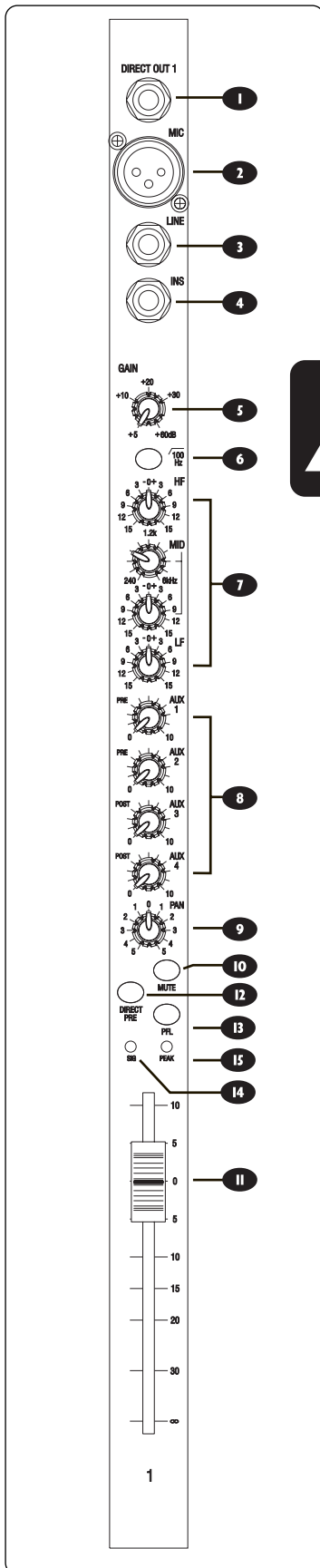


USER GUIDE



MONO INPUT CHANNEL

1 DIRECT OUTPUT

The first eight channels have a dedicated Direct Output which allows direct connection to external devices, for example to feed Tape Machines or effects units.

2 MIC INPUT

The mic input accepts XLR-type connectors and is designed to suit a wide range of BALANCED or UNBALANCED signals. Professional dynamic, condenser or ribbon mics are best because these will be LOW IMPEDANCE. You can use low-cost HIGH IMPEDANCE mics, but the level of background noise will be higher. If you turn the PHANTOM POWER on (top right-hand side of the mixer) the socket provides a suitable powering voltage for professional condenser mics.

ONLY connect condenser microphones with the +48V powering OFF, and ONLY turn the +48V powering on or off with all output faders DOWN, to prevent damage to the mixer or external devices.

TAKE CARE when using unbalanced sources, which may be damaged by the phantom power voltage on pins 2 & 3 of the XLR connector.

Unplug any mics if you want to use the LINE Input. The input level is set using the GAIN knob.

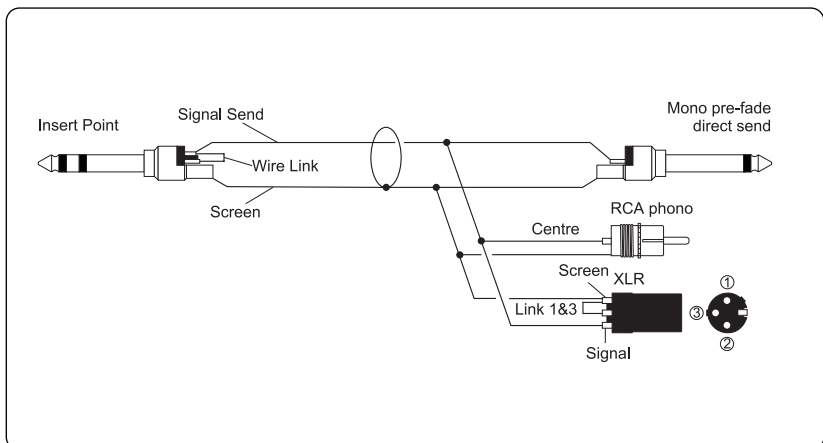
3 LINE INPUT

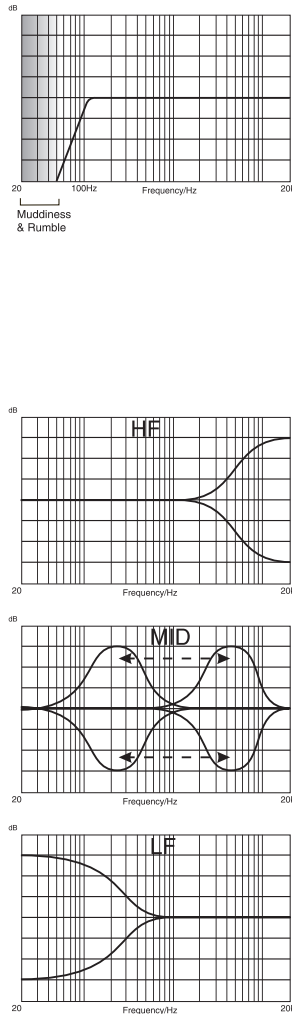
Accepts 3-pole 'A' gauge (TRS) jacks. Use this input for sources other than mics, such as keyboards, drum machines, synths, tape machines or guitars. The input is BALANCED for low noise and top quality from professional equipment, but you can use UNBALANCED sources by wiring up the jacks as shown below, although you should then keep cable lengths as short as possible. Unplug anything in the MIC input if you want to use this socket. Set the input level using the GAIN knob.

4 INSERT POINT (ALTERNATIVE DIRECT SEND)

The unbalanced, pre-EQ insert point is a break in the channel signal path, allowing limiters, compressors, special EQ or other signal processing units to be added in the signal path. The Insert is a 3-pole 'A' gauge jack socket which is normally bypassed. When a jack is inserted, the signal path is broken, just before the EQ section.

The Send may be tapped off as an alternative pre-fade, pre-EQ direct output if required, using a lead with tip and ring shorted together so that the signal path is not interrupted (see below).





5 GAIN

This knob sets how much of the source signal is sent to the rest of the mixer. Too high, and the signal will distort as it overloads the channel. Too low, and the level of any background hiss will be more noticeable and you may not be able to get enough signal level to the output of the mixer.

Note that some sound equipment, particularly that intended for domestic use, operates at a lower level (-10dBV) than professional equipment and will therefore need a higher gain setting to give the same output level.

See 'Initial Set Up' on page 23 to learn how to set GAIN correctly.

6 100Hz HI-PASS FILTER

Pressing this switch activates a steep 18dB per octave filter which reduces the level of bass frequencies only, and is a real bonus for a such a small mixer. Use this in live PA situations to clean up the mix, reducing stage rumble or 'popping' from microphones.

7 EQUALISER

The Equaliser (EQ) allows fine manipulation of the sound, particularly to improve the sound in live PA applications where the original signal is often far from ideal and where slight boosting or cutting of particular voice frequencies can really make a difference to clarity. There are three sections giving the sort of control usually only found on much larger mixers. The EQ knobs can have a dramatic effect, so use them sparingly and listen carefully as you change any settings so that you get to know how they affect the sound.

HF EQ

Turn to the right to boost high (treble) frequencies above 12kHz by up to 15dB, adding crispness to cymbals, vocals and electronic instruments. Turn to the left to cut by up to 15dB, reducing hiss or excessive sibilance which can occur with certain types of microphone. Set the knob in the centre-detented position when not required.

MID EQ

There are two knobs which work together to form a SWEPT MID EQ. The lower knob provides 15dB of boost and cut, just like the HF EQ knob, but the frequency at which this occurs can be set by the upper knob over a range of 240Hz to 6kHz. This allows some truly creative improvement of the signal in live situations, because this mid band covers the range of most vocals. Listen carefully as you use these controls together to find how particular characteristics of a vocal signal can be enhanced or reduced. Set the lower knob to the centre-detented position when not required.

LF EQ

Turn to the right to boost low (bass) frequencies below 60Hz by up to 15dB, adding warmth to vocals or extra punch to synths, guitars and drums. Turn to the left to cut low frequencies by up to 15dB for reducing hum, stage rumble or to improve a mushy sound. Set the knob to the centre-detented position when not required.

8 AUX SENDS

These are used to set up separate mixes for FOLDBACK, EFFECTS or recording, and the combination of each the Aux Send is mixed to the respective Aux Output at the rear of the mixer. For Effects it is useful for the signal to fade up and down with the fader (this is called POST-FADE), but for Foldback or Monitor feeds it is important for the send to be independent of the fader (this is called PRE-FADE).

AUX SENDS 1 AND 2

These are always PRE-FADE and therefore most appropriate for foldback or monitor mixes or external submix.

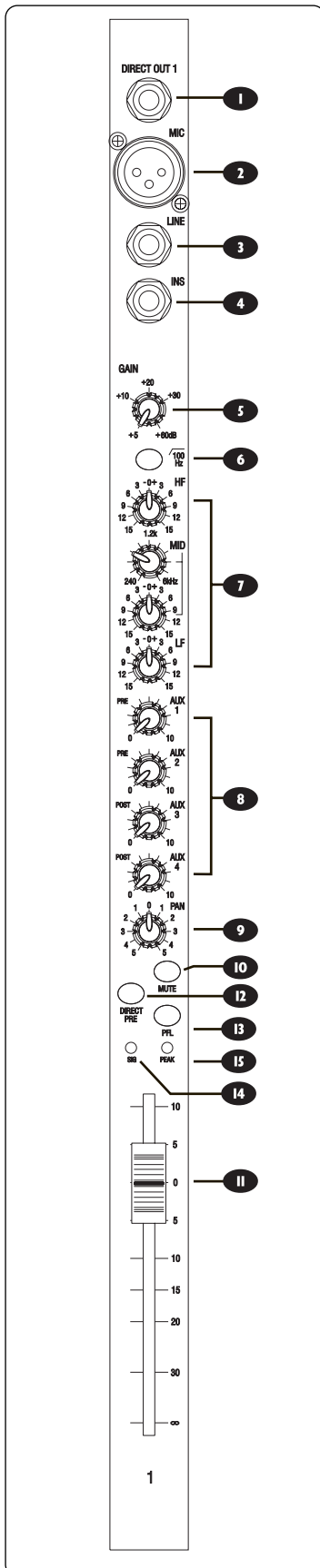
AUX SENDS 3 AND 4

These are always POST-FADE for effects sends, external submix (or for Centre Voice cluster or mono Tape mix).

9 PAN

This control sets the amount of the channel signal feeding the Left and Right MIX or SUB buses, allowing you to move the source smoothly across the stereo image. When the control is turned fully left or right you are able to route the signal at unity gain to either left or right outputs individually.

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10

MUTE

All outputs from the channel except inserts are on when the MUTE switch is released and muted when the switch is down, allowing levels to be pre-set before the signal is required. The only exception to the muting is any DIRECT OUTPUT configured as PRE-fade, which will be sent regardless of the status of the mute switch.

11

INPUT CHANNEL FADER

The 100mm FADER, with a custom-designed law to give even smoother control of the overall signal level in the channel strip, allows precise balancing of the various source signals being mixed to the Master Section. You get most control when the input GAIN is set up correctly, giving full travel on the fader. See the 'Initial Set Up' section on page 23 for help in setting a suitable signal level.

12

DIRECT PRE/POST

This button switches the Direct Output to be set pre or post the channel fader. In the UP position it is POST and in the DOWN position it is PRE.

13

PFL (Pre-Fade Listen)

When the latching PFL switch is pressed, the pre-fade signal is fed to the headphones, control room output and meters, where it replaces the MIX. The PFL/AFL LED on the Master section illuminates to warn that a PFL is active. This is a useful way of listening to any required input signal without interrupting the main mix, for making adjustments or tracing problems. When PFL is pressed anywhere on the console, the Control Room outputs automatically switch from monitoring the Mix Outputs.

14

SIGNAL PRESENT LED

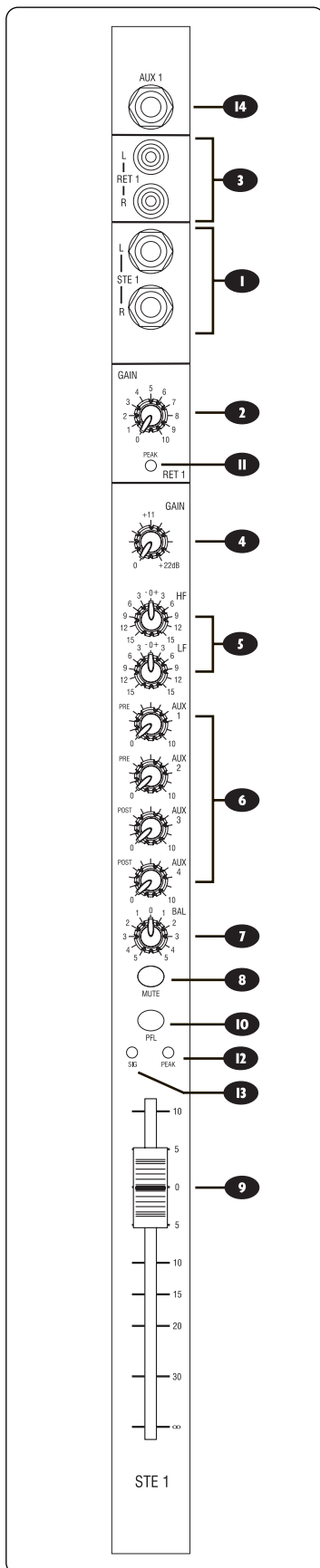
This LED will light when the channel signal exceeds -20dBu.

15

PEAK LED

This LED will light when the signal peaks (+18dBu internal). There is a three point signal analysis, and if the signal peaks at any of these points then the LED will light:

- a) PRE-EQ
- b) POST-EQ
- c) POST-FADE



STEREO INPUT CHANNELS

Each stereo input channel comprises two pairs of inputs per channel strip:

1 INPUTS STE-1/2/3/4

These inputs accept 3-pole 'A' gauge (TRS) jacks. Use these inputs for sources such as keyboards, drum machines, synths, tape machines or processing units. The inputs are BALANCED for low noise and top quality from professional equipment, but you can use UNBALANCED sources by wiring up the jacks as shown in the "Wiring it Up" section earlier in this manual, although you should then keep cable lengths as short as possible. Mono sources may be used by plugging into the left jack only.

2 GAIN

The GAIN control sets the level of the channel signal.

3 RETURNS RET-1/2/3/4

These inputs are unbalanced on RCA phono connectors, and are intended for use with CD players, DAT machines or Hi-Fi equipment. Alternatively they may be used as simple effects returns or stereo instrument inputs.

4 GAIN

The GAIN control sets the input level to the channel, allowing matching to a wide range of line level sources.

5 EQUALISER

HF EQ

Turn to the right to boost high (treble) frequencies, adding crispness to percussion from drum machines, synths and electronic instruments. Turn to the left to cut these frequencies, reducing hiss or excessive brilliance. Set the knob in the centre-detented position when not required. The control has a shelving response giving 15dB of boost or cut at 12kHz.

LF EQ

Turn to the right to boost low (bass) frequencies, adding extra punch to synths, guitars and drums. Turn to the left to reduce hum, boominess or improve a mushy sound. Set the knob to the centre-detented position when not required. The control has a shelving response giving 15dB of boost or cut at 60Hz.

6 AUX SENDS

These are used to set up a separate mixes for FOLDBACK, EFFECTS or recording, and the combination of each the Aux Send is mixed to the respective Aux Output at the rear of the mixer. For Effects it is useful for the signal to fade up and down with the fader (this is called POST-FADE), but for Foldback or Monitor feeds it is important for the send to be independent of the fader (this is called PRE-FADE).

AUX SENDS 1 AND 2

These are always PRE-FADE and therefore most appropriate for foldback or monitor mixes or external submix.

AUX SEND 3 AND 4

These are always POST-FADE for effects sends, external submix (or for centre Voice cluster or mono Tape mix).

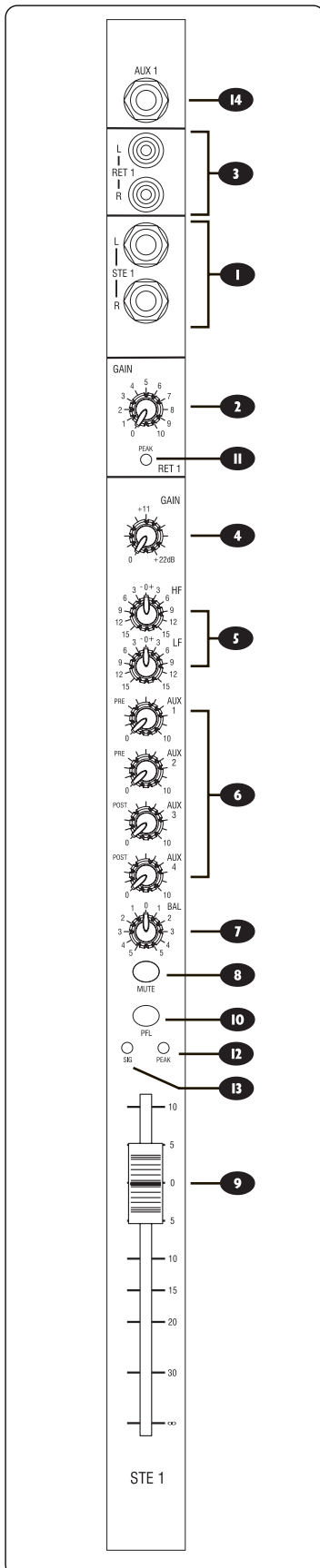
7 BALANCE

This control sets the amount of the channel signal feeding the Left and Right MIX or SUB buses, allowing you to balance the source in the stereo image. When the control is turned fully right or left you feed only that side of the signal to the mix. Unity gain is provided by the control in the centre-detented position.

8 MUTE

All outputs from the channel are enabled when the MUTE switch is released and muted when the switch is down.

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9 FADER

The 100mm FADER gives you smooth control of the overall signal level in the channel strip, allowing precise balancing of the various source signals being mixed to the Master Section. It is important that the input level is set correctly to give maximum travel on the fader which should normally be used at around the '0' mark. See the 'Initial Set Up' section on page 23 for help in setting the right level.

10 PFL

When the latching PFL switch is pressed, the pre-fade signal is fed in mono to the headphones, control room output and meters, where it replaces the MIX. The PFL/AFL LED on the Master section illuminates to warn that a PFL is active. The Left and Right meters display the PFL signal in mono. This is a useful way of listening to any required input signal without interrupting the main mix, for making adjustments or tracing problems.

11 RETURN PEAK LED

This LED will light when the return input signal peaks (+18dBu internal).

12 CHANNEL PEAK LED

This LED will light when the signal peaks (+18dBu internal). There is a three point signal analysis, and if the signal peaks at any of these points then the LED will light:

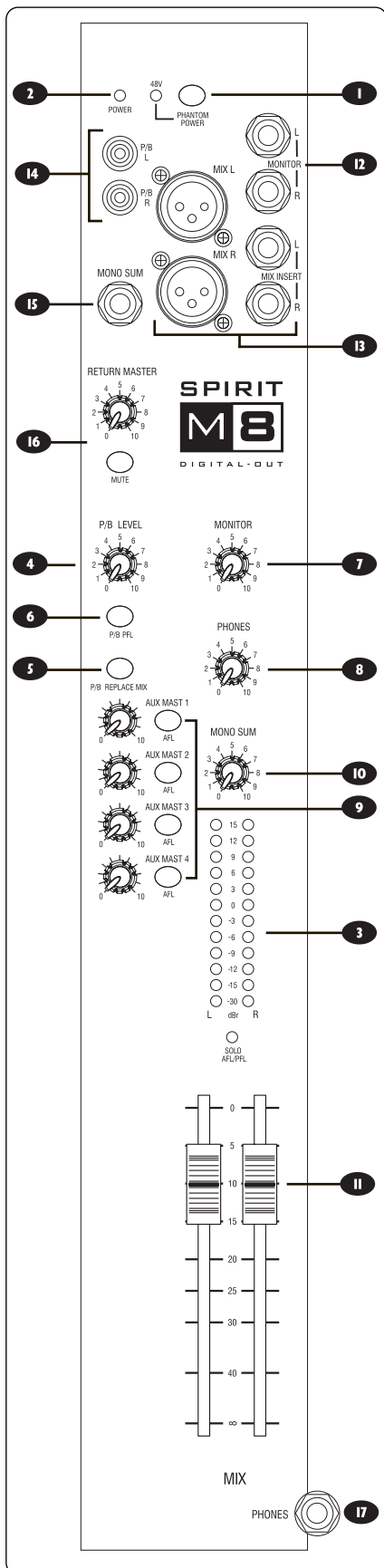
- a) PRE-EQ
- b) POST-EQ
- c) POST-FADE

13 SIGNAL PRESENT LED

This LED will light when the channel signal exceeds -20dBu.

14 AUX OUTPUTS (1-4)

These outputs are on 3-pole 'A' gauge jacks and are balanced outputs



MASTER SECTION

1 PHANTOM POWER

Many professional condenser mics need PHANTOM POWER, which is a method of sending a powering voltage down the same wires as the mic signal. Press the switch to enable the +48V power to all of the MIC inputs. The adjacent LED illuminates when the power is active.



WARNING: TAKE CARE when using unbalanced mics which may be damaged by the phantom power voltage. Balanced dynamic mics can normally be used with phantom power switched on (contact your microphone manufacturer for guidance)

Mics should always be plugged in, and all output faders set to minimum before switching the Phantom Power ON to avoid damage to external equipment

2 POWER INDICATOR

This LED lights to show when power is connected to the console.

3 BARGRAPH METERS

The three-colour peak reading BARGRAPH METERS normally show the level of the MIX RIGHT and MIX LEFT outputs, giving you a constant warning of excessive peaks in the signal which might cause overloading. Aim to keep the signal just touching the red segments at peak levels for best performance.

Similarly, if the output level is too low and hardly registering at all on the meters, the level of background noise may become significant. Take care to set up the input levels for best performance.

When any PFL switch is pressed, the meters switch to show the selected PFL signal on both meters, in mono.

4 PLAYBACK

The rotary control sets the level of the 2 Track Tape input, which is routed to the headphones, monitor outputs and meters. These inputs, on RCA phono connectors are an ideal way to connect the playback of a tape machine for monitoring.

5 PLAYBACK REPLACES MIX

Press this switch to replace the MIX Left/Right signal at the MIX outputs with the Playback signal connected to the Left and Right RCA sockets (14) (see also p.22).

6 PLAYBACK PFL

Press this switch to route the Playback signal to the monitor and phones, over-riding the default monitor/Phones signal. This listening point is **before** the PB LEVEL control, so material can be previewed before being routed.

7 MONITOR LEVEL

This control sets the level to the MONITOR LEFT & RIGHT outputs. If headphones are plugged into the PHONES jack, the headphone level will track the Monitor Level.

8 PHONES LEVEL

This control sets the output level to the Headphone outputs. If headphones are plugged into the PHNS jack, then the knob sets a comfortable headphone listening level without affecting the Monitor output levels.

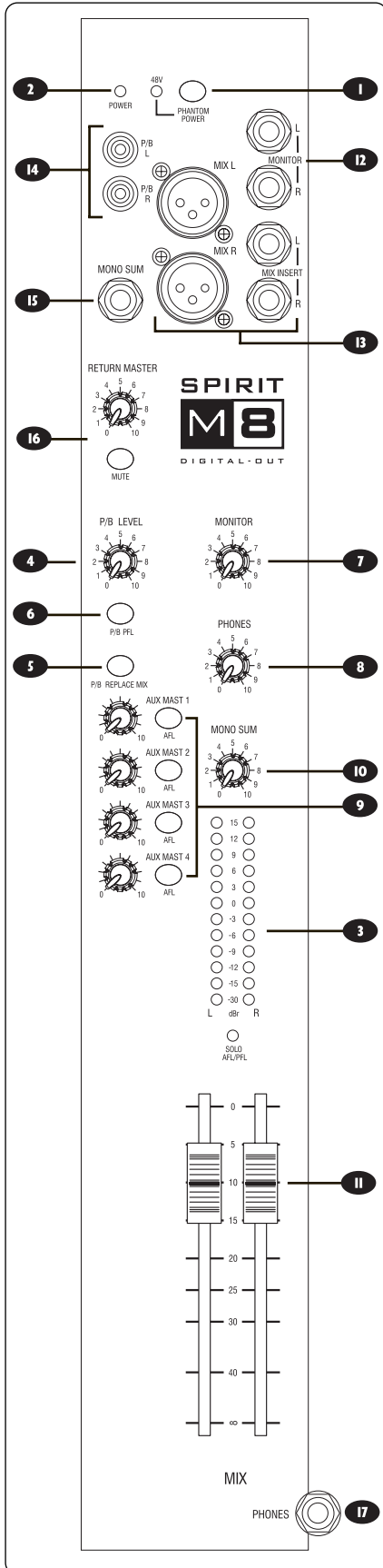
9 AUX MASTERS

Each Aux output has a master output level control and associated AFL switch.

AUX AFLs

Just like the PFL switches on the channels, you can monitor each AUX output by pressing the AFL switch. This routes the AUX output signal to the MONITOR or PHONES, replacing the MIX signal. The METERS also switch from the MIX to display the PFL/AFL signal and the PFL/AFL LED lights to warn that a PFL or AFL switch is pressed. When you release the switch, the Monitor swaps back to the MIX.

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10 MONO SUM

The Mix Left and Right signals are summed to a MONO output on a 3 pole 'A' gauge jack (15). Output level is set by the dedicated rotary control. Monitoring of the Mono output, if required, must be done at the external equipment it feeds, or the signal brought back to a spare console input.

11 MASTER FADERS

The MASTER FADERS set the final level of the MIX outputs, and separate faders are provided for each output. These should normally be set close to the '0' mark if the input GAIN settings have been correctly set, to give maximum travel on the faders for smoothest control.

12 MONITOR OUTPUTS

The Monitor Outputs are on 3-pole 'A' gauge jacks and are balanced connections

13 MIX OUTPUTS & INSERTS

The Mix LEFT and RIGHT outputs are sent from the XLR sockets as balanced signals. The Mix INSERT points are on 3-pole 'A' gauge jacks and are unbalanced.

14 PLAYBACK INPUTS

These two RCA phono sockets are unbalanced Left and Right line-level inputs, used for connecting the playback devices selected using button (5) (see also p.21) e.g. DAT or CD players, Minidisc, Cassette tape recorders etc.

15 MONO SUM OUTPUT

The MONO Sum output is on a 3-pole 'A' gauge jack output and is balanced.

16 RETURN MASTER / MUTE

This rotary control adjusts the overall level of the four stereo return inputs to the Mix. There is also a mute switch which can be used to quickly compare the level of the Mix, with and without effects.

17 HEADPHONES JACK

This output is on a 3-pole 'A' gauge stereo jack socket and accepts headphones of approximately 200Ω impedance.

USING YOUR SPIRIT M SERIES CONSOLE

The final sound from your PA system can only ever be as good as the weakest link in the chain, and especially important is the quality of the source signal because this is the starting point of the chain. Just as you need to become familiar with the control functions of your mixer, so you must recognise the importance of correct choice of inputs, microphone placement and input channel settings. However, no amount of careful setting up can take account of the spontaneity and unpredictability of live performance. The mixer must be set up to provide 'spare' control range to compensate for changing microphone position and the absorption effect of a large audience (different acoustic characteristics from sound check to show).

MICROPHONE PLACEMENT

Careful microphone placement and the choice of a suitable type of microphone for the job is one of the essentials of successful sound reinforcement. The diagrams on the left show the different pick-up patterns for the most common types of microphone. Cardioid microphones are most sensitive to sound coming from in front, and hypercardioid microphones offer even greater directivity, with a small amount of pickup behind the microphone. These types are ideal for recording vocalists or instruments, where rejection of unwanted sounds and elimination of feedback is important. The aim should be to place the microphone as close as physically possible to the source, to cut out unwanted surrounding sounds, allow a lower gain setting on the mixer and avoid feedback. Also a well-chosen and well-placed microphone should not need any appreciable equalisation.

There are no exact rules - let your ears be the judge. In the end, the position that gives the desired effect is the correct position!

INITIAL SET UP

Once you have connected up your system (see the sections on connection and wiring earlier in this manual for guidance) you are ready to set initial positions for the controls on your mixer.

The front panel drawing on page 8 shows typical initial control positions which is a useful guide to setting up the mixer for the first time.

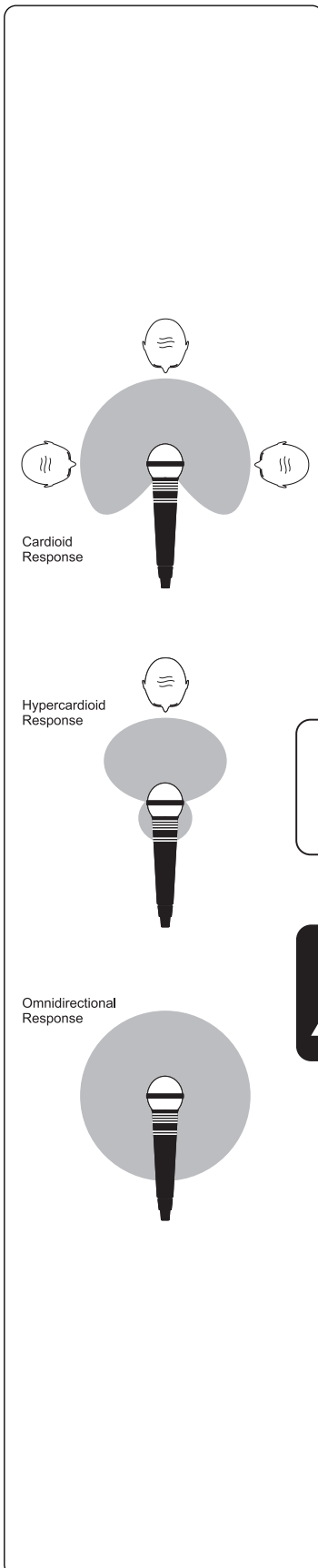
Set up individual input channel as follows:

- Connect your sources (microphone, keyboard etc.) to the required inputs.
WARNING: Phantom powered mics should be connected before the +48V is switched on. Ensure the PA system is OFF when switching phantom power on or off.
- Set Master faders at 0, input faders at 0, and set power amplifier levels to about 70%.
- Provide a typical performance level signal and press the PFL button on the first channel, monitoring the level on the bargraph meters.
- Adjust the input gain until the meter display is in the amber section, with occasional peaks to the first red LED at a typical maximum source level. This allows sufficient headroom to accommodate peaks and establishes the maximum level for normal operation (but see note below).
- Repeat this procedure on other channels as required. As more channels are added to the mix, the meters may move into the red section. Adjust the overall level using the Master Faders if necessary.
- Listen carefully for the characteristic sound of 'feedback'. If you cannot achieve satisfactory input level setting without feedback, check microphone and speaker placement and repeat the exercise. If feedback persists, it may be necessary to use a Graphic Equaliser to reduce the system response at particular resonant frequencies.

NOTE:

The initial settings should only be regarded as a starting point for your mix. It is important to remember that many factors affect the sound during a live performance, for instance the size of the audience!

Now ready to start building the mix and this should be done progressively,



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listening carefully for each component in the mix and watching the meters for any hint of overload. If this occurs, back off the appropriate Channel Fader slightly until the level is out of the red segments, or adjust the Master Faders.

Remember that the mixer is a mixer, not an amplifier. Increasing the overall level is the job of the amplifier, and if it is impossible to provide adequate level, it is probable that the amplifier is too small for the application. Choose your amplifier carefully, and do not try to compensate for lack of power by using the mixer to increase output level.

NOTE:



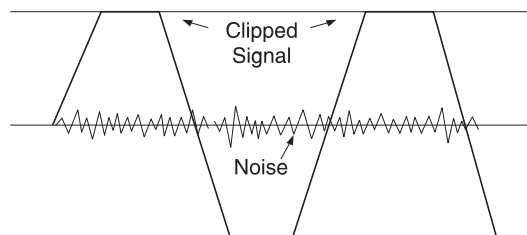
The level of any source signal in the final output is affected by many factors, principally the Input Gain control, Channel Fader and Mix Faders. You should try to use only as much microphone gain as required to achieve a good balance between signals, with the faders set as described above.

If the input gain is set too high, the channel fader will need to be pulled down too far in compensation to leave enough travel for successful mixing and there is a greater risk of feedback because small fader movements will have a very significant effect on output level. Also there will be a chance of distortion as the signal overloads the channel and causes clipping.

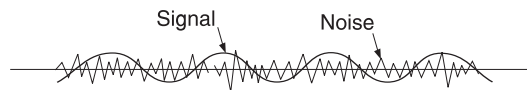
If the gain is set too low, you will not find enough gain on the faders to bring the signal up to an adequate level, and background hiss will be more noticeable.

This is illustrated below:

DIGITAL OUTPUT



If the signal level is too high, clipping distortion may occur.



If the signal level is too low it may be masked by the noise.

SPIRIT M SERIES

Each of the models in the Spirit M Series is fitted with a digital output. The output conforms to the S/PDIF standard.

The S/PDIF output conforms to the consumer standard IEC958 1989-03, and also the Japanese standard EIAJ CP-340 1987-9

SPECIFICATION

Signal bit rate is 2.8Mhz based on the sampling frequency (Fs) of 44.1kHz

Physical connection:

Cable: 75Ω +/-5% ($l < 10m$) or 75Ω +/-35% ($l > 10m$)

Line driver:

Zout: 75Ω +/-20% (100kHz .. 6Mhz)

Vout: 0.4Vpp .. 0.6Vpp, $< 0.05Vdc$ (75Ω terminated)

SYNCHRONISATION

The digital output sample frequency is fixed 44.1kHz operation, when connecting to a piece of external equipment you must ensure that the two are synchronised.

There are two ways to achieve synchronisation when operating the Spirit M Series consoles:

1. Ensure the device receiving the digital signal is set to slave to the embedded clock in the S/PDIF output from your console.
2. Ensure the device receiving the digital signal is fitted with a sample rate converter, which eliminates the need for synchronisation.

DIGITAL AUDIO CABLE

S/PDIF (IEC-958) uses 75Ω coaxial cable and RCA connectors. 75Ω coaxial cable is inexpensive, because it is the same cable as used in video transmission (you can buy a video cable with RCA connectors to connect your S/PDIF equipment together). Coaxial S/PDIF connections work typically at least to 10-15 metre distances with good 75Ω coaxial cable.

REMEMBER:

The Soundcraft website will contain the latest set-up files for describing the synchronisation settings for many digital pieces of equipment.

<http://www.soundcraft.com>

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RACKMOUNTING PROCEDURES FOR M8 AND M12

To turn the sleek looking Spirit M Series console into the rugged rackmount version follow the 3 point procedure below:

- A** Remove screws at points **A** and remove the arm rest.
- B** Remove screws at points **B** and remove the side extrusions.
- C** Remove the two screws at points **C** and remove both end-caps. Remember to re-fit the screws as they are used to strengthen the console.



Keep all parts and screws carefully in case you need to re-fit them at a later date.

