STUDER REVOX

SWISS SOUND

VIEWS AND NEWS FROM SWITZERLAND

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No. 15
April 1986

The most advanced tape recorder family is now complete and has a great future

New products introduced

The introduction of new products on the occasion of the AES convention in Montreux and their overwhelming acceptance prove that our equipment strategy is correct.

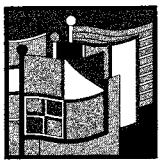
With utmost satisfaction the professional audio world has taken note of two absolutely new tape recorders:
- the A807, a particularly low-priced professional machine for universal applications,

and
- the A812, a compact machine for stationary use a rugged workhorse in broadcasting, in audio dubbing of video programs, and in recording studios.

Together with the PR99, the field-proven A810 and the mastering machine A820, we now have a unique and complete line of tape recorders. In the analog sector the market requires such a comprehensive range that can satisfy the corresponding requirements up to the year 2000.

We are delighted that our concept of equipment has found such a positive response, and we are looking forward to introduce these new products to our customers by individual tests and demonstrations.

Eugen Spörri



The window to the audioworld – with more Studer novelties than ever before

80th AES Convention in Montreux

Each year the Audio Engineering Society, Inc. (AES) conducts two technical workshops with exhibitions, one in the USA and one in Europe; for the first time in Zurich in 1976 and for the first time in 1982 in Montreux. With a worldwide membership of 10'000 the AES is the most important association of audio specialists. The Swiss section was able to celebrate its 10th anniversary at this year's convention in Montreux.

Everybody in this world who is in any way associated with professional audio engineering knows the AES. It is not only the most important forum for top-level lectures but also the initiator of innovations. Probably all major manufacturers in the audio field likely feel this initiation several months in advance in their own ranks. The closer the exhibition gets, the more hectic the schedule for the equipment planning groups as well as for the persons responsible for organizing the exhibition stand, the vast number of machines to be lent out (to over 40 other participants of the exhibition), the printed documentation, the symposia for the sales representatives, the hotel rooms etc. And after the crammed event is already a thing of the past, many smiles of relief can be seen on tired faces – we have come through, we have shown the world that we at Studer are trail blazers along the entire front.

Impressive growth rates

With 200 exhibitors the AES in Montreux occupied 25 % more space than the AES 1985 in Hamburg where 122 exhibitors and some 2400 professionals participated. Montreux 86 attracted 4000 professionals, i.e. 60 % more than last year! If we compare the figures with 1976 the development becomes readily apparent: in that year there were 57 exhibitors and only 1100 visitors.

The interest in the AES is international in every respect as evidenced by the 50 or so accredited press representatives from 12 different countries. Some 60 presentations by leading specialists, also available as papers, testify of the high quality of the discussions centering on a transparent audio world.

The largest Studer stand so far

Not only the size of the stand of 180 + 50 square meters was impressive but also the presentation exceeded the traditional scope. In four different sectors more new products were exhibited in the field of analog and digital recording, synchronizing systems and mixing consoles than ever before. For the first time two system controllers were demonstrated. The large demo room with the system controller SC 4016 contained the largest complex ever used for demonstration purposes. It was able to demonstrate the interaction of modern tape recorders with video recorders, film scanners and projectors without any space problems – a minor sensation, because this was new in this framework, even for AES.

The two system controllers SC 4008 and SC 4016 developed for different synchronizing functions will be presented in a separate article of this issue.

The new tape recorders

Two completely new tape recorders, the STUDER A812 and the STUDER A807 had their premiere at the AES. Two special versions of the STUDER A810, the TC-FM-NEO and the APV were shown, and for the first time the compatibility of DASH digital recorders and a special application for CD mastering with subcode data injection was demonstrated.

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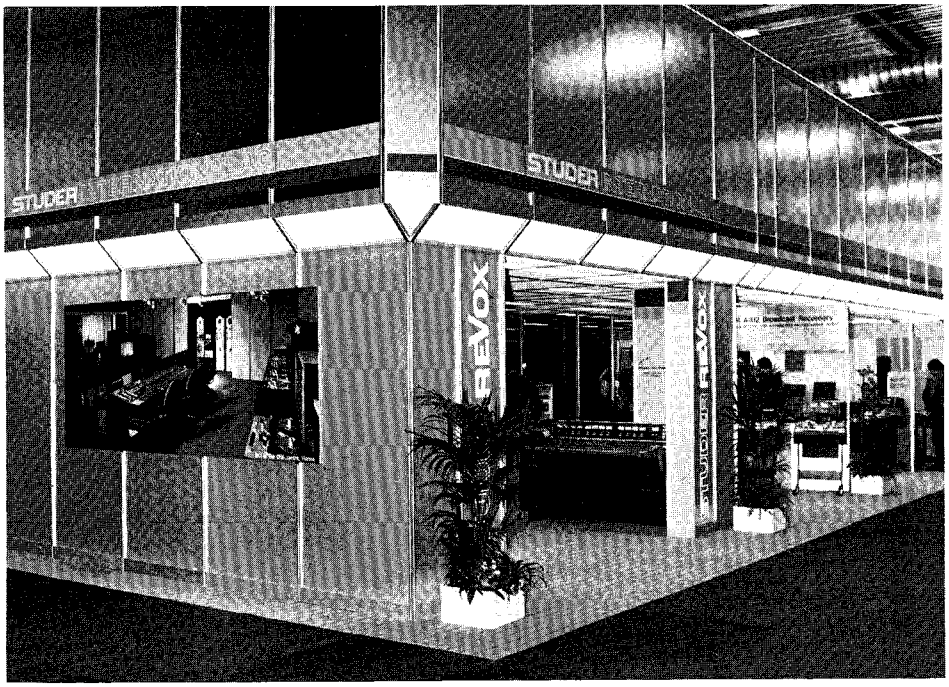


On a stand measuring 180 square meters the latest Studer products were exhibited at the AES in Montreux. On the second floor a 50 square meter lounge served as a conference room for discussions and for attending to our many international guests.

STUDER A812 – the new analog, compact and ergonomically refined recorder

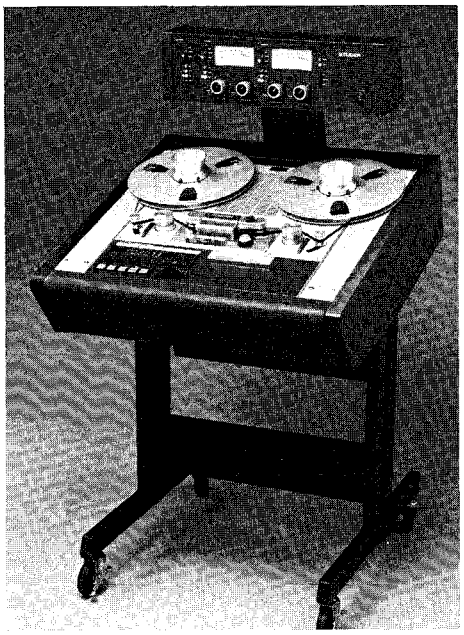
Designed for a wide application range in broadcasting, video dubbing and recording studios and equipped with a rugged die-cast chassis and powerful microprocessor electronics, the new A812 underscores our commitment to continuous enhancement also of the analog line with top-quality production machines.

The key features of the A812 can be summarized as follows:

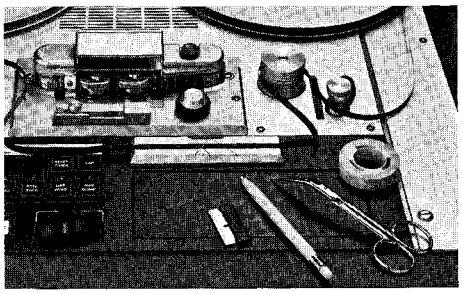
- New, exceptionally rugged die-cast aluminum chassis for 12.5" or 318 mm reel capacity.
- Brushless AC spooling motors with 3-phase control for high torque.
- Brushless, Hall-commuted precision DC capstan motor with separate processor control. Rugged like an AC motor yet lightning fast for optimum acceleration and deceleration ratings, and excellent synchronization characteristics. Designed for four tape speeds in both directions. Excellent specifications throughout a wide temperature range.
- Control of the tape transport and audio functions by means of microprocessors and A820 software structure.
- Pulse width modulated (PWM) high-efficiency output stages for capstan and spooling motors with low heat generation.
- Digital setting of the audio parameters via separate LC display, no potentiometers.
- Programmable tape speeds; 1 to 4 from 3.75 to 30 ips.
- Programmable spooling speeds from 1 to 12 m/s.
- Programmable library wind function and speed.
- Varispeed (+/– 7 semitones) as standard feature.
- Fully programmable tape command keys (menu with over 40 possible functions) with alphanumeric LC display. Programming can be secured against unauthorized access.
- Logically arranged tape transport panel with large LED-type tape timer display, resolution 1/10 sec.
- Shuttle control (same as A820) with directly storable speed (with or without tapelifting).
- High-precision headblock with close head spacing, excellent screening and integrated reproduce preamplifier, optimized for high phase stability and excellent signal-to-noise ratios. Preparared for TC head, tape scissors and marker.
- Cross talk rating of 90 dB for TC/audio; no time offset between TC and audio because of electronic delay unit. High-speed reader permits TC reading also in spooling mode.

At the same time synchronization examples were demonstrated with the SC 4008 in the "small" demo room.

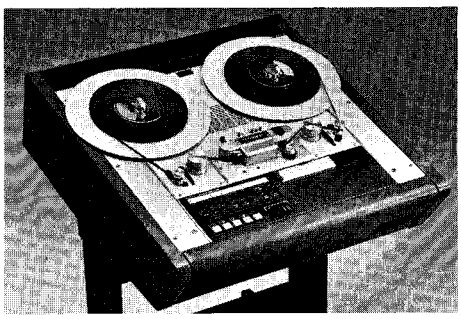
Complex synchronization applications were demonstrated live in the large demo room for the SC 4016.



The ergonomically designed A812 with VU-meter penthouse or in the "Euro version" without penthouse received much attention as a very compact tape recorder.



The "work station" of the A812 offers comprehensive facilities for easy editing.

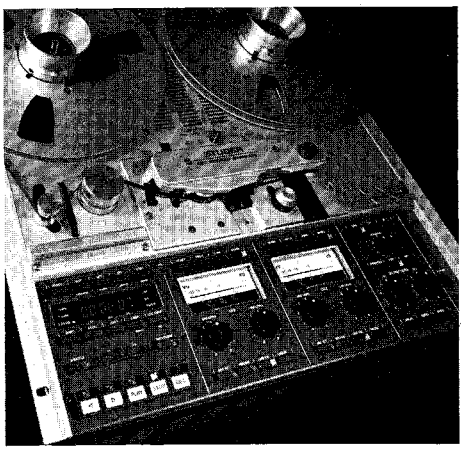


A812 "Euro Version".

- Phase-compensated record and reproduce amplifiers.
- Audio parameters stored digitally in microprocessor RAM, can be read out on separate LC display.
- Choice of input and output stages with or without transformers. Transformerless output stages with high output voltage up to 28 dBm and outstanding common-mode rejection.
- Excellent operating ergonomics: ample knee room, tape transport tiltable into 5 working positions, large unobstructed work area in front of headblock, and excellent accessibility to the audio heads for easy editing.
- Simple access to the electronic modules. No alignments are necessary after a circuit board has been replaced because all parameters are stored in RAM.
- Advanced remote control concept for parallel remote control (standard), serial remote control, serial remote counter, audio channel remote control, synchronizer, interface to the noise reduction system and external varispeed control.
- Versions with or without VU meter penthouse (Euro version with monitor speaker in tape transport); two basic console versions.

STUDER A807 – the professional tape recorder in a new price category

As a preliminary announcement also the completely new compact professional machine A807 was demonstrated at the AES. This machine has been developed to fit a new range at the lower end of the scale of professional recorders. Despite its comparatively low price this new model possesses all characteristics of a STUDER product:



The Studer A807 establishes a remarkable trend in a new price category.

- Rugged die-cast aluminum chassis.
- Direct-drive AC-spooling motors, servo-controlled, with 3-phase motor output stage and automatic control of the commutation frequency for high torque, i.e. fast acceleration and braking, as well as high spooling speed.
- Tape reel capacity 282 mm (11.1").
- Shuttle control as standard feature. The A807 is also suited for one-hand cueing.
- Brushless DC capstan motor, servo-controlled.
- 3 Tape speeds (3.75 – 7.5 – 15 ips), varispeed as standard feature.
- Microprocessor-controlled tape transport and audio electronics. The tape transport control features a number of supplementary functions: waste basket mode (tape dump), locator, loop mode, reverse play, etc.
- Headblock with 4 positions for erase, record and 2 reproduce heads (or 1 reproduce and 1 time code head).
- Individual head screening for versions with 2 reproduce heads.
- Prepared for tape scissors and tape marker.
- Phase-compensated audio electronics, digitally controlled, without alignment potentiometers.
- NAB/CCIR equalization changeover.
- Microphone inputs with phantom supply (48 V or 12 V) as standard feature.
- Monitor speaker as standard feature.
- Serial (RS 232) and parallel remote control ports as standard feature.

The STUDER A807 is 19" compatible and will optionally be available with wooden side panels or in a console. This clearly future-oriented concept ensures that this powerful and solid machine will find a wide application spectrum.

Film-audio special versions of the STUDER A810

Two new special versions of the series A810 have also been introduced:

STUDER A810-2 TC/FM/NEO VUK.

Equipped with a special headblock and the corresponding control electronics in the VU-meter penthouse, this machine can record and reproduce an FM pilot track as well as a time code track. Together with an external time code generator this configuration permits for the first time reproduction of an FM pilot signal with simultaneous recording of a time code signal. This means that FM pilot tapes can be converted directly to modern SMPTE/EBU time code tapes.

STUDER A810-APV

Equipped with a second headblock for prelistening and several guide rollers, the APV is able to supply a prelistening signal for controlling a luminous countdown chain. The following prelistening times can be implemented as a function of the tape speed and the film format: 2.2 – 4 – 4.4 sec. (7.5 ips) or 1.1 – 2 – 2.2 sec. (15 ips).

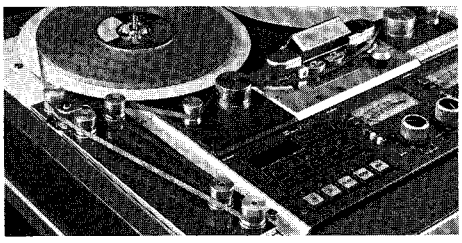
Remote control accessory
For the first time the complete line of remote control accessories, both in desk as well as plug-in module form has been introduced. In summary these are the following units:

for A807, A810, A812, A820:
- Parallel transport remote control
- Parallel transport remote control with varispeed
- Varispeed remote control with 10 turn potentiometer
- Varispeed remote control with digital indication of the tape speed deviation

for A810, A812, A820:
- Parallel audio channel remote control for 2 audio and one TC channel

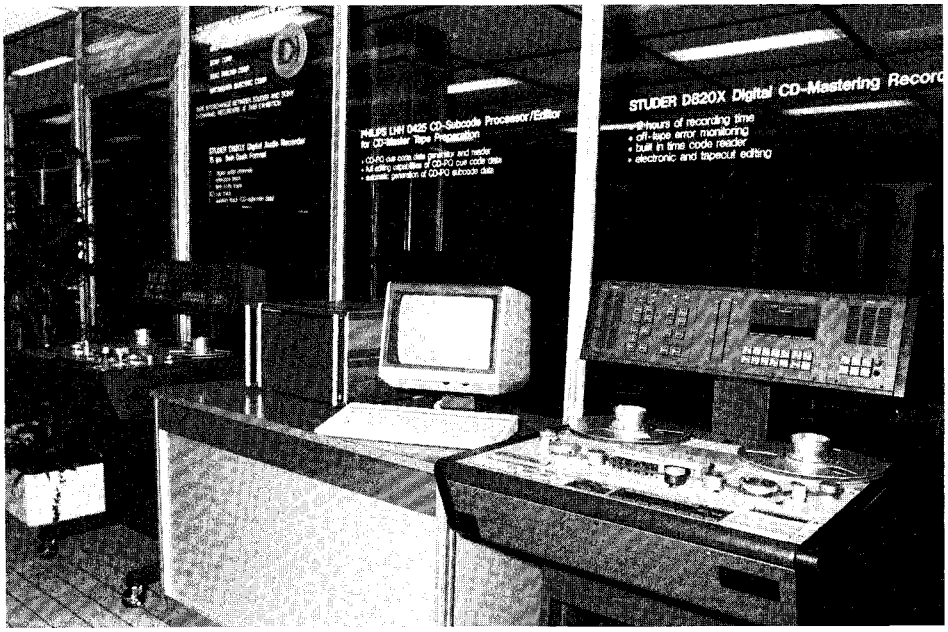
for A812 and A820:
- Serial transport remote control
- Remote counter

FM pilot tapes can be converted directly to modern, time-coded SMPTE/EBU tapes with the new Studer A810-2 TC/FM/NEO VUK.



The APV, a special version of the Studer A810, is equipped with a second headblock which supplies a prelistening signal for feeding a luminous count-down chain.

DASH compatibility demonstrated for the first time
One of the highlights of this year's AES and a historical moment in the still young history of digital recording with stationary heads was the first demonstration of the compatibility of 2-channel tape recordings in the twin DASH format between a Sony PCM 3202 and a STUDER D820 X.



Digital audio engineering – Studer publicly demonstrated for the first time the compatibility of PCM machines in the twin DASH format. A Studer D820 X with a system for producing CD master tapes with subcode data was in action at the same time.

At the same time it was announced that the DASH format introduced by Studer, Sony and Matsushita is now also being used by another manufacturer, Tascam Teac Co.

STUDER D820 X for CD mastering
Another demonstration in the field of digital recording was based on a production system comprising a Studer D820 X and the Philips subcode editor LHH 425. This system allows production of a complete CD master tape, including generation and recording of all CD subcodes (PQ data). In addition to the two digital audio channels, an SMPTE/EBU time code and the subcode data of the channels P ... W are recorded. These provide information on the contents list of the CD, the number of tracks, the start times, the track times, the pause times, and can also contain texts.

The main benefit of the new method over the previously employed principle based on preparing master tapes by means of rotating heads (U-Matic system) is the high reliability because of the lower error rate.

STUDER mixer technology – two new Series 900 mixing consoles
In the demo rooms where the system controllers were installed, the current audio mixers types 903 and 962 were in practical use. But in the mixing console sector of the stand two new audio mixer types, i.e. the 963 and the 970 were demonstrated. The latter incorporates a concept that is tailored to specific fields of application.

Studer Mixing Console 963
The new economy-priced mixing console type 963 is eminently suited for use in locations where space is at a premium. Because of their highly compact design and advanced circuit engineering, the audio mixers of the Series 963 feature a high function density and flexibility. They are equally well suited for OB vans, for theatres or direct broadcasts where the sound reinforcement (PA) can readily be disconnected on the console because of direct outputs. Its flexibility is also desirable in sound postproduction applications where clean separation between direct insertion, mixdown and monitoring is essential. Scene grouping in television productions can be implemented with equal ease.

A mechanical base frame of the Series 963 can accommodate 12 plug-in modules with a width of 30 mm each. By combining three or four such base frames, a mixing console can be configurated with 16 or 28 input modules and with up to 12 main outputs (8 groups and 4 masters). A mixing console with four base frames is less than 2 m wide but accommodates already 40 inputs, 40 direct outputs, 8 groups, 4 masters, 4 auxiliary masters as well as monitoring and insertion paths, and a bantam jack panel for insertion points.
Summary of the main features:
- The plug-in modules are based on an expanded concept of the Series 961/962.
- Outstanding technical data, suitable for PCM.

- Modular design with mechanical base frame that accommodates twelve 30 mm plug-in modules, highly space-saving.
- Direct outputs on all input modules.
- 12 main outputs (8 groups and 4 masters), 4 auxiliary masters.
- Signal switching implemented field-effect transistors in all critical audio paths.
- Insertion points of all input modules electronically balanced, insertion level +6 dB.
- Insertable limiter/compressor.
- Jack panel for insertion points, expandable for inputs/outputs.

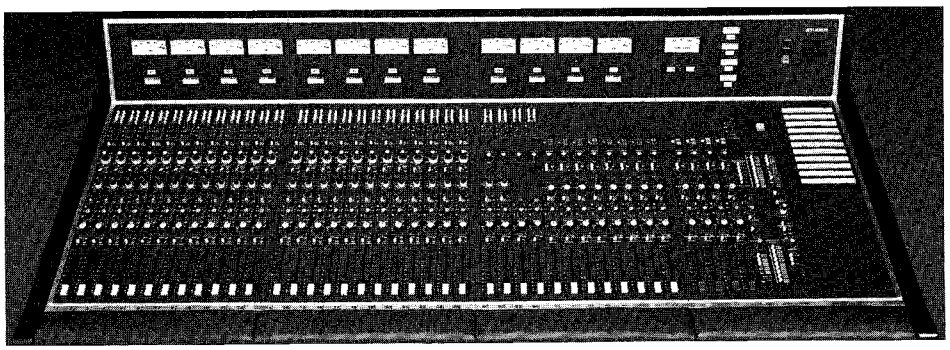
Studer continuity console 970

The Studer 970 mixing consoles are specifically designed to satisfy the requirements of broadcasting operations, including disk jockey mode. But ease of operation and functional clarity are also important features of this mixing console.

Each mechanical base frame of the 970 is designed for nine 40 mm plug-in modules. For dedicated on-air consoles three such base frames are combined. The center unit remains free as a manuscript storage area. For extensions to continuity and production configurations, the center unit can also be fitted with plug-in modules, and additional base frames accommodating 9 modules each can be coupled.

Summary of the main features:

- The plug-in modules are based on an expanded concept of the Series 961/962.



The new, highly compact Studer 963 mixing console is extremely flexible. Even in cramped locations it can satisfy the most demanding requirements with respect to operating convenience.

- The input modules are enhanced with three low-noise control buttons and a flexible, internally programmable logic circuit for controlling prelistening, start and stop of the audio players, signalling, and click-free through-connection of the audio signals. These functions can also be remote controlled via push buttons or relay contacts.
- Flexible, economy-priced technology.
- Outstanding technical data.
- Clearly arranged and easy-to-operate plug-in modules, each 40 mm wide.
- Modular mechanical design wsith base frames accommodating 9 plug-in modules each.
- Any combination of mono and stereo modules.
- Signal switching implemented with FETs in all critical audio paths.
- Insertion points of all modules electronically balanced.
  Insertion level +6 dB.

With the new Studer 970 mixing console we now have an efficient audio mixer that is also well suited for disk jockey mode.

Conclusion

At the 80th AES convention in Montreux we participated not only with the largest exhibition stand ever but also with the most comprehensive demonstration of system controllers and a large number of new products that represent a remarkable thrust of innovation.

Marcel Siegenthaler

Modular Sync System for Film, Video and Audio Post Production

Multi Machine Control Systems from STUDER

A few years back STUDER has introduced the TLS 4000 Synchronizer with a control unit for simple synchronization applications. The new STUDER Central Controllers SC 4008 and SC 4016 connect into TLS 4000 Synchronizers, with the capability to control up to 8 respectively 16 machines.

In conjunction with 1/4" audio tape recorders with centre track time code (STUDER A810, A812, A820), this brings a new dimension to Video Audio Post Production.

Film Dubbing Technique without sprocket holes

A post synchronization set-up with ATRs is nowadays limited to 3 or 4 machines (typically 1 VCR, 1 Multitrack and 1 Two-track ATR). The STUDER Multi machine Controllers SC 4008 and SC 4016 facilitate the use of a dubbing technique as known from Film Post Production. Instead of magnetic film recorders a bank of fully synchronized two-track ATRs is used. From the central controller, the machines are offset (shifted) against each other very easily.

Film, Video and Audio Transports – All in Sync

As the STUDER TLS 4000 interfaces not only to STUDER machines, video recorders, audio recorders and sprocket tape machines can all be interlocked as well. This allows to also fully integrate magnetic film recorders – they are synchronized as if time code addresses were punched into the sprocket holes.

The following description will show the potential and the flexibility of the STUDER Controllers SC 4008 and SC 4016.

STUDER SC 4008 System Controller

The SC 4008 is capable to control up to 8 synchronized machines. Each machine is equipped with a TLS 4000 Synchronizer. Most features of the well-known TLS 4000 Synchronizer can be accessed from the central controller. In addition, up to 10 non-synchronous devices can be event-started from the SC 4008. A Time Code Generator/Reader is also integral part of the SC 4008 controller system.

The Control Panel has been designed for utmost operational efficiency. In order to avoid awkward double functions, a relatively large number of keys has been employed. Dedicated function keys, grouped together in functional blocks, represent the basic priciple to an extremely easy-to-learn control panel.

Modular Conception – Tailored to your needs

- Basic System: 4-Machine Controller:
  In its basic configuration the SC 4008 is capable to control up to 4 machines. Fig. 1 shows a typical machine set-up for this basic version.

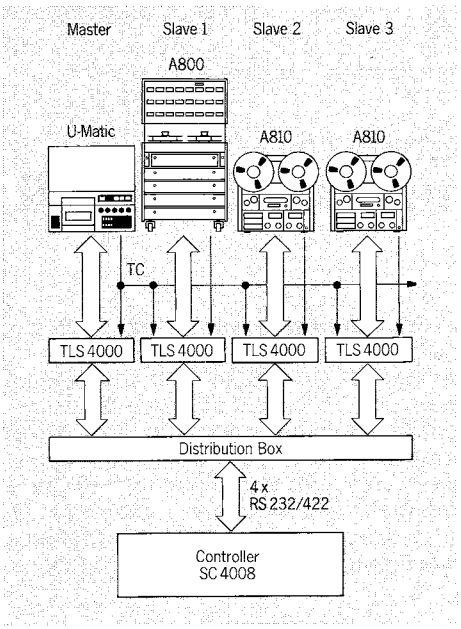


Fig. 1: SC 4008 Basic VAPP System with four machines.

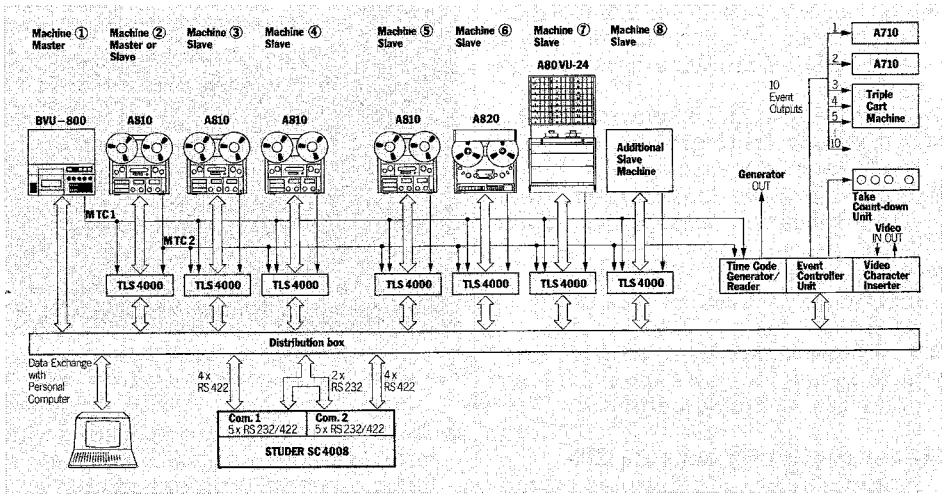


Fig. 2: SC 4008 Complete System Configuration with eight synchronized machines, event controller for 10 machines, TC-generator, video character inserter and data exchange.

- Direct Master Control:
  Some video machines offer the possibility to realize a direct control from the SC 4008; this consequently eliminates one TLS 4000 which is usually required for the master machine.
- Upgrading Kit for 8 Machines:
  As the control panel is basically laid-out for 8 machines, a card is retrofitted in order to upgrade the controller to give full access to 8 machines.
- Time Code Generator/Reader:
  A comprehensive TC generator/reader is available, featuring a high speed reader, jam sync mode, generation of original TC addresses into the user bits portion of the new generated TC, etc. This generator can, of course, be fully operated from the SC 4008.
- Event Controller with 16 ports:
  The Event Controller features 10 event outputs progammable to start non-synchronous equipment such as cart-machines or CD-players. With a software option, the SC 4008 features a powerful multi event controller with a storage capacity of hundreds of events. The remaining 6 auxiliary event ports are reserved to drive an external jumbo take count-down unit for advanced applications.
- Take Count-down Unit:
  This external Jumbo Display features 3 count-down lamps and a take lamp indicator. A built-in buzzer can also be activated if so required.
- Video Character Inserter:
  An optional character inserter allows to insert one or two data fields into the video picture, such as showing the time and user bit portion of master time code. In addition, there is a provision to facilitate take count-down indication 3, 2, 1 into the video picture as well. Outside the take the video picture's brightness is reduced, giving a perfect take-visualisation for applications such as dialog replacement.
- VITC Reader/Translator:
  This option allows the SC 4008/TLS 4000 system to cope with Vertical Interval Time Code. The VITC signal is therefore translated into a LTC onto which the slave machines are synchronized.
- Data Exchange with PC:
  With this software option, data from or to an IBM personal computer can be downloaded. This makes it possible to preserve sessions data on a floppy disk, to get a print-out or to prepare an edit decision list (EDL) off-line.

Fig. 2 shows the full potential of the STUDER SC 4008 Audio Post Production System according to the above mentioned topics.

Hardware Conception

The SC 4008 Synchronizing and Editing System consists of the following units:

- TLS 4000 Synchronizer for each machine
- Controller cabinet with control panel and electronics comprising:
  - Three 8 bit microprocessors
  - Dot Matrix Fluorescent Display with 2 x 40 characters
  - Dedicated function keys arranged in eight blocks; all keys with built-in tally lamp
  - Additional status LEDs
  - 10 serial data ports which can be set to RS 232 or RS 422 mode. The baudrate is software-defined (normally 38.4 kBaud).

The controller cabinet can either be equipped with 19" rack mount ears or wooden side panels (for table top use).

- 19"/3U Rack with the power supply and a connection distribution field for the up to 8 TLS 4000.
- 19"/3U Rack equipped with:
- Time Code Generator and Reader
- 16 Event Ports
- Video Character Inserter
- VITC Reader/Translator

Operational Features
Fig. 3 shows the Control Panel Layout of the SC 4008 Controller. Following is a summary of the controller's main features:

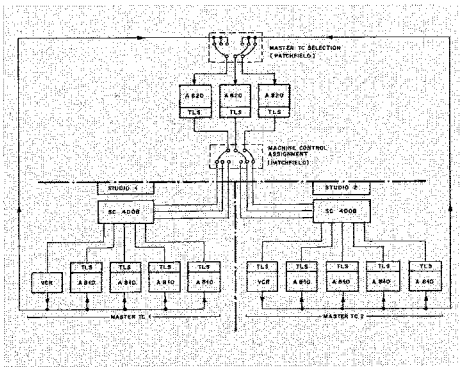


Fig. 4: Flexibility with 2 Studios which have access to a pool of common machines.

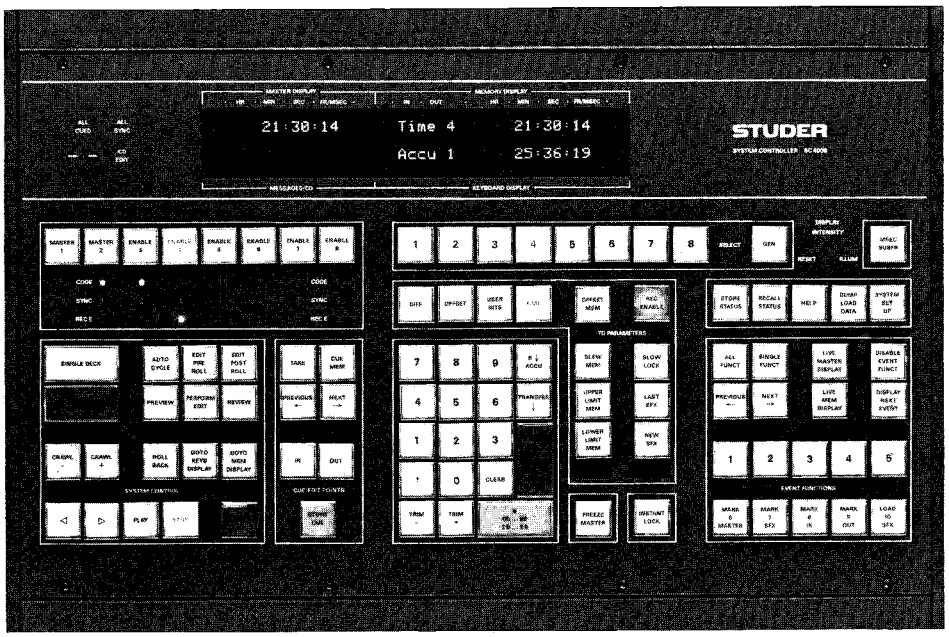


Fig. 3: Control Panel of SC 4008.

- Machine Control:
  Full remote control of all 8 machines, including crawl, rollback and GOTO functions. The dual task feature facilitates the control of a single machine whilst a group of machines is executing an edit sequence.
- Status Display:
  Comprehensive system status indications with push button tallies, LEDs and display section.

The 2 x 40 characters display provides the following information:
- Permanent display of the master time
- Memory display window for Cue points, offsets, events, etc.
- Keyboard display showing manual keyboard entries
- Message display for various system status information.

- Synchronizer Functions:
  Access to all important synchronizer functions is provided with single key strokes. This includes ENABLE (Lock), slow lock, slew, display of time or user bits of any machine, etc.
- Offset entering:
- Automatically (on-the-fly capturing or from cued position).
- Via keypad with add and substract possibility.
- Fine adjustments with TRIM keys.

- Cue/Edit Points:
  Manual or "on-the-fly" storage of up to 100 Cue points. Any two of these Cue points can be assigned as IN and OUT points of a TAKE for all edit functions. Rapid change to a new TAKE with PREVIOUS and NEXT. IN and OUT points can be easily modified with the help of the TRIM keys.
- Edit Functions:

A predefined take can be executed in the following three edit modes:
- PREVIEW (full rehearsal of Edit)
- PERFORM (execution of Edit)
- REVIEW (playback of Edit)

With the AUTO CYCLE key the above edit functions become repetitive. Edit preroll and postroll durations are, of course, programmable.

- Master Machine Selection:
  A switch-over between two Master machines is possible without any interconnection change. Basically all other machines can also be selected as Master, this, however, requires to repatch the master time code line.
- Event Functions:
  A special push button field is provided for the 10 Event Functions. The operation is therefore possible without double functions – even in case of the sophisticated Multi Event Processors Software Option.
- Special Facilities:
  For track laying often required key sequencies are provided for applications such as sound effects assembly or audio track conforming.
- User friendly Conception:
  The elimination of double functions, as the basic principle combined with interactive help messages, leads to an extremely easy-to-learn operation.
- Operational Flexibility:
  The system set-up mode provides many user definable features. The programming is completely menu driven.
- Battery back-up:
  All stored data are preserved in a battery-buffered RAM. Power failures have therefore no affect to your session data.

System Flexibility
The Studer Sync Systems with distributed intelligence in form of TLS 4000 Synchronizers attached to each machine have the great advantage of being easily expandable. One may start with a simple 3 machine system and upgrade it with more machines just when required so.

A further possibility is the potential to realize several set-ups which share some common machines. Fig. 4 shows an example of a studio complex with two studios, each equipped with a SC 4008 controller. Each studio is equipped with a number of machines and has in addition access to a central machine room.

Through a patch field any machine out of this pool of machines can then be assigned to the two studios.

STUDER SC 4016 System Controller

The complex task of film, video and audio post-production requires a modular, flexible and easy-to-operate system. A modular design enables the user to select from a variety of film, video and audio machines to configure a system that conforms to individual requirements. The STUDER SC 4016 is based on the SMPTE/EBU control bus for communication between system controller and up to 16 peripheral devices.

Supported by the software of the system controller, a very intelligent and easy-to-understand operating concept has been implemented using only a limited number of operating keys. An important feature is the fact that the alphanumeric displays are integrated in the operating keys.

System Overview

An overall block diagram of a typical system is shown in Fig. 5.

- Up to 16 machines are connected through a single serial SMPTE bus line to the SC 4016. Each machine controlled by the system requires the TLS 4000 synchronizer.

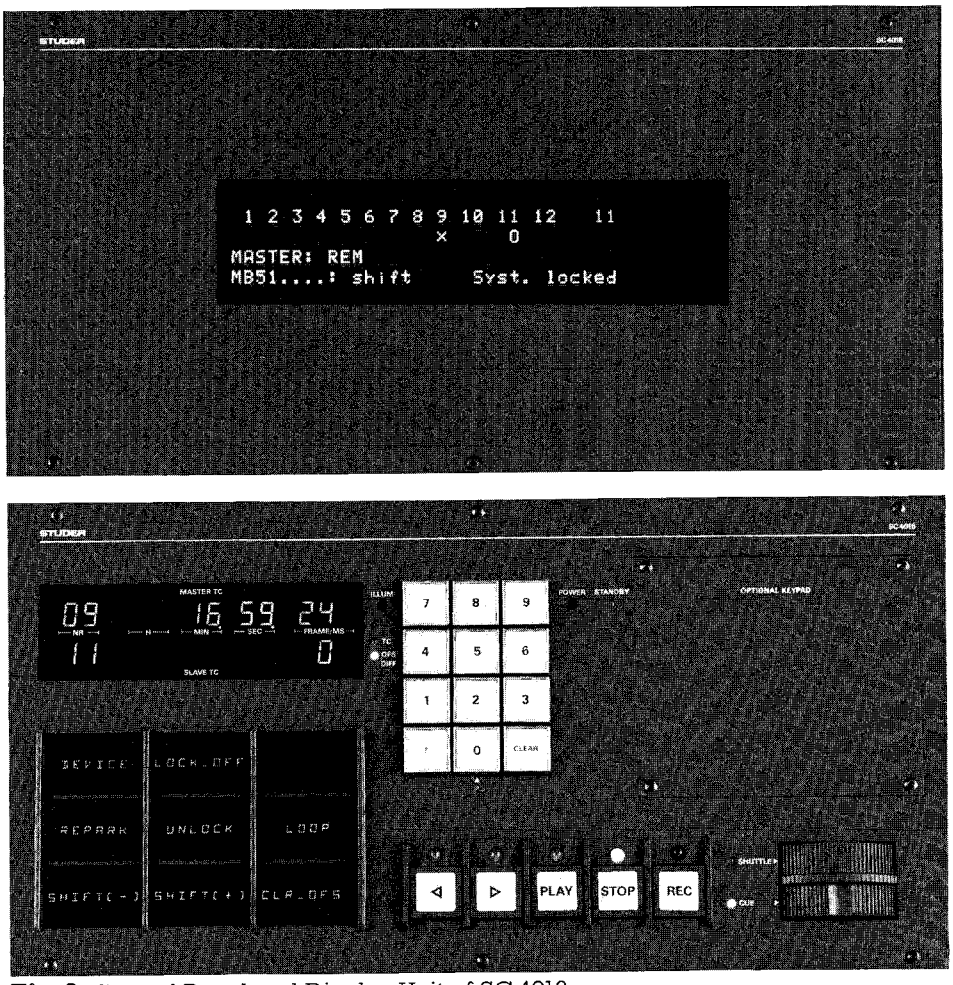


Fig. 6: Control Panel and Display Unit of SC 4016.

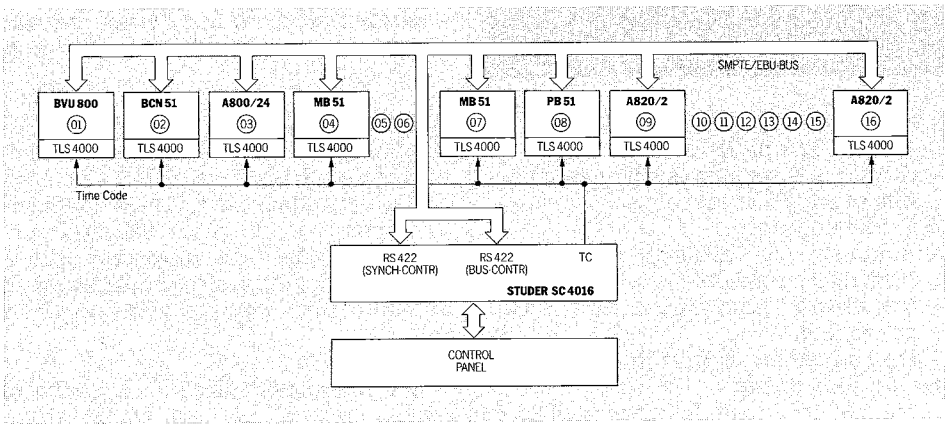


Fig. 5: SC 4016 Block Diagram of a typical system.

- A Time Code Generator built into the system controller is used as virtual system master. This solution has the advantage that each machine in the system can be the master machine. In fact, the master machine is also a slave, locked to the virtual system master with zero offset.
- The controller SC 4016 is the heart of the system. It can control the peripheral devices using only SMPTE bus interface and virtual system master TC-line. Two RS 232 ports can be used for communication with optional devices.
- In a more complex system a floppy disk is used for data transfer between SC 4016 and a computer or other intelligent devices. For example, Cue List or Edit Decision List (EDL) can be performed on a computer in advance and stored on floppy disk. This kind of data transfer eliminates the need for computer on-line operating in the studio.

A very important aspect of the system is the human interface (see Fig. 6). To perform an easy-to-operate system, a limited number of just 8 operating keys with built-in alphanumeric display is used. The keys are controlled by the software allowing the system controller to define functions which may change from operating step to operating step. The operator goes through several menus and has to take care only of functions which really can be used during different operating modes.

Fig. 7 shows the complete block diagram of the modular post production system with the STUDER SC 4016 controller. As one can see in this block diagram, a time code generator for independent use can also be controlled from the SC 4016. An optional character inserter and a take count-down unit as mentioned in the SC 4008 description is available as well.

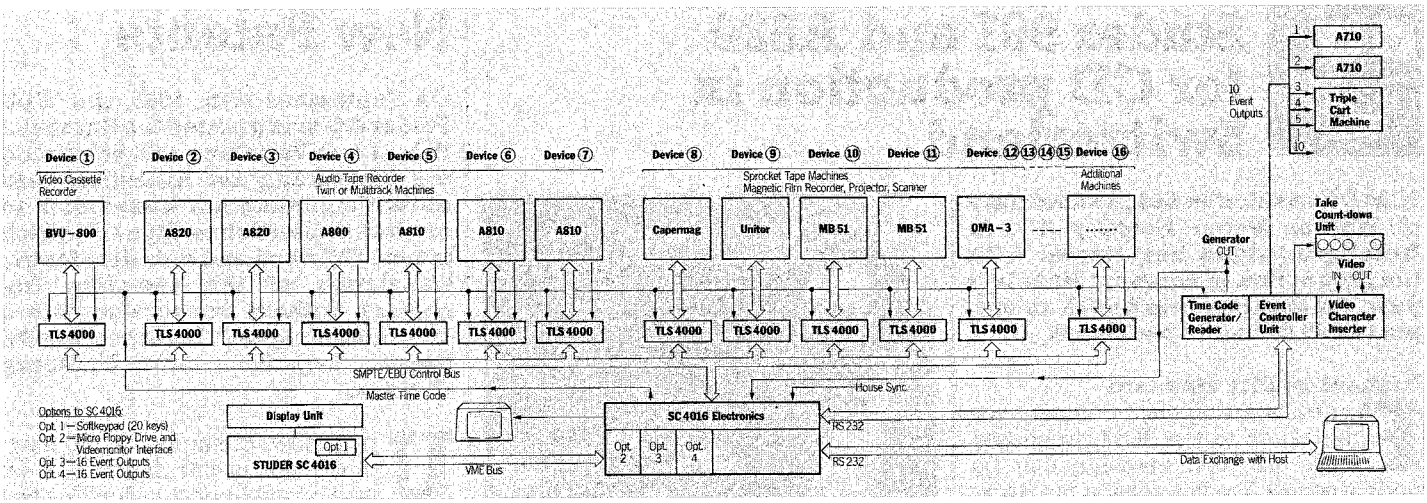


Fig. 7: SC 4016 Modular Post Production System with synchronized machines, event outputs, TC-generator, video character inserter and video monitor interface.

System Capabilities

- All tape synchronizing tasks for different transports used in the system are performed by the TLS 4000.
- Master and Slave designation may be reprogrammed at any time from the controller without need for re-cabling.
- Complete remote control, including GOTO-function and machine positioning with Shuttle and Cue and status display capability, is provided. The system permits the remote control of an independent machine during the synchronous running of several transports locked in a group.

- Comprehensive system status display:
  - SMPTE bus status for each machine
  - Master or Slave indication
  - Locked
  - Synchronism achieved
- Offset entering:
  - Automatically (instant lock)
  - via keypad
  - with trim keys
- Edit points entering:
  - On the fly
  - with numerical keypad
  - Trim (+/– Frame, +/– sec.)
- Looping (Cycle) Function with automatic Rec-IN and Rec-OUT is provided. The system's preroll and postroll duration is user programmable.

System Hardware

The SC 4016 synchronizing and editing system is consisting of the following units:

- TLS 4000 synchronizer for each machine
- 19"/6U Rack with power supply and VME bus based electronics, comprising (see Fig. 8):

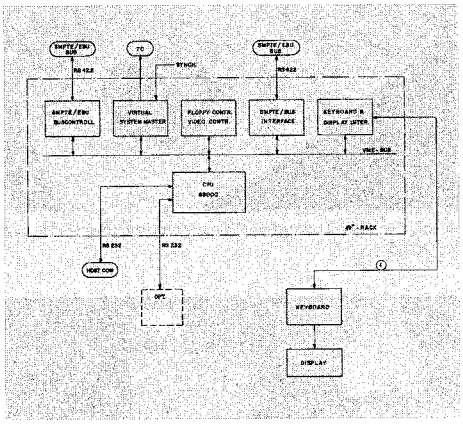


Fig. 8: VME Bus based system.

  - 16 Bit computer board
  - Two 8 Bit microprocessors: SMPTE bus controller and SMPTE bus interface
  - TC generator as virtual system master
  - Optional floppy drive and video monitor interface
  - Optional event control units
  - Interface for control panel display unit
- Control Panel with
  - Softkey section
  - Transport control
  - Numerical keypad
  - Display for Master and Slave time code
  - Optional keypad with 20 additional softkeys
- Display unit with 4 x 40 characters dot matrix fluorescent display

SMPTE/EBU Control Bus

The function of the SMPTE Bus is to establish connection between operational controlling and controlled devices.

The system is designed for the remote control of 16 TLS 4000 devices by one controlling device (SC 4016). The supervisory protocol conforms to SMPTE Recommended Practice 113. The control messages transmitted on the bus are non-standard STUDER TLS 4000 messages.

A more detailed description of the SMPTE/EBU bus will be given in one of the next issues of SWISS SOUND.

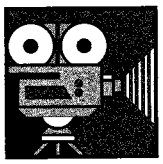
Conclusion – Spoilt for Choice

With the two new system controllers SC 4008 and SC 4016 STUDER has chosen two different approaches particularly with respect to the operational conception.

The SC 4008 follows the principle of dedicated function keys with a consequent elimination of double duty keys. The SC 4016 features a unique "softkey" philosophy which is completely menu driven.

The intention behind these different solutions is that we want to offer alternatives – **and let the customer choose ...**

Heinz Schiess



Studer 901 and A820 for CD production in Switzerland

ICM Diessenhofen Ltd., a subsidiary of Werner Weber Holding AG, in Baar/Switzerland has started with the production of compact discs last year, for the time being with an output of 250,000 units per month.

Highest quality standard

For transferring the incoming master tapes to the PCM processor, only the best machine can be good enough. For this reason the Swiss ICM company has decided to use the latest technology available with a Studer tape recorder A820 and a Studer mixing console 901 A.

The principal features of the A820 are:

- Four tape speeds
- Switch-selectable NAB/CCIR equalization
- Down-loadable audio alignment parameters for all tape types via serial interface
- Externally alignable head azimuth
- Fast change over from 1/4 to 1/2" tape
- Mountable reel sizes up to 14" in diameter

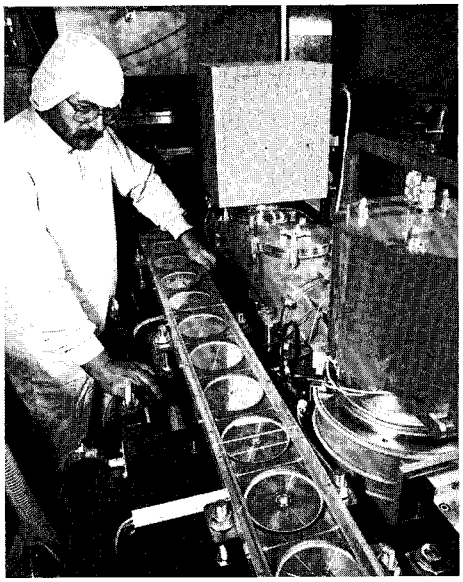
The technical data of the Studer mixing console 901 A are excellent and exceed those of a digital tape recorder by far. The signal-to-noise ratio from an input to the master output with a gain factor of 1 is over 98 dB! The mixing console 901, configured almost exclusive with standard modules, is not only a link between the effect machines and the PCM processor but also satisfies all requirements for monitoring the edited digital master tape from the U-matic as well as all other external audio sources.

Delicate production method

In the new Diessenhofen plant a far higher output of CDs is possible by employing the injection molding technique. The most difficult problem in the production of CDs is dust. For this reason the workers wear protective suits and headgear. In addition a small overpressure is produced in the production rooms by injecting clean air. Most manipulations are performed by robots and handling devices. The only time the CD is touched is as a finished product in the final inspection.

Even greater exactness is required in the production of CD ROMs which

A Studer A820 transfers the incoming mastertapes to PCM.



View of the CD production facility.

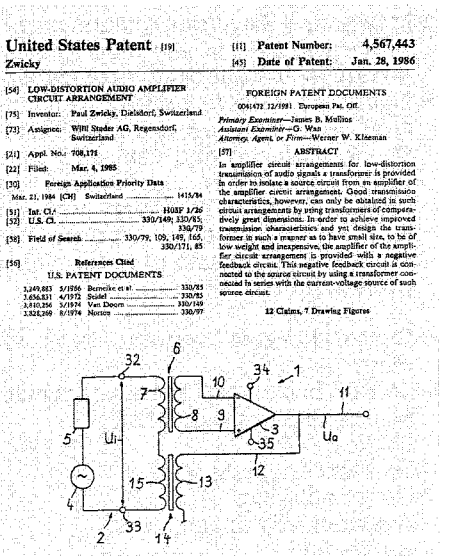
ICM plans to start up in the course of this year. CD ROMs are a new type of electronic data storage medium. The capacity of such a ROM is around 100 million words which corresponds to some 150,000 typewritten pages or the content of 10 encyclopaedias.

Bernhard Kohler

New Patents

On September 17th, 1985, the Willi Studer AG was granted the European Patent for "Verfahren und Schaltung zur Umsetzung der Abtastfrequenz unter Umgehung der Konversion in ein kontinuierliches Signal" which means "Method and circuitry for the translation of the sampling frequency without conversion into a continuous signal". Inventors are Dr. Roger Lagadec and Dr. Henry O. Kunz.

Up to now, changing of the sampling rate in the digital domain was possible only as long as two sampling rates were related at a fixed integer. In all other cases, it was necessary to convert to an analog signal, i.e. digital-analog-digital conversion was required; this resulted in quality deterioration. The new, patented method makes



United States Patent [19]
Zwicky

[11] Patent Number: 4,567,443
[45] Date of Patent: Jan. 28, 1986

[54] LOW-DISTORTION AUDIO AMPLIFIER CIRCUIT ARRANGEMENT

[75] Inventor: Paul Zwicky, Dielsdorf, Switzerland

[73] Assignee: Willi Studer AG, Regensdorf, Switzerland

[21] Appl. No.: 708,171

[22] Filed: Mar. 4, 1985

[30] Foreign Application Priority Data
Mar. 21, 1984 [CH] Switzerland 1415/84

[51] Int. Cl.4 ..... H03F 3/26
[52] U.S. Cl. 330/149; 330/85; 330/79
[58] Field of Search 330/79, 109, 149, 165, 330/171, 85

[56] References Cited
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FOREIGN PATENT DOCUMENTS
0041472 12/1981 European Pat. Off.

Primary Examiner—James B. Mullins
Assistant Examiner—G. Wan
Attorney, Agent, or Firm—Werner W. Kleeman

[57] ABSTRACT

In amplifier circuit arrangements for low-distortion transmission of audio signals a transformer is provided in order to isolate a source circuit from an amplifier of the amplifier circuit arrangement. Good transmission characteristics, however, can only be obtained in such circuit arrangements by using transformers of comparatively great dimensions. In order to achieve improved transmission characteristics and yet design the transformer in such a manner as to have small size, to be of low weight and inexpensive, the amplifier of the amplifier circuit arrangement is provided with a negative feedback circuit. This negative feedback circuit is connected to the source circuit by using a transformer connected in series with the current-voltage source of such source circuit.

12 Claims, 7 Drawing Figures

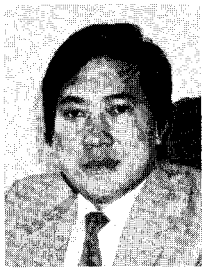
the conversion in the digital domain possible.

Another patent – this time granted in the USA – carries the date of January 28th, 1986. Paul Zwicky is the inventor; the patent with the original title "Low-distortion Audio Circuit Arrangement" concerns the improvement of the common mode rejection factor in audio circuits for microphone inputs. The desirable value of 120 dB can be reached only when utilizing transformers. The patented circuit reduces the non-linear distortion performance of such transformer circuits to a barely measurable level. Frequency response in the low-frequency region and phase-modulation are outstanding.

The Studer Group of Companies

"Who is who"

This column has been reserved for introduction of personalities of our affiliated companies and representatives in Europe and Overseas.



David F.C. Ling

Managing Director of Studer Revox Far East Ltd., Hongkong ● born 1949 and grown up in Hongkong ● after compulsory school, studies of electronics at Hongkong Polytechnic ● graduated Major in the field of Electronics & Telecommunications in 1969 ● married, one son ● joined the Studer group in 1970.

After graduation, David Ling took up work in a large engineering and trading company selling electronic equipment. He joined Studer Revox (HK) Ltd. in 1970 to establish a modern service centre with the sporadic assistance of the Swiss parent company. When business in the Far East increased, he became chief technician at the Hongkong Studer Revox organisation and faced the market's most advanced audio equipment: the Studer A80 new generation studio machine that took a successful course in the forthcoming decade. It was this model, the 2-channel version, that gave David excellent experience in his new position.

Although China's gates were still closed to the Western commercial world, David Ling visited the country to look after Studer Revox equipment that had been purchased on a rather irregular basis and in smaller numbers. In 1975, Studer Revox of Hongkong obtained pilot order by a Peking film studio for accommodation of complete 8-track studio facilities and other orders for some 20 Studer A80 machines of the pilot-tone version. His trips to the great Chinese country became more frequent and were no longer dedicated to maintenance and servicing of Studer Revox equipment only: David Ling got into the exciting area of sales acquisition and proved to be a top-class sales engineer. His travels took him to the Asiatic markets; he visited the Philipines, Taiwan, Korea, Singapore, Malaysia, Indonesia and Thailand in his mission as a technical sales and service engineer.

In 1980, the Hongkong organisation was turned into "Studer Revox Far East Ltd." and this first day of January five years back has opened a remarkable path to success, plastered with hard work and utter dedication. The company team grew to over 20 employees whereby his very first assistants in the early days were his brother Peter and Rebecca Ng who had both joined him in the seventies. David Ling as Managing Director of the new organisation had meanwhile married Denia Chang from Taiwan, daughter of the Taipei Studer Revox distributor, who takes an active part in all administrative and financial matters of the company.

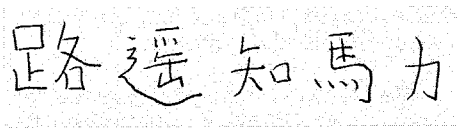
The markets-in-charge were covered with great activities and David Ling is proud to state that almost all recording studios, radio and TV stations in Hongkong operate Studer Revox products; the company has meanwhile become the major supplier of the most advanced and comprehensive range of audio products to radio, recording and film studios as well as to cassette duplicating plants in Hongkong and the P.R. China.

David Ling is determined to stay near success; in his opinion, it is hard work anyway and includes everyone in the company. He likes to run his organisation in a family-like manner and selects staff carefully as regards their skill, and also in view of long-term employment. Company premises have been organised to make the crew feel happy at work: on the top floor of a 25-storied building in the city of Hongkong, David Ling heads Studer Revox Far East family with great concern and efficiency.

He confirms that he finds it a pleasure to convince customers to buy the best quality product he can get – Studer Revox. And he likes passing on technical advice and looking after problems and their elimination. It is his first and foremost principle to keep the promises he makes to customers as regards our products and their availability.

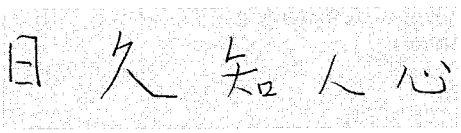
With a nine-months old son to look after, the Lings stick to family life. David Ling likes music and reads a great deal – also about audio electronics.

After fifteen years of experience in the competitive environment of the audio market, he quotes a saying a Chinese business friend once stated when determining his preference for Studer Revox products:



"You have to take a long road to come to realize a horse's strength"

and



"It takes good time to know a man's heart"

Renate Ziemann

Joint Venture Philips/Studer

On April 14, 1986 at a press conference during NAB Convention in Dallas, the biggest professional broadcast and television exhibition in the world, the following announcement has been made:

"Joint Venture for Compact Disc-related Professional Studio Systems.

Willi Studer AG and N.V. Philips Gloeilampenfabrieken intend to form a joint venture on a 50/50 basis for the research and the development of Compact Disc-related professional studio systems. The joint venture is intended to exploit the synergism attained by cooperation of the two companies in research & development resources, and know-how in product engineering.

The parties expect in this way to optimize their marketing efforts both in product range and in distribution channels.

The joint venture will not affect ongoing independent developments by both companies in the areas of magnetic tape recording and optical disc mastering systems.

Further, Studer and Philips have agreed to market the Philips Professional CD-player LHH 2000 and Philips subcode editor LHH 0425 in the U.S.A. by

Studer Revox America, Inc., the wholly-owned Studer U.S. subsidiary."

We will be able to give more details about this joint venture agreement in the next "SWISS SOUND" issue. Both companies make clear by that agreement that cooperation in the field of developing professional Compact Disc recording and playing systems within a commonly owned company will be of big importance.

Eugen Spörri

Time Code dates back to 1968
According to their own statement, the Swiss Stellavox company of Hauterive was first to introduce the center track time code as a novum worldwide. In a leaflet, printed back in 1968, this method is described as "Synchrotone". Monsieur G. Quellet, owner of Stellavox, explains that a patent was purposely not applied for so as to have centre track time code develop into an international standard.

Right on Success

Studer worldwide

France

Radio France

Another order for one Studer mixing console 904 was placed by Radio France. A series of magnetic tape recorder machines Studer A810 was supplied recently; the French radio company already operates some 40 tape machines of the A810 type. Two mixing consoles Studer 962 were delivered in March this year, and another four 962 models subsequently ordered.

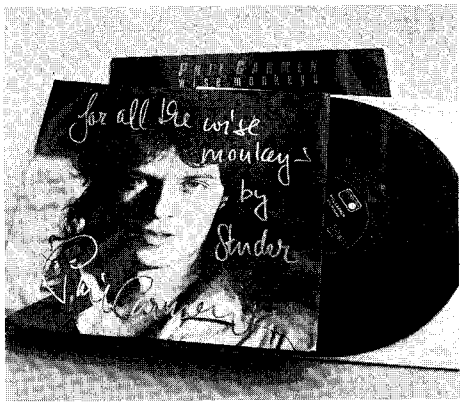
Switzerland

Schwarzfilm-technik AG

Still in April this year, the company in Ostermundigen will receive one Mixing Console Studer 906 A-30/24 VCA, a multichannel mixer in a special version, for motion picture sound re-recording in Dolby-stereo with fader automatisation (Mastermix system). Also supplied will be one Studer A800-24-2" Mk III machine, two Studer A810-2 TC VUK HS tape recording machines and five TLS 4000 for A800, A810, Sondor OMA-S and Perfectone Unitor. The consignment will be completed by a System Controller SC 4008 for eight machines.

Picar Recording Studio

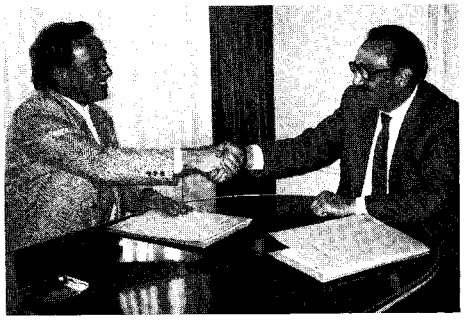
Only recently, the studio received a Studer multichannel mixing console of the 904 A type, 36+4/24/6, in-line technique with integrated patchbay, autolocator, channel remote control and VCA-fader with Mastermix automation on floppy disc. In addition, one each Studer A80-24/2 and A80 RC-0.75 VU were supplied. Picar Recording Studio of Stein, at the Rhine river, is owned by the well-known pop musician Phil Carmen.



For the production of the new Carmen LP "Wise Monkeys" Studer equipment was used.

Turkey

TRT Ankara



Rolf Breitschmid of STI and Mr. H. Gürsoy, Technical Deputy of TRT, signing the contract.

In March this year, a contract was signed by the Turkish Radio and Television Company (TRT) for renewal of their studios in Istanbul, Ankara and Izmir. The comprehensive order includes Studer mixing consoles 900, 961, 962 and periphery equipment in the value of approx. 3 million Swiss Francs. Delivery has been scheduled in three phases: August, October and November 1986. In addition, Studer takes care of installation work on site as well as technical and operational training.

Forthcoming events

1986 June 12 - 14
SIBC, Seoul

1986 June 24 - 27
Sound & Vision 86, SMPTE, Sydney

1986 June 25 - 27
APRS, London

1986 August 27 - Sept. 1
Fera, Zürich

1986 November 13 - 16
AES Convention, Los Angeles

1986 November 19 - 21
Inter-BEE, Tokyo

1986 November 19 - 22
Sound Engineers' Convention, Munich

1986 December 16 - 18
CTEAP, Paris

From the printers

10.26.0420 **40 W Amplifier** leaflet (e/g/f)
10.26.0430 **A812** brochure (g)
10.26.0440 **A812** brochure (e)
10.26.0820 **Mixing console 963** PI 17/86 (g)
10.26.0830 **Mixing console 963** PI 17/86 (e)
10.26.0840 **Mixing console 970** PI 18/86 (g)
10.26.0850 **Mixing console 970** PI 18/86 (e)
10.29.0730 **Piccolo-Flat** leaflet (g/e/f)
90.1640 **Revox Agora B** Test reprint (g)
90.1660 **Revox B215** Test reprint (e)
90.1680 **Revox B215** Test reprint (f)

PI = Product information
TI = Technical information
OI = Operating instructions
SI = Service instructions
SD = Set of diagrams

Sets of diagrams, operating and service instructions available at nominal charge.

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