

# Soundcraft

500

600

## USER MANUAL

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## SERIES 500/600

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\*Note

CPS 450 or 650 Power Supplies have a separate  
USER MANUAL

## SERIES 500/600 PERFORMANCE SPECIFICATION

### FREQUENCY RESPONSE:

Line In to Group Out                    20Hz:-0.5dB  
    1kHz: 0dB ref.  
    20kHz:-1.0dB.

### GAIN

Mic gain, maximum total                60+10+10 dB  
Line gain, maximum total               30+10+10 dB

### OPERATING LEVELS.

Switchable, +4dBu or -10dBV (Tascam level.)

### INPUT IMPEDANCES:

Mic Input:                                2kOhm.  
Line Input:                                10kOhm.  
Tape Return Inputs:                      10kOhm.

### OUTPUT IMPEDANCES:

Any output.                               <75Ohm.

### OUTPUT CAPABILITY:

Channel inserts and Line Outputs       +21dBu into 4k7.  
Mix inserts                                +21dBu into 600Ohm.  
All balanced outputs                      +26dBu into 600Ohm.

### DISTORTION:

Line in to Group out                    1kHz:<.005%  
    10kHz:<.015%  
    20kHz:<.02%  
Line in to Mix out                       1kHz:<.005%  
    10kHz:<.008%

### CROSSTALK:

	1kHz	10kHz
Panpot isolation	<-68dB	<-68dB
Group to Group	<-85dB	<-68dB
Unrouted channel to Group	<-85dB	<-68dB
Channel to Group, fader down.	<-85dB	<-68dB
Channel to Group, switched off.	<-90dB	<-70dB
Mix bus interchannel (L-R)	<-70dB	<-60dB

### NOISE: (Measurement bandwidth 20kHz, ref +4dBu.)

Mic equivalent input noise, 150Ohm source res	-128dBV
Group mix noise (24 channels routed.)	-85dB
Group mix noise (nothing routed.)	-98dB
Aux noise (master gain = 0dB)	-83dB

## 2.00 CONSOLE DESCRIPTION

### 2.01 Introduction

This User Manual is designed to be of value to both the operator and the technician. For the operator there are flow diagrams, line drawings and suggestions on how to work and connect the console, as well as a detailed description of all the functions and connectors. There are technical descriptions and circuit diagrams for the technician.

### 2.02 Brief Description

The Soundcraft Series 500 and 600 consoles are designed to cater for both the small studio, (up to 16-track), and for public address applications. The frame of both these consoles is designed to withstand the wear and tear of being on the road.

Key features on the desk include 8 group outputs, 6 auxiliary outputs and dedicated mix outputs (left and right). All balanced inputs and outputs use an electronic, transformerless design to ensure low inherent noise.

The use of electronic balancing reduces the degradation of signal quality which is introduced by more conventional transformer coupled designs, ensuring superior transient response, minimal phase shift and excellent common mode rejection even at high frequencies

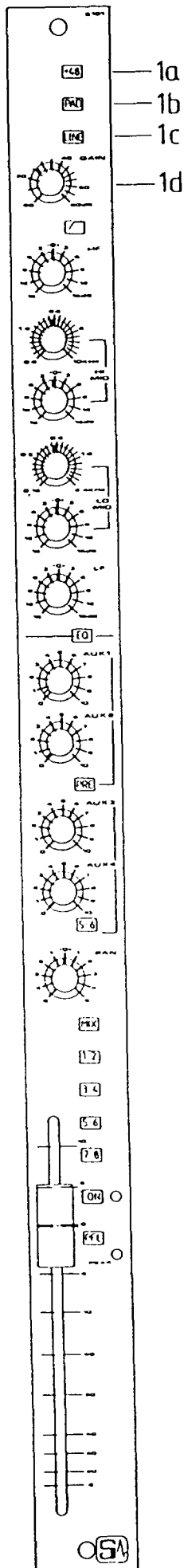
On the Series 500 VU meters are provided for the 8 group outputs and the stereo mix, whilst the Series 600 has an LED Bar-graph display, which may read VU or PEAK, as well as VU metering for the stereo mix.

Being Modular in construction both the Soundcraft Series 500 and the Series 600 are easy to dismantle making any necessary maintenance extremely straight-forward.

Both the Series 500 and the Series 600 consoles can operate at either +4dBu or -10dBV although the internal operating level, (including the insert points), is at -6dBu allowing for greater internal headroom.

The power supply is a 19" rack mounted unit supplying the console with 17 volts positive and negative rails, +24 volt for the LED display, and a +48 volt rail for phantom power of microphones.

NB: On some earlier models the PSU is the same as on the Soundcraft Series 800/1600 and differs slightly in construction from the Medium power supply unit.



## 2.03 INPUT MODULE

### 1) Input to Channel

Each channel is individually switchable between the Microphone Input and the Line Input by pressing the LINE switch.

Both Microphone and Line inputs are electronically balanced, using a transformerless design, configured for optimum low noise operation.

The balanced Microphone Input impedance is normally 2kOhms, increasing to 4kOhms when the 20dB Pad is inserted, thus ensuring correct matching for all normally used microphones.

The balanced Line Input has an input impedance of greater than 10kOhm, which is high enough to interface to any normal professional peripheral equipment, without causing undue loading of the source.

#### a) +48

Pressing the +48 button enables capacitor microphones to be powered by the console's internal 48Volt Phantom Power supply. CAUTION: It is not advisable to use a Direct Injection box when the Phantom Power is on.

#### b) PAD

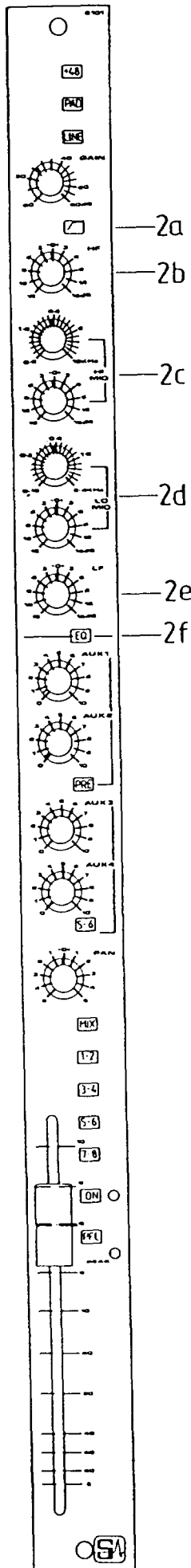
The PAD button inserts a 20dB attenuator into the input of the microphone amplifier, and allows extremely high level input signals to be catered for, without overloading the input stage.

#### c) LINE

Line Input may be selected by pressing the LINE button.

#### d) GAIN

The Microphone and Line inputs can be varied between 20dB and 60dB of gain using the GAIN trim control. When used in conjunction with the 20dB PAD, a 60dB control range is available on the Microphone input.



## 2) The Equalisation Section

The Series 500/600 equalizer is a flexible device allowing five areas of control to be exercised. All amplitude pots are centre detented for easy zeroing. The equaliser may be switched in or out of circuit, independently of the high pass filter.

### a) THE HIGH PASS FILTER

The High Pass Filter operates at 100Hz with an ultimate slope of 12dB/octave. This will effectively remove low frequency stage rumble, and other extraneous signals.

### b) HF (High Frequency)

15dB of boost or cut is available at 10kHz, with a "shelving" characteristic, ie. the slope of the EQ curve does not keep rising with frequency, but having reached the desired amount, flattens out or "shelves" from that frequency on.

### c) HI MID

The Hi Mid Frequency is continuously variable between 600Hz and 10kHz, with 15dB of boost or cut available. The response is of the "bell" type, ie. having reached maximum amplitude (or minimum in the case of cut) at the selected frequency, the amplitude response returns to zero on either side of that frequency. The "Q" (a measure of the bandwidth) of the network is 1.5.

### d) LO MID

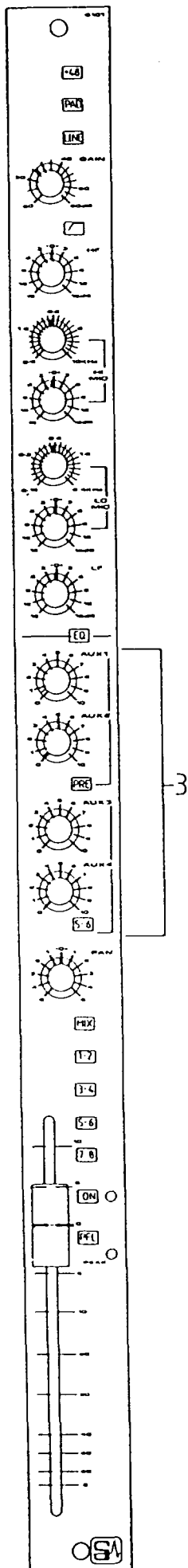
The Low Mid section is identical to the Hi Mid section with the exception that the frequency is variable between 150Hz and 2.4kHz.

### e) LF (Low Frequency)

15dB of boost or cut is available at 60Hz, with a "shelving" characteristic.

### f) EQ BUTTON

The equaliser circuitry can be switched in or out of the signal path, independent of the High Pass filter.



### 3) The Auxiliary Section

There are 6 Auxiliary sends available on the Series 500 and 600 Consoles, with 4 level controls, AUX 3 and 4 controls becoming AUX 5 and 6 controls respectively when the AUX 5-6 button is pressed. Note that only 4 auxiliaries can be sent from any one channel.

For each pair of auxiliary sends, (1-2, 3-4, 5-6), there are three options on where the auxiliary send is taken from. These are;

- i) Pre-EQ and Pre-fade
- ii) Post-EQ and Pre-fade
- iii) Post-EQ and Post-fade

These options may be adopted by the installation/removal of several push-on links, (Jumpers), located on the input channel PCB. (See Input PCB diagram ED2162).

#### a) SENDS 1 AND 2

- i. Pre-fade and Pre-EQ  
On input PCB push Jumper J1 (lower position) ON.  
Select PRE on Input Channel

- ii. Pre-fade and Post-EQ  
Push Jumper J2 (upper position) ON  
Select PRE on Input Channel

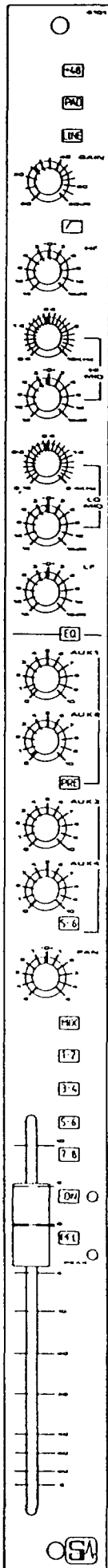
- iii. Post-fade and Post-EQ  
Push Jumper J2 (upper position) ON

#### b) SENDS 3 AND 4

- i. Pre-fade and Pre-EQ  
Push Jumpers J3 (lower position) and J8 (lower position) ON

- ii. Pre-fade and Post EQ  
Push Jumpers J4 (upper position) and J8 (lower position) ON

- iii. Post-fade and Post-EQ  
Push Jumpers J4 (upper position) and J7 (upper position) ON

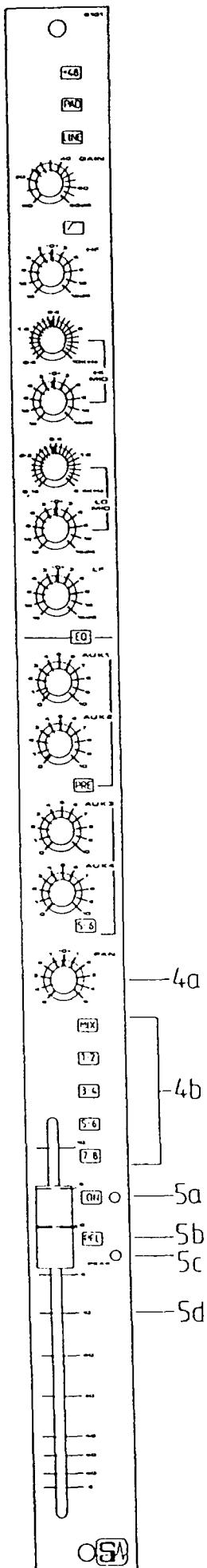


c) SENDS 5 AND 6

- i. Pre-fade and Pre-EQ  
Push Jumpers J5 (lower position) and J10 (lower position) ON
- ii. Pre-fade and Post-EQ  
Push Jumpers J6 (upper position) and J10 (lower position) ON
- iii. Post-fade and Post EQ  
Push Jumpers J6 (upper position) and J9 (upper position) ON

S500/S600  
STANDARD INPUT FACIA





5500/S600  
STANDARD INPUT FACIA

4) Routing Section

The channel input signal can be routed to any or all of the 8 Group Outputs and the stereo Mix by selecting the relevant routing button.

To route the input signal to one particular Group press the relevant routing button and hard pan left or right. Groups 1,3,5 and 7 correspond to the left-hand side of the pan-pot, and Groups 2,4,6 and 8 the right-hand side.

- a) The Pan Pot is a centre detented control, with a loss of 4.5dB at its centre point. This is a compromise between the 3dB loss required for constant power panning, and 6dB loss required for constant voltage panning.
- b) Selection of any routing button assigns the channel signal to a pair of output groups, or to the stereo mix via the Pan Pot.

5) Channel Status Section

- a) ON  
The channel "ON" status is indicated by a green LED. When a channel is switched off, all post-Eq auxiliary sends are also switched off, however, the signal to the insert jack and any pre-Eq auxiliary sends are not switched off.
- b) PFL (Pre Fade Listen)  
PFL solos the pre-fader, post insert jack signal, independently of the "ON" switch. Pressing the PFL button illuminates the Solo LED on the Master Module, routes the signal to the master meters and switches the control room monitors and headphones to monitor that input.
- c) PEAK  
A red LED indicates the peak signal level at the insert send point, illuminating at a level of approximately 4dB below clipping.
- d) CHANNEL FADER  
The channel fader has a slide length of 100mm and an exceptionally smooth feel. Infinity cut off is greater than 90dB.

## 2.04 GROUP/MONITOR MODULE SERIES 500

The Group/Monitor Module of the Soundcraft Series 500 handles the functions of 2 Group Outputs and 2 Monitor Channels. The module may be used to monitor either the group output or the corresponding tape return when this is selected by the numbered tape return button. Groups 2,4,6, and 8 are positioned at the top, and Groups 1,3,5, and 7 are positioned at the bottom of their respective Modules.

All balanced outputs use an electronic, transformerless design, to ensure low inherent noise.

Each Group/Monitor Module features an equalisation section and 2 auxiliary sends, (which may be switched to pre-Monitor volume control).

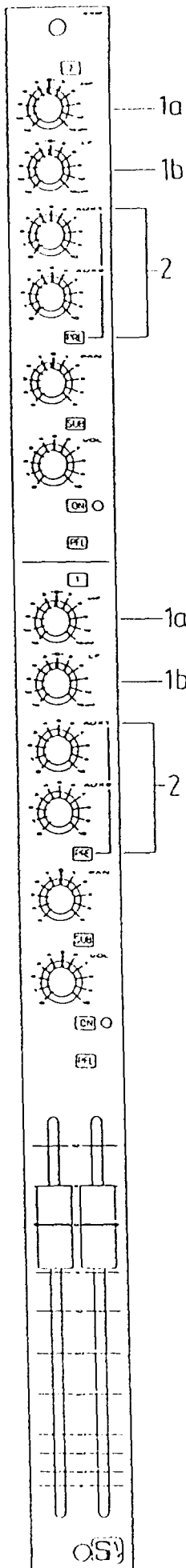
### 1) The Equalization Section

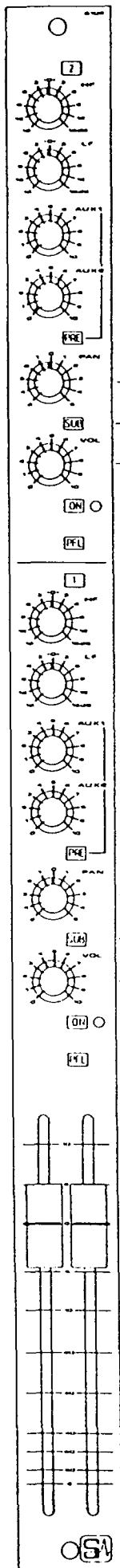
The Series 500 Group/Monitor Module equalizer allows for 2 areas of control which may be used whilst monitoring or as additional equalization when using the module as a Sub-Group. All EQ cut/boost pots are centre detented for easy zeroing. The Equalizer always stays in the Monitor path.

- a) HF (High Frequency)  
15dB of boost or cut is available at 8 KHz, with a "shelving" characteristic.
- b) LF (Low Frequency)  
15dB of boost or cut is available at 70Hz, with a "shelving" characteristic.

### 2) The Auxiliary Section

There are two auxiliary sends available on the Series 500 Group/Monitor Module. These are normally post-Monitor volume control but can be switched to pre-Monitor volume control by selecting PRE. In both cases the auxiliary signal is derived after the monitor ON switch. These may be used to provide headphone mixes during recording and overdubbing.





### 3) Pan

The Pan Pot is a centre detented control with a loss of 4.5dB at its centre point. The Pan control allows the monitor signal to be panned to the required position within the stereo mix.

### 4) Sub

When the SUB button is pressed any signal introduced at the Monitor Input point, (see Output Panel), is summed into the Group bus of that particular Group AND routed to the stereo mix bus. Also any channels assigned to that particular group are routed to both the group output and the stereo mix bus. This enables the formation of sub-groups as well as providing additional inputs to the console for Effects Returns etc.

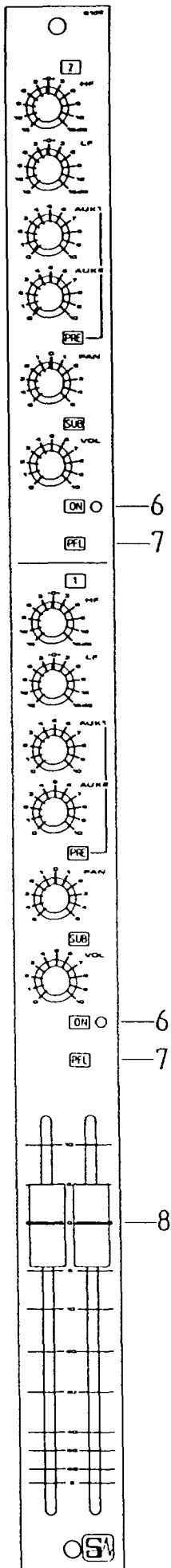
i.e. Say there are 4 different signals that need to be mixed together before reaching the main stereo bus, route all to Group 1, (by pressing 1-2 on the input channel and hard panning left), and press the SUB button on Group 1, the four signals now appear as one at both the Group output and the stereo bus.

NB: When SUB is pressed the meter reads the signal after the Group fader.

If the tape return button and SUB are pressed the meter reads only the monitor input signal.

### 5) Vol

The monitor volume control enables the monitor contribution to the stereo mix to be adjusted in level, to allow a satisfactory monitor balance to be achieved during recording and over-dubbing.



6) On

The Monitor channel and associated auxiliary sends are activated by pressing the "ON" button. Operation is indicated by an adjacent green LED.

7) PFL

Prefade Listen allows the monitor signal to be soloed independently of the Vol control. This illuminates the Solo LED on the Master Module.

8) Group Fader

The dual Group faders are full length linear faders.

## 2.05 GROUP/MONITOR MODULE SERIES 600

The Group/Monitor Module of the Soundcraft Series 600 handles the functions of 2 Tape Returns and a Group Output. The monitor section may be used to monitor either the group output or the corresponding tape return when this is selected by the numbered tape return button. Tracks 1-8 are positioned at the bottom of the modules and tracks 9-16 at the top of their respective modules. Since tracks 1-8 are paralleled to tracks 9-16 (1 connected to 9, 2 connected to 10 etc) to record tracks 9-16 simply select "record" on the relevant track on the multitrack machine.

All balanced outputs use an electronic, transformerless design, to ensure low inherent noise.

Each Group/Monitor Module features an equalisation section and 2 auxiliary sends, (which may be switched to pre or post monitor volume control).

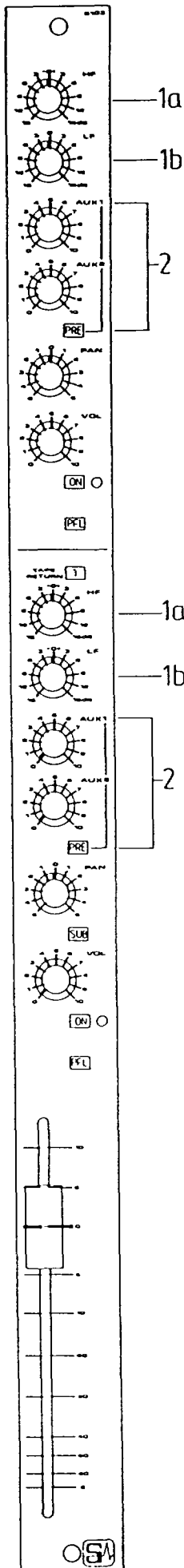
### 1) The Equalization Section

The Series 600 Group/Monitor Module equalizer allows for 2 areas of control which may be used whilst monitoring or when using the groups as FX returns during re-mix. All EQ cut/boost pots are centre detented for easy zeroing.

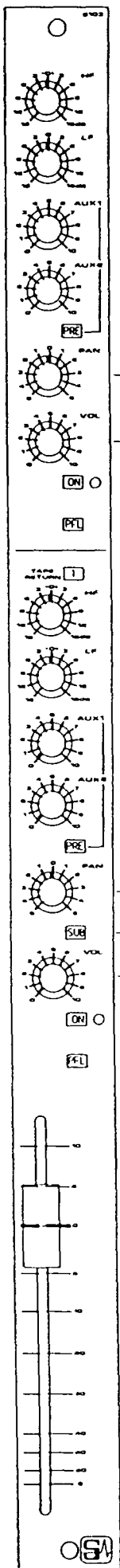
- a) HF (High Frequency)  
15dB of boost or cut is available at 15kHz, with a "shelving" characteristic.
- b) LF (Low Frequency)  
15dB of boost or cut is available at 50Hz, with a "shelving" characteristic.

### 2) The Auxiliary Section

There are two auxiliary sends available on the Series 600 Group/Monitor Module. These are normally post-monitor volume control but can be switched to pre monitor volume control by selecting PRE. In both cases the auxiliary signal is derived after the monitor ON switch. These may be used to provide headphone mixes during recording and overdubbing.



S600  
OUTPUT FACIA



S600  
OUTPUT FACIA

### 3) Sub

When the SUB button is pressed any signal introduced at the Monitor Input point, (see Output Panel), is summed into the Group bus of that particular Group and routed to the stereo mix bus. Also, any channels assigned to that particular group are routed to both the group output and the stereo mix bus. This enables the formation of sub-groups as well as providing additional inputs to the console for Effects Returns etc.

i.e. Say there are 4 different signals that need to be mixed together before reaching the main stereo bus, route all to Group 1, (by pressing 1-2 on the input channel and hard panning left), and press the SUB button on Group1, the four signals now appear as one at both the Group output and the stereo bus.

NB: When SUB is pressed the meter reads the signal after the Group fader.

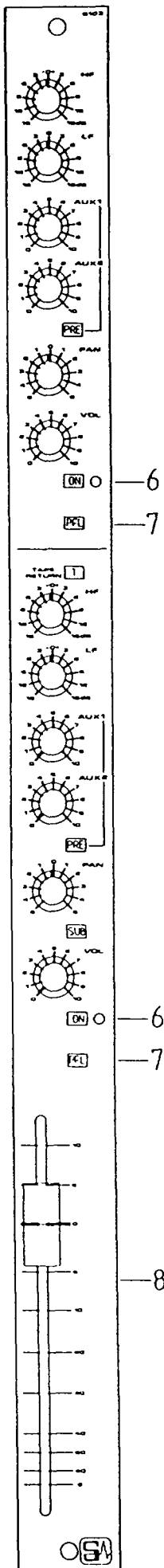
If the tape return button and SUB are pressed the meter reads only the monitor input signal.

### 4) Pan

The Pan Pot is a centre detented control with a loss of 4.5dB at its centre point. The Pan control allows the monitor signal to be panned to the required position within the stereo mix.

### 5) Vol

The monitor volume control enables the monitor contribution to the stereo mix to be adjusted in level, to allow a satisfactory monitor balance to be achieved during recording and over-dubbing.



6) On

The Monitor channel and associated auxiliary sends are activated by pressing the "ON" button. Operation is indicated by an adjacent green LED.

7) PFL

Prefade Listen allows the monitor signal to be soloed independently of the Vol control. This illuminates the Solo LED on the Master Module.

8) Group Fader

The Group faders have a slide length of 100mm infinity cut off is greater than 90dB.

S600  
OUTPUT FACIA

## 2.06 MASTER MODULE SERIES 500/600

The Master Module contains the 6 Auxiliary master level controls, the console oscillator, monitor facilities, the talkback system, the Master Stereo Fader and a headphone socket.

### 1) Metering on the Series 600

Metering is provided in the form of LED bar-graph meters for the Group Outputs 1-16 & the 6 auxiliaries and VU meters for the stereo mix.

The LED bar-graph meters may read PEAK or VU depending on the position of Jumpers (push on links) on the drive card. (See ED2173 & ED2174).

The jumpers are located at the base of the meter drive card. Odd numbers on top and even numbers underneath.

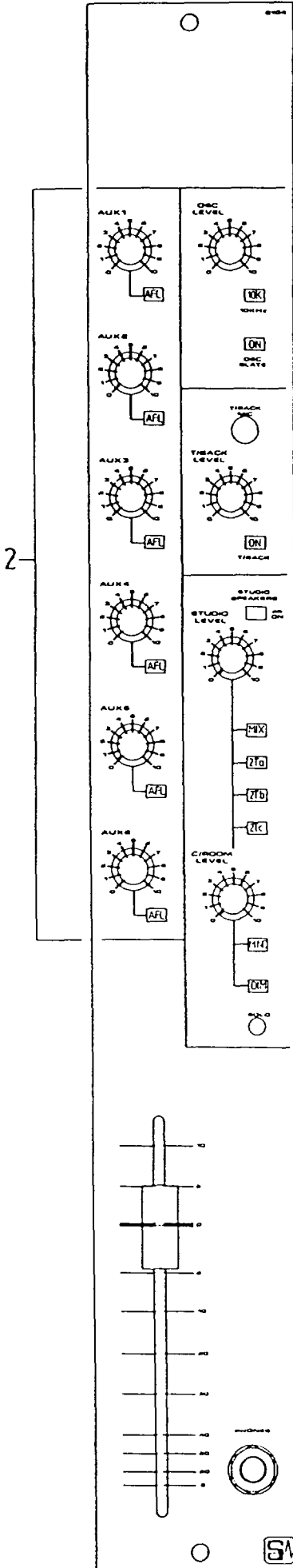
For Peak metering all the jumpers should be positioned to the left.

For VU metering all the jumpers should be positioned to the right.

eg. . . . . J1  
 . . . . . J2  
 PPM VU

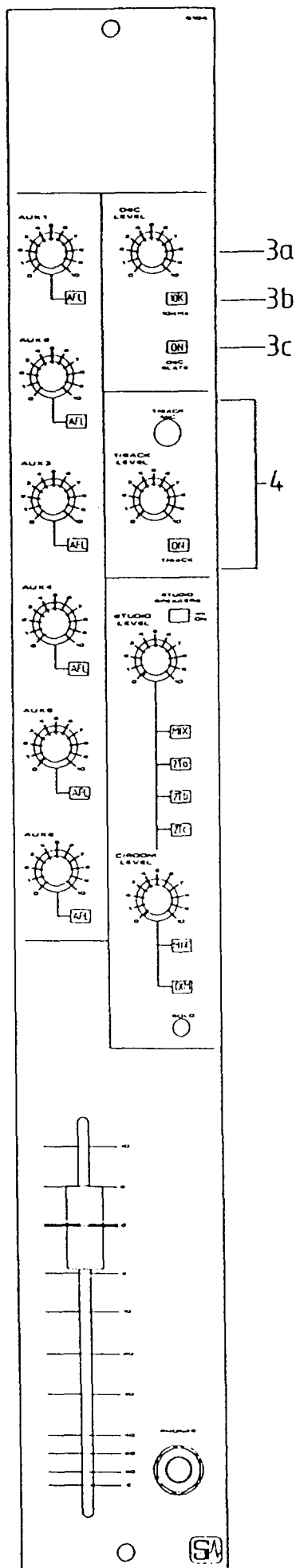
### 2) Auxiliary Masters 1-6

Each of the 6 auxiliary buses has an overall master level control. An associated AFL, (After fade listen), button allows the signal at the auxiliary to be monitored and metered. This illuminates the Solo LED on the Master Module.



S500/S600  
 MASTER FACIA





### 3) Oscillator

#### a) OSC SLATE

The Slate button switches on the oscillator. The Oscillator may be routed to all eight output groups and/or any pair of auxiliaries by the installation of several push on links (Jumpers) on the Right Hand PCB of the Master Module. (See ED2173).

To route the Osc/Talkback to GROUPS 1-8 push Jumper J6 ON.

To route the Osc/Talkback to AUX 1-2 push Jumper J7 ON.

To route the Osc/Talkback to AUX 3-4 push Jumper J8 ON.

To route the Osc/Talkback to Aux 5-6 push Jumper J9 ON.

#### b) FREQUENCY

The Oscillator frequency can be switched between two set values of 700Hz, when the button is out, and 10kHz, when the button is pressed.

#### c) OSC LEVEL

Adjusts the level of the Oscillator.

### 4) Talkback Section

The Talkback section contains the Talkback microphone, the Talkback level control and the Talkback on/off switch. The Talkback system is activated when the Talkback button is pressed. The Talkback System disables the Oscillator.

The Talkback signal may be routed to either Groups 1-8 and/or any pair of auxiliaries by the installation of jumpers 6-9, (located on the Right-hand master PCB). These links are used for both the oscillator signal and the talkback signal.

## 5. Monitor Section

### a) STUDIO LEVEL

The signal from the monitor source selection is fed via the Studio Speaker switch to the Studio Level control.

### b) MONITOR SOURCE

Four push buttons, 2Ta, 2Tb, 2Tc, and Mix, route the signals from 3 external stereo sources or the main stereo mix output to the Control Room, Studio and Headphone monitoring systems.

The input sensitivity of 2-track A and B can be increased together to -10dBV, TASCAM operating levels, for ease of use with cassette machines.

2-track C may be altered independently to -10dBV, Tascam operating levels, when the console is operating at +4dBu, for ease of use with cassette machines etc. (See section 3.02)

### c) CONTROL ROOM LEVEL

The Control Room monitoring signal can be adjusted in level. The source signal is either the output of the monitor source selection or the signal from any soloed (AFL/PFL) source.

### d) MNO

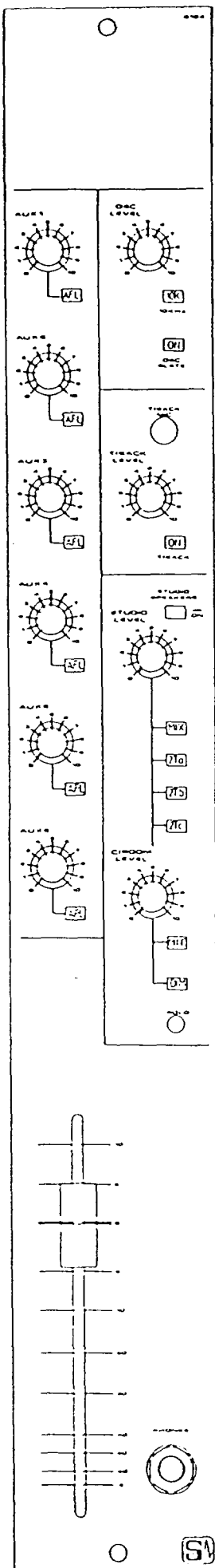
To provide a mono compatibility check of the stereo signal, the left and right monitor channels can be summed together by the MNO switch. This is operative on both the Control Room and Headphone monitoring systems, and does not affect the main stereo output.

### e) DIM

The Control Room and Headphone monitoring systems can be attenuated by 20dB.

### f) SOLO

The Solo LED illuminates when any PFL or AFL button has been pressed on either Input channels, the Group output modules or the Auxiliary masters. A mono signal replaces the stereo signal on the Phones and Control room output and on the Master Meters.



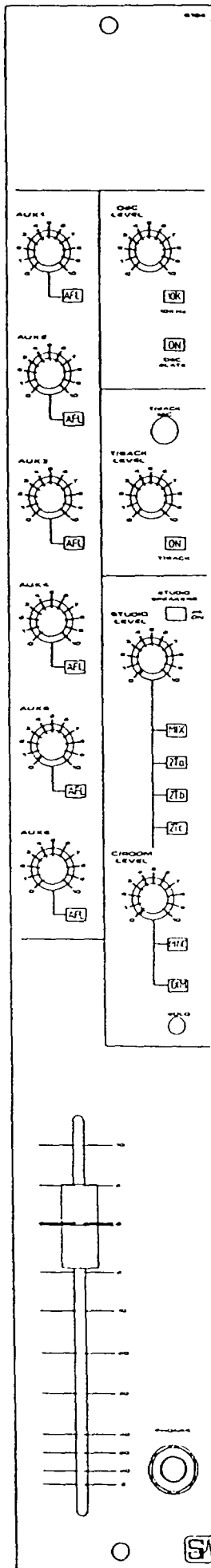
5500 / 5600  
MASTER FACIA

6) Master Stereo Fader

The Master Stereo fader is a full length linear fader.

7) Stereo Headphone Socket

The headphones output allows monitoring of the main stereo mix output or any soloed signal, and cuts out the control room feed when the headphones are plugged in. The headphone socket expects to see headphones of 600 Ohms, but will drive 8 Ohms if required.



5500 / S600  
MASTER FACIA

PLEASE NOTE

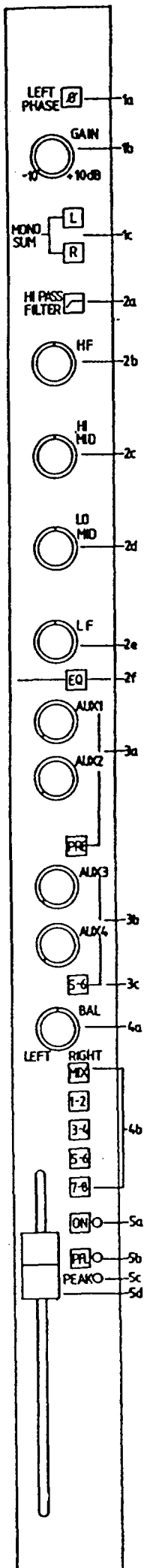
On leaving Soundcraft all Series 500 and Series 600 consoles are set to the following jumper options:-

Operating level - +4dBu.

Meter selection - VU.

Auxiliary sends - Aux 1-2 PRE EQ.  
                  Aux 3-4 POST EQ, POST FADE.  
                  Aux 5-6 POST EQ, POST FADE.

Talkback/Oscillator routing - GROUPS 1-8.  
                                  AUX 1-2.  
                                  AUX 3-4.  
                                  AUX 5-6.



## 2.07 OPTIONAL STEREO INPUT MODULE

The optional stereo input module is available in blocks of four.

### 1. Channel Input Section

The channel Line Input is electronically balanced with an input impedance of greater than 10kOhms, which is high enough to interface to any normal professional peripheral equipment without loading the source. Insert points Left and Right are provided post the Equaliser.

The interface level can be either +4dBu or -10dBV. To select -10dBV remove jumpers J1 and J2 on the input PCB.

- a) (Phase)
 

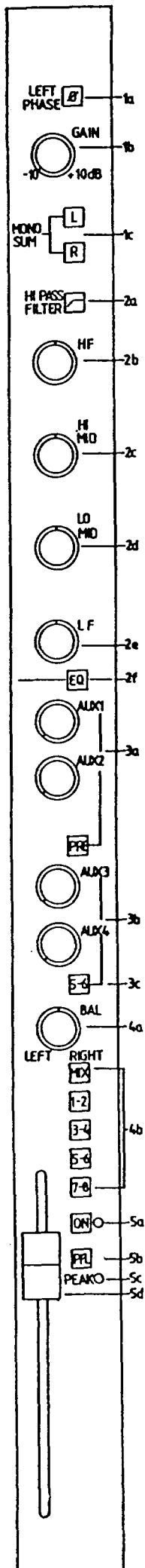
Pressing the Phase button will invert the phase on the left-hand only to correct for any input mismatch.
- b) INPUT GAIN
 

The Input Gain can be varied between -10dB and +10dB of gain using the Gain Trim control.
- c) L & R
  - i With both these switches out the module works in stereo mode.
  - ii With either L or R switched in, both channels of the module are fed by either the left or right input.
  - iii With both switches pressed, both channels of the module are fed by a mono sum of the left and right inputs.

### 2. Equaliser Section

- a) (High Pass Filter)
 

The High Pass Filter operates at 100Hz with an ultimate slope of 12dB/Octave. This will effectively remove low frequency stage rumble and other extraneous signals.

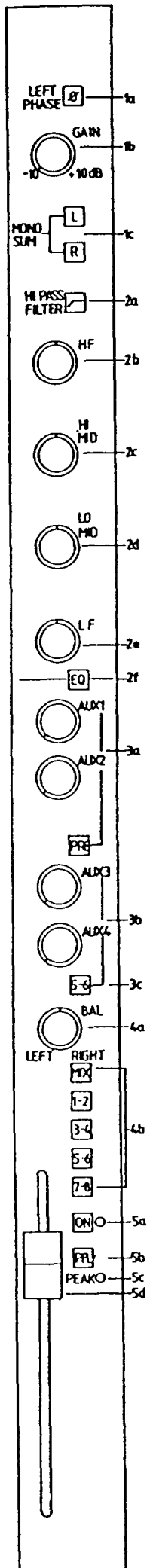


- b) HF (High Frequency)  
15dB of boost or cut is available at 10kHz, with a "shelving" characteristic, ie. the slope of the EQ curve does not keep rising with frequency, but having reached the desired amount, flattens out or "shelves" from that frequency on.
- c) HI MID  
15dB of boost or cut is available at 2kHz, with a peak/dip characteristic, ie. having reached maximum amplitude, ( or minimum in the place of cut), the amplitude response returns to zero on either side of the frequency. The shape of the curve, when plotted shows a characteristic bell shape. The Q of the net-work, (a measure of bandwidth), is 1.5.
- d) LO MID  
The Lo Mid section is identical to the Hi Mid section, with the exception that the frequency is 300Hz.
- e) LF (Low Frequency)  
15dB of boost or cut is available at 60Hz, with a "shelving" characteristic.
- f) EQ  
The Equaliser circuitry can be switched in and out of the signal path, independently of the high pass filter.

### 3. Auxiliary Section

There are four Auxiliary send controls available. The bottom two can be routed to either of two buses, giving a total of 6 Auxiliary sends. All Auxiliary sends are MONO.

- a) SENDS 1-2  
Auxiliary sends 1 and 2 are normally post-fader, but can be switched pre-fader by pressing the appropriate PRE button. In both cases they are post Equaliser.
- b) SENDS 3-4  
Auxiliary sends 3-4 may be either pre or post fader, depending on push-on links located on the PCB.



c) SENDS 5-6

Auxiliary sends 5-6 are accessed by pressing the 5-6 button. These may also be pre-selected either pre or post fader by the use of push-on links on the PCB.

ie. Pre Post

Aux 3&4 J4 J3

-----

Aux 5&6 J6 J5

Pre Post

(Refer to the Stereo Input module circuit diagram ED2323.)

4. Routing Section

The channel input signal may be routed to any of the pairs of Group Outputs, ( 1-2, 3-4, 5-6, 7-8), and the Stereo Mix, by selecting the relevant routing button.

a) BALANCE

The balance control corrects or deliberately creates any errors in stereo matching before the fader and the Auxiliary sends.

b) ROUTING

Selection of any routing button assigns the channel signal to a pair of output groups, or the stereo mix, via the balance correction.

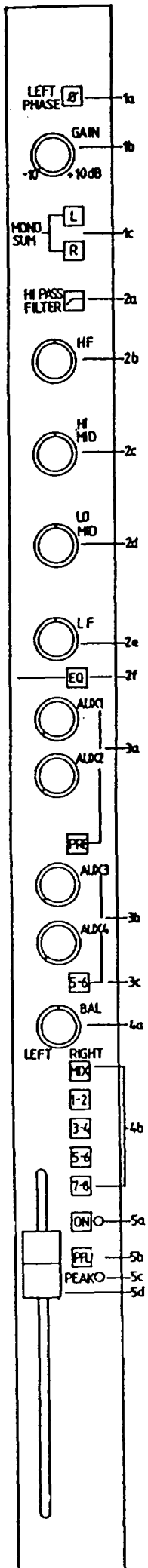
5. Channel Status Section

a) ON

The channel "ON" status is indicated by an LED. When a channel is switched off, all auxiliary sends are also switched off.

b) PFL

Pre-Fade Listen solos the Pre-fader signal independently of the ON switch. This gives a mono check of signal before the on/off switch. PFL operation is indicated by a master warning LED on the Master Module.



c) PEAK

A red LED indicated the peak signal level. This gives visual warning that the higher signal Right or Left is within 5dB of clipping.

d) CHANNEL FADER

The channel fader is an accurately matched long throw stereo fader. Infinity cut off is greater than 90dB.



## 2.08 INPUT CONNECTOR PANEL SERIES 500/600

### 1) Line Inputs

These stereo standard jacks carry the electronically balanced Line Inputs. They are wired as follows:-

Tip:	HOT (In phase signal)
Ring:	COLD (Out of phase signal)
Sleeve:	GROUND

Line Inputs 1-8, (1-16 on the Series 600), are normalled from the tape returns. This allows the Tape Returns to be sent directly to the Input Channels without having to re-patch.

### 2) Mic Inputs

These carry the electronically balanced Microphone Inputs and are wired as follows:-

Pin 1:	GROUND
Pin 2:	HOT (In phase signal)
Pin 3:	COLD (Out of phase signal)

The Microphone Inputs can be fed with a +48v Phantom Power for Capacitor microphones. This is controlled by the Phantom Power switch on the individual Input Channels.

### 3) Channel Inserts

The Channel Inserts are standard, unbalanced, stereo jacks used to carry both insert send and insert return signals. Under normal conditions with nothing inserted the signal is normalled through the jack socket and thus inserting a jack will automatically break the link. Channel inserts are wired as follows:-

Tip:	Insert return - unbalanced
Ring:	Insert send - unbalanced
Sleeve:	Common Ground

### 4) Line Outputs

The Line Outputs are standard, unbalanced, stereo jacks used for sending signals to peripheral equipment. Minimum loading is 5kOhm. They are wired as follows:-

Tip:	HOT (In phase signal)- unbalanced
Ring:	Signal Common
Sleeve:	Signal Common

## 2.09 OUTPUT CONNECTOR PANEL SERIES 500

### 1) Group Inserts

This is a stereo, standard break point jack socket which contains both insert send and return. The socket is connected as follows:-

Tip: Insert return (unbalanced)

Ring: Insert send (unbalanced)

Sleeve: Common ground

Under normal conditions i.e. with socket not in use, the send is connected to return so that inserting a jack automatically breaks the link.

### 2) Group Outputs

Fed from the eight individual groups these electronically balanced outputs are wired as follows:-

Pin1: GROUND

Pin2: HOT (In phase signal)

Pin3: COLD (Out of phase signal)

### 3) Monitor Inputs

The Monitor Inputs carry FX returns via the Monitor section or the SUB button without having to un-plug the Tape Returns. They are wired as follows:-

Tip: HOT (In phase signal)

Ring: COLD (Out of phase signal)

Sleeve: Common Ground.

### 4) Tape Returns

These stereo standard jack sockets, which are normalled to the Monitor input socket and the corresponding Line input, carry the balanced tape returns and are wired as follows:-

Tip: HOT (In phase signal)

Ring: COLD (Out of phase signal)

Sleeve: Ground

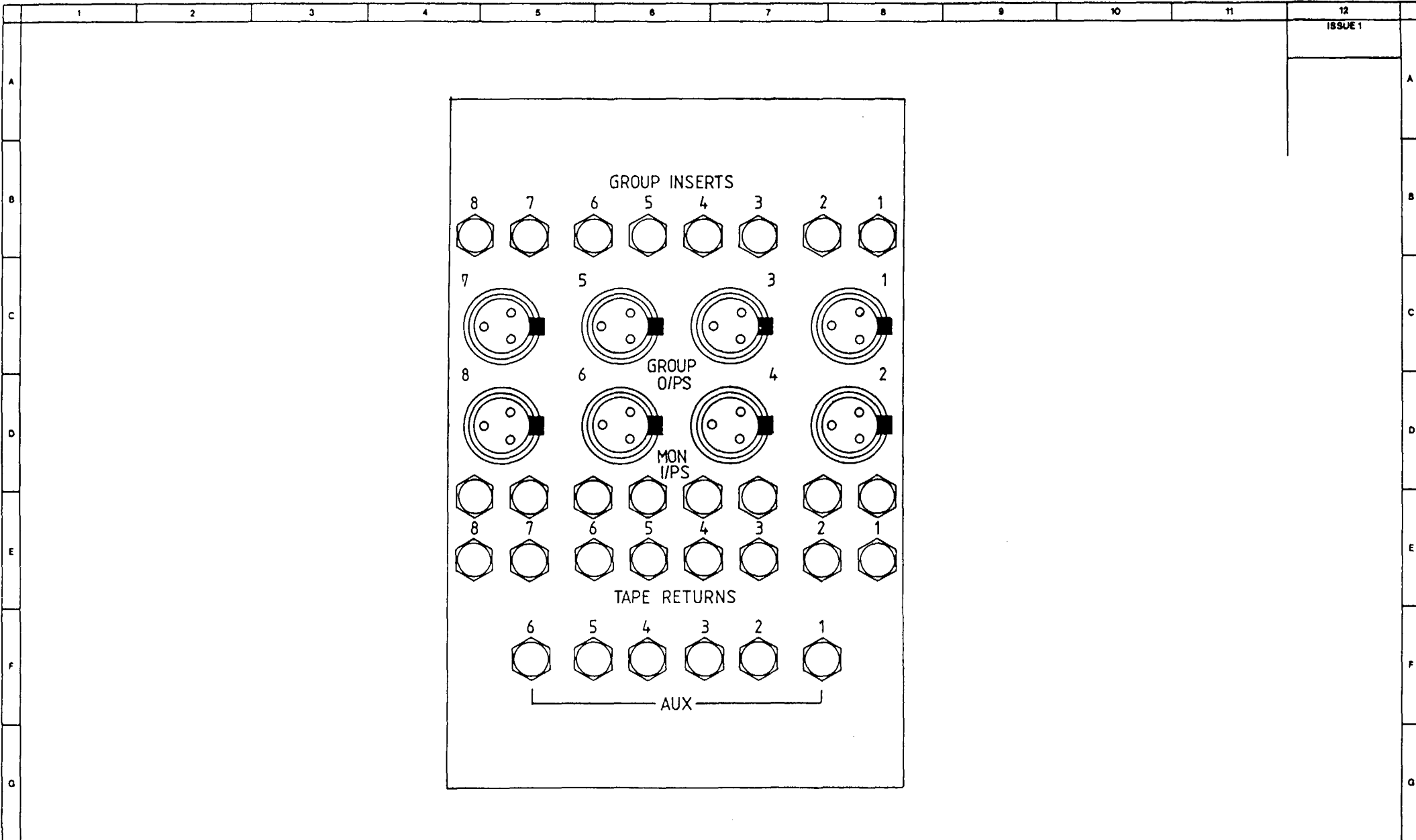
### 5) Auxiliary Outputs

These are standard electronically balanced jack sockets for the Auxiliary outputs and are wired as follows:-

Tip: HOT (In phase signal)

Ring: COLD (Out of phase signal)

Sleeve: Common Ground



<p><b>TOLERANCES</b></p> <p><b>HOLE SIZES AFTER PAINTING</b></p> <p>0-3mm    -0 -0.10</p> <p>OVER 3-6mm    -0 -0.12</p> <p>OVER 6-10mm    -0 -0.15</p> <p>OVER 10-15mm    -0 -0.20</p> <p>OVER 15-25mm    -0 -0.25</p> <p>OVER 25mm    -0 -0.30</p>	<p><b>GENERAL TOLERANCE</b></p> <p>Unless otherwise stated.</p> <p>± 0.05mm (0-020")</p> <p>± 0.25mm (0-010")</p> <p>± 0.12mm (0-005")</p> <p>HOLE CENTRES ± 0.004"</p> <p>ALL ANGLES ± 0-05°</p>	<p><b>HOLE INDEX</b></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p> <p><input type="checkbox"/></p>	<p><b>MATL</b></p> <p><b>FINISH</b></p> <p><b>SCALE</b></p>	<p><b>DRN</b></p> <p><b>AB</b></p> <p><b>TRCD</b></p> <p><b>CHKD</b></p>	<p>SOUNDCRAFT ELECTRONICS LTD</p> <p>UNIT 2,</p> <p>BOREHAMWOOD INDUSTRIAL PARK,</p> <p>ROWLEY LANE,</p> <p>BOREHAMWOOD,</p> <p>HERTFORDSHIRE WD6 8PZ.</p> <p>TELEPHONE: 01-207-5050</p> <p>FACSIMILE No. 2070194</p>	<p><b>TITLE</b></p> <p><b>S500 O/P REAR</b></p> <p><b>CONN PANEL</b></p>
<p>THIRD ANGLE PROJECTION</p> <p>THIS DRAWING TO COMPLY TO BS308.</p>					<p><b>DRG. No. MI2402</b></p>	

## 2.10 OUTPUT CONNECTOR PANEL SERIES 600

### 1) Auxiliary Outputs

These are standard electronically balanced jack socket outputs for the Auxiliary outputs and are wired the same as the Auxiliary Outputs on the Series 500 Output panel.

### 2) Group Inserts

This is a stereo, standard break point jack socket which contains both insert send and return. The socket is connected as follows:-

Tip: Insert return (unbalanced)

Ring: Insert send (unbalanced)

Sleeve: Common ground

Under normal conditions i.e. with socket not in use the send is connected to return so that inserting a jack automatically breaks the link.

### 3) Group Outputs 1-8

Fed from the eight individual groups these electronically balanced outputs are wired as follows:-

Pin1: GROUND

Pin2: HOT (In phase signal)

Pin3: COLD (Out of phase signal)

### 4) Tape Outputs 9-16

Paralled to the Group Outputs, they are wired as above.

### 5) Monitor Inputs

The Monitor Inputs carry FX returns. These are wired as follows:-

Tip: HOT (In phase signal)

Ring: COLD (Out of phase signal)

Sleeve: GROUND.

### 6) Tape Returns

These stereo standard jack sockets carry the balanced tape returns and are wired as follows:-

Tip: HOT (In phase signal)

Ring: COLD (Out of phase signal)

Sleeve: GROUND

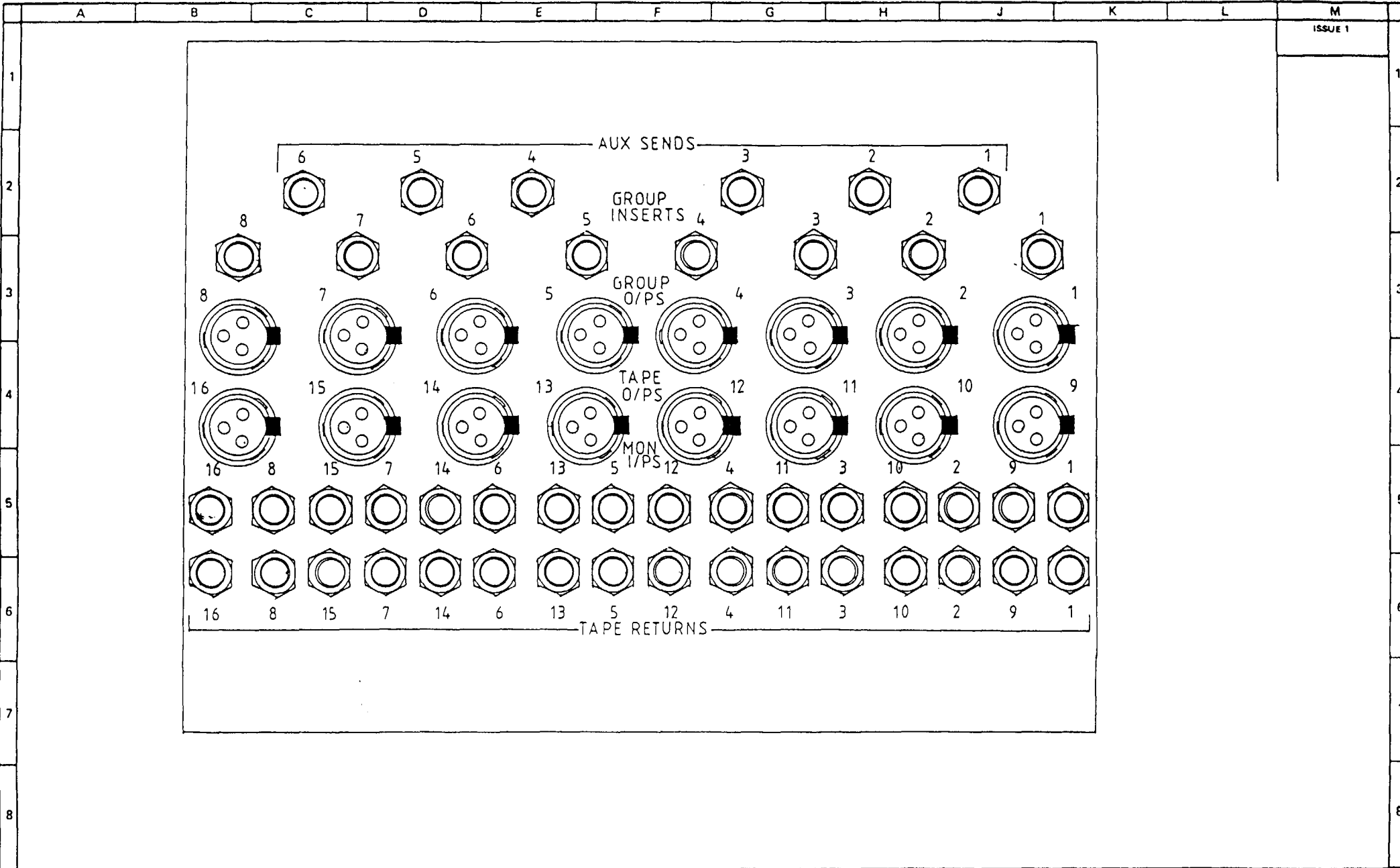
## 1) Initial Wiring Considerations.

- a) For optimum performance, it is essential for the earthing system to be clean and noise free, as all signals are referenced to this earth. A central point should be decided on for the main earth point system, and all earths should be "star fed" from this point. It is common electrical practice to "daisy chain" the earths to all electrical outlets but this method is unsuitable for audio installations. The preferred method is to run an individual earth wire from each outlet, back to the system star point to provide a safety earth of screen reference for each piece of equipment.

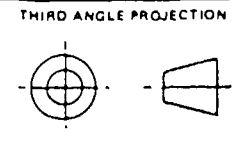
A separate earth wire should also be run from each equipment rack and area, to the star point. This may or may not be used depending on circumstances, but it is easier to install in the first place, than later when problems arise.

The location of the star point should be a convenient, easily accessible place preferably at the rear of the console, or in the main equipment rack.

- b) Install separate "clean" and "dirty" mains outlets, wired individually back to the incoming mains distribution box. Use the "clean" supply for all audio equipment and the "dirty" supply for all lighting, vending machines etc. Never mix the two systems.
- c) If necessary, to provide sufficient isolation from mains borne interference, install an isolating transformer for the "clean" supply. The isolation transformer should be provided with a Faraday Shield which must be connected to earth.
- d) Never locate the incoming mains distribution box near audio equipment, especially tape recorders, which are very sensitive to electro-magnetic fields.
- e) Ensure that all equipment racks are connected to earth, via a separate wire back to the star point.
- f) Equipment which has unbalanced inputs and outputs may need to be isolated from the rack to prevent earth loops.



M  
ISSUE 1



TOLERANCE  
All imperial dimensions  $\pm 0.010$   
All metric dimensions  $\pm 0.25\text{mm}$   
All angles  $\pm 0.50^\circ$   
Unless otherwise stated

HOLE INDEX

MATL  
FINISH  
SCALE

DRW  
AB  
TRCD  
CHKD

SOUNDCRAFT ELECTRONICS LTD  
5-8 GREAT SUTTON STREET  
LONDON EC1V 0BX.  
TELEPHONE. 01-251-3631/2/3  
TELEGRAMS. SOUNDCRAFT LDN EC1  
TELEX. UK. No. 21198. USA. No. 224408

TITLE  
S600  
OUTPUT REAR CONN  
PANEL  
DRG. No. MS 2403

## 2.11 MASTER CONNECTOR PANEL

The master connector panel contains the Control room and studio monitor outputs, the 2-track returns, the main mix outputs, the mix inserts and the PSU connector.

### 1. C/Room and Studio

These standard jacks carry the outputs to the control room and studio monitors these are electronically balanced and are wired as follows:-

Tip: HOT (In phase signal)  
Ring: COLD (Out of phase signal)  
Sleeve: GROUND

### 2. 2-track Returns B and C

These carry the 2-track returns and are wired as above.

### 3. Mix Outputs and 2-track A Returns

The main mix outputs and 2-track A returns are electronically balanced and are wired as follows:-

Pin 1: GROUND  
Pin 2: HOT (In phase signal)  
Pin 3: COLD (Out of phase signal)

### 4. Mix Inserts-

The mix inserts allow access to the main mix immediately before the main stereo fader, they are unbalanced and are wired as follows:-

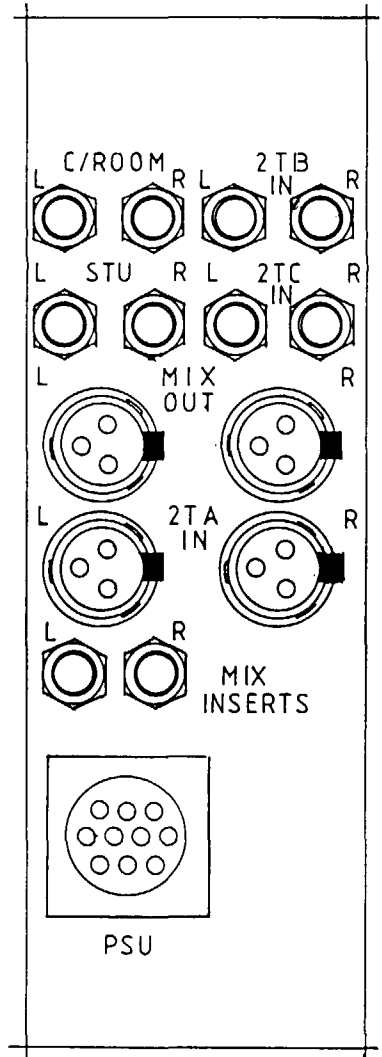
Tip: Insert return  
Ring: Insert send  
Sleeve: Common Ground

### 5. PSU

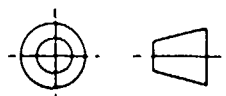
Power to the console is provided via the PSU connector located on the master rear connector panel.

A B C D E F G H J K L M

ISSUE 1



THIRD ANGLE PROJECTION



TOLERANCE  
 All imperial dimensions  $\pm 0.010$   
 All metric dimensions  $\pm 0.25\text{mm}$   
 All angles  $\pm 0.50^\circ$   
 Unless otherwise stated

HOLE INDEX

MATL  
 FINISH  
 SCALE

DRN  
 TRCD  
 CHKD

SOUNDCRAFT ELECTRONICS LTD  
 5-8 GREAT SUTTON STREET  
 LONDON EC1V 0BX.  
 TELEPHONE. 01-251-3631/2/3  
 TELEGRAMS. SOUNDCRAFT LDN EC1  
 TELEX. UK. No. 21198. USA. No. 224408

TITLE S500/600  
 10WAY PSU MASTER  
 CONN PANEL  
 DRG. No. MS 2401



## 2.12 OPTIONAL STEREO INPUT REAR CONNECTOR PANEL

This contains the Left and Right inputs and the Left and Right inserts for four Stereo Input modules.

### 1. Left and Right Inputs

These female XLRs are the Line inputs to the Stereo Modules and are balanced. They are wired as follows:-

Pin1: GROUND  
Pin2: HOT  
Pin3: COLD

### 2. Left and Right Inserts

The Left and Right insert points allow access to the signal path immediately after the Equaliser section, they are unbalanced and are wired as follows:-

Tip: Insert return  
Ring: Insert send  
Sleeve: Common Ground



## 3.00 INSTALLATION

### 3.01. Applying Power

Before switching on the Series 500 or 600 console check that the mains voltage selector on the power unit is set at the correct mains voltage for your area, and that the fuse is of the correct rating.

For operation on voltages between 220 and 240V ac the fuse should be rated at - 3.15A, 20mm, anti-surge.

For operation on voltages between 100 and 120V ac the fuse should be rated at - 6.30A, 20mm, anti-surge.

### 3.02. Interface Levels

Both the Soundcraft Series 500 and the Series 600 differ from previous Soundcraft consoles in that they are designed to work with 2 different nominal input/output levels. These are the usual +4dBu, (1.228Vrms), and -10dBV (= -7.8dBu), often called the Tascam level. These levels refer only to matching with the tape machine being used; mic sensitivity is not affected.

Changing between these two modes of operation requires the installation/removal of several push-on links, and the operation of various internal switches. (See ED2173, ED2176 & ED2177).

Note that whichever gain mode is in use, the nominal internal level in most parts of the console, including the insert points, is -6dBu, and this does not change.

#### a) INPUT CHANNELS

All that is necessary is to change one jumper (J11) on top of the channel PCB, to establish Line Input sensitivity.

+4 MODE: Jumper ON  
-10 MODE: Jumper OFF

#### b) OUTPUT GROUPS

Two things need to be changed on a group; the nominal output level and the tape-return sensitivity. This is done by simply using S9, the push switch pointing backwards away from the fascia.

+4 MODE: S9 OUT  
-10 MODE: S9 IN

#### c) MASTER MODULE

LEFT PCB - AUX MASTERS

If it is necessary to change the nominal output level of the aux masters then this is done with Jumpers 1 to 6, which configure the aux masters individually.

+4 MODE: Jumper OFF  
-10 MODE: Jumper ON

RIGHT PCB - MIX, CONTROL ROOM SELECT etc

Mix Output Level: Set by J1/101

+4 MODE: Jumper OFF

-10 MODE: Jumper ON

2-track returns sens: Set by J4,5 and J104/105

+4 MODE: Jumpers ON

-10 MODE: Jumpers OFF

2-track return C:

The sensitivity of this input may be increased separately, so that 2-track C operates in -10 MODE while the rest of the desk is at +4 MODE.

To do this Jumpers J2,3 and J102,103 are pushed ON.

### 3.03. Connector Conventions

All XLR type connections are normally wired to the following standard:-

Pin 1 GROUND

Pin 2 HOT (In phase signal)

Pin 3 COLD (Out of phase signal)

All inputs and outputs are electronically balanced except for Monitor Channel Insert and Line Out.

### 3.04. General Wiring Procedures

To take full advantage of the excellent signal to noise ratio and low distortion of Soundcraft consoles care must be taken to ensure that incorrect installation and wiring does not degrade the performance of the desk. Hum, buzz, instability and Radio Frequency Interference can usually be traced to earth loops and inferior earthing systems. In some areas, especially heavy industrial areas, the incoming mains earth will not be adequate, and a separate technical earth for all the audio equipment must be supplied. However, check with your local electricity supply company to ensure that safety regulations are not infringed or negated.

The successful, hum free, installation of a system requires forethought, and the establishment of a set of ground rules, which must be consistently adhered to at all stages of installation.

## 1) Initial Wiring Considerations.

- a) For optimum performance, it is essential for the earthing system to be clean and noise free, as all signals are referenced to this earth. A central point should be decided on for the main earth point system, and all earths should be "star fed" from this point. It is common electrical practice to "daisy chain" the earths to all electrical outlets but this method is unsuitable for audio installations. The preferred method is to run an individual earth wire from each outlet, back to the system star point to provide a safety earth of screen reference for each piece of equipment.

A separate earth wire should also be run from each equipment rack and area, to the star point. This may or may not be used depending on circumstances, but it is easier to install in the first place, than later when problems arise.

The location of the star point should be a convenient, easily accessible place preferably at the rear of the console, or in the main equipment rack.

- b) Install separate "clean" and "dirty" mains outlets, wired individually back to the incoming mains distribution box. Use the "clean" supply for all audio equipment and the "dirty" supply for all lighting, vending machines etc. Never mix the two systems.
- c) If necessary, to provide sufficient isolation from mains borne interference, install an isolating transformer for the "clean" supply. The isolation transformer should be provided with a Faraday Shield which must be connected to earth.
- d) Never locate the incoming mains distribution box near audio equipment, especially tape recorders, which are very sensitive to electro-magnetic fields.
- e) Ensure that all equipment racks are connected to earth, via a separate wire back to the star point.
- f) Equipment which has unbalanced inputs and outputs may need to be isolated from the rack to prevent earth loops.

## 2) Audio Wiring

Having provided all equipment with power and earthing connections, consideration must be given to the method of providing audio interconnection, and adequate screening of those interconnections. This must be done in a logical sequence to avoid problems, and assist in the localisation of problem equipment.

- a) Connect Control Room Monitor system to the console, and check for any hum, buzz, or RFI. Only when you are satisfied with the quietness of the console and the monitor system should you proceed with the next step.
- b) Connect multitrack tape recorder, via noise reduction system if applicable, and again check that the system is still clean.
- c) Connect stereo tape recorders, studio monitors, echo and foldback sends one at a time, checking and isolating any connection which degrades performance.
- d) Connect all peripheral devices.
- e) Connect all microphone lines.

By following this sequence much time and future trouble will be saved, and the result will be a quiet, stable system.

## 3) Shielding

Audio equipment is supplied with a variety of input and output configurations, which must be taken into consideration when deciding where the screen connections should be made. There are three sources of unwanted signal being impressed on the screen, which are as follows:-

- i Extraneous electrostatic or electromagnetic fields.
- ii Noise and interference on the earth line.
- iii Capacitive coupling between the screen and signal wires.

To minimise the adverse affects of the unwanted coupling to the signal wires, it is important that the screen is connected at one end only, i.e. the screen must not carry any signal current. Any signal on the wires within the screen will be capacitively coupled to the screen, and this current will ultimately be returned to the source of the signal, either directly, if the screen is connected at the signal source end, or indirectly via the earthing system, if the signal is connected at the signal destination end. The indirect connection will cause an increase in high frequency cross-talk, and should be avoided wherever possible. Therefore, in general, always connect the shield only at the signal source end. In high RF areas, the screen can also be connected to earth via a 0.01 micro Farad capacitor. This will present a short circuit at RF frequencies, thus lowering the effective shield impedance to ground. However, at low audio frequencies the reactance of the capacitor will be sufficiently high not to cause an earth loop problem.

Combinations of unbalanced, balanced and electronically balanced, (differential), systems mean that there are nine interconnection permutations. The optimum of the screen in each case is shown in Table 1.

TABLE 1

	OUTPUT	INPUT	SCREEN
1	Unbalanced	Unbalanced	Source
2	Unbalanced	Balanced	Source
3	Unbalanced	Differential	Source
4	Balanced (Note 1)	Unbalanced	Destination
5	Balanced	Balanced	Source
6	Balanced (Note 2)	Differential	Destination
7	Differential (Note 3)	Unbalanced	Source
8	Differential	Balanced	Source
9	Differential	Differential	Source

Note 1 - The shield is connected to the destination earth point, which is opposite to normal practice, because the signal wires being shielded are referenced to the input earth, not the output earth.

Note 2 - If the output transformer is centre tapped to earth, the screen should be connected at the source.

Note 3 - When an active differential output is operated in unbalanced mode, it is very important that the output current returns to earth via the shortest, least reactive route. Check for instability at the output.

N.B.

- a) In all cases, use good quality twin screened audio cable. Check for instability at the output.
- b) Always connect both conductors at both ends, and ensure that the screen is only connected at one end.
- c) Do not disconnect the mains earth from each piece of equipment. This is needed to provide both safety and screen returns to the system star point.
- d) Equipment which has balanced inputs and outputs may need to be electrically isolated from the equipment rack and/or other equipment, to avoid earth loops.

It is important to remember that all equipment which is connected to the mains is a potential source of hum and interference, and may radiate both electrostatic or electromagnetic radiation. In addition, the mains will also act as a carrier for many forms of RF interference generated by electric motors, air-conditioning units, thyristor light dimmers etc. Unless the earth system is clean, all attempts to improve hum noise levels will be futile. In extreme cases there will be no alternative but to provide a completely separate and independent "technical earth" to replace the incoming "noisy earth". However, always consult your local electricity supply authority to ensure that safety regulations are not being infringed.



S500/600 A, B MUTE OPTION INFORMATION

On mono module and stereo module fit components in dotted box. Opto isolator is 4N33 type, giving open collector pull down when module is "ON".

STEREO MODULE

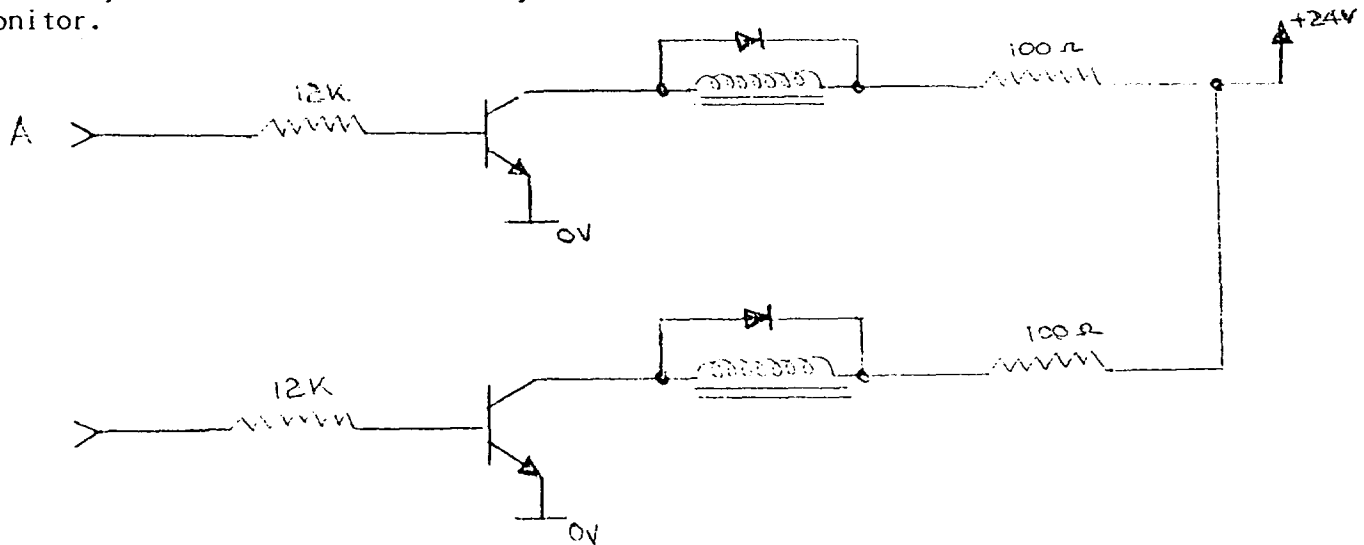
R60 to be 4K7 resistor. Fit J9 if momentary pulse NOT required.

MONO MODULE

Fit J14 if momentary pulse NOT required.

To use A, B monitor mutes, wire from PSU interface PCB from A, & B line to transistors as shown below.

These may then drive external relays to mute control room monitor and studio monitor.



Relays to be 24V type.

Transistors to be 2n1681 BL or 25c 2240 BL NPN or equivalent

N.B. Diodes are essential

## 4.00 OPERATION SERIES 500 AND 600

### 4.01 Introduction

The Soundcraft Series 500/600 console has been designed to provide the varied facilities required in a small modern recording studio.

The recording process can be broken down into 4 basic sequences:-

1. Record mode: Recording direct from microphone or line input onto the multitrack tape recorder.
2. Multitrack playback: Listening to what has been recorded.
3. Overdubbing: Building up the track complement whilst listening to what has already been recorded.
4. Mixing: Combining all the recorded tracks, various effects, echo etc to form the final stereo mix.

A detailed explanation of all the controls and switches has been given in section 2.00 and it is assumed that the user is familiar with basic multitrack recording methods.

### 4.02 Record Mode

#### 1. Record Mode

This is the basic starting point in making a recording. Input channels are placed in the microphone mode by placing the LINE button in the "up" position. The signal is routed to the desired console group output by pressing the relevant group routing button on each channel, on the Series 600 the signal may be routed to tracks 9-16 by simply selecting "record" on the relevant track of the multitrack machine. The signal can be routed to more than one group if desired and panned between any odd and even numbered groups by using the channel Pan Pot.

The signal may be metered at pre-fade, post EQ, by pressing PFL and using the mix meters and at the relevant Group Output to the tape machine on the Group Output meter, if the tape return button is in the "up" position. A monitor balance is achieved using the appropriate level control. The monitor Pan Pot will pan the signal between the left and right speakers.

The various gain and level controls throughout the signal chain may now be adjusted to set the operating levels for optimum signal to noise ratio and headroom conditions.

## 2. Channel and Group Faders

In general the channel and group faders should be set to approximately the zero position. This will enable the engineer to increase the level by 10dB, or fade out completely, while normally operating in the fine resolution area of the fader travel. The absolute position of the fader is not too critical, but situations where, for example, the channel fader is operated at -30dB will usually mean that the pre-fader headroom has been reduced to a point where an amplifier could overload and cause distortion. Operating with the channel fader below the zero point and the group fader above zero also means that the noise contribution from the group bus could degrade the normally excellent signal to noise ratio.

## 3. Microphone Gain

Having set both channel and group faders as above, the microphone gain is set to give the required level at the group output. The amount of gain required depends on the type of microphone, the sound pressure level developed by the instrument or voice and the distance between the sound source and microphone. In the case of high output and high sound pressure levels, it may be necessary to switch in the -20dB attenuator pad, to prevent overloading the input stage.

## 4. Insert Points

In situations where the dynamics of the input signal are very wide, or where a particular effect is required, it is often necessary to patch in a limiter/compressor, equalizer or effects device into the signal chain. This can be done by using either the Channel Insert points or the Group Insert points. Which insert point is used will depend on the type of effect required. If only an individual instrument is to be controlled, the channel insert point would be used. However, if a number of microphone channels have been mixed to a single group, for instance, backing vocals, then it will be necessary to patch in an overall limiter, using the group insert point.

## 5. Headphone Mix

During recording, it is of course essential for the musicians to hear what they and everybody else are playing. Headphone mixes are derived using any or all of the auxiliary sends, either direct from the input channels, or alternatively from the group monitor channels. Deriving the headphone mix from the monitor channels has the advantage of giving the musicians a mix when replaying the recording just made, which is useful when overdubbing to enable them to hear their performance. However, a mix derived from the monitor channels during recording will be affected by any gain riding of the channel or group faders, which may cause problems.

If the echo send level from the echo return is set too high, the entire system will start to feed-back and go into oscillation, instead of decreasing in amplitude with each successive loop.

If it is not required to record the echo signal, but merely to route it direct to the monitors select MIX. This will route the signal directly to the stereo mix bus, which is also the monitor signal in this mode.

#### 4.03 Multitrack Playback

Having actually recorded something on the multitrack recorder, it is necessary to be able to listen to the recording. This is achieved by simply selecting Tape Return. The effect of this is to connect the individual monitor to the output of the relevant track of the multitrack machine. Therefore, the signal from the tape machine now follows the same monitor signal path as the group output signal had been using. This means that all levels and panning, and therefore the monitor mix, will remain the same as they were when the recording was being made. This is assuming, of course, that the tape machines were correctly aligned.

The facility of monitoring the playback of the multitrack in this way enables the operator to perform a quality check even while the recording is being made, providing that the following precautions are observed.

1. Isolation between control room and studio is good. If not, the musicians will hear a delayed version of what they are playing.
2. Headphone mix is derived from the channel faders, otherwise the musicians will again hear a delayed version.
3. Any noise reduction is either a simultaneous encode-decode system, or not used. If it is not a simultaneous encode-decode system, then while recording it will be in the encode mode, and the signal presented to the console monitor return will probably be the tape recorder line input signal i.e. the signal from the console group output. In this case, pressing the Tape Return will appear to have no effect, as it will be the same signal in both cases. This particular effect can, in some cases, be put to good use, however, when overdubbing as it allows monitor switching to be achieved automatically, depending on the mode of the tape recorder. This will be dealt with more thoroughly in section 4.04 which describes the overdubbing process.

#### 4.04 Overdubbing

Overdubbing is the process of building up a recording track by track, while listening to all the previously recorded tracks. As such it will be clear that this is a combination of the previous two modes, with some of the channels in the microphone, (recording), mode and some monitors in the Tape Return, (multitrack playback), mode.

Any tracks which have already been recorded are monitored by selecting the relevant tape return buttons. A headphone mix may be set up using the auxiliary sends on the monitor channels. Monitor echo can also be similarly set up, as already described in section 4.02.

At this stage, a decision must be made as to the source of the headphone mix signal from the overdub channels. It can be derived from either the input channel or the monitor channel or both.

##### 1. Input Channel

In this case, the musician always hears himself. However, he will not be able to hear his previously recorded signal off the tape machine, if he needs to "drop in" in the middle of a take.

##### 2. Monitor Channel

If the headphone mix is derived from the monitor channels, the engineer can decide whether the musician hears himself live or the previously recorded signal off tape, (sync playback), by pressing the Tape Return button. However, he will not be able to hear both, and a vocalist, for instance, may find it difficult to match levels and intonation.

This switching can sometimes be achieved automatically if a noise reduction unit is in use, and with some tape machines. If the tape machine or noise reduction unit is arranged to switch its sync output to line input whenever the machine is in stop, fast forward, rewind, or record and only switch to sync playback off tape when the machine is in the play mode, the automatic switching condition will be met.

All that is now usually necessary when overdubbing is to select Tape Return on the relevant monitor channel, and let the tape machine and/or noise reduction perform the work of monitor switching.

The musician now hears himself live at all times except when the tape machine is actually in the sync play mode, then he will hear his previous signal off tape. This method saves the engineer from continually switching monitor sources, but can only be used with certain tape machines.

### 3. Both

If derived from both, then the musician is able to hear himself live, via the input channel, and his previous recording via the monitor channel, if it is switched to monitor Tape Return, until the moment of entering record mode. At that point, most tape machines switch from sync playback to line input. The effect of this will be a slight increase in the level of that signal in the headphone mix, due to the addition of the input channel signal and tape machine line input signal, which is effectively the same signal.

#### 4.05 Remix Mode

When all recording and overdubbing has been completed, the console is placed in the remix mode.

Remixing is the process of combining all the previously recorded tracks together with any special effects devices such as harmonizers, flangers and delay lines.

The remix mode is entered by selecting Line Input, (LINE) on input channels 1-8 on the Series 500 and 1-16 on the Series 600. This connects the outputs of the multitrack machine to the inputs of each channel, via the gain trim control. As when laying the initial tracks, the gain trim can be adjusted to allow the fader to work near its nominal zero position.

By selecting MIX, the channel can be routed directly to the stereo mix, via the channel Pan Pot, to allow positioning of the signal within the stereo perspective.

Sub-groups may be formed by routing a number of signals to any one group and pressing the SUB button on that group. This signal is summed into the relevant group bus AND that group is routed to the stereo mix bus.

NOTE that pressing SUB routes the Monitor Input to the relevant group and ALSO routes that group to the stereo mix bus.

On both the Series 500 and the 600 each Group/Monitor module can be used as a Line level input, say for FX returns, and directly accesses the stereo mix bus.

Limiters or other effects devices can be connected to any input channel or output group by patching into the relevant insert points.

All 6 auxiliary sends can be used to feed echo or effects devices, as headphone mixes are not required during remixing.

The composite stereo mix will be controlled in level by the stereo master fader and the level metered on the stereo mix meters. These meters will also indicate the level of any solo signal, or any of the stereo tape returns selected on the monitor source selection buttons. These monitor source selection buttons allows quality and level checking of the stereo recording in the same way as described for multitrack playback.

## 5.00 MAINTENANCE

Every console that leaves Soundcraft undergoes a thorough testing at all stages of manufacture. These tests include individual testing of every function on all the PCB's, a thorough testing of all the functions of the completed mixer, a soak test of 48 hours before the final test, which consists of listening, measuring and mechanical function checks prior to packaging and shipment. In this way we try to ensure that any faulty components or manufacture show up long before the console leaves the company. Thus a long and trouble-free life can be expected.

Although all Soundcraft Consoles have been designed with long term reliability in mind, it is inevitable that occasional maintenance will be required. However, due to the amount of attention given to the problems of maintenance during the design stages of this console, and the modular construction, servicing tends to be extremely simple to carry out, with the minimum of test equipment needed to isolate and rectify faults.

### 5.01 General Fault Finding

With the exception of the electronically balanced microphone amplifier, and the hybrid discrete/op amp summing amps, all signal electronics are configured around high slew rate, low noise integrated circuits. The microphone amplifier is a proprietary design, utilizing a discrete transistor, noise cancelling front end, differentially summed via a low noise integrated circuit.

The use of integrated circuits means that the majority of audio faults can be repaired by simply replacing the I.C., having first isolated the fault to a particular stage in the signal chain. The isolation can often be done without even having to remove the module from the console, by judicious use of insert points, and/or switching the module to various modes. As with all servicing a good knowledge of the basic signal flow is necessary for best results. Each module should be viewed as a number of signal blocks, through which the signal must flow. If the signal appears at the input to a block, but not at the output, then the fault lies within that block. By dividing a module into individual sections, what at first appears to be an extremely complicated piece of equipment can be simplified into a series of sequential stages. This is the basic first move in all types of fault finding, and usually requires no more than a certain amount of logical thought. Servicing a console is more a matter of clear thinking and having an understanding of what should be happening, than having a highly developed technical knowledge.



To illustrate the method of logical fault finding, let us assume that we have a non-functioning input module, in both microphone and line modes.

The first step is to ensure that a fault really does exist! Check that the module is in the correct mode of operation, and that no jacks are inserted in the insert points, which may be interrupting the signal flow.

If in doubt about the module operation, set up an adjacent module in exactly the same way, which will allow a direct comparison between a working and possible non-working module.

Route the channel directly to MIX, so that the channel may be monitored in the normal way. Using an oscillator set it to approximately 1kHz and patch the oscillator signal into the channel Line Input. If all is well, an undistorted signal should now be heard. More likely, because of the fault it won't.

Large sections of the module circuitry can be by-passed by switching out the Hi-pass filter and the Equalizer.

If switching out a section causes the signal to re-appear, then the fault is located in that section, which can then be traced at component level, by removing the module from the console frame, and reconnecting it via extender cables.

With the module installed on extender cables, access is now available to all parts of the module, and the signal may be traced through the various stages, using an oscilloscope, millivoltmeter, or even high impedance headphones. Refer to the Block Schematic which shows the signal flow through the modules. When a point is reached where the signal is not present, or is distorted, the probable faulty components can be checked out and if necessary replaced. Integrated circuits, due to their internal complexity, are the most likely cause of problems, followed by mechanical components such as switches and faders, which are susceptible to physical contamination from oxidisation, dust and liquids.

#### 5.02 Removing Modules

Remove the 2 module retaining screws, which will allow the module to be carefully withdrawn from the console. The ribbon cable will now be exposed, and may be detached from the module. The module will still have some cables attached, but these are sufficiently long to allow the module to be completely withdrawn from the console. Extender cables can now be plugged into the main ribbon cable, and the module, taking care not to twist the extender cable. Although damage to the module will not be caused by plugging and unplugging the module with the power still switched on, this is not recommended for the inexperienced, as it is possible to bend the connector pins if care is not taken.

### 5.03 Meter Alignment

#### SERIES 500

The VU meters are attached to drive cards in sets of four on the group outputs, with the two master VU meters being connected together on a separate card. These cards also contain the detection and drive circuitry for the peak LED which is pre-set to indicate a peak level of 8dB above 0VU.

0VU is normally adjusted to indicate a line level of +4dBu, i.e. a level of 1.228volts. However, it can be re-adjusted to indicate a different line level if required by the pre-set potentiometer on the drive card.

Connect a millivoltmeter to the group output. Route the oscillator set to 1kHz to the group outputs 1-4 and adjust the group output levels to read the required level on the millivoltmeter. (Normally this would be +4dBu). Adjust the VU drive pre-set to indicate 0VU on the VU meters and repeat for all other group meters and the Stereo mix meters.

Note that the peak LED will always indicate a level of 8dB above whatever the 0VU level has been set to.

#### SERIES 600

The LED Bargraph meters are connected, in sets of eight on the group outputs/tape returns, with the meters for the auxiliaries being connected in a group of 6, onto drive cards situated at the back of the meter. This drive card also contains the drive circuitry for the peak LED which is pre-set to indicate a peak level of 8dB above 0VU.

Align VU-meters as for Series 500. (See above.)

### 5.04 Lamp Replacement

Illumination of the VU meters is provided by 1 wire ended lamp in each meter. This is a 12 volt lamp. NB: On some early models illumination is provided by 2 wire ended lamps in each meter. These are 9 volt lamps. The lamps in each group of 4 meters are wired in series and powered by the + 17 volt audio supply. A series resistor provides turn on surge current limiting to prolong the lamp life.

The stereo mix meters have an additional series resistor to simulate the voltage drop of the missing pairs of meters.