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SERIES 10

USER GUIDE

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Introduction

Introduction

Precautions and Safety Instructions

Introduction

The Series 10 is a fully modular mixing console for local radio stations and smaller self-operated studios of national broadcasters. The system has been designed to accommodate the individual requirements of a station by providing flexibility and a choice of configurations.

The Series 10 is available in a 24 module-width frame with a capacity of 20 input channels (12 if fitted with a script space, the script space is 8 modules wide; or 14 if a 6-modules-width script blank is fitted) and a 32 module-width frame where more input channels are required. Note that the script tray is a dished compartment whereas the script blank is a flat plate on the same plane as the console panel.

Three types of input module are available:

Mono Input Module

Each module may be used for Mic/Line inputs. The module can be supplied with or without a 3-band fixed frequency EQ section.

Telco (Telephone Communication) module

In addition to outputting signals to the programme, each module provides for on and off-air telephone conversations with the Presenter, Guests or Producer. The module can be supplied with or without a 3-band fixed frequency EQ section.

Stereo Module

Each module accepts one of two switch-selectable stereo sources. One is the normal source, such as a CD player or cart. machine, which is hard wired to the multipin connector. The other may be an alternative or temporary source which is connected via XLR connectors. There are also connections for the remote operation of Start & Stop relays for both of the sources. The module can be supplied with or without a 3-band fixed frequency EQ section.

All inputs are fitted with peak signal detection to alert the operator to any impending headroom problems which could cause unwanted distortion.

Remote Controls

Remote controls are provided for cue lights and also 'on-air' lights for local and distant mics, and there are remote controls for cough muting and talkback routing. Remotes are provided for telephone hybrid control and for on-board talkback to cleanfeed. Off-air communication with the Caller can be set up from the Operator or the Producer. Stereo and mono modules (in line mode) have remote outputs for machine start and stop/re-cue.

Master and Monitor Module

There are two variants of the Master and Monitor module: the Production variant has the optional main Programme Faders and Effects Returns, the Broadcast version has neither. The Master and Monitor module also contains the auxiliary master level control; monitoring controls, for Presenter's headphones and loudspeakers, Studio headphones and loudspeakers; and communications inputs.

Module Options

Mono Input Module with EQ . . .	S10ME
Mono Input Module without EQ .	S10M
Stereo Input Module with EQ . .	S10SE
Stereo Input Module without EQ .	S10S
Telco Module with EQ	S10TE
Telco Module without EQ . . .	S10T
Production Master/Monitor . . .	S10OP
(with faders and effects returns)	
Broadcast Master/Monitor . . .	S10OB
(without faders or effects returns)	

The Meterhood

The meterhood conceals studio wiring and provides space for additional monitoring, loudspeakers, clock.timer,talkback and meter units.

It is equipped, as standard, with LED Master Meters. The following are optionally available:

- Large VU Master Meters
- Single Large VU Meter
- Small VU Meters
- Large PPM Master Meters
- Single Large PPM Meter
- Small PPM Meters
- RTW Bargraph Meter
- PFL/Talkback Loudspeaker Module
- Talkback Remote Module
- Timer Module
- Input Selector

Power Supply

The Series 10 requires a CPS150 power supply. This is available with an optional rack-mount front panel.

Precautions and Safety Instructions

General Precautions

Avoid storing or using the console in conditions of excessive heat or cold, or in positions where it is likely to be subject to vibration, dust or moisture. Do not use any liquids to clean the fascia of the unit: a soft dry brush is ideal. Use only water or ethyl alcohol to clean the trim and scribble strips. Other solvents may cause damage to paint or plastic parts.

Avoid using the console close to strong sources of electromagnetic radiation (e.g. video monitors, high power electric cabling): this may cause degradation of the audio quality due to induced voltages in connecting leads and chassis. For the same reason, always site the console power supply away from the unit .

Caution! In all cases, refer servicing to qualified personnel.

Handling and Transport

The console is a very rugged unit, designed for long service. However, care in handling and transportation will ensure a long and trouble-free life. If the console is to be regularly moved we recommend that it is installed in a foam lined flight case. At all times avoid applying excessive force to any knobs, switches or connectors.

Power supplies & cables

Always make sure that the power supplies have been set to the same source voltage as the mains supply.

Always use the power supplies and power cables supplied with the console: the use of alternative supplies may cause damage and voids the warranty; the extension of power cables may result in malfunction of the console.

Warning! Always switch the power supplies off before connecting or disconnecting the console power cable, removing or installing modules, and servicing. In the event of an electrical storm, or large mains voltage fluctuations, immediately switch off the PSU and unplug from the mains.

Always ensure that that you use the correct power supply for your console. Each Series 10 console requires the CPS150 power supply.

Signal Levels

It is important to supply the correct input levels to the console, otherwise signal-to-noise ratio or distortion performance may be degraded; and in extreme cases damage to the internal circuitry may result. Likewise, on all balanced inputs avoid sources with large common mode DC, AC or RF voltages, as these will reduce the available signal range on the inputs. Note that 0dBu = 0.775V RMS.

The microphone input is designed for use with balanced low impedance (150 or 200 Ω) microphones.

Caution! DO NOT use unbalanced microphones or battery powered condenser microphones without isolating the +48V phantom power - degraded performance or damage to the microphone may result.

Block Diagrams

Mono Input Module

Telco Input Module

Stereo Input Module

Master/Monitor Module

Block Diagrams

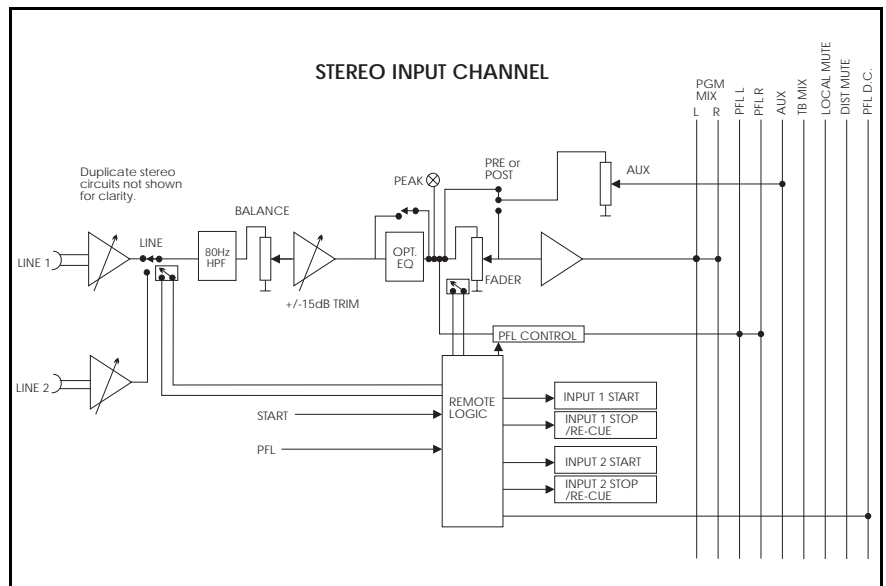
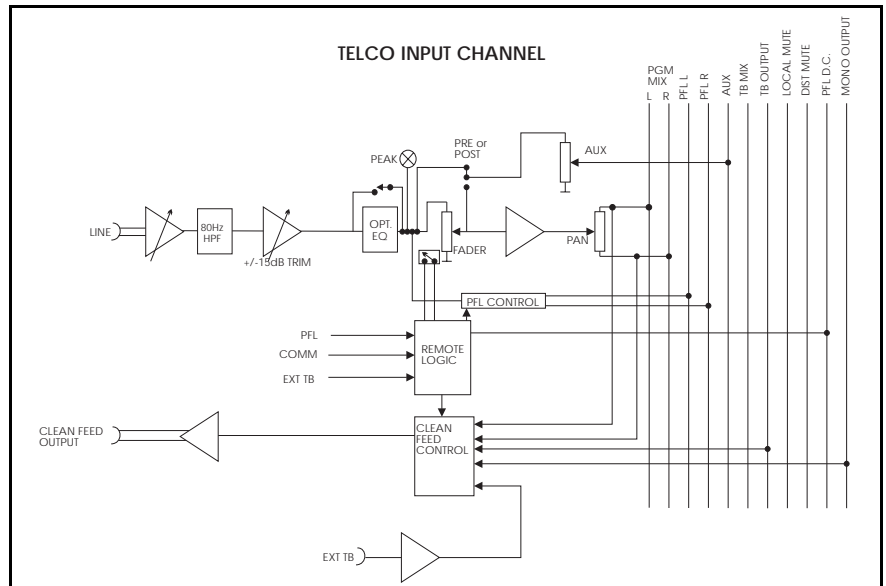
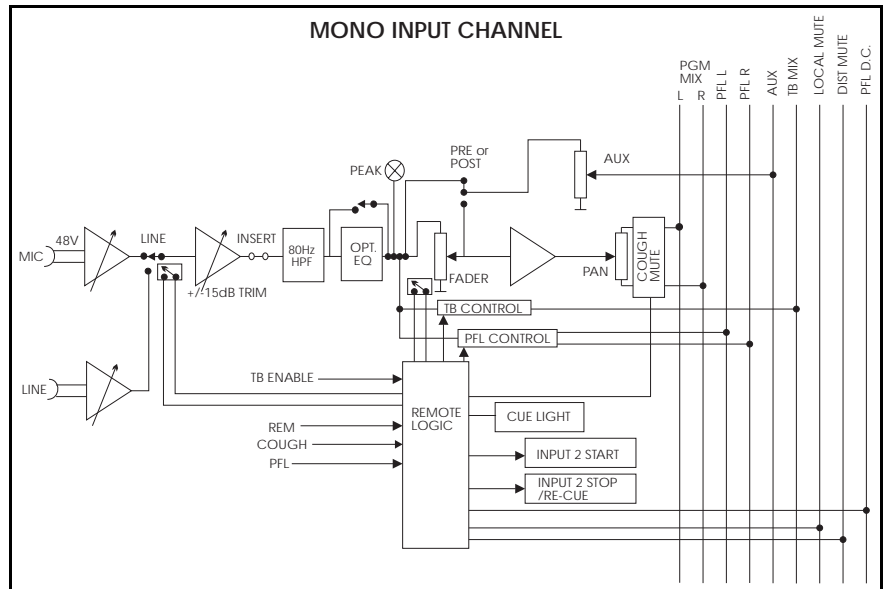
Mono Input Module

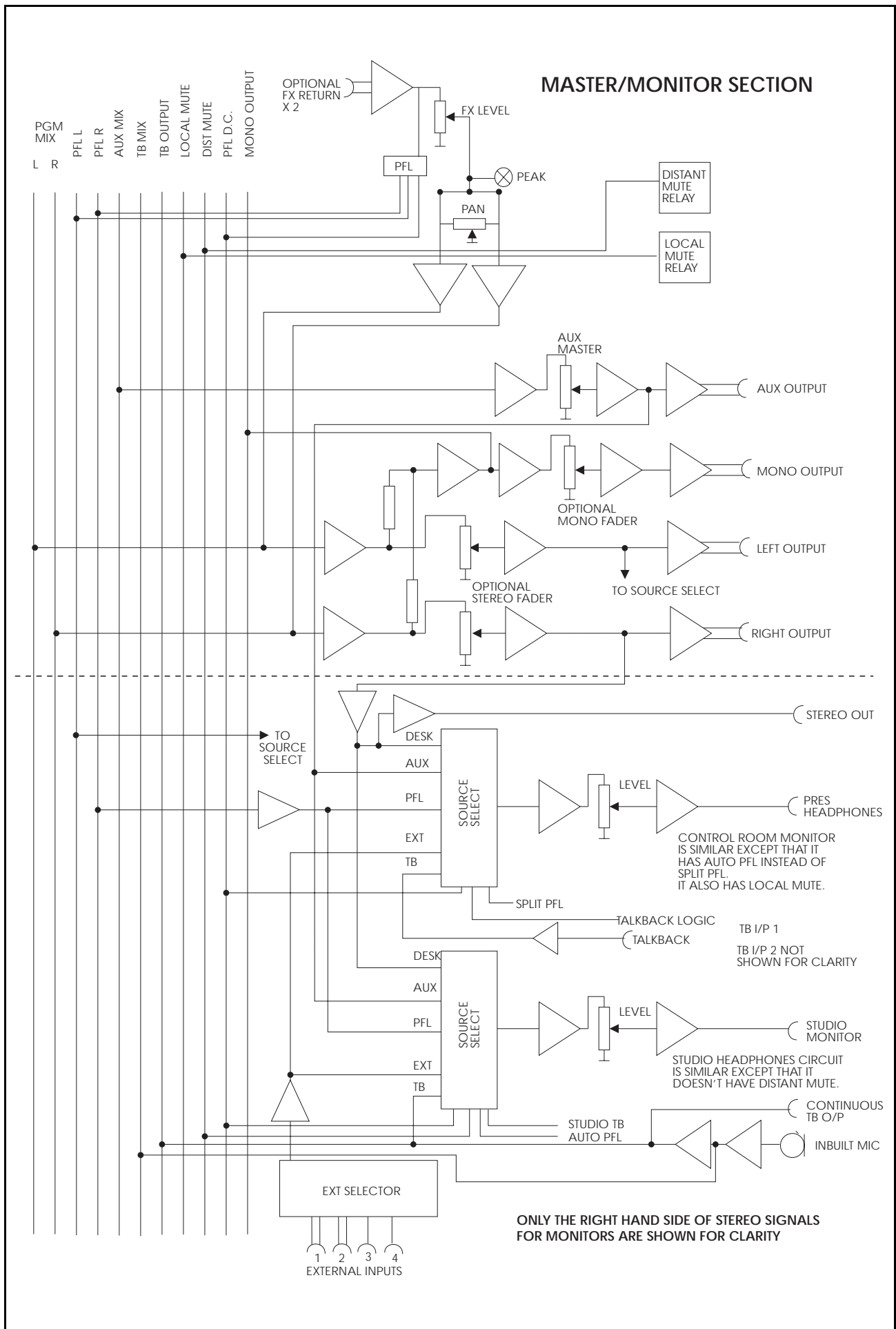
Telco Input Module

Stereo Input Module

Master/Monitor Module

Block Diagrams





Applications

Connections and Connectors

Mono Input Channel

Telco Input Channel

Stereo Input Channel

Master Section

Monitor Section

Meterbridge

Applications

Connections and Connectors

Mono Input Channel

Telco Input Channel

Stereo Input Channel

Master Section

Monitor Section

Meterbridge

Applications

This section is intended to help you to connect, to the console, the external equipment which you need. It also identifies all of the user-definable options which are available and gives the location of the links involved.

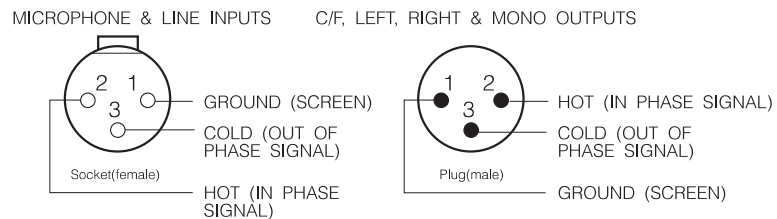
Connections And Connectors

Although this may seem to be a simple subject, faulty connectors and cabling are the source of most sound system problems. Correctly-made cables of the proper type will ensure peak performance from your console.

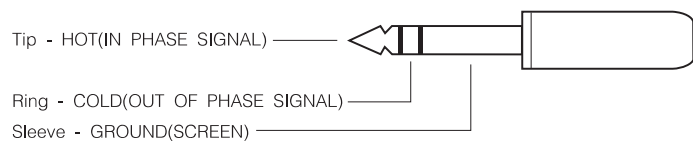
Three different types of connectors are used on your console: 3-pin XLR, 1/4" 3-pole jack sockets and D-type connectors. It is recommended that low-profile D-type connectors are used: there is a risk that high-profile types may foul the backs of meters etc. in the meterbridge.

Note: The Module Descriptions sections of this manual give details of the type and gender of the chassis mounted connectors.

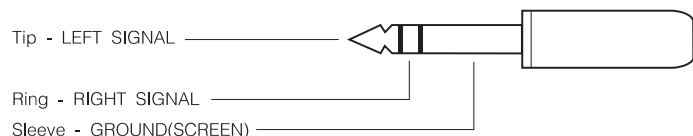
The following diagram shows details of the first two types.



1/4" 'A' Gauge Stereo Jack Plug used as balanced outputs/inputs, Aux and Effects Returns



1/4" 'A' Gauge Stereo Jack Plug used for stereo outputs, Headphones and Monitors



The following pages give details of all of the connectors which are not covered by the above diagram.

Mono Input Channel

REMOTES SOCKET (25-pin D-type female)

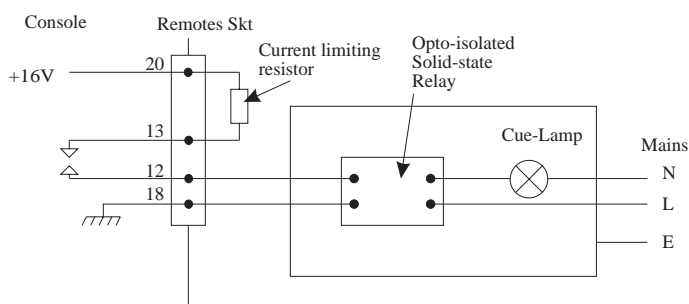
This socket provides for the following facilities:

Input 1 Cue Lamp

A relay switch closes between pins 12 & 13 of the Remotes socket when the following conditions are all met:

The Mic input is selected, the REM button is depressed and the Fader is up.

The following diagram shows one possible method of using this relay switch to control a cue lamp. It is vital that mains voltages are NOT connected to any of the connectors on the console.



Input 2 Start

A relay switch closes between pins 8 & 9 of the Remotes socket when the following conditions are all met:

The LINE input is selected, the REM button is depressed and the Fader is up.

Note: The relay may be configured to pick momentarily or latch depending upon link 6: if link 6 is present it causes the relay to latch.

Input 2 Stop/Re-Cue

A relay switch closes momentarily between pins 6 & 7 of the Remotes socket when the following conditions are all met:

The LINE input is selected, the REM button is released and the Fader is down.

Talkback

Two pins on the Remotes socket are used for this feature, as follows:

Ground	Pin 3
Talkback enable	Pin 15

A switch may be connected between pins 15 & 3. When this switch is closed the pre-fade input signal is fed to the T/B MIX bus. This would, for example, let a Studio Guest talk off-air to a telephone Caller provided that the Talkback feature on the Telco channel is also used.

COUGH/REVERSE TALKBACK Switch

This user-provided facility has two functions, as follows:

- 1) The Input Channel is muted when all of the following conditions are met: The Mic input is selected, the Fader is up and the Cough Switch is closed. This allows the Presenter/Guest to temporarily mute his or her microphone.
- 2) The Cough Switch allows the Guest to force a PFL so that he or she may talk to the Presenter. This forced PFL occurs when all of the following conditions are met: The Mic input is selected, the Fader is down and the Cough Switch is closed.

Two pins on the Remotes socket are used for this feature, as follows:

Ground	Pin 2
Cough	Pin 14

A switch may be connected between pins 14 & 2.

Insert Point (Send/Return)

Two pins on the Remotes socket are used for this feature, as follows:

Send	Pin 22	Send 0V	pin 21
Return	Pin 23	Return 0V	pin 18

You will need to remove link 5 from the pcb in order to use the insert Point.

Power Rails

The following power rails are available as follows:

+16V	Pin 20 (supplied via a 10R current-limiting resistor)
-16V	Pin 19 (supplied via a 10R current-limiting resistor)
0V audio	Pins 18 and 21.

Options

Designating a channel as Local or Distant

Link 2 may be set to A for Local or to B for Distant. This will control which set of speakers is muted when this channel is opened: if A is selected the Control Room Monitor output will be muted, or if B is selected the Studio Monitor output will be muted.

Aux - Pre-fade or Post-fade

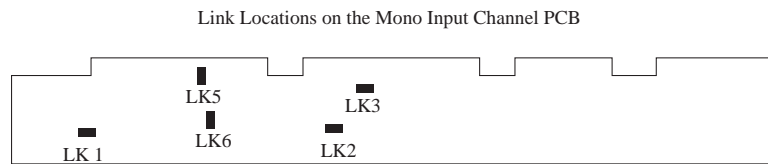
The factory default for the Auxiliary Output on the Mono Input channel is pre-fade. This may be altered to post-fade by moving link 3.

Phantom Power for Microphones

If Link 1 is in place then +48V will be present on pins 2 and 3 of the Mic XLR connector. Phantom powered mics should not be plugged in with the +48V switched on. You should also be aware that some mics draw an unusually large current. The current for each mic is limited to 14mA by series resistors.

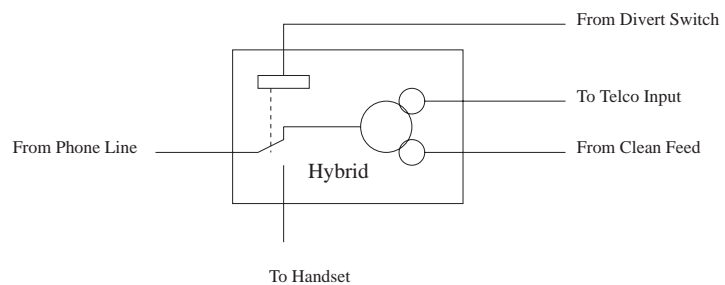
Link Locations

The following outline diagram of the Mono Input Channel PCB shows the location of the user-changeable links.



Telco Input Channel

The following diagram shows how a Telephone Hybrid may be connected to the Telco Input Channel. A separate Hybrid for each Telco channel will be required.



REMOTES SOCKET (25-pin D-type female)

This socket provides for the following facilities:

Telephone Divert

The Divert Switch on Telco channel is a single-pole 2-way switch. Connections to it are made available on the Remotes socket. The details are as follows:

Common	Pin 12
Normally Closed	Pin 13
Normally Open	Pin 11

It will be necessary to consult the Hybrid manufacturer's handbook in order to use this switch to control the divert function of the Hybrid you are using. You may have to devise a simple 'interface' to utilise the divert function.

Talkback

Two pins on the Remotes socket are used for this feature, as follows:

Ground	Pin 2
Talkback enable	Pin 15

To use this feature you must connect a switch between pins 2 and 15. When the switch is closed the telephone caller will hear a reduced programme output mixed with the output of the T/B OUTPUT bus. This bus carries the signal from the inbuilt desk mic plus the T/B MIX bus; the T/B MIX bus carries the pre-fade signals from any of the Mono Input channels whose Talkback enable is also active.

If a 2-pole switch is used, the other contacts may be used to enable the Talkback from a Mono Input Channel.

Ext Talkback (logic)

Two pins on the Remotes socket are used for this feature, as follows:

Ground	Pin 3
Talkback enable	Pin 14

To use this feature you must connect a switch between pins 3 and 14. When the switch is closed and the Telco channel Fader is down a PFL condition is forced (the led in the PFL switch glows to indicate this); The pre-fade signal from the Telco input is therefore placed on the PFL MIX L and R buses. In addition the Caller will hear a reduced programme output mixed with the input to the External Talkback input, see below.

Ext Talkback (audio)

This is an electronically balanced input.

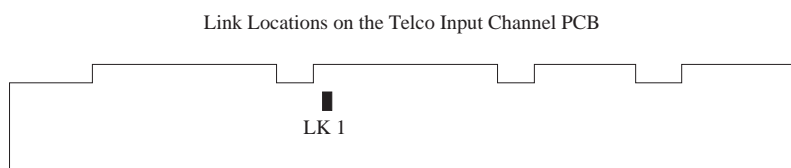
Two pins, pins 24 and 25, on the Remotes socket are used for this feature.

The External Talkback (logic and audio) would normally be connected to a custom-built Producer's Unit. This would contain the switch to control the logic, a mic and preamp to feed the audio input, and facilities for the producer to hear the PFL MIX L & R buses. The PFL signals are available on the MISC socket of the monitor section.

Options

Aux - Pre-fade or Post-fade

The factory default for the Auxiliary Output on the Telco channel is pre-fade. This may be altered to post-fade by moving link 1. The location of this link is shown in the following outline diagram of the Telco Channel PCB.



Stereo Input Channel

LINE 1 + REMOTES SOCKET (25-pin D-type female)

This socket provides for the following facilities:

Input 1 Left

This input is electronically balanced. The input pins are as follows:

Hot (+ve)	Pin 24
Cold (-ve)	Pin 25

Input 1 Right

This input is electronically balanced. The input pins are as follows:

Hot (+ve)	Pin 22
Cold (-ve)	Pin 23

Input 1 Start Relay

A relay switch closes between pins 12 & 13.

Input 2 Start Relay

A relay switch closes between pins 9 & 8.

Link for Latching Start

If Link 6 is present the Start Relays will latch instead of closing momentarily. Link 6 is located as shown in the diagram below.

Input 1 Stop/Re-cue Relay

A relay switch closes between pins 11 & 10.

Input 2 Stop/Re-cue Relay

A relay switch closes between pins 7 & 6.

Power Rails

The following power rails are available as follows:

+16V	Pin 20 (supplied via a 10R current-limiting resistor)
-16V	Pin 19 (supplied via a 10R current-limiting resistor)
0V audio	Pins 18 and 21

Options

Aux - Pre-fade or Post-fade

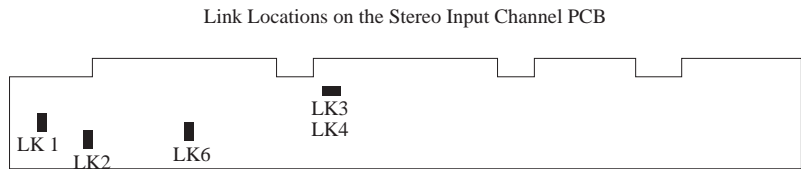
The factory default for the Auxiliary Output on the Stereo Input channels is pre-fade. This may be altered to post-fade by moving the links (3 and 4) which are located as shown in the diagram below.

Links for +10dBv boost on input 2

If Links 1 and 2 are present the output of the preamps on Input 2 will be boosted by 10dBv. The links are located as shown in the following diagram.

Link Locations

The following outline diagram of the Stereo Input Channel PCB shows the location of the user-changeable links.



Master Section

Power Socket

The connections are as follows:

Pin 1	+17V
Pin 2	-17V
Pin 3	+48V
Pins 4, 5 and 6	tied together and to all grounds

REMOTES SOCKET (9-pin D-type male)

This socket provides for the following facilities:

Local Mute Relay

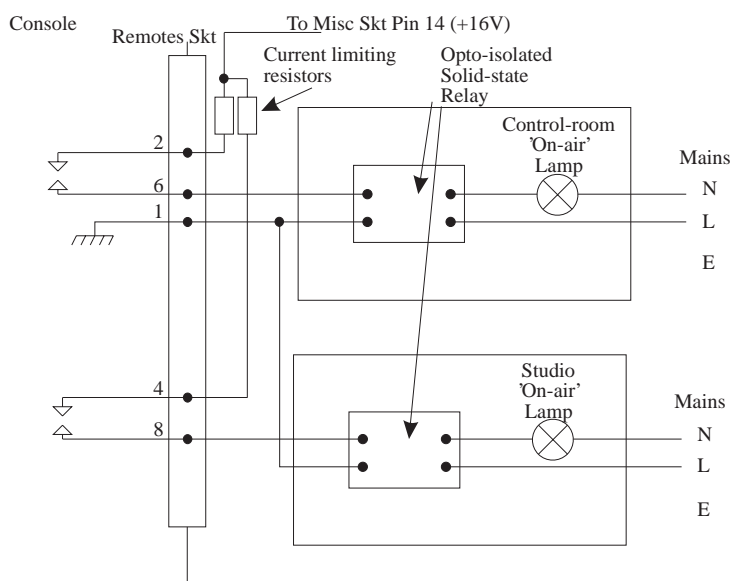
A 2-pole relay switch closes between pins 2 & 6, and pins 3 & 7. This relay could be used to control an 'On-Air' lamp in the Control-Room.

Distant Mute Relay

A 2-pole relay switch closes between pins 4 & 8, and pins 5 & 9. This relay could be used to control an 'On-Air' lamp in the Studio.

Pin 1 is a Ground connection.

The following diagram shows one possible method of using these relay switches to control an 'On-Air' lamp. It is vital that mains voltages are NOT connected to any of the connectors on the console.



Monitors Section

Talkback 1 and 2

The TB I/P 1 and 2 inputs are via 1/4" 3-pole jack sockets. The connections are:

Sleeve	Gnd
Ring	Logic control (this is shorted to ground via a switch to activate the Talkback circuit)
Tip	An unbalanced audio input

Continuous TB O/P

The connections are:

Tip	Signal
Ring + Sleeve	Ground

External Inputs Socket (15-pin D-type male)

The following **balanced** inputs are provided for:

External Input 1 Left+	Pin 2
External Input 1 Left-	Pin 9
External Input 1 Right+	Pin 3
External Input 1 Right-	Pin 10
External Input 2 Left+	Pin 4
External Input 2 Left-	Pin 11
External Input 2 Right+	Pin 5
External Input 2 Right-	Pin 12

The screen for all of these balanced inputs is pin 1.

The following **unbalanced** inputs are provided for:

External Input 3 Left	Pin 7
External Input 3 Right	Pin 8
External Input 4 Left	Pin 14
External Input 4 Right	Pin 15

The 0V for all of these unbalanced inputs is on pins 6 and 13.

Misc Socket (15-pin D-type female)

This socket is used to drive the meterbridge modules.

Pin 1	Chassis Ground
Pin 2	V- (-16V audio)
Pin 3	V+ (+16V audio)
Pin 4	Ref Ground
Pin 5	MFML (Meter Follows Monitor-Left)
Pin 6	MFMR (Meter Follows Monitor-Right)
Pin 7	PFL Line Left
Pin 8	PFL Line Right
Pin 9	Stereo Left (this is provided from the same source as the Stereo Output Socket)
Pin 10	Stereo Right (this is provided from the same source as the Stereo Output Socket)
Pin 11	Local Mute (logic level signal, 0=local mute is active)
Pin 12	Talkback Output (a direct connection to T/B OUTPUT bus)
Pin 13	PFL Enable (logic level signal, 0=PFL is active)
Pin 14	+16V (Logic)
Pin 15	0V (Logic)

Meterbridge

Wiring

The meterbridge is equipped with a distribution board, SC3357, to which the meterbridge modules are connected. The optional meterbridge equipment (listed below) can be user-connected to this distribution board via the wiring harness which is supplied with the optional equipment.

Options

The 24 module-width frame has space for 24 meterbridge-option widths and the 32 module-width frame has space for 32 meterbridge-option widths. Note that a meterbridge-option width is not the same size as an input-module width: the meterbridge-option width is slightly smaller in order to accommodate the edges of the meterbridge frame.

The following options are available:

LED Master Meters (Std) . . .	S10LED	. 4MW (Meterbridge-Option Width)
Large VU Master Meters . . .	S10VLR	. 8MW
Single Large VU Meter	S10V1	. 4MW
Small VU Meters	S10V2	. 4MW
Large PPM Master Meters . . .	S10PLR	. 8MW
Single Large PPM Meter	S10P1	. 4MW
Small PPM Meters	S10P2	. 4MW
RTW Panel (inc. loom but excluding Meter)	S10RTW	. 8MW
PFL/TB Loudspeaker Module	S10MBS	. 4MW
Talkback Remote Module . . .	S10TB	. 4MW
Double Meterbridge Blank . . .	S10MB8	. 8MW
Single Meterbridge Blank . . .	S10MB4	. 4MW
Timer	S10TIM	. 4MW
Input Selector	S10SEL	. 4MW

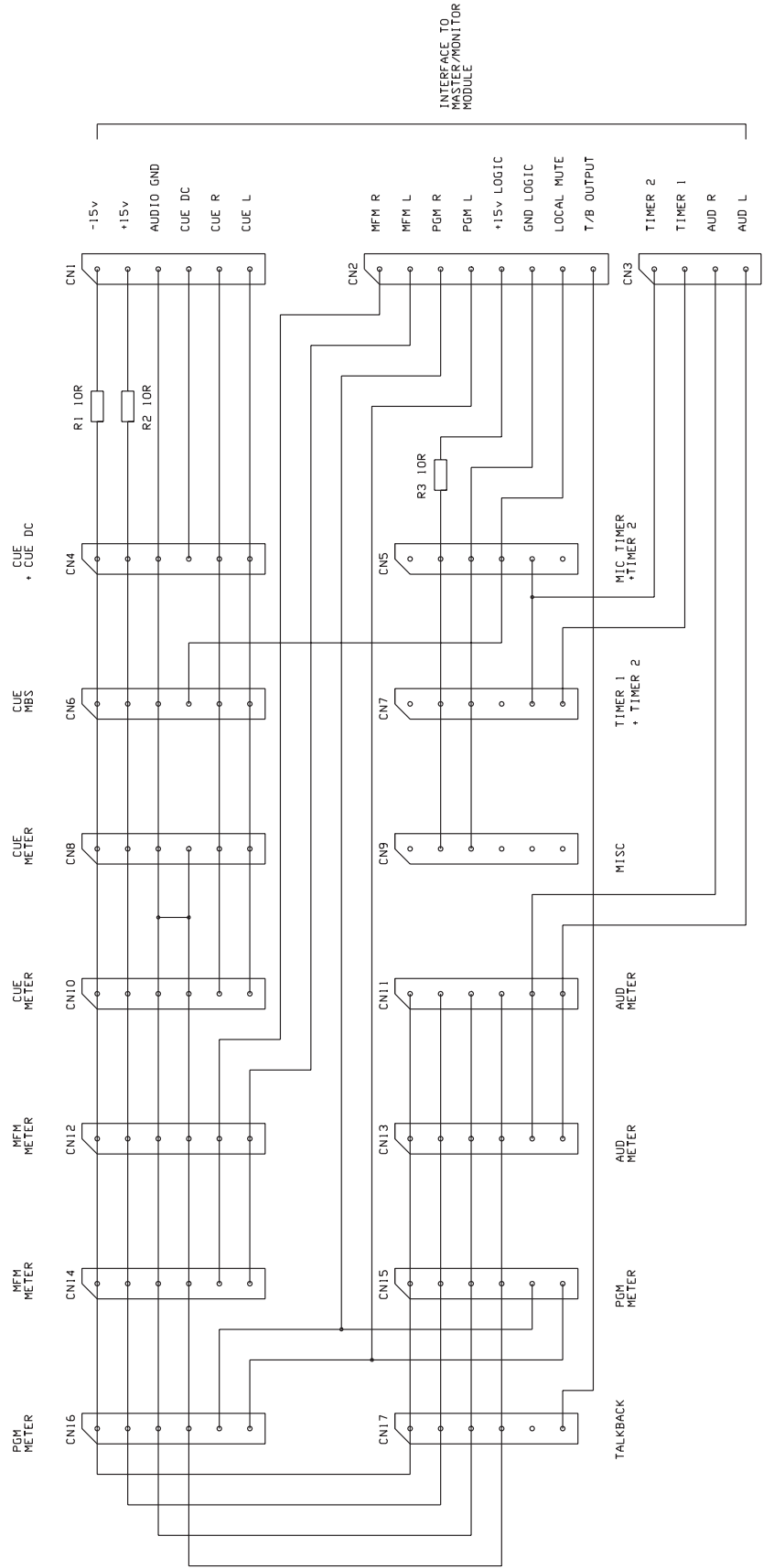
Meterbridge Distribution Board

The diagram for this PCB is shown overleaf. Fitting instructions are provided with the optional Meterbridge Modules.

Installing Meterbridge Modules

- 1) Raise the Meterbridge housing and secure in the raised position with the two wingnuts.
- 2) Unscrew the blanking plate in the required location.
- 3) Mount and secure the module in the meterbridge.
- 4) Connect the module's loom to the relevant connector.
- 5) Loosen the wingnuts and carefully lower the meterbridge.

Meterbridge Distribution Board SC3357



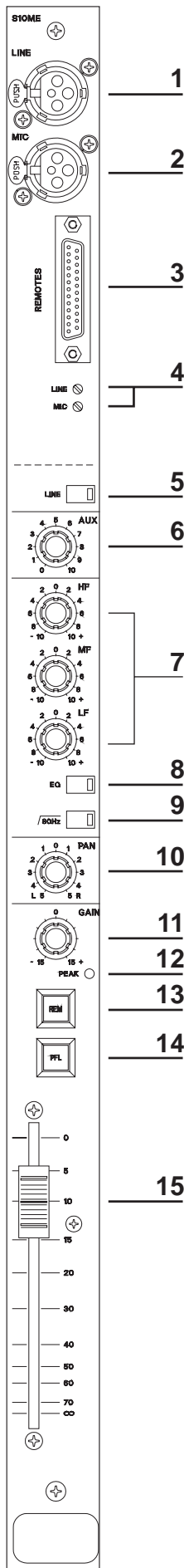
INTERFACE TO
MASTER/MONITOR

Mono Input Channel

Description & Operation

Specification

Mono Input Channel



Input Stage

1 The **LINE INPUT** is via a standard female XLR-3 connector. It is available when the **LINE** switch is depressed.

2 The **MIC INPUT** is via a standard female XLR-3 connector. It is available when the **LINE** switch is released.

3 REMOTES Socket

This 25-way D-type connector allows you to implement the following facilities:

COUGH/REVERSE TALKBACK Switch

This user-provided facility has two functions, as follows:

1) The Input Channel is muted when all of the following conditions are met: The Mic input is selected, the Fader is up and the Cough Switch is closed. This allows the Presenter/Guest to temporarily mute his or her microphone.

2) The Cough Switch allows the Guest to force a PFL so that he or she may talk to the Presenter. This forced PFL occurs when all of the following conditions are met: The Mic input is selected, the Fader is down and the Cough Switch is closed (*see the Applications section*).

CUE LAMP

This user-provided facility will be controlled via relay contacts which close when all of the following conditions are met: The Mic input is selected, the Fader is up and the REM switch is depressed (*see the Applications section*).

START RELAY

The contacts of this relay will close when all of the following conditions are met: The Line input is selected, the REM switch is depressed and the Fader is up. The relay contacts can either close momentarily or they may latch, depending upon link 6 (*see the Applications section*).

STOP/RE-CUE RELAY

The contacts of this relay will close momentarily when the following conditions are met: The Line input is selected and the REM switch is released and/or the Fader is down (*see the Applications section*).

TALK-BACK SWITCH

This user-provided switch will, when closed, put the signal from the pre-fade section of the circuit onto the T/B OUTPUT bus and also to the Continuous Talkback Output socket of the Monitor section. The major use of this facility is that the T/B OUTPUT bus feeds the Telco Channels and will allow the Presenter, Guest or Producer to talk to a telephone Caller off-air (*see the Applications section*).

SEND/RETURN

This allows for the use of an effects machine to be added to the mono input channel, e.g. voice processor, echo. The send and return lines are unbalanced and care will need to be taken with the length and type of leads which are used. This facility is enabled by the removal of link 5 (*see the Applications section*).

4 Two **COARSE ADJUSTMENT PRESET POTS** are available, one for each of the input sockets. They allow for the coarse adjustment of input levels.

5 The **LINE** switch selects the Line Input socket when depressed and the Mic Input socket when released. A LED in the switch glows red when the Line Input is selected.

Auxiliary Send

6 The **AUX** control routes the input channel signal onto the Auxiliary Mix bus. The input channel signal may be fed to the Auxiliary control either pre-fade or post-fade. The factory default is pre-fade but this can be changed via a link on the pcb (*see the Applications section*).

Optional Equaliser

7 The **HF EQ** control provides high frequency (above 8.5kHz) boost and cut of +/-10dB. The **MF EQ** control provides medium frequency boost and cut of +/-10dB at 3kHz. The **LF EQ** control provides low frequency (below 180Hz) boost and cut of +/-10dB.

8 When the **EQ** switch is depressed, the EQ section, described above, is switched into the signal path. A yellow LED glows to indicate this. When the switch is released the signal path bypasses the EQ section.

9 When the **80Hz** switch is depressed an 80Hz high-pass filter is switched into the signal path. A yellow LED glows to indicate this. This control is useful for filtering-out low frequency hum.

Level Control

10 The **PAN** control determines the position of the signal within the stereo image. Rotation fully anticlockwise feeds the signal solely to the left mix bus, whilst rotation clockwise sweeps the image to the right mix bus.

11 The **GAIN** control provides +/- 15dB gain.

12 The **PEAK** LED glows to give a warning of possible overload.

Cueing

13 The **REM** (Remote) switch works in conjunction with the Fader microswitch. There is a red LED in the REM switch which will glow at two levels of brightness. The LED will glow at half brightness if the Fader is down when the REM button is pushed; you may regard this as the REM circuit being armed but not active. To make the REM circuit active the Fader must be moved away from the down position. The LED will glow at full brightness to indicate that the REM circuit is now active. When the REM circuit is active it will, depending upon other switch settings, control the Cue Lamp, Start Relay and Stop Relay: full details are given above. If the REM switch is pushed whilst the Fader is already away from the down position then the REM circuit will be active as soon as the REM switch is pushed and the LED will glow at full brightness to indicate this.

14 The **PFL** (Pre-Fade Listen) switch allows you to listen, via the Monitors section, to an the input on this channel. When the Fader is moved away from the down position the PFL circuit is automatically deactivated: PFL cannot therefore be activated when the Fader is up. A red LED glows to indicate that the PFL circuit is active. If the REM switch's LED is glowing at half brightness and the PFL is pushed, the START relay will operate.

Output To The Programme

15 The smooth-action, 100mm **FADER** gives a gain of unity (0dB) when it is in the fully up position. The scale alongside the Fader indicates the attenuation, in dB, for any position. There is a microswitch attached to the Fader which detects when it is in the fully down position. This microswitch helps to control many of the features which are described in this section.

The input to the channel will be on-air whenever the Fader is open (unless the cough switch is closed).

Note: Each Mono Input channel can be configured as a Local or Distant channel. This controls which monitor circuit will be muted when the channel's Fader is opened and the mic is selected.

Specifications

Microphone Input

Electronically balanced

Input Impedance	>1.5k Ω
Maximum I/P level	-2dBu
Sensitivity Range	-70dBu to -23dBu
CMRR	>100dB @70dB gain
EIN	-128dB, 200R source

Line Input

Electronically balanced

Input Impedance	>20k Ω
Input Range	-10dBu to 0dBu

Equalisation

LF	+/- 10dB shelving at 180Hz
MF	10dB cut and boost at 3kHz
HF	+/-10dB shelving at 8.5kHz

General

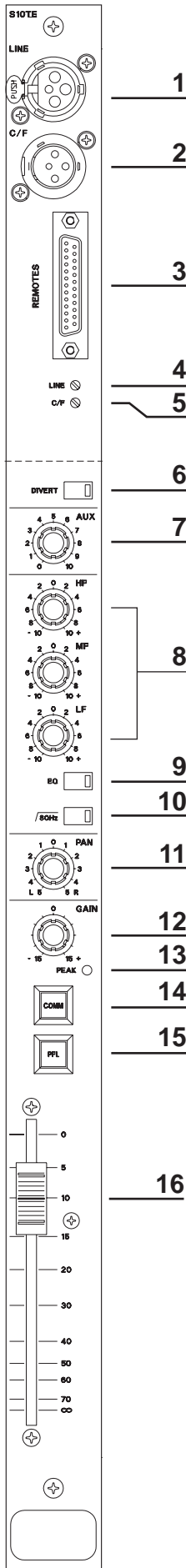
Insert Send Level	-6dBu
THD	0.006% @1kHz 0dBu

Telco Channel

Description & Operation

Specification

Telco Channel



Input Stage

The Telco module must be connected to the telephone system via a telephone hybrid circuit. The Applications section of this manual gives more details.

1 The **LINE** input is a female XLR into which the output from an external telephone hybrid may be plugged. It is a balanced input.

2 The **C/F** (Clean Feed) output is a male XLR connector which may be plugged into the input of an external telephone hybrid. The Clean Feed signal (also known as Mix Minus) is the programme output signal *minus* the phone signal. It is a balanced output.

3 REMOTES Socket

This 25-way D-type female connector allows you to implement the following facilities:

Telephone Divert

See Divert Switch.

Talkback Enable

This user-provided switch will, when closed, cause the Caller to hear a reduced programme output plus the signal on the T/B OUTPUT bus. This bus will have the signal from the inbuilt mic plus the signal from any of the Mono Input modules if their respective Talkback Switches are closed (*see the Applications section*).

External Talkback

This allows the Producer to talk to the Caller. It consists of a balanced audio input and also two contacts which may be shorted via a user-provided switch. When the switch is closed the Caller will hear a reduced programme plus the input to the External Talkback circuit (*see the Applications section*).

4 **LINE** (Coarse Adjust) allows the coarse adjustment of the Line input level.

5 **C/F** (Coarse Adjust) allows for the reduction, to a minimum, of the Caller's signal in the Clean Feed output. This is factory set and should not require further adjustment.

6 The **DIVERT** switch on the module is a 1-pole 2-way switch; these connections are available on the Remote socket. It is possible to connect this switch to the external telephone hybrid to enable the Caller to be diverted to, for example, a standard telephone. You will need to consult the telephone hybrid circuit's handbook for its requirements.

Auxiliary Send

7 The **AUX** control routes the Caller's signal onto the Auxiliary Mix bus. The signal may be fed to the Auxiliary control either pre-fade or post-fade. The factory default is pre-fade but this may be changed via a link on the pcb (*see the Applications*

section).

Optional Equaliser

8 The **HF EQ** control provides high frequency (above 8.5kHz) boost and cut of +/-10dB. The **MF EQ** control provides medium frequency boost and cut of +/-10dB at 3kHz. The **LF EQ** control provides low frequency (below 180Hz) boost and cut of +/-10dB.

9 When the **EQ** switch is depressed, the EQ section, described above, is switched into the signal path. A yellow LED glows to indicate this. When the switch is released the signal path bypasses the EQ section.

10 When the **80Hz** switch is depressed an 80Hz high-pass filter is switched into the signal path. A yellow LED glows to indicate this. This control is useful for filtering-out low frequency hum.

Level Control

11 The **PAN** control determines the position of the signal within the stereo image. Rotation fully anticlockwise feeds the signal solely to the PROGRAM MIX L bus, whilst rotation clockwise sweeps the image to the PROGRAM MIX R bus.

12 The **GAIN** control provides +/- 15dB gain.

13 The **PEAK** LED glows to give a warning of possible overload.

Cueing

14 When the **COMM** circuit is active the Caller will hear a reduced programme plus the signal on the T/B OUTPUT bus. This bus will carry the signal from the inbuilt mic plus the signal from any of the Mono Input modules if their respective Talkback Switches are closed. In addition the Caller's input will be put on the PFL MIX L & R buses and a PFL condition is signalled on the PFL Enable bus. The Presenter will therefore hear the caller as a PFL. The LEDs in the COMM and PFL switches will glow. The COMM circuit will be deactivated when the Fader is moved away from the down position, or when the COMM switch is pushed a second time.

15 When the **PFL** circuit is active the Caller's input will be put onto the PFL MIX L & R buses. The Presenter will therefore hear the caller as a PFL. The LED in the PFL switch will glow. The PFL circuit will be deactivated when the Fader is moved away from the down position.

Output To The Programme

16 The smooth-action, 100mm **FADER** gives a gain of unity (0dB) when it is in the fully up position. The scale alongside the Fader indicates the attenuation, in dB, for any position. There is a microswitch attached to the Fader which detects when the Fader is in the fully down position. This microswitch helps to control many of the features which are described in this section.

The input to the channel will be on-air whenever the Fader is up (unless the Divert

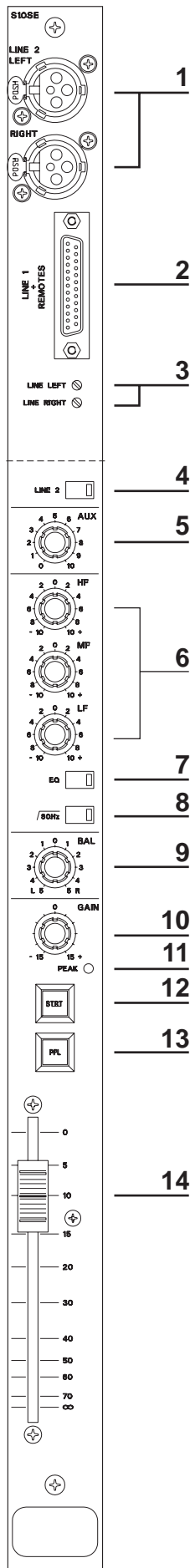
switch is depressed and is properly connected to the Hybrid).

Stereo Input Channel

Description & Operation

Specification

Stereo Input Channel



Input Stage

1 The **LINE 2 (LEFT and RIGHT)** female XLR connectors provide for an alternative or temporary source. The inputs are electronically balanced.

2 The **LINE 1 + REMOTES** 25-way D-type female socket provides the connections for the Line 1 Inputs and also the remote controls for Line 1 and Line 2 inputs. The inputs are electronically balanced.

The remote controls, which are duplicated for both Line 1 and Line 2, are described below. Only one of the two Start relays (Line 1 Start or Line 2 Start) will be active at any time, depending upon the setting of the LINE 2 switch. The two Stop/Re-cue relays are controlled similarly.

Start Relay

The contacts of this relay will close when the STRT switch is depressed and the Fader is up, or it will close when the PFL switch and the STRT switches are depressed. The relay contacts can either close momentarily or they may latch, depending upon link 6 (*see the Applications section*).

Stop/Re-Cue Relay

The contacts of this relay will close momentarily when the STRT switch is released or the Fader is down, or, the STRT switch is released or the PFL switch is released (*see the Applications section*).

3 The **LINE LEFT and LINE RIGHT COARSE ADJUSTMENT PRESET POTS** allow for the coarse adjustment of the inputs on Line 1 only. The inputs to Line 2 can be boosted by 10dBv if links 1 and 2 are present on the circuit board (*see the Applications section*).

4 The **LINE 2** switch selects, as the input source, Line 2 when depressed and Line 1 when released. A red LED glows to indicate when Line 2 is selected.

Auxiliary Send

5 The **AUX** control routes both the left and right stereo input signals onto the AUXILIARY MIX bus. The input channel signal may be fed to the Auxiliary control either pre-fade or post-fade. The factory default is pre-fade but this can be changed via a link on the pcb (*see the Applications section*).

Optional Equaliser

6 The **HF EQ** control provides high frequency (above 8.5kHz) boost and cut of +/-10dB. The **MF EQ** control provides medium frequency boost and cut of +/-10dB at 3kHz. The **LF EQ** control provides low frequency (below 180Hz) boost and cut of +/-10dB.

7 When the **EQ** switch is depressed, the EQ section, described above, is switched into the signal path. A yellow LED glows to indicate this. When the switch is released the signal path bypasses the EQ section.

8 When the **80Hz** switch is depressed an 80Hz high-pass filter is switched into the signal path. A yellow LED glows to indicate this. This control is useful for filtering-out low frequency hum.

Level Control

9 The **BAL** control allows the stereo image to be balanced. It has a range of $\pm 6\text{dB}$.

10 The **GAIN** control provides $\pm 15\text{dB}$ gain.

11 The **PEAK** LED glows to give a warning of possible overload.

Cueing

12 The **STRT** switch works in conjunction with the Fader microswitch. There is a red LED in the STRT switch which will glow at two levels of brightness. The LED will glow at half brightness if the Fader is down when the STRT button is pushed; you may regard this as the STRT circuit being armed but not active. To make the STRT circuit active the Fader must be moved away from the down position. The LED will glow at full brightness to indicate that the STRT circuit is now active. When the STRT circuit is active it will, depending upon other switch settings, control the Start Relay and Stop/Re-cue Relay: full details are given above. If the STRT switch is pushed whilst the Fader is already away from the down position then the STRT circuit will be active as soon as the STRT switch is pushed and the LED will glow at full brightness to indicate this.

13 The **PFL** (Pre-Fade Listen) switch allows you to listen, via the Monitors section, to an the input on this channel. When the Fader is moved away from the down position the PFL circuit is automatically deactivated. A red LED glows to indicate that the PFL circuit is active. If the STRT switch's LED is glowing at half brightness and the PFL is pressed, the START relay will operate.

Output To The Programme

14 The smooth-action, 100mm **FADER** gives a gain of unity (0dB) when it is in the fully up position. The scale alongside the Fader indicates the attenuation, in dB, for any position. There is a microswitch attached to the Fader which detects when the Fader is in the fully down position. This microswitch helps to control many of the features which are described in this section.

The input to the channel will be on-air whenever the Fader is open.

Specifications

Line Inputs

Electronically balanced

Input Impedance >10k Ω

Input Levels: Line 1 -10dBu to 0dBu,
Line 2 0dBu or -10dBv selectable

EQ

LF +/- 10dB shelving at 180Hz

MF 10dB cut and boost at 3kHz

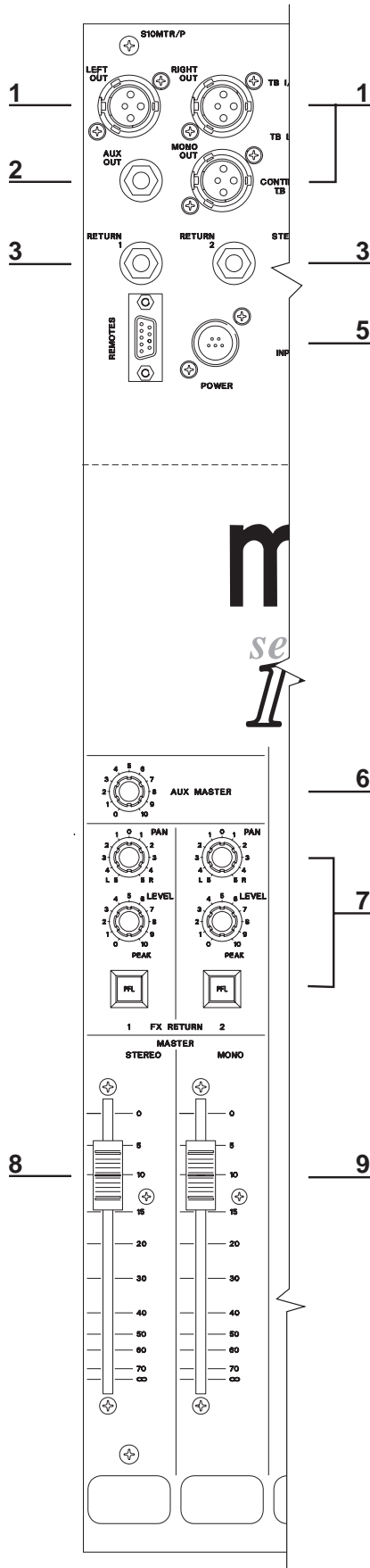
HF +/-10dB shelving at 8.5kHz

Master Section

Description & Operation

Specification

Master Section



Outputs

1 Programme Outputs

The **LEFT OUT** male XLR connector provides an electronically balanced output from the PGM MIX L bus. The Stereo Master Fader (8) controls the level of the output.

The **RIGHT OUT** male XLR connector provides an electronically balanced output from the PGM MIX R bus. The Stereo Master Fader (8) controls the level of the output.

The **MONO OUT** male XLR connector provides an electronically balanced output which is the sum of the PGM MIX R and PGM MIX L buses. The Mono Master Fader (9) controls the level of the output.

Auxiliary Output

2 The **AUX OUT** 1/4" jack socket provides an electronically balanced output from the AUX MIX bus. The AUX MASTER pot (6) controls the level of the output.

Optional Effects Inputs (Production variant only)

3 The **RETURN 1 and 2** 1/4" jack sockets provide a balanced input. The inputs here are fed onto the PGM MIX L and PGM MIX R buses, via the LEVEL and PAN controls.

Muting

4 The 9-way D-type **REMOTES** male connector provides two 2-pole 1-way relay contacts. One is controlled by the LOCAL MUTE bus and the other is controlled by the DIST MUTE bus. The relay contacts close when the appropriate mute is active. These relays may be used to provide 'On-Air' lamps in the Control Room and the Studio (*see the Applications section*).

Power Input

5 The 5-way locking **POWER** connector is the power input to the console. The console requires +17V, -17V and +48V.

Auxiliary Control

6 The **AUX MASTER** pot controls the level of the signal at the Aux Output socket. The signal is fed to the Aux Master control from the AUX MIX bus.

Optional Effects Control (Production variant only)

7 The following **FX** controls are duplicated for both FX Return 1 and FX Return 2.

PAN

This control determines the position of the signal within the stereo image. Rotation fully anticlockwise feeds the signal solely to the left, whilst rotation clockwise sweeps the image to the right.

LEVEL

This controls the level of the signal being fed to the PGM MIX L and PGM MIX R buses.

Note: FX Returns are always connected to the PGM MIX L and PGM MIX R buses.

PEAK

This LED glows to give a warning of possible overload.

PFL

A red LED glows to indicate that the PFL circuit is active. When it is active the FX Return signal is passed to the PFL MIX L and PFL MIX R buses.

Optional Master Output Control (Production variant only)

8 The **STEREO MASTER FADER** is a smooth-action 100mm fader. It controls the signal level at the Output Left and Output Right XLR sockets.

9 The **MONO MASTER FADER** is a smooth-action 100mm fader. It controls the signal level at the Mono Output XLR socket.

Specifications

Mix Left, Right & Mono

Max. output +21dBu

Output impedance <75Ω

General

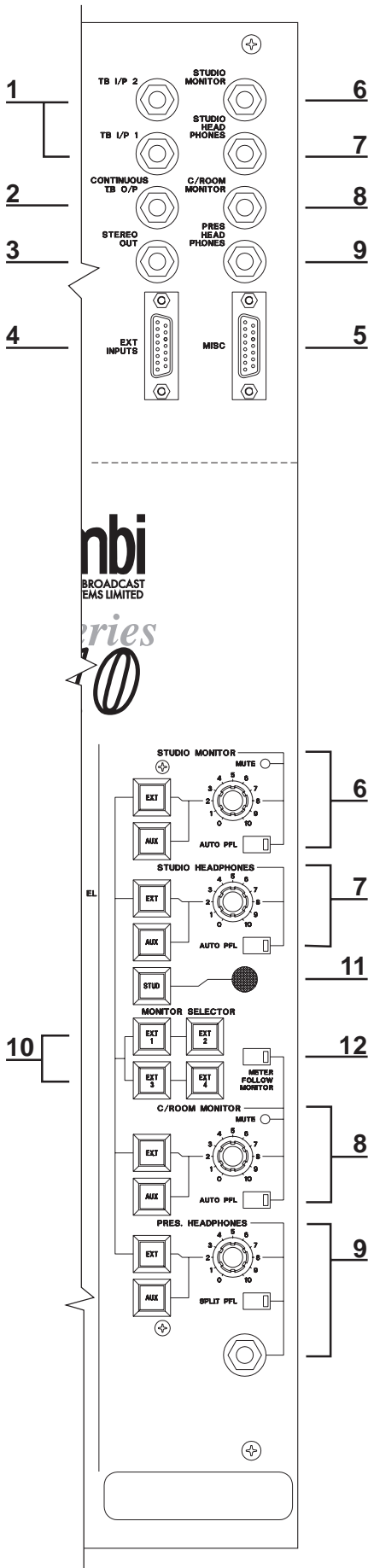
THD < 0.03%

Crosstalk < 60dB

Monitor Section

Description & Operation

Monitor Section



Input/Output Sockets

1 The **TB I/P 1** and **T/B I/P 2** inputs are via 3-pole ¼" 'A' gauge jack sockets. They each provide the means of connecting a microphone, at line level, and an activating switch to provide talkback to the Control-room. The signal from each mic is passed to the Control-room monitor and the Presenter's headphones (*see the Applications section*).

2 The **CONTINUOUS TB O/P** is via a 3-pole ¼" 'A' gauge jack socket. The signal available at this socket is a mix of the following inputs: the inbuilt mic in the console, and talkback signals from Mono-input channels, e.g. when user-provided cough switches are depressed (*see the Applications section*).

3 The **STEREO OUT** output is provided via a 3-pole ¼" 'A' gauge jack socket. It provides buffered versions of the **DESK O/P L & R** buses.

4 **EXT INPUTS** are provided on a 15-way D-type male connector. Four Stereo channels are provided, channels 1 and 2 have balanced inputs whilst channels 3 and 4 have unbalanced inputs.

5 The **MISC** socket provides the following signals:

- Chassis, Ref and Logic Ground
- Audio and Logic power supply rails
- MFM (Meter Follows Monitor) signals
- PFL signals
- Stereo Output signals
- Local Mute control signal
- Talkback output
- PFL logic control signal.

These are used to feed the meterbridge distribution board. (*See the Applications section*).

Studio

6 STUDIO MONITOR

This output is via a 3-pole ¼" 'A' gauge jack socket. The output must be amplified in order to drive speakers.

The Studio Monitor has 4 sources of input. They are: Desk, Ext, Aux and PFL. The default source, which is selected at power-on, is Desk, i.e. the program output.

EXT

This switch selects the external inputs as the source of the Studio Monitor. A green LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the AUX switch.

AUX

This switch selects the auxiliary input as the source of the Studio Monitor. A red LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the EXT switch.

MUTE

This red LED glows to indicate that the Studio Monitor output has been muted. This occurs when any mics connected to Mono Input Channels which are designated as Distant are being used.

AUTO PFL

When this switch is depressed any PFL selected from any of the channels will be fed to the Studio Monitor. The PFL signal will replace the existing signal. A red LED in the switch glows to indicate that this feature is enabled.

When the switch is released PFL signals will not be fed to the Studio Monitor.

LEVEL Control

This controls the level of output fed to the output socket.

Note: When the studio talkback switch is depressed, the signal from the selected source is replaced by the signal from the inbuilt mic plus the signal from the T/B Mix bus.

7 STUDIO HEADPHONES

This output is via a 3-pole 1/4" 'A' gauge jack socket.

The Studio Headphones have 4 sources of input. They are: Desk, Ext, Aux and PFL. The default source, which is selected at power-on, is Desk, i.e. the program output.

EXT

This switch selects the external inputs as the source of the Studio Headphones. A green LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the AUX switch.

AUX

This switch selects the auxiliary input as the source of the Studio Headphones. A red LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the EXT switch.

AUTO PFL

When this switch is depressed any PFL selected from any of the channels will be fed to the Studio Headphones. The PFL signal will replace the existing signal. A red LED in the switch glows to indicate that this feature is enabled.

When the switch is released PFL signals will not be fed to the Studio Headphones.

LEVEL Control

This controls the level of output fed to the output socket.

Note: When the studio talkback switch is depressed, the signal from the selected source is replaced by the signal from the inbuilt mic plus the signal from the T/B Mix bus.

Control Room

8 C/ROOM MONITOR

This output is via a 3-pole ¼" 'A' gauge jack socket. The output must be amplified in order to drive speakers.

The Control-room Monitor has 4 sources of input. They are: Desk, Ext, Aux and PFL. The default source, which is selected at power-on, is Desk, i.e. the program output.

EXT

This switch selects the external inputs as the source of the Control-room Monitor. A green LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the AUX switch.

AUX

This switch selects the auxiliary input as the source of the Control-room Monitor. A red LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the EXT switch.

MUTE

This red LED glows to indicate that the Control-room Monitor output has been muted. This occurs when any mics connected to Mono Input Channels which are designated as Local are being used.

AUTO PFL

When this switch is depressed any PFL selected from any of the channels will be fed to the Control Room Monitor. The PFL signal will replace the existing signal. A red LED in the switch glows to indicate that this feature is enabled.

When the switch is released PFL signals will not be fed to the Control Room Monitor.

If either of the reverse talkback inputs (TB INPUT 1 or 2) are being used they will over-ride all other signals to the Control Room Monitor.

LEVEL Control

This controls the level of output fed to the output socket.

9 PRES. HEADPHONES

There are two 3-pole ¼" 'A' gauge jack sockets. The Presenter's Headphones have 4 sources of input. They are: Desk, Ext, Aux and PFL. The default source, which is selected at power-on, is Desk, i.e. the program output.

EXT

This switch selects the external inputs as the source of the Presenter's Headphones. A green LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the AUX switch.

AUX

This switch selects the auxiliary input as the source of the Presenter's Headphones. A red LED glows to indicate that it has been selected. To de-select this input you may either press this switch again to return to Desk, or you may press the EXT switch.

SPLIT PFL

When this switch is depressed any PFL selected from any of the channels will be summed and fed to the right-hand channel of the Presenter's Headphones. The existing source to the headphones is summed and fed to the left-hand channel of the headphones. A red LED in the switch glows to indicate that this feature is enabled.

When the switch is released PFL signals, when present, will be fed to both sides of the Presenter's Headphones.

When there is no PFL signal the Presenter will hear the selected Monitor input through both sides of the headphones in either of the above cases.

If either of the reverse talkback inputs (TB INPUT 1 or 2) are being used they will over-ride all other signals to the Presenter's headphones. The input of the reverse talkback inputs will be heard through both sides of the headphones.

LEVEL Control

This controls the level of output fed to the output socket.

External Inputs

10 MONITOR SELECTOR

Each of the monitor/headphone circuits described above may select Ext as an input source. The Ext source has four inputs which may be selected by depressing the desired switch: Ext1 to Ext4. A green LED in each switch indicates its selection. Depressing one of these switches automatically deselects the previously selected Ext input, therefore only one of the four Ext inputs may be selected at any time.

Note: Ext 1 is the default input which is selected at power up.

Talkback

11 When the **STUD** switch is depressed the Studio Headphones and Monitor circuits will have their existing sources replaced by the signal from the inbuilt **MIC** summed with the T/B MIX bus.

Note: the switch is non-latching; it also does not turn the mic on: its output is always present on the T/B OUTPUT bus. The signal T/B OUTPUT bus is always available at the Continuous Talkback Output socket.

Metering

12 When the **METER FOLLOW MONITOR** switch is released the Meters will follow the Desk output, but will be interrupted by any PFL signal. When the switch is depressed the meters will follow the Control-room Monitor. A red LED in the switch glows to indicate that the Meters are following the Control-room Monitor.

Note: The Meters will follow the Monitor even if talkback to the Control-room is used, i.e. the meters will not follow the talkback signal.

Appendices

Glossary

Dimensions

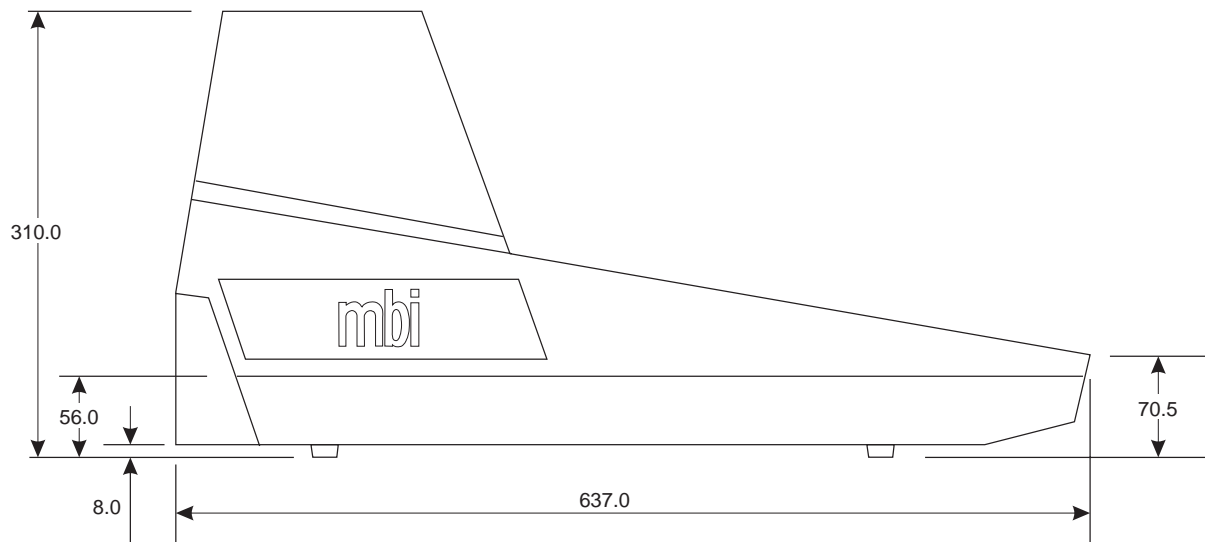
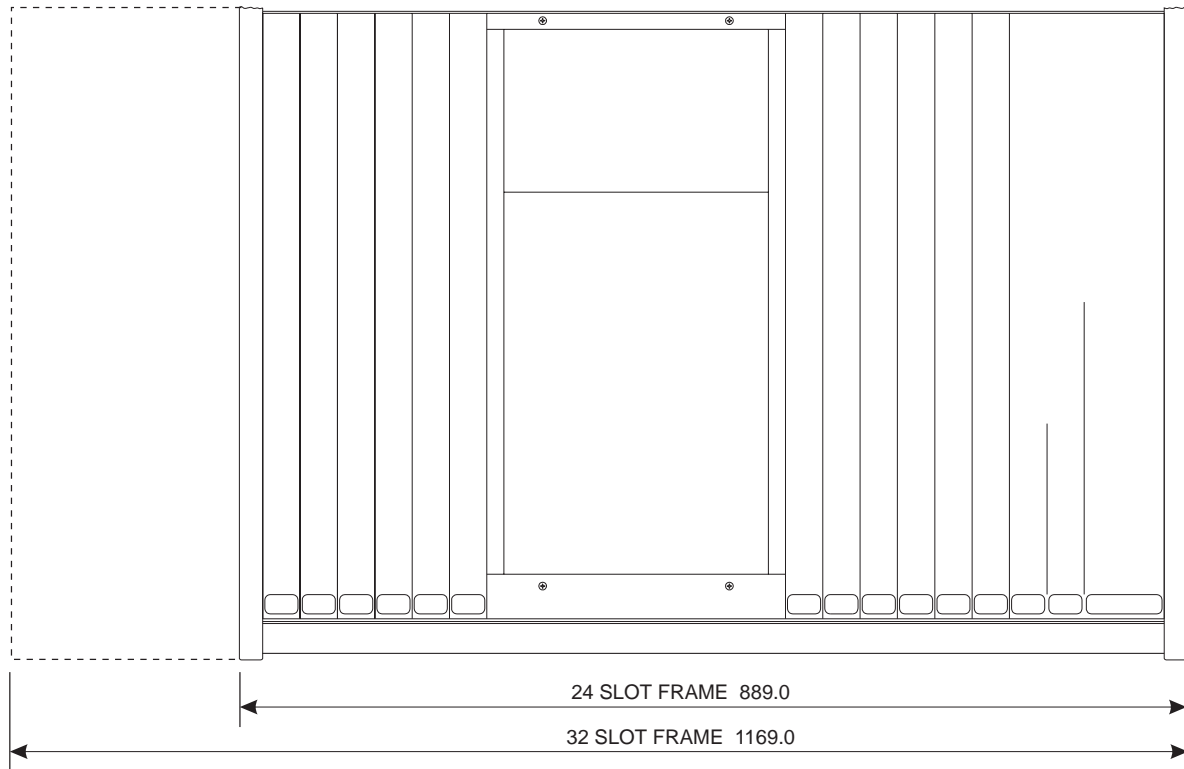
Warranty

Glossary

Attenuation	The reduction of a signal level. The attenuation is usually measured in dB.
Balance	The relative levels of the left and right channels of a stereo signal.
Clipping	The onset of severe distortion in the signal path, usually caused by the peak signal voltage being limited by the circuit's power supply voltage.
CMRR	Common Mode Rejection Ratio. It is the ratio of the extent to which a differential amplifier will cancel noise, which is present on both inputs, compared to its ability to amplify the wanted signal.
dB (decibel)	A ratio of two voltages or signal levels, expressed by the equation $\text{dB} = 20 \text{LOG}_{10}(V_1/V_2).$ <p>Adding the suffix 'u' denotes that the signal is relative to 0.775V RMS. Adding the suffix 'v' denotes that the signal is relative to 1V RMS.</p>
EIN	Equivalent Input Noise. It is the ratio of output noise to the gain. It describes the level of noise which would need to be fed into an ideal amplifier to produce the measured output noise.
EQ (Equaliser)	A device which allows the cutting or boosting of selected bands of frequencies in the signal path.
Gain	The degree of amplification, or attenuation applied to a signal.
Hybrid	A device which allows a telephone line to be connected to a broadcast desk in such a way that the caller may hear the programme output without the caller's voice being re-introduced onto the phone line which would cause unwanted feedback.
LED	Light Emitting Diode.
PAN	An abbreviation of 'panorama': it controls the levels sent to left and right outputs.
PFL (pre-fade listen)	A function which allows the operator to monitor the pre-fade signal independently of the programme mix.
TELCO	TELEphone COmmunication.
THD	Total Harmonic Distortion.

Dimensions

All dimensions are in millimetres.



Warranty

1 **Soundcraft** means Soundcraft Electronics Ltd.

End User means the person who first puts the equipment into regular operation.

Dealer means the person other than Soundcraft (if any) from whom the End User purchased the Equipment, provided such a person is authorised for this purpose by Soundcraft or its accredited Distributor.

Equipment means the equipment supplied with this manual.

- 2 If within the period of twelve months from the date of delivery of the Equipment to the End User it shall prove defective by reason only of faulty materials and/or workmanship to such an extent that the effectiveness and/or usability thereof is materially affected the Equipment or the defective component should be returned to the Dealer or to Soundcraft and subject to the following conditions the Dealer or Soundcraft will repair or replace the defective components. Any components replaced will become the property of Soundcraft.
- 3 Any Equipment or component returned will be at the risk of the End User whilst in transit (both to and from the Dealer or Soundcraft) and postage must be prepaid.
- 4 This warranty shall only be available if:
 - a) the Equipment has been properly installed in accordance with instructions contained in Soundcraft's manual; and
 - b) the End User has notified Soundcraft or the Dealer within 14 days of the defect appearing; and
 - c) no persons other than authorised representatives of Soundcraft or the Dealer have effected any replacement of parts maintenance adjustments or repairs to the Equipment; and
 - d) the End User has used the Equipment only for such purposes as Soundcraft recommends, with only such operating supplies as meet Soundcraft's specifications and otherwise in all respects in accordance Soundcraft's recommendations.
- 5 Defects arising as a result of the following are not covered by this Warranty: faulty or negligent handling, chemical or electro-chemical or electrical influences, accidental damage, Acts of God, neglect, deficiency in electrical power, air-conditioning or humidity control.
- 6 The benefit of this Warranty may not be assigned by the End User.
- 7 End Users who are consumers should note their rights under this Warranty are in addition to and do not affect any other rights to which they may be entitled against the seller of the Equipment.