SOUNDCRAFT



USER GUIDE

CE This equipment complies with the EMC Directive 89/336/EEC

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Introduction

Introduction to the Delta Theatre

The Delta Theatre is a fully modular 4 bus mixer providing unique versatility for sound effects and live mixing, whether it's in a theatre, concert hall or conference auditorium.

The console is based on a theatre input module specifically tailored to the requirements of theatre sound, providing comprehensive routing facilities on illuminated switches. Consoles may be specified with theatre modules for all inputs, or frames may be filled with any combination of modules from the Delta range, enabling you to design a console that fits your exact needs.

The console provides full 4 bus routing and six independent auxiliary sends, with front-panel-switchable pre/post fader status.

The Stereo Input includes a further innovation - a Stereo Width control, enabling the width of a stereo image to be continuously varied. This is a unique feature on a console of this type, and is ideal for enhancing theatre sound effects.

Delta Theatre comprises a range of input module, output module and frame options that lets you configure the console for a wide variety of applications, and to alter the layout very easily if required. The only constraint on the selection and positioning of modules is that any console must have a master module (2 channels width) fitted, and that any group output modules fitted have to be positioned immediately to the left of this.

Should you wish to replace or add extra modules, please contact your authorised Soundcraft dealer, who can supply the modules and change the configuration without voiding the warranty.

The output section of the Delta Theatre has been carefully designed to offer the maximum number of independent outputs in a compact mixer. The Dual Matrix module provides superb versatility for theatre applications, allowing additional output mixes to be created from signals present at the group and mix outputs, or from external submixers. A full 6 x 4 matrix is created by using only two modules, although any number can be specified.

The Dual Group/Stereo Return module contains all the features required for generating subgroups and stereo effects returns, and the stereo return section is ideal for bringing in additional stereo sources without taking up valuable input modules.

The Delta Theatre is supplied in four frame sizes - 8, 16, 24 or 32 channels. A rack-mount 8 channel version is also available.

Precautions and safety instructions

General Precautions

Avoid storing or using the mixing 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 supplied in a rugged cardboard box. If it is necessary to move it any distance after installation it is recommended that this packing is used to protect it. Be sure to disconnect all cabling before moving. If the console is to be regularly moved (e.g. for touring) 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 and cabling

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

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

Warning! **Always switch the power supply 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.**

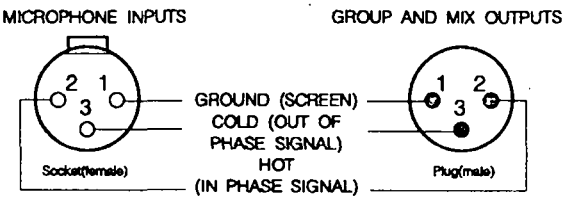
Always ensure that you use the correct type of power supply for the size of your console as shown below:

8, 16 & 24 Channel Frames	CPS150
32 Channel Frames	CPS450/B

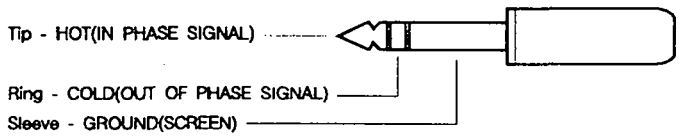
Connections

Wiring conventions

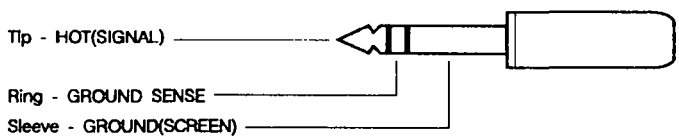
The standard Delta Theatre console uses two different types of audio connector, 3 pin XLR (top diagram) and ¼" three pole ('A' gauge or stereo) jacks. The latter are used in three different configurations, as shown below. The rear frame of the console has standard apertures fitted with blanking panels. Your Soundcraft dealer can supply a variety of mounting plates to fit these, with EDAC (ELCO) multiway connectors, together with looms to link them to the modules.



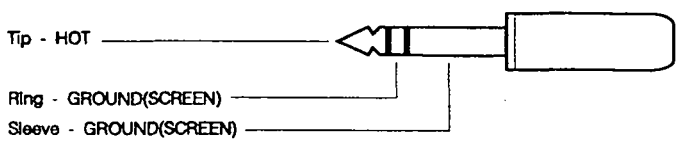
¼" 'A' Gauge Stereo Jack Plug used as balanced input: line inputs and tape returns



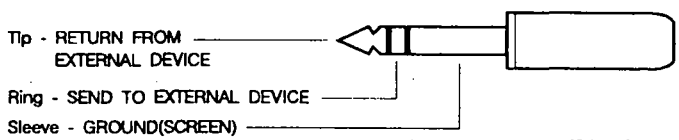
¼" 'A' Gauge Stereo Jack Plug used as ground compensated output: auxiliary send outputs and control room monitor outputs



¼" 'A' Gauge Stereo Jack Plug used as unbalanced output: direct outputs



¼" 'A' Gauge Stereo Jack Plug used as insert send/return



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 ohm) microphones.

Caution! **DO NOT use unbalanced microphones or battery powered condenser microphones with the +48V phantom power switched on: degraded performance or damage to the microphone may result.**

The sensitivity of the microphone input is variable from -2dBu to -70dBu (for +4dBu at the Stereo Mix outputs), and the maximum input level (balanced) is 20dB above the set sensitivity that is, with the gain control at minimum, the maximum input level is +18dBu. Although the microphone input can thus handle some line level signals, we don't recommend this, since the source may be unduly loaded by the low (2kΩ) input impedance, or be damaged by the +48V phantom power.

The line input has a sensitivity variable between -20dBu and +10dBu, and can also handle a maximum input level up to 20dB above the set value. Note that the maximum input level for unbalanced inputs is 4 or 5dB less than that for balanced signals, so very high level unbalanced signals (e.g. loudspeaker outputs of power amplifiers) may cause distortion. The input impedance is approximately 20kΩ, and thus high impedance sources (e.g. electric guitars) may be loaded too heavily. Such sources are best fed through an external DI (Direct Inject) box to the microphone input.

The main outputs of the console (e.g. Stereo mix, group outputs, aux sends) have a nominal output level of +4dBu, and an impedance of 75ohms. The Stereo mix and Group outputs also have the facility to switch the operating level to -10dBV to allow easy interface to domestic and semi professional equipment. These outputs will deliver full level (+21dBu unbalanced, +27dBu balanced) into loads of greater than 600ohms. Secondary outputs, such as channel insert sends and channel direct outputs (all unbalanced) have a nominal output level of -2dBu and a slightly higher output impedance of 200ohms, and will only deliver the full output level of +21dBu into load impedances of greater than 5kΩ.

Installation

Installation

The Delta Theatre is designed to offer ruggedness and compactness for touring applications, and to meet the exacting standards of fixed installations.

The diversity of live sound applications around the world is a great challenge for the designers of a top quality console such as the Delta Theatre. While great care is taken during design to ensure that installations are as trouble-free as possible, the following guidelines should be noted:

- Avoid multiple earth connections, especially in a large sound reinforcement installation where power is distributed, and cable runs can be very long.
- Where possible ensure that all cable screens and other signal earths are connected to ground only at their source.
- Avoid installing the console close to thyristor dimmer racks or other heavy current electrical equipment.
- Keep audio cables separate from lighting and other power cables.
- Provide a separate mains power supply for audio equipment, and where possible install an independent earth for all audio and communications equipment.
- Always ensure that you use the correct type of power supply for the size of your console as shown below:

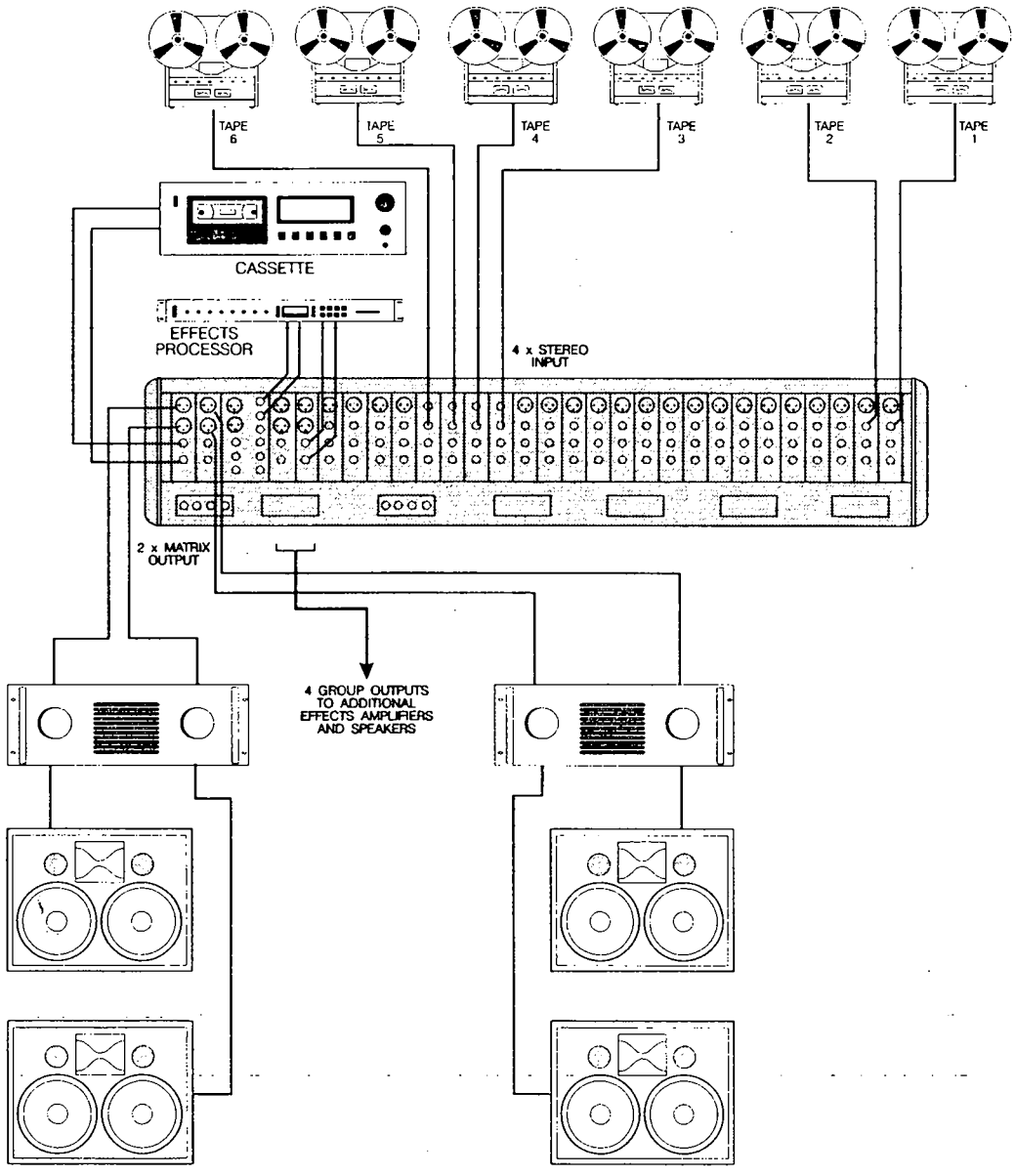
8, 16 & 24 Channel Frames	CPS150
32 Channel Frames	CPS450/B

Examples of use

The diagrams opposite and overleaf show typical applications of the Delta Theatre in small and large scale PA applications, and in a theatre installation. These examples are of course only an indication of the systems possible with the unique flexibility of the Delta Theatre, which may be easily reconfigured to ideally suit your particular requirements.

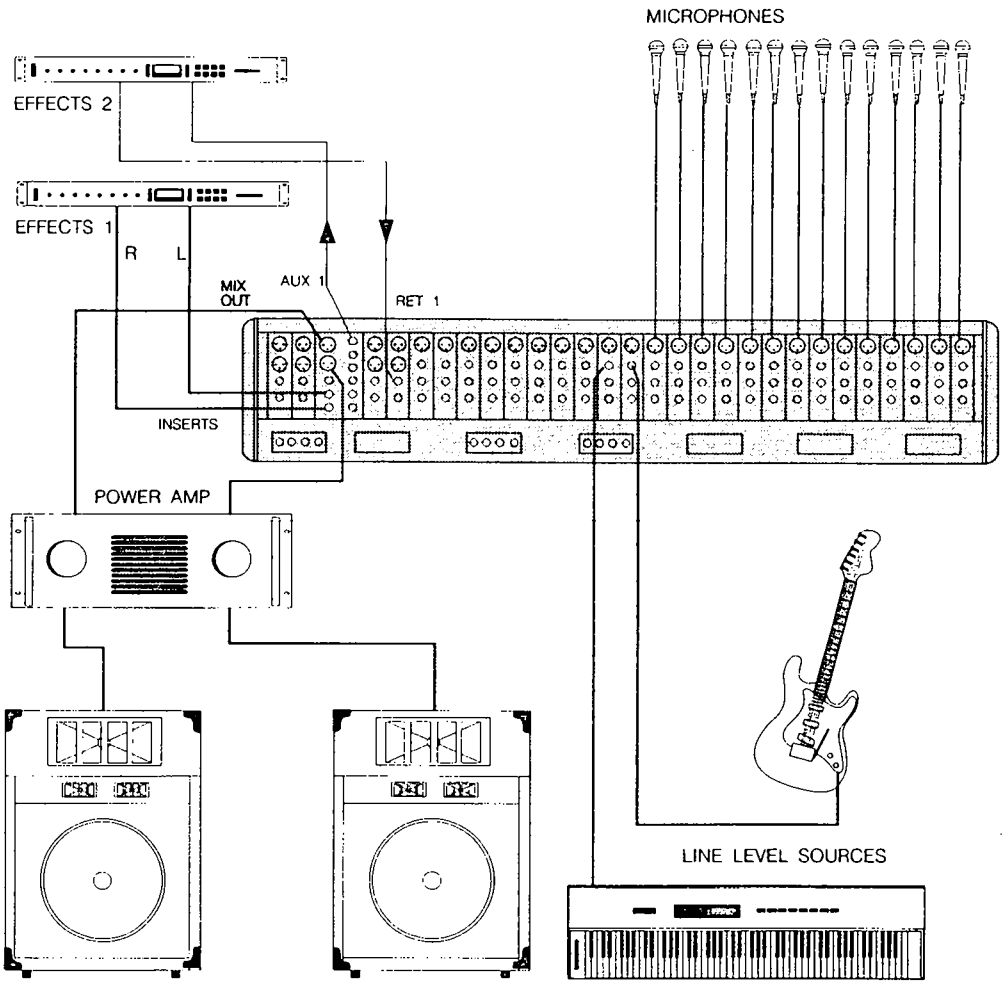
Theatre Sound

Theatre sound calls for the maximum flexibility from a console, and the wide choice of input and output options available on the Delta Theatre ideally suits the console to this role. The configuration below shows a 24 channel frame fitted with 4 stereo modules handling 2 track tape machines, and two dual matrix modules feeding effects speakers. Mono outputs from two other tape machines are fed to the line inputs of the first two Theatre input modules, taking advantage of the full routing flexibility of those modules for spot effects. Typically there would be many more speakers required, ideally on individual mixer outputs, and this console provides 4 matrix outputs in addition to the normal mix L&R, 4 groups and 6 auxiliaries. Note that additional outputs may be taken from the direct outputs of all Theatre input modules. A stereo cassette player feeds the external inputs of one of the matrix modules to provide the simplest possible source of house music. The output from an effects processor is fed back to the groups and mix via a stereo return module. Since the requirement for microphones is often limited in a theatre application, the stereo modules provide the maximum number of inputs in a compact console.



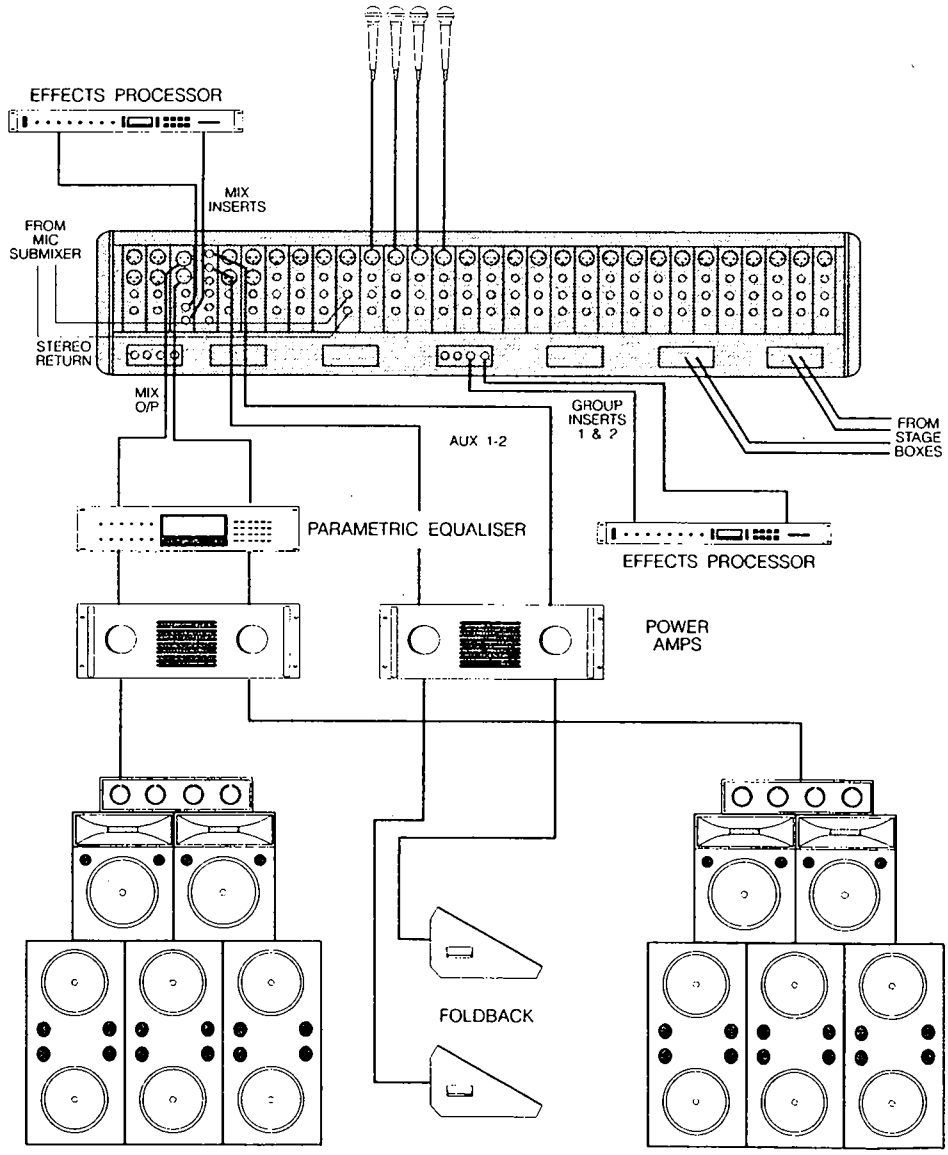
Public Address

Use as the front-of-house console in a sound reinforcement system. Microphones covering drums, guitars and vocals are fed to the mic inputs of Mono Input modules. Keyboard and other line level sources are fed to line inputs, and stereo modules could be fitted in these positions as an alternative. The Stereo mix is fed to the main speakers, with a stereo effects unit available via the mix inserts. A separate effects unit is accessed via Aux 1, and returned to the console on one of the Dual Group/Stereo Return modules. Other Aux outputs may be used for foldback or other outboard equipment.

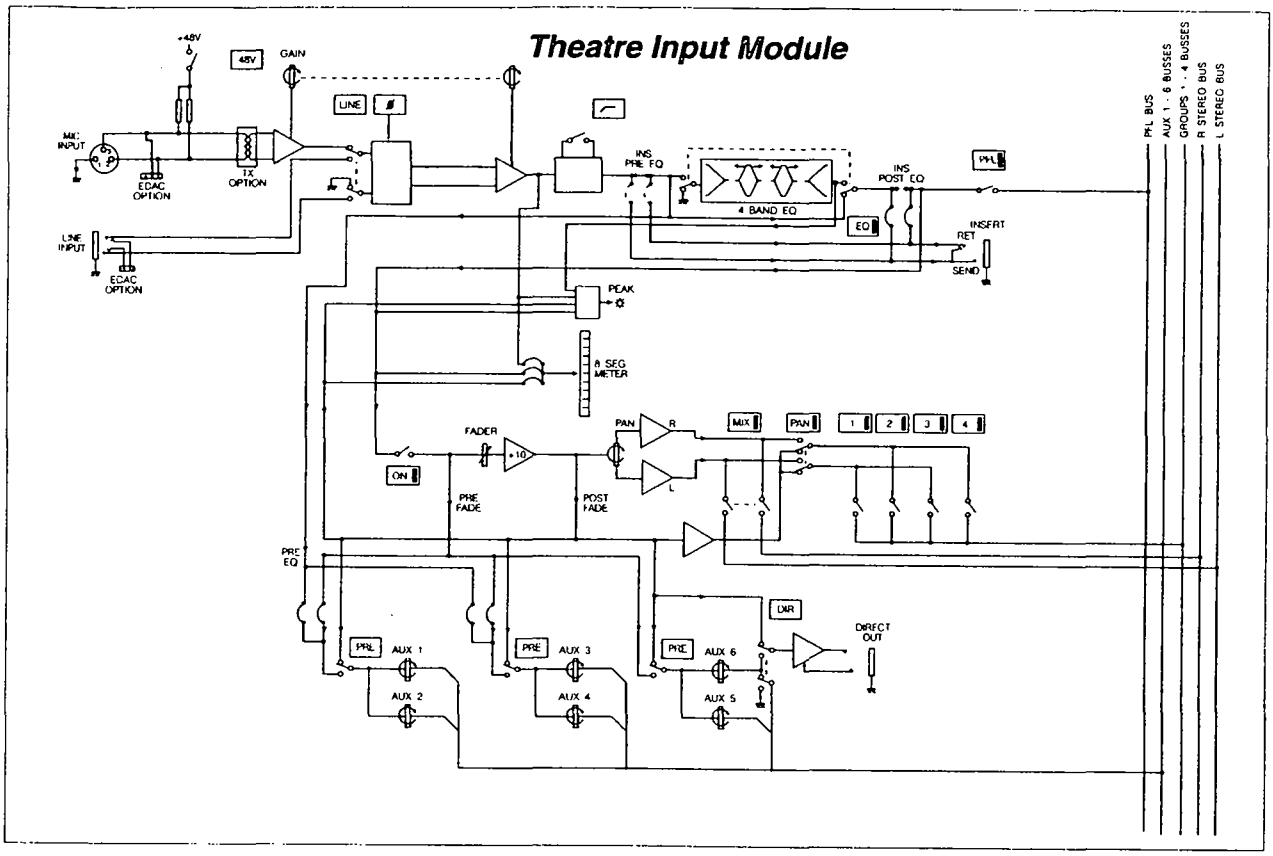


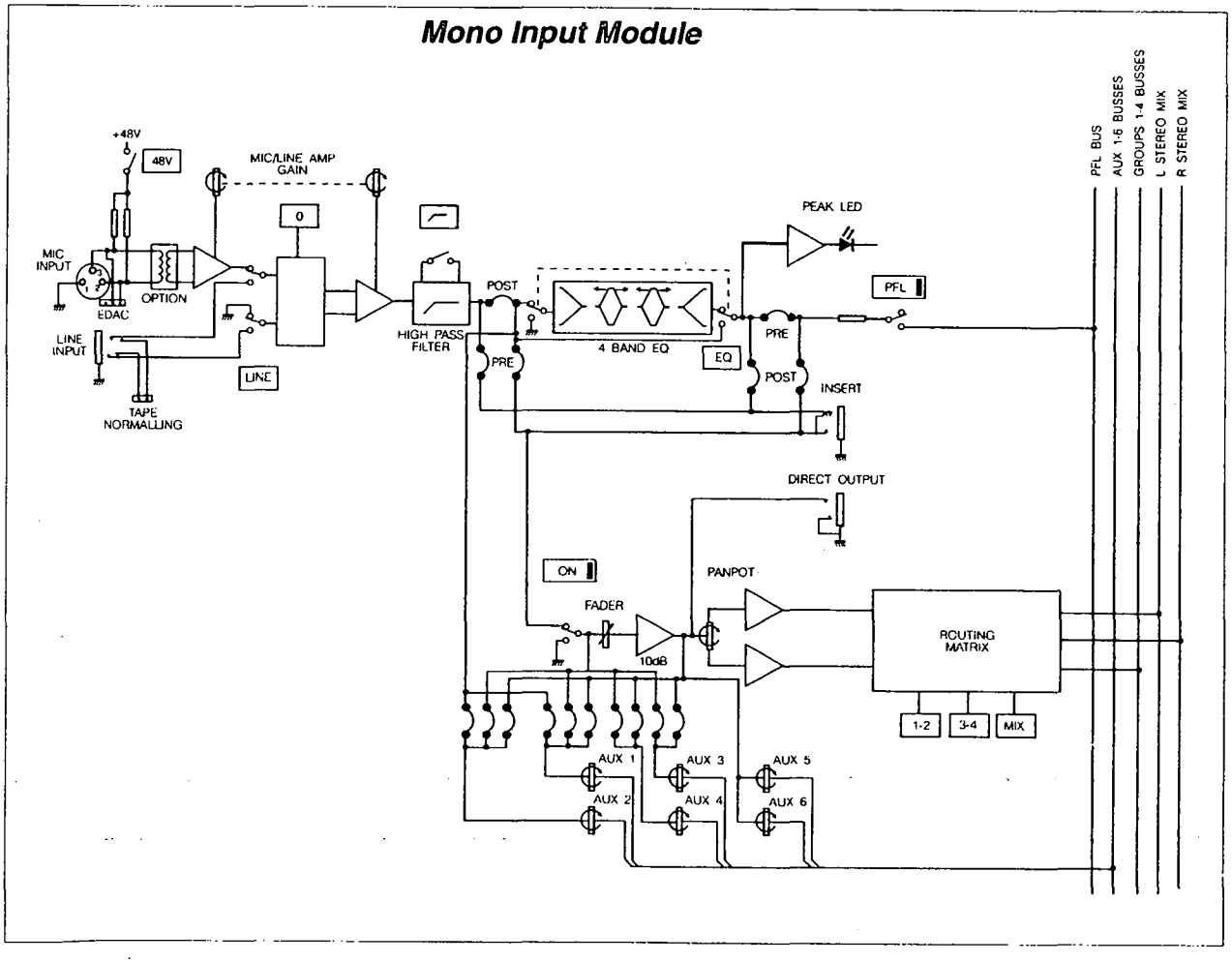
Sound Reinforcement

The diagram below shows a typical configuration in a larger scale sound reinforcement application. The main speakers are fed from the stereo mix via a parametric equaliser, with an effects processor connected to the mix inserts. Aux 1 and 2 feed stage foldback, and the outputs from an additional submixer are brought into one of the Dual Group/Stereo Return modules. Four Matrix sections are provided to feed side fill speakers or a centre cluster. The console is fitted with optional EDAC multicore connectors, to connect quickly and conveniently to stage microphone boxes or split feeds from another console.

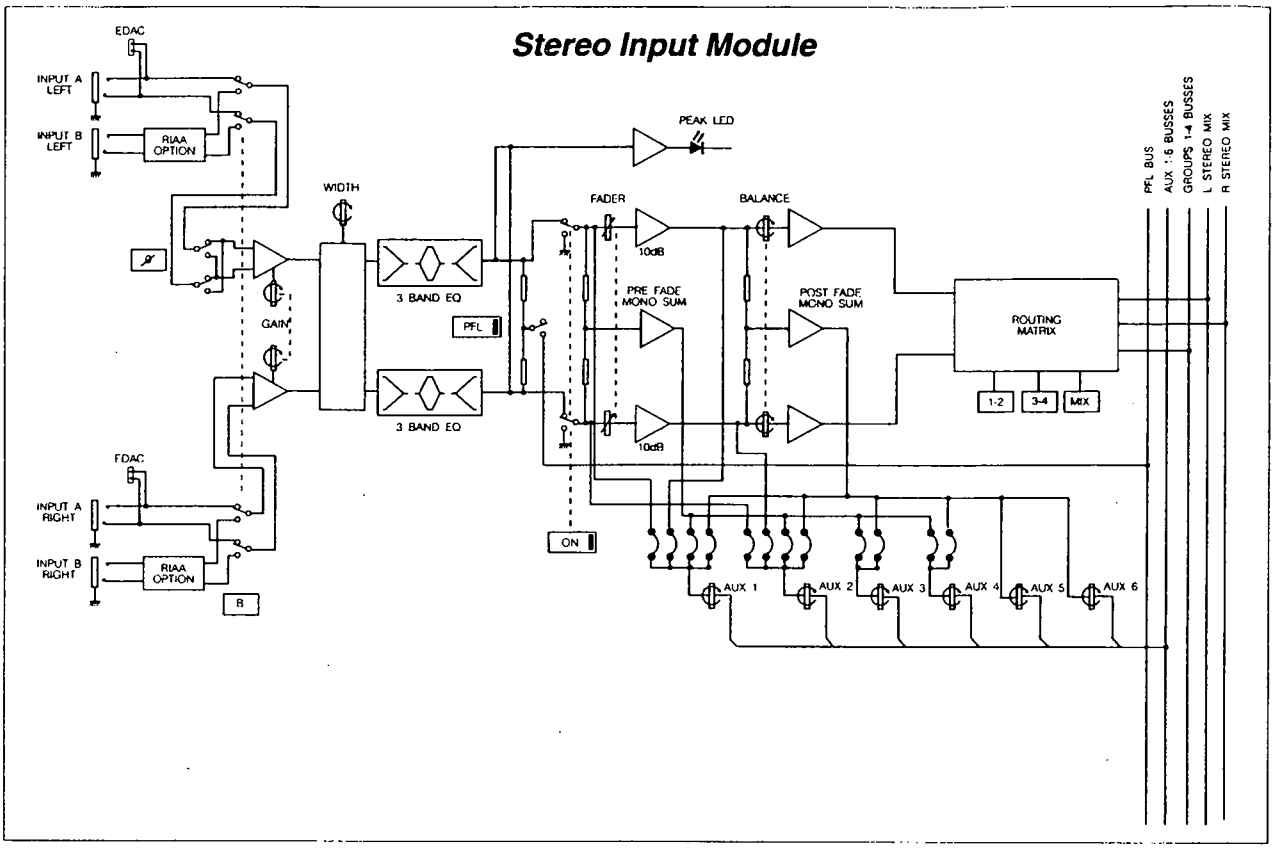


Module Block Diagrams

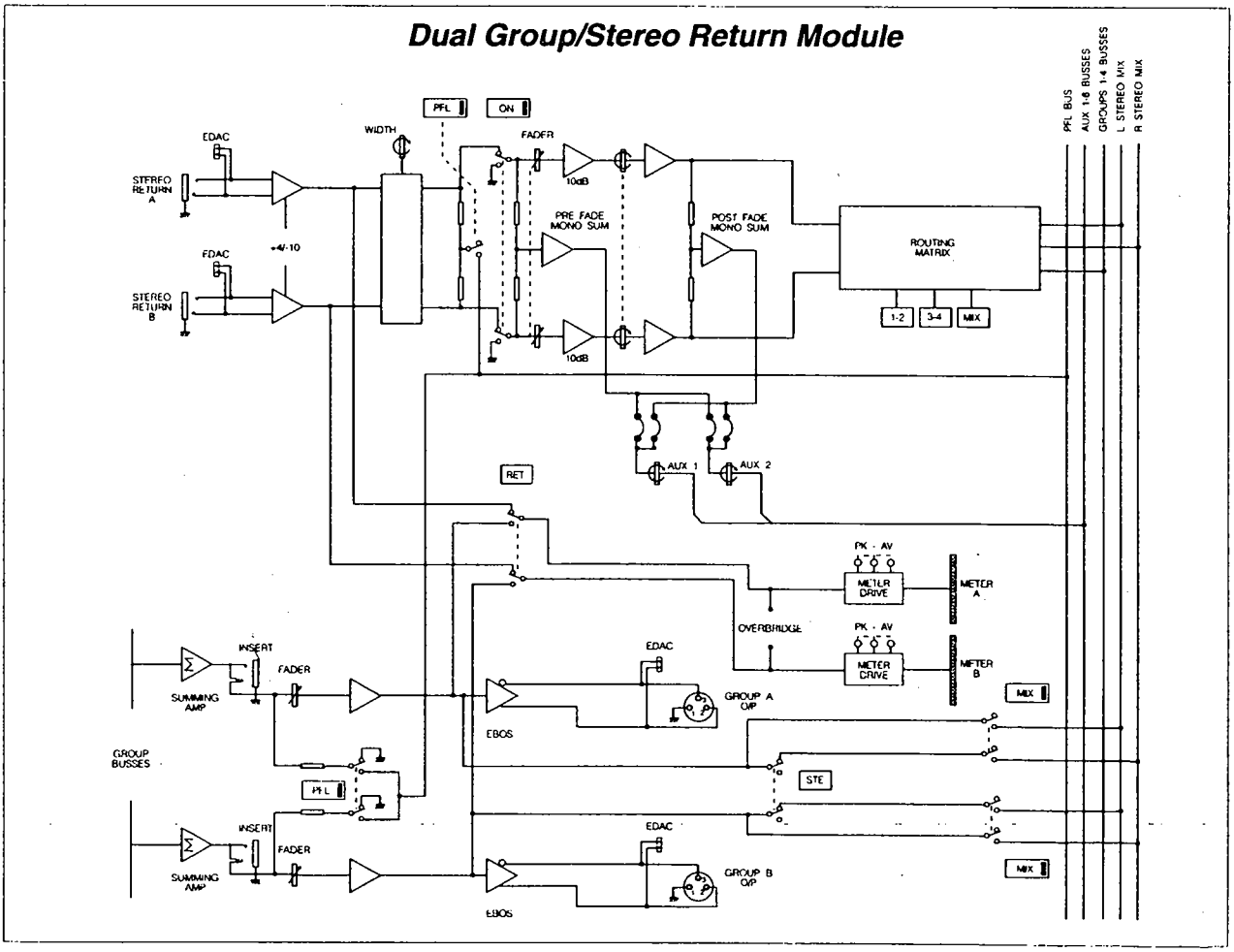

Theatre Input Module
+48V
48V
GAIN
LINE
MIC INPUT
EDAC OPTION
TX OPTION
LINE INPUT
INS PRE EQ
4 BAND EQ
INS POST EQ
PFL
EQ
INSERT RET
SEND
PEAK
8 SEG METER
FADER
+10
ON
PRE FADE
POST FADE
PAN
R
L
MIX
1
2
3
4
PRE EQ
DIR
DIRECT OUT
PRE
AUX 1
AUX 2
AUX 3
AUX 4
AUX 5
AUX 6
PFL BUS
AUX 1 - 6 BUSSES
GROUPS 1 - 4 BUSSES
R STEREO BUS
L STEREO BUS


Mono Input Module
+48V
48V
MIC/LINE AMP GAIN
0
MIC INPUT
EDAC
OPTION
LINE INPUT
TAPE NORMALLING
LINE
HIGH PASS FILTER
POST
PRE
4 BAND EQ
EQ
PEAK LED
PFL
INSERT
DIRECT OUTPUT
ON
FADER
10dB
PANPOT
ROUTING MATRIX
1-2
3-4
MIX
AUX 1
AUX 2
AUX 3
AUX 4
AUX 5
AUX 6
PFL BUS
AUX 1-6 BUSSES
GROUPS 1-4 BUSSES
L STEREO MIX
R STEREO MIX

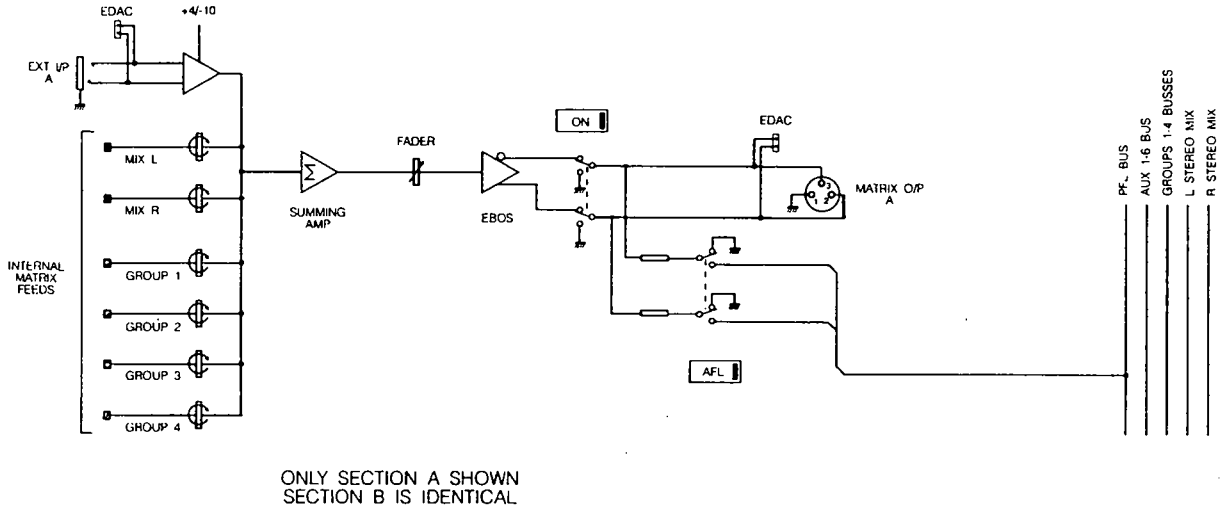
Stereo Input Module



Dual Group/Stereo Return Module

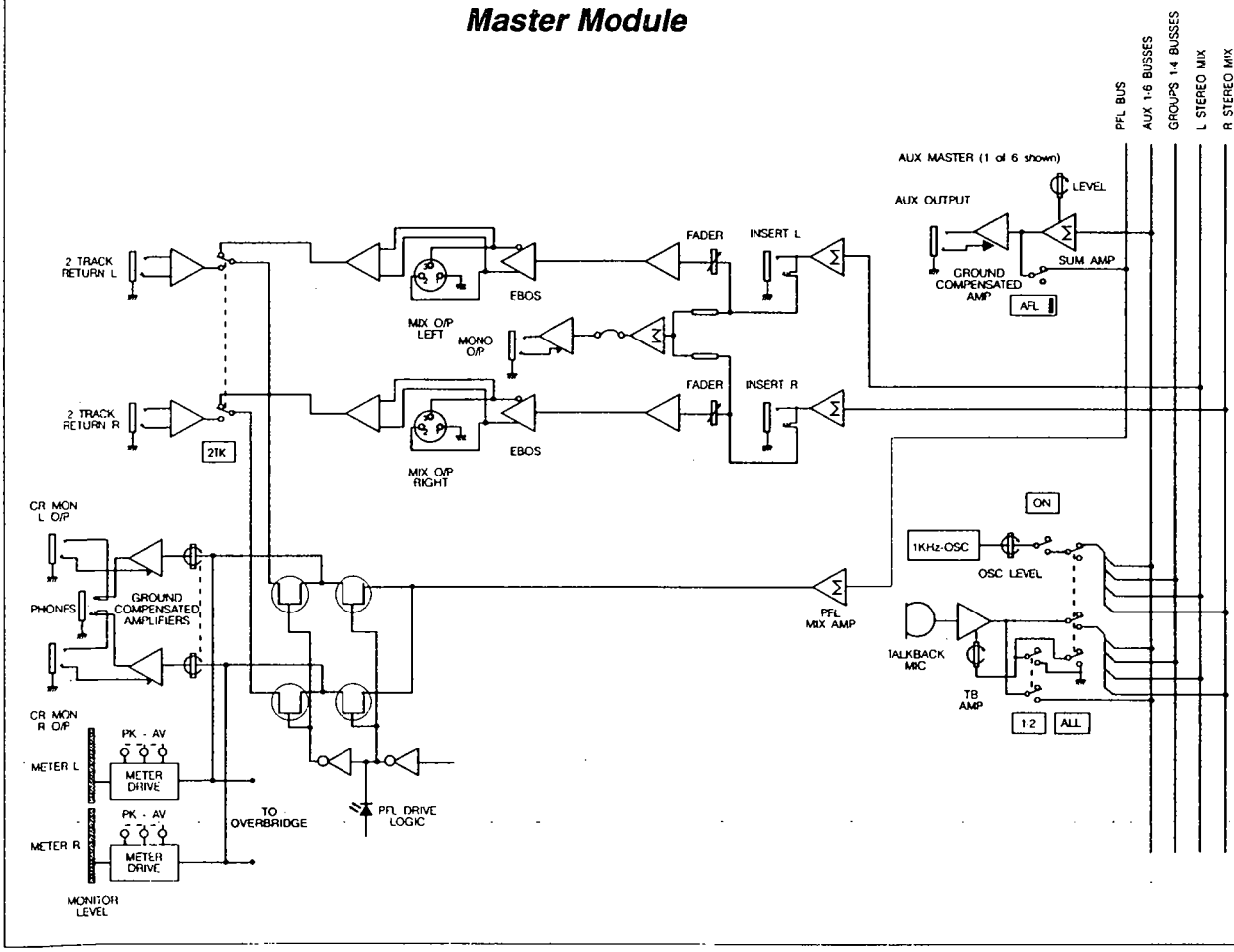


Dual Matrix Module



ONLY SECTION A SHOWN
SECTION B IS IDENTICAL

Master Module

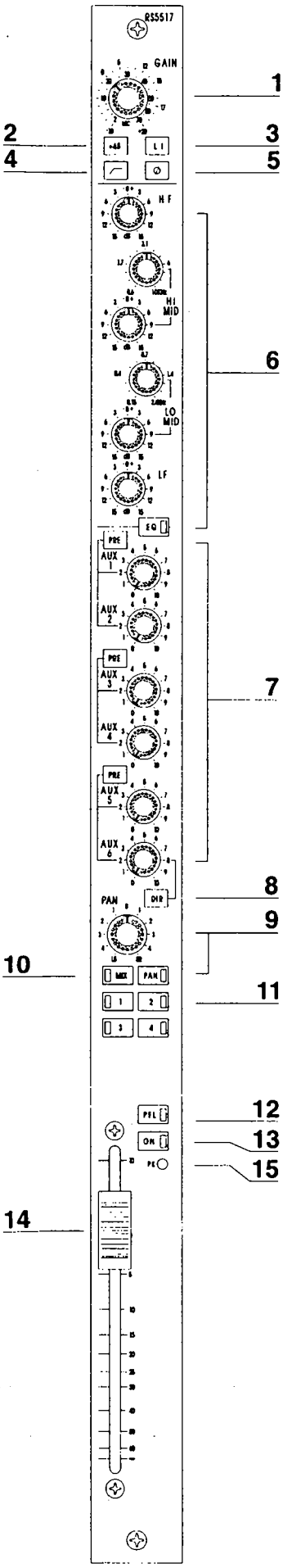


Theatre Input Module

Description

Specifications

and Operation



Theatre Input Module

Channel Input

1 **GAIN** adjusts the sensitivity of both mic and Line inputs. Mic input sensitivity: -2dBu to -70dBu. Line input sensitivity: -20dBu to +10dBu.

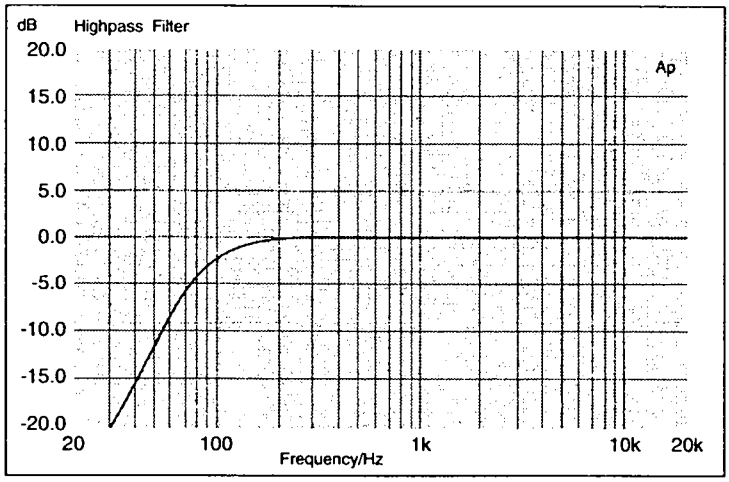
2 **+48V** switch applies 48V phantom power to the microphone input.

3 **LINE** selects the line input to the channel.

4 **HI-PASS FILTER** inserts a 100Hz second order filter immediately after the input amplifier.

5 **Ø** (PHASE) reverses the phase of the selected input.

Frequency Response Curves of the Hi-Pass Filter



Equaliser

6 The **EQUALISER** is a 4-band semi-parametric. HF. +/- 15dB shelving at a fixed frequency of 12kHz. HI MID. +/- 15dB peaking between 0.6 - 10kHz. Q = 1.5 LO MID. +/- 15dB peaking between 0.15 - 2.5kHz. Q = 1.5 LF. +/- 15dB shelving at a fixed frequency of 60Hz, with 30Hz VLF rolloff. The cut/boost pots are centre detented, the centre position giving a flat response. **EQ** switches the equaliser into circuit.

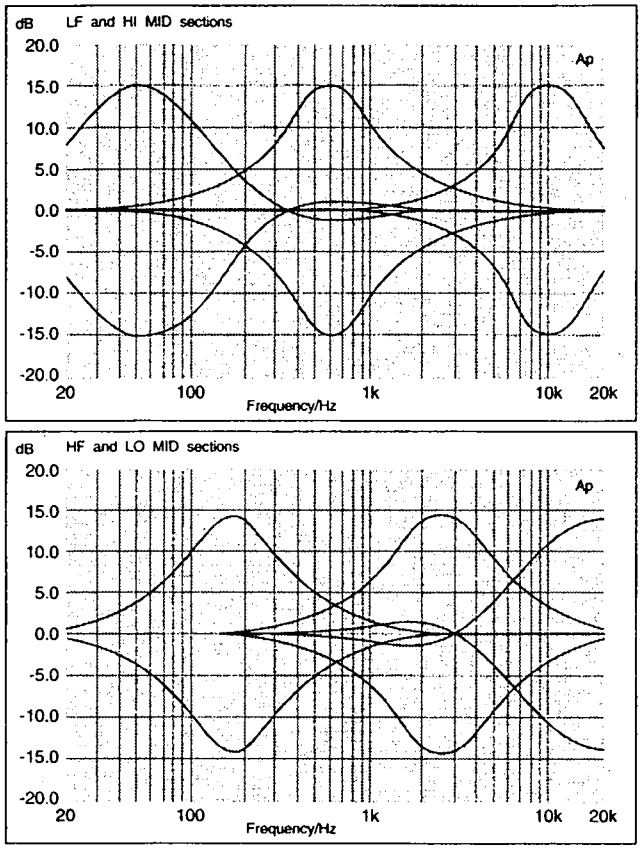
Auxiliaries

7 Six **AUXILIARY SENDS** are provided:

AUX SENDS 1 & 2 are normally sourced post-fade; The associated **PRE** sources them pre-fade instead. The pre-fade signal is jumper selectable pre-mute (default) or pre-EQ.

AUX SENDS 3 & 4 are normally sourced post-fade; The associated **PRE** sources them pre-fade instead. The pre-fade signal is jumper selectable pre-mute (default) or pre-EQ.

Frequency Response Curves of the Equaliser



Auxiliaries (cont)

AUX SENDS 5 & 6 are normally sourced post-fade; The associated **PRE** sources them pre-fade instead. The pre-fade signal is jumper selectable pre-mute (default) or pre-EQ.

Direct Output

8 The ground compensated **DIRECT OUT** is normally post-fade; **DIR** disconnects AUX 6 from the auxiliary bus, and uses it to control the level of the DIRECT OUT instead.

Routing

9 **PAN** determines the position of the signal within the stereo mix, or enables the channel signal to be routed to selected output groups. In the centre position there is a 4.5dB level drop. Pan left feeds the signal to odd numbered group busses, pan right to even group busses. Panning fully left or right sends the channel signal to only the left or right side respectively.

The illuminated **PAN** switch activates the PAN control. When the switch is released all group output routing switches are sourced pre-PAN.

10 **MIX** routes the panned, post-fade signal to the left and right mix busses.

11 Four illuminated **ROUTING SWITCHES** give access individually to the four group busses. When used with the PAN control the channel signal may be routed to selected output groups by panning fully right (even groups) or left (odd groups), or panned smoothly between two or more outputs.

Channel Status

12 The illuminated **PFL** switch feeds the pre-fade signal to the phones or control room, replacing the selected monitor source.

13 The illuminated **ON** switch activates the signal to the pre- and post-fade auxiliaries, routing and direct output.

14 The **FADER** is a 100mm Alps type with 10dB gain at maximum, and controls the level to the routing, post-fade auxiliaries and direct output.

Metering

15 The **PEAK** LED illuminates when the signal level exceeds +14dBu (6dB before clipping) at the output of the input amplifier, the output of the EQ, the insert return or the output of the fader amplifier.

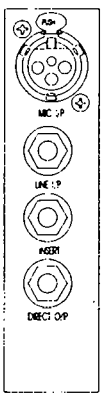
The **INSERT POINT** is link selectable to be either pre- or post-EQ. The factory fitted default is post-EQ. Both the send and the return are unbalanced and at a level of -2dBu.

A **DIRECT OUTPUT** is provided. It is ground compensated at a level of -2dBu. See paragraph 8 on the previous page for a description of the sourcing and level control of the direct output.

The Microphone and Line inputs have provision for optional EDAC multicore interfacing. The signal from the Mic multicore connects in parallel with the XLR. The signal from the Line multicore enters the module via the break contacts of the line input jack.

The rear connector panel is integral to the module and houses all external interface connectors as shown on the left.

Rear Connector Panel



Mic I/P Female XLR

Pin1	Screen
Pin 2	Hot
Pin 3	Cold

Line Input 3 Pole Jack

Tip	Hot
Ring	Cold
Sleeve	Screen

Insert 3 Pole Jack

Tip	Return
Ring	Send
Sleeve	Screen

Direct Output 3 Pole Jack

Tip	Hot
Ring	Ground Sense
Sleeve	Screen (cold)

Specification

MICROPHONE INPUT

Electronically Balanced, (Transformer Optional)	
Input Impedance	>2kΩ
Maximum I/P Level	+18dBu
Sensitivity Range	-2 to -70dBu
CMRR	>80dB at Max Gain. 1kHz
EIN 150R Source	<-127.5dBu at max gain

LINE INPUT

Electronically balanced	
Input Impedance	>10kΩ
Maximum I/P Level	>+27dBu
Sensitivity Range	-20 to +10dBu
CMRR	>40dB at 1kHz
EIN 40R Source	<-90dBu at unity gain

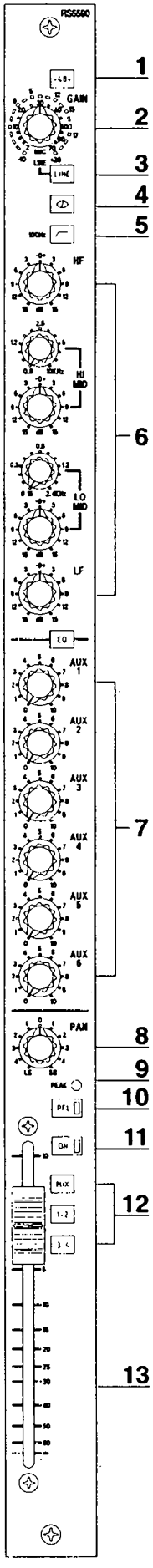
EQUALISER

Boost/Cut Range	+/-15dB
Break Frequencies	HF 12kHz Shelving, 2nd Order HI MID 0.6 - 10kHz Peaking. Q=1.5 LO Mid 0.15 - 2.5kHz Peaking. Q=1.5 LF 60Hz 2nd Order Shelf with 30Hz VLF Rolloff
Highpass Filter	-3dB at 100Hz, 2nd Order

GENERAL

Insert Send Level	-2dBu, Unbalanced
Insert Send Max O/P	+21dBu into 2kΩ
Direct Output Level	-2dBu, Ground compensated
Direct Output Max O/P	+21dBu into 600Ω
Fader Off Ratio	>80dB @ 1kHz, 80dB @ 10kHz Reference 0dB
Panpot Cross talk	<-85dB @ 1kHz, 80dB @ 10kHz
THD	<0.005% @ 1kHz <0.015% @ 10kHz

Mono Input Module



Mono Input Module

Channel Input

1 **+48V** switch applies 48V phantom power to the microphone input.

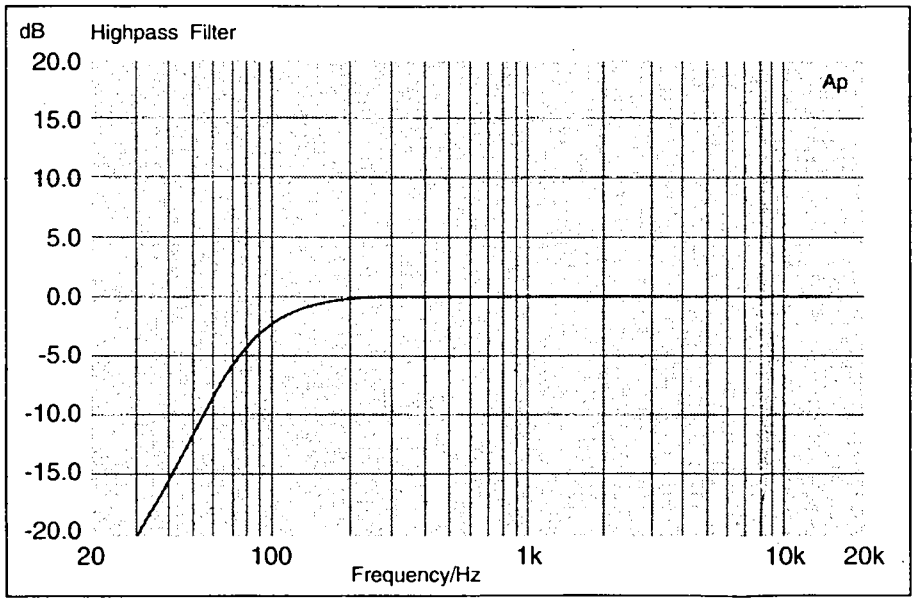
2 **GAIN** adjusts the sensitivity of both mic and Line inputs. Mic input sensitivity: -2dBu to -70dBu. Line input sensitivity: -20dBu to +10dBu.

3 **LINE** selects the line input to the channel.

4 **Ø** (PHASE) reverses the phase of the selected input, to compensate for different wiring standards and conflicting microphone placement.

5 **HI-PASS FILTER** inserts a 100Hz second order filter immediately after the input amplifier. This is especially useful for counteracting the proximity effect experienced with directional microphones, and eliminating low frequency spill and interference.

Frequency Response Curves of the Hi-Pass Filter

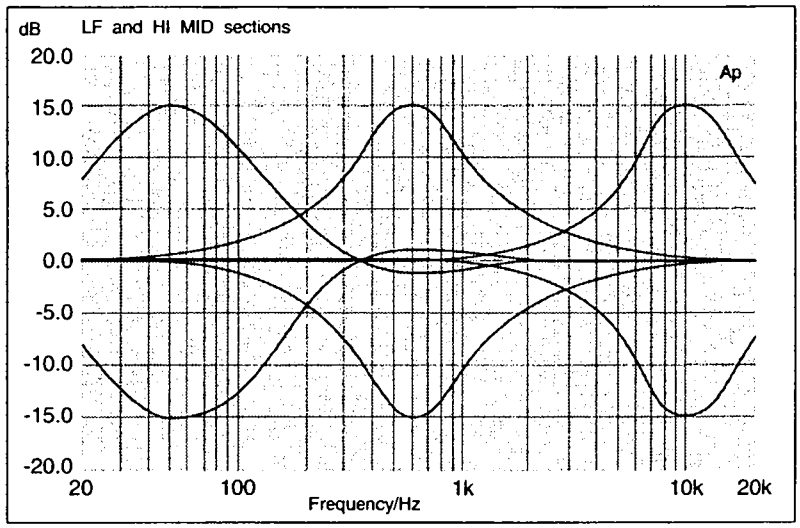


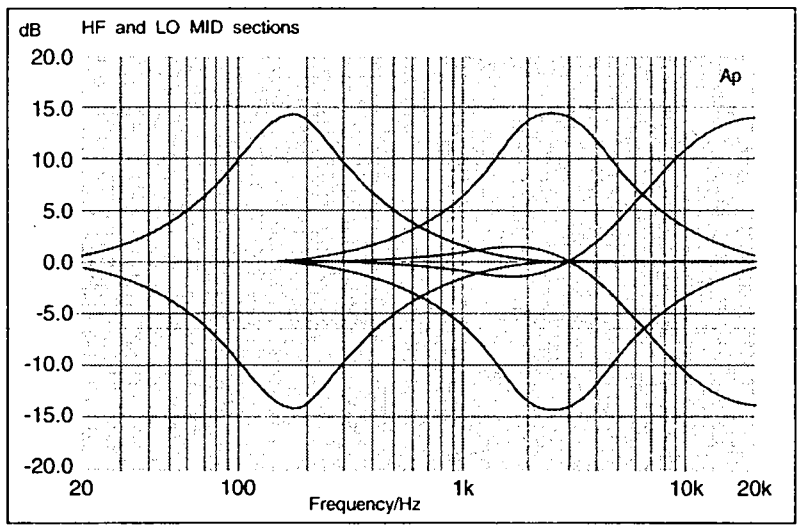
Equaliser

6 The equaliser is a 4-band semi-parametric. HF. +/- 15dB shelving at a fixed frequency of 12kHz. HI MID. +/- 15dB peaking between 0.6 - 10kHz. Q = 1.5 LO MID. +/- 15dB peaking between 0.15 - 2.5kHz. Q = 1.5 LF. +/- 15dB shelving at a fixed frequency of 60Hz, with 30Hz VLF rolloff. The cut/boost controls are centre detented, the centre position giving a flat response.

EQ switches the equaliser into the signal path when pressed.

Frequency Response Curves of the Equaliser





Auxiliaries

7 Six **AUXILIARY SENDS** are provided: Aux sends 1 through 4 have their sources individually selectable by internal jumpers. 1 & 2 can be: pre-EQ, pre-fade, or post-fade. 3 & 4 are either pre- or post-fade. The factory fitted default is AUX 1 and 2 pre-fade, AUX 3 and 4 post-fade. Aux sends 5 and 6 are permanently sourced post-fade.

Routing

8 **PAN** determines the position of the signal within the stereo image. In the centre position (detented) there is a 4.5dB level drop. Pan left feeds the signal to odd numbered busses, pan right to even busses. Panning fully left or right sends signal to only the left or right side respectively.

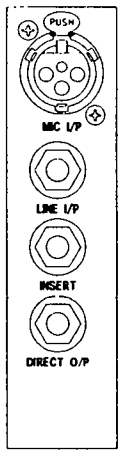
12 Three routing switches give access in pairs to MIX left and right busses and 4 group busses. The signal may be routed to an individual bus by using the relevant routing switches with the PAN control turned fully left or right. It is recommended that the routing is deselected on any unused channels to maximise the audio performance of the console.

Channel Status

9 The **PEAK** LED illuminates 7dB below clipping point, ie, it illuminates when a level of +14dBu is present within the module. It is sourced from the insert send.

10 The illuminated **PFL** switch feeds the pre-fade signal into the monitor system, where it replaces the selected monitor source.

11 The illuminated **ON** switch enables the post EQ, post insert channel signal path: when off, all auxiliary sends except those selected pre-EQ, and all routing outputs are muted. We recommend that you switch all unused channels 'off' , to prevent unwanted noise being added to any parts of the mix.



13 The fader is a 100mm Alps type, with 10dB gain, and this is the main level control of the channel, with a long throw to enable rapid and accurate control of the channel output level. When mixing, you will get optimum headroom and signal-to-noise ratios by keeping the fader at about the unity gain (0) mark; avoid running the input **GAIN** too high, and the fader resultingly low, since this gives very little headroom. Similarly, running the input **GAIN** very low, and the fader fully up (10dB of gain) will increase noise levels, and does not allow any increase in gain on the fader should the source signal level drop unexpectedly.

The insert point is link selectable to be either pre- or post-EQ. The factory fitted default is post-EQ. Both the send and the return are unbalanced and at a level of -2dBu.

An unbalanced direct output is provided at a nominal level of -2dBu at the rear panel jack socket.

The rear connector panel is integral to the module and houses all external interface connectors as shown on the left.

Rear Connector Panel

Mic I/P Female XLR

Pin 1	Screen
Pin 2	Hot
Pin 3	Cold

Line Input 3 Pole Jack

Tip	Hot
Ring	Cold
Sleeve	Screen

Insert 3 Pole Jack

Tip	Return
Ring	Send
Sleeve	Screen

Direct Output 3 Pole Jack

Tip	Hot
Ring	Ground
Sleeve	Screen

Microphone Input

Electronically Balanced, transformer Option (Sowter 7026)

Input Impedance	>2kΩ
Maximum I/P Level	+18dBu
Sensitivity Range	-2 to -70dBu
CMRR at max gain	>70dB at 1kHz
EIN 150R Source	<-127.5dBu at max gain

Line Input

Electronically balanced

Input Impedance	>10kΩ
Maximum I/P Level	>+27dBu
Sensitivity Range	-20 to +10dBu
CMRR at max gain	>40dB constant with frequency
EIN, 150R Source	<-90dBu at +4dBu sensitivity
Frequency Response	+/- 0.5dB 20Hz - 20kHz

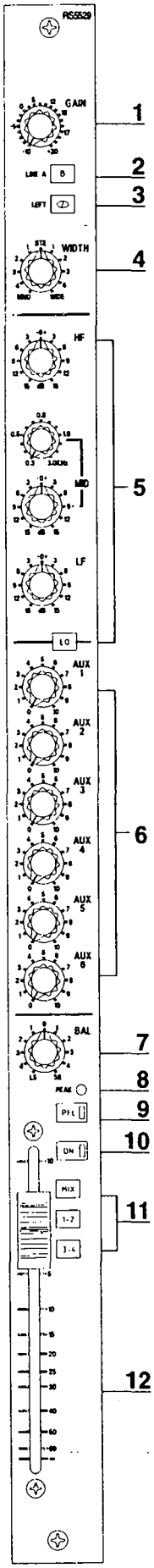
Equaliser

Boost/Cut Range	+/-15dB
Break Frequencies	HF 12kHz Shelving, 2nd Order HI MID 0.6 - 10kHz Peaking. Q=1.5 LO Mid 0.15 - 2.5kHz Peaking. Q=1.5 LF 60Hz 2nd Order Shelf with 30Hz VLF Rolloff
Highpass Filter	-3dB at 100Hz, 2nd Order Butterworth (maximally flat).

General

Insert Send Level	-2dBu, unbalanced
Insert Send Max O/P	+20dBu into 2kΩ
Direct Output Level	-2dBu, unbalanced
Direct Output Max O/P	+21dBu into 5kΩ
ON switch "off" Ratio	>100dB @ 1kHz, 90dB @ 10kHz
Fader Off Ratio	> 85dB @ 1kHz, 80dB @ 10kHz Reference 0dB
Panpot Cross talk	< -85dB @ 1kHz, 80dB @ 10kHz
Routing "off" ratio	> 95dB @ 1kHz, > 90dB @ 10kHz
Aux send "off" ratio	> 85dB @ 1kHz, > 80dB @ 10kHz
THD +20dB at LINE IN	< 0.005% @ 1kHz, < 0.015% @ 10kHz

Stereo Input Module



Stereo Input Module

Channel Input

1 **GAIN** adjusts the sensitivity of the line inputs of both channels from -20dBu to +10dBu.

2 **B** selects the alternative B inputs which may be fitted with an RIAA preamp option.

3 **Ø LEFT** reverses the phase of the left channel of the selected input.

4 **WIDTH** is a continuously variable control which allows the width of the stereo image to be varied from mono (ACW) through stereo (centre detent) to phase enhanced wide stereo (CW).

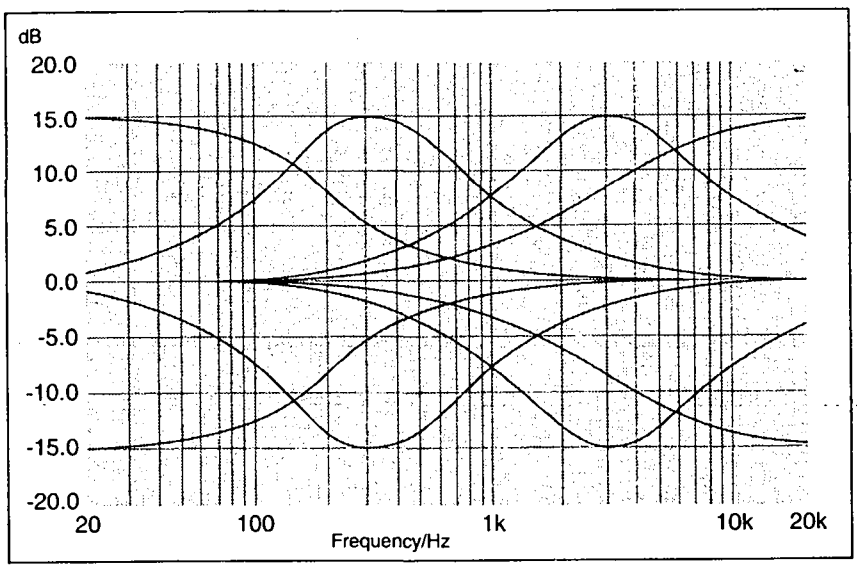
Equaliser

5 The **EQ SECTION** is 3-band semi-parametric. HF. +/- 15dB shelving at a fixed frequency of 12kHz. MID. +/- 15dB peaking between 0.3 - 3kHz. Q = 1.0 minimum. LF. +/- 15dB shelving at a fixed frequency of 60Hz. The cut/boost controls are centre detented, the centre position giving a flat response. **EQ** switches the equaliser into circuit.

Auxiliaries

6 Six **AUXILIARY SENDS** are provided: Auxiliary sends 1 and 2 are internally individually link selectable for pre or post fade, and mono or stereo operation: when stereo is selected, the left channel feeds AUX 1, and the right AUX 2. The factory default is AUX 1 and 2 pre fade, mono. AUX 3 through 6 are permanently sourced mono, with AUX 3 and 4 link selectable to be pre fade or post fade (default), whilst AUX 5 and 6 are permanently post fade.

Frequency Response of the Equaliser



Routing

7 The **BAL** (balance) control determines the relative level of the L and R signals. In the centre position (detented) its gain is unity. Turning it fully CW increases the right signal by +4.5dB, and totally kills the left signal. Full ACW rotation has the opposite effect. Balance left biases the signal to odd numbered busses, balance right to even busses.

11 Three **ROUTING SWITCHES** give access in pairs to MIX left and right busses and 4 group busses.

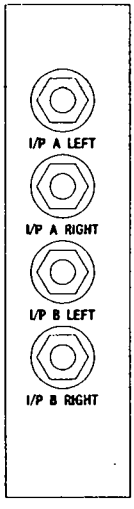
Channel Status

8 The **PEAK** LED illuminates 7dB below clipping point, ie, it illuminates when a level of +14dBu is present within the module. It is sourced from the post EQ signal.

9 The illuminated **PFL** switch feeds the pre-fade signal into the monitor system, where it replaces the selected monitor source.

10 The illuminated **ON** switch enables the post EQ signal path.

12 The **FADER** is a stereo 100mm Alps type, with 10dB gain.



Rear Connector Panel

Line Inputs A & B L & R

3 Pole Jack, balanced

Tip	Hot
Ring	Cold
Sleeve	Screen

The inputs are electronically balanced.

Line Input A has provision for optional EDAC multicore interfacing. The signal from the Line multicore parallels the input.

The rear connector panel is integral to the module and houses the 4 external interface connectors as shown on the left.

Line inputs

Electronically balanced.	
Input impedance	>10k ohms.
Maximum input level	+27dBu.
Sensitivity range	-20 to +10dBu
CMRR	>40dB @ 1kHz.
Frequency response	+/-0.5dB 20Hz - 20kHz.

Equalisation

Boost/cut range	+/-15dB
Break frequencies	HF 12kHz shelving
	MF 0.3 - 3kHz peaking, Q=1
	LF 60Hz shelving

General

ON switch off ratio	>95dB @ 1kHz, >90dB @ 10kHz
Fader off ratio	>85dB @ 1kHz, >80dB @ 10kHz
Balance pot off ratio	<-85dB @ 1kHz, <-80dB @ 10kHz
Routing off ratio (16 CH routed)	>90dB @ 1kHz,
	>80dB @ 10kHz.
L/R crosstalk,	<-60dB @ 1kHz.
width control at centre	
THD	<0.005% @ 1kHz,
	<0.015% @ 10kHz

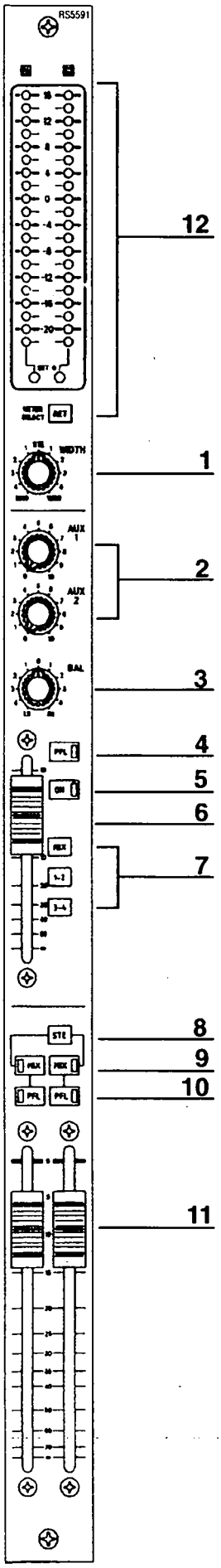
Dual Group/Stereo Return Module

Description

Specifications

and Operation

Dual Group/Stereo Return Module



Functionally this module comprises two separate parts: the dual group output and the stereo effects return.

Stereo Return

The Left and Right line inputs are accessed by 1/4" stereo jacks on the rear connector panel. These inputs are buffered by a standard line input stage, which has a nominal sensitivity of +4dBu, switchable by a rear panel switch to -10dBV. The switch has physical protection against accidental operation.

1 The **WIDTH** control allows continually variable control over the WIDTH of the stereo image from mono (ACW) through normal stereo (centre detent) to phase enhanced wide stereo (CW).

2 Individual summed mono sends to auxiliary busses 1 and 2 are provided through the rotary controls **AUX 1** and **AUX 2**. These are shipped as pre-fade, but may be individually selectable by internal jumpers to be post fade.

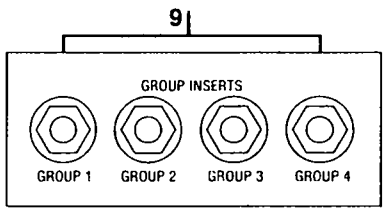
3 The **BALANCE** control trims the level of the signal being fed to the routing switches. In the centre position the gain of the balance control is unity. Turning it fully CW increases the right signal by +4.5dB, and totally kills the left signal. Full ACW rotation has the opposite effect. Balance left biases the signal to odd numbered busses, balance right to even busses.

4 The illuminated **PFL** switch allows monitoring of a mono sum of the signal.

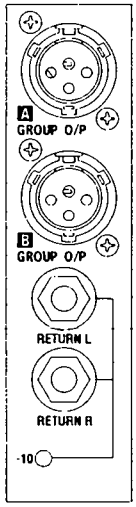
5 The illuminated **ON** switch enables the signal to be routed to all the outputs (Group busses and Mix) of the return.

6 & 7 The 60mm throw Alps **FADER** has a gain of +10dB at the top of its travel. It controls the level fed to the centre detented balance control which in turn feeds the routing switches. These give access to all group busses and the stereo mix bus.

Insert Panel



Rear Connector Panel



Line Outputs Male XLR

Pin 1	Screen
Pin 2	Hot
Pin 3	Cold

Stereo Line Returns

3 pole Jack, balanced

Tip	Hot
Ring	Cold
Sleeve	Screen

Group Insert 3 pole jack

Tip	Return
Ring	Send
Sleeve	Screen

Group Output

The group busses are fed to single ended low noise virtual earth summing amplifiers via 0.1" movable links to select the position of the particular module in the console. The summing amplifier outputs are at a nominal level of -2dBu, and feed the group faders via the insert. An internal switch selects the pair of inserts that the module feeds (1 & 2, 3 & 4).

Routing

8 & 9 The post fade signals can be routed individually as mono signals at unity gain to the stereo mix bus by the illuminated **MIX** switches. If the **STE** switch is depressed, the group signals are fed to the stereo mix as stereo signals, odd groups routing to left, even to right.

The post fade group signals are also buffered, electronically balanced and fed to the rear panel XLR connectors: the nominal level at these connectors is +4dBu.

10 The pre fade group signals are accessed by individual illuminated **PFL** switches.

11 The group **FADERS** are 100mm Alps types, with unity gain (0dB) at the top of their travel.

Metering

12 The 20 segment LED bargraph **METERS** normally read the group outputs and are link selectable for a peak or average response. Selecting the **RET** switch allows the stereo return signal to be metered.

The insert jacks are located in rear aperture panels.

The rear connector panel is integral to the module and houses the stereo return level switch and the 4 external interface connectors. The returns and group outputs have provision for optional EDAC multicore interfacing. The signals from the Line multicore parallel the return inputs.

Specification

Group Output

Electronically Balanced	
Insert Send Nominal Level	-2dBu
Nominal Output Level	+4dBu
Maximum Output Level	>+26dBu into 600Ω
Output Impedance	75Ω
Group - Group Crosstalk:	
Same Module	<-90dB @ 1kHz
	<-85dB @ 10kHz
Adjacent Module	<-105dB @ 1kHz
	<-95dB @ 10kHz
Fader Off Ratio	>85dB @ 1kHz
	>80dB @ 10kHz
Mix Switch Off Ratio	>-100dB @ 1kHz
	>-95dB @ 10kHz
THD	0.003% @ 1kHz
	0.005% @ 10kHz

Stereo Return

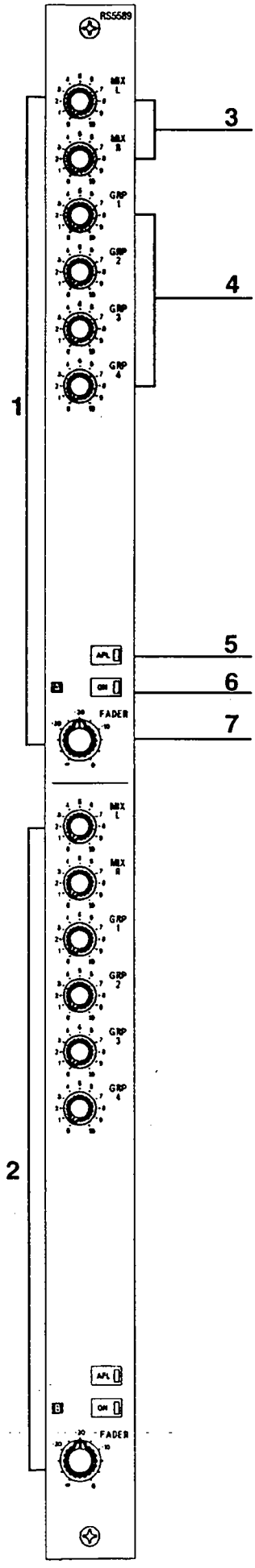
Electronically balanced	
Input Impedance	10kΩ
Nominal Input Level	+4dBu/-10dBV, Switchable
Mute Off Ratio	>95dB @ 1kHz
	>90dB @ 10kHz
Fader Off Ratio	>75dB @ 1kHz, 10kHz
Balance Pot Off Ratio	>70dB @ 1kHz, 10kHz
L/R Crosstalk,	
Width Control at Centre	<-60dB @ 1kHz, 10kHz
THD	0.003% @ 1kHz
	0.007% @ 10kHz

Dual Matrix Module

Description

Specifications

and Operation



Dual Matrix Module

Module Input

1 & 2 The module contains two functionally identical receive matrix sections designated A (upper) and B (lower). Each dual matrix output module allows the creation of two additional output mixes from the signals present at the group and mix outputs.

The MIX L and R signals enter the module via a 20 way ribbon cable that runs from the master rearconn via the masters to the group output modules. The group signals enter via a 10 way ribbon cable that connects to all group and matrix modules. All internal inputs are at a level of -2dBu, and all the matrix level controls have a gain of unity when fully clockwise. The matrix summing amplifiers have a gain of -6dB, which is made up after the fader, to optimise fader headroom.

The External Input is balanced. Its sensitivity is switchable between +4dBu and -10dBV. The switch is located on the rear panel and affects both external inputs. It has physical protection against accidental operation. Each input is summed into the matrix mix at fixed (unity re. the output) gain. The External inputs can be used for feeding sub-mixes directly into the matrix.

3 The left and right stereo mix signals are summed into the matrix mix via the **MIX L** and **R** level controls .

4 The four **GROUP LEVEL** controls set the level of each group sent to the matrix mix.

5 The **AFL** switch allows each signal to be monitored.

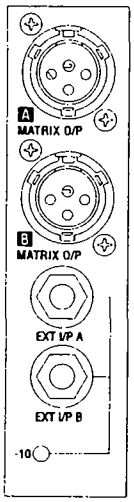
6 The post fade signal is buffered and balanced before being output via the **ON** switch to the rear panel XLR sockets at a nominal level of +4dBu.

7 The output level of each matrix mix is controlled by a rotary **FADER**, with a gain of 0dB when rotated fully CW.

The rear connector panel is integral to the module and houses the external interface connectors. The External Inputs have provision for optional EDAC multicore interfacing. The signal from the Line multicore can either parallel the external input or enter the module via the break contacts of the external input jack. When the line multicore option is not fitted, the break contacts are shorted together via a link.

Dual Matrix modules will normally be fitted on the far right-hand side of the frame.

Rear Connector Panel



Matrix Outputs Male XLR, balanced

Pin 1	Screen
Pin 2	Hot
Pin 3	Cold

External Inputs 3 pole jack, balanced

Tip	Hot
Ring	Cold
Sleeve	Screen

Specification

Matrix Output

Electronically Balanced	
Nominal Output Level	+4dBu
Maximum Output Level	>+26dBu into 600Ω
Output Impedance	75Ω
A - B Crosstalk	<-100dB @ 1kHz
	<-95dB @ 10kHz
Fader Off Ratio	>90dB @ 1kHz, 10kHz
ON Switch Off Ratio	>100dB @ 1kHz, 10kHz
THD (Ext In to Matrix Out)	0.003% @ 1kHz
	0.005% @ 10kHz

External Inputs

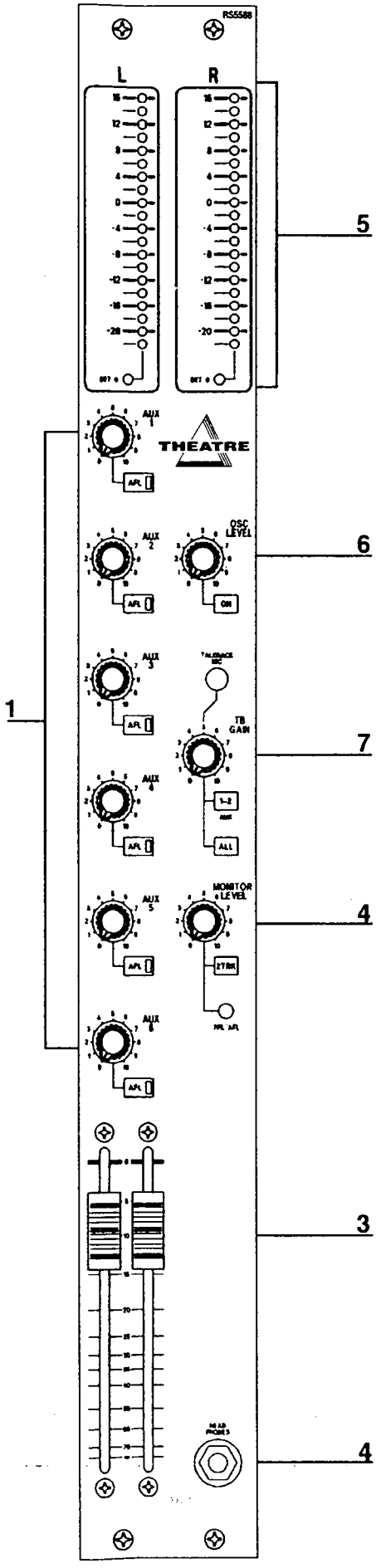
Input Impedance	10kΩ
Nominal Input Level	+4dBu/-10dBV Switchable
Max Input Level	+21dB Above Nominal
CMRR	> 40dB @ 1kHz

Master Module

Description

Specifications

and Operation



Master Module

Auxiliaries

1 The **AUXILIARY SEND MASTER** level controls set the output level of the auxiliary send mixes: the output level can be conveniently monitored using the aux send AFL switches. Optimum noise performance will be obtained with the send controls on the input channels turned up far enough to give a peak output level (metered using the aux send AFL switch) of +16 with the output level control at unity gain (7 on the scale). The output level should then be turned down to suit the input level of the device the send is driving.

Master Outputs

2 **INSERT** points are provided in the stereo mix signal path to enable the insertion of external processing devices in the signal path.

3 The master output **FADERS** control the level of the stereo mix output. In order to preserve headroom, they should normally be run in the top 10dB of their range. If the stereo output is feeding a device which requires a lower input level (e.g. a domestic tape recorder), the reference level of the output and 2-track return level should be changed using the internal switch: see the Venue II technical manual.

A mono sum of the stereo mix signal, taken before the main faders, is available on the rear connector panel.

Monitoring

4 Provision is made to monitor the stereo mix output, the PFL signal and the 2 track return (see Ancillary Connector Panel). The **CR MON** jacks on this panel are available to drive on external power amplifier/loudspeakers, alternatively stereo **HEADPHONES** can be plugged into the front panel jack: this will mute the CR MON outputs. The level is set by the **MONITOR LEVEL** control. Selection of the **2TRK** switch routes the 2 track tape return inputs to the monitors. Selecting a **PFL** switch on any input will automatically switch the monitoring to the PFL signal, overriding the Mix/2 track selection.

Output Meters

5 The stereo output **METERS** automatically follow the monitor selection of mix/2 track/PFL, though the meter reading is independent of the MONITOR LEVEL. The meter reading is relative to the operating level selected (see 3 above).

Oscillator

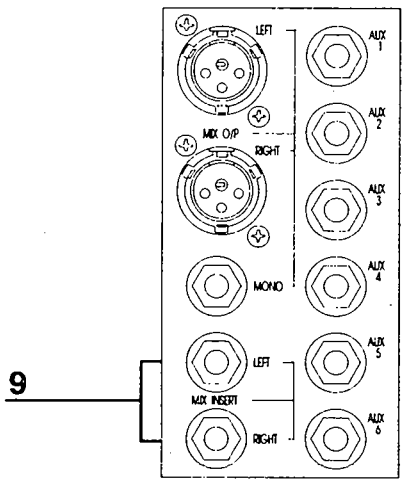
6 A 1kHz **OSCILLATOR** is provided, which feeds a sine wave output of up to +16dBu to all groups, the stereo mix and aux buses, at a level set by the **OSC LEVEL** control. The oscillator is enabled by the **ON** switch, and is overridden by the selection of the talkback switch.

Talkback

7 Talkback can be routed to either aux send 1 and 2 (**1-2** switch), or to all buses (**ALL** switch). An integral mic is provided, flush mounted behind the front panel, with an associated gain control **TB GAIN**. In order to avoid acoustic feedback, the CR monitor outputs are attenuated ("Dimmed") by approximately 20dB when talkback to Aux 1-2 is selected, and muted when talkback to ALL is selected.

Insert points are provided in the stereo mix path to enable the insertion of external processing devices in the signal path.

Rear Connector Panel



Mix O/Ps, Male XLR

Pin 1	Screen
Pin 2	Hot
Pin 3	Cold

Aux O/Ps, 3 pole jacks

Tip	Hot
Ring	Cold
Sleeve	Ground

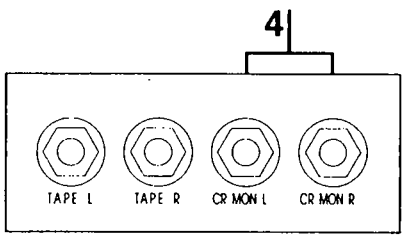
Mix Inserts, 3 pole jack

Tip	Return
Ring	Send
Sleeve	Ground

Mon O/P, 3 pole jacks

Tip	Hot
Ring	Gnd Sense (Cold)
Sleeve	Ground

Ancillary Connector Panel



CR Mon O/Ps 3 pole jack

Tip	Hot
Ring	Ground Sense (cold)
Sleeve	Ground

2TRK Tape 3 pole jack

Tip	Hot
Ring	Cold
Sleeve	Ground

Specification

Mix L&R Outputs

Electronically Balanced	
Insert Send Nom. Level (Unbal)	-2dBu
Insert Send Maximum Output	+21dBu into 1kΩ
Insert Return Impedance	10kΩ
Master Fader Rejection	>80dB at 1kHz
Stereo Mix Output Nom. Level	+4dBu/-10dBV Selectable
Stereo Mix Maximum Output	+27dBu into 600Ω
Output Impedance	75Ω
L/R Crosstalk	<-80dB at 1kHz
THD	0.003% at 1kHz
	0.006% at 10kHz
Mono Output Level (Unbal)	+1dBu
Mono Maximum Output Level	+21dBu into 600Ω

Monitor Outputs and Switching

CR Mon Nominal Output Level	+4dBu
Maximum Output Level	+20dBu into 5kΩ
Output Impedance	<75Ω
Phones Nominal Output Level	+4dBu
Phones Output Maximum Level	+20dBu into 600Ω
	+14dBu into 50Ω
	0dBu into 8Ω
2-Track Return Nominal Level	+4dBu/-10dBV Switchable
2-Track Return Maximum Level	+25dBu
2-Track Return to Mix Crosstalk	<-85dB at 1kHz

Auxiliary Send Output

Unbalanced, ground compensated.	
Nominal Level	+4dBu
Maximum output level	+21dBu into >600Ω
Output impedance	75Ω
Master gain control range	+10...-8.5dB
Mix bus noise (36ch. frame)	<-80dBu
THD	0.003% at 1KHz
	0.006% at 10KHz

Oscillator

Max Level at Group/Mix O/P	+16dBu
Frequency 1kHz	+/-10%
Distortion	<1% THD

Meter

20 Segment LED Bargraph	
Response	Peak or Average Reading
Rise Time to -1dB	150msec (average)
	4msec (Peak)
Decay Time to -20dB	250msec (Average)
	1.2sec (Peak)
Accuracy Relative to 0dB	+/-1dB
Calibration Range	0dB+-2dBu...+20dBu
	(Output Nom. Level = +4dBu)

Typical Performance Figures

Typical Performance Figures Measured on 32 Channel Console.
For details of measurement and further specs., refer to your dealer

TOTAL HARMONIC DISTORTION

Measured @ +20dBu, 30kHz Bandwidth, Unweighted

Group Output	1kHz:0.003% 10kHz:0.007%
Aux Output	1kHz:0.003% 10kHz:0.006%
Input to Line Output	1kHz:0.005% 10kHz:0.015%
Line Input to Any Output	1kHz:0.005% 10kHz:0.02%
Oscillator to Group Output @+16dBu	1kHz: <1%

CROSSTALK

Channel Muting	>100dB Measured @ 1kHz
Maximum Fader Attenuation	>80dB
Panpot Isolation (Active Pan)	>85dB
Routing (Channel to Groups or Mix)	>95dB
Maximum Aux Send Attenuation	>85dB
Mic. Input @ Max Gain, CMRR	>80dB
Line Input @ Unity Gain, CMRR	>40dB

NOISE

Measured 22Hz to 22kHz Bandwidth, Average reading, Unweighted

Mic. Input @ Max Gain, EIN with 200Ω Source	-127.5dBu
Line Input @ Unity Gain, EIN with 40Ω Source	-90dBu
Mix Bus Noise (32 Channels Routed, Faders Down)	-80dBu
Typical Mix Output Noise (32 Channels Routed)	-73dBu
Aux Bus Noise	<-80dBu

FREQUENCY RESPONSE

Mic or Line Input to Any Output 20Hz to 20kHz +0,-0.5dB

INPUT & OUTPUT LEVELS

Mic Input Max Level	+18dBu
Line Input Max Level	+26dBu
Insert Send Max Level into 5kΩ	+21dBu
Insert Send Nominal Level	-2dBu
Direct Output Max Level into 1kΩ	+21dBu
Direct Output Nominal Level	-2dBu
Group Output Max Level into 600Ω	+26dBu
Group Insert Nominal Level	-2dBu
Group Output Nominal Levels	+4dBu
Aux Output Max Level	+26dBu
Aux Output Nominal Level	+4dBu
Mix Output Max Level	+26dBu
Mix Insert Nominal Level	-2dBu
Mix Output Nominal Levels	-10dBV or +4dBu
Internal Operating Level	-2dBu
Oscillator Max Level @ Group Output	+16dBu
Headphones Output Max Level into 600Ω	+20dBu

INPUT & OUTPUT IMPEDANCES

Mic Inputs	
Electronically Balanced (Transformer Option)	>2kΩ
Line Inputs Electronically Balanced	>10kΩ
R.I.A.A. Inputs	220pF, 47kΩ
Insert Sends	75Ω
Insert Returns	10kΩ
Outputs	75Ω

Appendices

Specification Notes

SPECIFICATION NOTES AND CONDITIONS

A The figures displayed in the Specification tables are for a 32 input channel console: other frame sizes may show different results.

B The console has a nominal output level of +4dBu: all input sensitivities are relative to this: i.e. with line input gain set to '0', an input of 0dBu, will give an output of +4dBu at any group or mix output and, a sensitivity of +4dBu gives unity gain from input to output.

C Noise measurements are taken with 22Hz-22kHz bandwidth, average reading response.

D Distortion measurements are made with an input of +20dBu (line inputs at +4dBu sensitivity) giving an output of +20dBu. The analyser reads THD+N with an average response, over a 30kHz bandwidth.

E Frequency response and E.Q. measurements are made with an input of 0dBu to line inputs at unity gain, outputs are quoted relative to 0dBu.

F Crosstalk and rejection measurements are made with an input level of +20dBu (line inputs at +4dBu sensitivity) giving an output of +20dBu on the active signal path. The ratio quoted is relative to +20dBu output.

G Gain tolerance +/-1.5dB or 10% of indicated value, which ever is the greater.

H All crosstalk and rejection figures stated with 16 channels routed to the measured output, where applicable.

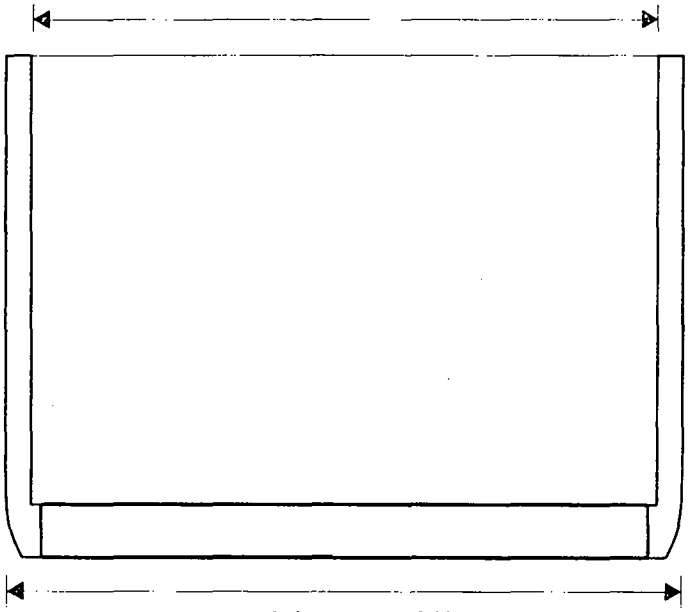
I Mix noise figures are stated in three ways:

- Bus residual noise: Noise measured at the output with no inputs routed.
- Mix bus noise: Noise measured at the output with 16 channels routed, faders down.
- Typical mix noise: Noise measured at the output with 16 channels routed, faders at 0, line inputs at +4dBu sensitivity, terminated 40Ω.

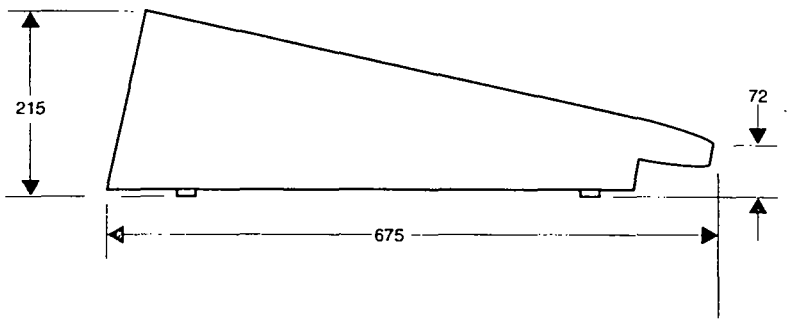
Dimensions

Delta Theatre Outline Dimensions

8 input - 972
16 input - 1222
24 input - 1534.5
32 input - 1659.5



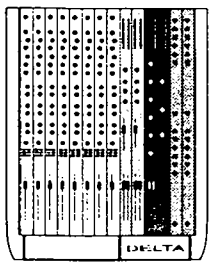
8 input - 1048
16 input - 1298
24 input - 1610.5
32 input - 1735.5



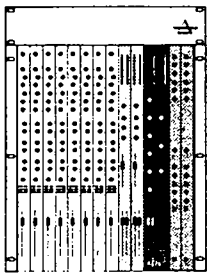
All dimensions shown in millimetres (mm).

Configurations

8 Input Frame



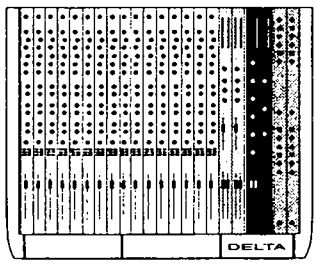
8 Input Rack-Mount Frame



Notes:

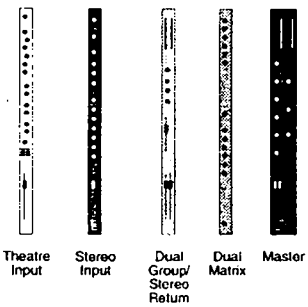
- The 8 & 16 channel frames are also available with the side and front trims replaced with fixing brackets for flush fitting in a desk top.
- The Rack Frame requires 2U of blank space above for connector clearance.

16 Input Frame

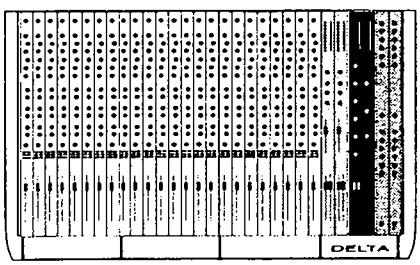


16:4:2 + 6x4 Matrix

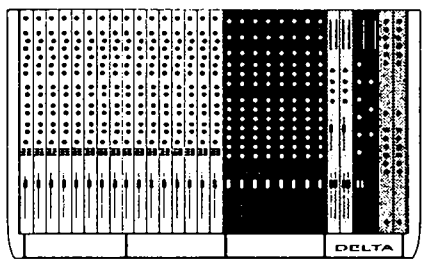
Key



24 Input Frame

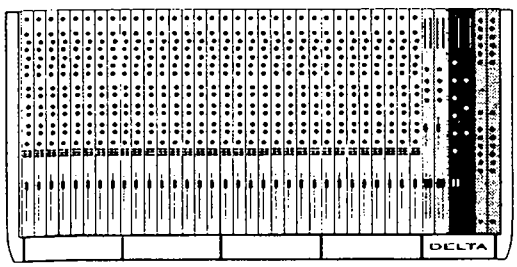


24:4:2 + 6x4 matrix



24 input frame shown with an optional 8 stereo input modules

32 Input Frame



32:4:2 + 6x4 matrix

Above only shows samples of most popular options - there are few practical restrictions to potential configurations in any frames, using the individual channel and group modules and separate master module. Please consult your dealer for advice on particular layouts.

Warranty

1.1 Soundcraft means Soundcraft Electronics Ltd.

1.2 Owner means the purchaser of the Equipment from Soundcraft or its dealer, who is the legal and beneficial owner at the time the Warranty claim is made.

1.3 Dealer means the person other than Soundcraft (if any) from whom the Owner purchased the Equipment, provided such a person is authorised for this purpose by Soundcraft.

1.4 Equipment means the equipment sold with this warranty card.

2 If within the period of twelve months from the date of delivery of the Equipment to the Owner, it shall prove defective by reason only of faulty materials and/or workmanship to such an extent that the suitability for the purpose for which it has been designed is materially affected, the Equipment or, with the consent of Soundcraft or the Dealer, 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 any defective component. Any Equipment or component replaced will become the property of Soundcraft.

3 Any Equipment or component returned will be at the risk of the Owner whilst in transit (both to and from the Dealer or Soundcraft) and postage and/or delivery charges must be prepaid.

4 This warranty shall only be available if:

a) the Warranty Card has been returned to Soundcraft within thirty days of purchase of the Equipment by the Owner; and

b) the Equipment has been properly installed in accordance with instructions contained in Soundcraft's manual; and

c) the Owner has notified Soundcraft or the Dealer within fourteen days of the defect appearing; and

d) no persons other than authorised representatives of Soundcraft or the Dealer have effected any replacement of parts or carried out maintenance, adjustments or repairs to the Equipment; and

e) the Owner has used the Equipment only for such purposes as Soundcraft recommends, with only such electrical and 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: mishandling, chemical, electro-chemical, electro-magnetic or electrical influences, accidental damage, Acts of God, neglect, deficiency excess or surges in electrical power, air-conditioning or humidity.

6. The benefit of this Warranty may not be assigned by the Owner.

7. Owners who are consumers should note that 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.

Glossary

auxiliary send	an output from the console comprising a mix of signals from channels and groups derived independently of the main stereo/ group mixes. Typically the feeds to the mix are implemented on rotary level controls.
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.
CR (control room) monitors	loudspeakers used by the operator (engineer) in the control room to listen to the mix.
dB (decibel)	a ratio of two voltages or signal levels, expressed by the equation dB=20Log10 (V1/V2). Adding the suffix 'u' denotes the ratio is relative to 0.775V RMS.
DI(direct injection)	the practice of connecting an electric musical instrument directly to the input of the mixing console, rather than to an amplifier and loudspeaker which is covered by a microphone feeding the console.
equaliser	a device that allows the boosting or cutting of selected bands of frequencies in the signal path.
foldback	a feed sent back to the artistes via loudspeakers or headphones to enable them to monitor the sounds they are producing.
frequency response	the variation in gain of a device with frequency.
(sub) group	an output into which a group of signals can be mixed.
headroom	the available signal range above the nominal level before clipping occurs.
highpass filter	a filter that rejects low frequencies.
line level signals signals	at a nominal level of -10 to +6dBu, coming from a low impedance source.
pan (pot)	abbreviation of 'panorama': controls levels sent to left and right outputs.
peaking	an equaliser response curve affecting only a band of frequencies i.e. based on a bandpass response.

PFL (pre-fade listen)	a function that allows the operator to monitor the pre-fade signal in a channel independently of the main mix.
rolloff	a fall in gain at the extremes of the frequency response.
shelving	an equaliser response affecting all frequencies above or below the break frequency i.e. a highpass or lowpass derived response.
spill	acoustic interference from other sources.
talkback	the operator speaking to the artistes or to tape via the auxiliary or group outputs.
transient	a momentary rise in the signal level.