

INTRODUCTION

The Series 12 mixing console is designed for full stereo operation throughout, but can be used in a mono mode if required. It is primarily designed for use in applications where a simple operation is required such as in busy newsrooms, dubbing suites, and outside broadcasts. The mixer will fully meet IBA technical specifications and may be used in a number of different operational configurations. It is ruggedly constructed and its circuit design is of modular construction.

It consists of three components: the mixer, power supply, and optional Penny and Giles fader pack. Each component may be 19" rack mounted and mounting brackets with handles are supplied if specified. Alternatively, the system may be fitted in console woodwork or a flight case. The mixer and power supply may either be used on their own or linked with the fader pack which can be retro-fitted after purchase.

The mixer is equipped with two microphone inputs, one switchable mic/line input, a mono line/telephone input which generates a clean feed of mixer output, four stereo line inputs, and a stereo line input selectable between four stereo sources. It also has three separate monitor feeds: guest headphones, presenter headphones, and monitor loudspeakers, each with their own individual volume controls.

This manual gives a detailed description of the mixer and all the information necessary for the correct installation and maintenance of the equipment.

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C O N T E N T S
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L I S T O F I L L U S T R A T I O N S

This document is in three sections.

Series 12 Manual
issue 2

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Soundex drg

SECTION 1

CHAPTER 1
TECHNICAL SPECIFICATION

CHAPTER ONE - TECHNICAL SPECIFICATION

ELECTRICAL SPECIFICATION

Frequency Response	From input through to stereo main output at any level below clipping loaded with 10k ohms. 20Hz - 20KHz: +0, -1dB
Normal Operating Level	0dBu (0.775 volts rms)
Input Impedance	Microphone inputs are transformer balanced and fully floating. Minimum input impedance 1k ohm. Stereo line level inputs are electronically balanced. Minimum input impedance 10k ohms.
Input Sensitivity	For normal operating level -40dBu min to -74dBu max (mic) +10dBu min to -10dBu max (line)
Output Impedance	Outputs are transformer balanced and fully floating. Source impedance is approximately 75 ohms. Minimum recommended load on all outputs 600 ohms. Rated load 10k ohms.
Maximum Output Level	+22dBu, 20Hz - 20kHz
Input Headroom	+28dB
Total Harmonic Distortion	From input through to stereo main output +8dBu, +20dB gain 100Hz to 10kHz typically 0.05%

Noise

RMS 20Hz - 20KHz

microphone E.I.N. 200 ohm source
127dBm

stereo main output, inputs faders
closed -79dBm

stereo main output, 1 line channel
fader at 0dB -78dBm

stereo main output, 1 mic channel fader
at 0dB, 70dB gain -54dBm

Crosstalk

Interchannel and stereo crosstalk performance
exceeds IBA code of practice

Power Requirements

AC 100 - 115 volts, 220 - 250 volts,
45 - 65 Hz, 150VA max

supplying:

+/- 16 volts, 1.5 amps, dc (electronics)
+24 volts, 2.4 amps, dc (lamps and relays)

CHAPTER 2
I N S T A L L A T I O N

CHAPTER TWO - INSTALLATION

The Series 12 mixer is designed for inclusion within the furniture of a studio, flight case, or a 19" rack (refer to figure 2 for dimensions and support points). Space should be provided either beneath or behind the console for access to the socket panel (depending on socket panel location, refer to figure 1). All electrical connections, power, audio circuits, and console status controls are on the one panel (all connectors are plug-in type, refer to figure 7 for connection details). Room should be provided for cable to enter and leave via access holes in the furniture or flight case. So during the planning stage of the installation, a study should be made of the Series 12 to ensure that cable access to the console location is adequate.

2.1 CONNECTION DETAILS

2.1.1 POWER

The power system is a bipolar 16 volt amplifier supply to control crosstalk and noise and a 24 volt aux supply for lamps and relays. This places a restriction on the cable type and length fitted to the power terminals so the cable harness supplied should not be cut. The console power inlet is via a multiway connector. The AC power requirement is normally 220-250 volts, 45-65Hz. (For operation on other supplies refer to the electrical description section of this manual). Allow ventilation of the unit by providing clear space above it in the rack, do not cover the top. The case of the power supply is connected to ground (AC power earth) by the AC power cord. The DC output to the mixer does not contain this earth so the console must be earthed separately to either the mains earth or a technical earth if one is available.

2.1.2 EARTHING

The console audio common circuits and power supply 0 volt circuits join with the console frame electrical earth at the power connector earth star point. There is an earth terminal provided at this point on the connector panel and the technical earth for the console should be connected to this point. All audio connectors include an audio ground circuit. This is pin 1 of 3 pole XLR types and the sleeve contact of jack types. To avoid hum loops when connecting audio circuits, do not join pin 1 of XLR connectors to the plug case terminal.

2.2 AUDIO CONNECTIONS

2.2.1 AUDIO INPUTS (3 pin XLR types)

In all cases the input circuit is balanced across connector pins 2 and 3. Phase continuity between all balanced inputs and outputs is guaranteed by console design method. Either pin 2 or 3 may be standardised as "IN-PHASE". Absolute phase of inputs is pin 2 + phase. The input impedance for line is 10K ohms and for mic inputs is 1K ohms. For line inputs, optimum matching is obtained with external equipment having an output source impedance of 600 ohms or less. To operate with unbalanced equipment, the unused phase (normally pin 3) should be connected to pin 1, signal to pin 2, and screen to pin 1. When using channel line inputs with outside programme sources via cables rented from the telephone authority, suitable interfacing equipment approved by the authority must be added externally to the console.

2.2.2 AUDIO INPUTS (20 pin multiway connector)

An auxiliary input for 4 external stereo programme sources, eg: taperecorder outputs and other studios etc, is also provided on this console. The circuits connect via a DIN spec 20 pin multiway connector which is wired according to the table shown in figure 7. The console loads the selected input circuit by a 10K ohms balanced connection. Unselected inputs are not loaded, nominal sensitivity is 0dBm.

2.2.3 AUDIO OUPUTS (3 pin XLR types)

In all cases the audio outputs are transformer balanced at line level, nominally 0dBm 1kHz "PPM 4". The outputs are on pins 2 and 3, phase information and operation with unbalanced external equipment is as described for audio inputs. The output impedance is approximately 75 ohms, and the optimum performance is obtained when bridging loads of 10K ohms or similar value are connected. Loads rated at 600 ohms will cause signal loss and high frequency losses due to mismatching. When connecting outputs to cables rented from the telephone authority, suitable interfacing equipment approved by the authority must be added externally to the console. The clean feed output is normally used in conjunction with the telephone channel. It is mixer output minus the telephone input signal.

2.2.4 CLEAN FEED BREAK POINTS (jack plug type B, small tip)

The clean feed break points are available so that if a cue programme send is required, it can easily be obtained. They can be linked together so that the telephone channel input appears on the clean feed output socket. The break points are present so that the mixer can be used with an external source switcher and when a cue programme is required, it can easily be obtained. For connection details, refer to figure 7.

2.2.5 HEADPHONE OUTPUT (jack plug type A large tip)

The Series 12 mixer has two internal headphone amplifiers, one for guests and one for presenter. The outputs to these amplifiers appear on the connector panel and an extra output socket for the presenter is sited on the front panel. The recommended impedance for headphones is 400-600 ohms. Tip = left, ring = right, sleeve = earth.

2.2.6 TALKBACK INPUT (9 pin D type connector)

There is provision for two talkback inputs to this mixer. They should be unbalanced line level 0dBm signals. To enable the talkback signal to be present in the headphones, a voltage-free loop is required to activate a relay in the monitor drive circuits of the console. There are two control circuits available, one for each talkback input. For connection details refer to figure 7.

2.2.7 TALKBACK OUTPUT (9 pin D connector)

There is provision for two talkback outputs from this mixer. They are unbalanced line level 0dBm signals. The two talkback non-latching send switches are mounted on the front panel next to the meter. When these switches are activated, a voltage-free closed loop is available for remote interfacing with other consoles to allow them to receive the talkback signal. There are two control circuits available, one for each talkback output. For connection details refer to figure 7.

2.3 EXTERNAL DC CONTROL

2.3.1 MUTING RELAYS (9 pin D connector)

There is provision for connections to be made to two voltage free loops which are activated when a microphone is live. These are normally used for the muting of external equipment, ie intercoms, and also for 'mic live' light drive circuits. To enable an on-air light to be activated, the auxiliary supply of 24 volts and 0 volts is available on this connector so that a relay, or similar, may be interfaced with the mixer. For connection details refer to figure 7.

2.3.2 CHANNEL REMOTES (9 pin D connector)

Each stereo channel has a remote stop/start function available so that equipment can be controlled from the console, ie turntables, cartridge machines etc. The stop/start pulses are momentarily closed voltage-free loops. In the case of channel 9, this function is only available when the auxiliary input switch number 4 is latched-in. For connection details refer to figure 7.

2.4 OPTIONAL FADER PACK

2.4.1 WITHOUT FADER PACK

The bottom row of switches act as channel on/off controls. In the case of a stereo channel, when the switch is activated to turn the channel on, a start pulse is available on its channel remote connector. When the channel is turned off, a stop pulse is activated. On microphone channels, as well as the channel being turned on, the auxiliary muting circuits are activated.

2.4.2 WITH FADER PACK

The bottom row of switches can now have two different functions. On the microphone channels, they still act as channel on/off switches and over-ride the fitted fader. However, in normal operation, the channel is left on and the microphone is controlled by the fader only. In the case of stereo channels, there are two different options which are controlled by a moveable link plug on each individual stereo board: option one is for the stop/start circuits to be controlled by the fader. In this case, the channel audio can still be turned on and off by the switch. Option two is that the channel audio is now only controlled by the fader and the switch becomes a remote start button only. The stop pulse, in this case, is activated when the fader is closed. For link operation refer to section 4.3, stereo channel circuit description. To gain access to these links, the bottom of the mixer must be removed. The link consists of a 7-way molex type plug and is situated about a third of the way up the stereo channel printed circuit board. To change options, the plug is reversed.

CHAPTER 3
MIXER OPERATION

CHAPTER THREE - MIXER OPERATION

3.1 METERING

The stereo meter is always dedicated to desk output except when a 'PFL'(prefade listen) switch is latched in on any input channel, then it automatically changes over to read 'PFL' so that a level can be set by the gain control on the channel. As soon as the 'PFL' switch is delatched, the meter reverts back to measuring desk output.

3.2 MONITORING

There are three ways of monitoring the mixer: two headphone circuits, presenter and guest; and monitor speakers. Each has its own independent level control.

3.2.1 PRESENTER HEADPHONES

The presenter headphones can either monitor desk output or an auxiliary input (if the monitor source switched is latched in) interrupted by 'PFL' when an input channel's 'PFL' switch is latched in. Talkback is also received as a total interrupt function.

3.2.2 GUEST HEADPHONES

The guest headphones are dedicated to desk output only and are not affected by either 'PFL', talkback, or monitor source functions.

3.2.3 MONITOR SPEAKERS

The speakers can either monitor desk output or an auxiliary input (if the monitor source switch is latched in). 'Auto PFL' is also available if the switch, marked 'auto PFL', next to the speaker level control is latched in. If not, only the presenter headphones are interrupted by 'PFL'. Talkback does not interrupt speaker monitoring.

3.3 MONO SWITCH

The function of this switch is to mono up the desk output, metering, and monitoring. It does this by halving the sum of the left and right hand channels.

3.4 LIMITER

This fixes the maximum output level of the mixer to +7dBm so that any peaks in input signals do not cause over-modulation of the transmitter.

3.5 TALKBACK OUTPUT

There are two separate talkback send controls which enable talkback to be sent to two separate sources independently. When these non-latching switches are pressed and held, audio is routed from channel one microphone pre-amp (channel one is normally presenter microphone) to the talkback destination. Talkback communication for the telephone channel comes from the same source.

3.6 OVERLOAD LAMP

The overload lamp serves two purposes depending on whether the limiter is switched in or out.

Limiter Out:

The overload lamp glows when signal levels at the mixer output are over +8dBm.

Limiter In:

The overload lamp will now glow when limiting is taking place. The brighter the lamp, the harder the limiter is working.

3.7 INPUT CHANNELS - WITHOUT FADER PACK

3.7.1 MICROPHONE CHANNELS

There are two dedicated microphone channels (positions 1 & 2) and one mic/line input (position 3) which is determined by a switch on the connector panel. When the switch is in line mode, as well as padding down the input, it also disables the local mute circuit for channel 3. The channel's audio signal and local muting is controlled by the 'channel on' switch. It is a non-latching switch that is pressed once for 'on' then again for 'off'. When the channel is turned on, the audio is routed to the main output and local muting is activated. In the 'off' position, by latching in the 'PFL' switch, an audio input level can be set by the channel gain control by means of the meter which will automatically switch over to meter 'PFL' level. When the 'PFL' switch is delatched, the meter will then revert back to desk output. When the channel is turned on, levels will then have been set for normal operation. If the input source is of largely varying levels, such as an outside broadcast interview, then the 'auto' switch should be latched in. This will then hold the broadcast level to within acceptable limits by means of an automatic gain control circuit.

3.7.2 TELEPHONE CHANNEL

There is one dedicated telephone channel (position 4) and the audio is controlled by the 'channel on' switch (as described in 3.7.1) except that no muting circuits are activated. When the 'PFL' switch is latched in, the incoming audio level from the caller can be adjusted. While in 'PFL' mode, communication with the source is available by pressing and holding in the non-latching talkback switch situated above the channel gain control. When the 'PFL' switch is latched-in, the caller does not receive a clean feed of desk output, only talkback when sent. When the 'PFL' switch is delatched, a clean feed of desk output is then sent. Talkback is still available, but it will be mixed with the clean feed output.

3.7.3 STEREO CHANNELS

There are five stereo channels, four of which are dedicated (positions 5 to 8) and one with a four position auxiliary input switch bank (position 9). The stereo channel audio is controlled by the 'channel on' switch (as described in 3.7.1) except that no muting takes place and a momentary start pulse is activated when the channel is turned on so that external equipment may be remotely switched on. When the channel is turned off, a stop pulse is activated to enable the external equipment to be remotely switched off. Remote stop/start pulses for channel 9 are only activated when switch position 4 of the auxiliary input switch bank is selected. ('PFL' is as described in 3.7.1)

3.8 INPUT CHANNELS - WITH FADER PACK

3.8.1 MICROPHONE CHANNELS

The operation of the microphone channels is as without fader pack except that the channel can be left switched on. Audio and muting are then controlled by the fader.

3.8.2 TELEPHONE CHANNEL

The operation of the telephone channel is as without fader pack except that the channel can be left switched on. Audio is then controlled by the fader.

3.8.3 STEREO CHANNELS

The operation is similar as without fader pack except that there are two options for remote stop/start control, depending on the position of the internal plug setting (refer to figure 24):

- 1) fader stop/start - the 'channel on' switch then acts as an audio on/of switch only.
- 2) push button start - the 'channel on' switch now becomes a push button start switch only. Audio is now controlled by the fader only. A stop pulse is then activated when the fader is closed.