Soundcraft

200BVE

USER MANUAL

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SOUNDCRAFT SERIES 200B MIXING CONSOLE

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*Note
CPS 450 or 650 Power Supplies have a seperate USER MANUAL.

1.00 SERIES 200B

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

2.00 SOUNDCRAFT SERIES 200B CONSOLE

GENERAL DESCRIPTION

The Soundcraft Series 200B is designed primarily for up to 8-track recording, as well as public address and monitor applications.

The console has 4 main buses, 4 auxiliary outputs and dedicated mix outputs. All inputs are electronically balanced.

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.

The outputs, with the exception of the Mix Outputs and the Control Room Outputs, are "GROUND COMPENSATED" to minimise hum or interference in differing enviroments, where earthing rules, etc may not always have been adhered to.

The Microphone Input impedance is greater than 2kOhms, which will not cause any loading effects on any normally used microphone. The Line level Input has an input impedance of greater than 10kOhms, which is high enough to ensure that it will interface with most studio peripheral equipment without causing loading effects.

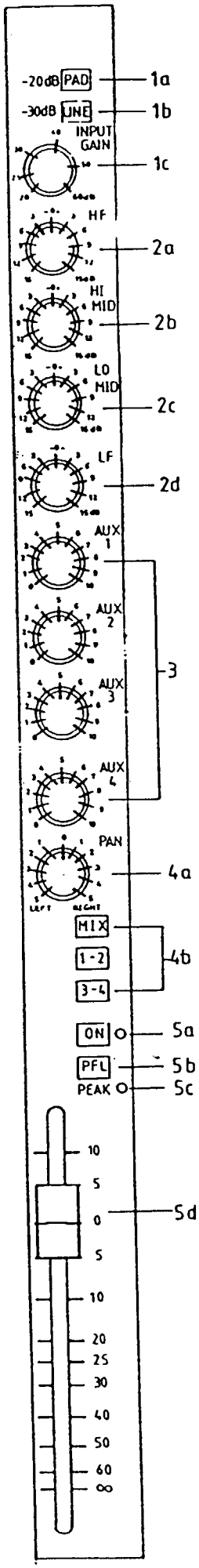
The auxiliary sends are selectable between both Pre/Post EQ and Pre/Post Fade by the use of push-on links (Jumpers) on the PCB.

Metering is via 4 VUs reading Group Outputs 1-4. Meters 3 and 4 are switchable as a pair to read the monitor source. This may be either the stereo mix bus, the 2-track return or any PFL/AFL signal.

The power supply is an external unit supplying the console with 17volts positive and negative rails and +48V Phantom Power supply.

The console is designed to work at either +4dBu or -10dBV (Tascam) level. Changing between the two requires altering an internal switch on the group outputs and adding push-on jumpers on the input channel PCBs.

The console is available with 8, 16, or 24 input modules. There is also an optional rack mounting version with a maximum of 8 input modules. A stereo Line input module will also be available for use with stereo effects devices, keyboards etc. In a broadcast situation this module is available to introduce stereo cart machines, turntables etc into the console.



2.01 INPUT MODULE

1. Channel Input Section

The Channel can be operated in either Mic or Line Input modes. Both the Mic Input and the Line Input are electronically balanced for optimum low noise performance.

Mic Input impedance is greater than 2kOhms and Line Input impedance is greater than 10kOhms.

a) PAD
Pressing the PAD button inserts a 20dB attenuator into the Mic path.

b) LINE
The high level Line Input is selected by pressing the LINE button. Tape returns should be re-patched into the Line Input socket for remix purposes.

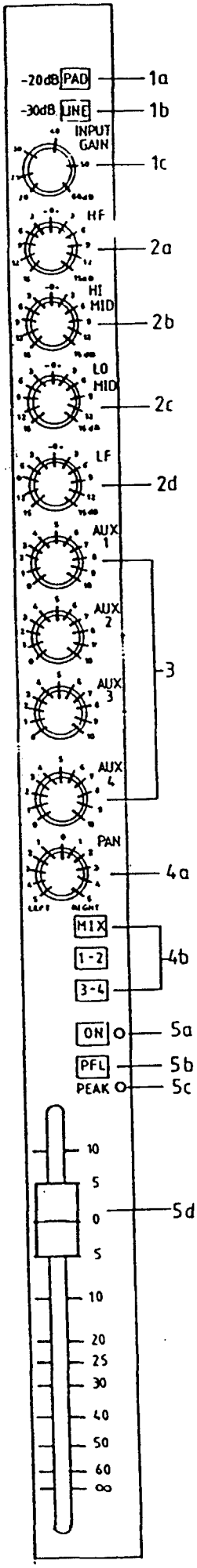
c) INPUT GAIN
The Input Gain is used to ensure that the source, whether Mic or Line sufficiently "drives" the module. If the source signal is too high, causing distortion, the level may be attenuated to match the working level of the module. If the source signal is too low, it may be boosted to reach the working level of the module.

To achieve the optimum working level for the module, and for the console, first set the fader(s) and the relevant group fader to unity gain, and then adjust the input gain(s) so that you are sending sufficient level to tape for optimum signal to noise, without introducing distortion.

2. Equaliser Section

The Equaliser on each module is a 4-band, fixed frequency design. All amplitude pots are centre detented for easy zeroing.

a) HF
Provides 15dB of boost or cut at 12kHz. The control has 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.



b) HI MID
15dB of boost or cut is available at 5kHz with a "peak/dip" characteristic. ie. Having reached maximum amplitude (or minimum in the case of cut), the amplitude response returns to zero on either side of that frequency. The shape of the curve, when plotted, gives a characteristic bell shape.

c) LO MID
15dB of boost or cut is available at 250Hz with a "peak/dip" characteristic.

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

3. Auxiliary section

There are four auxiliary sends available for use as echo, foldback or other auxiliary effects units.

For each pair of Auxiliary sends there are three options on where to take the auxiliary send from, these are:-

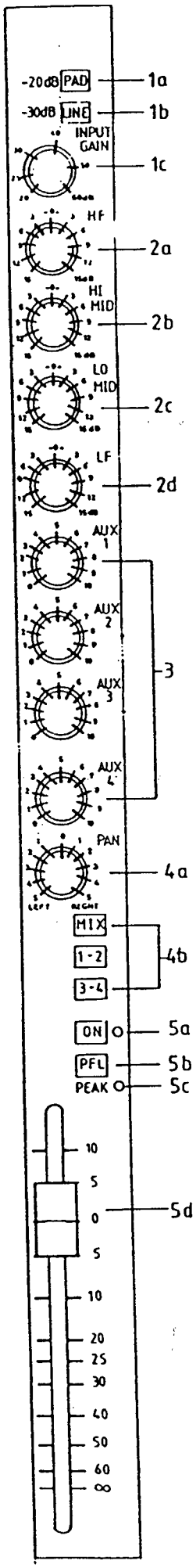
i. Pre-EQ and Pre-Fade.
ii. Post-EQ and Pre-Fade.
iii. Post-EQ and Post-Fade.

These options are selected by a series of push-on links (jumpers) as marked on the PCB.

eg.

```
     Pre Post     Pre Post
Aux 1&2
     .---.  .     .---.  .
     .  .---.     .  .---.
Aux 3&4
        EQ           FADER
```

Refer to the Input module circuit diagram, (ED2183) and the Input module signal flow diagram, (ED2227).



4. Routing Section

The channel input can be routed to any or all of the 4 Group outputs and the stereo mix by selecting the relevant routing button.

a) PAN POT
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 the 6dB loss required for constant voltage panning.

b) ROUTING
Selection of any of the routing buttons assigns the channel input signal to any pair of group outputs or the stereo mix via the Pan Pot. By panning left the signal may be routed to odd numbered groups and by panning right the signal may be routed to even numbered groups.

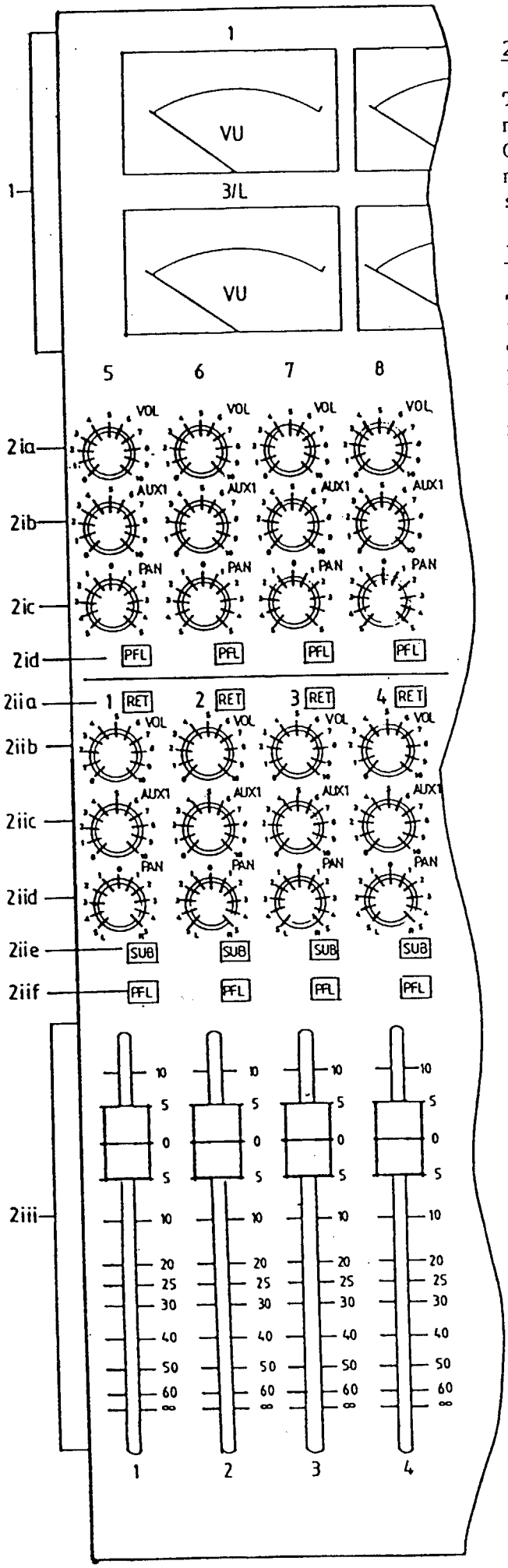
5. Channel status section

a) ON
The channel "ON" status is indicated by a green LED.

b) PFL
Pressing PFL (Pre-fade listen) soloes the signal from that module on the monitor/headphone outputs, along with any other modules that have their PFL button down. The PFL signal is taken after the insert return but before the ON switch.

c) PEAK
The PEAK LED illuminates when the signal level at the insert send point is 4dB below clipping.

d) CHANNEL FADER
The Channel fader is a long throw linear fader. Infinity cut off is greater than 90dB.



2.02 MASTER MODULE

The Master Module contains the VU meters, the Group/Returns sections, Oscillator, Talkback, the Auxiliary masters and the Control Room Monitor section

1. The VU meters

The four VU meters usually monitor the outputs from the 4 groups, or Tape/FX Returns. Pressing the MNTR button changes the function of meters 3 and 4. These may now be used to monitor the main mix bus, or the auxiliaries, 3 reads left and 4 reads right.

If PFL or AFL has been pressed then the meters will monitor the PFL/AFL buses which feed the monitors/headphones.

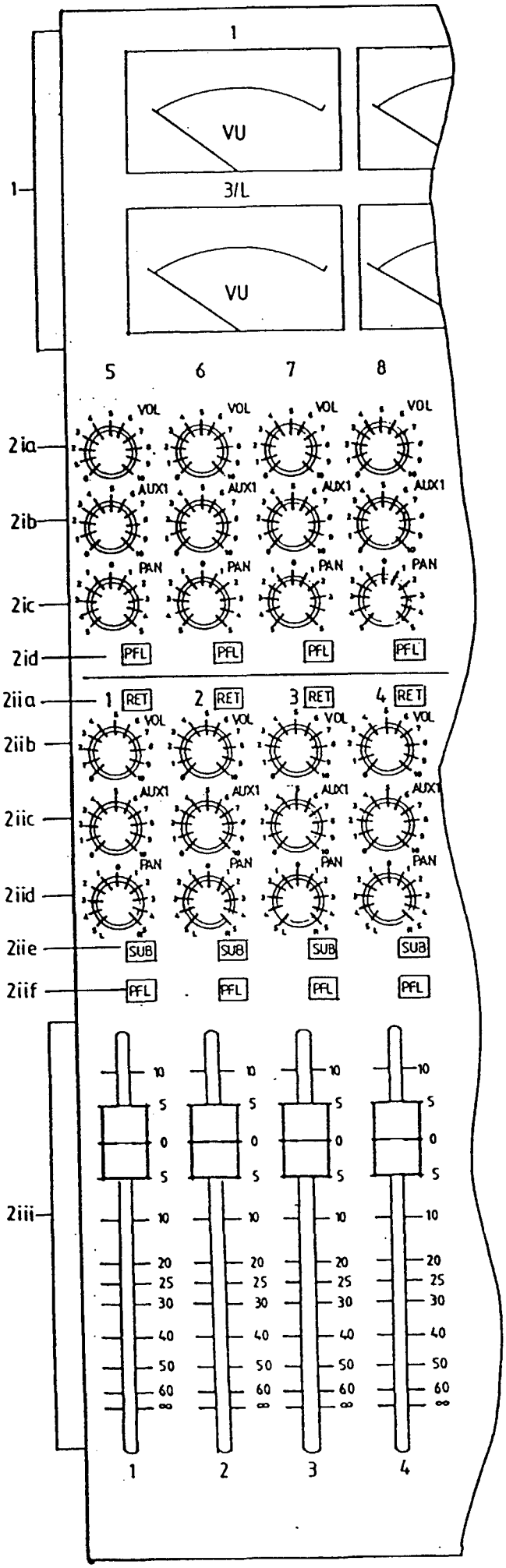
2. Group/Return section

The Group/Return section handles the functions of 2 Tape/FX Returns and a Group Output. The monitor section may be used to monitor either the group output or the corresponding return when this is selected by the appropriate RET button. Returns 1-4 are positioned at the bottom and Returns 5-8 at the top.

i. RETURNS 5-8
These are dedicated Tape/FX Return monitors.

a) VOL
The Monitor Volume control enables the monitor contribution to the stereo mix to be adjusted in level, allowing a satisfactory monitor balance to be achieved during record and playback.

b) AUX 1
The auxiliary send is post fader and may be used to provide headphone mixes during recording and overdubbing.



c) PAN
The PAN control allows the monitor signal to be panned to the correct position within the stereo mix.

d) PFL
The PFL facility on the monitor signal is independent of the monitor volume.

ii. SECTIONS 1-4
These may be used to monitor either the associated group outputs OR one of the Tape/FX Returns 1-4.

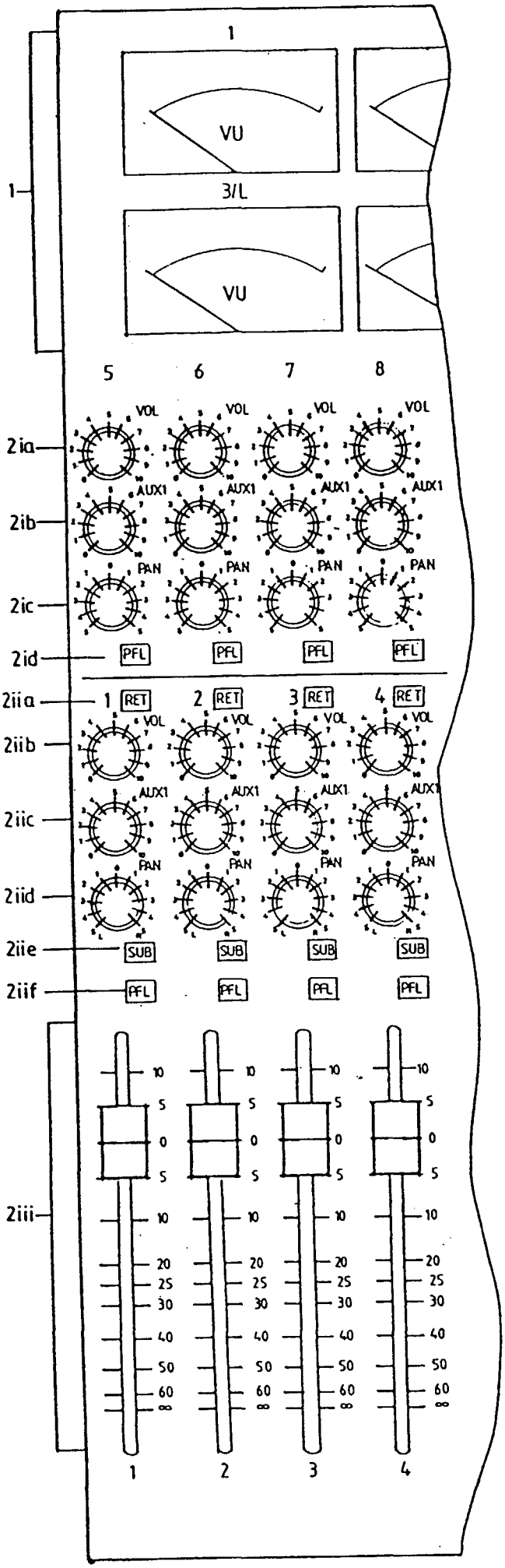
a) RET
When the RET button is pressed the monitor source will be the Tape/FX Return. When the Return button is up the monitor source will be the Group Output.

b) VOL
The Monitor Volume control enables the monitor contribution to the stereo mix to be adjusted in level, allowing a satisfactory monitor balance to be achieved during record and playback.

c) AUX 1
The auxiliary send is post fader and may be used to provide headphone mixes during recording and overdubbing.

d) PAN
The PAN control allows the monitor signal to be panned to the correct position within the stereo mix.

e) SUB
When the SUB button is pressed the group fader below overrides the VOL control and accesses the mix bus via the pan pot, and consequently the main master outputs.



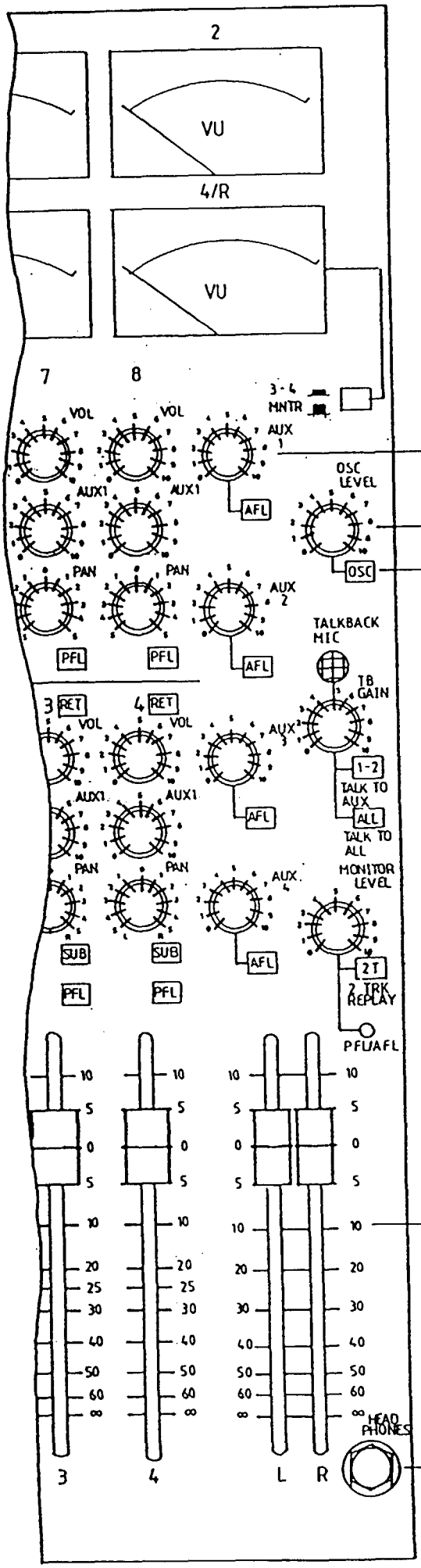
The VOL control, although bypassed, is not redundant. If RET is selected, the VOL controls the signal from the appropriate return socket and routes it to the Group below. This additional signal may be regarded as a separate input with level control and aux send BUT it can only access one group. ie. for Return 1, Group 1.

f) PFL

The PFL facility on the monitor signal is independent of the monitor volume.

iii. GROUP FADERS

The 4 long throw, linear faders control the overall group output levels.



3
4a
4b
6d
6e

3. Auxiliary Master Section

Each of the four auxiliary buses has its own master level control and an AFL select. The AFL works in the same way as the PFL bus. eg. AFL soloes the signal from that Auxiliary master on the monitor, (headphone output), along with any other Auxiliary masters with AFL selected.

4. Oscillator

a) OSC LEVEL
The oscillator may be adjusted in level.

b) ON
The ON switch enables the internal 1kHz Oscillator and routes it to the Group and Auxiliary buses.

5. Talkback

The Talkback microphone is an electret microphone and has variable gain controlled by the Talkback Gain pot. The Talkback signal overrides the Oscillator.

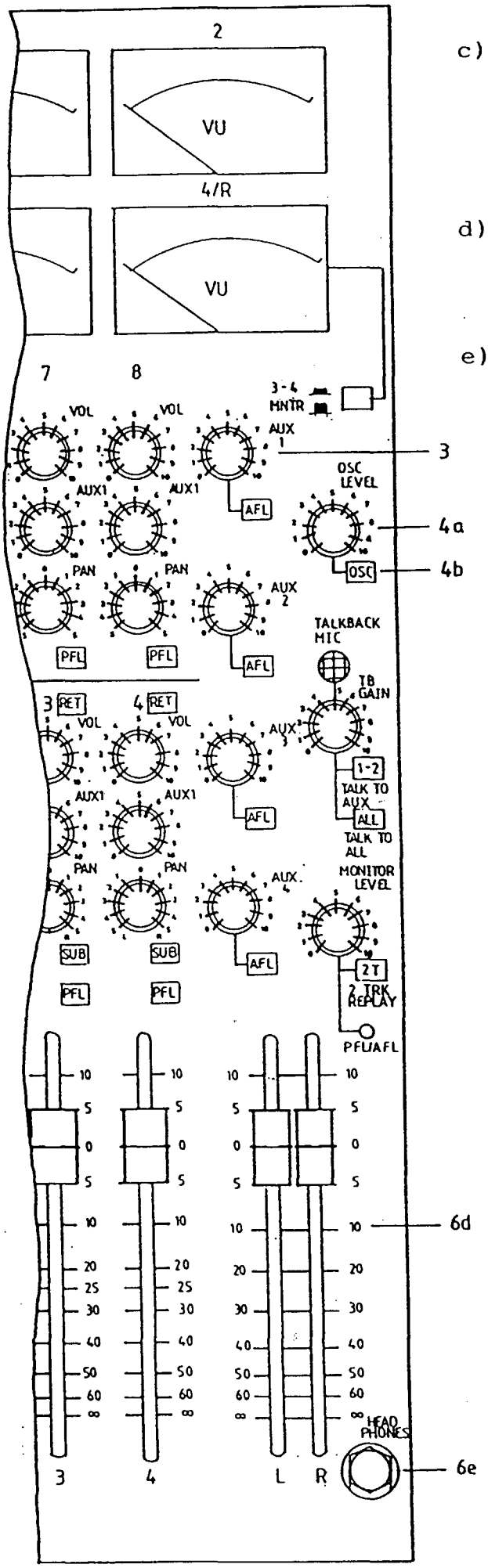
a) TB TO ALL
This routes the Talkback signal to the Group buses and all four Auxiliaries.

b) TB TO AUX 1-2
This sends the Talkback signal to Auxiliaries 1 and 2.

6. Monitor Section

a) MON VOL
The Monitor Volume is controlled by a variable gain pot.

b) 2T
This allows the signal from the 2-track master machine to be routed to the monitor speakers/headphones.



c) SOLO LED

The SOLO LED illuminates whenever a PFL has been selected on an Input module or Group Output OR when an AFL has been selected on the Auxiliary masters.

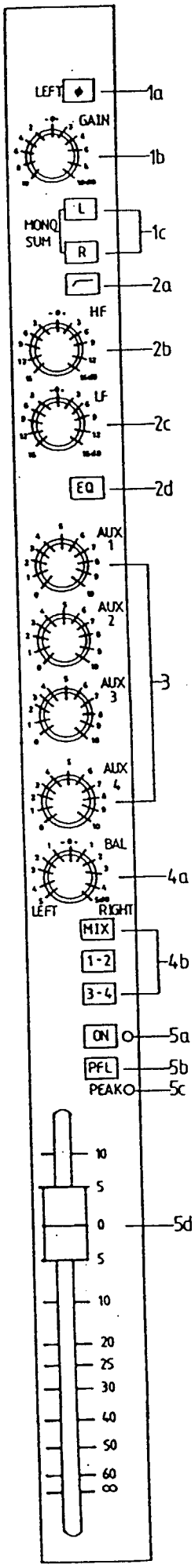
d) MASTER FADERS

The long throw master faders control the overall level of the stereo mix.

e) PHONES

The headphone socket expects to see 600 Ohms. Monitor speakers are cut when headphones are inserted. The socket is wired as follows:-

Tip:	LEFT
Ring:	RIGHT
Sleeve:	GROUND



OPTIONAL STEREO INPUT MODULE

The optional stereo input module is available in blocks of 2.

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.

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

a) ϕ(Phase)
Pressing the Phase button will invert the phase on the left-hand input 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.

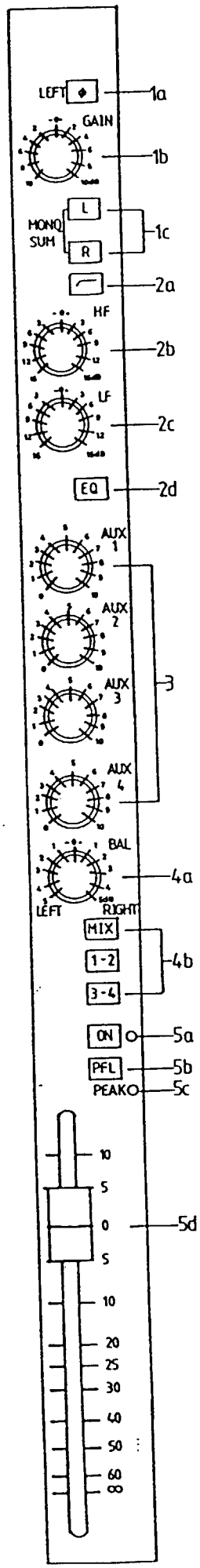
ii With either L or R switched in, both channels of the module are fed by either the left or right input.

iii With both switches pressed, both channels of the module are fed by a mono sum of the left and right input.

2. Equaliser Section

The Equaliser is a versatile unit, allowing 3 areas of control over the audio spectrum. All amplitude pots are centre detented for easy zeroing.

a) ⌐ (High Pass Filter)
The High Pass Filter operates at 100Hz with an ultimamte 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) LF (Low Frequency)
15dB of boost or cut is available at 60Hz, with a "shelving" characteristic.

d) EQ
The Equaliser circuitry can be switched in and out of the signal path, independently of the high pass filter.

3. Auxiliary section

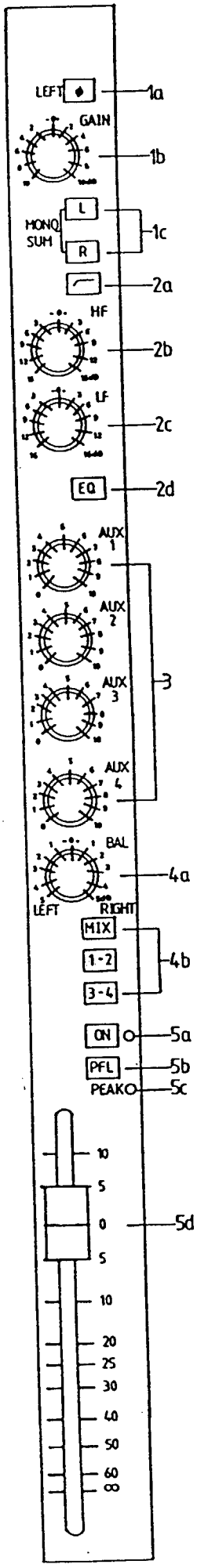
There are four auxiliary sends available for use as echo, foldback or other auxiliary effects units.

Each pair of Auxiliaries may be pre selected either pre or post fader. These options are selected by a series of push-on links (jumpers) as marked on the PCB.

eg.

```
     Pre Post
Aux 1&2
     .--.  .
     .  .--.
Aux 3&4
      FADER
```

Refer to the Stereo Input module circuit diagram, (ED) and the Stereo Input module signal flow diagram, (ED).



4. Routing Section

The channel input signal may be routed to any pair of Group Ouputs, (1-2, 3-4) and/or the Stereo Mix, by selecting the relevant routing button.

a) BALANCE
The balance control corrects or deliberately creates any changes in stereo imaging before the fader and the auxiliary sends. The balance control has a range of ±5dB.

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 a green LED.

b) PFL
Pre-Fade Listen soloes the Pre-fader, post insert jack signal independently of the the ON switch. This gives a mono check of the signal, after the insert point but before the on/off switch. PFL operation is indicated by a red master warning LED on the master module.

c) PEAK
A red LED indicates the peak signal level. This gives a visual indication that the higher signal, either Right or Left, before the insert points 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.

3.00 CONNECTIONS AND WIRING

There are two types of standard connector panel on the Series 200B console. These are the Input connector panel and the main output connector panel. There is always one output panel, but the input panels each serve 8 input modules. So if you have a 16 input console you will have two input panels.

If you have the rack mounting version the input and output connection panels are not separate.

3.01 INPUT CONNECTION PANEL

The Input panel serves 8 Input modules and the panel is labelled accordingly. ie. 1-8, 9-16 etc.

a) INS

These stereo standard jacks carry both the insert send and the insert return signals. Under normal conditions with nothing inserted the signal is normalled through by the jack socket and thus inserting a jack will automatically break this link.

The insert point is post EQ but BEFORE the PFL, ON switch and fader.

Tip: Insert return (Unbalanced)
Ring: Insert send (Unbalanced)
Sleeve: COMMON GROUND

b) LINE

These stereo standard jacks carry the balanced Line Input, and are wired as follows:-

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

c) MIC

These carry the balanced microphone inputs and are wired as follows:-

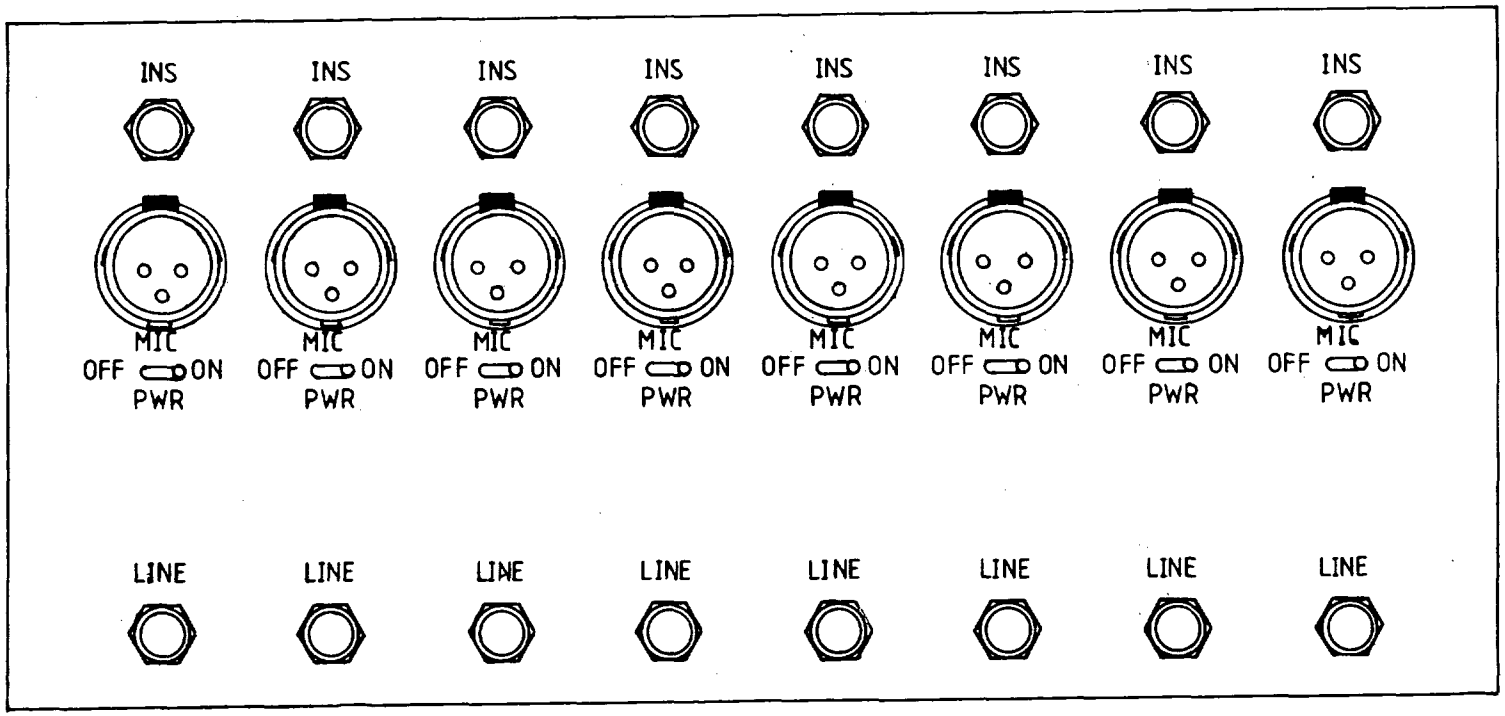
Pin 1: GROUND
Pin 2: HOT (In phase signal)
Pin 3: COLD (Out of phase signal)

d) PWR

The PWR switch provides phantom power of +48volts for capacitor microphones.
NB: It is not advisable to use an unbalanced microphone, or DI boxes with the Phantom power on.

ISSUE 1

18-2-85



THIRD ANGLE PROJECTION	TOLERANCE All imperial dimensions ± 0·010 All metric dimensions ± 0·25mm All angles ± 0·50° Unless otherwise stated	HOLE INDEX	MATL	DRN AB	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 S 200B 8WAY I/P REAR CONN PANEL
			FINISH	TRCD		
			SCALE	CHKD		DRG. No. MI2422

3.02 OUTPUT CONNECTION PANEL

a) GROUP OUTPUTS 1-4

These carry the signal from the Group Outputs and are Ground Compensated, they are wired as follows:-

Pin 1: GROUND
Pin 2: HOT
Pin 3: COLD

As the console only has the 4 outputs to feed all 8 tracks of the tape machine either

i. Parallel the connections of the inputs on the 8-track of tracks 1-4 and 5-8, using the tape machines logic to ensure that you record on the correct tracks,

OR

ii. Use a box which changes over the feeds either individually or all together,

OR

iii. Simply manually plug the correct outputs from the console into the inputs of the 8-track on an individual basis as the session progresses.

b) TAPE RETURNS

These stereo standard jack sockets carry the Tape Returns and are wired as follows:-

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

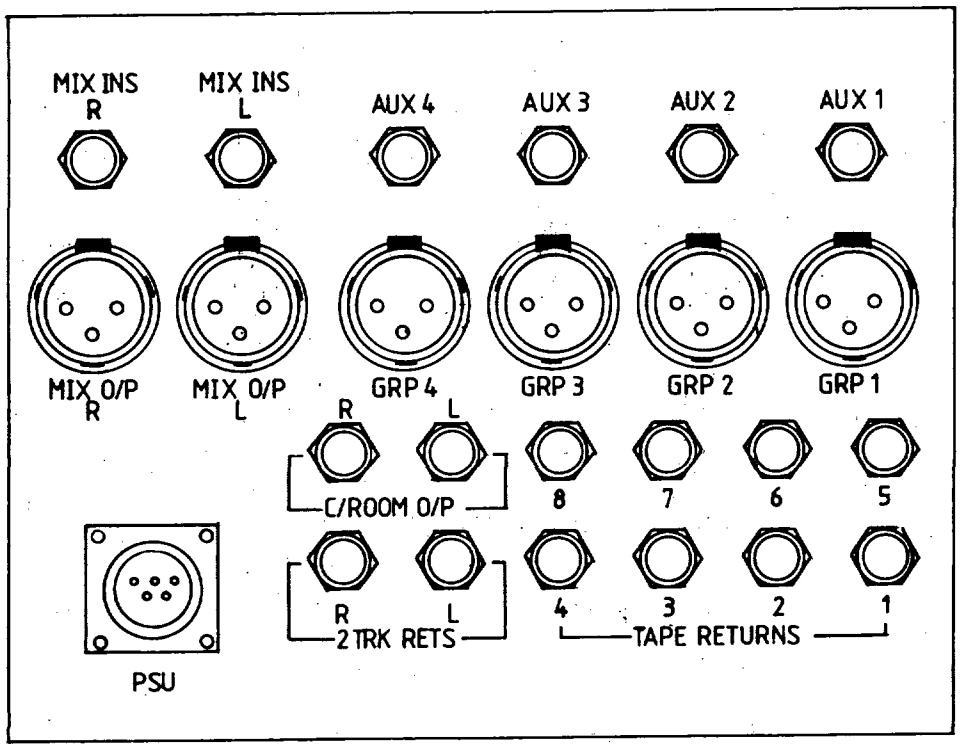
During mix down, you would normally connect the outputs of the 8-track to the Line Inputs on modules 1-8 to make use of the input module's more extensive facilities, thus freeing the RETs inputs for effects returns etc.

It is perfectly feasible to parallel the outputs of the 8-track and to permanently connect one set to the RETs sockets and the other to the line input sockets on modules 1-8. This is assuming that you have more than 8 inputs, so that during mix down, you may bring effects returns etc. down individual input modules.

If you have an 8-track which has dedicated sync outputs, such as the SOUNDCRAFT 381, you would normally connect the sync outputs to RETs 1-8 and the playback outputs to line inputs 1-8.

ISSUE 1

15-2-85



THIRD ANGLE PROJECTION	TOLERANCE All imperial dimensions ± 0·010 All metric dimensions ± 0·25mm All angles ± 0·50° Unless otherwise stated	HOLE INDEX	MATL FINISH SCALE	DRN 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. 224406	TITLE S200B STD O/P REAR CONN PANEL DRG. No. MI2420

UDO 30910

c) MIX INSERTS

This stereo standard jack socket allows the Mix bus to be accessed immediately before the Master Faders, and is wired as follows:-

Tip: Insert return (Unbalanced)
Ring: Insert send (Unbalanced)
Sleeve: COMMON GROUND

d) 2-TRACK RETURNS

These stereo standard jacks carry 2-track returns and are wired as follows:-

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

e) AUX OUTPUTS

These are stereo standard jack sockets for the Auxiliary masters and are ground compensated. (MI2426).

Tip: HOT
Ring: COLD
sleeve: GROUND

f) MIX OUTPUTS

These sockets carry the main stereo outputs and are balanced. They are wired as follows:-

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

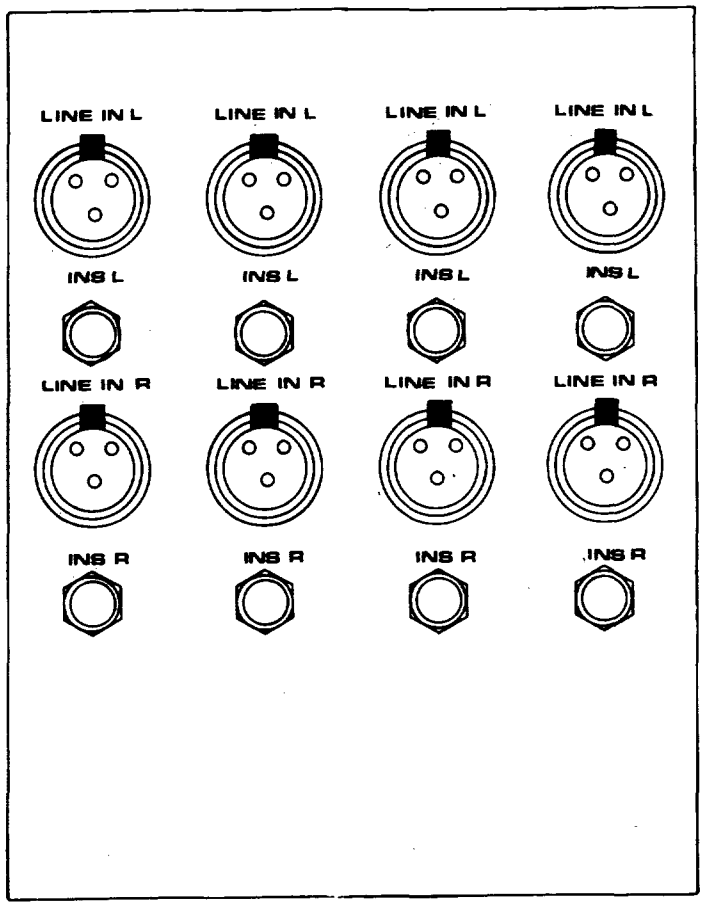
If your master machine is unbalanced, connect the cold pin (3) to ground at the input to your machine, and a standard 1/4" jack from the outputs of the tape machine will suffice.

g) CONTROL ROOM

These unbalanced jack sockets carry the signal to the monitor speakers. This signal path is interrupted when headphones are plugged in to the headphone socket. They are wired as follows:-

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

ISSUE 1
16-10-85



TOLERANCES
HOLE SIZES AFTER PAINTING

0-3mm	+0·10 −0·00	GENERAL TOLERANCE
OVER 3-6mm	+0·12 −0·00	Deleze where not applicable.
OVER 6-10mm	+0·15 −0·00	± 0·50mm (0·020")
OVER 10-18mm	+0·18 −0·00	± 0·25mm (0·010")
OVER 18-25mm	+0·21 −0·00	± 0·12mm (0·005")
OVER 25mm	+0·25 −0·00	HOLE CENTRES ± 0·004"
		ALL ANGLES ± 0·50°
		Unless otherwise stated.

HOLE INDEX

MATL	DRN AB
FINISH	TRCD
SCALE	CHKD

THIRD ANGLE PROJECTION

THIS DRAWING TO COMPLY TO BS308.

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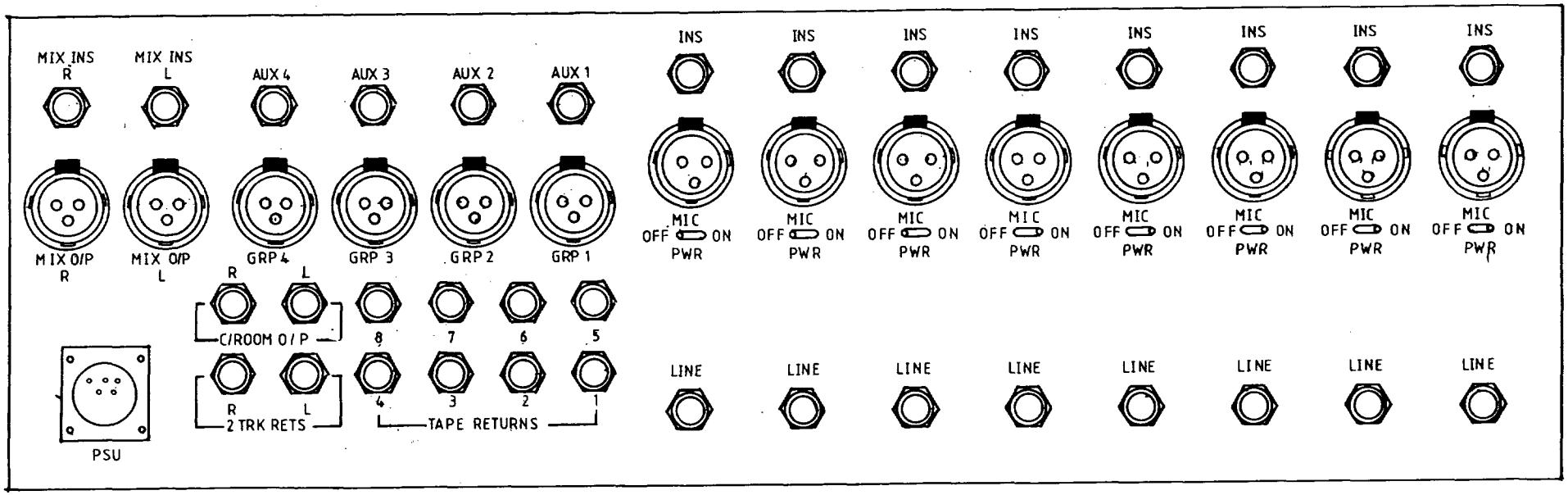
TITLE
S200B STEREO I/P
REAR CONN PANEL

DRG. No. M12515

UDO 31149

ISSUE 1

18-2-85



THIRD ANGLE PROJECTION	TOLERANCE All imperial dimensions ± 0·010 All metric dimensions ± 0·25mm All angles ± 0·50° Unless otherwise stated	HOLE INDEX	MATL FINISH SCALE	DRN 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 S200B RACK MOUNT REAR CONN PANEL DRG. No. MI2423

UDO 30910

3.03 OPTIONAL STEREO INPUT REAR CONNECTOR PANEL

Each connector panel for the stereo input modules contains 2 channels, thus, the stereo input modules can only be fitted in blocks of 2. (Either 2 modules or 1 module and 1 blank.)

a) L & R LINE INPUTS

The XLR sockets carry the balanced line inputs for the left and right inputs as marked. They are wired as follows:
Pin 1: GROUND
Pin 2: HOT (In phase signal)
Pin 3: COLD (Out of phase signal)

b) L & R INSERTS

These stereo standard jacks carry both the insert sends and returns for the left and right channels as marked and are wired as follows:-
Tip: Return (Unbalanced)
Ring: Send (Unbalanced)
Sleeve: Common Ground

3.04 GENERAL WIRING PROCEDURE

To take full advantage of your Soundcraft Console, with its excellent signal to noise ratio and low distortion figures, care must be taken that the enviroment into which you place your console does not degrade its performance.

Typical problems are hum, buzz, instability and radio interference, these are usually problems which are NOT of the console's making. When finally traced, they often turn out to be earth loops or an inferior earthing system. Indeed, in some areas the mains supply earth is inadequate and separate arrangements for earthing must be made.

A separate technical earth should be installed in these instances, and you should ALWAYS check with your electricity supply company to ensure that you do not infringe any regulations.

The installation of a successful earthing system requires careful planning and adherance to the "rules". Outlined below are the main points which should assist you in establishing a good audio earthing system.

Central Earth

To provide optimum performance, there should only be ONE earth point, (star point), for the entire audio installation. Each piece of equipment should run a separate lead to this point for its earth. It is not good enough to "daisy chain" - joining several earths together on their way to the earth point is NOT correct.

Separate Supplies

A separate mains feed should be used for the audio installation, and ONLY for the audio installation. A separate feed should be taken from the distribution box and use another feed for any other mains outlets such as lighting, kettles etc.

It may be necessary to install an isolating transformer for the audio supply, so that there is positively no interferance from the other mains feed. The transformer should be provided with a Faraday shield which should be connected to earth.

Location of Equipment

NEVER place audio equipment near the mains distribution box. Especially tape recorders, as these are particularly sensitive to electro-magnetic radiation.

Racks

A rack full of balanced professional equipment may be earthed as a rack, with the rack being connected to the star point by a separate lead. ANY equipment which has either unbalanced inputs OR outputs should be isolated from the rack and earthed separately to the star point. (Otherwise you will get an earth loop.)

Audio Connection

Having established the "star" system, then start connecting the various audio lines, listening for hum etc. as you go. If you do it this way, you should be able to isolate a problem quickly. It is probably best to use a logical sequence such as: multitrack, stereo tape machines, monitors, echo sends one by one, effects units and finally microphone lines.

Audio Shields

The screen should generally only be connected at ONE end of the cable and this is usually at the signal end. However, there are a few exceptions and below is a table covering all the interconnection possibilities. If radio frequency seems to be a major problem, it is probably best to connect the screen via a 0.01 micro-farad capacitor.

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.

Ground Compensated Outputs

The main outputs of the Series 200B are Ground Compensated, as already mentioned. When connecting a ground compensated output to an unbalanced destination, make sure that the cold lead is connected to earth at the DESTINATION end. The consideration for wiring the screen at only one end is not of such importance with a ground compensated output. (See MI2426)

3.05 INTERFACE LEVELS

The Series 200B is normally supplied to be compatible with standard professional equipment ie. +4dBu (ref. 0.775 volt).

However, provision has been made to allow the user to operate with semi-professional tape machines etc. which operate at -10dBV (ref. 1.0volt).

The change in tape interface operating level is accomplished by reducing the console group output level and increasing the console monitor return gain by an equal amount.

This is easily achieved by pushing a switch, S5, located on the Output Module PCB. (Switch OUT for +4dBu, switch IN for -10dBV).

MIX OUTPUTS left and right may also interface to -10dBV by removing jumpers J1 and J2 . -10dBV operation is also available on 2-track returns left and right, for 2-track return left REMOVE J3 and J4 and 2-track return right REMOVE J5 and J6. (See ED2251 Master Right-hand circuit diagram.)

To allow the Line Input to interface to -10dBV simply remove a link on the Input Module PCB. (See ED2183 - on the circuit diagram this is located just below the LINE switch). This link is located above Conn 1 and immediately left of RIC 1 on the input PCB.

POWER AMPLIFIERS are often rated at 300mV sensitivity for full output. In such cases, an attenuator should be installed at the input to the power amplifier to attenuate the +4dB level (1.228 volt) coming from the console, by approximately 10-15dB.

This may be achieved by using a 2.2kOhm series resistor and 680 Ohm shunt resistor across the amplifier's input.

3.06 FUSE RATINGS

220-240 volts AC the fuse should be 3.15 amps 20mm anti-surge.

100-120 volts AC the fuse should be 6.3 amps 20mm anti-surge.

BEFORE SWITCHING ON ALWAYS CHECK THAT THE VOLTAGE SELECTOR IS SET CORRECTLY AND THAT THE FUSE IS CORRECT.

4.01 THE 200BVE OPTION

SYSTEM DESCRIPTION

The 200BVE is a variation on the Soundcraft Series 200B mixing console allowing it the facility to link up to a Sony BKE-916 Parallel Mixer Interface. The BVE system allows the Sony BVE-900 automatic editing unit to control the channel levels and the output switching of the 200B console. The Soundcraft 200-BVE system is revolutionary in that it allows better control over the audio channels of the 200B than the basic commands of the Sony editor generally allow.

CONNECTION

Connection for the BVE package is through a single 15way D-type connector for each set of eight channels fitted with the BVE option. The most suitable cabling would use Insulation Displacement Connectors on flat cable. For more demanding work where the console may need to be dis-connected and re-connected often, then it would advisable to use solid bodied strain relief connectors and multicore cable.
The connecting lead should be wired pin 1 to pin 1, pin 2 to pin 2 and so on to pins 15. Practically all fifteen of the pins are used. The cable should have a female 15-way connector on one end and a male 15-way connector on the other.
Reference should be made to the Sony 900 and 916 manuals to set the DIP switches and ROM internally to the Sony system. These will set-up the number of channels in the BVE controlled by the Sony machine and the formation of channels in terms of stereo or mono sets. In general the BKE-916 will be factory set for the Sony MXP-29 mixer. This will give outputs 1 to 4 from the Sony editor control over channels 1 and 2, 3 and 4, 5 and 6, 7 and 8 respectively. This is effectively four stereo pairs on an eight channel 200BVE. Alternatively, the BKE-916 card can be set to the Sony MXP-2000 mixer option internally. This will allow channels 1 to 6 from the editor to control channels 1 to 6 on the 200BVE. Channels 7 and 8 on the 200BVE will not be controlled by the editor. Individual channels from the Sony editor to the 200BVE can be turned off using the 8 pole DIP switch on the rear panel of the 200BVE.

CHANNEL CONTROL

On each channel next to the main fader is the Fade Depth control. This fader controls the depth or attenuation of the fade produced by the editor. When the Depth fader is at the bottom of its travel, -infinity, a fade controlled by the editor will fade the channel signal down to effectively off. On the other hand, when the Depth fader is at the top of its travel, the fade from the editor will have no effect at all. This means that control from the editor can be overriden by setting the channel Fade Depth fader to zero at the top of its travel. The main purpose of the Depth fader is to allow signal to be faded down to a preset 'background' level. For example, an atmosphere track could be faded in and out under editor control without it being muted entirely.
A crossfade initiated between two channels will produce an equal level between the two channels with both at -6dB.

MASTER CONTROL

On the master section there are three indicators for the two External inputs and overall BVE control and a switch to Dim the monitor outputs.
a) BVE
The BVE indicator indicates that the BKE-916 editor has control over the console.
b) DIM
The DIM switch is a latching switch that will mute the Monitor output of the console by around 12dB when illuminated. Pressing the DIM switch will override any Dim signal from the editor. The Dim signal from the editor is dependant on the operation of the editor.
c) MON 1 & 2, (L & R)
The two MON indicators refer to the Left and Right 2-track return inputs. To use the editors automatic monitor selection, the 2-track return switch on the console should always be ON. The two Monitor control lines from the editor can be selected to be driven independantly and so the Left and Right signals can be mono signals from two different machines.

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 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 proprietory 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 monitoring the signal at the insert send.

If bypassing 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 cicuits, 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. Modules should NOT be plugged in or unplugged with the power switched ON.

5.03 METER ALIGNMENT

Each VU meter has its own individual drive card on the master RH PCB.

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

Connect a millivoltmeter to the group output. Route the oscillator to the group and adjust the group output level 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 meter and repeat for all other groups.

5.04 LAMP REPLACEMENT

Illumination of the VU meters is provided by 1 lamp in each meter, these are 12 volt lamps. The lamps in each pair of meters are wired in series and powered by the ±17 volt audio supply. A series resistor in each meter pair provides turn on current limiting to prolong the lamp life.

To replace the lamp remove the VU meter from the panel. This is achieved by the following method:-

1. Remove the group/master module from the console.
2. Unscrew the four screws through the PCB and remove the connecting cable.
3. The meter assembly can now be removed from the module.
4. Remove the front from the meter(s) and replace the bulb.
5. To replace the assembly reverse the above procedure.

5.05 Power Supply Servicing

The Series 200B power supply provides the following regulated supply rails;

i) +/- 17 volts, Audio
ii) +48 volts, Phantom Power

If a power supply fault is suspected, first ensure that it really is the P.S.U. which is at fault, and not a short circuit in the console. This can be checked by disconnecting the P.S.U. from the console, and measuring the voltage at the connector. A load across the supply should be provided, to simulate the normal load conditions imposed by the console.

A 10 Ohm, 20 Watt resistor should be connected across each of the audio supply rails. The phantom power supply can be loaded with a 2.2kOhm, 1 Watt resistor.

The ripple and noise value of the various supply rails can now be measured, using a millivoltmeter or an oscilloscope.

If a fault is found to exist in the P.S.U., disconnect the mains supply and remove the cover. Check visually for any obvious problems, such as blown fuse, burnt components, etc. If nothing obvious is observed, reconnect the mains and measure the voltages across the various electrolytic smoothing capacitors, which should be as follows;

Audio Supply	C1	= +26volts
	C2	= -26volts
Phantom Supply	C12	= +59volts

Differences of ±10% are acceptable, due to variations in the incoming mains voltage. If satisfactory, the problem lies in the regulator section. If not, however, check the bridge rectifier, smoothing capacitor and transformer for failure.

6.00 GLOSSARY OF TERMS USED

AFL	After fade Listen: This button will "solo" the signal (or ALL with their AFL buttons down) on the monitors, and the feed for this solo is taken AFTER the fader.
Attenuate	To reduce the electrical level or amount of gain.
Auxiliary Send	Extra output from the console, usually used for echo sends and foldback.
Bus	Wire carrying a signal or sum of a group of signals.
Cold	The negative going current of a signal. With 2 signal wires, one is positive going (hot), and the other is negative going.(cold)
Cut	To cut a channel means to turn it OFF.
dB (decibel)	A logarthmic ratio used to represent voltage or power gain. The reference about which the ratio is made is usually stated.
Ground	Earth or screen of a cable when refering to connecting leads.
Group Output	The output of a group bus which is carrying a sum of all the signals assigned to that group number.
Hot	Positive going current of a signal. With 2 signal wires, one is positive going (hot), and the other is negative going.(cold)
Hz	Measurement of frequency (Hertz) 1Hz = 1 cycle per second.
Insert	An insert point allows peripheral equipment to be introduced into the signal path.
Khz	Measurement of frequency expressed to the power of 1000.i.e. 1Khz = 1000 cycles per second.
kOhm	Measurement of electrical resistance expressed to the power of 1000.i.e. 1 kOhm = 1000 Ohms.
Mains	Local Electrical Supply.
Multitrack Logic	Either the multitrack machine's monitor switching or its safe/record switching.

Ohm	Measurement of electrical resistance.
Overdubbing	The process of recording new tracks on a multitrack tape recorder whilst listening back in synchronisation with previously recorded tracks.
Pan Pot	A pan pot places a signal across two stereo lines (left & right) turning it to the left will send all the signal to the left line, and when turned to the right, all the signal will be sent to the right side. If the pan pot is at its centre detent, an equal amount of signal will be fed to both sides and the image in the stereo picture will be central.
PFL	Pre fade Listen: This button will "solo" the signal (or ALL with their PFL buttons down) on the monitors, and the feed for this solo is taken BEFORE the fader.
Phantom Power	A voltage (usually +48 Volts) across the microphone input to power capacitor microphones.
Post	Post means after the fader.
Pre	Pre means before the fader.
Ring	The connecting part in the middle of a stereo jack,(it mates second).
Signal to Noise Ratio	The ratio between the level of signal and the level of unwanted noise.
Sleeve	The connecting part of a stereo jack which mates last and is always earth.
Star Point	A single point to which ALL earths are separately connected.
Sync Mode	Used whilst overdubbing; previously recorded tracks are played back through the record head whilst you record on other tracks.
Tip	The connecting part at the end of a stereo jack, (it mates first).
Track Bouncing	Taking a group of previously recorded tracks and recording them as a group onto another track. e.g. bouncing down 4 vocals from 4 tracks to just one track "frees" 3 tracks for fresh recording.

7.00 SERIES 200B TECHNICAL DESCRIPTION

7.01 GENERAL

1. Configuration

Inputs:
Between 8 and 32 input channel modules.
8 tape returns in the monitor/mix section.
1 two-track tape return.

Outputs:

4 Groups.	Ground compensated. (See MI2426)
4 Auxiliaries.	Ground compensated. (See MI2426)
Mix L and R.	Electronically balanced.
Headphones. (Breaks CRM.)	
Control Room Monitor, (CRM).	Electronically balanced.

2. Level switching

There is extensive level switching within the console, enabling it to be used with both +4dBu and -10dBV, (Tascam level), external equipment. The level switching is done on a per-PCB basis allowing both level standards to be used.

3. Operating levels

Inputs:
Line In: +4dBu or -10dBV.
Mic In:

Group outputs/Tape returns:
+4dBu or -10dBV.

Aux outputs:
+4dBu. Not switchable; adjust level on Aux master pot.

Mix outputs:
+4dBu or -10dBV.

2-track return:
+4dBu or -10dBV.

Internal:
-6dBu nominal.

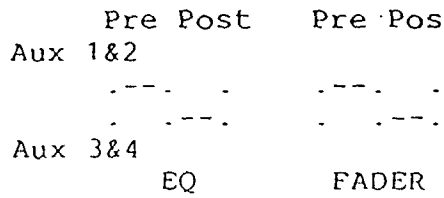
7.02 INPUT CHANNEL

The circuitry of the channel is fairly standard, and only the points of interest are noted.

A jumper provides the gain switching for the line input. Pushing the jumper ON introduces extra attenuation, and provides suitable sensitivity for +4dBu operation. This is located above Conn 1 and to the left of RIC 1.

The PFL switch, (S4), signals a PFL condition to the Solo Enable bus by connecting it to V- through a 100k resistor, (R25). The Solo Enable bus operates as a virtual-earth bus so that there are no transient signals on it that might crosstalk onto the audio buses..

Extensive changes in the sourcing of the 4 Aux sends are possible by moving the pre/post jumpers located towards the centre of the PCB, these allow various combinations of pre/post EQ and pre/post fader sends. The Auxes are arranged in two pairs.



(Refer to Input module Circuit diagram ED2183 and Input module Signal flow diagram ED2227.)

Routing is through 22k resistors, the outward end being grounded when routing switching is released, so that crosstalk cannot occur to the bus across the switch contact capacitance.

7.03 GROUP OUTPUT

The Series 200B Group Output summing circuit is a conventional virtual-earth amp whose output feeds the fader. At this point the signal is out of phase. The fader amp is configured for 10dB of gain, and restores the signal to its -6dBu nominal level and correct phase. The output amp is a ground compensated type. This has output level swtiching in its feedback loops.

Switch, S5, OUT for +4dBu.
Switch, S5, IN for -10dBV.

TAPE RETURNS
Two returns are provided per group. For Group 1, the returns are 1 and 5, for Group 2, they are 2 and 6, etc. Each return is balanced with an input impedance of >10k. There is level switching in the feedback loop, and the switch contacts are combined with those of the Group Output so that by operating one switch, all levels on a Group PCB are changed.

The output of return amp 1 goes to the normally open side of the RET switch, (S2). The meter and PFL feeds are taken from the wiper of S2. When pressed, the signal accesses VR1, (Aux 1), and VR2, (Vol). The output of IC goes to the SUB switch, (S4), which normally routes it to the Pan pot, (VR3), and then the Mix bus.

If the SUB switch is pressed, IC 's output goes via a mix resistor to the group bus, and the Group Output is fed into the Panpot. With SUB and RET out, the Group Output feeds the meter, VR1, VR2 and the Panpot via IC and SUB: the tape return goes no-where.

Return 5 is somewhat simpler in operation: the balanced input goes to the gain-switched return amp and then into AUX1, (VR4), VOL, (VR5), and PFL. The VOL amp's output is applied to the Panpot and the Mix buses.

7.04 MASTER LH PCB (Auxiliary Masters)

The are 4 Aux masters, each of which have a master level pot and an AFL switch. They reside on the Master LH PCB. The circuitry is conventional and consists of a virtual-earth summing amp followed by a level pot and ground compensated output amp.

7.05 MASTER RH PCB

This PCB holds the Mix L and R paths, 2-track returns, headphone monitors, PFL/AFL system, oscillator and talkback circuitry.

MIX PATH
The Mix summing amp is followed by an inverting insert-send driver which corrects the signal phase. The insert return feeds the fader and its amp, (+10dB gain). The level switching stage drives the EBOS amp, the output of which goes to the Mix XLR and the 2-track return switch.

2-TRACK RETURN
This is a balanced line input with level switching. Its output is switched by an FET into the headphone monitor circuit.

PFL/AFL SYSTEM
The PFL/AFL signal is summed, passes through an inverting stage and then goes to the switching FETs.

When a PFL or AFL switch is pressed the PFL/AFL enable bus is connected to V- by a 100k resistor. IC9 is connected as a virtual earth stage and so acts to maintain zero volts on the bus by moving its output positively. When the op-amp output goes positive, TR5 is turned on by R70 and the not-PFL logic signal goes low. TR6 is turned off by R42 and the PFL logic circuit goes high. These changes turn off TR7 via D1 and allow R21 to keep TR8 held on. Therefore, the signal from IC23 is ignored, and that from the PFL/AFL summing amp, IC8, is passed to the monitoring system instead. R22 helps absorb FET

switching transients.

HEADPHONE MONITORING
The FET outputs go to the meter switch, talkback switches, (which kill the phones when operated), and the Monitor Volume pot. The tip-normal and ring-normal contacts of the phones socket feed the Control Room monitor EBOS amps.

OSCILLATOR AND TALKBACK
The talkback, (TB), and slate oscillator, (OSC), share the same set of mix resistors, and therefore only one can be used at a time. TB always overrides OSC. When neither are enabled S3D, S5B, and S4C ground the mix resistors to prevent interbus crosstalk. C48 is not grounded by S3D or S4D and the TB mic amp gain is reduced to unity.

The oscillator is enabled by S5A and switches S3C, S5B and S3D take the output signal to ground when it is not slated. When OSC is pressed the ground is removed from both the osc output and the mix resistors, which slates the oscillator.

For Talkback to be enabled, either TB ALL or TB 1-2 are used. TB 1-2 selects the first 2 Auxes, TB ALL applies TB to the 4 group buses, Auxes 1 and 2 and the mix buses.

Operating TB switch removes the ground on the mix resistors and applies a ground to C48 to allow the full mic gain set by VR2 to be realised. R84 sets the maximum gain and R82, C45 provide smooth power to the electret microphone.

METER DRIVE
This is an active gain, single op-amp driver.

8.00 SOUNDCRAFT RECOMMENDED WARRANTY

(This warranty applies to sales within the UK and should form the basis of the warranty offered by the overseas vendor of Soundcraft products.)

1. 'Soundcraft' means Soundcraft Electronics Ltd.
   'End User' means the person who first puts the equipment into regular operation.
   'Dealer' means the person other than Soundcraft (if any) from whom the End User purchased the Equipment, provided such a person is authorised for this purpose by Soundcraft or its accredited Distributor.
   'Equipment' means the equipment supplied with this manual.

2. If within the period of twelve months from the date of delivery of the Equipment to the End User it shall prove defective by reason only of faulty materials and/or workmanship (but not faulty design) to such an extent that the effectiveness and/or usability thereof is materially affected the Equipment or the defective component should be returned to the Dealer or to Soundcraft and subject to the following conditions the Dealer or Soundcraft will repair or at its option replace the defective components. Any components replaced will become the property of Soundcraft.

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

4. This warranty shall only be available if:-
   a) the Equipment has been properly installed in accordance with instructions contained in Soundcraft's manual; and
   b) the End User has notified Soundcraft or the Dealer within 14 days of the defect appearing; and
   c) no persons other than authorised representatives of Soundcraft or the Dealer have effected any replacement of parts maintenance adjustments or repairs to the Equipment; and
   d) the End User has used the Equipment only for such purposes as Soundcraft recommends, with only such operating supplies as meet Soundcraft's specifications and otherwise in all respects in accordance with Soundcraft's recommendations.

5. Defects arising as a result of the following are not covered by this Warranty: faulty or negligent handling, chemical or electro-chemical or electrical influences, accidental damage, Acts of God, neglect, deficiency in electrical power, air-conditioning or humidity control.

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

7. End Users who are consumers should note their rights under this Warranty are in addition to and do not affect any other rights which they may be entitled against the seller of the Equipment.