ALLEN & HEATH

SR PLUS

Sound Mixing Consoles

Online version PART 1

building on success

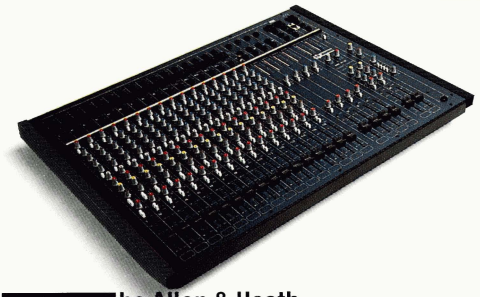
Effective from serial number 501001 onwards.

This manual includes operating and service information for all models of the SR Series currently in production. Where differences between models exist, such as four bus and two bus models, this is indicated in the text.

CONTENTS

Sound Reinforcement

Control Functions



The Allen & Heath SR plus series of sound reinforcement consoles is a development of their highly successful SR range.

SR mixers are installed in churches, leisure centres, theatres and concert halls around the world, including the Purcell Room at London's South Bank Centre.

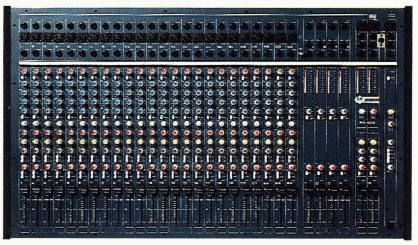
SR consoles are frequently behind the quality sound demanded for todays professional product launches and commercial presentations.

SR Plus, like its predecessor, has been designed and built for the rugged life led by a touring board.

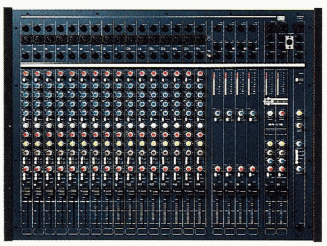
SR Plus now has an input pad switch operating on both microphone and line inputs for maximum flexibility on gain matching and XLR connectors are provided for left, right and mono outputs. These can be balanced with the Allen & Heath ground sensing electronic output balance amplifier.

SR plus stands for Sound Reinforcement – now more than ever.

PRODUCT RANGE



SR424 four group, stereo and mono outputs, 24 input channels



SR416 four group, stereo and mono outputs, 16 input channels

SR16 stereo and mono outputs,16 input channels

SR12 stereo and mono outputs,12 input channels

SR8 stereo and mono outputs, 8 input channels

Note: *Consoles will be finished in grey with grey side trims during 1991*

INPUT CHANNEL

LINE LEVEL INPUT JACK
¼" Jack accepts balanced or unbalanced signals.

MICROPHONE INPUT XLR
Electronically balanced input with phantom powering.

INSERT JACK
Pre-equaliser insertion point.

INPUT GAIN
Adjusts pre-amplifier to suit various input levels.

PAD SWITCH
Reduces Mic input by 18 dB or line input by 12 dB.

HF CONTROL
Shelving characteristic with ±12 dB cut/boost at a corner frequency of 8 kHz.

HIGH MF CONTROL
Peaking characteristic with ±12 dB cut/boost at a centre frequency of 3.5 kHz.

LOW MF CONTROL
Peaking characteristic with ±12 dB cut/boost at a centre frequency of 250 Hz.

LF CONTROL
Shelving characteristic with ±12 dB cut/boost at a corner frequency of 80 Hz.

EQ CUT SWITCH
By pass switch for the equaliser section allowing instant comparisons.

AUX SEND LEVELS A,B,C,D
Allows up to four mixes of input sources for foldback, echo and cue mixes. A & B post fade, C & D pre eq, (internal links allow optional -re eq, pre fade or post fade sends.)

ASSIGNMENT SWITCHES (SR Plus 416, SR Plus 424 ONLY)
Selects the channel to groups 1 - 4 or L - R outputs.

PAN CONTROL
Used to position the input in the stero mix or between a pair of groups.

PFL SWITCH
Monitors pre fader signal to allow cueing of input signal.

MUTE SWITCH (SR Plus 416, SR Plus 424 ONLY)

PEAK INDICATOR
LED warns of imminent overload (clipping)

CHANNEL FADER
With 10 dB boost available.

GROUP OUTPUT

GROUP OUTPUT JACK
With optional electronically balanced output.

AUX INPUT JACK

TAPE INPUT JACK

GROUP INSERT JACK
Pre fade insertion point.

GROUP METER
10 segment VU characteristic display giving visual indication of group output signal level.

AUX/TAPE SWITCH AND LEVEL CONTROL
With switch in aux position, signals from an external source can be mixed into the group with the level control. With switch in the tape position, group output no longer feeds the pan control and the tape input is fed to the L - R outputs via the level and pan controls. The group fader always feeds the group output jack.

PAN CONTROL
Used to position the signal in the stereo mix.

GROUP PFL SWITCH
Monitors pre-fader signal to allow cueing of group signal.

PEAK INDICATOR
LED warns of imminent overload (clipping).

GROUP FADER
With 10 dB boost available.

STEREO OUTPUT

R (L) MASTER OUTPUT XLRs
With optional electronically balanced output.

AUX B (A) OUTPUT JACK

FX RETURN 2 (1) INPUT JACK
Dual level input connector

R (L) INSERT JACK
pre fader insertion point

R (L) MONITOR METER
10 segment Vu characteristic display giving visual indication of the selected monitor source.

AUX B (A) LEVEL CONTROL
Auxiliary mix master output level control.

FX RETURN 2 (1)
Line input signal can be added to the stereo mix and to aux mixes C and D. A level control, 2 Aux send controls and a pan control are provided, along with a PFL switch.

PEAK INDICATOR
LED warns of imminent overload (clipping).

MASTER R (L) OUTPUT FADER
Controls the level to the stereo output and mono summing amplifier.

MASTER SECTION

MONO OUTPUT XLR
With optional electronically balanced output.

AUX D OUTPUT JACK

AUX C OUTPUT JACK

MONITOR OUTPUT JACK
Unbalanced stereo monitor output.

PHANTOM POWER LED AND SWITCH
Switches the 48 volt phantom power for the microphones on and off.

AUX C LEVEL CONTROL
Master output level control.

AUX D LEVEL CONTROL
Master output level control.

MONO LEVEL CONTROL
Master control of summed L-R mix (MONO) output.

MONITOR SOURCE SELECT SWITCHES
Selects the signal for headphone or control room monitoring and monitor meters.

MONITOR LEVEL CONTROL
Sets listening level for both monitor and headphone output.

HEADPHONE JACK

ELECTRONIC PERFORMANCE

0dBv = 0.775 RMS 1kHz
0VU = +4dBv = 1.23 Volts RMS

GAIN

MIC IN to GROUP OUT +82dB max
MIC IN to L/R OUT +72dB max
LINE IN to L/R OUT +50dB max
LINE IN to GROUP OUT +60dB max
GROUP to L/R OUT +10dB max
L/R to MONO OUT +6dB
FX RETURN to L/R OUT +12dB max
AUX RETURN to GROUP OUT +17dB max
Figures include 10dB input and group fader boost.
INPUT GAIN CONTROL RANGE 41dB

FREQUENCY RESPONSE

Equaliser set to flat response or switched out – 20Hz-20kHz +0, –1dB.

OUTPUTS

Max level +21dBv, recommended load 2K ohms or more. With 600 ohms load max level +18dBm.

DISTORTION

THD typically better than 0.05% 20Hz-20kHz at normal levels and gain settings.

EQUALISER

HF continuously variable ±12dB with shelving characteristic at 8kHz.
3.5kHz continuously variable peak/dip ±12dB centred at 3.5kHz, Q=0.6
250Hz continuously variable peak/dip ±12dB centred at 250Hz.
LF continuously variable ±12dB with shelving characteristic at 80Hz.

Each model is shipped in protective packing with the power supply and one owner handbook which includes technical service data and schematics.

CONSTRUCTION

Steel control panel, stove enamel, epoxy silkscreen legend.
Steel base, black finish with wood trims.
Channel circuit boards are individual, secured to control panel.
Internal bussbar circuits employ removeable harness.
IC op amp circuit design with discreet transistor input pre amp.

NOISE PERFORMANCE

RMS noise 20kHz bandwidth, ref 0VU

MODEL	SR8	SR12	SR16	SR416	SR424
Stereo Output, all inputs routed and faders closed	–89dB	–87dB	–86dB	–85dB	–83dB
Group Output, all inputs routed and faders closed	–	–	–	–79dB	–76dB
Aux Output	–89dB	–86dB	–82dB	–82dB	–79dB

Microphone Input equivalent noise –125dBm (200ohm source).
Line input pre-amp noise at 0dB gain: –88dB.

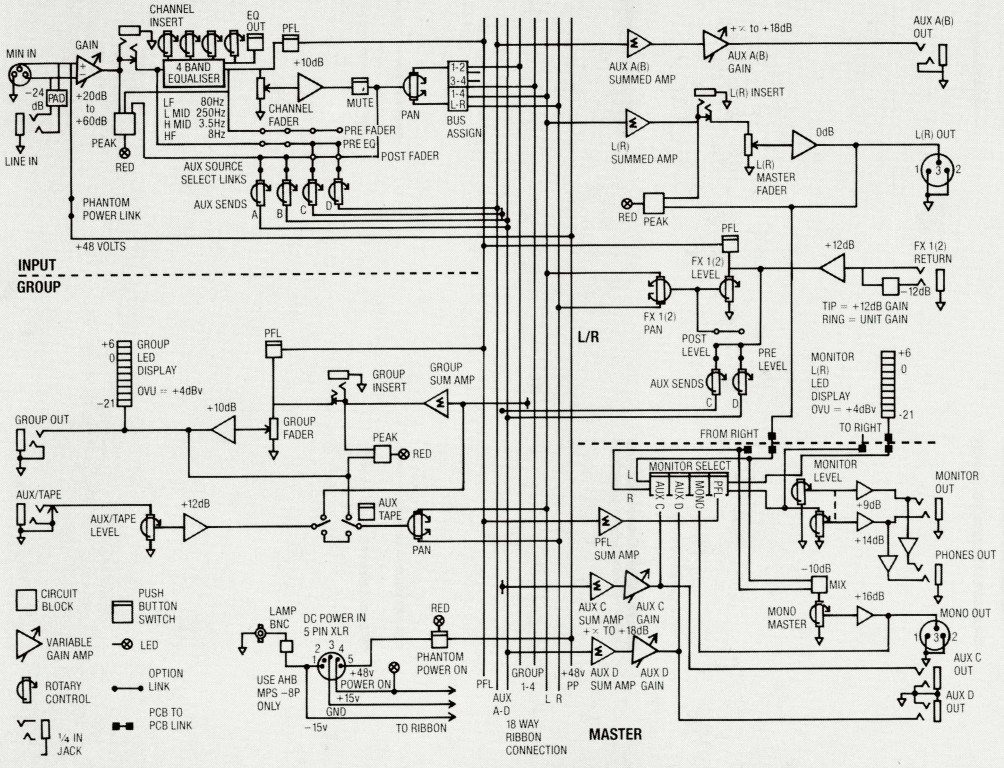
DIMENSIONS mm(in)

MODEL	SR8	SR12	SR16	SR416	SR424
Width	472 (19)	600 (24)	728 (29)	872 (35)	1128 (45)
Height	100 (4)	100 (4)	100 (4)	100 (4)	100 (4)
Front-to-back	644 (26)	644 (26)	644 (26)	644 (26)	644 (26)
Packet weight kg lbs		20 (44)	25 (55)	26 (58)	35 (77)

All models use power supply AHB MPS8P
The supply voltage setting may be altered to suit local requirements if required. BNC connector (to suit lamps rated 12-15v, 50m A, D.C.).

Note:
Optional soft covers are available

SR PLUS BLOCK SCHEMATIC



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In line with our continuous product improvement, we reserve the right to amend the design and specification of equipment without notice.

ALLEN & HEATH

Designed by Barrie James West Associates Limited. Printed in England AH157/M105

INTRODUCTION

SPECIFICATION

The AHB SR SERIES is a range of versatile, economical and easy-to-use audio mixing consoles intended for stereo and mono PA applications and stereo/4-track recording. The quality of design, construction and components employed will ensure high quality performance in these applications when correctly used. Operators are encouraged to study the contents of this handbook.

The SR SERIES includes five models as follows:

SR8	stereo and mono outputs, 8 input channels
SR12	stereo and mono outputs, 12 input channels
SR16	stereo and mono outputs, 16 input channels
SR416	four group, stereo and mono outputs, 16 input channels
SR424	four group, stereo and mono outputs, 24 input channels

NOTE: All models use ext. power supply MPS8-P, or rack mountable RPS-1 power supply.

Construction:

1. Steel control panel, stoved enamel, epoxy silkscreened legend.
2. Steel base, black finish with wooden side trims.
3. Channel assemblies are individual and secured to control panel.
4. Internal busbar circuits employ removable harness.
5. IC op-amp circuit design featuring discrete transistor input preamp.

AC Power Requirement:

AHB power supplies MPS8-P, MPS9 and RPS1 provide the necessary DC for the mixer and are the only power supplies recommended for use with this product. Use of power supplies other than the above may void the mixer warranty. All AHB power supplies operate on the following mains voltages/frequencies -

220-240V A.C. 50/60Hz 50VA Europe
110-120V A.C. 50/60Hz USA
100V A.C. 50/60Hz 50VA Japan.

Further details on mains voltages in SERVICE section.

SERVICE AND GUARANTEE INFORMATION

Service

There are no adjustments or alignment procedures required to maintain the performance standard of SR Series products.

To preserve the working life of the unit and its presentation, avoid the use of chemicals, abrasives and solvents. The control panel is best cleaned with a soft brush and a damp cloth. Faders, switches and potentiometers are lubricated for life; the application of electrical lubricants to these parts is not recommended.

In the event of a failure, refer the work to your Allen & Heath Sales and Service Agent. He has the information and staff to make an effective repair, and is authorised to make repairs under warranty. In the unlikley event the equipment must be returned to a service agent, always include the power supply and as much information as possible as to the nature of the problem. Always include the model number and serial number of the unit with service queries to ensure that accurate information is obtained.

Guarantee

SR Series products are made in the UK by ALLEN & HEATH BRENELL LTD, and are guaranteed against defective parts and workmanship for a period of ONE YEAR from the date of purchase by the original owner. Other than the work specified in the OPTIONS Section of this handbook, no alterations to the original construction of the product are authorised by AHB or its agents and any such work invalidates the Guarantee.

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ELECTRONIC PERFORMANCE

0dBv = 0.775 RMS 1kHz
0VU = +4dBv = 1.23 Volts RMS

GAIN:		
	MIC IN to GROUP OUT	+84dB max
	MIC IN to L/R OUT	+74dB max
	LINE IN to L/R OUT	+51dB max
	LINE IN to GROUP OUT	+61dB max
	GROUP to L/R OUT	+14dB max
	L/R to MONO OUT	+6dB
	FX RETURN to L/R OUT	+12dB max
	TAPE IN to L/R OUT	+16dB max

Figures include 10dB input and group fader boost.

INPUT GAIN CONTROL RANGE 41dB.

FREQUENCY RESPONSE: Equaliser set to flat response or switched out - 20Hz-20kHz +0, -1dB.

OUTPUTS: Max level +21dBv, recommended load 2K ohms or more. With 600 ohms load max level +18dBm.

DISTORTION: THD typically better than 0.05% 20Hz-20kHz at normal levels and gain settings.

NOISE PERFORMANCE: RMS noise 20kHz bandwidth, ref 0VU

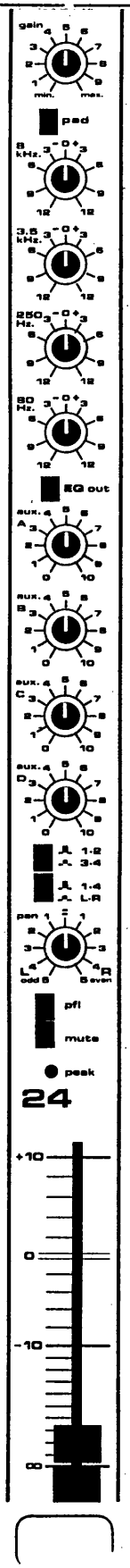
	MODEL				
	SR8	SR12	SR16	SR416	SR424
i Stereo Output, all inputs routed and faders closed	-89dB	-87dB	-86dB	-85dB	-83dB
ii Group Output, all inputs routed and faders closed	-	-	-	-79dB	-76dB
iii Aux Output	-89dB	-86dB	-82dB	-82dB	-79dB

iv Microphone Input equivalent noise -125dBm (200ohm source).

v Line input pre-amp noise at 0dB gain: -88dB.

PANEL CONTROLS

INPUT CHANNEL



1. **INPUT GAIN**
   Adjusts the sensitivity (gain) of the input pre-amplifier to suit various input levels. Used in conjunction with the PFL system to set correct operating levels.

2. **PAD SWITCH**
   When selected, reduces the signal level of the MIC input by 18dB or reduces the level of the LINE input by 12dB.

3. **HIGH FREQUENCY EQUALIZER**
   Boosts or cuts HF content of input signal as desired. ±12dB maximum boost/cut at a corner frequency of 8kHz with shelving characteristics.

4. **HIGH MID EQUALIZER**
   Operates as above but with peaking characteristics at a centre frequency of 3.5kHz. Q = 0.6 (approximately 2 octaves wide).

5. **LOW MID EQUALIZER**
   Operates as above but at a centre frequency of 250Hz.

6. **LOW FREQUENCY EQUALIZER**
   Shelving type as high frequency equalizer. Corner frequency 80Hz.

7. **EQ CUT SWITCH (SR416 AND SR424 ONLY)**
   Instantly by-passes EQ circuit allowing direct comparison of equalized/unequalized signal without the need for resetting EQ controls back to the "flat" position.

8. **AUXILIARY SEND LEVELS A,B,C,D**
   Allows the operator to create up to four different mixes of all input sources for providing foldback, echo or cue mixes as desired. SR Series mixers are wired in manufacture with auxiliary sends A and B POST-fader, and auxiliary sends C and D wired PRE-eq. Internal selector links are provided to allow custom formatting of all aux bus sources for operation in the pre-eq, pre-fade or post fade modes. (See OPERATION, OPTIONS.)

9. **ASSIGNMENT SWITCHES (SR416 AND SR424 ONLY)**
Used in conjunction with the pan pot (10) to route a selected input channel to subgroups 1-4 or directly to the L/R masters as desired.

10. **PAN POT**
Positions input signal in the stereo mix. Also assists in routing signals to subgroups 1-4 and permits panning of signal between groups if desired. (See Assignment Switches.)

11. **PFL SWITCH**
Allows operator to monitor channel levels prior to the fader, regardless of fader level or channel mute status. Used with input gain control (1) and peak indicator (13) to accurately set input signal levels and provide checks of overall signal quality.

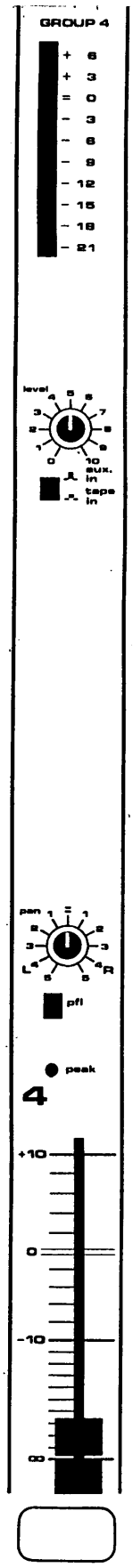
12. **MUTE SWITCH (SR416 AND SR424 ONLY)**
Cancels or "mutes" selected input channel after the fader. Also mutes signal to any aux send controls which are set to derive their signal from the fader output.

13. **PEAK INDICATOR LED**
This LED indicator flashes a warning of imminent overload distortion (clipping) when the channel level is too high. Illuminates 3dB before the onset of actual channel clipping and is affected by INPUT GAIN (1), and EQ (3-6) and CHANNEL FADER (14) settings.

14. **CHANNEL FADER**
Controls level of input channel to selected groups and any POST fader aux sends. The fader marking "0" is normal operating position, indicating unity gain between input and output sections. There is an extra 10dB boost available at the fader which is obtained by raising the fader to its full up position.

15. **SCRIBBLE PATCH**
Provided to permit identification of input programme source.

GROUP CHANNELS



1. **GROUP METER**
   The group meter is a 10 segment LED display which gives a visual indication of the group signal level after the fader.

2. **AUX/TAPE SELECT SWITCH AND CONTROL**
   With this switch in the UP (aux) position, signals from an external source can be mixed into the group using the return level control. With the switch in the DOWN (tape) position, the fader is disconnected from the panpot and the level control mixes the external signal to the L/R masters via the panpot. Used in this mode to monitor previously recorded tracks during overdubs. It should be noted that whilst the signal from the group fader is disconnected from the panpot in this mode, the signal from the fader to the group output jack is unaffected and operates normally.

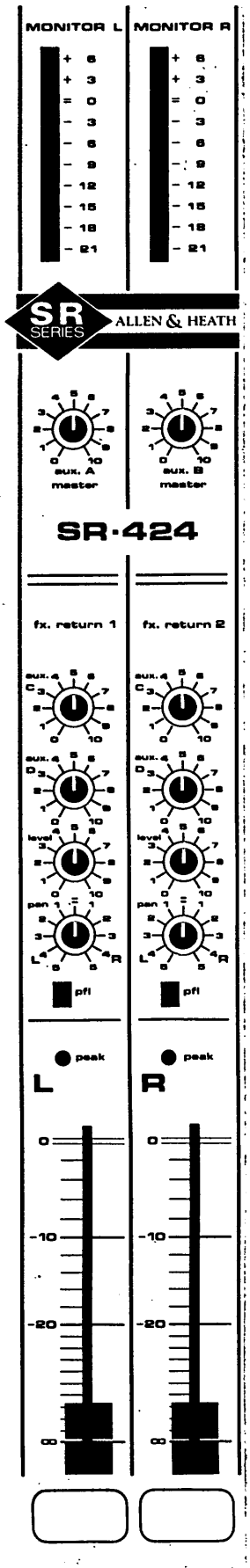
3. **GROUP PFL BUTTON**
   Operates in the same fashion as the channel PFL button but reads pre-fader level of group.

4. **GROUP PEAK INDICATOR**
   This LED indicator flashes a warning of imminent group overload distortion (clipping) when the group level is too high. Illuminates 3dB before the onset of clipping distortion. Operates PRE fader and is affected by the level and number of input channels assigned to the group.

5. **GROUP FADER**
   Determines the level of the signal from the group to the L/R outputs, or to a tape track when recording. Normal operating position "0", however a 10dB boost is available by raising the group fader full up.

6. **SCRIBBLE PATCH**
   SEE "Scribble Patch", INPUT channel.

OUTPUT SECTION



1. **L/R MONITOR METERS**
   These multipurpose meters monitor the L/R output levels of the mixer and four other signal sources as well. VU characteristics with 3dB resolution. Range from -21 to +6 VU with 0 VU equal to 1.23 Volts RMS (+4dBv).

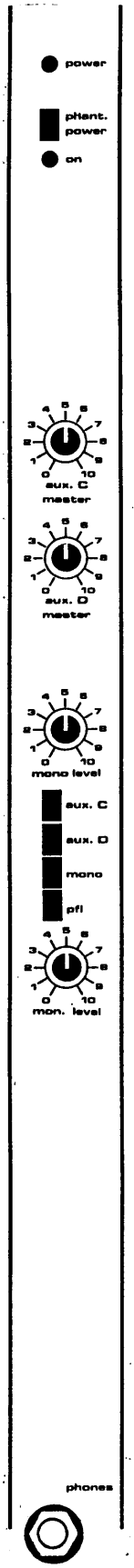
2. **AUX A/(AUX B) LEVEL CONTROLS**
   The master output level controls for auxiliary mixes A and B.

3. **FX RETURNS 1 AND (2)**
   These identical sections allow two line level signals (eg the outputs from 2 effects devices) to be added to the stereo mix and to aux mixes C and D. Each has a level control performing the same function as an additional channel input fader, mixing the effects signal to the main outputs via a PANPOT to position the signal in the stereo mix. Two send controls are also provided so that the FX signal can be mixed to the performers headphone or stage monitoring system.

4. **PEAK INDICATOR LED**
   Operates as other peak indicators described in this handbook.

5. **MASTER LEFT/(RIGHT) OUTPUT FADERS**
   Control the final output level of the stereo mix and provides signal to the MONO summing amplifier.

MASTER SECTION



1. **PHANTOM POWER SWITCH AND LED**
   Turns 48 Volt phantom power "on" or "off". Illuminated LED indicates "on" status.

2. **MASTER OUTPUT LEVELS AUX C AND D**
   Control the final output level of auxiliary mix buses C and D.

3. **MONITOR SOURCE SELECT SWITCHES/MONITOR LEVEL**
   This section selects the signal available for headphone or control room monitoring via the jack socket on the top panel. The MONITOR LEVEL control directly beneath the switch assembly determines listening level for both MONITOR and HEADPHONE outputs.

4. **MONO LEVEL CONTROL**
   Determines the final output level of the summed L/R mix.

5. **HEADPHONE JACK SOCKET**
   Use the headphone output to check the quality of the mixer outputs when a suitable pair of monitor speakers is not available.

USE OF FACILITIES

THE INPUT CHANNEL

The input channel accepts a balanced or unbalanced input signal from a microphone, direct box or a line level source such as the output of a synthesiser, or external signal processing device such as a digital delay line, reverb, etc.

SR range products are factory wired for the 48 volt phantom powering of condenser microphones. The supply is present at XLR pins 2 and 3. Power supplies MPS8-P, MPS9 and RPS1 provide the necessary voltage. The master phantom power pushbutton switch and power on indicator LED are located at the top of the master section. **NOTE**: When using phantom power it is important to avoid connecting an UNBALANCED signal source to a MICROPHONE input without having first disconnected the phantom power source from that input. This is accomplished by removing the phantom power internal link from the channel, or switching the phantom power OFF. (See OPTIONS section.)

Input Gain Control

The input gain control amplifies or attenuates incoming microphone or line level signals depending on which source is selected for use. Control range is +21 to +62 (mic) and -1dB to +40dB (line).

Input Pad Switch

On occasion, situations may arise where high level signal sources (a live kick drum, or some drum machines and synths) overload the input channel, even though the input gain control is set at minimum. Depressing the input pad pushbutton attenuates (or reduces) the incoming MIC signal level by 18dB and the LINE signal level by 12dB before those signals reach the input gain control Should this amount of attenuation prove to be excessive, the input gain control can then be raised to bring the signal level back up to unity gain. The PFL system can be very helpful here, and should always be employed when attempting to set channels up to the proper operating levels.

Channel Insert Jack

Located between the input XLR and the input gain control, this jack socket allows access to the signal path at a point immediately AFTER the input pre-amp, and BEFORE the equalizer section. This is a convenient place to "insert" into the signal path an external signal processing device such as a compressor, limiter, or graphic/parametric equalizer. It is also handy when you wish to put a certain effect on just one channel without tying up an entire auxiliary mix bus to do so.

Use of a channel insert jack requires a cable consisting of 1 "stereo" (ring/tip/sleeve) 1/4" phone plug wired to two "mono" (tip/sleeve) 1/4" phone plugs as shown in the diagram below. When the stereo plug is plugged into the insert jack, the mono plug wired to the ring of the stereo plug becomes the send, or input to the processing device, and the ring becomes the return from the output of the device.

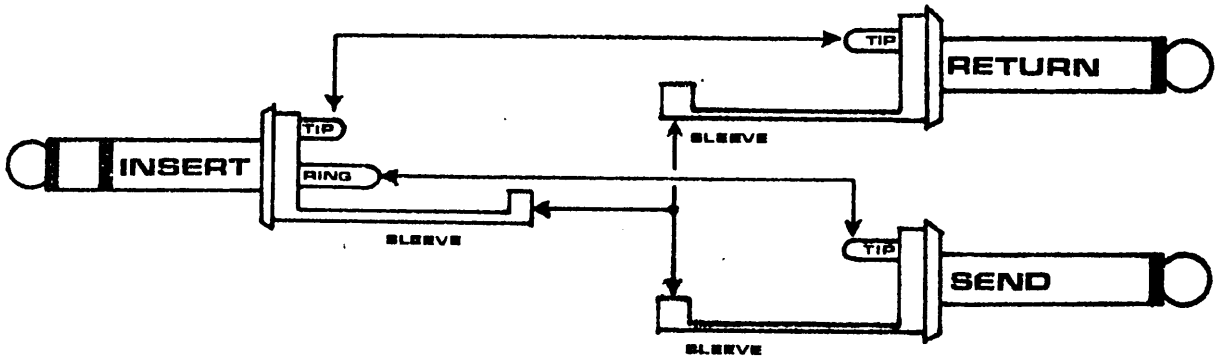


figure 1. Insert Cable Assy.

Equalizer

The four band, fixed frequency equalizer section (the channel EQ) allows you to alter the tone and harmonic balance of the signal in the channel. You can also filter out unwanted high frequency noise (hiss) or low frequency noise (rumble) and compensate for deficiencies in older microphones or problems with your acoustic environment.

The High Frequency Equalizer

This control either boosts or cuts the high frequency content of the signal source by up to 12dB at 8kHz, having progressively less effect at frequencies below 8kHz. This is known as a "shelving" type equalizer. At its centre "zero" position, the control has a "flat" response and therefore no effect on the high frequency signal content.

The Low Frequency Equalizer

This control operates as the high frequency equalizer, but boosts or cuts those frequencies BELOW 80Hz. This is also a shelving type equalizer; and like the high frequency control, when set to its center "zero" position, it has no effect on the low frequency signal content.

The High Mid/Low Mid Equalizers

These equalizers operate over the middle of the frequency range centred at 3.5kHz and 250Hz respectively. These controls provide up to 12dB of boost or cut at the specified frequencies. The mid equalizers operate both above AND below the centre frequencies with a range of approximately 2 octaves. This means that boosting the high mid equalizer at 3.5kHz affects not only 3.5kHz but also frequencies as low as 1.5kHz and as high as 5kHz, but to a lesser degree. This is known as a "peaking" type equalizer. As with the other EQ controls, these have no effect on the signal when set to the centre flat position.

The EQ Cut Switch (SR416 and SR424 only)

This allows you to instantly by-pass the EQ circuit, producing a flat response from the channel without having to reset the controls back to their zero positon. This switch is useful for making A/B comparisons of the equalized/unequalized signal, or it can be used to "program" a certain EQ setting for use as a special effect when needed. (Eg: a vocal "robot" eq.)

Channel Auxiliary Sends

Each SR input channel features 4 auxiliary send controls. These controls feed auxiliary masters A, B, C, and D and allow the user to create four additional mixes of the signal sources fed to the mixer. These mixes are generally used as feeds to external FX devices, as foldback mixes to an on-stage monitor system, or as a cue mix for performers' headphones (cans) in recording applications.

Aux A and B are POST fader feeds to the aux A and B mixes. Their operation is dependent on the level of channel fader and will change proportionally with fader movements and will be cut off when the mute switch (on four group models) is activated. For this reason, these mixes are used as feeds to external FX devices.

Aux C and D are PRE-EQ feeds to the aux C and D mixes. These mixes are unaffected by channel EQ settings, mute status or fader position and are used as feeds to an on-stage monitoring system. It should be noted that whilst these mixes are not affected by changes in the EQ settings, they ARE affected by changes made at the input gain control, and changes made there will require that a proportional change be made at the aux send.

SR Series mixers have been wired in this configuration in manufacture. However, provision has been made within the mixer which allow the user to choose the point in the channel circuit from which the aux level control derives its source. Three choise are available - PRE-EQ, PRE-FADER, (but POST-EQ), and POST-FADER. For further information, see OPTIONS section.

Pan Pot

An input signal can be placed anywhere in the stereo image by turning the PANPOT to the right or left. Models which employ subgrouping also use the PANPOT for routing input channels to specific groups or tracks if recording. When routing input channels, turning the PANPOT full left routes to ODD numbered groups, and turning full right routes to EVEN numbered groups.

Channel Routing (SR416 and SR424 only)

Two pushbutton switches are provided for the purpose of input channel routing. The bottom button L-R/1-4 routes the selected input channel to the main L/R output when DEPRESSED. When this button is in the UP position, the channel signal is routed to the GROUPS. Pairs of groups are selected by the top switch 1-2/3-4. With both switches in the UP position, the channel signal is routed to groups 1 and 2. Depressing the 1-2/3-4 switch routes the channel signal to groups 3 and 4. To route a channel to a single specific group, all that is necessary is to select the proper pair of groups (1-2 or 3-4) and then turn the panpot. To route to ODD numbered groups, pan full LEFT. To route to EVEN numbered groups, pan full RIGHT. (See PANPOT, GROUP CHANNELS.)

PFL Button (Pre-Fader Listen)

Operates as the name implies. Depressing the PFL allows you to listen to the signal of an individual channel in the control room monitors or in headphones without the need for raising the channel fader. The PFL system always takes its signal from the point immediately AFTER the EQ section, but BEFORE the fader, which makes it handy for making signal level and quality checks before bringing that channel up into the mix. It is used in conjunction with the MASTER PFL PUSHBUTTON located at the far right of the mixer. When the MASTER PFL button is depressed, the monitor and headphone outputs switch over to "listen" to the PFL bus, and the signal level of the selected channel is displayed on the L/R monitor meters simultaneously.

Mute Button (SR416 and SR424 only)

When depressed, mutes or "cancels" the signal from the channel AFTER the channel fader. Also cancels signal going to any auxiliary mixes which are set to derive their signal post fader. (Aux A and aux B unless others have been selected. See OPTIONS.)

Panpot

An input signal can be placed anywhere in the stereo image by turning the PANPOT to the right or left. Models which employ subgrouping also use the PANPOT for routing input channels to specific groups or tracks if recording. When routing input channels, turning the PANPOT full left routes to ODD numbered groups, and turning full right routes to EVEN numbered groups.

Peak Indicator LED

This provides a visual warning that the input signal is approaching overload distortion (clipping). This can be caused by the use of too much input gain, or excessive equalizer boost, especially at lower frequencies. An illuminated peak indicator is a cue to you to check the channels operating level via the PFL system and make the proper adjustments.

Channel Fader

Used to alter the level of an individual channel in the mix. Normal operating level is the "0" position; however, an extra 10dB boost can be obtained by raising the fader full up. Also provides signal feed to auxiliary mix controls A and B or other if selected. (See OPTIONS.)

Scribble Patch

This space provided for channel identification. Use with grease pencil or other easily erasible marker to avoid permanent damage to the mixer finish. Use of masking or duct tape may damage the silkscreened mixer legend, particularly if left on for long periods of time.

GROUP CHANNELS (SR416 and SR424 only)

Use of the group channels allows you to control the level of any number of input channels simultaneously. This is extremely helpful in situations where the balance between individual channels is important. For example, let us say that after having established a tight balance between four or more vocal channels, the need suddenly arises to turn the vocals up or down overall. Attempting to change each channel by the same amount is a difficult task at best, and the end result is likely to be a big mess where your nice, tight mix was a minute ago, and your carefully established balance ruined. Mixing situations which require the operation to be done quickly AND accurately complicate matters further. By assigning the vocal channels to a group, you can adjust the overall vocal level quickly and easily whilst preserving the balance between channels assigned to the group. Any number of similar input sources are likely candidates for grouping. Besides vocals, drums, keys, horns, etc are easier to keep in control when they are assigned to a group.

The Group Meter

The group meter is a 10 segment LED display which provides a visual indication of the group output level AFTER the fader, in 3dB steps from -12dB to +6dB. It is a VU (average) responding meter with the "0" position indicating a group output level of OVU or +4dBv (1.23v RMS).

Aux/Tape Level Control (SR416 and SR424 only)

There may be times when it will be necessary to add signals from an external source to the group signal without using a full input channel. This could be taped accompaniment, or pre-recorded sound effects. Regardless of the application, whenever additional audio signals must be combined with the signal of a particular group, it can be done via the aux return. To accomplish this, bring the extra signal into the mixer using the 1/4" jack socket labelled AUX IN/TAPE IN. Ensure that the AUX/TAPE switch is in the UP (Aux) position. Your signal can now be mixed into the group in any amount you desire using the return level control. The return level control has another function when the button is depressed to select the tape mode. When recording, the track outputs are brought to the AUX/TAPE jacks and when the button is pressed the group fader is disconnected from the panpot (and therefore the L/R outputs) and is replaced with the signal from the tape track. It should be noted that this does not disconnect the fader from the group output jack, allowing additional tracks to be recorded from a group while that group is monitoring other tracks. More on this in RECORDING WITH SR.

OUTPUT SECTION

Left/Right/Monitor Meters

Operate as the group meters in every respect, but will also read other sources as selected by the MONITOR SOURCE select switch (aux C, aux D, mono output, or PFL.)

Aux Masters A and B

These controls determine the output level of auxiliary mixes A and B. Generally used as FX sends and should be set at around the "5" position for best operating results. Individual input aux send controls should be set at about position "6" to "9".

FX Returns 1 and 2

By use of the control marked "level" these inputs can be used to bring signals from external FX devices back into the stereo mix and also permits a portion of the FX signal to be returned to auxiliary mix buses C and D by using the controls provided for this purpose. The FX signal can be mixed to the aux buses independently of the amount of signal mixed to the L/R outputs; however, internal links are provided in the FX return circuits to enable these controls to take their signal AFTER the level control allowing the FX signal to be mixed to the aux buses in the same proportion as that which is mixed to the L/R outputs. (See OPTIONS.) A PAN control is also provided so that the FX signal can be placed within the stereo image as desired. The FX return jack is configured to provide either unity return gain or +12dB return gain. For low level (-10dB) devices, the return plug should be inserted all the way into the jack socket: this provides 12dB extra gain. For high level devices, insert the plug half way into the FX return jack to provide unity gain. Use the FX PFL switch to determine the proper position if not certain. Alternatively, use a stereo jack plug and connect the input signal to the ring contact.

FX Return PFL Switch

Depress this switch to listen to the outputs of the FX devices. Should be used for the purpose of verifying level and sonic quality of the FX signal and for setting delay times, etc prior to bringing them up into the mix. (See PFL - INPUT CHANNEL.)

Peak Indicator LED

Warns of imminent overload distortion (clipping) when the signal level of the L/R outputs gets too high and tells you to reduce the level of the mix. The indication is of the pre L/R output fader signal level.

L/R Output Faders

Controls the final output level of the stereo mix to the L/R output jacks and the mono summing amplifier.

MASTER SECTION

Phantom Power Switch

Connects 48 volt phantom power to all mic inputs. LED illuminates to indicate phantom power selected. Please consult INPUT CHANNEL operation section for details and cautions regarding the use of phantom power. Also refer to OPTIONS section for information on the method of disconnecting phantom power from individual mic inputs.

Aux C/Aux D Masters Level Controls

These controls determine the level of the auxiliary mix outputs C and D. Output level of these mixes can be read on the L/R MONITOR meters by pressing the appropriate button in the MONITOR SELECT section.

Mono Output Level Control

Determines the level of the MONO OUTPUT. This is an especially useful feature as it allows your PA system to be driven from the MONO OUTPUT which frees up the L/R output jacks to allow simultaneous stereo recording. (See CONNEXION DIAGRAM - SOUND REINFORCEMENT.)

Monitor Source Select Switches/Monitor Level

The four pushbutton switches in the master section allow you to monitor the mixer functions both audibly and visually, with the MONITOR LEVEL control governing the listening level to both the MONITOR OUTPUT and the HEADPHONES as well.

When all the switches are in the UP position, the monitor meters display the stereo output level of the mixer. To monitor other mixer functions, select the appropriate pushbutton and when it is pressed, the meters will switch over to display that function in mono, with the exception of the PFL button. When this button is pressed, no level is displayed unless a channel, group, or FX PFL button is pressed as well. Essentially, what the PFL button in the master section does is PREPARE the PFL system to receive signals from other areas of the mixer.

Monitor Select Priority

When using the monitor section, it should be noted that the lowest button pressed takes priority over the others. For example, when PFL is selected it will override all other monitor functions. When mono is selected, it overrides the aux buttons but not PFL, and so on. Remember that the lowest button pressed is the source you are listening to.

Monitor Level Control

Located beneath the monitor select switchbank, this control determines the level of both the monitor AND headphone outputs.

Headphone Jack Socket

Used to drive a pair of stereo headphones having an impedance of 8-600 ohms. Headphone signal always follows signal source selected at MONITOR SELECT switchbank.

RECORDING WITH SR

USE OF GROUP CHANNELS (SR416 and SR424 only)

Connection from Groups to Recorder

This should be done as shown in the multitrack recording diagrams, using the four group outs to a 4 track recorder, and four replays to groups aux/tape.

GROUP 1	TRACKS 1
GROUP 2	TRACKS 2
GROUP 3	TRACKS 3
GROUP 4	TRACKS 4

The operating level is 0Vu = +4dBv = 1.23 volts.