Soundcraft

2400

USER MANUAL

Soundcraft Electronics Ltd.
Unit 2, Borehamwood Industrial Park,
Rowley Lane,
Borehamwood, Herts. WD6 5PZ England.
Tel: 01-207-5050.
Telex: 21198
Facsimile: 01-207-0194

JBL
PO Box 2200
8500 Balboa Boulevard
Northridge
CA 91329
Tel: 818 893 4351
Telex: 23 66 4923
Facsimile: 818 893 3639

Soundcraft Canada Inc
1444 Hymus Boulevard
Dorval
Quebec. Canada. H9P 1J6.
Tel: (514) 685 1610
Telex: 05 822582
Facsimile: (514) 685 2094

Soundcraft Japan
4F Yoyogi Living,
12-21 Sendagaya 5,
Shibuyaku, Tokyo, 151 Japan.
Tel: (03) 341 6201.
Facsimile: (03) 341 5260

The information in this document has been carefully checked and is believed to be entirely reliable. However, no responsibility is assumed for inaccuracies. Furthermore, Soundcraft reserves the right to make changes to any products herein to improve reliability, function or design.

Soundcraft does not assume any liability arising out of the application or use of any product or circuit described herein.

SOUNDCRAFT SERIES 2400 USER MANUAL

CONTENTS PAGE NO.

1.00	INTRODUCTION	1
2.00	DESCRIPTION	3
2.01	Introduction	3
2.02	Console Layout	3
2.03	Input Module	4
2.04	Group/Monitor Module	9
2.05	Master Module	12
2.06	24-Track Monitor Module (small frame only)	16
3.00	INSTALLATION	18
3.01	Assembly	18
3.02	Interface levels and connectors	19
3.03	General Wiring Procedures	20
4.00	OPERATION	24
4.01	Introduction	24
4.02	Record Mode	24
4.03	Multitrack Playback	28
4.04	Overdubbing	29
4.05	Remix Mode	30
4.06	Sub-groups	31
5.00	MAINTENANCE	33
5.01	General Fault Finding	33
5.02	Removing Modules	34
5.03	Removing Patch Cards	35
5.04	VU Meter Alignment	35
5.05	Lamp Replacement	35
5.06	LED Meters	36
5.05	Power Supply Servicing	38
5.06	Medium Power Supply	40
6.00	GLOSSARY	42
7.00	WARRANTY	44
8.00	CUSTOMER SPARES KIT	46

1.00 SERIES 2400

Model No. ..... Frame size.....

Serial No. ..... PSU Serial No. .....
(as used in final test)

Original Customer..... Works Order No. .....

PROGRESS	NAME	DATE	SUPERVISORS INSPECTION
Frame Fitted by.....			
Assembled/Wired by.....			
First Test by.....			
Final Test by.....			
Despatch Inspection by.....			

EQUIPPED WITH	TYPE	QUANTITY ISSUE
Input Modules.....		
Output Modules.....		
Master Module.....		
P.S.U.		

OPTIONS - SPECIFY

ALTERATIONS TO SPEC.

SPECIAL INSTRUCTIONS

DESPATCH KIT REQUIRED

SYSTEM MEASUREMENTS

1. Channel Line Input to Mix Output

CHANNEL	THD (Ref 1kHz, +12dBu)	Frequency Response (Ref 1khz) 20Hz	20kHz
1	0.0 %	-0.	-0.
2	0.0 %	-0.	-0.
3	0.0 %	-0.	-0.
4	0.0 %	-0.	-0.
5	0.0 %	-0.	-0.
6	0.0 %	-0.	-0.
7	0.0 %	-0.	-0.
8	0.0 %	-0.	-0.
9	0.0 %	-0.	-0.
10	0.0 %	-0.	-0.
11	0.0 %	-0.	-0.
12	0.0 %	-0.	-0.
13	0.0 %	-0.	-0.
14	0.0 %	-0.	-0.
15	0.0 %	-0.	-0.
16	0.0 %	-0.	-0.
17	0.0 %	-0.	-0.
18	0.0 %	-0.	-0.
19	0.0 %	-0.	-0.
20	0.0 %	-0.	-0.
21	0.0 %	-0.	-0.
22	0.0 %	-0.	-0.
23	0.0 %	-0.	-0.
24	0.0 %	-0.	-0.
25	0.0 %	-0.	-0.
26	0.0 %	-0.	-0.
27	0.0 %	-0.	-0.
28	0.0 %	-0.	-0.

2. Channel LIne Input to Auxiliary Output

AUXILIARY OUTPUT	THD (Ref 1kHz, +12dBu)	
1	0.0	%
2	0.0	%
3	0.0	%
4	0.0	%
5	0.0	%
6	0.0	%

3. Channel Line Input to Control Room Outputs

CONTROL ROOM OUTPUT	THD (Ref 1kHz, +12dBu)	
Left (Via solo)	0.0	%
Right (Via solo)	0.0	%
Control (Via PFL)	0.0	%

4. Channel Line Input to Studio Output (Via all groups)

STUDIO OUTPUT	THD (Ref 1kHz, +12dBu)	
Left	0.0	%
Right	0.0	%

5. Crosstalk (at 10kHz)

Stereo Mix	-	dBu
Channel to Channel	-	dBu
Mute	-	dBu

6. Mix Noise (DIN Audio, all channels and groups at unity gain)

Mix Left	-	dBu
Mix Right	-	dBu

7. Power Supply

OUTPUT	RIPPLE & NOISE		VOLTAGE
+17V Audio	-	dBu	Volts
-17V Audio	-	dBu	Volts
+24V Logic	-	dBu	Volts
+48V Phantom	-	dBu	Volts
+7.5 Logic	-	dBu	Volts
-7.5 Logic	-	dBu	Volts

NOTES

0dBu = 0.775 Volt
0dBV = 1.000 Volt

The constraints and conditions under which the above performance figures have been measured are configured so as to ensure that all signal paths are within specification, with a minimum of separate tests. Many are therfore recorded via very long signal paths or under worst case conditions.

The results should not, therefore, be taken as representative of typical published specifications, which would normally be conducted under standard operative conditions.

1.00 SERIES 2400 INTRODUCTION

The Soundcraft Series 2400 is a fully modular 24 group console for up to 24-track recording and mixing.

Configured as a split console, with the Group/Monitor channels being separated from the input channels, the Series 2400 presents the engineer with logical layout which is easy to follow, even first time round!

The Series 2400 is truly state of the art in all aspects of its design and construction. Almost all the wiring is computer flat wire and all amplifiers are the latest low noise, high slew rate devices with the exception of the microphone amplifier, which is a proprietry discrete transformerless design offering a lower noise figure and superior high frequency common mode rejection to all conventional transformer coupled designs. 41 position detented potentiometers are used throughout (with the exception of the equaliser boost/cut and pan controls which have a single centre detent), enabling accurate repeatability of previously established settings. Solid state switching of channel mutes removes the inherent unreliability of relays. The channel and group faders are long throw conductive plastic types, and the monitor fader is a well proven carbon track design.

Several unique features of the Series 2400 combine to achieve a completely new approach to the split console format.

Main Features

A unique feature of the Series 2400 is the ability of the group monitor channels to split into 2 independent sections during mix down, which allows the creation of a sub master and an effects return, with 3 band equaliser. The auxiliary sends and the pan pot can be switched into either section. This means that a 28/24 configuration will become a 28/24/2 plus 24/2, all with equaliser, auxiliary sends, pan, and solo facilities during mix down operation, giving a total of 52 inputs to the stereo mix, with 24 sub groups.

Solo modes

Another feature is the triple mode solo facility on the input channels. The 3 modes are "Mono" (pre-fade), "stereo" (post-fade), and "solo in place". The first 2 modes are "safe" in that they are monitor modes only and do not affect the mix signal. The "solo in place" mode mutes all input channels other than those which are soloed or assigned to "safe". The 3 modes are selected on the master module.

Mute System

To further facilitate complex mix downs 2 master mute buses have been provided. Any input can be assigned to Mute A, Mute B, or both.

Auxiliary Sends

There are 6 auxiliary sends available from every input channel and group/monitor channel. On the input channels, sends 5 and 6 can be switched to the output of the pan pot to allow creation of stereo effects.

Patch Points

Every input channel, group channel and the stereo master has a pre-fade insert point driven at nominal level from a low source impedance. This allows the insertion of external devices such as limiters, compressors, parametric eequalisers etc. into the signal path at the individual channel, at the sub groups or at the overall master.

Post Fade Outputs

All input channels and subgroups have their post fade outputs available at the patchbay. This allows further access to the non-insertable kind of device, such as reverberation, to that afforded by the six auxiliary sends.

Equalisers

Two different equalisers are present on the Series 2400.

1. Input channel equaliser

± 15dB at 12kHz shelving
± 15dB from 600Hz to 10kHz peaking/dipping.
± 15dB from 150Hz to 2.4kHz peaking/dipping.
± 15dB at 60Hz shelving.

2. Monitor channel equaliser

± 15dB at 12kHz shelving
± 15dB from 300Hz to 5kHz peaking/dipping
± 15dB at 60Hz shelving.

Both equalisers can be switched out of circuit. In addition, there is a high pass filter on the input channels, switchable in/out. This has a slope of 12dB/octave below cut off frequency which is variable between 50Hz and 800Hz.

2.00 DESCRIPTION (Physical)

2.01 INTRODUCTION

The following description is intended to describe the function of each module and other parts of the console to enable the user to achieve a clear picture of the general functioning of the system. The various signal paths will not be discussed in detail here, but will be covered in the operational section (3.0).

2.02 CONSOLE LAYOUT

The Series 2400 console utilizes the classic "split" approach, with all input channels located on the left and all sub group outputs and monitoring facilities located on the right. Each subgroup and monitor module contains all the electronics and facilities for two tape tracks in a double width module. Two frame sizes are available, 28/24/2, and a small frame 24/16/2, with optional 24-track monitor module, which is located between the subgroup/monitor modules and the patchbay. This provides an additional 8 monitoring channels to the 16 already contained in the sub group and monitoring section, to enable monitoring of a 24-track tape machine to be achieved.

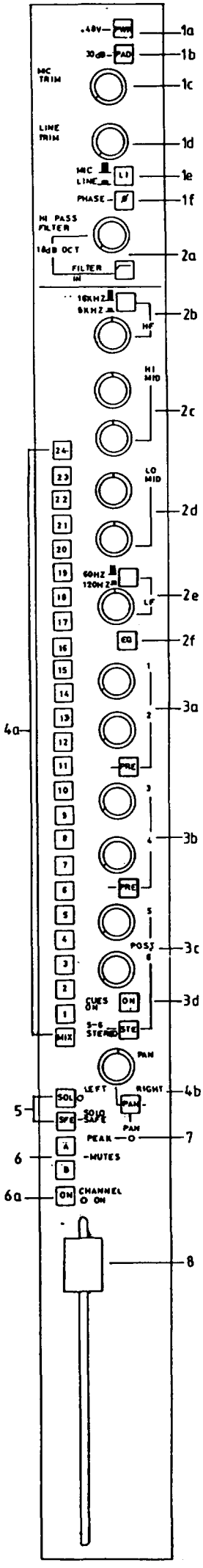
Between the input section and the output section is the master module. This contains the stereo mix master fader, Control Room and Studio monitoring facilities and also the line-up oscillator. Master programming switches for the solo system and mute buses are also contained in this module.

At the far right of the console is the patchbay. This is built up of up to 29 rows, each row containing 16 jacks. All jacks are of the Bantam or T.T. type, allowing access to all channel inputs, outputs and insertion points, as well as external devices such as reverberation systems, limiters and equalisers.

Metering facilities are provided by either a VU or an LED meter bridge assembly across the top of the console.

The VU version either contains 16 or 24 VU meters for the subgroup output or tape returns depending on frame size, and two centrally mounted VU meters for the stereo mix outputs or stereo tape return. An LED above each meter indicates a peak signal level 8dB above 0VU.

The LED meter bridge contains high resolution bargraphs, switchable between Peak or VU characteristics, to meter group outputs, the stereo mix, and the auxiliary sends. In addition, these meters can be switched to become a 1/3 octave real time analyser.



2.03 INPUT MODULE

1) Input to Channel

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

The Microphone input is electronically balanced, using a transformerless design, configured for optimum low noise operation.

The balanced Microphone Input impedance is normally 2kOhms, increasing to 5kOhms when the 30dB Pad is inserted, thus ensuring correct matching for all normally used microphones.

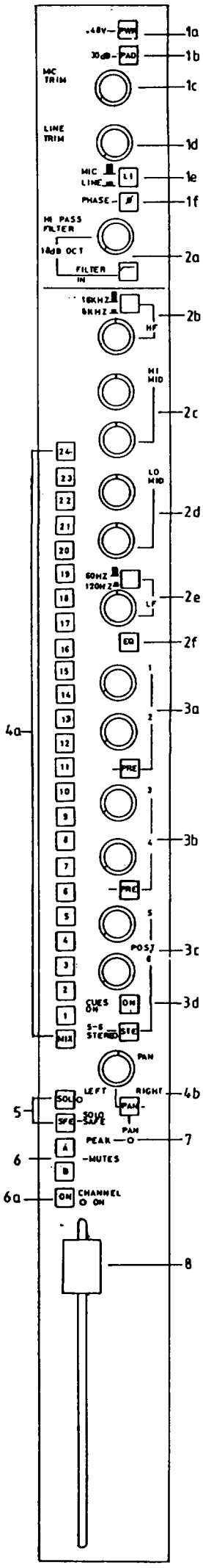
The unbalanced Line Input has an input impedance of greater than 10kOhm, which is high enough to interface to any normal professional peripheral equipment, without causing undue loading of the source.

a) PWR
Pressing the PWR 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 30dB 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) MIC TRIM
The Microphone input sensitivity can be varied between -70dB and -30dB ref 0.775v using a 41 detented position potentiometer, allowing good resettability with essentially continuously variable gain control. When used in conjunction with the 30dB PAD, a 70dB control range is available on the Microphone input.

d) LINE TRIM
The Line input gain can be varied between -10dB and +20dB using a detented potentiometer.



e) LI
The high level line input is selected by pressing the LI button. This will normally connect the relevant tape return to the input channel for remixing or overdubbing purposes. ie. Tape Return 1 will connect to channel input 1. However, an insert jack for each channel allows access to the line input for other signal sources.

f) PHASE
The Phase of the input signal can be reversed by pressing the phase button. This is used to correct for out of phase microphone pickup in multimicrophone situations, or to correct miswired microphones.

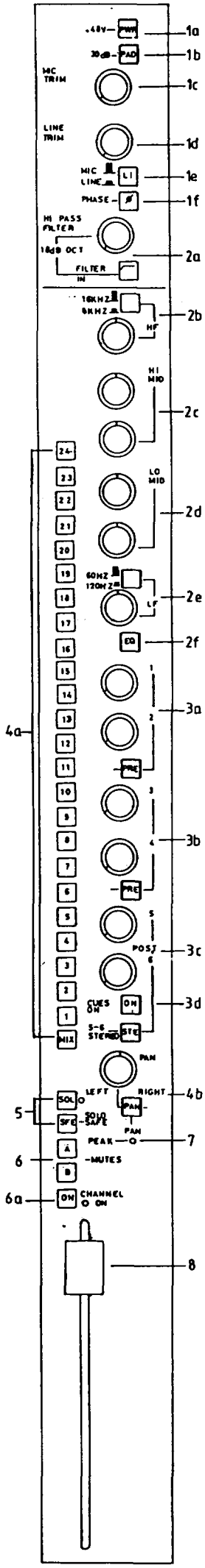
2) The Equalisation Section

The Series 2400 equalizer is a flexible device allowing five areas of control to be exercised. All amplitude pots are centre detented for easy zeroing, and the mid band frequency select controls are 41 detented position types. The equaliser may be switched in or out of circuit, indepently of the high pass filter.

a) HIGH PASS FILTER
The High Pass Filter has a contiuously variable turnover frequency between 50Hz and 800Hz, below which the signal is attenuated at a rate of 12dB per octave.

b) HIGH FREQUENCY
15dB of boost or cut is available at either 8kHz or 16kHz, 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, 15dB of boost or cut available, with a peak/dip characteristic. 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) LOW FREQUENCY
15dB of boost or cut is available at either 60Hz or 120Hz, 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) Auxiliary Section

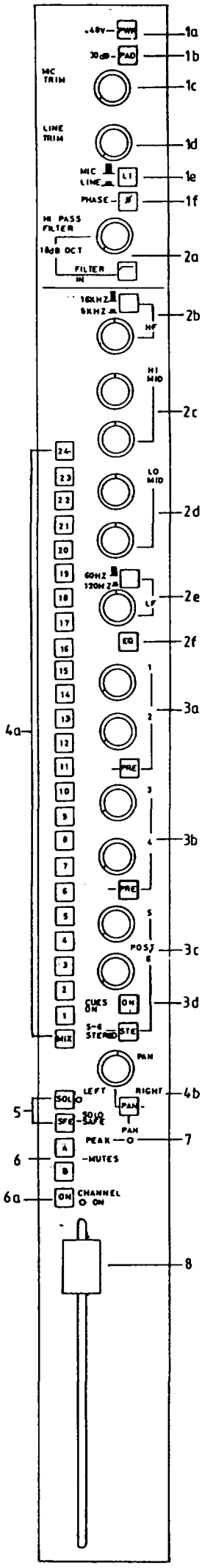
Six sends are available from the input modules for echo, foldback or auxiliary effects devices. All level controls are 41 detent type.

a) SENDS 1&2
Sends 1 and 2 are normally post fader, but can also be switched pre-fader but post equaliser, patchbay insert point, and channel mute circuitry by selecting PRE.

b) SENDS 3&4
Sends 3 and 4 are normally post-fader but can also be switched pre-fader.

c) SENDS 5&6
Sends 5 and 6 are permanently post fader. If the STE button is pressed, however, they are connected post pan-pot, so that a stereo mix may be obtained, ie. for stereo headphones or effects.

d) ON
All six sends are enabled by pressing the Cues On button.



4. Routing Matrix

a) A signal may be routed to any or all of 24 sub groups by pressing the relevant routing button. The signal may also be routed direct to the mix buses by pressing mix.

b) PAN
Pressing PAN inserts the pan pot into the signal path before the routing matrix. This allows the operator to pan between odd and even numbered groups and the left and right of the mix bus.

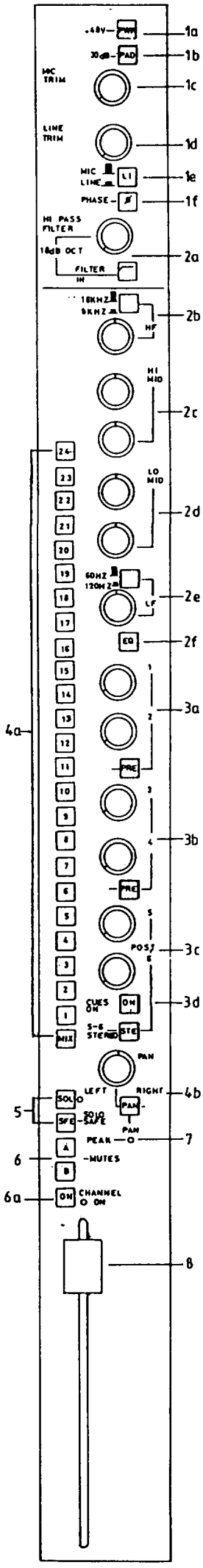
The pan pot is a centre detented control, with a loss of 4.5dB at the centre point. This is a compromise between the 3dB loss required for constant power panning and the 6dB loss required for constant voltage panning.

5. Channel Solo

The solo function has three modes of operation, selected by 2 master control buttons on the master module, these are; mono (PFL), stereo (AFL), and Solo-In-Place.

a) MONO (PFL), STEREO (AFL).
The mono/stereo button, located on the Master Module, causes the solo monitoring point to be moved from post pan-pot (stereo solo or AFL) to pre fader (mono solo or PFL). Neither of these modes will cause an interruption or disturbance to the signal going to tape, as only the monitor facilities are being switched. Therefore, this is a completely safe mode of operation. However, the signal heard will not necessarily be at the same level as the signal heard in the mix.

b) SOLO-IN-PLACE
Should it be desired to solo a signal, while still preserving the relative levels and perspective within the mix, the Solo-In-Place (SIP) mode may be selected on the master module. Now, when a channel solo is selected, all other channels will be muted, as indicated by their channel ON LED being switched off.



This is a potentially dangerous mode, as the signals to tape are affected by the muting of all other channels. The muting command to other channels can however be disabled selectively on each channel by pressing the solo safe SFE button. Any channel with the SFE button pressed will remain in operation when any other solo mode is pressed.

An LED is illuminated on any channel with a solo pressed and a lamp is also illuminated on the master module. The solo button is a latching action switch, and any number of buttons may be operated at one time.

6. Channel Muting

Each channel can be switched on or off from either of 2 master muting buses, programmed from either Master Mute A or Master Mute B buttons on the master module. Any channel set to Mute A will be controlled from Master Mute A bus, and similarly for Mute B.

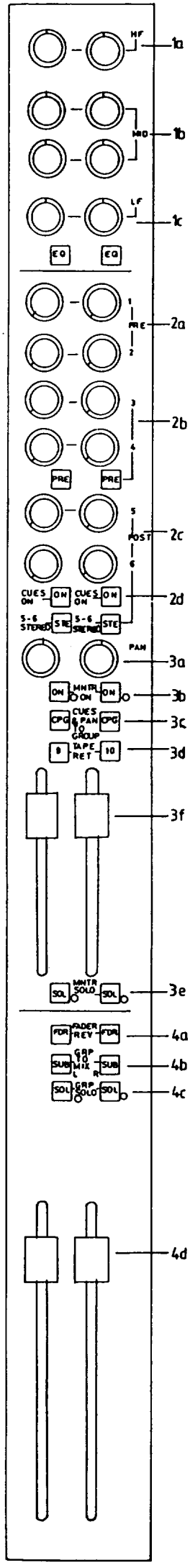
a) ON
In addition, each channel has an individual channel on/off button which is independent of the Master Mute function. When a channel is muted or switched off, all sends are also muted, with the exception of the insert send signal to the patchbay. An LED indicates when the channel is ON.

7. Peak LED

Each channel has a peak LED which monitors the level of the post-equaliser, pre-fader point. The LED will illuminate at a level of 4dB below the clipping point of the channel. Even very short duration transients will be registered for a period of time due to the memory action of the peak measuring circuit.

8. Channel Fader

The fader is a high quality long throw conductive plastic unit. The law has been specially tailored to allow very fine resolution in the upper working region with excellent attenuation when the fader is completely down.



2.04 GROUP/MONITOR MODULE

Each output module handles the functions of 2 sub groups and 2 monitor channels. This section may also be used to form audio sub-groups in remix mode to allow signals to be processed before being combined with the rest of the stereo mix. The monitor section can be used to provide additional line inputs into the stereo mix.

By using the console in this way, a 28 input 24 output console infact becomes a 52 input console when remixing, with extra flexibility of up to 24 sub groups. This flexibility is provided by 2 buttons marked SUB and CPG (Cues and Pan to Group). The operation of these will be dealt with in detail later in this section.

1. Equaliser

The Equaliser is a 3 band device, which can be switched in or out of the monitor section by pressing the EQ switch.

a) HIGH FREQUENCY
The High Frequency section has a shelving characteristic giving 15dB of boost or cut at 12kHz.

b) MID FREQUENCY
The mid frequency has peak/dip characteristic giving 15dB of boost or cut at frequencies between 300Hz and 5kHz.

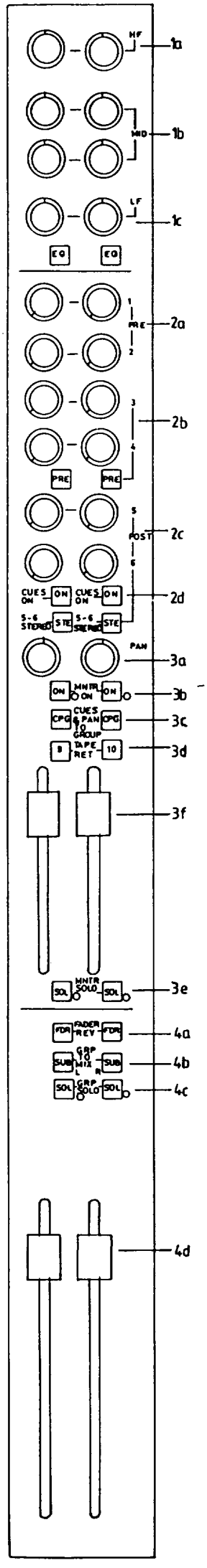
c) LOW FREQUENCY
The low frequency has a shelving characteristic giving 15dB of boost or cut at 60Hz.

2. Auxiliary sends

The 6 auxiliary sends are normally situated in the monitor section unless the CPG button is pressed. All level controls are 41 detent type.

a) SENDS 1&2
Sends 1 and 2 are permanently pre-fader.

b) SENDS 3&4
Sends 3 and 4 are normally post-fader, but may be switched pre-fader by pressing the button marked PRE.



c) SENDS 5&6
Sends 5 and 6 are permanently post-fader. By pressing the button marked STE, they may be placed post pan-pot.

d) ON
All auxiliary sends are switched on by pressing the Cues On button.

3. Monitor Section

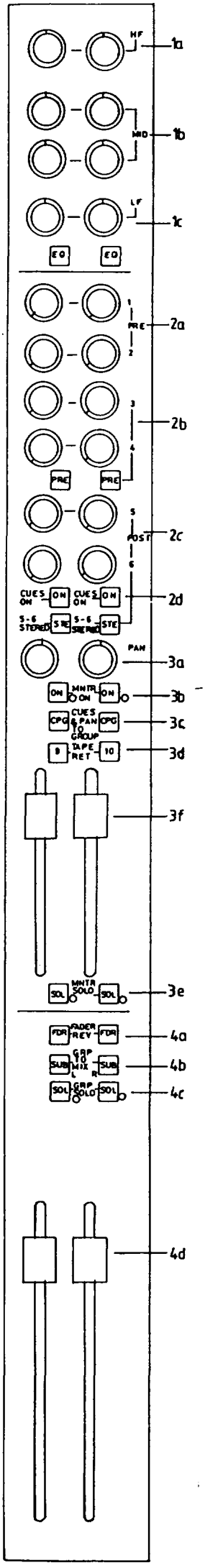
The monitor section enables monitoring of either the sub-group or the tape return signal, and provides the facility to route the monitored signal to the stereo mix, normally via the pan pot. However, the mode of operation of the monitor section and the output group section is modified by the operation of the two buttons marked CPG and SUB. This allows four modes of operation which will be dealt with in detail in the next section.

a) PAN
The monitor pan control allows the monitored signal to be routed between the left and right of the stereo mix.

b) MONITOR ON
Pressing the ON button switches the monitor section on.

c) CPG
Pressing the CPG removes the pan pot and auxiliary send controls from the monitor section in readiness to be assigned to the group section which will occur when SUB is also selected. When in this mode, all odd numbered monitors route directly to the left of the stereo mix, while all even numbered monitors route directly to the right.

d) TAPE RETURN
Selects whether the monitor section receives the group output signal, or, when pressed, the tape return signal, via the monitor return jack. If SUB has been pressed, the group output is removed from this switch.



e) SOL
Depending on the solo mode selected on the master module, the soloed signal may be either mono (pre monitor fader) or stereo (post monitor pan pot). If solo-in-place (SIP) mode is selected, however, this switch has no function. In CPG mode stereo solo will be left or right, depending on whether the monitor channel is odd ir even.

f) MONITOR FADER
The signal in the monitor path is fed to the Mix bus via a short throw fader.

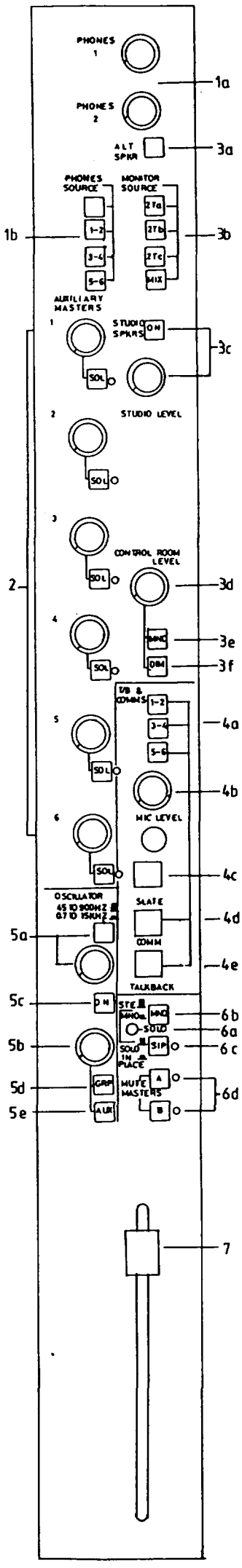
4 Group Section

a) FDR
The fader reverse button, when pressed, reverses the function of the monitor fader and the group fader. This is useful when using the monitor channels for extra line inputs into the stereo mix, to allow the long throw faders to become return faders.

b) SUB
If the SUB (Group to Mix) button is selected, the group signal, in addition to its jack field destination, is also routed directly to the stereo mix, odd numbered groups being assigned to the left, even numbers to the right. However, if CPG is also selected, the pan pot and the auxiliary sends are connected into the group signal chain, providing the facility of panning the group signal across the stereo mix. SUB is used to enable the formation of audio sub-groups when mixing, and to allow the return of such groups into the stereo mix, without using any extra return channels, either directly, or via the pan pot.

c) SOL
The Group solo is similar in operation to the monitor solo, except that the soloed signal is either pre or post the group fader. In SUB or SUB + CPG mode, the soloed signal will appear on the control room speakers in its stereo position.

d) GROUP FADER
The Group fader is a high quality, low noise, conductive plastic, long throw fader.



2.05 MASTER MODULE

The Master Module contains all master level controls relating to the six auxiliary sends, the control room and studio monitoring selection and the volumes, the talkback facilities, alignment oscillator, the mute and solo programming, and the stereo mix fader.

1. Headphones Section

a) PHONES 1/2
The headphone volumes can be individually controlled allowing either a double mono or single stereo headphone feed to be derived from the Phones Source selector switch.

b) PHONES SOURCE
The headphone output can be sourced from any of the auxiliary outputs of from the main monitor source selection.

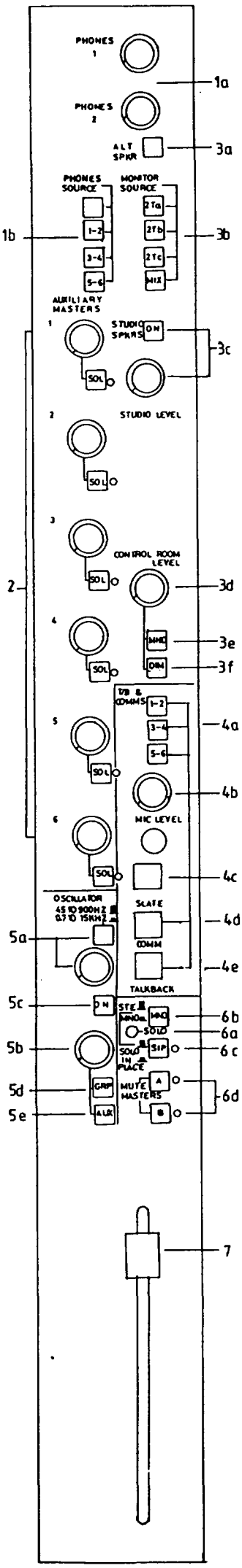
2. Auxiliary Masters

The six sends can be controlled in level by 41 detent controls. Each auxiliary has a solo switch below it with an associated red LED. If the master solo mode is switched to mono, the signal will be heard in mono as a centre image on the control room monitors. When switched to stereo solo mode the odd numbered sends will be heard on the left and even numbered sends will be heard on the right. This allows the monitoring of stereo sends such as a stereo headphone mix.

3. Monitor Section

a) ALT SPKR
The control room output can be switched between 2 sets of speaker systems.

b) MONITOR SOURCE
4 interlocking switches marked 2Ta, 2Tb, 2Tc, and MIX are used to route the outputs of the 3 stereo sources or the output of the console to the control room and studio monitoring systems.



c) STUDIO SPKRS
The Studio monitor signal selected by the Monitor Source switches can be switched on or off and its level controlled independently of the talkback signal.

d) CONTROL ROOM LEVEL
This adjusts the volume of the signal selected by the Monitor Source Selection switches.

The source selection is over-ridden by any solo switch, except when in Solo In Place mode. Therefore any soloed signal will be heard either in dual mono or in stereo as selected.

Because the stereo mix meters are fed from the signal present at the input of the control room level control, any signal soloed will also be metered on the stereo mix meters. This makes it possible to meter the level of the auxiliary sends of the pre fader level of the input channels.

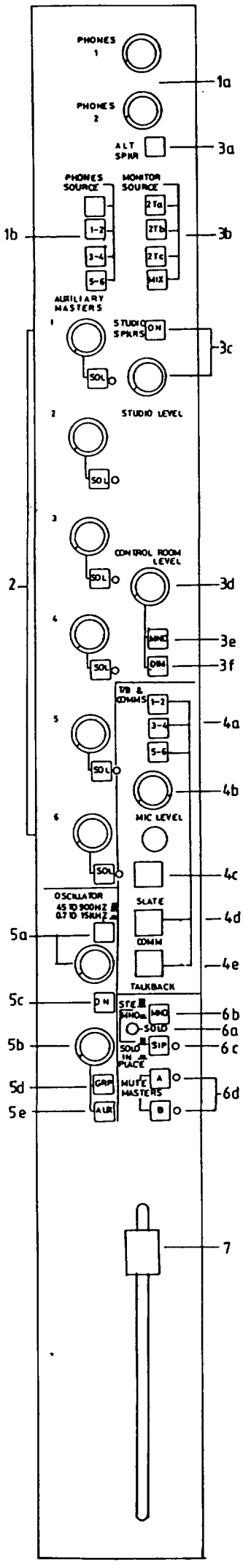
e) MNO
The MNO button causes the control room monitor signals to be summed together in order to check the mono compatability of a stereo signal.

f) DIM
The DIM button attenuates the level of the control room signal by 20dB.

4. Talkback Facilities

a) 1-2, 3-4, 5-6
These buttons determine which pairs of auxiliary outputs will be fed with talkback signals and can be used in any combination.

b) MIC LEVEL
The Mic Level control adjusts the level of the talkback signal.



c) SLATE
Slate routes a combined talkback and 30Hz signal to all group buses. This signal will therefore be recorded on all tape tracks in order to identify various tape sections. When slate is selected partial muting of the control room monitors occurs.

d) COMM
COMM routes the talkback signal to any auxiliary outputs selected by buttons 1-2, 3-4, or 5-6. Partial muting of the control room monitors occurs.

e) TALKBACK
This is similar to COMM with the exception that the signal is also routed to the studio monitoring system, independent of the studio level control.

5. Oscillator Section

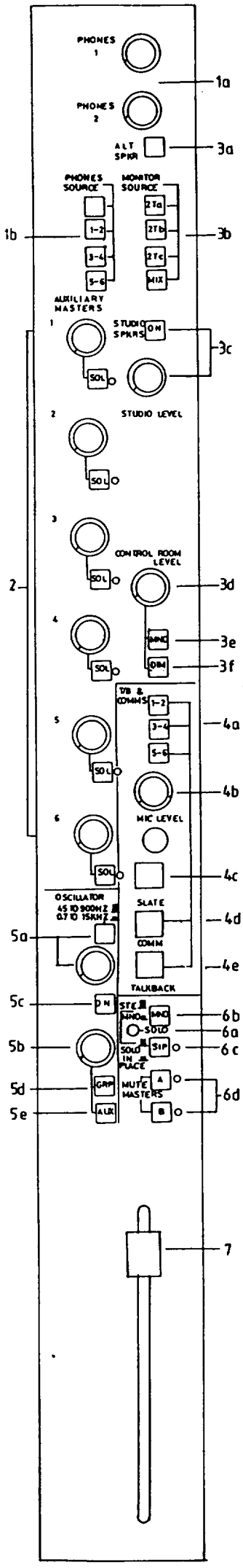
a) FREQUENCY
The oscillator frequency is continuously variable between 45Hz and 15kHz in 2 ranges. The first range covers 45Hz to 900Hz and the second range covers 700Hz to 15kHz.

b) LEVEL
The oscillator level is adjusted by a 41 position detented control.

c) ON
This button switches on the oscillator which is then available at the patchbay.

d) GROUP
This button routes the oscillator signal to all group/mix buses.

e) AUX
This button routes the oscillator signal to all auxiliary buses.



6. Solo/Mutes

a) SOLO
The solo lamp is illuminated when ever any solo function on the desk is operated. This warns the operator that a solo condition exists, which can then be specifically located by the individual solo LEDs.

b) MNO
The overall mode of the solo system is detemined by this master status button. When not pressed (in stereo postion) the soloed signal is heard in stereo on the control room monitors.

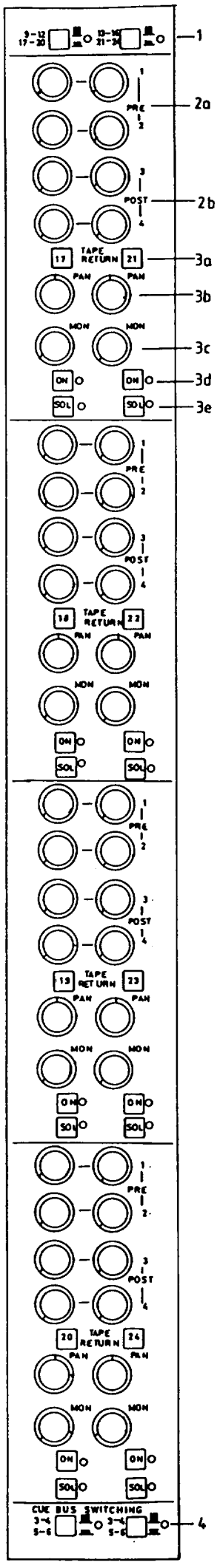
However,when the MNO button is pressed the soloed signal will be the pre-fader signal and will be heard in mono on the control room monitors. Neither mode will affect any signals to tape and are completely safe to use at any time.

c) SIP
When SIP is on, selecting any channel solo will cause all other channels to be uted, except those that have been switched to SAFE. The signal will be heard in its true stereo perspective, with no change in level. Naturally, signals to tape are affected. However, it can also be used as an extra muting system during mixdown.

d) A/B (MASTER MUTES)
Input channels which have been assigned to either A or B mute buses can be switched on or off by the relevant Master Mute button. Red LEDs indicate operation of the function.

7. Main Stereo Fader

The stereo mix level is controlled by a closely matched stereo conductive plastic fader.



2.06 24-TRACK MONITOR MODULE

(Small frame only)

The optional 24-track monitor module can be installed at any time in the small frame 24/16 configuration console to give full 24 track monitoring facilities. Signals to tracks 17 to 24 can then be routed to directly from the input channels. The signal to tape or the signal from tape can be monitored and metered through the 24-track monitor module, with full panning, auxiliary sends, solo, and meter switching facilities.

1. MTR

To allow metering of tracks 17 to 24 meters 9 to 16 may be switched in 2 groups of 4. Meters 9 to 12 will therefore meter tracks 17 to 20, and meters 13 to 16 will meter tracks 21 to 24 when the respective MTR button is pressed.

2. Auxiliary Sends

4 Auxiliary send controls are provided on each monitor.

a) SENDS 1&2
Sends 1 and 2 are connected pre-monitor level control.

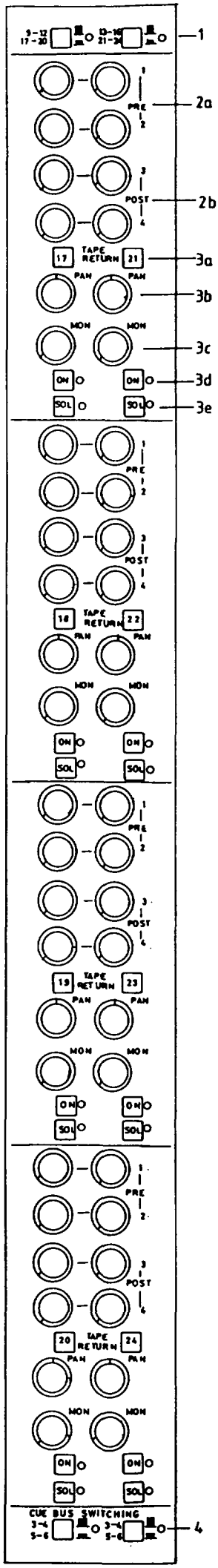
b) SENDS 3&4
Sends 3 and 4 are connected post monitor level control.

c) SENDS 5&6
See Cue Bus Switching

3. Monitor Section

a) TAPE RETURN
The Tape Return switch selects the monitor and meter source. If not pressed, the source will be the signal which is routed to the tape send, ie. console output. If pressed, the monitor source will be the tape return signal ie. the tape machine output.

b) PAN
The monitor signal can be panned between the left and right of the stereo mix, via the centre detented pan pot.



c) MON
The monitor level control allows the adjustment of the level of the monitored signal within the stereo mix.

d) ON
When pressed, the ON button will switch on the monitor channel and the auxiliary sends.

e) SOL
Depending on the solo mode selected on the master module, the soloed signal may be either Mono (Pre monitor level) or stereo (Post monitor pan pot). If solo in place (SIP) mode is selected hwever, the solo button is inoperative.

4. Cue bus Switching

Although each monitor section has only 4 auxiliary send controls, access to auxiliary buses 5 and 6 may be obtained by pressing the relevant Cue Bus Switching button, which is operative on the 4 monitor channels above it. Auxiliary send contreols 3 and 4 will now route to auxiliary send buses 5 and 6.

3.00 INSTALLATION

Under normal circumstances the Series 2400 will be freighted in two wooden cases, containing the following items:-

1 Console
1 Power Supply Unit
1 Left Leg
1 Right Leg
1 Cross Member (foot rest)
1 Cable Tray
1 10-way Power Cable
1 IEC Mains Cable
2 40-way Extenders
1 10-way Extender
5 Elco Multiway Connectors
10 18" Patch Cords
6 Dzus Fasteners (for cable tray)
8 4BA x 1/2" Pan Pozi Black screws
10 M3.5 x 8mm Pan Pozi Black screws
6 M6 x 65mm Hex screws
10 4BA Nylon washers
16 M6 Metal washers
2 3.15A 20mm Fuses
2 6.3A 20mm Fuses

3.01 ASSEMBLY

Having identified all the above parts, proceed with assembly as follows:-

a) Slot stand cross-member into left hand leg and secure if with three m6 x 12mm bolts.
b) Repeat for right hand leg.
c) Place stand in required position and lift console onto the legs securing it with eight m6 x 65mm bolts.
d) Check PSU voltage selector and adjust for correct voltage in your area.
e) Install correct fuse.

3.15A....220-240volts
6.3A 110-120volts

3.02 INTERFACE LEVELS AND CONNECTORS

The series 2400 will provide compatible level interfacing with standard professional equipment. ie. +4dBu (ref 0775 volt).

All XLR type connectors are wired to the following standard:

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

NB: SERIES 2400 24/16 SMALL FRAME ONLY

The Control Room Monitor outputs are wired to the following convention:

Pin 1: Signal low
Pin 2: Signal high (Speaker system A)
Pin 3: Signal high (Speaker system B)

Control Room, Studio and Auxiliary outputs

Power amplifiers are often rated at 300mV sensitivity for full output. In such cases, an attenuator should be installed at the input of the power amplifier, to attenuate the +4dBu signal from the console by using a 2.2kOhm series resistor, and a 680 Ohm, shunt resistor across the amplifier input.

3.03. 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 heavily 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 bae 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 detination 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 no 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 independant "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.

4.00 OPERATION

4.01 INTRODUCTION

The Series 2400 console has been designed to provide the facilities required in a modern recording studio, with a minimum of operator effort and to allow free and uninhibited use of these facilities, without unnecessary patching, or redundant switching. Sub-grouping and monitoring facilities in particular are novel in operation, and require a certain amount of understanding of the console signal flow, in order to fully utilize the potential and flexibility which is available.

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 ben 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 mic/line switch in the "up" position. The signal is routed to the desired console group output by pressing the relevant group routing button on each channel. 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 both the input, 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.