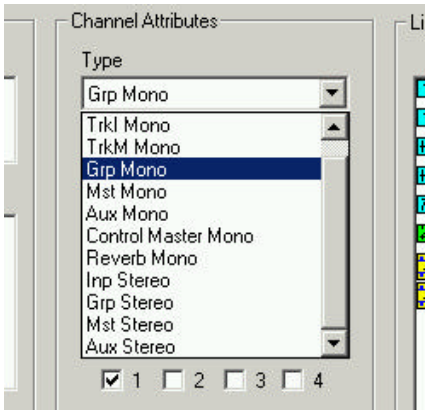
Edit Channels Double-click on an existing channel type in the channel area of the Channel/Bus page.

Both actions will open the “Add Channel” dialog box that allows editing all the entries for new or existing channels.



Select Channel Type Click on the box to display the available channel types. Currently, the following channel types are available:

- Mono Input
- Mono Multitrack Input
- Mono Multitrack Monitor Input
- Mono Group
- Mono Master
- Mono AUX Master
- Mono Reverb
- *Mono Control Master*
- Stereo Input
- Stereo Group
- Stereo Master
- Stereo AUX Master.



All channel types correspond to similar channels of an analog console. Each channel will be assigned to a channel strip on the Studer D950/Vista Desk upon loading of the configuration. AUX mono and stereo masters are treated as normal channels in this respect. On selection, a set of factory default functions will be loaded to the Channel Structure area, depending on channel type.

Mtrk Input / Monitor *(D950 only)*

These channel types largely correspond to what is known as "in-line" channel. They have a very similar structure as input channels, and the only major difference is in the way they are both assigned to the D950 desk. The Mtrk Monitor channel is always automatically assigned to the upper layer of a bank, and the Mtrk Input channel to the lower layer. This simulates an in-line desk layout. Please refer to the corresponding chapter in the Studer D950 Operating Instructions for more information on the Desk layer/bank concept.
The Vista knows no such rule.

Control Master

The Mono Control Master is a special channel type having any audio functions – it is the Control Group Master used for the "VCA" style control groups. Up to 16 such Control Masters may be configured.

User Label

User label is an optional text label that can be entered to additionally differentiate the channel types. Usually, labels are used to differentiate channels of the same type but with different functions, e.g. Input Mono "with EQ", Input Mono "without Dynamics", etc.

Number of Channels

Any number can be entered here to define the quantity for this particular channel type. The maximum numbers are in function of the overall installed DSP capacity (check the Core page to see how requirements change) and, for some channel types, the maximum number is limited by the capacity of the Studer D950 or Vista Desks to operate them. Desk limitations are as follows:

Aux Mono *D950*	8, can be extended to 16 if no Aux Stereo extension
Aux Mono *Vista*	32
Aux Stereo *D950*	4, can be extended to 8 if no Aux Mono extension
Aux Stereo *Vista*	16
Master Mono	8
Master Stereo	8
Group Mono + Stereo	48, Stereo counts as 2 (e.g. 32 Mono + 8 Stereo Groups)
Control Master	16

MultiDesk Groups

See chapter 7.4.3.4.

Current Channel Structure

This area displays the functions that have been selected for the current channel type. There are five sections of each channel, corresponding to the audio signal flow:

- Input Section
- X-bar Section (order of functions can be set in the D950/Vista GC using drag-and-drop)
- Output Section
- Pan Section
- Meter Section

The functions have icons in different colours corresponding to each of the five sections above. Functions can be removed from the current channel by

double-clicking on the function, or by using the >>>> button. Each of the functions requires DSP power, therefore it is prudent to keep only the functions that are really needed. The minimum functions of a channel are:

- Input Selector
- Fader
- Direct Out.

Library / Available Functions In this area, the functions available from the system library are listed. The list changes slightly depending on the channel type (e.g. master channels do not have a Pan function available), but most functions are the same for all channel types. This means that master channels may be configured with an EQ, or an Aux master can have a limiter if needed. Functions can be added to the current channel by double-clicking on the function in the library, or by using the <<<< button.

Please note that several restrictions to the X-bar section apply:

- The X-bar section can contain a maximum of 6 functions.
- "Delay 100 ms" and "Delay 240 ms" must not be used at the same time.
- "4-Band EQ" and "4-Band EQ Notch" must not be used at the same time.
- "VSP Surround PAN" requires a lot of DSP power and cannot be used in a full channel, otherwise an error will be displayed during the Generate process. It is usually sufficient to remove Dynamics or EQ + Delay functions to allow fitting of the VSP PAN.

Remove Channels Simply click on the channel type to be removed and hit the "Del" (delete) key.

☞ **Tip** Note how the requirements shown in the "Core Statistics" area in the Core page change as you add or remove channels, change their number, or add/remove functions.

7.4.3.2 Function Library

Mono and Stereo Channel Functions:

Input Selector	3-way input selector
Input Selector PreAmp Ctrl	3-way input selector, with a control interface to pre-amplifiers
Input HPF/LPF & Gain	variable high-pass and low-pass filters, channel gain ±24 dB
Insert	Insert function with dry/wet mix feature
Delay 100 ms	VariabIe audio delay 0...100 ms
Delay 240 ms	VariabIe audio delay 0...240 ms
4-Band EQ	Fully parametric 4-Band EQ with Bell/Shelving switch in the LO and HI bands, Constant Q/Constant Range switch in the HI-MID and LO-MID bands
4-Band EQ Notch	Fully parametric 4-Band EQ with Bell/Shelving switch in the LO and HI bands, Constant Q/Constant Range switch in the HI-MID and LO-MID bands, with additional Notch filter
Dynamics	Full dynamics section with Compressor, Limiter, Expander, Gate, Look-forward circuit and Auto Make-up gain, Sidechain with HP/LP Filter
IPL	In-Process-Listen functions, allows listening into various points along the signal path
Meter	Precision metering function, switchable to channel input or after fader.

Functions for Mono channels only:

Input Mode Phase Phase reversal switch

LR Pan Standard Left/Right panner

Multiformat Pan Multiformat Surround Pan (MPAN): Format selection: 2CH, LCR, LCRS, 5.1, EX, 7.1, Amplitude Panning, adjustable Divergence, Panaround feature

Multiformat Pan w/LFE Format selection: 2CH, LCR, LCRS, 5.1, EX, 7.1, Amplitude Panning, adjustable Divergence and centre usage, Panaround feature, and LFE feed.

VSP VSP (Virtual Surround Panning): Format selection: 2CH, LCR, LCRS, 5.1, EX, 7.1, Amplitude Panning, adjustable Divergence, Panaround feature, Intensity, Frequency-depending and echo Pan modes, Simulation algorithms for several surround microphone types (HRTF, ORTF, AB, Sphere), Simulation of Virtual Rooms with Room Size Control, Ambiance & Absorption Controls, Variable Source Distance

Reverb Special channel type for generation of late reverb (tail): Diffuse reverb on up to four buses (bus 1, 2, 4, and 5). Separate adjustment of high and low frequencies as well as reverb time. Balance control of late reverb between front and rear buses. As a standard, this type of channel gets fed by a reverb bus, but can also be patched to any AUX bus.

Functions for Stereo channels only:

Input MS Mode Phase MS/XY decoding matrix, stereo mode (Normal, LL, LR, reverse, Mono) and Phase switch L, R, LR

Input MS Mode Phase Width MS/XY decoding matrix, stereo mode (Normal, LL, LR, reverse, Mono) and Phase switch L, R, LR, stereo Width control 0...200%

Pan Bal Stereo panorama

Pan Bal Width Stereo panorama, stereo Width control 0...200%

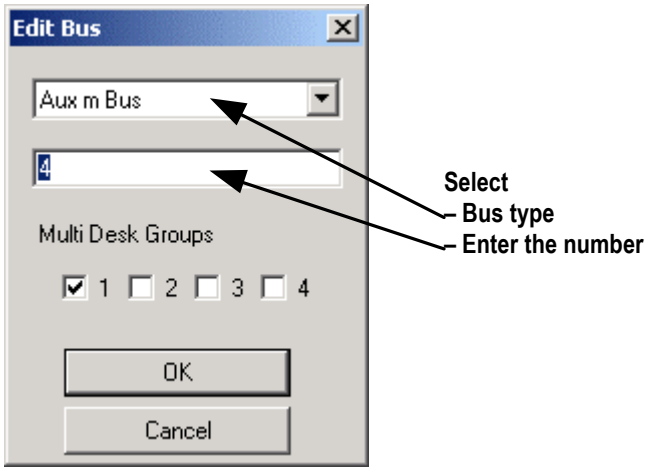
7.4.3.3 Add / Edit Buses

Add New Buses Double-click on “new bus” in the bus area

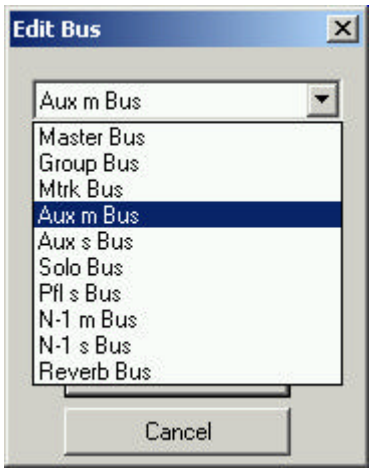
Edit Buses Double-click on an existing bus type in the bus area

Assign/Deassign Buses Double-click on the “On/Off” button, where the corresponding channel and the bus are crossing. All channels of the selected type will have access to all buses of the selected type if the button is set.

Both the Add and the Edit actions will open the “Edit Bus” dialog box that allows editing all the entries for new or existing buses.



Select Bus Type



Click on the box to display the available bus types. Currently, the following bus types are available:

- Mono Master bus
- Mono Group bus
- Mono Reverb bus
- Mono Multitrack bus
- Mono AUX bus
- Stereo AUX bus
- Mono SOLO bus
- Stereo PFL bus
- Mono N–1 bus
- Stereo N–1 bus

Number of Buses

Any number can be entered here to define the quantity for this particular bus type. The maximum numbers are in function of the overall installed DSP capacity (check the Core page to see how requirements change) and, for some bus types, the maximum number is limited by the capacity of the D950 Desk to operate them. This does not apply for Vista.
Here the D950 Desk limitations:

Aux Mono	max. 48
Aux Stereo	max. 48
N–1 Mono	max. 48
N–1 Stereo	max. 48
Master Mono	max. 8
Master Stereo	max. 8
Group Mono + Stereo	max. 48, stereo counts as 2 (e.g. 32 mono + 8 stereo groups)

Bus Conventions

There are three types of stereo buses

- Aux Stereo bus
- PFL Stereo bus
- N–1 Stereo bus

These bus types have to be entered bearing in mind that their number is counted as stereo. All other bus types are mono, regardless how they are used. For example, having eight mono master channels and eight stereo master channels will need a total of 24 mono master buses.

The required numbers are automatically entered into the Edit Bus dialog based on the number of corresponding channels. In the example above, the Edit Bus box will suggest 24 buses automatically.

For buses which do not correspond to channels (Multitrack, SOLO, PFL and N–1 buses), the suggested number will be initially zero and must be set by hand.

☞ **Tips**

When having mono and stereo channels of the same type (applies for master and group channels only), you have to make a gang of buses for each type. The first gang will be connected to the stereo channels and the second gang to the mono channels.
When adding a new mono or stereo channel format (applies for master and group channels only) to an existing configuration, first delete the corresponding buses (group or master) before adding the new buses, in order to guarantee the correct bus sequence.

Typically, there will only be one stereo PFL bus. The number of Solo buses has to comply with the surround format – i.e., for the 5.1 format you will need six Solo buses.
It is legal to have more buses than corresponding channel types. The reason for this is that the buses (unlike in analog consoles) are valid audio signals and can be used as such in the Studer D950/Vista patch. They are simply summing buses which will output the sum of all assigned inputs, which means that the buses can also be used as components of multiformat stems.

Remove Buses Simply click on the bus type to be removed and hit the "Del" (delete) key.

MultiDesk Groups See chapter 7.4.3.4.

7.4.3.4 Special Configuration Functions: MultiDesk and Stems

Here a brief explanation of two concepts which are unique to the Studer D950/Vista.

7.4.3.4.1 The Concept of MultiDesk Control Groups *(D950 only)*

Up to four individual operating desks can access the same DSP Core on the D950 (*not possible on the Vista consoles*). Each of these desks can have a separate Monitor section, PFL buses, Solo buses, and a set of Outputs. The four desks can work on individual tasks in different studios, but they share the available DSP power of the core and the AutoTouch automation. It is also possible that any or all four desks access the same audio channels. Using the built-in digital router, audio resources such as input converters can also be shared among the studios. This allows to have up to four operators (in four different locations or in the same room) working on the same task, or to have four independent mixing consoles working on four separate tasks.
The Session Configuration defines and configures the way how several Desks in a MultiDesk setup are working and sharing DSP power.

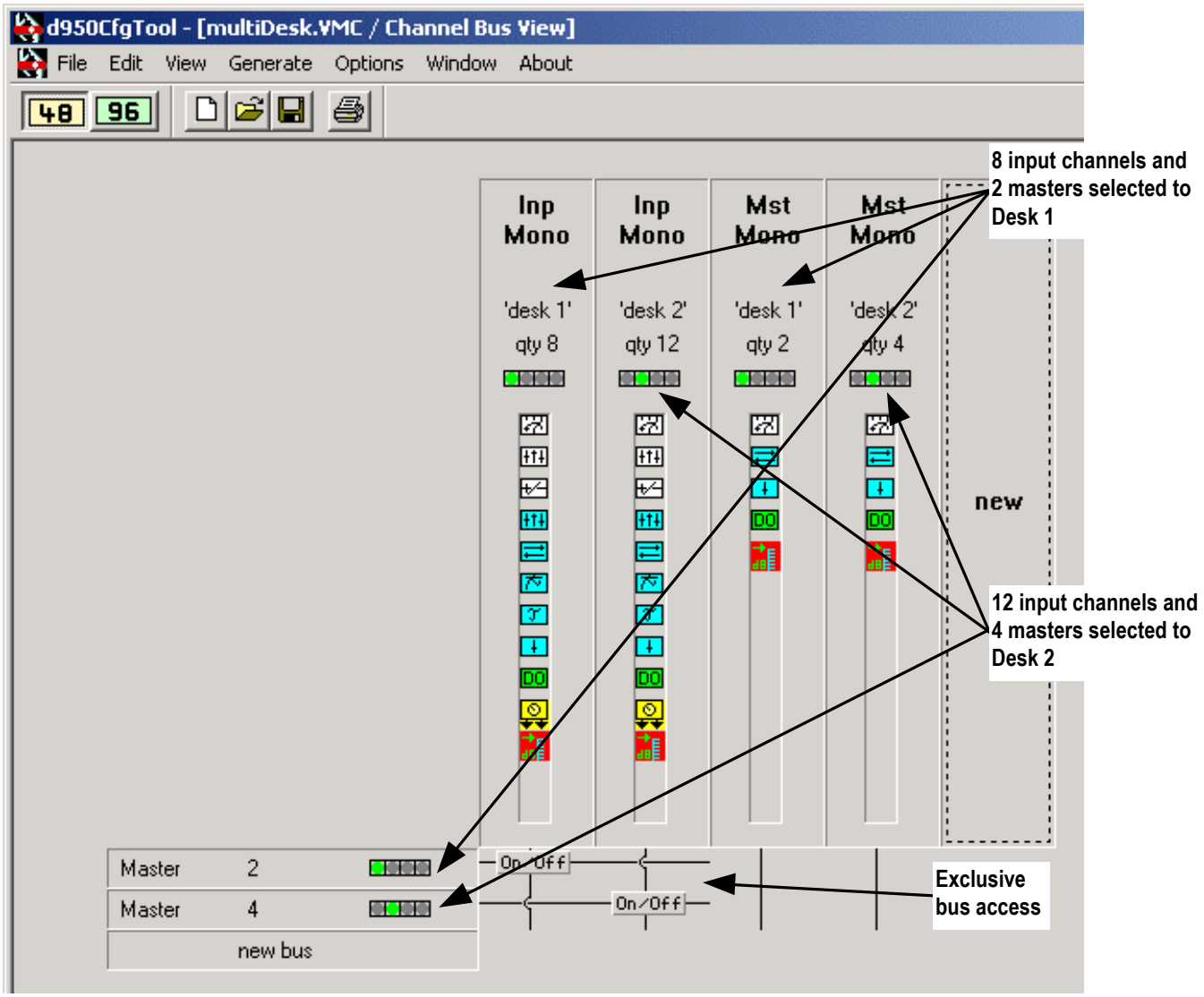
☞ **Tip** Please note that there are two limitations to this concept:

- Regardless of the number of desks in a MultiDesk system, they must all work with the same Timecode, since there is only one TC input to the system
- Since there is only one control system, and only one Session Configuration, it is impossible to reconfigure individual desks and to load a configuration independently from other desks. This means that all (up to 4) desks are always loaded at the same time.

Please also note that having made a MultiDesk configuration is only a part of the work. The Studer D950 desk also must have been manufactured and equipped in an appropriate way, as well as all peripheral devices configured to serve the MultiDesk purpose. The next section describes the principle of making two strongly different MultiDesk configurations. In both cases we will make a two-desk configuration for reasons of simplicity.

How to Make a Split Desk?

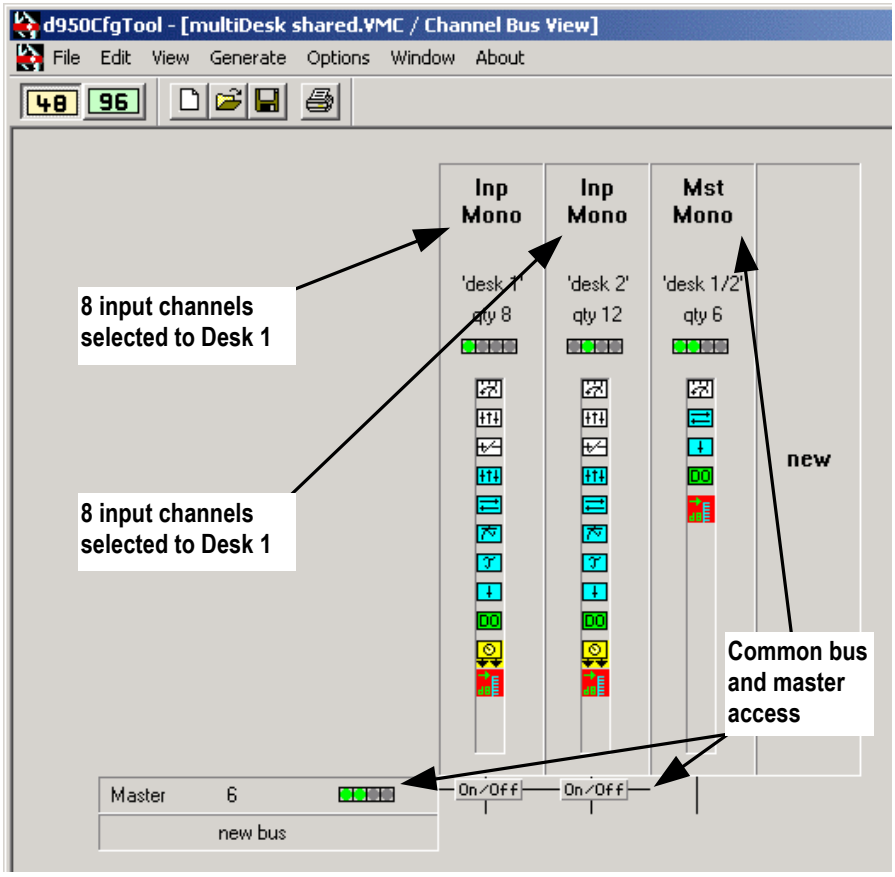
Use the MultiDesk Groups checkboxes in the Edit Bus and Add Channel dialogs in order to assign channels and buses to the two desks (operators). The following example shows a two-operator split desk, whereby the desks are independent of each other:



The DSP capacity is sufficient for a total of 20 input channels and six master channels. Operator 1 sees eight input channels and two master channels, whereas Operator 2 sees twelve input channels and four master channels.

How to Make a Parallel Desk?

Use the MultiDesk Groups checkboxes in the Edit Bus and Add Channel dialogs in order to assign channels and buses to the two desks (operators). The following example shows a two-operator parallel desk configuration, whereby the inputs of the desks are independent of each other, but the masters are common and both operators have access to the same master buses.



The DSP capacity again is sufficient for a total of 20 input channels and six master channels. Operator 1 sees eight input channels and all six master channels, and Operator 2 sees twelve input channels and all six master channels.

7.4.3.4.2 The Concept of Stems

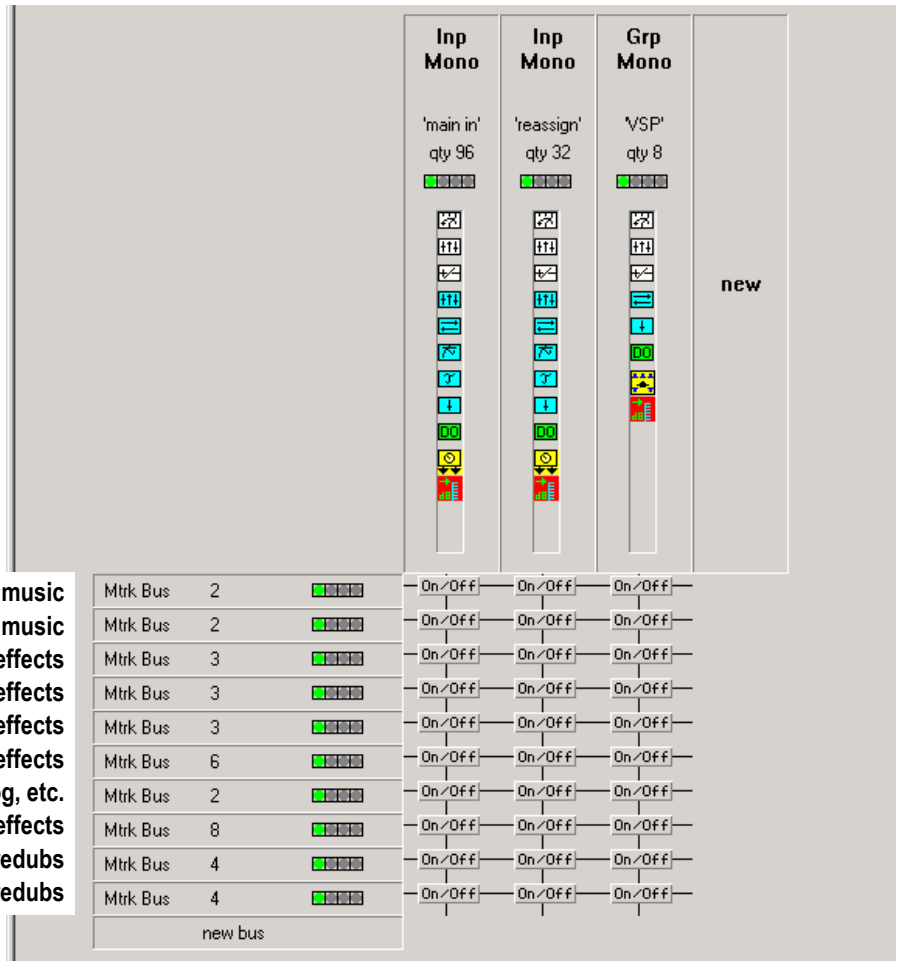
For Film style mixing, bits and pieces of film sound are put together from a variety of surround formats, ranging from mono to eight channels. Very often, there may be hundreds of audio sources that need to be mixed together and put into the right spatial image. In order to bring some order to such a vast number of sources and formats, a concept of Stems is often used.

A Stem is a group of sounds (i.e., audio summing buses) that belong together. Stems can be 1-channel to 8-channel wide. For example, a console may be configured to have:

2 Stereo stems for music
3 LCR stems for simple effects
1 5.1 stem for effects
1 Stereo stem for dialog, etc.
1 8-CH stem for effects
2 Dolby Surround (4-CH) stems for predubs

The basic Stem setup is defined in the Session Configuration – the number, type and assignment of Stem buses is fixed. In the Studer D950/Vista GC, there are controls for dynamic Stem setup and for assignments of the related recorder tracks. In this way, the Stem setup may be changed dynamically as the need arises.

The restriction to the total number of Stems is the number of buses for a certain Session Configuration. Studer D950/Vista Master, Mono Group and/or Track buses are used to build a system of Stems (each stem consists of a number of buses) up to a maximum of 104 Stem buses at any time.



Stereo stem for music
Stereo stem for music
LCR stem for simple effects
LCR stem for simple effects
LCR stem for simple effects
5.1 stem for effects
Stereo stem for dialog, etc.
8-CH stem for effects
Dolby Surround (4-CH) stems for predubs
Dolby Surround (4-CH) stems for predubs

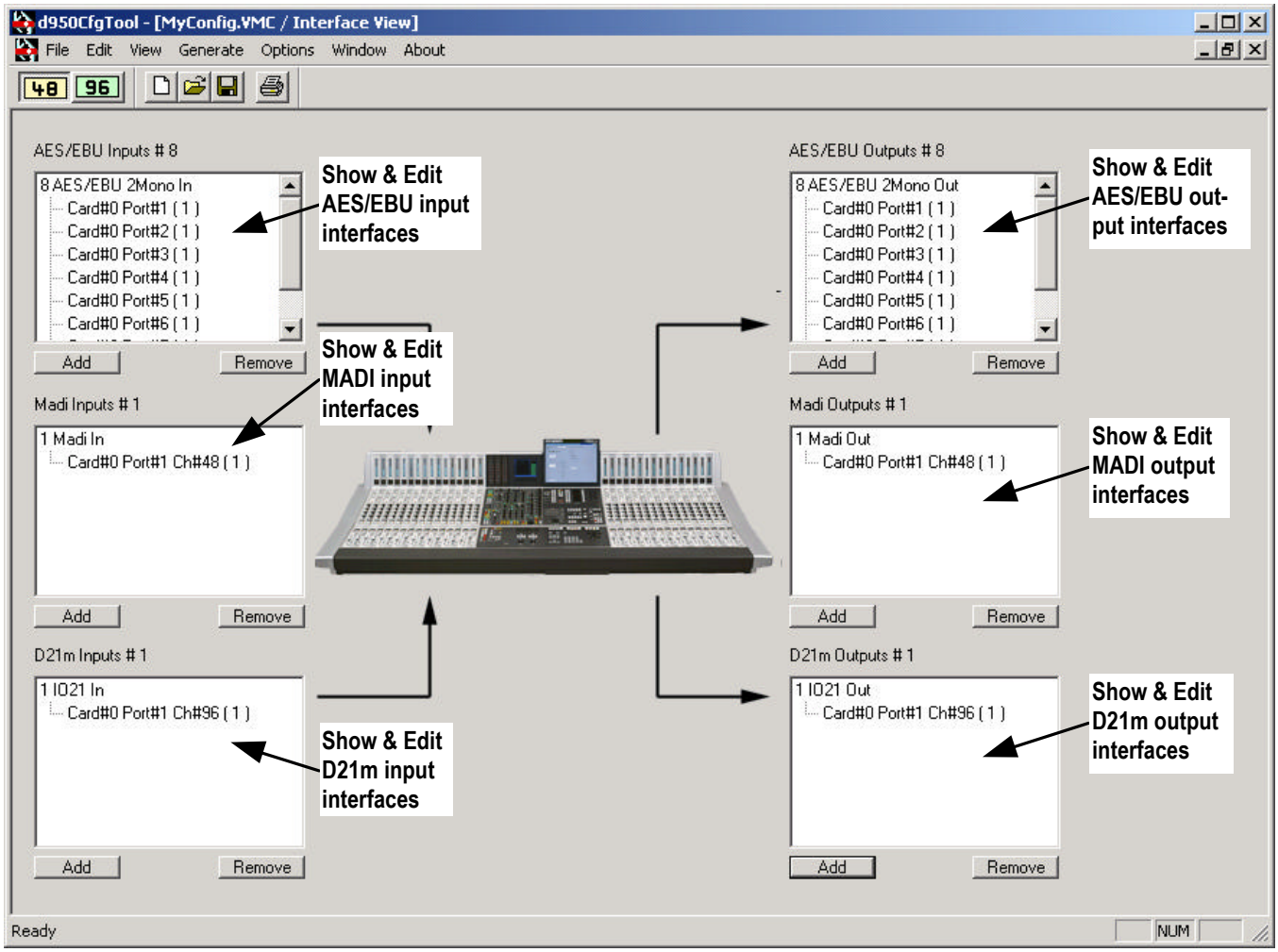
In this example, the bus structure has been set to allow for the above stem configuration using multitrack buses as Stem buses. A total of 37 multitrack buses has been configured by adding new buses for a stem of 2, a stem of 2, a stem of 3, etc. All 136 input and group channels have access to all ten stems.

7.4.4 The Interface Page

The interface page allows viewing and editing of the audio interfacing to the DSP core. It is important to assign enough audio input and output interfaces so that the configured system can work satisfactorily. There are eight types of interfaces that can be edited here:

- AES/EBU Stereo inputs
- AES/EBU 2 Mono inputs
- AES/EBU Stereo outputs
- AES/EBU 2 Mono inputs
- MADI inputs
- MADI outputs
- D21m inputs
- D21m outputs

All those require a little DSP power and, obviously, the right DSP board type and quantity. Only the direct-to-core interfaces are relevant for the core load. Any mic preamps, A/D or D/A converters or other digital format converters must be connected to the above four direct-to-core interface types.



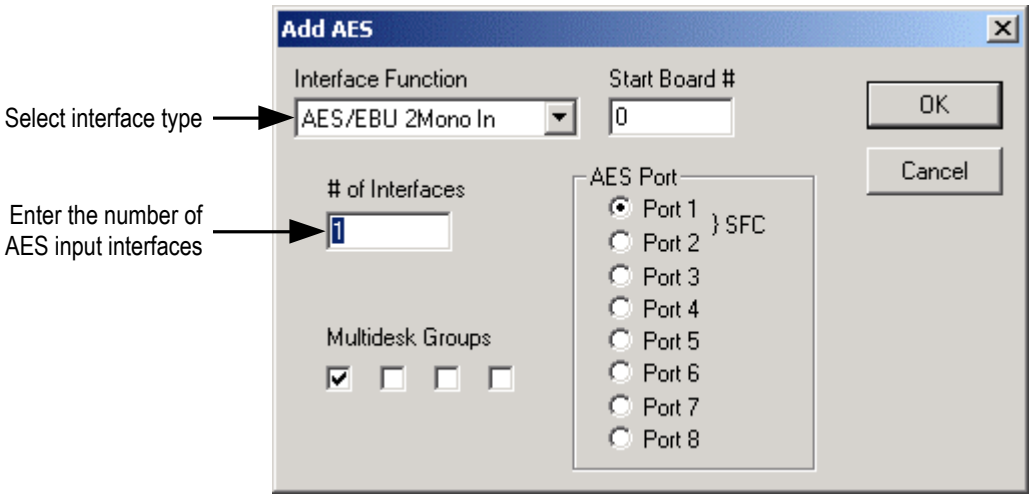
The Studer D950/Vista system can contain three I/O board types that are relevant for the interfacing:

- PEAES – DSP board with 6 DSP processors, 8 AES/EBU inputs (2 of which with SFC) and 8 AES/EBU outputs
- MADI I/O board with 2 MADI optical input connectors and 2 MADI optical output connectors per board
- PED21m I/O board with one LVDS interface to be used in conjunction with the D21m.

The Session Configuration Tool will check all the relevant requirements as you enter the numbers and will calculate the necessary DSP power, the board types and their number, and will display that information on the Core page.

Edit AES/EBU Interfaces

To add AES/EBU input interfaces to the system configuration, simply click on the Add button in the AES/EBU Inputs area. A dialog box will appear:



Most of the time it is sufficient only to enter the total number of interfaces, bearing in mind that the number of AES/EBU interfaces will mean twice the number of available mono-equivalent audio inputs – if you enter 24, this will mean 48 mono signals that can enter the DSP system.

The Configuration Tool will calculate the total number of PEAES boards needed (3 in the example above). Normally, the other entries in the box will never have to be used.

For Specialists Only!

The "start board" entry allows to set the board where the first interface will be placed by the system (this normally starts with board 00). The "AES Port" entry allows to set the first of the 8 AES ports on the selected board. The "Interface Function" entry only allows Digital Input to be set ® currently no function.

To add AES/EBU output interfaces to the system configuration, simply click on the "Add" button in the AES/EBU Outputs area and a similar dialog box will appear, allowing to set the number of AES/EBU outputs.

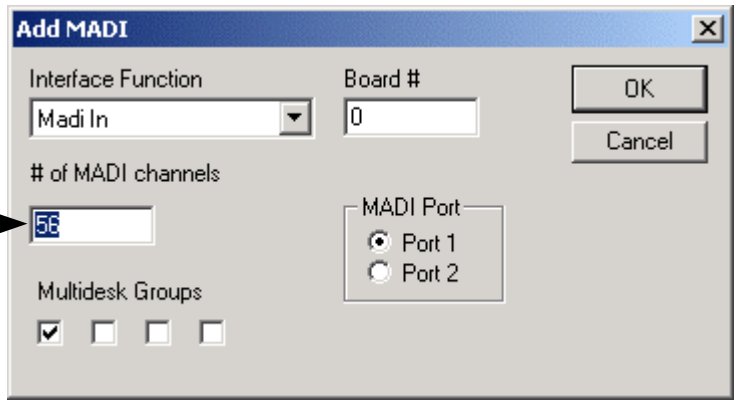
The total number of AES/EBU inputs does not have to be the same as the number of outputs. Since all AES/EBU inputs and outputs require a little DSP power, it is prudent to keep the numbers as low as necessary.

After adding the required interfacing, the display will show the total number of interfaces and their distribution on the PEAES board, starting with board number 00.

To remove AES/EBU input interfaces from the system configuration, simply select the interface to be removed (or to remove all, select the uppermost line) and click on the "Remove" button, or use the "Del" (delete) key.

Edit MADI Interfaces

To add MADI input interfaces to the system configuration, simply click on the "Add" button in the MADI Inputs area and a dialog box will appear:



The number of channels per each MADI interface has to be entered, and the process repeated for every MADI interface.

The Configuration Tool will calculate the total number of MADI I/O boards needed. Normally, the other entries in the box will never have to be used.

For Specialists Only!

The "start board" entry allows to set the board where the first interface will be placed by the system (normally starts with board 00). The "MADI Port" entry allows to set the first or second of the two MADI ports on the selected board. The "Interface Function" entry only has a function for outputs in order to select between MADI Out and reduced MADI out. Reduced MADI out obviously has reduced functionality and is only used in Router applications; it is, therefore, only accessible to expert users.

To add MADI output interfaces to the system configuration, simply click on the "Add" button in the MADI Outputs area and a similar dialog box will appear, allowing to set the number of MADI outputs.

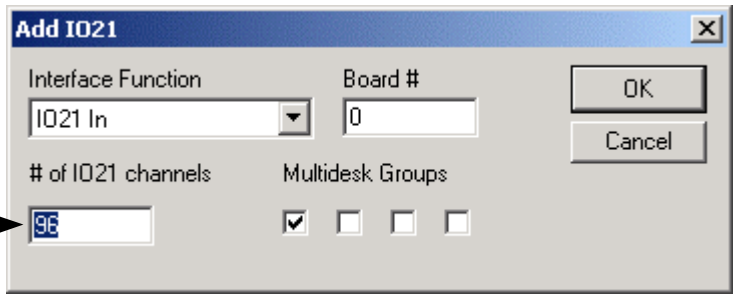
The total number of MADI inputs does not have to be the same as the number of outputs. Since a new MADI board is added per each two new MADI interfaces, it is prudent to keep the numbers as low as necessary. Since all individual channels within a single MADI interface require a little DSP power, it is also prudent to enter only the required number. If you need to interface a 24-track digital recorder via MADI, then only enter 24 in the "# of MADI channels" box instead of 56, which would be the maximum that a standard MADI interface will support.

After adding the required interfacing, the display will show the total number of interfaces and their distribution on the MADI board, starting with board number 00.

To remove MADI input interfaces from the system configuration, simply select the interface to be removed (or to remove all, select the uppermost line) and click on the Remove button, or use the “Del” (delete) key.

Edit D21m Interfaces

To add D21m input interfaces to the system configuration, simply click on the “Add” button in the D21m Inputs area and a dialog box will appear:



The number of channels per each D21m interface has to be entered, and the process must be repeated for every D21m interface. The number of channels must be a multiple of eight which is the smallest function unit.

For Specialists Only!

The “start board” entry allows to set the board where the first interface will be placed by the system (normally starts with board 00).

To add D21m output interfaces to the system configuration, simply click on the “Add” button in the D21m Outputs area and a similar dialog box will appear, allowing to set the number of D21m outputs.

The total number of D21m inputs does not have to be the same as the number of outputs, since a new D21m board is added per each new interface. It is prudent to keep the numbers as low as necessary in order to save DSP power.

When operating with 96 kHz sampling frequency, the board cannot handle 96 inputs and 96 outputs. Please refer to the following table for possible combinations of inputs and outputs.

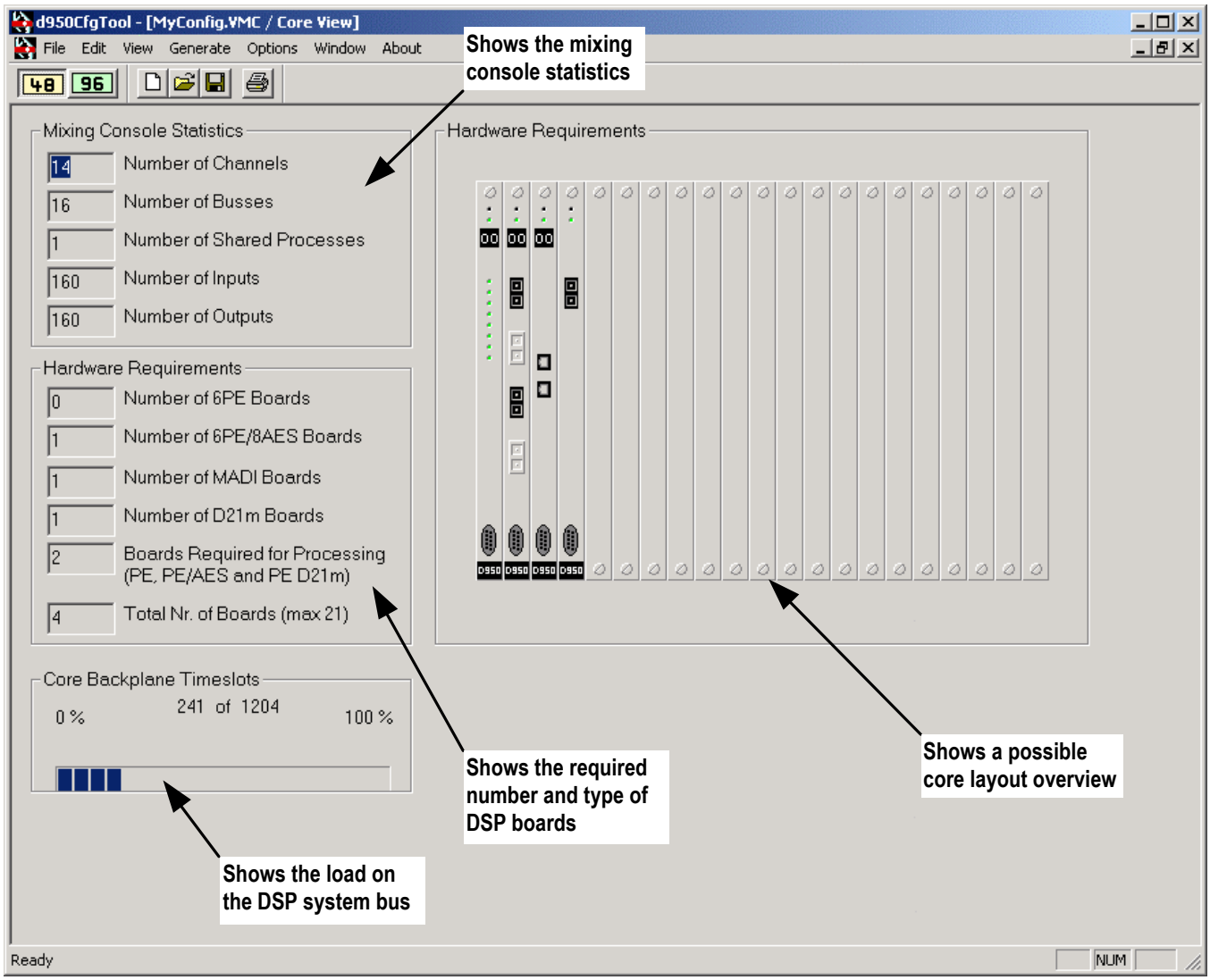
Inputs	Outputs
0	80
24	72
48	64
72	56
96	48

After adding the required interfacing, the display will show the total number of interfaces and their distribution on the D21m board(s), starting with board number 00.

To remove D21m input interfaces from the system configuration, simply select the interface to be removed (or to remove all, select the uppermost line) and click on the Remove button, or use the “Del” (delete) key.

7.4.5 The Core Page

The Core page displays the statistics of the channels, buses, and I/Os, as well as the occupancy of the DSP core. The page has four parts:



Mixing Console Statistics This area indicates the configured number of channels, buses, shared processes (test tone generator, side-chain links), and input and output interfaces. These numbers reflect all the entries that have been made during the configuration process.

Hardware Requirements For already generated configurations it shows the exact hardware Requirements. When generating a new or editing an existing configuration, the display switches to “rough estimation”. It shows the expected requirements by applying a simple algorithm that is not as accurate as the one used for generating a configuration. Therefore the number of boards may change when generating the configuration. The total number of boards must not exceed 21.

Global Buses Shows the current communication load on the DSP system communication bus (not to be mistaken for audio buses in the mixing console). The number of buses must not exceed 1204.

7.4.6 The Shared Functions Page

The Shared Functions page allows adding and editing the so-called shared functions. Currently the following shared functions are available:

- Generator (D950/Vista)
- Dynamics sidechain link (D950/Vista)
- Fader (Router)
- Extended Fader (Router)
- Tieline (Router)
- Mixer (Router)
- Stereo to Mono (Router)
- Delay 240 ms (Router)
- 4-Band EQ (Router)
- Dynamics (Router)
- Dynamics Stereo (Router)

The router functions are only accessible for expert users.

Generator The Generator is used to test the console with sine-wave, white noise, and pink noise signals. The number is automatically set to 1.

Dynamics Sidechain Link The dynamics sidechain link allows to link the controls (sidechains) of the dynamics sections of up to eight different channels. It is similar to the "stereo link" function found on many standalone compressor/limiters, but the number of linkable channels has been set to eight rather than only two, so that all current surround formats can be supported. The dynamics sidechain link requires DSP power, so the number is best set to the required minimum. The default number is zero, and the number can be set freely.

Tieline Virtual Patch point.

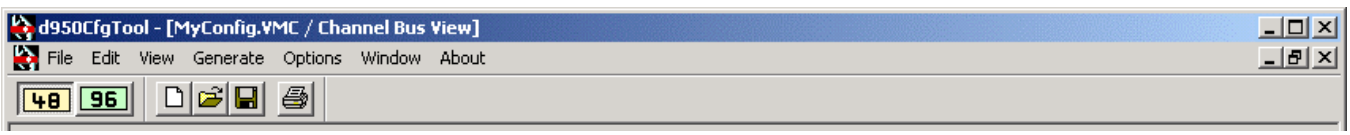
Other Functions Audio functions have the same functionality as their corresponding channel functions.

To Edit To edit the numbers of shared functions go to the VMC Tree View.

7.4.7 The Session Configuration Tool Menu and Toolbar

Most of the functions of the Session Configuration Tool are controlled directly from the four View pages as described in the previous chapters. There are, nevertheless, some functions that are accessible only via the menus. The following descriptions briefly explain all the menu items, and only go into details for functions not explained in the previous chapters.

7.4.7.1 The Toolbar



48 Set sampling frequency to 48 kHz.

96 Set sampling frequency to 96 kHz.

7.4.7.2 The File Menu

New	Opens a new, empty configuration file called “Untitled”.
Open	Opens an existing `*.vmc` configuration file. First looks into the folder as stated in the “Options/Directories/Files” menu, usually `C:\D950SYSTEMDB`.
Close	Closes the current `*.vmc` configuration file.
Save VMC	Saves the current `*.vmc` configuration file under the same name, thus overwriting it.
Save VMC as...	Saves the current `*.vmc` configuration file under a different name. The extension `*.vmc` does not have to be typed out. Generates a new folder with the same name as the `*.vmc` configuration file and saves the `*.vmc` configuration file there.
Save VMC Overview	Saves the Overview of the current `*.vmc` configuration file as a `*.txt` file. The overview contains condensed information on the current configuration. Example in chapter 7.4.7.5.
Print VMC Overview	Prints the Overview of the current `*.vmc` configuration file. The overview contains condensed information on the current configuration.
Print Preview	Shows the Overview of the current `*.vmc` configuration file on screen.
Print Setup	Standard Windows printer setup.
Exit	Quits the Session Configuration Tool.

7.4.7.3 The Edit Menu

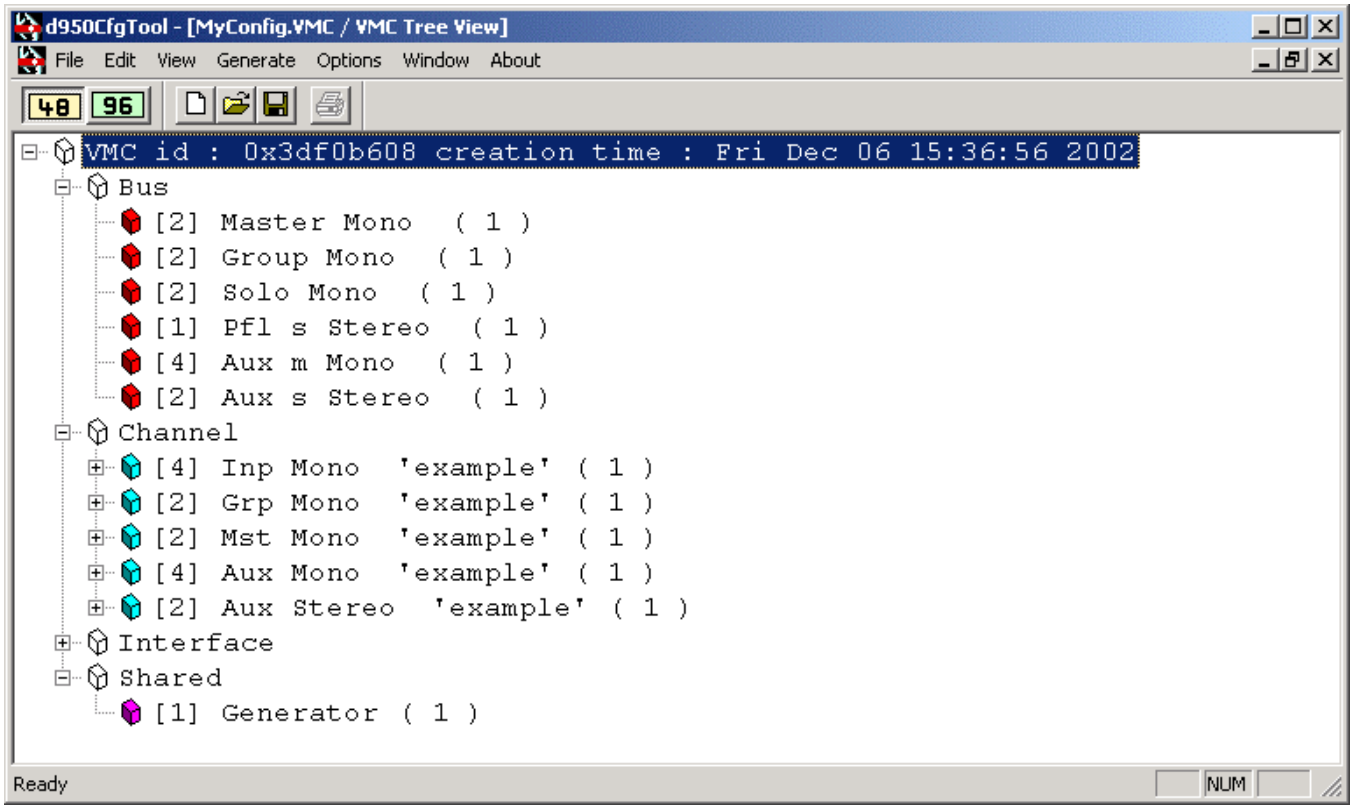
Remove Last Process	An “Undo” function to remove the last added process (channel, bus, shared function or interface).

7.4.7.4 The View Menu

Vmc	✋ **For Specialists Only!**
FuncLib	✋ **For Specialists Only!**
Log File	Shows the Log File that contains information on the last several Generate runs. The oldest information is shown at the top of the file.
Tool Bar, Status Bar	Switches the Tool Bar and The Status Bar on and off.
Channel Bus	Brings up the Channel Bus page. For a description, please see previous chapters.
Interface	Brings up the Interface page. For a description, please see previous chapters.
Shared and External	Brings up the VMC Tree View (see chapter 7.4.7.5).
Core	Brings up the Core page. For a description, please see previous chapters.
Tree	Brings up the VMC Tree View (see chapter 7.4.7.5).

7.4.7.5 The VMC Tree View

The VMC Tree View can be used to view and even edit the configuration.



Edit an Item Select any function and choose “Edit” from the menu, accessed by hitting the right trackball button.

Delete an Item Select any function and choose “Delete” from the menu, accessed by hitting the right trackball button.

Delete all Buses Select the item Bus and choose “Delete” from the menu, accessed by hitting the right trackball button.

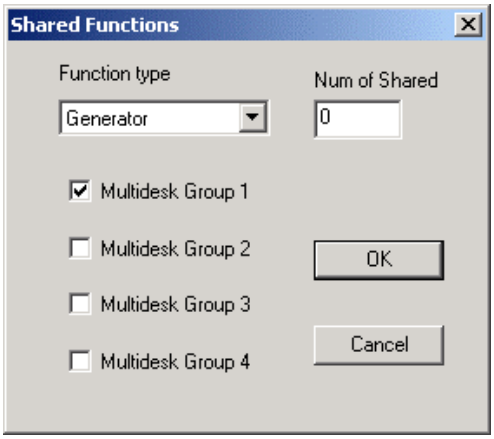
Delete all Channels Select the item Channel and choose “Delete” from the menu, accessed by hitting the right trackball button.

Delete all Interfaces Select the item Interface and choose “Delete” from the menu, accessed by hitting the right trackball button.

Delete All Shared Functions Select the item Shared and choose “Delete” from the menu, accessed by hitting the right trackball button.

Add New Items To add a function select the “Root” item, right-click, and choose “Add”.

Add Shared Functions To add a shared function select the “Root” item, right-click, and choose “Add”, then “Shared”. The following dialog will appear.



☞ **Important Tip** The number of functions is set to 0 per default. It is important to enter the number of functions here, otherwise nothing will happen.

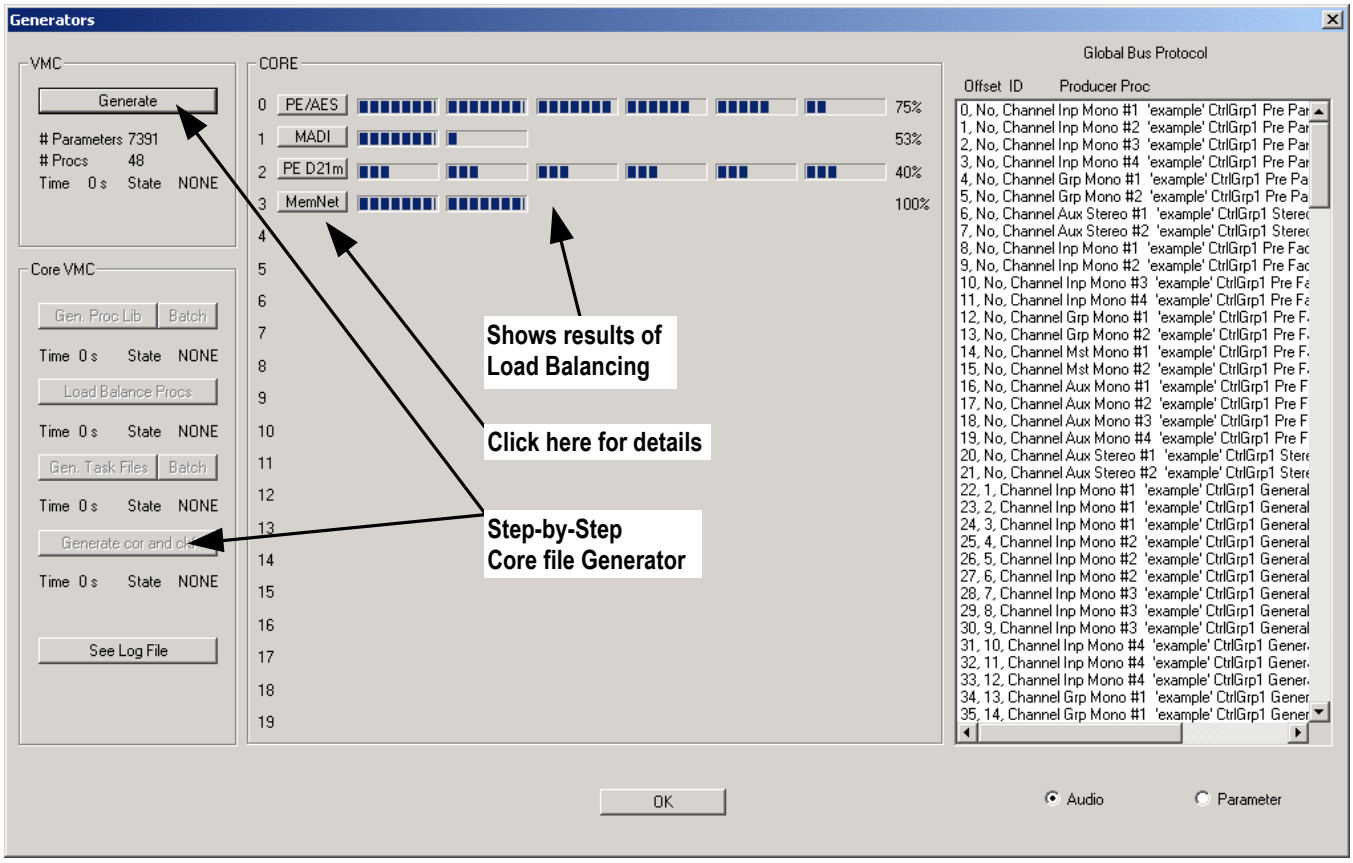
Add External Functions If you want to add an external function select the “Root” item, right-click, and choose “Add” from the menu. When choosing “Ext Device” the following dialog will appear.

☞ **Important Tip** The number of devices is set to 0 per default. It is important to enter the number of devices here, otherwise there will be no remote control possibility.

7.4.7.6 The Generate Menu

Detailed This menu opens up an interactive dialog box that allows to start step-by-step manual Load Balancing and generation of the DSP core file. It allows the expert user to see more details of the current configuration as if Generate/All would be used.

For Specialists Only! It is not necessary to go to this menu item to do the whole generate process. The main reason for looking at this page is to see the load distribution to various DSP boards and individual PE processors. There is a lot of other information here that does not mean much to the "ordinary humans" (uhm, sorry, ordinary humans).
This menu becomes available when you are in the expert mode. The expert mode is activated by double-clicking the right trackball button with the trackball pointer on the "About" dialog while holding the **Ctrl/Shift** keys.



If a Generate process has already been done, the "CORE" area will show the results of load balancing and distribution of the load to DSP boards. Click on one of the buttons to see the load distribution on one DSP board in detail. If the Generate process has not yet been done, the "CORE" area is empty.

To do the Generate process from here, all seven boxes in the "VMC" area have to be clicked in turn, always waiting for the result of the previous action to appear before the next box is clicked. The order of the individual processes is as follows:

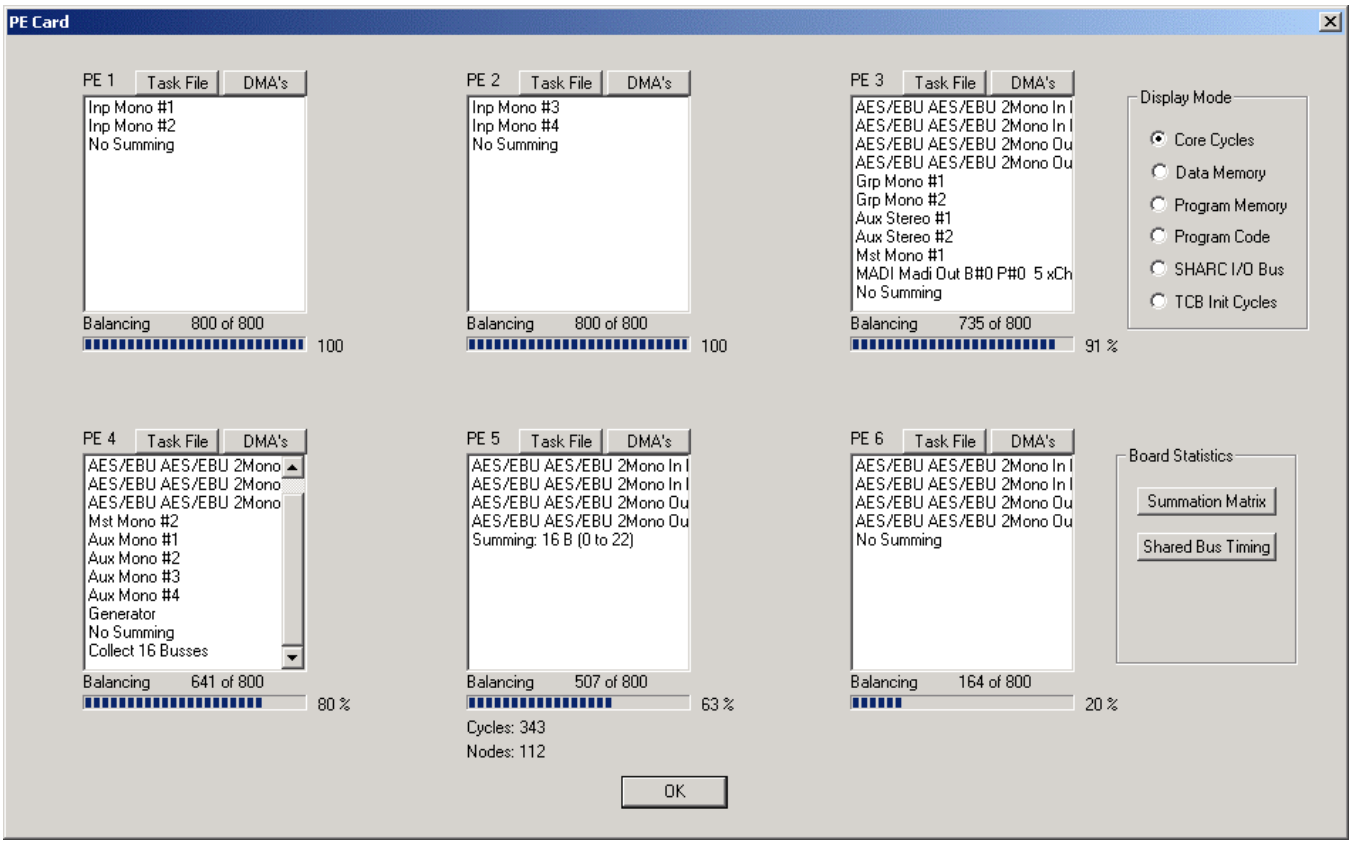
- Generate (VMC)
- Gen Proc Lib
- Batch
- Load Balance Procs (now the “CORE” area will be filled in)
- Gen Task Files
- Batch
- Generate Core File

If all steps are completed, the new core file is generated.

☞ **Tip** If you only wish to see the results of load balancing, but not to generate a core file, use only the following three boxes:

- Generate (VMC)
- Gen Proc Lib
- Load Balance Procs

which will display the “CORE” area. Click on one of the buttons in this area to see the load distribution on one DSP board in detail. Here the display for the PEAES Board 00 is shown as an example:



Some of these details can also be found in the core knowledge file. An example of this file is given in chapter 7.5.2.1. The page and the file contain condensed information on the load distribution on DSP PE and PEAES boards and individual PE processors. This information may be helpful during troubleshooting of the system, because all the individual channels, buses, and functions can be precisely located to a particular board.

All Starts the Load Balancing and automatic generation of the DSP core file. For a description, please see previous chapters.

7.4.7.7 The Options Menu

Core Constants	☝ **For Specialists Only!** ***You are not allowed to change anything here, even if you are an expert user.***

Directories / Files... Allows to edit the `D950CfgTool.Ini` file, as described in the previous chapters.

7.4.7.8 The Window Menu

This menu contains standard functions for windows management. Multiple windows and copies of existing windows are allowed.

New Channel Bus Opens a new Channel Bus page, or, if there are already Channel Bus pages, creates a new copy of the page.

New Interface Opens a new Interface page, or, if there are already Interface pages, creates a new copy of the page.

New Core Opens a new Core page, or, if there are already Core pages, creates a new copy of the page.

New Tree Opens a new VMC Tree dialog.

Cascade Arranges the Workspace as cascaded windows.

Tile Arranges the Workspace as tiled windows.

1, 2, 3, ... Brings the selected page to the top of the workspace

7.5 Maintenance

7.5.1 Managing the Files – Which File is Where?

Any Session Configuration starts with only two files:

- myConfig.vmc
- myConfig.cor

They are stored in a subfolder (with the name of the configuration) of the Session Configuration folders on the Studer D950/Vista PC.

7.5.2 The D950CfgTool.ini File

The :\Windows_Root directory contains the "D950CfgTool.ini" file. This file tells the Configuration Tool where to look for various components and what the basic settings are. This root directory may be called similarly to "Windows", "Win95", or "WINNT40" and is usually found on the C: drive of every PC.

The contents of this file are set by the Session Configuration Tool software. The user should not find it necessary to edit the file using a text editor.
This file is automatically generated if there is none available upon starting the Configuration Tool for the first time.

7.5.2.1 Example of a Core Knowledge File

The Core Knowledge file offers the following information on a Configuration.

VMC ID	Identification of the VMC used to ensure that the *.vmc and *.cor files match.
Sampling Frequency	48 kHz or 96 kHz
Tasks	Shows the task (channels, buses….) of the configuration.
D950CfgTool.ini	A copy of the *.ini file used to generate the configuration.
Resources	List which task is being executed on which board and processor.

(Please turn page)

```
C:\D95ØSYSTEMDB\MyConfig\MyConfig.ckf
--------------------------------------------------------------------------------

VMC id : Øx3df46da8 creation time : Mon Dec Ø9 11:17:12 2ØØ2

The configuration runs at 48k.
--------------------------------------------------------------------------------

The configuration executes the following tasks
--------------------------------------------------------------------------------

Channels:

4 Inp Mono 'example' Channels

Input Selector PreAmp Ctrl Mono
Input HPF/LPF & 3 Gains
Input Mode Phase
4 Band EQ
Insert
Dynamics
Delay 1ØØms
Fader
Direct Out
LR Pan
Meter

2 Grp Mono 'example' Channels

Input Selector
Input HPF/LPF & 3 Gains
Input Mode Phase
Insert
Fader
Direct Out
LR Pan
Meter

2 Mst Mono 'example' Channels

Input Selector
Insert
Fader
Direct Out Simple
Meter

2 Aux Mono 'example' Channels

Input Selector
Insert
Fader
Direct Out Simple
Meter

2 Aux Stereo 'example' Channels

Input Selector
Insert
Fader
Direct Out Simple
Meter
```

```
Buses:

2 Master Buses
2 Group Buses
2 Solo Buses
1 Pfl s Bus
4 Aux m Buses
2 Aux s Buses

Shared Process

1 Generator

Interfaces:

8 Digital Input AES Interfaces
8 Digital Output AES Interfaces
1 Digital Input MADI Interface
1 Digital Output MADI Interface
1 Digital Input D21m Interface
1 Digital Output D21m Interface


The configuration was generated, using the following ini file
--------------------------------------------------------------------------------

[globals]

DpramAMessageChOffset=0
DpramAAudioChOffset=666
DpramABoardChStartOffset=700
DpramALength=992
DpramBMessageChOffset=64
DpramBParamChOffset=128
DpramBAudioChOffset=666
DpramBBoardChStartOffset=700
DpramBLength=992
DpramReadWaitStates=0
DpramWriteWaitStates=0
DpramABeginWrite=c00000
DpramABeginRead=400400
DpramBBeginWrite=c01000
DpramBBeginRead=401400
AddToIoBus=100
AddToSharedBus=64
MaxNumOfTcbInitCycles=280
DeskType=D950

[dir and file settings]

CoreFuncLibFile=C:\D950cfg\CoreFunc021119.lib
CoreFuncLibFile96k=C:\D950cfg\CoreFunc96k021120.lib
LogFile=C:\D950Cfg\LogFile.txt
CoreMemNet1File=C:\D950cfg\mn020809.exe
CoreMemNet2File=C:\D950cfg\mn020809.exe
PearchFile=C:\D950cfg\Ar010515.ach
RtosFile=C:\D950cfg\rt020919.a
CoreTempFilesPath=C:\D950Cfg\tmpFiles\
CfgPath=C:\D950SYSTEMDB\
```

```
[GUI settings]

ShowWindow=3
View=ChanBusView,1,176,176,980,756,0,0,InterfaceView,1,110,110,914,690,0,0,CoreView,1,572,0,
890,591,0,0,TreeView,3,154,154,842,734,0,0

[GUI settings-Summary]

Bars=4
ScreenCX=1024
ScreenCY=768

[Recent File List]

File1=D:\D950SystemDB\MyConfig\MyConfig.VMC
File2=D:\D950SystemDB\Untitled\Untitled.VMC

[GUI settings-Bar0]

BarID=59392
XPos=86
YPos=-2
Docking=1
MRUDockID=0
MRUDockLeftPos=86
MRUDockTopPos=-2
MRUDockRightPos=202
MRUDockBottomPos=30
MRUFloatStyle=8256
MRUFloatXPos=-2147483648
MRUFloatYPos=0

[GUI settings-Bar1]

BarID=59392
XPos=-2
YPos=-2
Docking=1
MRUDockID=0
MRUDockLeftPos=-2
MRUDockTopPos=-2
MRUDockRightPos=88
MRUDockBottomPos=30
MRUFloatStyle=8256
MRUFloatXPos=-2147483648
MRUFloatYPos=0

[GUI settings-Bar2]

BarID=59393

[GUI settings-Bar3]

BarID=59419
Bars=4
Bar#0=0
Bar#1=59392
Bar#2=59392
Bar#3=0
```

```
In addition to the MemNet baord, the configuration uses the following resources
--------------------------------------------------------------------------------

PE/AES Boards : 1
PE Boards : Ø
MADI Boards : 1
D21m Boards : 1

Backplane Timeslots : 241

Distribution Information
------------------------

BOARD :Type : PE/AES Addr : Ø Task No : Ø

Summing Buses:

Bus Pfl s #1__Ø CtrlGrp1 left
Bus Pfl s #1__Ø CtrlGrp1 right
Bus Master #1__Ø CtrlGrp1
Bus Master #2__1 CtrlGrp1
Bus Group #1__Ø CtrlGrp1
Bus Group #2__1 CtrlGrp1
Bus Solo #1__Ø CtrlGrp1
Bus Solo #2__1 CtrlGrp1
Bus Aux m #1__Ø CtrlGrp1
Bus Aux m #2__1 CtrlGrp1
Bus Aux m #3__2 CtrlGrp1
Bus Aux m #4__3 CtrlGrp1
Bus Aux s #1__Ø CtrlGrp1 left
Bus Aux s #1__Ø CtrlGrp1 right
Bus Aux s #2__1 CtrlGrp1 left
Bus Aux s #2__1 CtrlGrp1 right

PE 1:
Channel Inp Mono #1  'example' CtrlGrp1
Channel Inp Mono #2  'example' CtrlGrp1
No Summing

PE 2:
Channel Inp Mono #3  'example' CtrlGrp1
Channel Inp Mono #4  'example' CtrlGrp1
No Summing

PE 3:
AES/EBU AES/EBU 2Mono In B#Ø P#Ø
AES/EBU AES/EBU 2Mono In B#Ø P#1
AES/EBU AES/EBU 2Mono Out B#Ø P#Ø
AES/EBU AES/EBU 2Mono Out B#Ø P#1
Channel Grp Mono #1  'example' CtrlGrp1
Channel Grp Mono #2  'example' CtrlGrp1
Channel Aux Stereo #1  'example' CtrlGrp1
Channel Aux Stereo #2  'example' CtrlGrp1
Channel Mst Mono #1  'example' CtrlGrp1
MADI Madi Out B#Ø P#Ø  5 ext.ch
No Summing
```

```
PE 4:
AES/EBU AES/EBU 2Mono In B#0 P#2
AES/EBU AES/EBU 2Mono In B#0 P#3
AES/EBU AES/EBU 2Mono Out B#0 P#2
AES/EBU AES/EBU 2Mono Out B#0 P#3
Channel Mst Mono #2  'example' CtrlGrp1
Channel Aux Mono #1  'example' CtrlGrp1
Channel Aux Mono #2  'example' CtrlGrp1
Channel Aux Mono #3  'example' CtrlGrp1
Channel Aux Mono #4  'example' CtrlGrp1
SharedProc Generator 1
No Summing

PE 5:
AES/EBU AES/EBU 2Mono In B#0 P#4
AES/EBU AES/EBU 2Mono In B#0 P#5
AES/EBU AES/EBU 2Mono Out B#0 P#4
AES/EBU AES/EBU 2Mono Out B#0 P#5
Summing: 16 B (0 to 22)

PE 6:
AES/EBU AES/EBU 2Mono In B#0 P#6
AES/EBU AES/EBU 2Mono In B#0 P#7
AES/EBU AES/EBU 2Mono Out B#0 P#6
AES/EBU AES/EBU 2Mono Out B#0 P#7
No Summing

BOARD :Type : MADI Addr : 0 Task No : 1

No Summation

PE 1:
MADI Madi In B#0 P#0  48 ch
MADI Madi Out B#0 P#0  43 ch


PE 2:

BOARD :Type : PE D21m  Task No : 2

No Summation

PE 1:
IO21 IO21 In B#0 P#1
IO21 IO21 In B#0 P#1
IO21 IO21 Out B#0 P#1
IO21 IO21 Out B#0 P#1

PE 2:
IO21 IO21 In B#0 P#1
IO21 IO21 In B#0 P#1
IO21 IO21 Out B#0 P#1
IO21 IO21 Out B#0 P#1

PE 3:
IO21 IO21 In B#0 P#1
IO21 IO21 In B#0 P#1
IO21 IO21 Out B#0 P#1
IO21 IO21 Out B#0 P#1
```

```
PE 4:
IO21 IO21 In B#0 P#1
IO21 IO21 In B#0 P#1
IO21 IO21 Out B#0 P#1
IO21 IO21 Out B#0 P#1

PE 5:
IO21 IO21 In B#0 P#1
IO21 IO21 In B#0 P#1
IO21 IO21 Out B#0 P#1
IO21 IO21 Out B#0 P#1

PE 6:
IO21 IO21 In B#0 P#1
IO21 IO21 In B#0 P#1
IO21 IO21 Out B#0 P#1
IO21 IO21 Out B#0 P#1
```

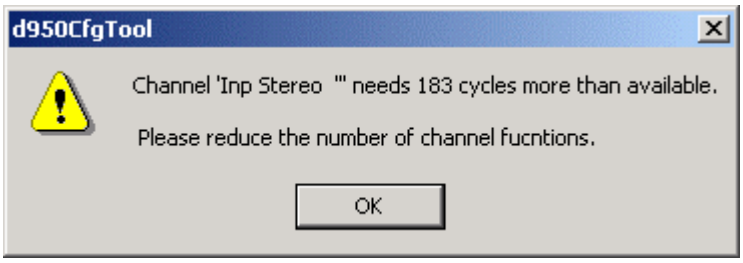
7.5.3 Troubleshooting

The Session Configuration Tool was checked at the factory during more than a year for malfunctions and erroneous operations. Hundreds of different configurations were tried, and all sorts of tests have been made. Nevertheless, since there exists an almost infinite number of channel, bus, and I/O configuration combinations, not all of them could be tested. So it may happen that on a very rare occasion an error message will be issued during editing or during the Generate process. A description of some of the typical error messages is listed below.

7.5.3.1 Errors and Warnings During Generate Process / In Log File

When Inserting a New Function

When inserting a new function that exceeds the capacity of the core, the following dialog will appear:



This message is very likely to appear when the console is operating with 96 kHz, or when switching from 48 to 96 kHz.
If you decide to proceed in generating the configuration regardless of the warning, the following message will be displayed in the Generate All dialog, and the configuration process will be stopped.

```
Could not find pe for 'Channel Inp Stereo #1 CtrlGrp1'!
Please reduce the requirements of that function
```

D21m

If the configured number of D21m interface channels exceeds the capacity of the D21m board the following message will be displayed. This can only happen with 96 kHz configurations.

```
Unable to Distribute the D21m interfaces of PE D21m Board # 0.
Please reduce the number of channels.
```

Shared Bus

The load balancing of the on-board communication is not always as accurate as it should be. This may happen because assumptions are made during load balancing which do not always apply. The following warning will be displayed in such a case:

```
Warning: Shared Bus Cycles overflow on board 1, in timeSlot 0.
```

This does not mean that the configuration does not work. If you want to make sure that it does work, please send it to the factory for further investigation.

I/O Bus The I/O bus is a SHARC internal bus used to communicate between the DMA controller and the internal memory.
Also there assumptions are made which do not always apply. This leads to the following warning.

```
Warning: 611 I/O buses of 600 on PE 2 of board 1
```

Again, this does not mean that the configuration does not work. For further investigation please send it to the factory.

CHAPTER 8

8 DIMENSIONS, BASIC TECHNICAL SPECIFICATIONS

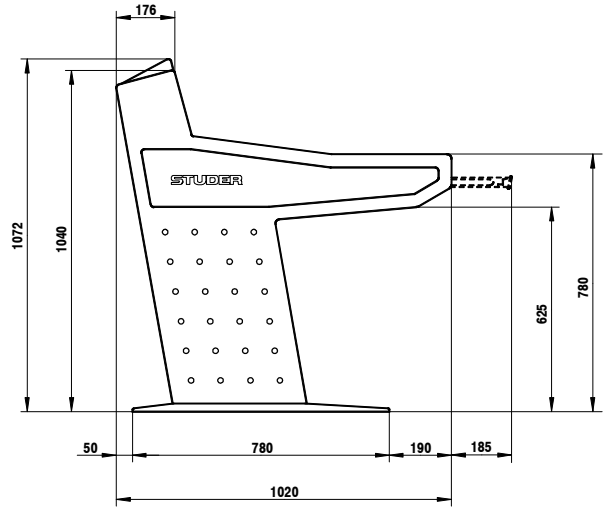
Compliant to the following technical standards:
IEC 721-3-3: 1994 + Amendment 1:1995 and EN 60721-3-3:1995

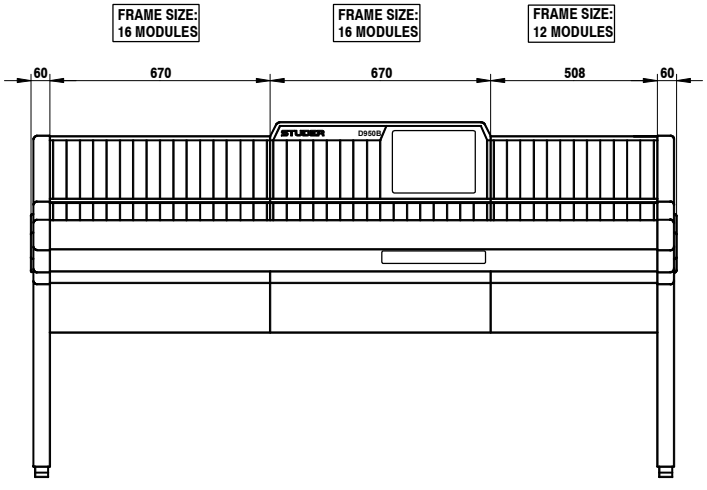
Environmental Class: Combination SET IE 32 (3K3/3Z2/3Z4/3B1/3C1/3S1/3M1)
Details of some of the parameters indicated above can be found in the Safety chapter at the very beginning of this manual.

Conditions during initial phase of fire: 3T2/3P3/3F2/3V3/3H3

8.1 Operating Desk

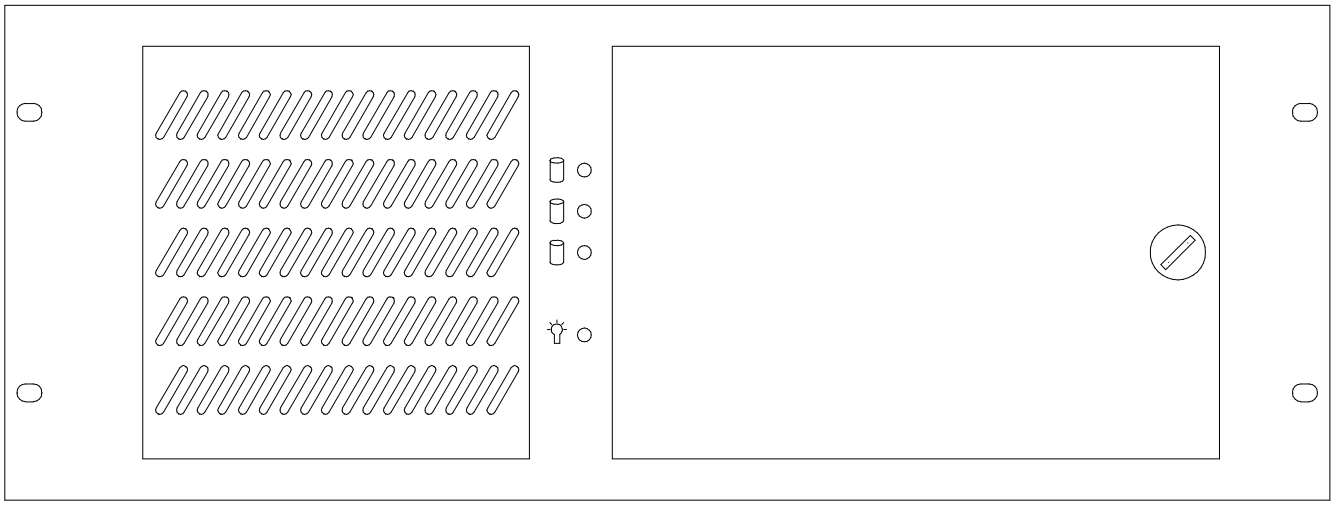
The operating desk is a modular construction consisting of a combination of 12 and/or 16 module frames, the basic module width being 40 mm. The fader and input/output blocks come in widths of four modules (160 mm), and they can be equipped in any multiple of four channel strips. So any console can have from 4 up to 96 or more channel strips. The central section is basically 16 or 12 modules wide and houses the GC cockpit.





Typical power requirements: 100...110 V or 220...240 V, 50/60 Hz, 150...600 W,
depending on the number of channel strips.

8.2 Control System

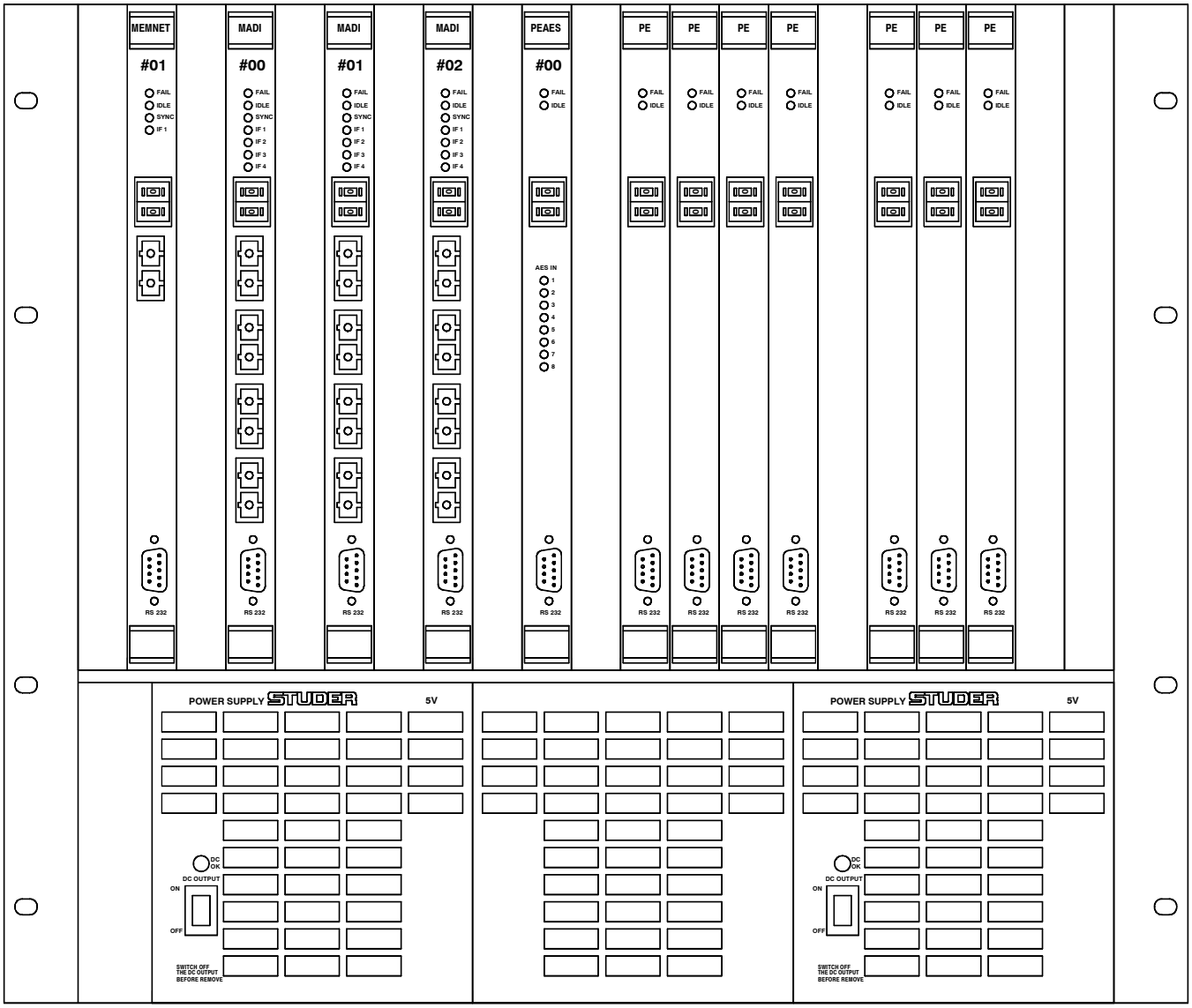


The Control System is an IBM compatible 19"/4U industrial PC running Windows NT, with a redundant power supply and a mirrored main hard disk. All Control Systems are equipped with a backup drive, a 100 MB ZIP drive as a rule. Each D950 is also equipped with a 19"/3U uninterruptable power supply (UPS) which will keep the Control System running for approximately 10...15 minutes in case of a power failure.

Typical power requirements: 100...110 V or 220...240 V, 50/60 Hz, 250 W

8.3 DSP Core

Front View:

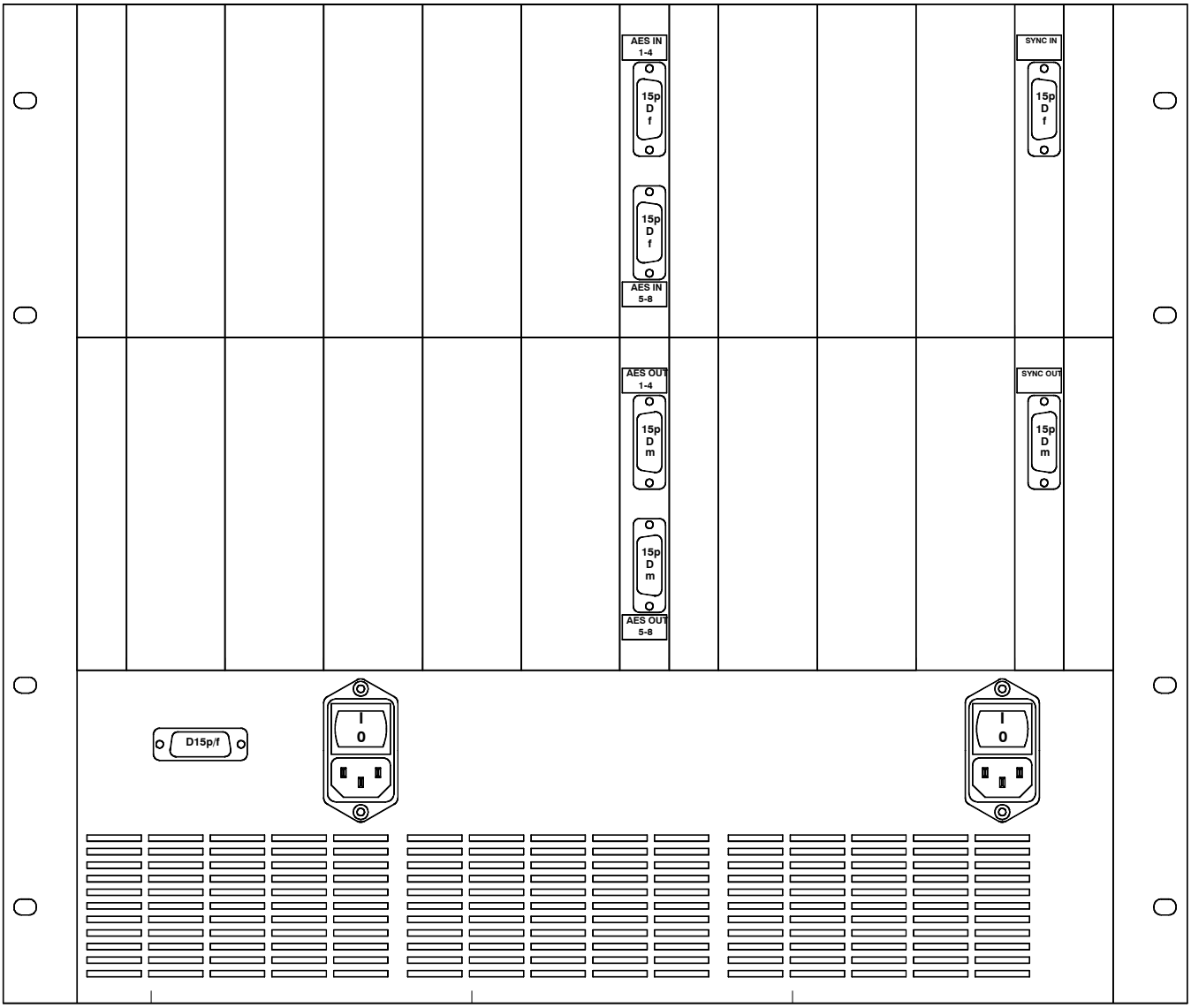


The D950 DSP core is housed in a 19"/9U frame, containing all the DSP cards, the power supply, and the digital audio connections. In standard cases, a 1U air deflector panel mounted on top of the DSP frame is supplied. This arrangement, together with the built-in fans, is sufficient for the ventilation of the DSP frame in the specified environmental conditions. The DSP cards are hot-pluggable. The available cards are:

- DSP card with 8 AES/EBU inputs and 8 AES/EBU outputs (PEAES).
- DSP card (PE).
- Twin MADI card with 2 optical MADI inputs and 2 optical MADI outputs on SC connectors.
- MEMNET communication card for the connection to the Control System via SC connectors.

The DSP core is powered by one or two universal 5 V power supplies, depending on the number of cards. The power supply chassis has 3 slots so that a third power supply can optionally be installed for redundancy, if required.

Rear View:



All optical connections to the DSP frame are done on the front of the rack directly onto the cards, and the optical cables are fed through the air deflector panel to the back of the frame. The AES/EBU inputs and outputs are all located at the back of the DSP frame on a selection of connector panels:

- Two D-type 15 pin connectors per panel (standard).
- One Siemens 39 pin connector per panel (on request).
- 4 XLR connectors per panel (on request).

The exact number and type of DSP cards and connector panels depends on the actual project specification. The MEMNET card also features one external digital audio DARS sync input and 4 DARS outputs (AES11-1991, also known as "AES black").

Configurable DSP channel processing blocks:

Input selector, input processing & filters, input mode, 4-band EQ, 4-band EQ with notch, insert, variable delay, C/L/E/G dynamics, PAN, stereo PAN, multiformat PAN, VSP PAN, direct out, IPL.

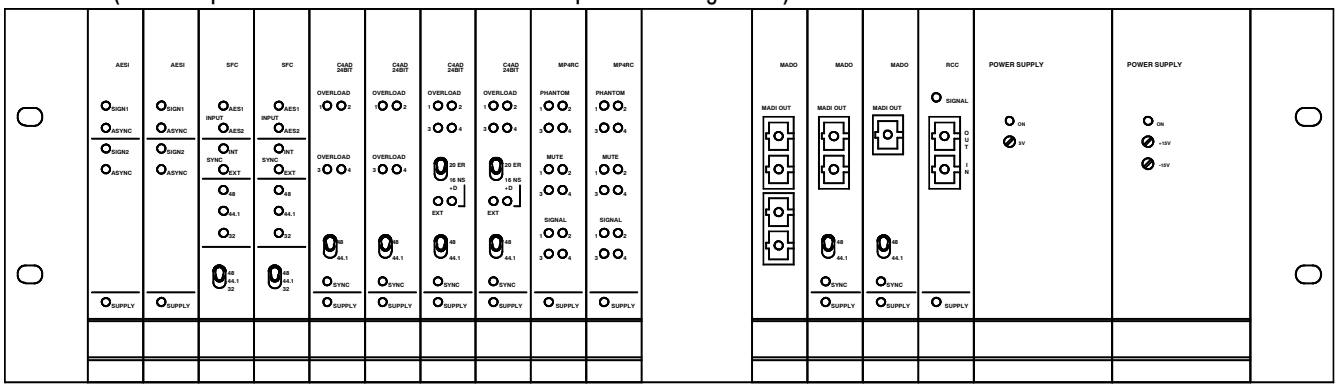
Typical power requirements: 100...240 V, 50/60 Hz, 100...600 W, depending on the number of DSP cards.

I/O interfaces: 8 balanced AES/EBU inputs on PEAES DSP card (compliant to AES3-1992/ANSI S4.40-1992), two of those inputs with SFC.
8 balanced AES/EBU outputs on PEAES DSP card (compliant to AES3-1992/ANSI S4.40-1992).
Fibre optic MADI inputs and outputs (2 each) on SC connectors on Twin MADI card (compliant to AES10-1991/ANSI S4.43-1991).

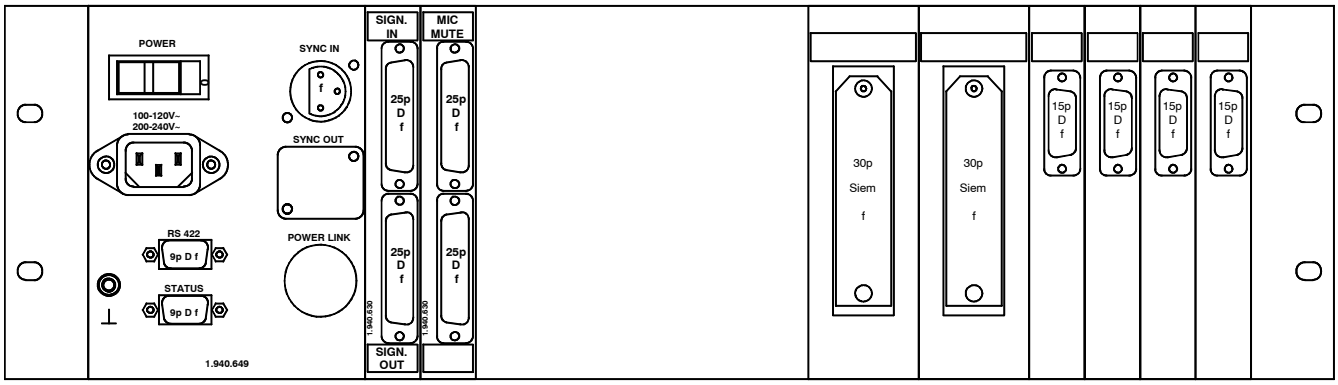
8.4 D19m Audio Interfaces

8.4.1 D19m Series MUX

Front view (this example shows all available cards but not a practical configuration)



Rear view:



For analog microphone, analog line, or digital AES/EBU inputs, the D19m series converters are used. The frame can be used in multiplexer mode with a MADI output containing all converter outputs, or in individual mode with AES/EBU outputs from the converters. The MADI optical connections are done on the front of the rack directly on the MADO card, and the optical cables are led through suitable cable ducts to the rear of the frame. The analog inputs and the AES/EBU outputs are located at the rear of the frame on a selection of panels:

- 1 Siemens 39 pin connector per panel (standard for analog signals).
- 1 D-type 15 pin connector per panel (standard for AES/EBU signals).
- 4 XLR connectors per panel (on request).
- 4 BNC connectors per panel (on request).

The exact number and type of the connector panels depends on actual project specification. *For more details on D19m cards and information on optional connector panels, refer to the Studer D19m brochure (english: 10.26.3441, german 10.26.3430).*

D19m MUX frame:

Typical power requirements: 100...120 V or 200...240 V, 50/60 Hz, 100...200 W, depending on the number of cards.

Mic input on remote controlled D19m MP4RC card:

4 transformer-balanced inputs with gain control in 1 dB steps; switchable mic/line level, 48 V phantom power, and high-pass filter per input, 4 electronically balanced outputs.

Input impedance:	> 1 kΩ (mic), > 2 kΩ (mic)
Sensitivity for +15 dBu nom. out:	–60...0 dBu (mic), –10...+24 dBu (line)
Frequency response (mic), –0.4 dB:	30 Hz...20 kHz
Equiv. mic input noise:	–124 dB (R_i 200 Ω, max. gain)
Crosstalk (mic), @ 15 kHz:	> 90 dB

Analog line input on D19m C4AD card:

4 inputs per card, 24 bit delta-sigma converter.

Input impedance:	> 10 kΩ, balanced, floating
Input level @ 0 dB_{fs}:	15/21 dBu fixed/0...26 dBu adj.
Frequency response, –0.2 dB:	20 Hz...20 kHz
THD+N, @ 1 kHz, –30 dB_{fs}:	< –108 dB_{fs}
Crosstalk, @ 1 kHz:	< –110 dB_{fs}
Sampling frequency range, ext. sync:	28...55 kHz

AES/EBU input on D19m AESI card (alternately to AES/EBU inputs on the DSP cards):

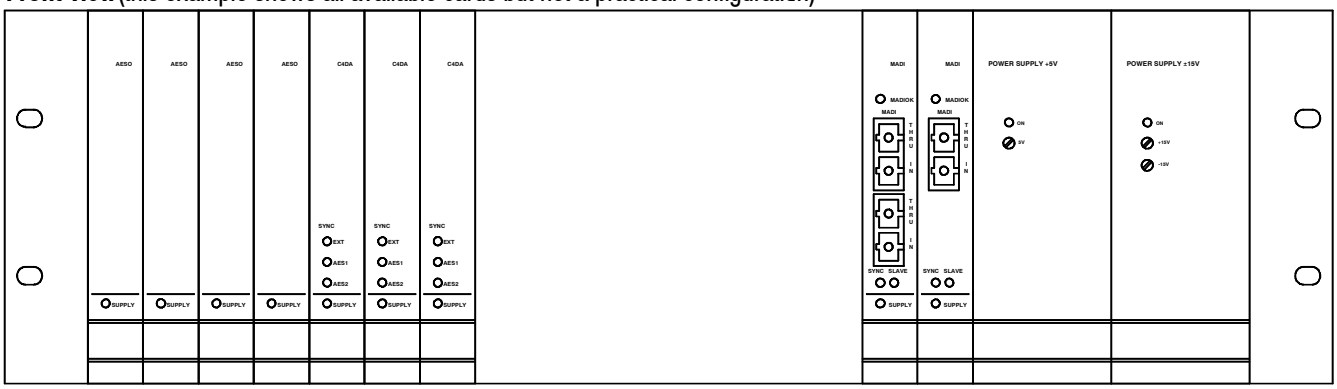
2 balanced AES/EBU inputs per card, compliant to AES3-1992 (ANSI S4.40-1992).
Optional: D19m AESI card with sampling frequ. converter.

MADI output on D19m MADO card:

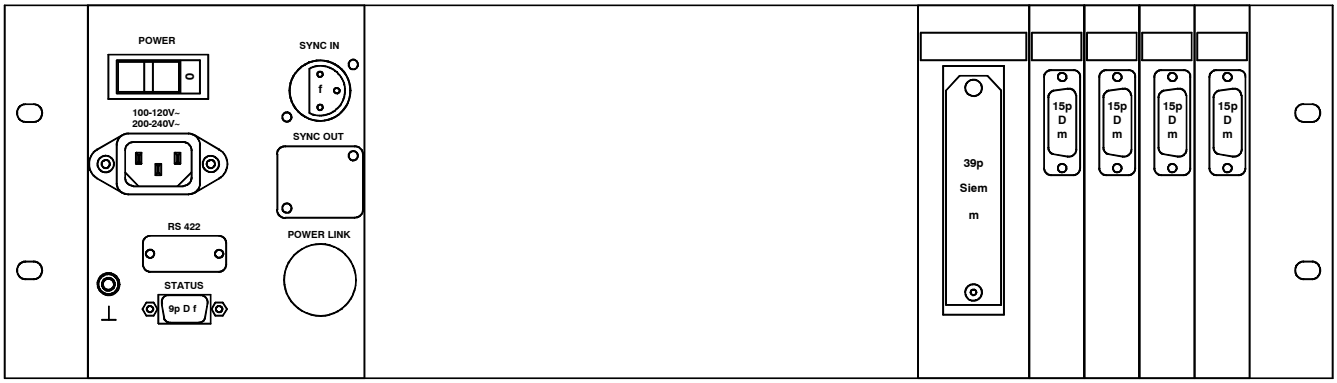
Fibre optic MADI output on SC connector, compliant to AES10-1991 (ANSI S4.43-1991).

8.4.2 D19m Series DEMUX

Front view (this example shows all available cards but not a practical configuration)



Rear view:



For analog line or digital AES/EBU outputs, the D19m series converters are used. The D19m DEMUX frame can be used in the demultiplexer mode with a MADI input containing all the individual converter inputs, or in the individual mode with AES/EBU inputs to the converters. The MADI optical connections to the D19m frame are done on the front of the rack directly onto the MADI card, and the optical cables are guided through a suitable cable duct to the back of the frame. The analog outputs and the AES/EBU inputs are all located at the back of the D19m frame on a selection of connector panels:

- 1 Siemens 39 pin connector per panel (standard for analog signals).
- 1 D-type 15 pin connector per panel (standard for AES/EBU signals).
- 4 XLR connectors per panel (on request).
- 4 BNC connectors per panel (on request).

The exact number and type of the connector panels depends on actual project specification. *For more details on D19m cards and information on optional connector panels, refer to the Studer D19m brochure (english: 10.26.3441, german 10.26.3430).*

D19m DEMUX frame:

Typical power requirements: 100...120 V or 200...240 V, 50/60 Hz, 100...200 W, depending on the number of cards

Analog line output on D19m C4DA card:

4 outputs per card, 24 bit delta-sigma converter

Output impedance: <40 Ω, electronically balanced

Output level @ 0 dBFS: 15/21 dBu fixed/0...26 dBu adj.

Frequency response, –0.2 dB: 30 Hz...20 kHz

THD + N, @ 1 kHz, –30 dBFS: < –110 dBFS

Crosstalk @ 1 kHz: < –110 dB

Sampling frequency range: 30...54 kHz

AES/EBU output on D19m AESO card (alternately to AES/EBU outputs on the DSP cards):

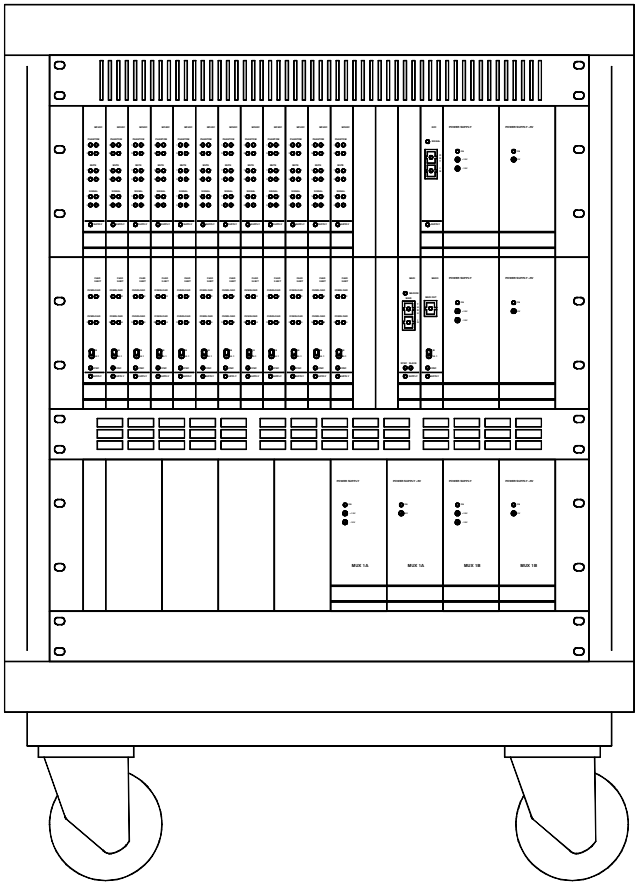
2 balanced AES/EBU outputs per card, compliant to AES3-1992 (ANSI S4.40-1992)

MADI input on D19m MADI card: Fibre optic MADI input on SC connector, compliant to AES10-1991 (ANSI S4.43-1991)

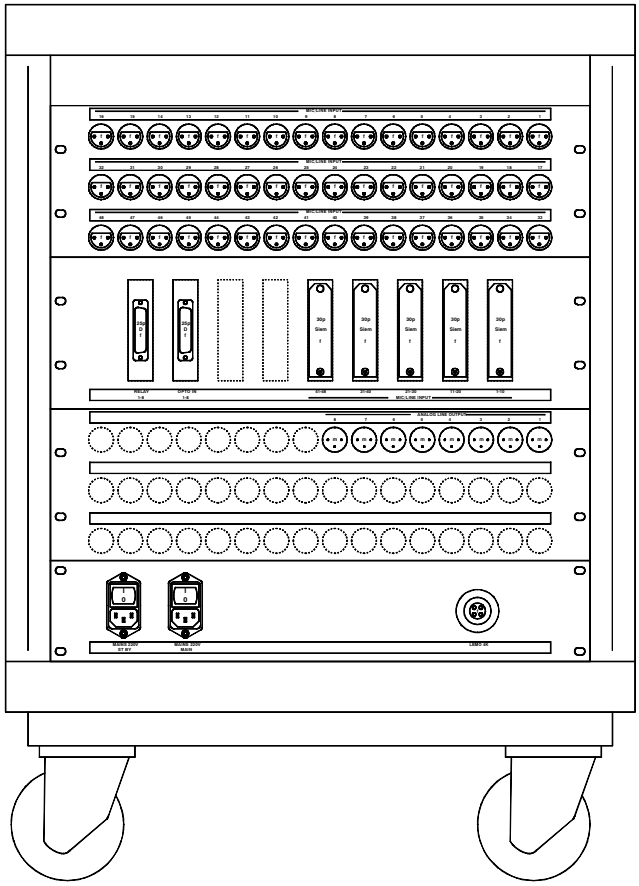
8.4.3 D19m Series Stagebox

(only one of the many possible variations shown)

Front view:



Rear view:

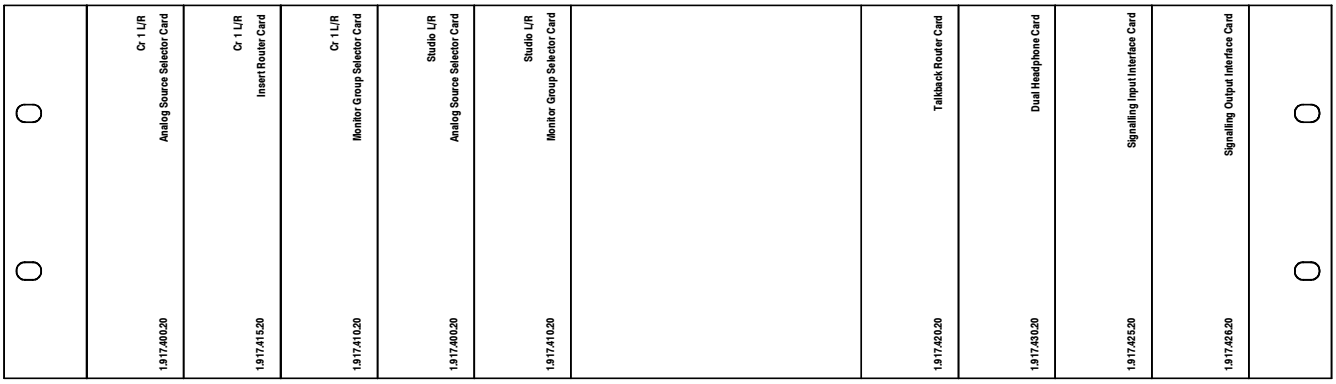


A transportable stagebox can be ordered as an option for the system. It typically consists of one or several Studer D19m frames in a flightcase. The number of frames and cards is variable and is usually done to customer specification. The following are some of the characteristics of the Studer D950 Stagebox system:

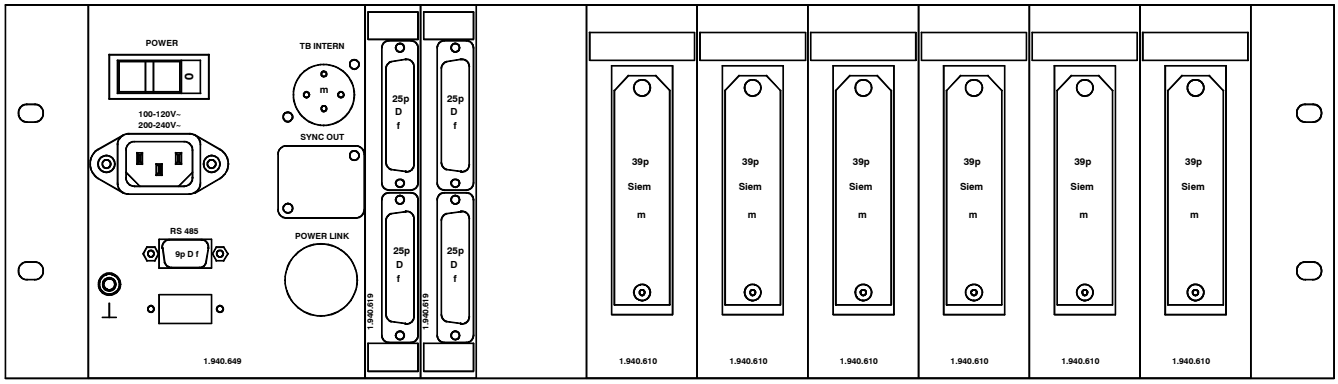
- A D19m frame can hold input and output cards (mixed arrangement).
- The connection to the D950 is typically via a single, robust, four-core optical fibre cable for MADI in/out, control receive/transmit signals, as well as the sync. This cable can cover distances of up to several hundred meters.
- The control signals are standard RS232/RS422 connections.
- A low-noise fan is required for large stageboxes.
- Optional redundant power supply is available (as shown in the example above).

8.4.4 Monitoring/Signaling Frame

Front view:



Rear view:



The monitoring and signaling cards are housed in one or more 19"/3U frames. All audio monitoring, talkback, and signaling functions of the D950 system are contained in this frame. The operating desk contains panels such as CR monitor or Studio controls, source selectors, talkback panels, etc., which only serve as remote controls.The number and type of cards depends on the actual system configuration.

The audio connections of external monitoring sources, talkback, and signaling are all located at the back of the monitoring and signaling frame on a selection of connector panels:

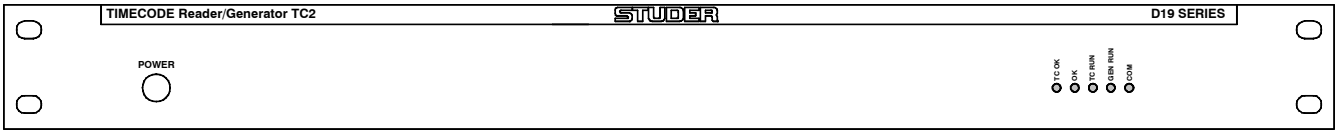
- One Siemens 39 pin connector per panel.
- Two D-Type 25 pin connectors per panel.

The exact number and type of the connector panels depends on actual project specification.

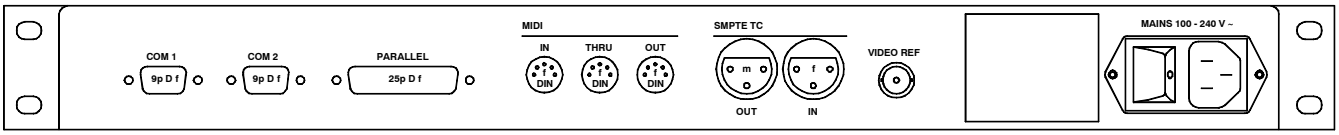
Typical power requirements: 100...120 V or 200...240 V, 50/60 Hz, 50...150 W, depending on the number of cards.

8.4.5 TC2 Timecode Reader/Generator

Front view:



Rear view:



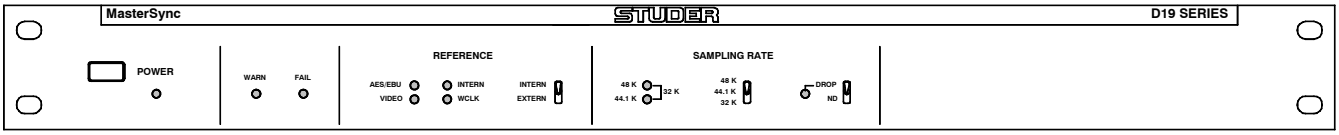
The TC2 timecode reader/generator is a 19"/1U unit. It is equipped together with the optional AutoTouch™ Dynamic Automation. Its main function is to read external timecode, generate a re-shaped TC output and house the P2 9-pin controller for simple machine control.

Typical power requirements: 100...240 V, 50/60 Hz, 50 W

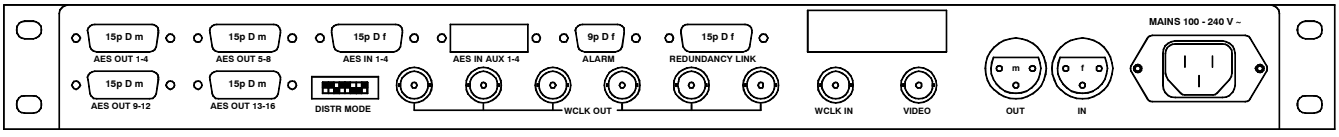
TC dropout sensitivity: The TC2 allows TC dropout duration of approx. 1 second before a stop is issued, as opposed to the Sony 9-pin interface which allows TC dropout duration of approx. 2 seconds.

8.4.6 D19 MasterSync Generator

Front view:



Rear view:



The Studer D19 MasterSync generator/distributor is a 19"/1U unit. The generator part can be slaved to an external video clock, word clock, or AES/EBU input. Should the external reference signal fail, the generator automatically switches over to an internal reference with 1 ppm accuracy.
The unit distributes one word clock signal to 6 outputs, and the AES/EBU input (also AES/EBU frame clock signals) to typically 16 outputs each. The AES/EBU distribution can be configured as 1 × 16, 2 × 8, or 4 × 4 (or 1 × 8 and 2 × 4 simultaneously) distribution by means of a DIP switch on the back panel.
The generator can be set to 32 kHz, 44.1 kHz, 44.056 kHz, 48 kHz, and 47.952 kHz. When synchronizing to an external video reference, the generator rate can be set by means of switches.
One MasterSync generator is supplied with the D950 system as standard. Two generator/distributor units can optionally be linked together by means of a redundancy cable. In this case, one unit takes over the supply, the AES/EBU reference, and the word clock reference of both units, should the power supply of the other unit fail. Both units are always synchronized in normal operation, so that no phase shift can occur if one unit fails.

Typical power requirements: 100...240 V, 50/60 Hz, 50 W

CHAPTER 9

9 TROUBLESHOOTING & MAINTENANCE

9.1 What can go Wrong?

Please note: According to Mr. Murphy's law, anything that can go wrong will do so. **;-)**

9.2 Local Diagnostic Tools

Surveyor: For more information on the Surveyor functions contained in the GC application, please refer to chapters 4.8 and 4.5.4.5

9.3 DSP Rack

The D950 Core system consists of:
- A back plane (1.950.650.00)
- A ”MEMNET” communication card (1.950.620.20) used to communicate with the PC.
- One or more ”MADI” interface cards (1.950.615.21) to interface MADI devices.
- One or more ”PEAES” cards (1.950.605.20) to interface AES/EBU I/Os and for audio processing.
- One or more ”PE” cards (1.950.610.20) to do audio processing without AES/EBU I/Os.

The slightly more expensive PEAES card can replace the PE card in all respects.
Each card has several LEDs on its front panel. Some of the LEDs are the same on all the cards, some have special meanings for each card.

9.3.1 Configuration Meets Core – FailSafe and Hot Plug-In Concepts

Distributing Configurations is the art to combine hardware (Core) and software (Configuration). A Configuration is divided into Tasks. These Tasks represent the DSP code used by one Card.
The system will distribute the Tasks to the Core Cards:
- At startup;
- When changing the Session Configuration;
- In case of a Card failure.

The Core has four different types of cards. Therefore we also have four different types of Tasks:

Card Type	Description
MEMNET	handles the communication between the PC and the Core
PEAES	has 6 SHARC DSPs and 8 AES/EBU interfaces
PE	has 6 SHARC DSPs (no audio interfaces)
MADI	has 2 SHARC DSPs and 2 MADI interfaces

MemNet Task The core has only one MemNet Card. The MemNet Task is added automatically to the Configuration. It cannot be configured.

PEAES Tasks PEAES Tasks consist of a DSP processing part and an AES/EBU interfacing part. PEAES Tasks can run on both PE and PEAES cards. If a PEAES Task is distributed to a PE card, all the DSP functions will work except the AES interfacing. Each PEAES Task has a unique Card number which can be set with the Session Configuration Tool if desired (otherwise, it starts with 00).
The PEAES Task will be distributed to the PEAES Card with the corresponding Card number. In case the Core offers no PEAES card with that number., the Task will be distributed to any available PEAES or PE card. If the intended PAES Card is added to the Core later, the task will be switched to this card automatically.

PE Tasks PE Tasks consist only of a DSP processing part. PE Tasks can run on both PE and PEAES cards. The Card number of all PE Tasks is internally set to zero (which has no effect). If there is no PE Card available, the PE Task will be distributed to the next available PEAES Card.

MADI Tasks MADI tasks can only run on MADI Cards. The Card number of the Task must correspond to the Card number of the Card. Each MADI Task has a unique Card number, which can be set with the Session Configuration Tool if desired (otherwise, it starts with 00).

Fail Safe

The Fail Safe principle allows automatic switchover of Tasks in case of a Card failure. In other words, if a Card fails, another Card can take over under the following conditions:
If a card hosting a task fails, the task will be redistributed applying the rules above;
There must be a free Card in the system, conforming to the rules above.

Examples: The core houses 7 PEAES Cards. The currently loaded Session Configuration requires only 3 PEAES Tasks and 3 PE Tasks, leaving one PEAES Card idle. We usually say there is one redundant card. There are 24 AES/EBU inputs and 24 AES/EBU Outputs configured.

Case 1: The sixth PEAES Card with a PE Task fails.
The seventh PEAES Card automatically takes over the full PE Task;
All DSP Channel functions are working.

Þ All System functions restored!

Case 2: The second PEAES Card with the Card number 01 fails.
The seventh PEAES Card automatically takes over the full PEAES Task;
All DSP Channel functions are working;
The 8 AES/EBU Inputs and Outputs of the original card (connected to the slot where Card 01 is) do not work.

Þ System functions partially restored!

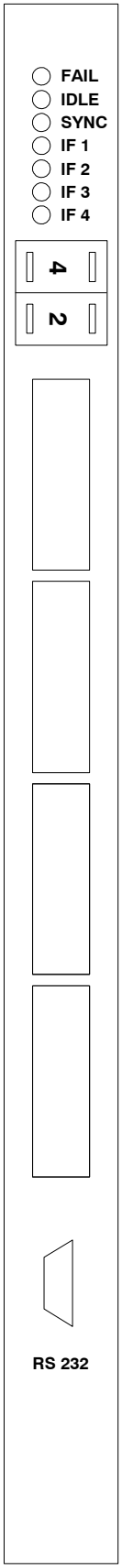
Hot Plug-In

For case 2 above, several remedies can be taken:
If there is a spare AES/EBU Card on stock, the faulty PEAES Card can be hot-unplugged and replaced by the new one, which can be hot-plugged. To restore the original functionality after a card change, the new one must have the correct Card number (01 according to the example above). The spare card will take over the original PEAES Task, restoring the full system functionality.
Simply plugging the AES/EBU cables into the right connectors corresponding to the slot where the seventh card is will restore full system functionality.
In all cases above, all the other Cards function properly, so that a Card failure has only very limited consequences.

Another solution is to use the seventh card as a spare AES/EBU Card. In this case, because the seventh card currently is in operation, the core must be switched off before unplugging the seventh card. Now you can power on the DSP rack again. The faulty PEAES Card can be unplugged and replaced by the seventh card. To restore the original functionality after a card change, the new one must have the correct Card number (01 according to the example above). The spare card will take over the original PEAES Task, restoring the full system functionality.

9.3.2 Looking at the LEDs

9.3.2.1 LEDs of the MEMNET Card, 1st Generation 1.950.615.20



FAIL The red FAIL LED on a working card normally should be off. It is on whenever the card fails or it is reset either manually or by the system.

IDLE The green IDLE LED has a special meaning on the MEMNET card. Its flashing rate depends on how much communication is going on. The busier the system communication is, the higher is the flashing rate. No flashing could mean that the PC system is not working, or that the MEMNET flash EPROM is being erased.

SYNC The green SYNC LED turns on whenever a valid AES/EBU SYNC input signal is fed to the MEMNET SYNC input, and the system has locked to the external clock. When the LED is off the core operates from its internal 48 kHz clock source.

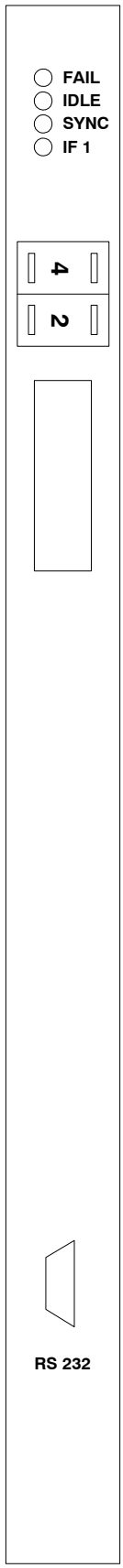
IF 1...4 Only the first of the four green IF LEDs is used on a MEMNET card. When it is on, the optical-fibre link to the PC is valid. When it is off, either the core or the PC is shut down, or the optical link is broken. The IF 2...4 LEDs are not used.

Card number The card number has no real meaning on a MEMNET card during normal operation and should simply be set to a non-zero value. *When the card is reset while this number is zero, the flash EPROM memory will be erased. This can be useful when the core system must be forced to reload a configuration for whatever reason.*

Connectors The first interface (SC connector) is used to connect the core to the Control PC. When the connection is done properly, the IF1 LED will be green. *The three remaining SC connectors are not used.*

RS 232 *This serial interface is used only for card testing during manufacturing. Do not connect anything during normal operation!*

9.3.2.2 LEDs of the MEMNET Card, 2nd Generation 1.950.620.20



FAIL The red FAIL LED on a working card normally should be off. It is on whenever the card fails or it is reset either manually or by the system.

IDLE The green IDLE LED has a special meaning on the MEMNET card. Its flashing rate depends on how much communication is going on. The busier the system communication is, the higher is the flashing rate. No flashing could mean that the PC system is not working, or that the MEMNET flash EPROM is being erased.

SYNC The green SYNC LED turns on whenever a valid AES/EBU SYNC input signal is fed to the MEMNET SYNC input, and the system has locked to the external clock. When the LED is off the core operates from its internal 48 kHz clock source.

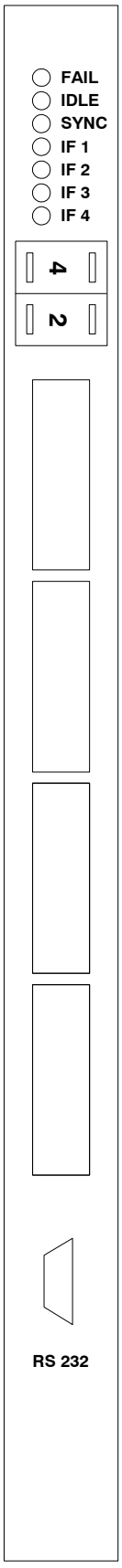
IF 1 When the IF 1 LED is on, the optical-fibre link to the PC is valid. When it is off, either the core or the PC is shut down, or the optical link is broken.

Card number The card number has no real meaning on a MEMNET card during normal operation and should simply be set to a non-zero value. *When the card is reset while this number is zero, the flash EPROM memory will be erased. This can be useful when the core system must be forced to reload a configuration for whatever reason.*

Connectors The interface (SC connector) is used to connect the core to the Control PC. When the connection is done properly, the IF1 LED will be green.

RS 232 *This serial interface is used only for card testing during manufacturing. Do not connect anything during normal operation!*

9.3.2.3 LEDs of the MADI Card 1.950.615.21



FAIL The red FAIL LED on a working card normally should be off. It is on whenever the card fails or it is reset either manually or by the system.

IDLE The green IDLE LED is on whenever a card is not used for the current configuration. It is off when the card is processing audio.

Important: *Never remove a card with both the IDLE and the FAIL LEDs off. This card is actively used to process audio data; the result of removing the card is unpredictable.*

SYNC The green SYNC LED has no meaning on a MADI card and is always off.

IF 1...4 The four IF LEDs are on whenever the corresponding interface input signal below is valid. When it is off, either the transmitting device is off, TX and RX are mismatched, or the cable is broken.

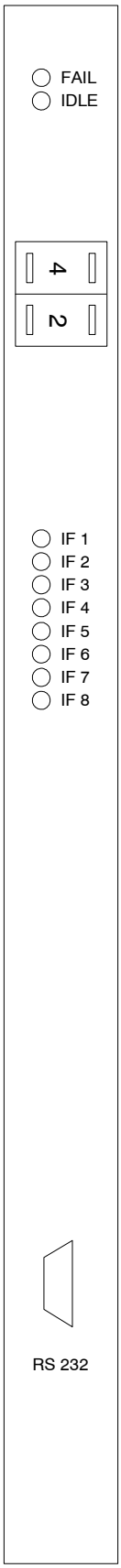
Card number The card number corresponds to the MADI interface in your configuration. Be careful to match this number to the corresponding interface number. The numbers start with “00” on the first card for the first two MADI interfaces and are continued as “01”, “02”, and so on for subsequent groups of two MADI interfaces each. A sufficient number of MADI cards must be present in the DSP rack, and they must be numbered properly.

Example: If the current Session Configuration requires four MADI interfaces, there must be two MADI cards numbered “00” and “01” in the DSP rack, in order for the system to work properly.

Connectors This first interface (SC connector) is used to connect the *main MADI A* signal to the core. When the connection is done properly, the *IF1 LED* will light green. TX1 is the main output of MADI A, RX1 is the main input of MADI A.
The second interface (SC connector) is used to connect the *main MADI B* signal to the core. When the connection is done properly, the *IF3 LED* will light green. TX2 is the main output of MADI B, RX2 is the main input of MADI B.
The third/fourth interface (SC connector) are used to connect a *redundant MADI A/MADI B* signal to the core. When the connection is done properly, the *IF2/IF4 LED* will light green. TX3/4 is a redundant output of the corresponding main output. The input can be main MADI A/B or redundant MADI A/B, depending on which connection is valid. If both connections are valid, the first connection to become valid will be used. RX3/4 is used as an extra redundant MADI A/B input. When the main MADI A/B input is not valid, the system automatically switches to this input when a valid signal is available. Switching is done within one audio sample. The lost audio sample is zeroed. When the main MADI A/B input becomes valid again, the system will not switch back until the redundant MADI A/B connection fails.

RS 232 *This serial interface is used only for card testing during manufacturing. Do not connect anything during normal operation!*

9.3.2.4 LEDs of the PEAES Card 1.950.605.20



FAIL The red FAIL LED on a working card normally should be off. It is on whenever the card fails or it is reset either manually or by the system.

IDLE The green IDLE LED is on whenever a card is not used for the current configuration. It is off when the card is processing. IDLE should be on for redundant and not used cards. It should be off for used cards.

Important: *Never remove a card with both the IDLE and the FAIL LEDs off. This card is actively used to process audio data; the result of removing the card is unpredictable.*

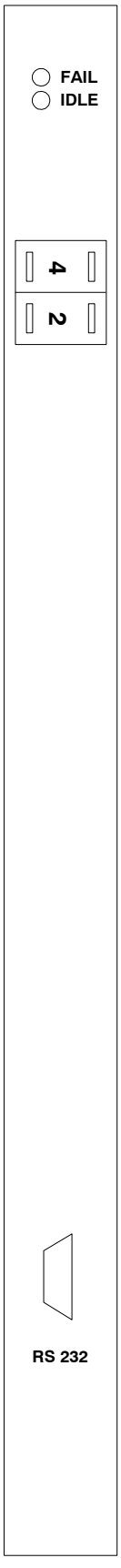
Card number The card number corresponds to the AES/EBU interface number in your configuration. Be careful to match this number to the corresponding interface number. The numbers start with "00" for the first eight AES/EBU interfaces (D 1 to D 8 in the patch) and are continued as "01", "02", and so on for subsequent groups of eight AES/EBU interfaces each. A sufficient number of PEAES cards must be present in the DSP rack, and they must be numbered properly.
The card must be plugged into the slot where the AES/EBU I/O connections are done to the AES/EBU connectors on the rear side of the DSP frame.

Example: If the current Session Configuration requires 32 AES/EBU interfaces, there must be at least four PEAES cards numbered "00", "01", "02", and "03" in the DSP rack, in order for the system to work properly.

IF1...8 These green interface LEDs light whenever a valid AES/EBU signal is connected to the card. Whenever these LEDs are off the corresponding AES/EBU channels are muted.

RS 232 *This serial interface is used only for card testing during manufacturing. Do not connect anything during normal operation!*

9.3.2.5 LEDs of the PE Card 1.950.610.20



FAIL The red FAIL LED on a working card normally should be off. It is on whenever the card fails or it is reset either manually or by the system.

IDLE The green IDLE LED is on whenever a card is not used for the current configuration. It is off when the card is processing. IDLE should be on for redundant and not used cards. It should be off for used cards.

Important: *Never remove a card with both the IDLE and the FAIL LEDs off. This card is actively used to process audio data; the result of removing the card is unpredictable.*

Card number The card number has no real meaning for PE cards. Make sure that no card numbers which are configured for PEAES cards are used.

RS 232 *This serial interface is used only for card testing during manufacturing. Do not connect anything during normal operation!*

9.4 Regular Maintenance

9.4.1 Air Filters

9.4.1.1 Removing and Installing the Supply Unit (1.950.601.00) in the Rack

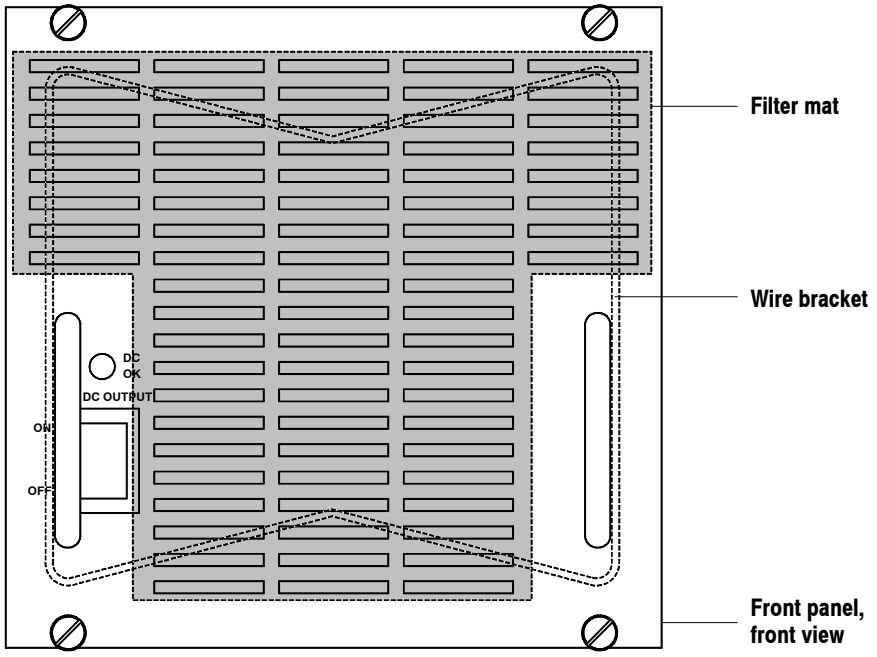
Removing:

- Before you start set the DC OUTPUT switch to OFF, also switch off the mains supply whenever possible.
- Loosen the four knurled screws at the front panel; pull out the supply unit towards the front.

Installation:

- Carefully insert the supply unit into the rack.
- *Never apply sheer force* if the connector contacts do not find their way easily; check the path to the female contact points inside the rack, it might be blocked by a foreign object.
- Retighten the four knurled screws at the front panel.

9.4.1.2 Changing the Air Filter Mat



- Remove the supply unit as described above.
- Place the supply unit onto your working surface in a way that the front panel is directed towards you.
- The wire bracket which fixes the filter mat is hooked into four recesses; first unhook at the upper right, then at the upper left.
- Now the filter mat can be pulled out in upward direction.
- For inserting the new filter mat tilt the supply unit to the left. Carefully lift the lower part of the wire bracket by a small amount with an appropriate tool (e.g. screwdriver); slide the new filter mat in under the bracket. Make sure that all the air vents are covered by the filter mat and readjust it, if necessary.
- Bring the supply unit in an upright position again and hook the wire bracket first at the left, then at the right-hand side.
- Recheck that all the air vents are covered by the filter mat.
- Reinstall the supply unit as described above.

CHAPTER 10: UPDATE INFORMATION

Operating Manual: Configuration Editor 3.4 for STUDER D950

New Dynamics

The Configuration Editor software 3.4 hosts a completely re-engineered DSP code for the dynamics section (Limiter, Compressor, Expander, Gate). All configurations generated by software version 3.4 or later will automatically have this new DSP code included. All operating parameters have been retained, so the console operator doesn't have to operate any differently when working with the new dynamics. Please see the upgrade instructions in order to read how to upgrade existing configurations in detail.

Possibility to fit EQ&Notch into a standard channel

Compared to previous versions the new Configuration Editor software uses less DSP power for the same configurations. While the increase in processing power can often not be used for additional functionality, it should now be possible to fit a "4 Band EQ with Notch" into a standard channel and not need additional DSP card compared to previous versions of the Configuration Editor software.

Standard: 2 SOLO, 1 PFL bus

When starting a new configuration, there are automatically 2 SOLO and 1 PFL busses added to the configuration. They may freely be removed or extended by the user. This feature is due to the fact that some users tend to forget the configuration of those buses. The new SOLO bus will automatically be available also for master channels (new!).

New entry in file D950CfgTool.ini

Some bus types and other features of the Configuration Editor 3.4 are not available for D950 mixing consoles. In order to show only the features available on the individual console, a new entry in the D950CfgTool.ini file has been added. The entry DeskType=Vista – or DeskType=D950 should be added within the first section "[globals]" of the file noted below:

Entry on a Vista console:

[globals]
...
DeskType=Vista
[dir and file settings]
...

Entry on a D950 console:

[globals]
...
DeskType=D950
[dir and file settings]
...

Bug fixes and improvements Configuration Tool 3.4.03

new features : new dynamics (it is now possible to have two standard input mono channel with eq aux assignability)

1 Pfl s bus and 2 Solo busses are now added by default in every new configuration

entry in the ini file DeskType accepts D950, Vista7, Vista6, Vista8 and Vista

bug fixes :

- Generating code for summing process**.** Holes in the matrix are loadbalanced correctly (no processing). But the CfgTool generated code for processors which "calculate" only nodes belonging to such a hole. So the amount of core cycles is exceeded and the board fails temporarily.
- [Bug 830] VMC indices can now be > 65534
- insufficient number of audio cycles specified for output section stereo: dir out/meter/dir, dir out/meter/dir width
- restoring of the last vmc state (core standalone) does not work for big configurations.

Release Notes for STUDER D950 Software 3.4

Introduction

Studer is very happy to present the latest software 3.4, suitable for all our large format digital consoles D950, Vista 6, Vista 7 and for the first time also for the Vista 8, the newest version within this product line. Along with this software also comes the Configuration Editor 3.4, bringing the improved sound of our new dynamics section to our products and providing new possibilities!

The new console application software provides a lot of additional functionality for the existing products D950, Vista 6 and Vista 7, along with some improvements and corrections. The first sections of these release notes are dedicated to the new features on the various products while the second part lists all the minor improvements and fixes which were made for release 3.4. There is also an application example for PA applications. Besides this document describing the new functionality, there is a separate document about how to install this software upgrade as well as giving some insight into the changes made in the background of the user interface itself.

By providing new functionality even to consoles shipped 7 years ago, Studer shows how serious we take the topic of being "future proof". We assure you by purchasing a Studer product you have invested in the right kind of product. Given the fast changing technology in today's audio world, we are proud to be able to offer this upgrade service without compromising new products, delivering leading edge technology at the same time!

Studer wishes you a lot of success and fun when working with your console!

Stefan Ledergerber, Product Manager

Content

1. New Dynamics in DSP core

The new dynamics section looks 100% identical to the previous one. However, the DSP code has been completely re-engineered and the sound of it has been greatly improved. Since all parameters are identical, there is no need to import old production data. The only thing necessary to take advantage of the new dynamics is a re-calculation of the configurations (without editing them!). Please see the upgrade instructions for more details.

2. VCA style CGMs ("Motors Off" option)

The "Control Group Masters" up to now were implemented in the way, that all channel faders belonging to a certain control group would automatically move up and down whenever the master fader was moved. This has the advantage that you always visually see the audio settings which are currently active in the DSP core. However, there are two disadvantages to this behaviour:

a) When the Control Group Master fader is closed, the user is not able to adjust the balance between the member channels, since they moved down together with the master fader.
b) When the master fader was closed, it was possible that there was still some audio passing through member channels, since their fader was not completely closed.

With software release 3.4 there is now an alternative way of how the control group master channels can work. It is very similar to the VCA groups of an analogue mixing console. Sometimes this new behaviour is also called "motors off". In this mode, the value set on the control group master channels (as seen on their scale) is added to/subtracted from all member channels and the resulting level is set in the DSP core (audio). The faders of the member channels don't move up/down and it is possible to have the master fader closed and still correct the balance between the member faders. Also the user can be assured that whenever the master channel is closed, no audio can be heard from the member channels.

Note 1: If the "VCA style" operation is active, you may see member channels change their fader values as soon as they are added to a control group. This is the case, if the master channel is already set to a value other than 0dB at the moment when a new slave channel is added to the group. This behaviour is by intention, in order not to have any audio changing when adding or subtracting member channels from a control group. Example: You have set a microphone channel to -15dB, and you add it to a "VCA" group, where the master channel is already set to -10dB. In the moment when the microphone channel is added to that group, the user will see the microphone fader jump up to -5dB. This results in no audio change, as requested.

Note 2: The option "VCA style Control Groups" can be found in the OPTIONS menu of the graphical controller screen. On D950 it is only available while the console doesn't have dynamic automation active.

3. Hierarchical CGMs

It is now possible to have CGMs being a member of other CGMs. On the D950 it is not possible to see, to which CGM a CGM may belong. A small light next to the fader shows the presence of another hierarchical level.

4. Exclude certain patch targets from being changed by snapshots

Some customers are using our consoles as audio routers for other studio installations and are controlling our internal router by protocols such as Probel or ARMI. When recalling console snapshots, the patch points set by those devices are reset to the value of the snapshot, even if this was not always requested. With software release 3.4 it is possible to define certain patch targets as "isolated from snapshot recalls". In other words: The user defines the patch outputs which are controlled by Probel/ARMI devices and therefore makes those targets completely independent from snapshot recalls by the console operator. This set-up is typically done once on a system. See service information about how to set-up this isolation.

5. Possibility to import labels from 3rd party systems

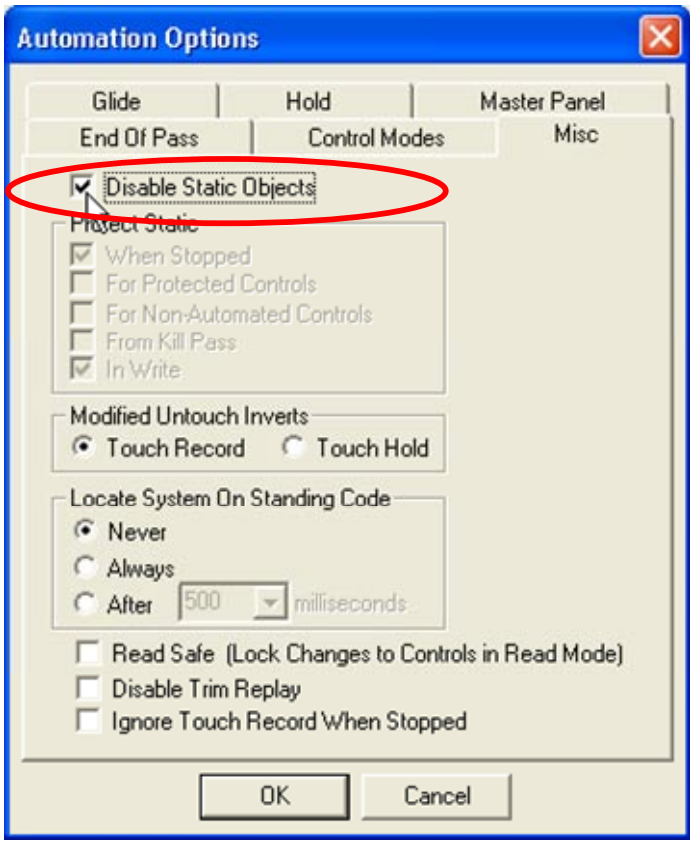
We are making integration of our systems with 3rd party products even more seamless. We are now offering the possibility to exchange label information with external router systems such as Probel and Grass Valley. By using a serial connection, it is possible to set-up a permanent label exchange in the way, that the "device labels" used in the Vista and D950 are permanently overwritten by received labels from the 3rd party router. This means that you will automatically see the name of the original sources on your channel strip, even if a large routing system is placed before your console.

Studer supports two label exchange protocols: Pro-Bel SW-P-08 and Grass Valley Group Series 7000. Normally this feature is only used for **importing** of labels from the external devices. However, when using Pro-Bel SW-P-08 protocol, Studer supports also **export** of output interface labels. It is therefore possible to connect two Vistas together and get the labels automatically from one Studer D950 or Vista console transferred to the other one.

Note: If you plan to use this feature, please contact Studer Service & Support beforehand.

6. New Option: Dynamic Automation without static objects

A new option has been introduced in order to disable static objects completely. Some customers wanted to have all objects dynamic at all times and not use the feature of having static objects as long as they are not dynamically written. For those customers we previously recommended punching in and out all objects at the beginning of a mix. This was seen as a workaround. However, this was in fact a bug in the software, since punching elements in and out without writing any changes should not make them dynamic. This bug is now fixed since the bug had some impacts for other customers - therefore the workaround doesn't work anymore. But the new option allows to work without static objects at all times – without using this workaround. If this option is selected, all other options no longer applying are grayed out.



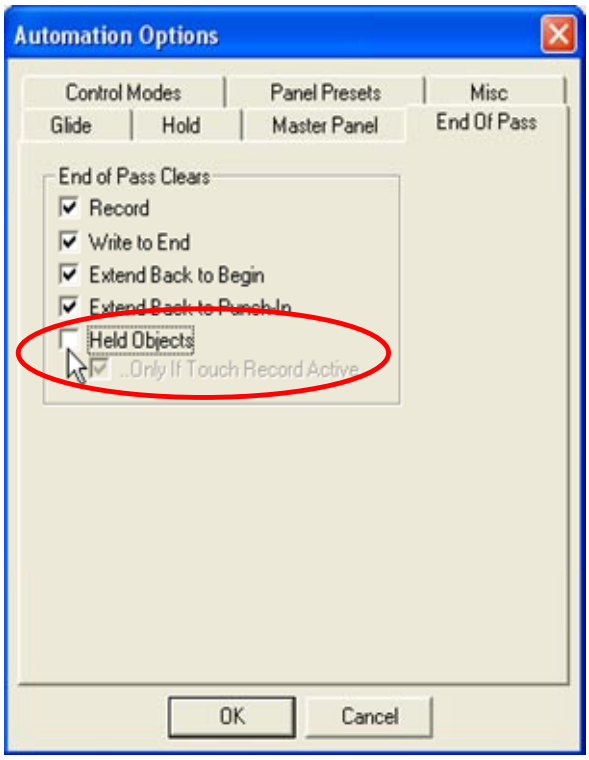
Comment: Presets versus Snapshots

Since the last software upgrade 3.3 we encountered some misunderstandings regarding the protected patch points, snapshot filtering and the meaning of presets. We would therefore like to add some comments on this topic: It is important to know that the difference between snapshots and presets has grown against previous software versions. Previously a preset was the same as a snapshot with the difference that it existed only once per session configuration (rather than per title) and it could only be altered by the system administrator. Now we regard the preset also as more powerful than a snapshot, ignoring all filters and protections which may be active. The reason is that since the introduction of sophisticated snapshot filtering and partial snapshots, it is not 100% sure anymore that recalling a snapshot is putting the whole console into a defined audio state. But being able to do so is necessary. This is the difference to Presets. When recalling presets, the whole console is put into a 100% defined state of audio, as it was when the preset was created. This happens regardless of protected patch points or filtered parameters. However, the fact that some parameters may be filtered or protected against changes by snapshot recalls stays active. As soon as any snapshot is recalled, the rules of filters and protections are valid as before.

Minor improvements and fixed bugs

Description	Comment
Various:	
Label type in menu "Subclassify Digital Interfaces" in menu SysAdmin/General Patch shows only fixed labels	Label type now follows label type selected in General Patch
When applying monitor settings within setup menu, these settings were not remembered the next time the title was loaded	Changed name of button into "Apply for session only" in order to make clear that this button doesn't save the settings, but only applies them as long as the title isn't closed.
Mic Preamp gains were sometimes not displayed correctly after a title change – until recalling a snapshot (sometimes twice necessary)	Fixed.
When booting the DSP core without MemNet connection, the last state was not always restored when working with large configurations	Fixed when recompiling configuration with Configuration Editor 3.4
GPIO events were sometimes lost, especially when working the D19m RCC card GPIOs	Fixed.
Static Automation:	
D950: Bus assigns were not protected together with channel	Fixed.
Dynamic Automation:	
Separate icon in toolbar for opening AutoTouch+ panel	
If mix options file was write protected and user wanted to overwrite file, it seemed like it succeeded.	Warning added, if user tries to save options to a write protected file.
TRIM TO END sometimes didn't work	Fixed
Loading mix options was showing wrong colours (blue / black)	Fixed. The currently loaded mix options are shown in black, other are shown in blue – same as titles in “Open Title” menu
CLEAR HELD without timecode running didn't switch the held status off	Fixed.
WRITE TO NEXT CHANGE was sometimes missing last value by one. (e.g. pan recorded to 0, replayed at 1L)	Fixed.
Protected Patch points could get lost when using dynamic automation	Fixed.
Instability when changing automation state of MUTE button on CAS	Fixed.
When tape stopped without having written a pass, options selected to be cleared at end of pass were cleared	Now this option is only valid, if a pass has been really written. If tape is stopped without any objects being written, there is no clearing of options performed. This means that in a lot of cases the option “End Of Pass Clears… Held Objects” is ok to be deactivated. Typically the user runs a try without writing anything. Since this is not regarded as a mix pass, there is no clearing taking place anyway. *

*


Automation Options
Control Modes
Panel Presets
Misc
Glide
Hold
Master Panel
End Of Pass
End of Pass Clears
Record
Write to End
Extend Back to Begin
Extend Back to Punch-In
Held Objects
..Only If Touch Record Active
OK
Cancel

Release Notes for STUDER D950 Software 3.5

Introduction

Studer is happy to announce the release of software version 3.5. This software is a major step forward for all of our Vista series consoles. It contains improvements and major new functionality for Vista 6,7 and 8 as well as the D950.

The majority of the new features relate to live PA work, with the most significant new feature being the new cuelist functionality. With the addition of this feature, the Vista 8 console can now be used as a versatile Live PA console while maintaining and even improving its suitability for any kind of broadcasting work.

The new cue functionality allows the user to build up a list of cues and sort them into a specific order. A cue may contain a snapshot of the console and additionally fire off various events at the same time, such as MIDI messages. It is also possible to trigger a specific cue from incoming MIDI messages. Finally it is possible to control the cue list itself using "MIDI Show Control" messages. The cue list also supports for the first time the brand new Harman Pro HiQNet network technology which was introduced to the public in January 2005. This allows networking of various Harman components together and control from a central position such as a tablet PC – or the Vista console. The cue list window of the console allows you to fire off HiQNet "Venue Recall" messages which allow triggering of various events from within the attached HiQNet units.
Changing settings across multiple snapshots has now become easier than ever before. For example, correcting a fader setting within multiple snapshots can now be accomplished with one single update action.

The software 3.5 also provides new functionality specifically for live broadcasting use: It is now easily possible to control a fader by opening and closing a "general purpose input" (GPI) or even make it move up and down by just shortly touching the fader itself. The purpose of this is to make the life of live TV sound engineers during a talk show much easier: Simply open and close microphones by tapping their faders! But there is even more: Software 3.5 natively supports the control of the console patch points using the standard "Pro-Bel" protocol. D950 hosts extensive mapping functionality in order to make it possible to switch any number of patch points upon reception of one single Pro-Bel command. Not only is it possible to control output patch points. You may in fact control any patch point within the patch window using a “Pro-Bel” command, such as patches to input channels. Finally it is now possible to configure one or multiple "Stereo-To-Mono" processes within the configuration editor software. Each process will then have two inputs and one output visible on the general patch window. This allows easy mono summing of any two signals available on the patch.

But there is even more. Read on to find out about all the great new functionality provided in the new software.

Stefan Ledergerber, Product Manager

Content

1. Cue List

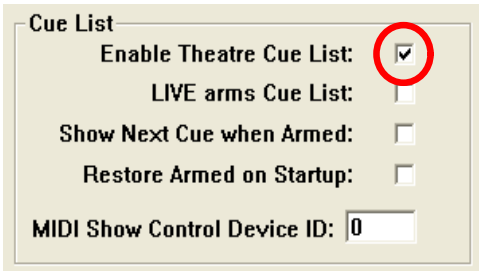
This function is only available when in “static automation mode”.

Using software version 3.5 or newer, extensive cue list functionality is available. The Cue List allows sorting of snapshots as well as attaching MIDI and HiQNet commands to each of them. Each title can contain one cue list. The cue list can also be controlled from external controllers using MIDI messages. It is additionally possible to use standard "MIDI show control" commands as well as recalling certain cues with a user defined MIDI command (Note and Program change). The cue list is only available in "static" mode, hence not when dynamic automation is active.

Opening the cuelist is done by clicking on the cue icon  in the toolbar of the graphical controller screen.

Note: MIDI functionality on the D950 is only available when purchasing the TC3 time code reader/generator.

Activating Theatre Cue List functionality
In order to activate the "theatre cue list" functionality, enter the menu “Option: Snapshot Automation” menu.



Hardware Buttons
The following keys are located on the Vista8 control bay:

It is possible to use these keys to control various functions of the cue list. They allow certain functions to be switched using a hardware button, while it is still possible to use the mouse and operate these functions on the graphical controller screen:

- Switching on/off the crossfade function between cues
- Activate or de-activate the cue preview mode
- Go to next or previous cue.

Creating a cue
In order to create a cue, simply drag&drop one of the available snapshots from the top left corner or an event from below the snapshots to the cue area. It is also possible to create a cue using the MAKE button on the right side of the cue list. A cue doesn't have to contain a snapshot. It is also possible to just add any event without activating any console setting changes.

Recalling a cue
There are several ways to recall a cue:

- Double-click on its name

- Click on "NEXT" or "PREVIOUS" buttons on the graphical control screen
- If cuelist is armed: attach an incoming MIDI event to it and send the appropriate MIDI message to the console
- If cuelist is armed: Hit "NEXT" or "PREVIOUS" on the Vista 8 control bay
- Send MIDI show control messages to the console, according to the specification given below.

Cue numbering and sorting
The number to the cue will automatically be given, but can be edited manually in order to match cue numbers with other teams within a project (e.g. lighting department). In order to do this, select the cue and click on "NAME, #" on the right side of the cue list. When altering the cue number, it will automatically be resorted depending on the number given. The numbers used may contain a decimal point and up to two digits thereafter. (#.##) When resorting cues using drag&drop, the numbers are automatically extended using decimal points and up to two digits after this. In order to sort the cues, simply drag&drop the cue name to the right place.
Automatic numbering example: When inserting a cue between cue number 2 and 3, this cue will automatically be numbered 2.1. If another cue is inserted between 2 and 2.1, this new cue will be numbered 2.01. The system doesn't allow further cues to be inserted between 2 and 2.01. The user would have to manually alter the number 2.01 first.

Crossfading between cues
Each cue displays a number for the crossfade time when activating this cue. To alter this time, press-and-hold the left mouse button onto the digits and scroll up and down. Alternatively, enter the number using the numeric keyboard. (Note that the Cue crossfade must be active for you to be able to change this value).
When clicking on the crossfade time once, options for the behaviour of switches during crossfades become visible on the left side of the window (Options Area). It is possible to define for each cue, whether the switches should change their state before, in the middle or after the crossfade – while other parameters are changing seamlessly.

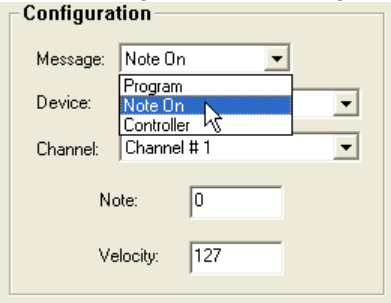
Organizing Events
It is possible to move events from one cue to another one by using drag&drop. It is also possible to move snapshots between cues using drag&drop. This adds the possibility to replace snapshots within cues or exchanging them.

Updating snapshots
The snapshot names displayed in the cue list only refers to the corresponding snapshot contained in the snapshot list. It is therefore possible to use the same snapshot in multiple cues, possibly using different crossfade times. When updating a snapshot, the cues containing it will automatically use the updated snapshot. Note: It is possible to update snapshots from within the cue list window: Right-click on the snapshot within the snapshot list in the top left corner in order to get different options like: MAKE, UPDATE, NAME etc.

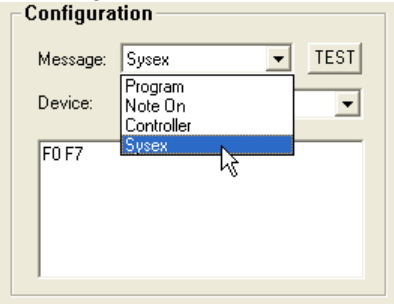
MIDI (only if TC3 installed!)
It is possible to use MIDI note, program change and controller messages both as a source for firing a cue or as events to be sent out of the console upon recalling a cue. In order to attach a MIDI command as cue trigger, drag&drop the MIDI icon to the left side of the cue name. If a MIDI command should be sent out upon cue recall, drag&drop the MIDI icon to the right side of the cue. It is possible to add multiple output events to the cue.

Event options
After having attached an event to a cue, it is possible to alter various parameters, depending on the event. **After** having attached an event to a cue, click on the event icon within the cue list. The corresponding options are displayed within the "Options" area of the window (bottom left). The following options are available:

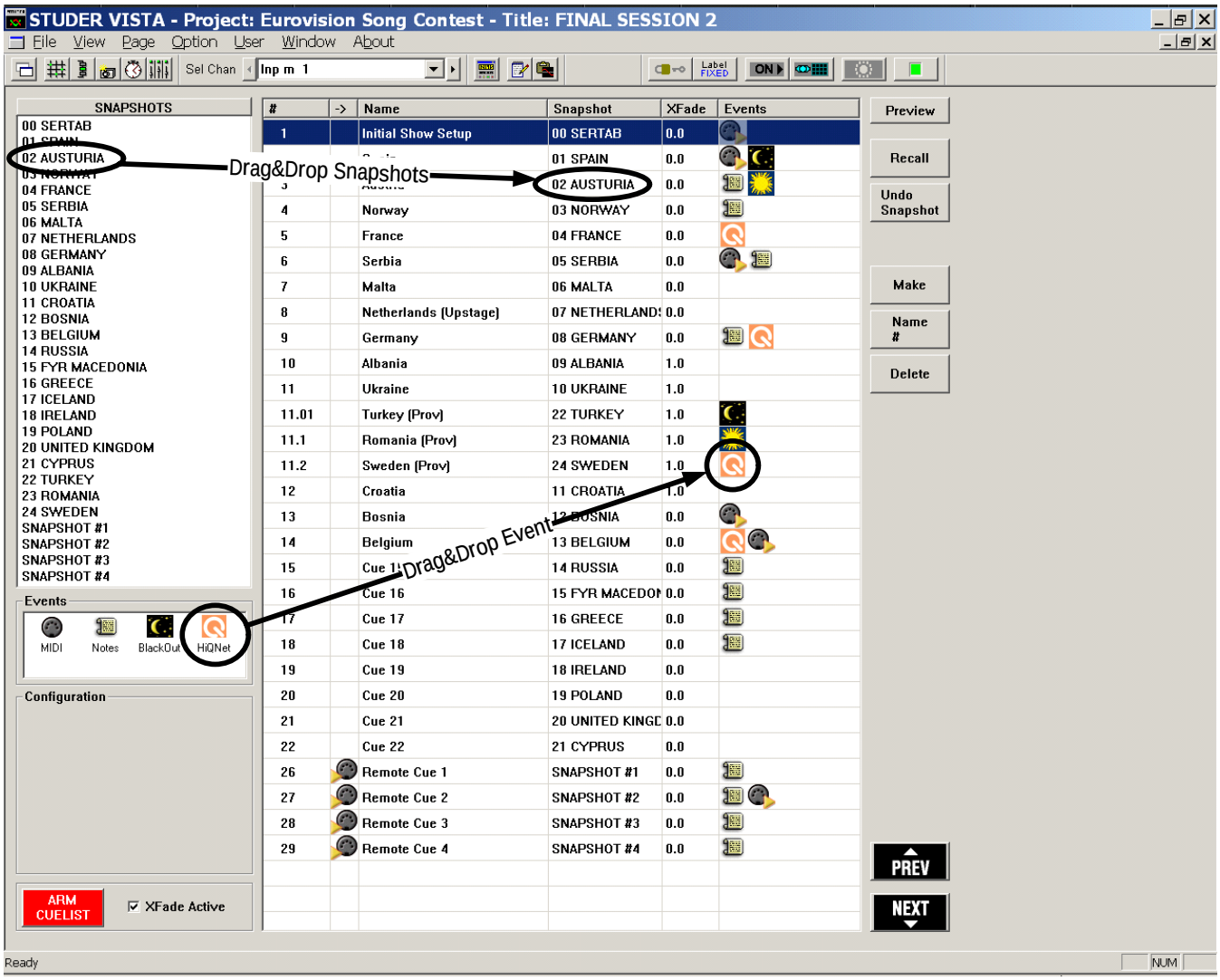
- MIDI In: Program, note change and controller commands may activate the corresponding cue



- MIDI Out: Program change, note change, controller and sysex commands may be fired off by this event. A TEST button allows sending out this parameter during system setup without recalling the cue.



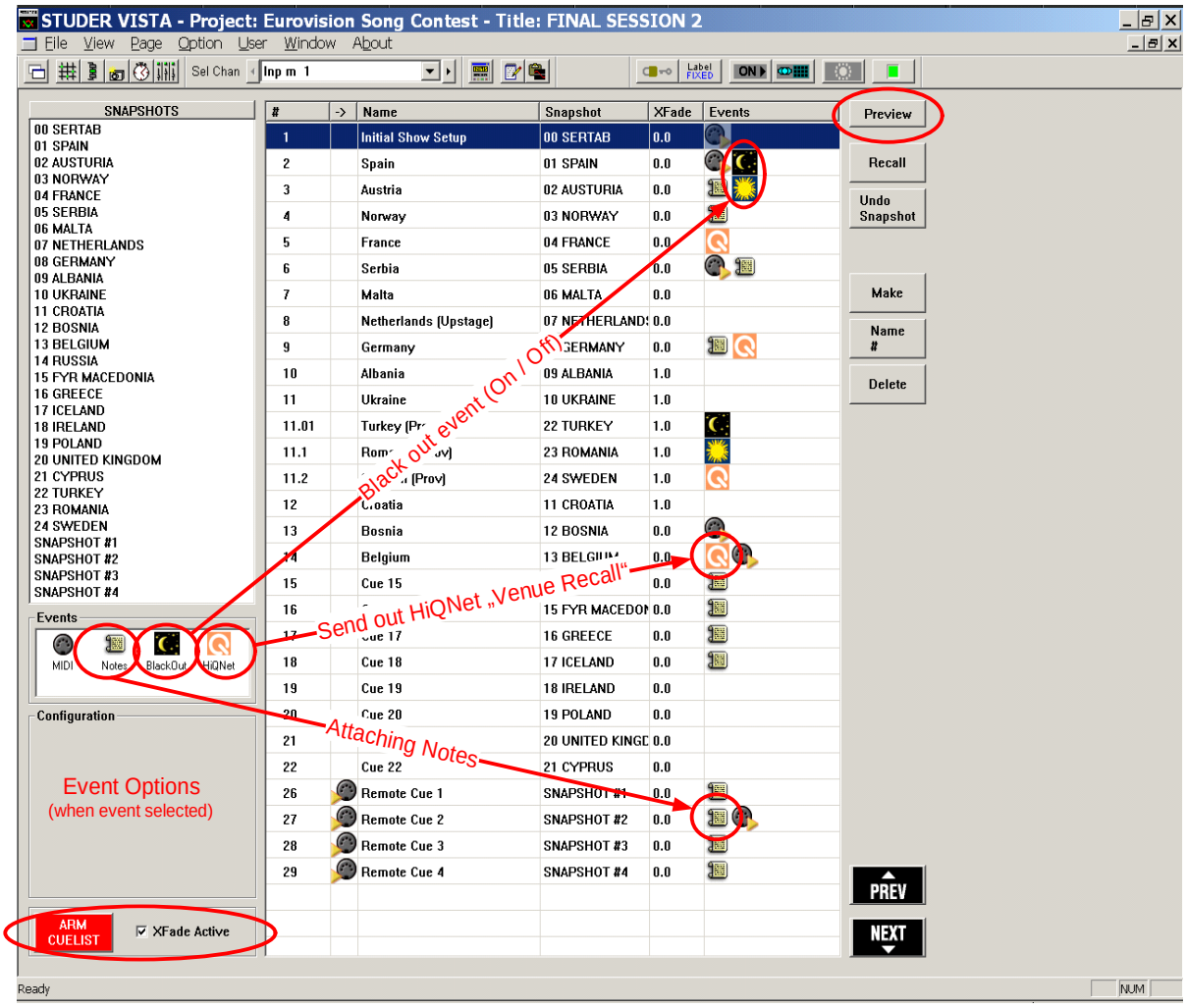
- Notes: Enter your notes. An option allows the user to change the behaviour of the cue list for note events: Should they be displayed before the cue is recalled or afterwards? (see “Options” for more details.)
- HiQNet: "Venue Recall" message sent out of the console to any HiQNet device. The corresponding venue number is entered in the configuration area of the window.



Blackout
(This function is not available on the D950.)

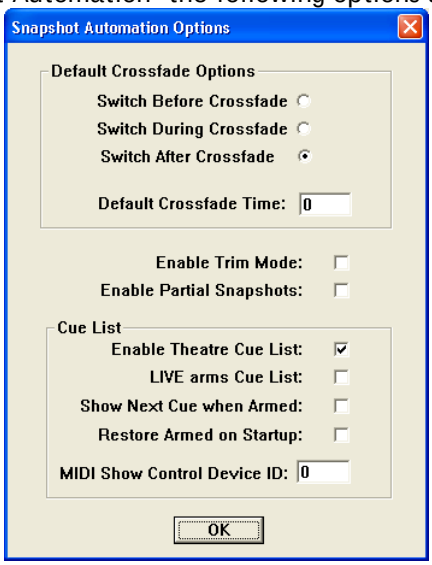
Arm Cuelist
In order to avoid unwanted influence by external devices, it is possible to arm/disarm the cue list inputs. When not armed, the blackout function, the MIDI IN events as well as the hardware buttons "NEXT"/"PREVIOUS" on the console surface are disabled.
It is possible to set various options for this button using the menu “Option: Snapshot Automation”

XFade active
It may be useful to temporary disable cue crossfades (e.g. during rehearsals). This can be done by un-checking this item.



Cue List Options

In the menu "Options", "Snapshot Automation" the following options are available:



Default Crossfade Options:

The system allows cross-fading between two cues. It is possible to define the default values for cross-fades. These values will be used whenever a new cue is created.

Switch options:	Describes behaviour of switches (e.g. MUTE, EQ on/off etc.) when cross-fading. They apply if a switch changes its state in the next cue. They may change their state before, during or after the crossfade.
Default Crossfade Time:	Set default value of crossfades when new cues are created.
Enable Trim Mode:	When pressing-and-holding ISO button on the channel strip, followed by touching individual controls (e.g. faders, rotaries), their state can be set to being isolated from snapshot recalls. If this option is on, it is possible to touch the particular parameter a second time. This will set it into TRIM mode. In this mode all changes to that parameter since the last snapshot recall will be applied relatively (!) to all upcoming snapshot recalls. Thus, not altering them on disk!
Enable Partial Snapshots:	Activates the "partial Snapshot" feature.
Enable Theatre Cue List:	Enables the cue list functionality.
LIVE (ON AIR) arms Cue List:	When pressing the "Live" button on the Vista 8 control surface, the armed state of the cue list will change accordingly.
Show Next Cue when Armed:	Defines, whether the currently active or the next cue should be highlighted when the cue list is armed. This also allows to read attached notes ahead during the live event.
Restore Armed on Startup:	The system will switch the console into the stored "armed" state whenever the software is started. This allows e.g. constant reception of external MIDI commands for firing off cues.
MIDI Show Control Device ID:	See below

The D950 is a MIDI Show Control device

It is possible to control the cue list by using "MIDI Show Control" commands. The D950 is acting as a “slave” in this case. The following "MIDI Show Control" commands are supported:
Go, Stop, Resume, Load, Reset, Standby+, Standby-, Sequence+, Sequence-

D950 is designated as a Music Command Format (0x11). The MIDI device ID is set in the menu “Option”, “Snapshot Automation”.

Examples:

Next Cue:	F0 7F [Device ID] 02 11 01 F7 (Go command)
Previous Cue:	F0 7F [Device ID] 02 11 12 F7 (Standby- Command), then F0 7F [Device ID] 02 11 01 F7 (Go Command)
Recall Cue 3.5:	F0 7F [Device ID] 02 11 01 33 2E 35 F7 (Go Command, with Q specified)

2. Updating multiple snapshots

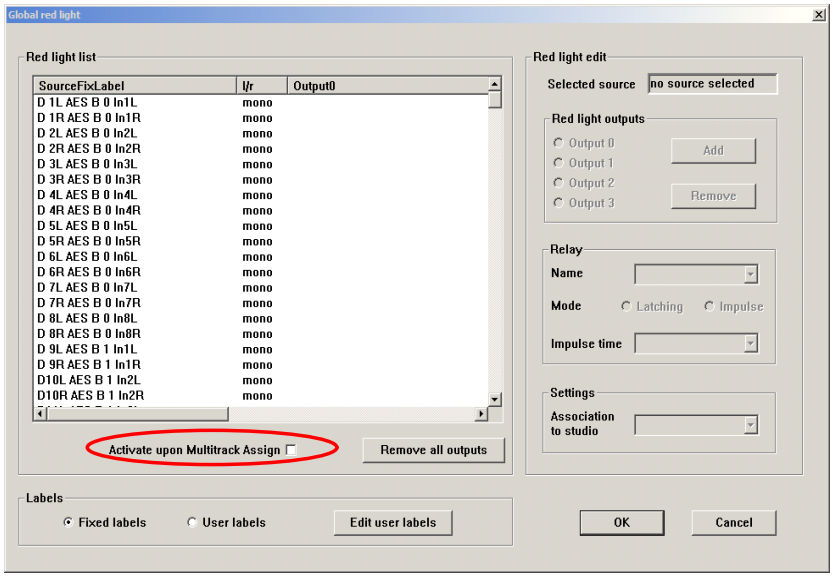
This function makes only sense when in “static automation mode”.

Very often certain controls should be updated in multiple snapshots. It may be important that only certain channels are overwritten and others obviously left as stored. In order to achieve this, place those controls into "Isolate" mode by hitting the AUTO MODE button and recall a snapshot. If this action is now followed by an UPDATE command, only the isolated controls will be updated.
It is possible to do all this even faster: First select multiple snapshots and press "Recall and Update" once. Note: The button "Update" is changing its name whenever multiple snapshots are selected.

Selecting multiple snapshots
It is possible to select multiple snapshots at the same time by using the keyboard SHIFT or CTRL key. The selection of multiple snapshots is following standard windows rules: SHIFT selects all snapshots in between the two, CTRL+click allows selection of individual snapshots.

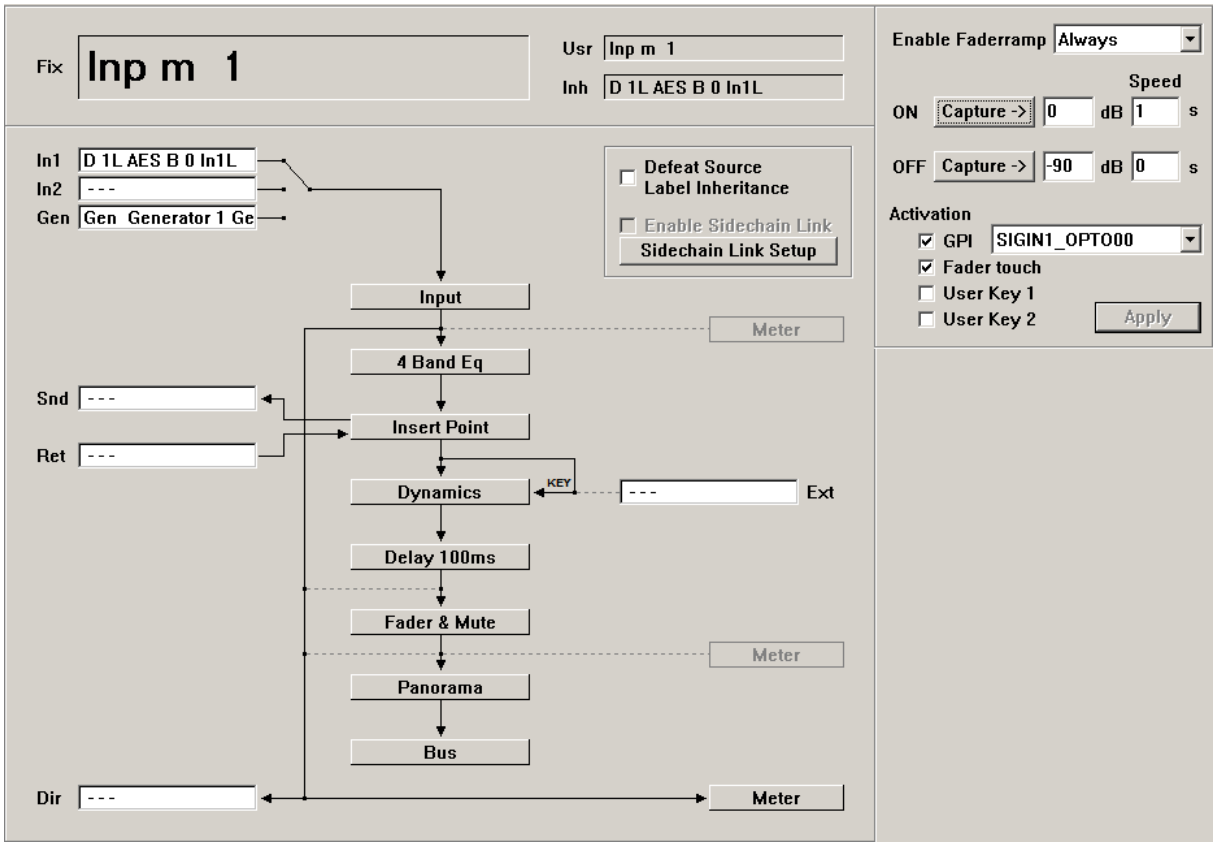
3. New Option: Red Light upon Multitrack assignment

In the setup menu of the red light functionality it is now possible to activate the Option "Activate upon Multitrack Assign". If this option is active, the red light condition is already met when an assignment to the multitrack busses is done and the fader is opened. This supports customers working with multitrack recorders.



4. Fader Ramp control ("Audio follows Video")

This function is only available when in “static automation mode”.



It is possible to control faders of all console channels externally. When using this feature, the console operator determines the "Fader Open/Close" values, as well as the speed the fade in/out should happen. Various triggers are available in order to activate the fade. The channel patch window allows adjustment of all necessary settings.
The "Fader Ramp" function might be particularly useful when doing TV work. The opening and closing of certain microphone channels may be controlled by the video switcher, using "GPIs" (closure contacts in monitoring rack). Another possible use is for radio/TV talk-shows: Different people have their microphones which are constantly opened and lowered. This action may be pre-programmed and the fade in / out may be activated by just touching the fader or pressing one of the USER buttons. The following options may be set in the channel patch window:

- **Enable Fader Ramp:** Select, if you want to use one of the two USER keys to enable the fader ramp on a specific channel. It is also possible to constantly activate it, leaving the USER buttons free for other functions.
- **ON fader value**: Pressing the "Capture" button will set the current fader value to be used when the GPI is active, hence the value used when the fader is opened.
  Alternatively the value may be typed in using the keyboard or by using the mouse: Click in the number field and drag the wheel up and down. This action is similar to the way time values are adjusted in the dynamic automation of the Vista consoles.
- **OFF fader value**: Pressing the "Capture" button will set the current fader value to be used when the GPI is inactive, hence the value used when the fader is lowered/closed.
  Alternatively the value may be typed in using the keyboard or by using the mouse: Click in the number field and drag the wheel up and down. This action is similar to the way time values are adjusted in the dynamic automation of the Vista consoles.

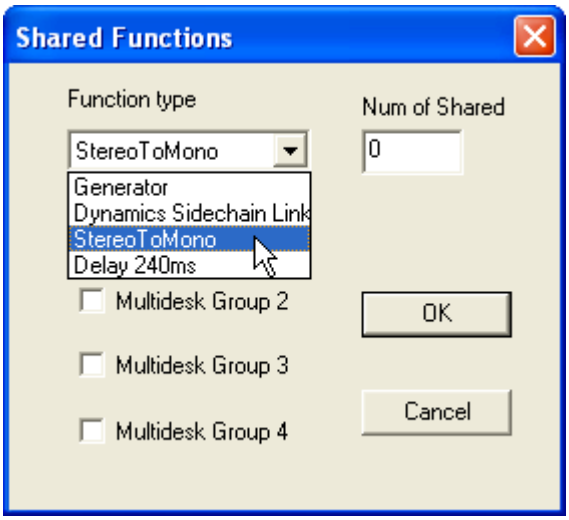
  Note: By using the same GPI on two channels and setting on one of the two the ON value to the "fader closed" position and vice versa allows using one GPI to control opening and closing of various channels at the same time.
- **Speed ON**: Determines the time used for "fade in" the corresponding channel
- **Speed OFF**: Determines the time used for "fade out" the corresponding channel
- **Activation**: The fade actions may be activated by different events. Some events may be enabled at the same time. The fade will take place whenever one of the activated events is detected:
  - **GPI:** Select one of the "General Purpose Inputs" available on the console for triggering the fade.
  - **Fader Touch**: Touch-and-Release the fader in order to activate the fade.
    Note: If the fader is moved while being touched, the trigger of the fade is deferred. This prevents from accidental fading.
  - **User Key 1/2**: The fade is activated when pressing the corresponding User key on each channel.

Notes: In the case where adjusted values constantly jump back to their previous values, check that the file "C:\D950System\Sig...ini" is not write protected.

The Fader Ramp parameters are stored in the current signaling.ini file which is referenced from the used monitoring.ini file. Each title can have its own settings (separate monitoring/signaling files) or multiple titles can use the same settings (shared monitoring/signaling files). See enclosed Application Note for a detailed example.

5. Mono summation

It is possible to configure "Stereo-To-Mono" processes within the configuration editor software. If your session configuration contains one or more such processes, you will see them on the general patch window. Each process has two inputs (left and right) and one output. You will find them when right-clicking on the sources or targets area. Select "Shared Processes". The output is the sum of the two inputs, attenuated by 3 dB.



Note: It is also possible to configure one or multiple delays as a „shared process". However, in order to adjust its value you would have to be a system administrator and go into the „VMC tree" view of the console parameters. Hence this function is only intended when installing a console. Fixed delays might be set by Studer Service personal at that time.

6. General Information

For customers having D950 and Vista consoles in their facilities and want to transfer configurations and settings between the consoles: Vista configurations containing Vista specific features may not be taken over onto the D950 consoles. Current Vista specific functions are:

- Auxiliary busses used as matrix outputs (assign function to aux busses from aux master channels or master channels)
- SOLO assign functions from master or aux master channels
- New multitrack busses with enhanced functionalities (Pan on/off, post/prefade switch)
- n-x busses

7. Minor improvements and fixed bugs

Description	Comment
Improved reliability of desk communication (HDLC)	fixed (new firmware)
CAS looses fader calibration setting	fixed (new download SW)
"Clear All" action lets control over microphone preamplifiers disappear	fixed
Monitoring settings were not stored with title or their application fails when changing configurations.	fixed
Configuration Editor Software: After removing an insert function from a CGM, it can't be added anymore	fixed
Easy to create offsets when working with Control Group Masters	fixed
Snapshot recall doesn't restore position of VCA member channels correctly	fixed
Channel isolation doesn't include insert points and misses some direct out settings	fixed
Channel delays can't be controlled by CGM	fixed
Improvement: When trying to open a title which doesn't belong to the currently loaded configuration, the question about importing it into the currently loaded configuration defaults to YES. Dangerous!	Now default NO
Unreliable restore of snapshot filter state upon console application start	fixed
Deleted snapshot after error "Failed to update Snapshot"	fixed

8. Native Pro-Bel support

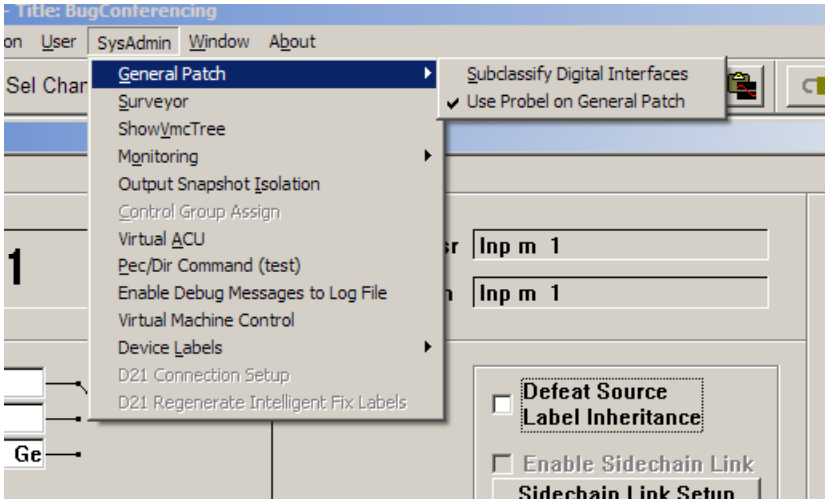
Starting with version 3.5 of the D950 and the Vista Software those products are able to support Pro-Bel enabled devices natively, and so a second PC is not necessary for this functionality. However, we do not recommend that existing installations are altered which are already in use with a second PC for Pro-Bel interfacing. The explanations following below are therefore intended for installation personal and not for the console operators.

Supported Functionality

Our implementation enables the ability to map certain Pro-Bel connect requests to a set of definable Patch connections. This set up procedure is done from the General Patch screen, where certain patches can be selected (by just selecting the affected targets) and which are being mapped to a Pro-Bel source/destination combination with a single click on a dialogue.

Enabling Pro-Bel Setup

To be able to activate and see the Setup Probel button on the General Patch the system has to be in Sysadmin Mode.The SysAdmin menu contains a sub menu GeneralPatch and a switch to use Pro-Bel.



Menu for activating native Pro-Bel support

This setting will be written to the D950System.ini as well, resulting in the same behaviour as if it was edited by hand in the first place.
The button will then be visible whenever the System enters the Sysadmin Mode.

Enabling COM ports for use with the Pro-Bel protocol

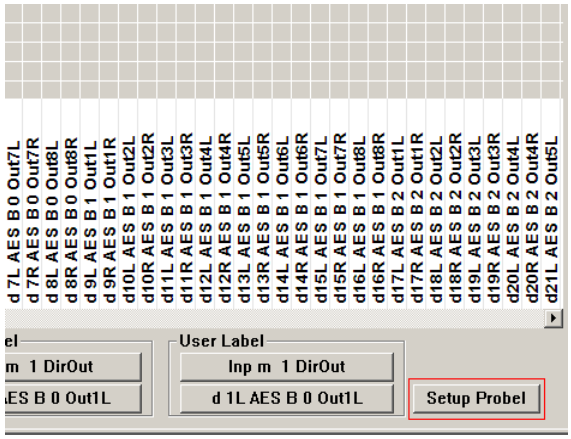
Ports that are to be used for Pro-Bel need to be specified in the D950System.ini in the [d950SerialPorts] section. This gives the possibility to use non standard data rates and parity settings.

```
[d950SerialPorts]
1= {p} COM1 baud=115200 parity=N data=8 stop=1
2= {b} COM6 baud=38400 parity=E data=8 stop=1
```

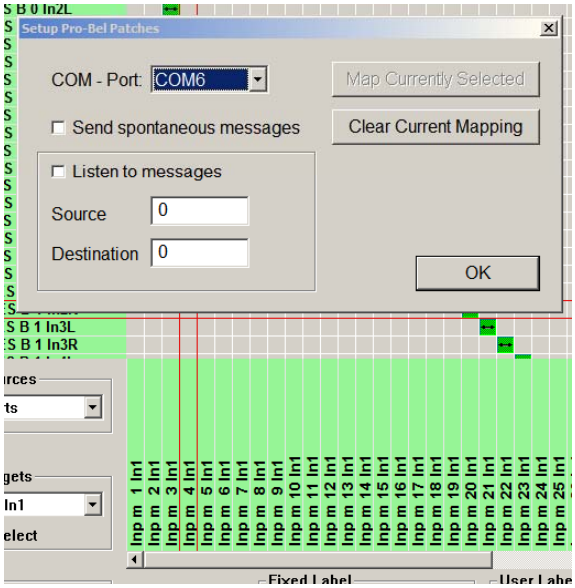
The b is used to indicate the Pro-Bel utilisation. Only the COM ports defined like this will be available in the Pro-Bel setup dialogue.

Bringing up the set up dialogue for Pro-Bel

With Pro-Bel setup button enabled the General Patch presents a new button on the bottom right. Hitting this button the system brings up the set up dialogue and enters Pro-Bel set up mode.

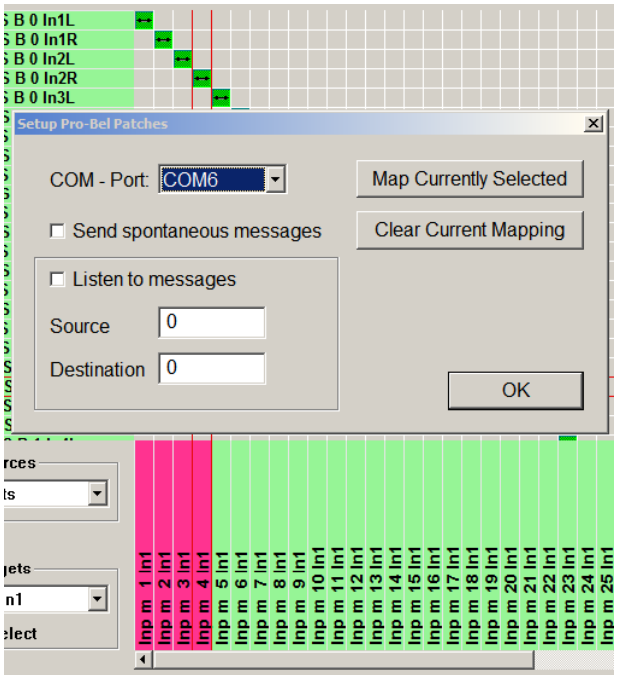


Pro-Bel Setup button



Active Pro-Bel set up dialogue

Targets with their respective connections can be selected by clicking on them in the list on the general patch. Selected targets change their colour to pink to show their selection state.



Active Pro-Bel set up dialogue

Hitting the “Map Currently Selected” button maps the patches for the selected targets (the pink coloured ones) to the Pro-Bel connect command specified on the left.
With the listen button enabled, incoming connect messages are mapped to the edit fields on the dialog. To select targets affected by this connect command simply click on them in the target list of the general patch (colour is set to pink).
Make sure to always associate the same Pro-Bel destination to the same set of targets.

It is possible to map any connection on the patch to certain Pro-Bel connect commands. You are not limited to outputs or inputs!

It's possible to activate spontaneous messages. The appropriate CONNECTED message is sent whenever one of the defined patch combinations matches the combination when they were defined.

Files used to store Pro-Bel set up
The system creates human readable files (ini-file format) in the D950System directory to store the set up. The files are named according to the COM – port used.
Filename: PortX.probel
with X being the COM – port used.

```
[TARGET_1 SOURCE_6]
Im23 Inp m 23 In1 left=D12L AES B 1 In4L left
Im24 Inp m 24 In1 left=D12L AES B 1 In4L left
[TARGET_1 SOURCE_7]
Im23 Inp m 23 In1 left=D11R AES B 1 In3R left
Im24 Inp m 24 In1 left=D11R AES B 1 In3R left
[TARGET_1 SOURCE_4]
Im23 Inp m 23 In1 left=
Im24 Inp m 24 In1 left=
[TARGET_0 SOURCE_0]
Im23 Inp m 23 In1 left=D11R AES B 1 In3R left
Im24 Inp m 24 In1 left=D11R AES B 1 In3R left
Im25 Inp m 25 In1 left=
Im26 Inp m 26 In1 left=
```

Example for a .probel file

This file basically has a section for each used Source/Target combination. The fixed labels are being used and left is appended for left or mono sources/targets and right is appended for right sources/targets.

Application Note: "Working with Fader Ramps"

Since the Fader Ramp settings are stored in the signaling.ini file, they will be valid for all titles using the the same signaling.ini file. The currently used signaling file is referenced by an entry in the active monitoring.ini file.
In order to allow different titles and productions to have their unique Fader Ramp settings (i.e different signaling.ini files), be sure to assign the appropriate monitoring files. If two titles should use the same monitoring but different fader ramps : simply duplicate the common monitoring file, and change one signaling reference to the original signaling.ini, the other to the alternative signaling2.ini.

Example : Separating Productions with/without Fader Ramps

After the upgrade to V3.5 there should be productions with and others without fader ramps. The following steps show the required modifications when starting with a common monitoring.ini file for all productions, but it also applies also for systems with multiple monitoring files.

Before starting to work with Fader Ramps at all

1. make a copy of the monitoring file "*Monxxx.ini* " in C:\D950system and name it "*MonxxxFR.ini*".
2. make a copy of the signaling file "*SigVista.ini*" in C:\D950system and name it "*SigxxxFR.ini*"
3. Open the new "*MonxxxFR.ini*" file, and go to the very end
   where you find the line `SignalingFile=C:\D950System\SigVista.ini`
   and change it to `SignalingFile=C:\D950System\SigxxxFR.ini`

Assign one of the 2 available monitoring files (and the linked signaling file) to any existing or new title now. Titles without fader ramps need to load the "Monxx.ini", titles with Fader Ramps will load the Mon.ini file "MonxxFR.in".:

4. Open or create the title which should be used with Fader Ramps.
5. Go in "Sysadmin" mode and open the monitor file editing window.
6. Load the newly created "MonxxFR.ini" and confirm with "Apply"

If you wish to use different Fader Ramp settings on different "Fader Ramp" titles, you can of course have several monitoring files available, each linked to a signaling file with it's own settings.