4.02 OPERATION OF STEREO INPUT

The Stereo Line input module is similar in operation to the standard module except that all paths are in stereo. (NB: Aux sends, however, are mono.). This module is particularly useful when you wish to introduce stereo keyboards or effects devices into the console. In a broadcast situation the stereo input modules can be used for cart machines, turntable feeds etc.

Should the signal entering the module be out of phase pressing the Phase button will invert the phase on the left-hand input only. The L & R buttons allow a mono source to feed both the left and right channels of the module. In the situation where a full track recording is replayed on a stereo machine pressing both L & R will provide a mono sum of the two inputs.

The High pass filter and Equaliser can be independently switched into the signal path thus enabling the operator to enhance sounds before going to tape or 'on air'.

Four Auxiliary sends, which may be pre-selected in pairs either Pre or Post Fade, are available for headphone mixes etc. however, it should be noted that the auxiliary sends are mono.

The signal in the module may be routed to any pair of groups, via the balance control, which corrects or deliberately creates any errors in stereo imaging.

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 $\pm$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.

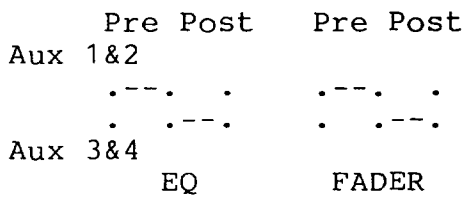
7.02 INPUT CHANNEL

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.

9.00 SERIES 200B CUSTOMER SPARES KIT LIST - RZ2259

COMPONENT ITEM NO.	DESCRIPTION	QTY
BA0001	DIODE IN4148	5
BB0106	ZENER DIODE 400mW 11V	1
BC0302	BDG RECT KBF02 200V 2.5A	1
BD0301	PNP TRANS 2SA842GR/2SA970GR	1
BD0302	NPN TRANS 2SC1681BL/2SC2240BL	5
BD0317	NPN TRANS BD135	1
BD0322	FET SWITCH J112	2
BD0329	PNP TRANS 2N4403	5
BE0403	QUAD OP AMP IC TL074	2
BE0404	SGL OP ICTL071	2
BE0413	DUAL OP AMP IC TL072	5
BE0418	V.REG LM337K-1.2/37V 1.5A (TO3)	1
BE0419	V.REG LM317K+1.2/37V 1.5A (TO3)	1
BE0428	DUAL OP AMP IC NE5532	5
JA0001	TOSHIBA MINI LED GREEN TLG102	3
JA0002	TOSHIBA MINI LED RED TLR102	3
JA0003	TOSHIBA LED RED TLR104	1
NA0130	M3x8mm PAN POZI BLCK SCRW	10
NC0231	M3 BLACK NYLON WASHER	10
RV1297	S200B EXTENDER WFM ASSY.	1
ZD0301	1.6A ANTI-SURGE FUSE 20mm	3
ZD0307	6.3A 20mm FUSE	3