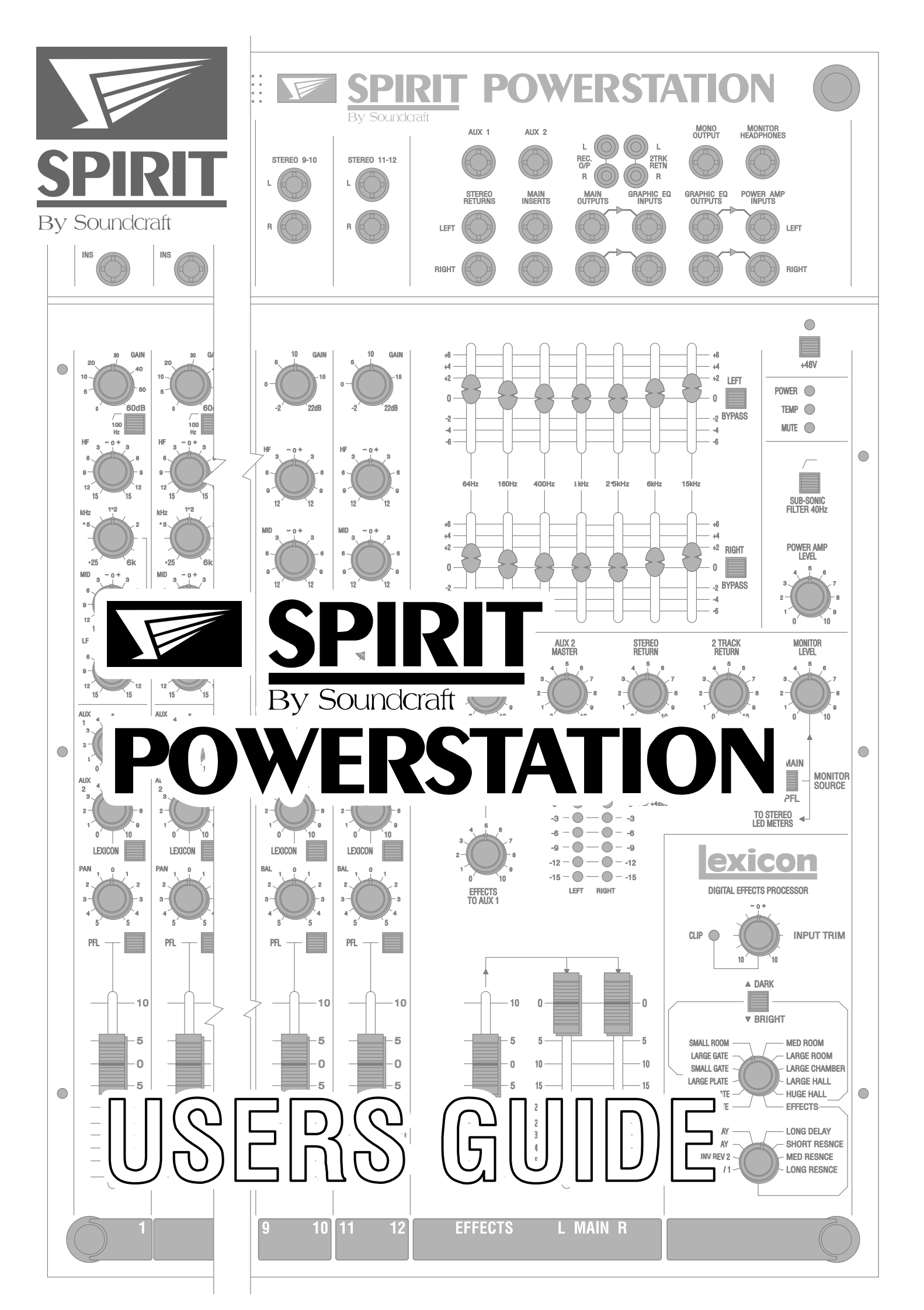


SPIRIT By Soundcraft POWERSTATION

USERS GUIDE

SPIRIT POWERSTATION

By Soundcraft

User Guide

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Safety Precautions

For your own safety and to avoid invalidation of the warranty please read this section carefully

The wires in the mains lead are coloured in accordance with the following code:

- Green and yellow:Earth
- Blue:Neutral
- Brown: Live

As the colours of the wires in the mains lead may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

- The wire which is coloured Green and Yellow must be connected to the terminal in the plug which is marked with the letter E or by the earth symbol.
- The wire which is coloured Blue must be connected to the terminal in the plug which is marked with the letter N or coloured black.
- The wire which is coloured Brown must be conected to the terminal in the plug which is marked with the letter L or coloured Red.

Ensure that these colour codings are followed carefully in the event of the plug being changed.

Ensure correct mains voltage is set and correct fuse is fitted before connecting mains supply. Do not change mains settings while the mains supply is connected. The replacement mains power fuse must be the correct value, as indicated on the unit.

Do not obstruct air vents. Clean air filter at the front of the unit regularly.

INTRODUCTION

Congratulations on your purchase of a **POWERSTATION** mixer. Owning a **SPIRIT** console brings you the expertise and support of one of the industry's leading manufacturers and the results of over 21 years experience supporting some of the biggest names in the business.

Designed by engineers who understand the individual needs of engineers and musicians, **SPIRIT POWERSTATION** has been built to the highest standards using quality Japanese and Swiss components and employing automated assembly techniques beyond the reach of most manufacturers of compact mixers.

SPIRIT POWERSTATION is the basis of a complete sound system, combining a high quality Mixer, Effects Controller, Graphic Equaliser and Power Amplifier in a single unit.

POWERSTATION incorporates circuit technology identical to that used on some of the most sophisticated Soundcraft consoles. The mono input channels are able to accept a wide range of Microphone and Line level signals from separate input sockets. Every mono channel features wide range gain control, 3-band Equalisation with swept Mid section, plus a Hi-Pass Filter, 2 Auxiliary Sends, one of which may be switched to a dedicated FX bus to feed the built-in Lexicon Effects Controller, PFL(Pre Fade Listen) and panning to a Stereo Bus. Each channel has a pre-EQ, pre-fade insert point and is controlled by a high-quality linear fader.

POWERSTATION is provided as standard with a pair of stereo inputs. Each stereo input includes a 3-band fixed frequency EQ and similar facilities to the mono input.

The Master section provides master faders for the Left and Right outputs, plus a fader controlling the mix to the Lexicon Digital Effects Processor, the output of which feeds back into the main mix. Master level controls are provided for the Auxiliary Sends and Stereo and 2-Track Returns, and headphone listening and LED bargraph metering is included to monitor the main mix or PFL signal. A Mono output is provided which sums the post-fade Left & Right signals to mono.

A built-in 7-band Graphic Equaliser offers precise correction of the output signal if required, and is normally patched into the input to the integral power amplifier.

POWER STATION is designed to be as user-friendly as possible, but a few minutes spent reading through this manual will help you become familiar with the product away from the pressure of a live session, and allow you to gain full benefit from the superb performance offered by your new mixer.

Above all, remember that your **SPIRIT** mixer is designed to extend your creativity. The more you explore the controls and the effect they have on the sound output, the more you will appreciate how you can influence and enhance the final sound.

BASIC PRINCIPLES OF PA MIXING

There was a time when the P.A. system and the operator existed only to increase the overall volume of the performers, so that they could be heard in a large room or above high ambient noise levels. This just isn't true any more. The sound system and the sound engineer have become an integral part of the performance, and the artists are heavily dependent on the operator's skill and the quality of the equipment.

The following introduction to the basics of mixing are included for the benefit of those users who may not have any significant familiarity with sound equipment, and who are baffled by the endless jargon used by engineers and artists alike.

System Overview

As one would expect, the main purpose of the mixer is to combine sounds, but under precise and smooth control. This is why linear faders are essential on any professional product. The faders provide you with clear and instinctive control of the final sound balance and like an artist playing an instrument you should listen to the effect of your fader movements, not look at your hands.

Your **SPIRIT POWERSTATION** mixer accepts a wide range of input signals via a microphone input, for very low level signals, or a line input, for higher level signals from, for instance, tape machines, keyboards, etc.

The **SPIRIT POWERSTATION** forms the heart of a complete sound system, and splits into five sections. The **Inputs** receive, match and process individual source signals, and distribute them at precise mix levels to a stereo Mix output. The **Master** section allows overall level control of the outputs, and provides monitoring of the audio signal at many points in the mixer, either on headphones or meters. The **Graphic Equaliser** provides a means of correcting the output signal to suit different room acoustics, and the **Lexicon Digital Effects Processor** offers a wide range of treatments to the sound. The **Power Amplifier** receives the output from the other sections and drives the loudspeaker system. A brief overview of the facilities is given below:

The Auxiliary Sends provide a way of routing the input signals to a choice of secondary outputs, for artists foldback, echo units or additional speaker outputs. The Aux 2 control also provides access to a dedicated feed to the Lexicon Digital Effects Processor.

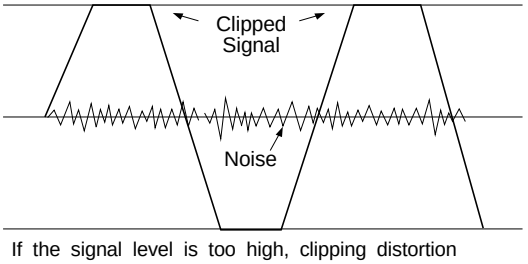
The Pan control adjusts the position of the input signal within the stereo mix, and can be swept from full left, through to full right. This allows particular artists to retain their correct spatial position within the mix, and can be valuable for live effects.

Pre-Fade-Listen(PFL) allows you to monitor the signal at many points in the mixer. Pressing any PFL switch places the signal at that particular point onto the headphones and the meters (if PFL is selected as the Monitor Source), to check the quality of the signal or to pin-point problems. Using PFL will not affect the signals on the outputs from the desk.

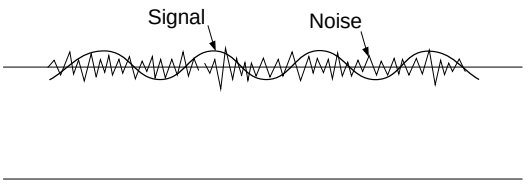
Each input channel and the main L/R outputs have an Insert 'A' gauge jack socket, which is a break point in the signal path. It allows the signal to be taken out of the mixer, through an external piece of equipment and then back into the mixer directly after its original exit point. The Insert point is normally bypassed by the 'A' gauge jack socket contacts, and is only brought into operation when a plug is inserted. Typical uses would include Effects Processors, Limiters, additional Equalisers or Delay units.

The terms PRE and POST are often used in the context of Inserts, Equalisers and Auxiliary Sends, and describe whether that facility is placed before (Pre) or after (Post) another particular section. This is explained further in the detailed description of facilities.

A mixer is often judged, amongst other factors, by the amount of Headroom available. This is a measure of the reserve available to cope with sudden peaks in the input signal, without distortion caused by Clipping, when the signal becomes so high that it would exceed the power supply rail voltages and is as a result limited. This commonly occurs where gain settings are incorrectly set or where sources are improperly matched to the mixer input. If the source signal is too high, clipping and distortion results. If the signal is too low it becomes masked by the background noise which is present to some degree in all mixers. The diagram below illustrates this point.



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



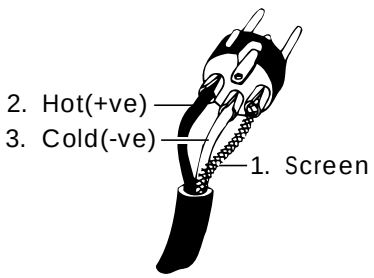
If the signal level is too low it may be masked by the noise.

GETTING STARTED

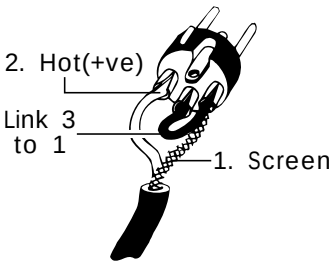
Audio Connections and Connectors

Although this may seem a simple subject, faulty connectors and cabling are the source of most sound system problems. Correctly-made cables of the proper type, with the right connectors for the job will ensure peak performance from your system with minimum noise pick-up. The following section will help you to connect **SPIRIT POWERSTATION** correctly.

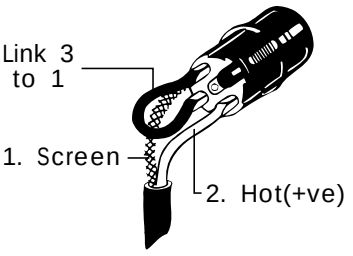
Three different types of audio connectors are used. 3-pin XLR and ¼" three pole ('A' gauge) jacks are used in several configurations as shown in the diagrams below.



Balanced Input

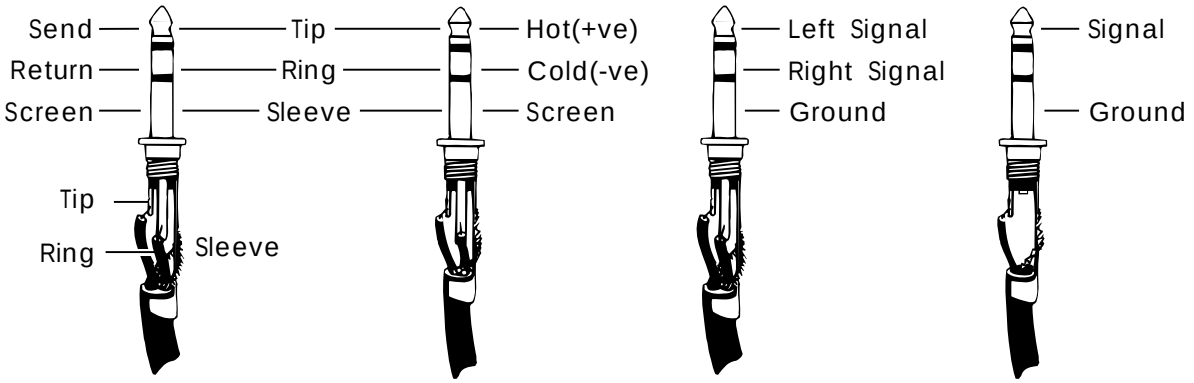


Unbalanced Input



Unbalanced Output

3 POLE (stereo) JACK — 2 POLE (mono) JACK



Insert Points	Line, Graphic, Power Amp Inputs Main, Mono, Graphic, Aux Outputs Stereo Inputs	Headphones	Unbalanced Input (Ring will be grounded by console)

In addition, RCA phono connectors are used for the Record outputs and 2 Track Returns.

Balanced and Unbalanced

All channel inputs are balanced, i.e. there are separate +ve(hot) and -ve (cold) wires for each signal plus a ground. The design of the differential input amplifiers is such that interference picked up on these wires is cancelled out. This is because, since both wires are in close proximity, the same interference will be picked up on each wire and balanced input amplifiers will only amplify the difference between +ve(hot) and -ve(cold). Any signal on both hot and cold (i.e. noise) will not be amplified - this is known as common mode rejection (CMR). Balanced inputs should always have both +ve and -ve connected or if only an unbalanced source, the -ve pin shorted to ground.

Note: many modern audio/musical instruments have electronically balanced outputs which should not be unbalanced by shorting one wire to ground. Always use your inputs balanced where possible to minimise noise.

The Mixer and Graphic Equaliser outputs are all impedance balanced and provide a very effective way of optimising noise immunity, without the cost and complexity of balanced outputs (note: This is the method used in most condenser mics)

Polarity

You will probably be familiar with the concept of polarity in electrical signals and this is of particular importance to balanced audio signals. Just as a balanced signal is highly effective at cancelling out unwanted interference, so two microphones picking up the same signal can cancel out, or cause serious degradation of the signal if one of the cables has the +ve and -ve wires reversed. This phase reversal can be a real problem when microphones are close together and you should therefore take care always to connect pins correctly when wiring audio cables.

Grounding and Shielding

For optimum performance it is vital that all signals are referenced to a solid, noise-free earthing point and that all signal cables have their screens connected to ground. You should be aware that you may introduce ground loops with screens connected to ground at both ends of a cable, and it may be necessary to lift the ground at one end to avoid this problem. **Note that microphones must always be grounded**. The **SPIRIT POWERSTATION** should be used as the grounding point for the system, and an earth stud is provided beside the power connector.

Normally the use of standard stereo jack leads will be suitable for most puposes, but do not be afraid to clip a ground wire at one end of the lead if a ground loop is suspected. Make sure that the end with the ground removed is marked for future identification.

Ideally, where a ground wire is removed, a 0.1µF tubular capacitor should be connected in its place to provide RF protection.

Avoid running audio cables or placing audio equipment, close to thyristor dimmer units or power cables.

Noise immunity is improved significantly by the use of low impedance sources, such as good quality professional microphones or the outputs from most modern audio equipment. Avoid cheaper high impedance microphones, which may suffer from interference over long cable runs, even with well-made cables.

Fault Finding Guide

Repairing a sound mixing console requires specialist skills, but basic Fault Finding is within the scope of any user if a few basic rules are followed.

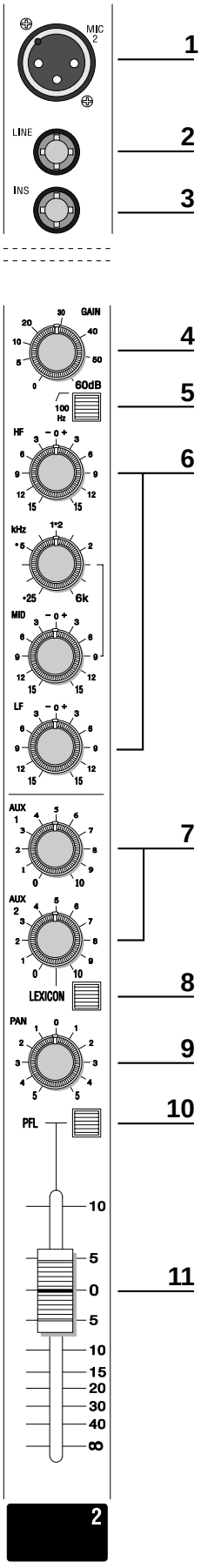
- Get to know the Block Diagram of your console (see inside rear cover)
- Get to know what each component in the system is supposed to do.
- Learn where to look for common trouble spots.

The Block Diagram (see inside rear cover) is a representative sketch of all the components of the console, showing how they connect together and how the signal flows through the system. Once you have become familiar with the various component blocks you will find the Block Diagram quite easy to follow and you will have gained a valuable understanding of the internal structure of the console.

Each Component has a specific function and only by getting to know what each part is supposed to do will you be able to tell if there is a genuine fault! Many 'faults' are the result of incorrect connection or control settings which may have been overlooked.

Basic Troubleshooting is a process of applying logical thought to the signal path through the console and tracking down the problem by elimination.

- Swap input connections to check that the source is really present. Check both Mic and Line inputs.
- Eliminate sections of the channel by using the insert point to re-route the signal to other inputs that are known to be working.
- Route channels to different outputs or to auxiliary sends to identify problems on the Master section.
- Compare a suspect channel with an adjacent channel which has been set up identically. Use PFL to monitor the signal in each section.



GETTING TO KNOW YOUR CONSOLE

MONO INPUT CHANNEL

1 & 2 MICROPHONE/LINE INPUT

The **MICROPHONE** input (**1**) is via a standard female XLR-3 connector and shares an input stage with the Line input. It is designed to accept a wide range of balanced or unbalanced low impedance input signals. The **LINE** (**2**) input is a 3-pole ¼" 'A' gauge jack socket and presents a high impedance (>10kΩ) to the input signal, enabling many types of instruments to be plugged straight in without D.I. boxes or external preamplifiers. **Any connection to the Mic input should be unplugged when the Line input is in use**.

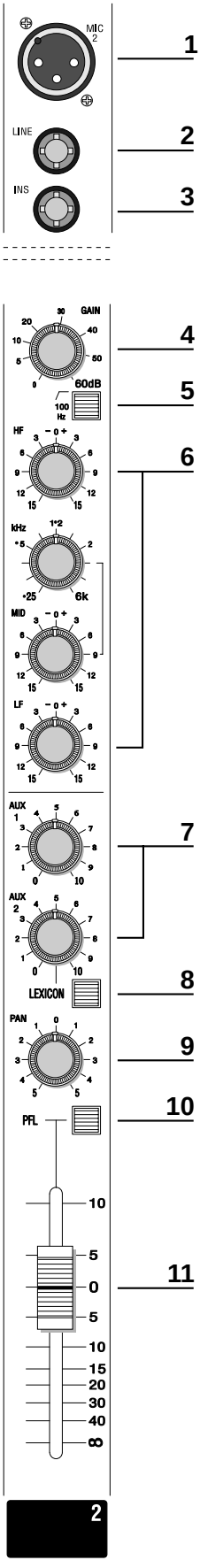
+48V Phantom Power is available on each input microphone socket. This is switched on globally from the master section at the top right corner of the mixer. **All faders should be DOWN when switching on phantom power.**

NOTE: Phantom powered mics should not be plugged in with the +48V switched on. DO NOT use phantom power with unbalanced mics or damage may result. Transformer-coupled dynamic microphones may be used without causing damage, even when the +48V power is connected.

Input level is set by the GAIN control (**4**).

3 INSERT

The **INSERT** is a break point in the input channel signal path. It allows the signal to be taken out of the mixer, through an external piece of equipment such as a compressor and then back into the mixer to continue through to the final mix output. The Insert is a 3-pole ¼" 'A' gauge Jack Socket, which is normally by-passed. When a jack plug is inserted, the signal path is broken at a point just after the Hi-Pass Filter, but before the EQ section. The signal from the channel appears on the TIP of the plug and is returned on the RING. The insert point allows limiters, compressors and other signal processing units to be added as required to particular input channels and because it is located PRE EQ, noise generated by the external equipment may be reduced by a small amount of H.F. cut in the Equaliser.



4 GAIN CONTROL

When the Microphone input is selected this control acts as a SENSITIVITY control covering a 60dB range. Channel signal level increases as the control is turned clockwise. The control is a custom design which distributes the gain evenly across the range. When the Line input is selected it serves as a GAIN control, with the scaling reduced by approximately 20dB. The control range suits both professional equipment operating at a nominal +4dBu or semi-professional equipment operating at a lower -10dBV.

5 HI-PASS FILTER

Pressing this switch inserts a 3rd order, 18dB per octave 100Hz Hi-Pass Filter in the signal path, immediately after the input amplifier. This is particularly useful on live vocals to reduce stage rumble or 'popping' from mics, and its use is strongly recommended, even on male vocals. It can also be used for filtering out low frequency hum.

6 EQUALISER

The Equaliser(EQ) comprises three sections.

The upper control provides H.F. (treble) boost and cut of 15dB. Turning to the right provides boost, adding crispness to vocals and electronic instruments. Turning to the left cuts the same frequencies, reducing hiss or distorted consonants which can occur with certain types of microphone.

The middle pair of knobs is arranged as a cut/boost control (lower knob) of +/- 15dB, and a SWEEP (frequency) control which determines at which frequency the boost/cut action will be centered. This section, with a frequency range from 250Hz to 6kHz is particularly versatile for vocals, enabling particular characteristics of the singer to be lifted or suppressed very precisely.

The lowest knob is an LF (bass) section providing boost and cut of 15dB. Turning to the right provides boost, adding warmth to vocals or extra punch to synths, guitars or drums. Turning to the left can be helpful to reduce stage rumble or to improve a mushy sound, although the Hi-Pass Filter will often be found more effective for this purpose. Combining the Hi-Pass Filter and bass boost is a good way of providing warmth to a sound without rumble.

Set the cut/boost controls to the centre-detented position when not required.

7 AUXILIARY SENDS

These controls route the input channel signal to any one or more Auxiliary busses. These are separate from the main outputs and can therefore provide additional outputs for foldback, echo units or extra loudspeaker 'fills', or provide a dedicated mix to the on-board Lexicon Digital Effects Processor.

AUX 1 is normally POST-FADE, and will therefore fade up and down with the fader, which is useful for effects. By pressing the AUX1 PRE switch on the Master section, the AUX 1 send is set PRE-FADE and PRE-EQ, and will be independent of the fader which is important for foldback or monitor feeds. The knob should be turned down when not in use.

The AUX 2 control is always POST-FADE, and may be switched between the Aux 2 buss or, by pressing the LEXICON switch, feeds the channel signal to the Effects bus. The knob should be turned down when not in use.

8 LEXICON SWITCH

This switch, when pressed, enables the post-fade Aux 2 control to send the chanel signal to the Lexicon Digital Effects Processor on the right hand side of the console.

9 PAN

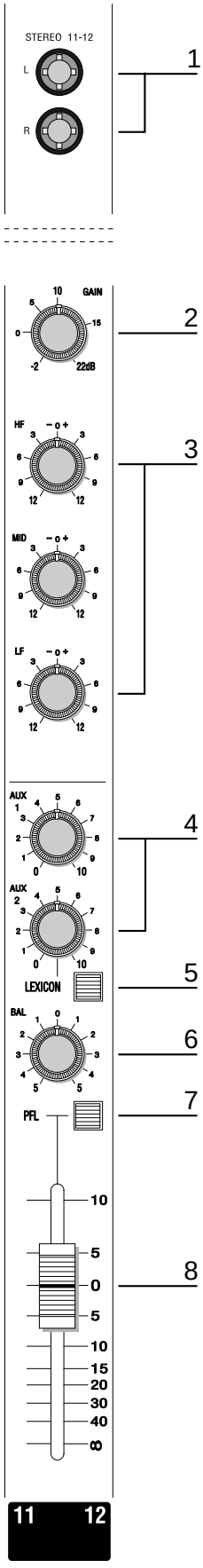
The PAN control determines the position of the signal within the stereo mix image. Rotation fully anticlockwise feeds the signal solely to the Left mix buss, while rotation clockwise sweeps the image to the Right buss.

10 PFL

When the PFL switch is pressed, the pre-fade signal is fed equally to both sides of the monitors, where it is available as a switched choice of sources for the headphones or meters (*see Master Section*). This is a useful way of listening to any required input signal without interrupting the main mix, for making adjustments or tracing problems.

11 CHANNEL FADER

This linear fader determines the proportion of the channel in the mix and provides a clear visual indication of channel level. Normal operating position is at the '0' mark, providing 10dB of gain above that point if required.



STEREO INPUT CHANNEL

1 STEREO INPUTS

Each Stereo Input section comprises a pair of similar inputs. The inputs are electronically balanced and separate 3-pole 'A' gauge (TRS) jacks are provided for the Left and Right source signals. A mono signal may be plugged into the upper (left) socket only to be fed equally to both paths.

2 GAIN CONTROL

This knob allows you to match the input level to suit a wide variety of professional, semi-professional and hi-fi sources.

Start with a low setting, especially for professional equipment, and increase it if you cannot reach an adequate signal level with the fader at the nominal '0' mark.

3 EQUALISER

The Equaliser(EQ) comprises three sections.

The upper control provides H.F. (treble) boost and cut of 15dB at 12kHz. Turning to the right provides boost, adding crispness to drum machines, synths and electronic instruments. Turning to the left cuts the same frequencies, reducing hiss or excessive brilliance.

The MID control provides cut and boost of 15dB, at a 1kHz.

The lowest knob is an LF (bass) section providing boost and cut of 15dB at 80Hz. Turning to the right provides boost, adding extra punch to synths, guitars or drums. Turning to the left can be helpful to reduce hum or boominess or to improve a mushy sound.

Set the controls to the centre-detented position when not required.

4 AUXILIARY SENDS

These controls route the input channel signal in mono to any one or more Auxiliary busses. These are separate from the main outputs and can therefore provide additional outputs for foldback, echo units or extra loudspeaker 'fills', or provide a dedicated mix to the on-board Lexicon Digital Effects Processor.

AUX 1 is normally POST-FADE, and will therefore fade up and down with the fader, which is useful for effects. By pressing the AUX1 PRE switch on the Master section, the AUX 1 send is set PRE-FADE, and will be independent of the fader which is important for foldback or monitor feeds. The knob should be turned down when not in use.

The AUX 2 control is always POST-FADE, and may be switched between the Aux 2 buss or, by pressing the LEXICON switch, feeds the channel signal to the Effects bus. The knob should be turned down when not in use.

5 LEXICON SWITCH

This switch, when pressed, enables the post-fade Aux 2 control to send the chanel signal to the Lexicon Digital Effects Processor on the right hand side of the console.

6 BALANCE

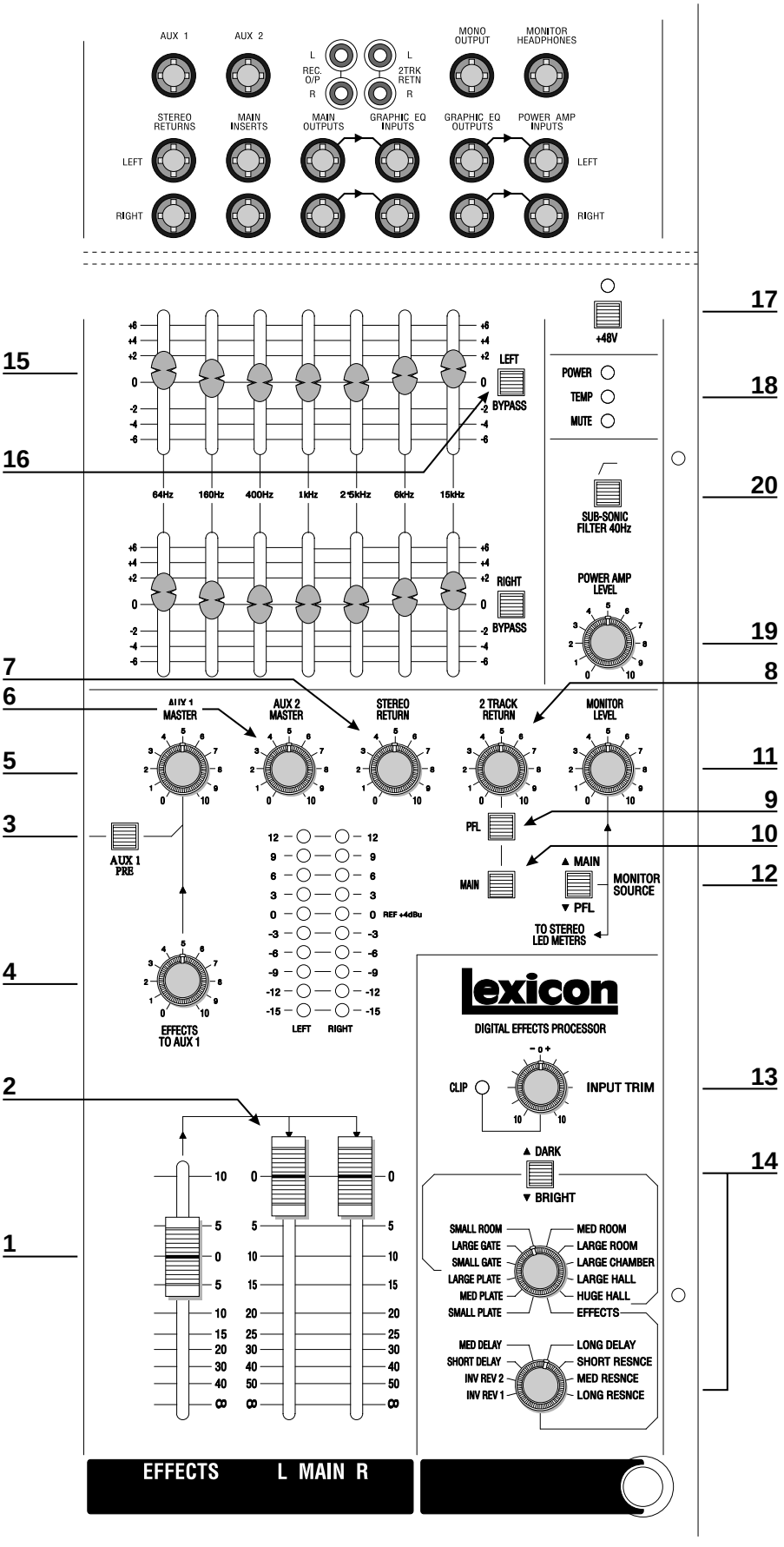
The BAL (Balance) control determines the position of the signal within the stereo mix image. Rotation fully anticlockwise feeds the signal solely to the Left mix buss, while rotation clockwise sweeps the image to the Right buss.

7 PFL

When the PFL switch is pressed, the pre-fade signal is fed in stereo to the monitor, where it is available as a switched choice of sources for the headphones or meters (*see Master Section*). This is a useful way of listening to any required input signal without interrupting the main mix, for making adjustments or tracing problems.

8 CHANNEL FADER

This linear fader determines the proportion of the channel in the mix and provides a clear visual indication of channel level. Normal operating position is at the '0' mark, providing 10dB of gain above that point if required.


AUX 1
AUX 2
REC. O/P
2TRK RETN
MONO OUTPUT
MONITOR HEADPHONES
STEREO RETURNS
MAIN INSERTS
MAIN OUTPUTS
GRAPHIC EQ INPUTS
GRAPHIC EQ OUTPUTS
POWER AMP INPUTS
LEFT
RIGHT
64Hz
160Hz
400Hz
1kHz
2·5kHz
6kHz
15kHz
BYPASS
+48V
POWER
TEMP
MUTE
SUB-SONIC FILTER 40Hz
POWER AMP LEVEL
AUX 1 MASTER
AUX 2 MASTER
STEREO RETURN
2 TRACK RETURN
MONITOR LEVEL
AUX 1 PRE
EFFECTS TO AUX 1
REF +4dBu
PFL
MAIN
MONITOR SOURCE
TO STEREO LED METERS
Lexicon
DIGITAL EFFECTS PROCESSOR
CLIP
INPUT TRIM
DARK
BRIGHT
SMALL ROOM
MED ROOM
LARGE GATE
LARGE ROOM
SMALL GATE
LARGE CHAMBER
LARGE PLATE
LARGE HALL
MED PLATE
HUGE HALL
SMALL PLATE
EFFECTS
MED DELAY
LONG DELAY
SHORT DELAY
SHORT RESNCE
INV REV 2
MED RESNCE
INV REV 1
LONG RESNCE
EFFECTS L MAIN R

Page 16

MASTER SECTION

1 EFFECTS MASTER FADER

The EFFECTS linear fader controls the level of the stereo output signal of the on-board Lexicon Digital Effects Processor, which feeds directly to the Left/Right mix, and is subject to the control of the Main L/R Master Faders (*see 2 below*).

2 MAIN LEFT & RIGHT MASTER FADERS

The MAIN L & R MASTER FADERS control the final output level of the signal to the Main impedance balanced outputs, after the Insert Point.

3 AUX 1 PRE

Aux Send 1 is normally post-fade, but for flexibility it may be switched to PRE-FADE by pressing the AUX 1 PRE switch. This simultaneously affects all Aux 1 sends across the mixer.

4 EFFECTS TO AUX 1

The EFFECTS TO AUX 1 control allows the output of the Lexicon Digital Effects Processor to be mixed in mono with the Aux 1 Sends if required to provide a 'wet' foldback feed or alternative output.

5 AUX 1 MASTER

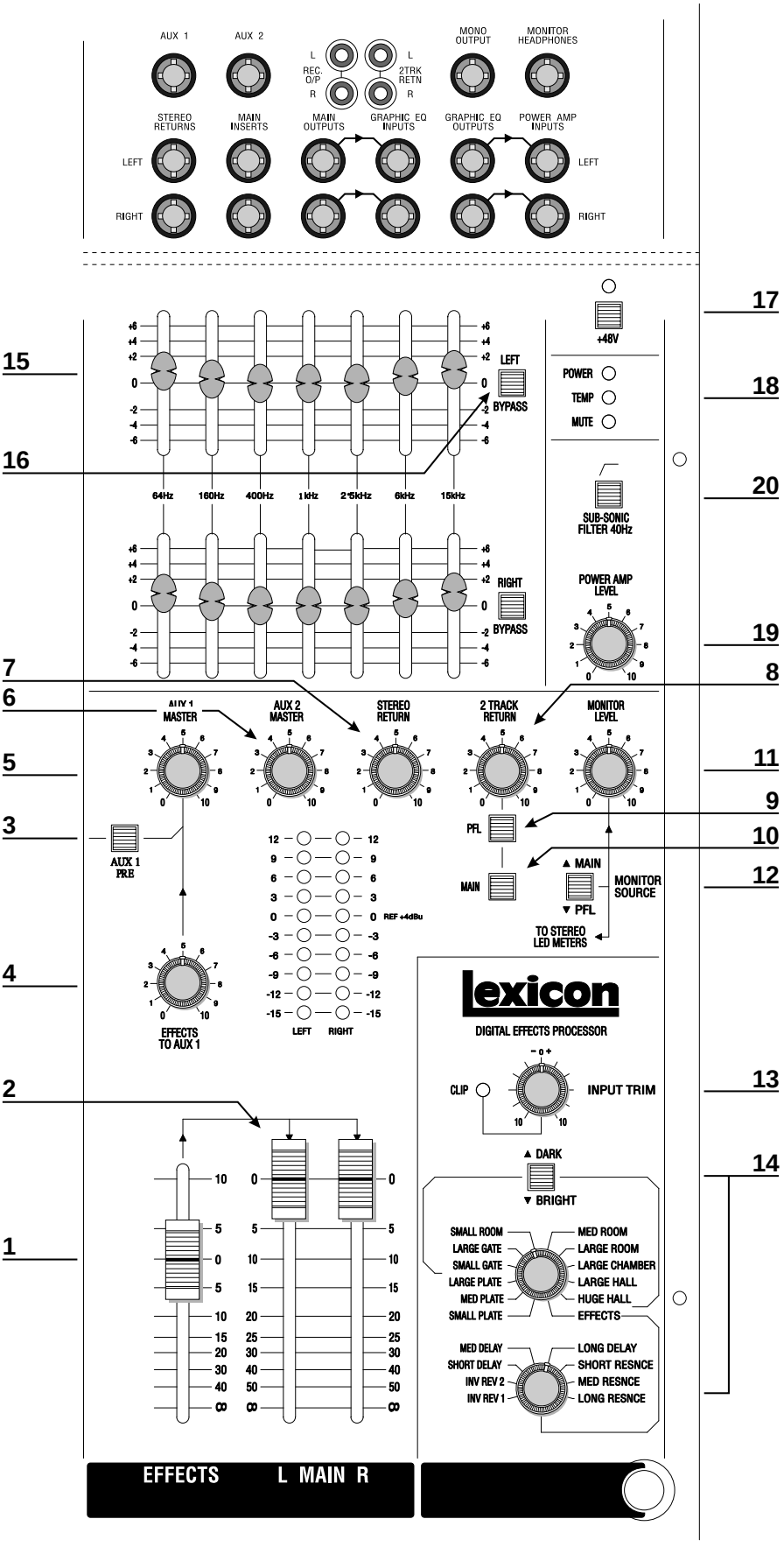
The AUX 1 MASTER control sets the final level of the Aux 1 mix to the impedance balanced Aux 1 output.

6 AUX 2 MASTER

The AUX 2 MASTER control sets the final level of the Aux 2 mix to the impedance balanced Aux 2 output.

7 STEREO RETURN

The unbalanced Stereo Return, at a nominal -10dBV, feeds via the STEREO RETURN control to the Main L/R mix, before the L/R Master faders. If a mono source is to be used, plugging into the Left jack automatically feeds the signal equally to both sides of the Return.


AUX 1
AUX 2
REC. O/P
2TRK RETN
MONO OUTPUT
MONITOR HEADPHONES
STEREO RETURNS
MAIN INSERTS
MAIN OUTPUTS
GRAPHIC EQ INPUTS
GRAPHIC EQ OUTPUTS
POWER AMP INPUTS
LEFT
RIGHT
64Hz
160Hz
400Hz
1kHz
2·5kHz
6kHz
15kHz
BYPASS
+48V
POWER
TEMP
MUTE
SUB-SONIC FILTER 40Hz
POWER AMP LEVEL
AUX 1 MASTER
AUX 2 MASTER
STEREO RETURN
2 TRACK RETURN
MONITOR LEVEL
AUX 1 PRE
EFFECTS TO AUX 1
REF +4dBu
PFL
MAIN
MONITOR SOURCE
TO STEREO LED METERS
lexicon
DIGITAL EFFECTS PROCESSOR
CLIP
INPUT TRIM
DARK
BRIGHT
SMALL ROOM
LARGE GATE
SMALL GATE
LARGE PLATE
MED PLATE
SMALL PLATE
MED ROOM
LARGE ROOM
LARGE CHAMBER
LARGE HALL
HUGE HALL
EFFECTS
MED DELAY
SHORT DELAY
INV REV 2
INV REV 1
LONG DELAY
SHORT RESNCE
MED RESNCE
LONG RESNCE
EFFECTS L MAIN R
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8 2TRACK RETURN

The unbalanced 2Track Return, at a nominal -10dBV on RCA phono sockets, feeds via the MAIN switch (*see 10 below*) and the 2TRACK RETURN control to the Main L/R mix, before the L/R Master faders. This input is ideal for interval music from an external source, or as an additional effects return

9 PFL

When the PFL switch is pressed, the pre-fade signal is fed in stereo to the monitor, where it is available as a switched choice of sources for the headphones or meters (*see 12*). This is a useful way of listening to the Return for making adjustments or tracing problems.

10 MAIN

The MAIN switch routes the 2Track Return to the Main L/R mix, and provides a very simple method of feeding an external machine to the mix output, for interval music for instance.

If the input to the same machine is fed from the Record Output, there is the possibility of serious feedback when recording, and this switch must therefore NOT be used in those circumstances.

11 MONITOR LEVEL

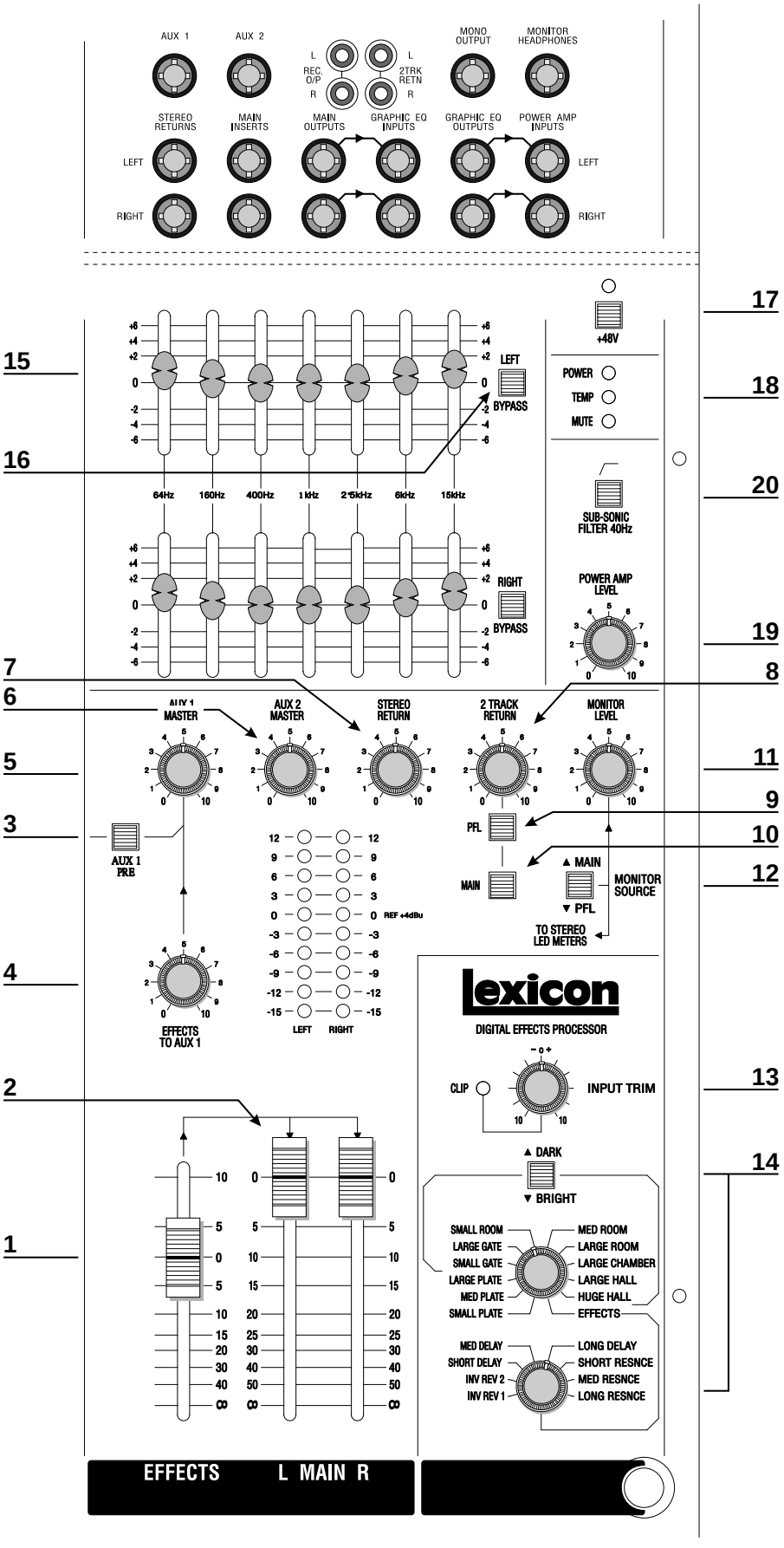
The MONITOR LEVEL control sets the level of signal to the Monitor Headphones jack.

12 MONITOR SOURCE

This switch selects the source for the Monitor Headphones and bargraph meters, providing the option of either MAIN L/R Mix (switch UP), or PFL (switch DOWN). When switched to PFL the meters may be used to set the optimum gain on the input channels.

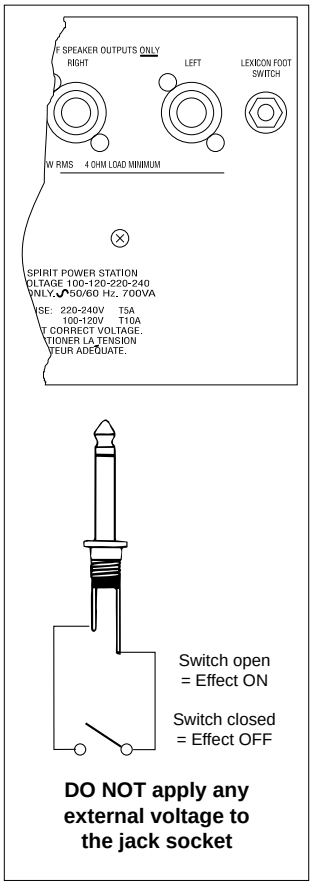
RECORD OUTPUT

A RECORD OUTPUT, on RCA phone sockets, provides a -10dBV pre-mix-fader, post insert feed for recording. Since the signal is derived after the insert, a compressor can be included in the signal path if required.


AUX 1
AUX 2
REC O/P
2TRK RETN
MONO OUTPUT
MONITOR HEADPHONES
STEREO RETURNS
MAIN INSERTS
MAIN OUTPUTS
GRAPHIC EQ INPUTS
GRAPHIC EQ OUTPUTS
POWER AMP INPUTS
LEFT
RIGHT
64Hz
160Hz
400Hz
1kHz
2·5kHz
6kHz
15kHz
LEFT BYPASS
RIGHT BYPASS
+48V
POWER
TEMP
MUTE
SUB-SONIC FILTER 40Hz
POWER AMP LEVEL
AUX 1 MASTER
AUX 2 MASTER
STEREO RETURN
2 TRACK RETURN
MONITOR LEVEL
AUX 1 PRE
PFL
MAIN
MONITOR SOURCE
TO STEREO LED METERS
REF +4dBu
EFFECTS TO AUX 1
Lexicon
DIGITAL EFFECTS PROCESSOR
CLIP
INPUT TRIM
DARK
BRIGHT
SMALL ROOM
LARGE GATE
SMALL GATE
LARGE PLATE
MED PLATE
SMALL PLATE
MED ROOM
LARGE ROOM
LARGE CHAMBER
LARGE HALL
HUGE HALL
EFFECTS
MED DELAY
SHORT DELAY
INV REV 2
INV REV 1
LONG DELAY
SHORT RESNCE
MED RESNCE
LONG RESNCE
EFFECTS L MAIN R
1
2
3
4
5
6
7
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13 lexicon INPUT TRIM

The input level to the integral Effects Controller is set by the INPUT TRIM control, with an associated LED to warn of levels high enough to cause clipping. The control should where possible be kept in the centre detent position to minimise noise, and if a setting over '0' is required this would indicate that the input is not being driven hard enough from the channel sends.



Lexicon Foot Switch Connections

14 lexicon EFFECTS CONTROLS

The controller provides a wide range of echo, reverb and acoustic treatments to add fullness to the sound, complement room acoustics or for specific effects.

The upper knob selects a range of room acoustics, with a switch to chose DARK or BRIGHT settings, or a choice of three echo treatments. The Effects position (fully clockwise) provides a choice of reverb effects selected by the lower knob. The best setting for a particular application will be found by experimentation and careful listening to the final sound.

The controller may be turned ON or OFF remotely by connecting a standard guitar foot switch, or similar unit providing an **isolated** switch closure, to the rear panel Lexicon Foot Switch jack socket as shown. The Effect is muted when the switch is closed.

GRAPHIC EQUALISER

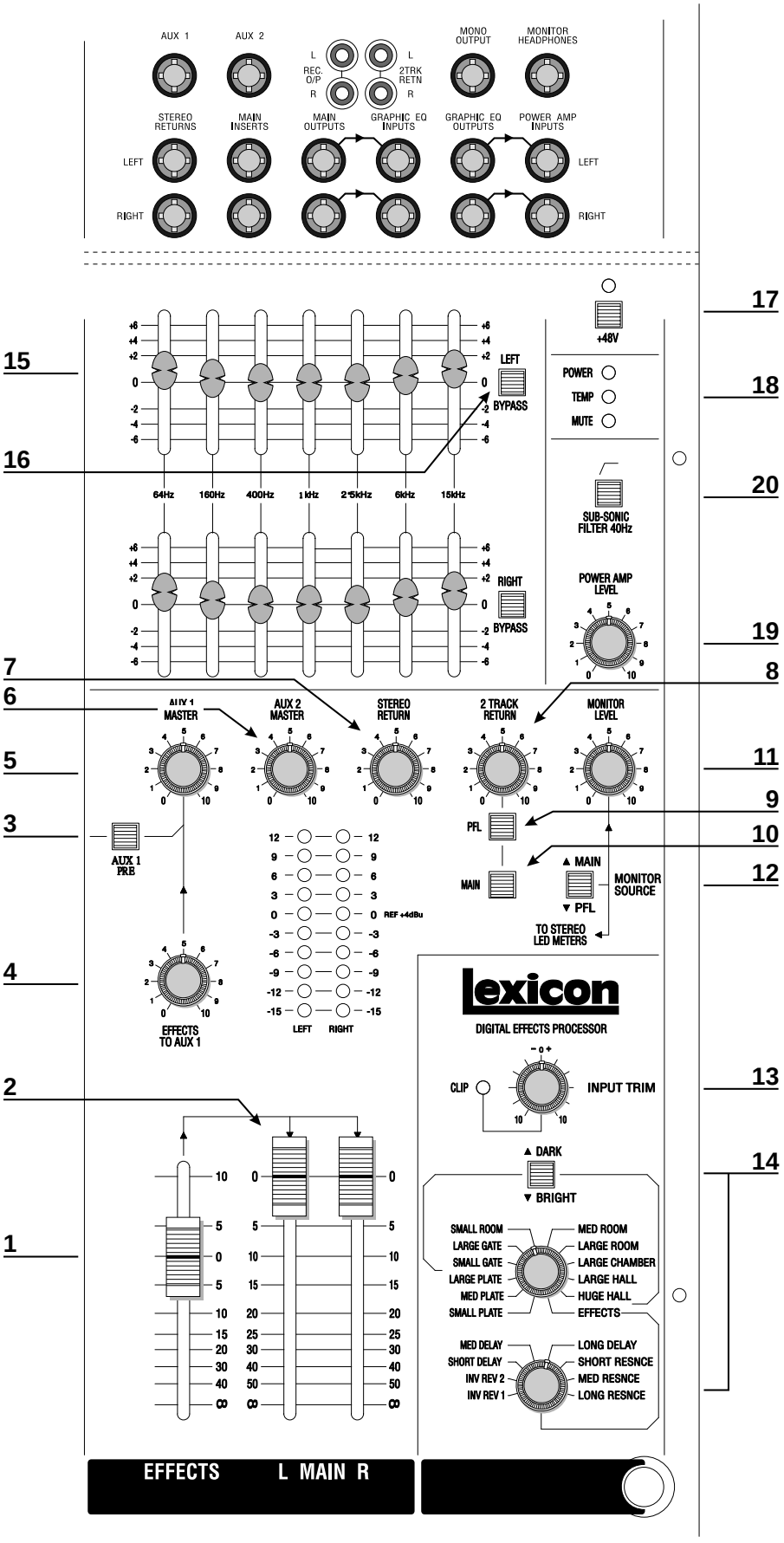
15 GRAPHIC EQUALISER

The stereo GRAHIC EQUALISER is normalled to the Main L/R outputs. Seven frequency bands, with cut or boost of 6dB, allow very precise control over subtle tonal changes to the PA rig in a particular room. This is in contrast to the much more dramatic +/-12 or +/-15dB on some other units where a deceptively small movement of the faders can result in feedback or similar unwanted effects.

The graphic equaliser is not intended to be used to null out ringing. A full 31-band EQ is essential for that purpose.

16 LEFT/RIGHT OUT

Each channel of the Graphic Equaliser may be bypassed by pressing the LEFT OUT or RIGHT OUT switches. This allows a direct comparison to made of the treated signal (with EQ) and untreated signal, to judge the effect of the Graphic EQ settings.


AUX 1
AUX 2
REC. O/P
2TRK RETN
MONO OUTPUT
MONITOR HEADPHONES
STEREO RETURNS
MAIN INSERTS
MAIN OUTPUTS
GRAPHIC EQ INPUTS
GRAPHIC EQ OUTPUTS
POWER AMP INPUTS
LEFT
RIGHT
64Hz
160Hz
400Hz
1kHz
2.5kHz
6kHz
15kHz
BYPASS
+48V
POWER
TEMP
MUTE
SUB-SONIC FILTER 40Hz
POWER AMP LEVEL
AUX 1 MASTER
AUX 2 MASTER
STEREO RETURN
2 TRACK RETURN
MONITOR LEVEL
AUX 1 PRE
EFFECTS TO AUX 1
REF +4dBu
PFL
MAIN
MONITOR SOURCE
TO STEREO LED METERS
Lexicon
DIGITAL EFFECTS PROCESSOR
CLIP
INPUT TRIM
DARK
BRIGHT
SMALL ROOM
LARGE GATE
SMALL GATE
LARGE PLATE
MED PLATE
SMALL PLATE
MED ROOM
LARGE ROOM
LARGE CHAMBER
LARGE HALL
HUGE HALL
EFFECTS
MED DELAY
SHORT DELAY
INV REV 2
INV REV 1
LONG DELAY
SHORT RESNCE
MED RESNCE
LONG RESNCE
EFFECTS L MAIN R

17 +48V

Many professional condenser microphones need Phantom Power, and this is enabled to all of the Mic input connectors by pressing the +48V switch.

18 STATUS INDICATORS

Three LEDs provide visual indication of the status of the mixer. POWER (green) lights to show that power is switched on, and senses the power amplifier voltage rails. THERMAL (yellow) indicates that power amplifier over-temperature has been detected, and MUTE (red) lights when the power amplifier output relays are open. This happens momentarily on power-up to isolate surges as the power rails stabilise, or will happen if the protection circuits detect a d.c. fault situation or a thermal condition, and open the relays as protection for the loudspeakers. If overheating is suspected, check that the air vents at the front and rear of the mixer have not been inadvertently covered.

POWER AMPLIFIER

The Power Amplifier contains no user-serviceable parts. Refer all servicing to a qualified service engineer, through the appropriate Spirit dealer

The **POWERSTATION** contains an integral 265W + 265W into 4Ω power amplifier, the inputs to which are normalled to the Graphic Equaliser outputs, or may be accessed directly via the jackfield. The amplifier incorporates a sohisticated protection system which guards against over-temperature, to protect the output transistors, and isolates the speaker outputs via relays if a damaging fault condition is detected in the output stage. The amplifier is cooled by a variable speed fan which senses the output signal level and delivers greater airflow as the signal level, and corresponding heat dissipation in the output devices increases. When there is no signal or a very low level signal, the fan will be running very slowly and quietly.

Air is drawn in along the front of the unit and expelled through vents at the left-hand side at the rear. It is important that sufficient clearance is allowed at the front and rear of the mixer to ensure unrestricted airflow, especially in a rack-mounted installation.

WARNING
Do not obstruct air vents. Clean air filter at front of unit regularly. (OK, so we know you probably won't do this regularly, but you've been warned...!)

19 POWER AMP LEVEL

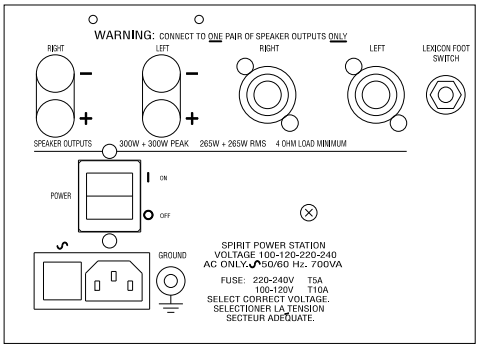
The signals from the balanced Power Amp Inputs jacks (normally the output from the Graphic Equaliser) are fed via the POWER AMP LEVEL control to the integral stereo power amplifier. Set the control at position 7 for normal operation.

20 SUB-SONIC FILTER

An 18dB/octave 40Hz SUB-SONIC FILTER may be switched into the feed to the amplifier, and in most applications it is recommended that this filter should be switched in. Using the filter avoids potential loss of control in PA cabinets with reflex ports when driven below their frequency range, and offers some protection against damage from heavy ultra-bass signals.

Switching the filter into circuit is almost always a good idea, but may unnecessarily restrict the dynamic range of a system with particularly wide-range PA cabinets, and should be switched out if very low frequency rumbles are specifically required and the speaker system has the capability. The filter also allows you to use your LF boost to warm up the bottom end of your mix without the usual problems of bass distortion.

Loudspeaker Output Terminals

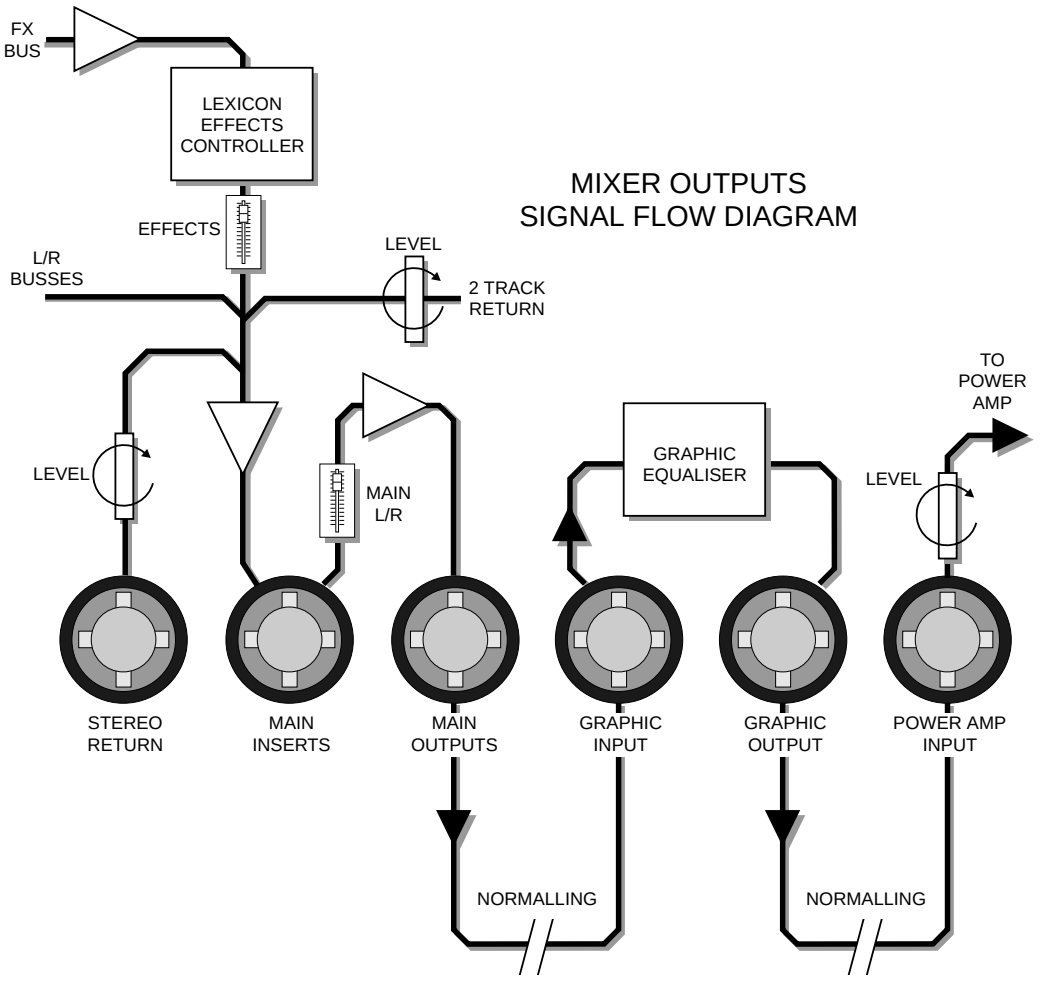


The power amplifier output is available on standard dual banana terminals and 'speakon' connectors on the rear of the mixer, above the power switch.

Minimum recommended load impedance is 4Ω but the amplifier guards itself against damaging overload, switching in the protection systems when necessary. While this will maintain safe operating limits, the result will be serious distortion and a very unmusical sound. Always follow the load recommendations where possible.

Patchbay

The line level outputs from the mixer, inserts and returns are arranged together on the top right of the mixer. For maximum flexibility the inputs to the Mixer, Graphic Equaliser and the Power Amplifier are available separately to allow replugging for particular purposes. The three sections are 'normalled' together by the switch contacts on the jacks, as shown below:

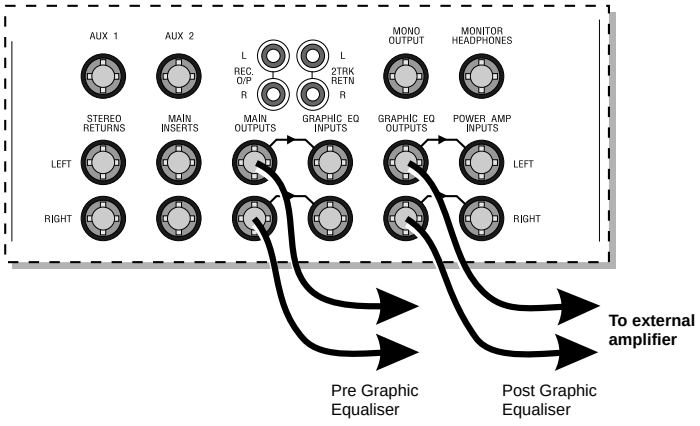


The normalling is broken as soon as a jack is inserted, allowing the signal to be re-routed as required. Note that separate left and right jacks are provided for all signals shown in the diagram above . Only one side is shown for clarity.

Patchbay Applications

The individual access that the patchbay offers to each of the main sections of the **POWERSTATION** allows the mixer, the graphic equaliser and the power amplifier to be interfaced separately to external equipment if required, or used in different configurations for particular applications. Three typical examples are given below:

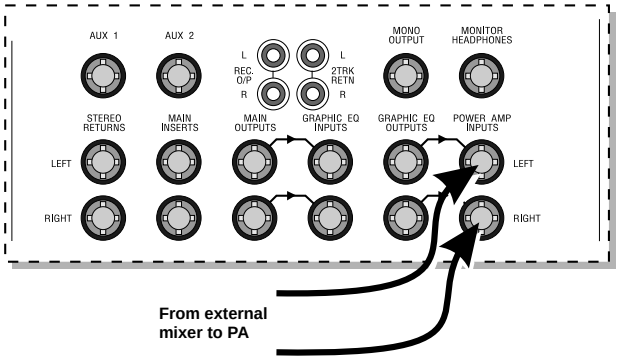
Example 1



Example 1

In this example the outputs from the console are used to feed an external power amplifier. The feed may be taken pre-graphic equaliser (from the main outputs jacks) or post-graphic equaliser (from the graphic EQ outputs jacks). In either case, plugging a jack into the output sockets breaks the normalling to bypass the following sections (*see diagram on previous page*).

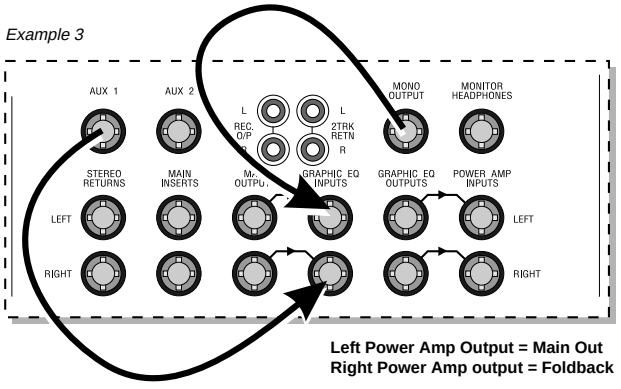
Example 2



Example 2

In this example a feed from an external mixer, for a secondary band perhaps, plugs directly into the power amplifier jacks, bypass the **POWERSTATION** mixer and graphic equaliser. Alternatively the external feeds could plug into the Graphic EQ Inputs jacks, providing some signal correction if required.

Example 3



Example 3

If only a mono PA output is required, one channel of the power amplifier can be fed from the Mono Output by overplugging as shown, and the second channel may be used to drive, for example, foldback from Aux 1. In both cases the Graphic EQ is left in the signal path.

USING YOUR SPIRIT POWERSTATION *CONSOLE*

The final sound from your P.A. system can only ever be as good as the quality of the source signal. 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 and 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).

Initial Set Up

The diagram on page 6 demonstrated how the matching of input gain to the signal source was crucial to avoid distortion at one extreme and excessive noise at the other. Set up individual input channel as follows:

- Connect the input required (microphone, keyboard etc.) Note: Phantom powered mics should be connected before the +48V is switched on.
- Set Master faders at 0, input faders at 0, and set the Power Amplifier level to about 70%.
- Press the Monitor Source button on the Master section to select PFL listening and metering. Provide a typical performance level signal and press the PFL button on the particular channel, monitoring the level on the meters.
- Adjust the input gain until the meter is just reaching the amber section (0dB) 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.

- If you cannot obtain a satisfactory setting, e.g. the gain control is right at the extreme low end of the scale on Microphone Input, try using the Line Input instead.

- 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.

- Once individual input channel settings are complete, release the Monitor Source switch to select the Main mix.

You are now ready to start building the mix and this should be done progressively, 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.

Note: The level of any source signal in the final output is affected by many factors, principally the Gain control, Channel Fader and Output 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. 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.

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 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.

CARE OF YOUR MIXER

General Precautions

Avoid storing or using the mixer in conditions of excessive heat or cold, or in positions where it is likely to be subject to vibration, dust or moisture.

Keep the mixer clean using a soft dry brush, and an occasional wipe with a damp cloth or ethyl alcohol. Do not use any other solvents which may cause damage to paint or plastic parts.

Avoid placing drinks or smoking materials on or near the mixer. Sticky drinks and cigarette ash are frequent causes of damage to faders and switches.

WARNING: To reduce the risk of fire or electric shock, do not expose this unit to rain or moisture.

Regular care and inspection will be rewarded by a long life and maximum reliability.

Glossary

auxiliary send — an output from the console comprising a mix of signals from channels and groups derived independently of the main stereo / group mixes. Typically the feeds to the mix are implemented on rotary level controls.

balance — the relative levels of the left and right channels of a stereo signal.

clipping — the onset of severe distortion in the signal path, usually caused by the peak signal voltage being limited by the circuit's power supply voltage.

dB (decibel) — a ratio of two voltages or signal levels, expressed by the equation $dB=20Log_{10}(V1/V2)$. Adding the suffix 'u' denotes the ratio is relative to 0.775V RMS.

DI(direct injection)	the practice of connecting an electric musical instrument directly to the input of the mixing console, rather than to an amplifier and loudspeaker which is covered by a microphone feeding the console.
direct output	a post fade line level output from the input channel, bypassing the summing amplifiers, typically for sending to individual tape tracks during recording.
equaliser	a device that allows the boosting or cutting of selected bands of frequencies in the signal path.
feedback	the 'howling' sound caused by bringing a microphone too close to a loudspeaker driven from its amplified signal.
foldback	a feed sent back to the artistes via loudspeakers or headphones to enable them to monitor the sounds they are producing.
frequency response	the variation in gain of a device with frequency.
headroom	the available signal range above the nominal level before clipping occurs.
highpass filter	a filter that rejects low frequencies.
line level signals	at a nominal level of -10 to +6dBu, usually coming from a low impedance source.
mono output	a mono sum of the left / right mix outputs, providing a separately controlled line level feed for additional loudspeakers.
pan (pot)	abbreviation of 'panorama': controls levels sent to left and right outputs.
PFL (pre-fade listen)	a function that allows the operator to monitor the pre-fade signal in a channel independently of the main mix.
spill	acoustic interference from other sources.
transient	a momentary rise in the signal level.
+48V	the phantom power supply, available at the channel mic inputs, for condenser microphones and active DI boxes.

TYPICAL SPECIFICATIONS

T.H.D.

Mic, Line or stereo input to Main Outputs, +20dB at outputs, any input gain	< 0.009%

Crosstalk

Fader Attenuation	100dB @1kHz
Aux Send Attenuation	80dB @1kHz
Stereo Separation	70dB @1kHz

Noise

Measured RMS, 22Hz to 22kHz bandwidth

Aux Outputs	-83dBu
Main Outputs	-80dBu

E.I.N.

Microphone Input, Maximum Gain, terminated 150R	-129dBu

Max. Gain to Main Outputs

Mic Input	74dB
Line Input	54dB
Stereo Input	32dB
Stereo Return & 2Track Return	12dB

Maximum Input Levels

Mic Input	+21dBu
Line Input	> 30dBu
Stereo Input	+26dBu
Stereo Return & 2Track Return	> 30dBu

Maximum Output Levels

Any Output	+22dBu

Power Amplifier

Power Output @1%THD	175W + 175W into 8Ω 265W + 265W into 4Ω 300W into 4Ω toneburst

Amplifier will deliver rated power output with +4dBu at power amp input sockets, power amp level control at maximum.

THD @ 1kHz with both channels driven just below clipping:

Into 4Ω	< 0.025%
Into 8Ω	< 0.015%

Metering

10 Segment LED Bargraph

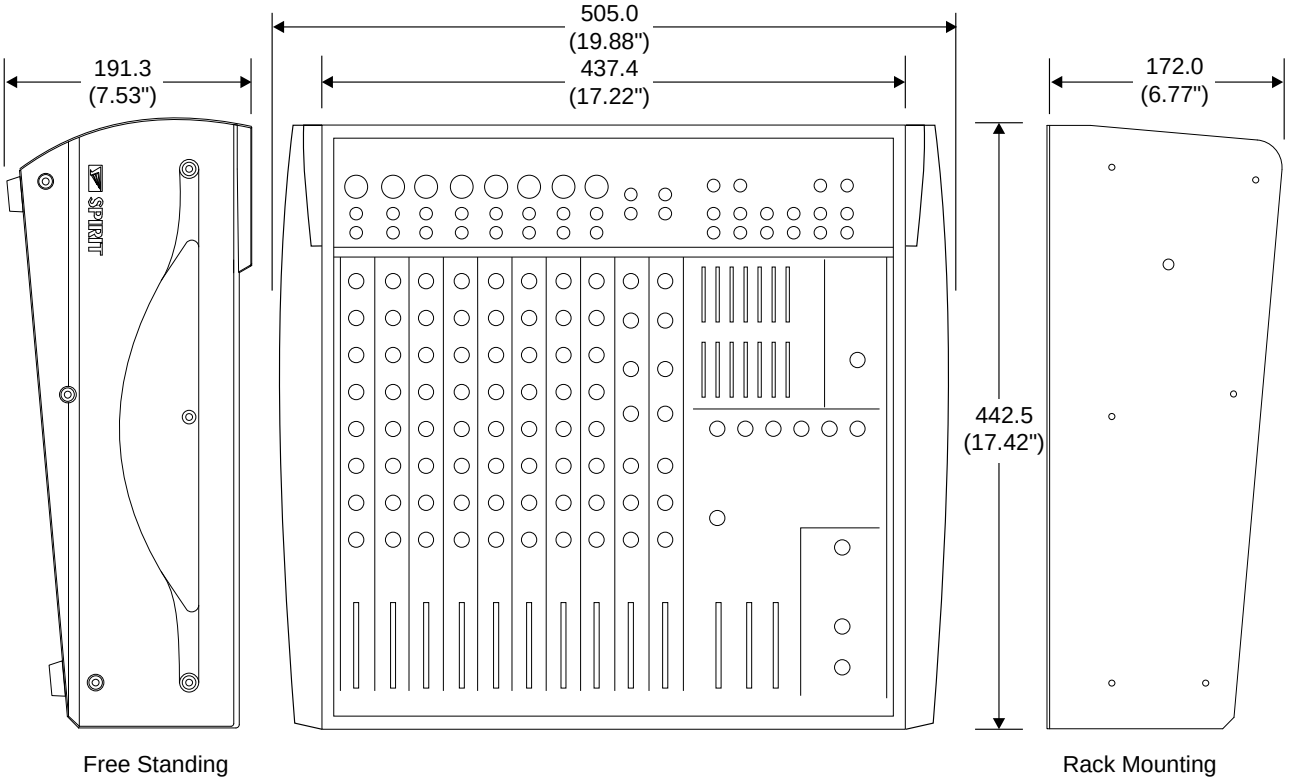
Accuracy Relative to 0dB	+/- 1dB

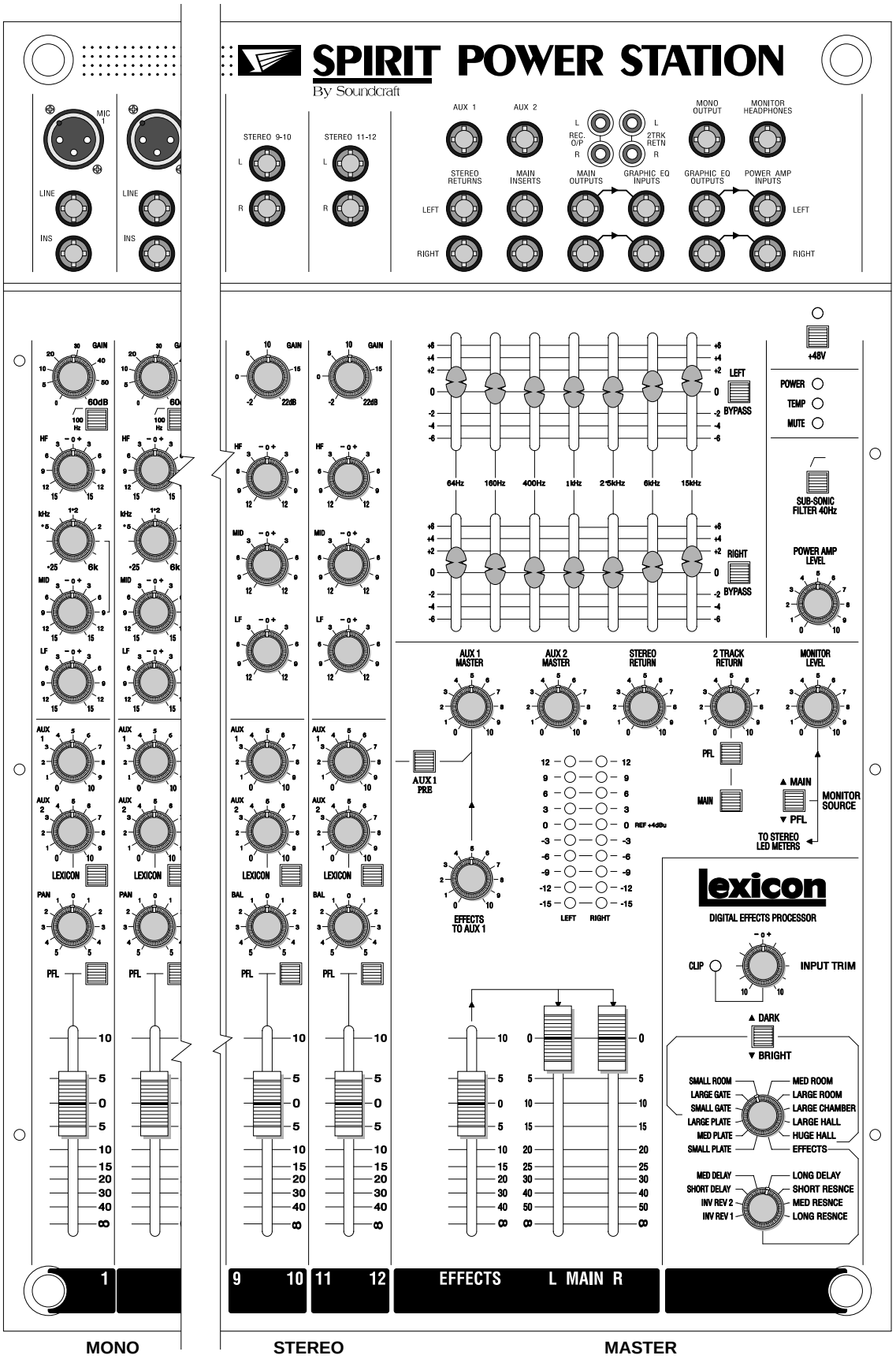
Weight

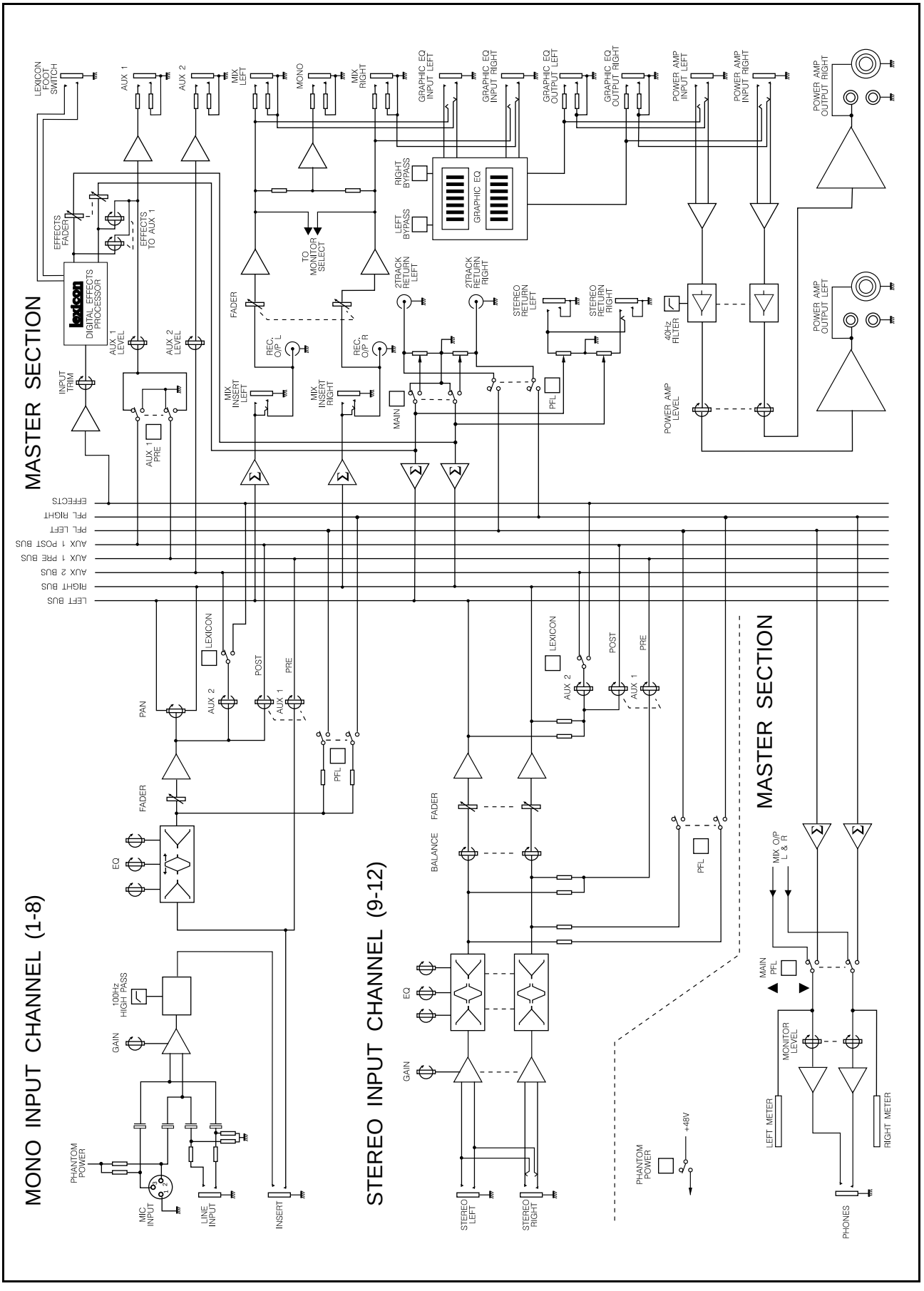
18.2Kg

Dimensions

All dimensions are given in millimetres and inches (in brackets)




SPIRIT POWER STATION
By Soundcraft
MIC
LINE
INS
STEREO 9-10
STEREO 11-12
AUX 1
AUX 2
REC O/P
2TRK RETN
MONO OUTPUT
MONITOR HEADPHONES
STEREO RETURNS
MAIN INSERTS
MAIN OUTPUTS
GRAPHIC EQ INPUTS
GRAPHIC EQ OUTPUTS
POWER AMP INPUTS
LEFT
RIGHT
GAIN
60dB
100 Hz
HF
kHz
MID
LF
22dB
AUX
LEXICON
PAN
BAL
PFL
64Hz
160Hz
400Hz
1kHz
2·5kHz
6kHz
15kHz
BYPASS
+48V
POWER
TEMP
MUTE
SUB-SONIC FILTER 40Hz
POWER AMP LEVEL
AUX 1 MASTER
AUX 2 MASTER
STEREO RETURN
2 TRACK RETURN
MONITOR LEVEL
AUX 1 PRE
EFFECTS TO AUX 1
REF +4dBu
MAIN
MONITOR SOURCE
PFL
TO STEREO LED METERS
lexicon
DIGITAL EFFECTS PROCESSOR
CLIP
INPUT TRIM
DARK
BRIGHT
SMALL ROOM
LARGE GATE
SMALL GATE
LARGE PLATE
MED PLATE
SMALL PLATE
MED ROOM
LARGE ROOM
LARGE CHAMBER
LARGE HALL
HUGE HALL
EFFECTS
MED DELAY
SHORT DELAY
INV REV 2
INV REV 1
LONG DELAY
SHORT RESNCE
MED RESNCE
LONG RESNCE
1
9 10 11 12
EFFECTS L MAIN R
MONO
STEREO
MASTER


MASTER SECTION
LEXICON FOOT SWITCH
AUX 1
AUX 2
MIX LEFT
MONO
MIX RIGHT
GRAPHIC EQ INPUT LEFT
GRAPHIC EQ INPUT RIGHT
GRAPHIC EQ OUTPUT LEFT
GRAPHIC EQ OUTPUT RIGHT
POWER AMP INPUT LEFT
POWER AMP INPUT RIGHT
POWER AMP OUTPUT RIGHT
POWER AMP OUTPUT LEFT
RIGHT BYPASS
LEFT BYPASS
GRAPHIC EQ
EFFECTS FADER
EFFECTS TO AUX 1
lexicon
DIGITAL EFFECTS PROCESSOR
TO MONITOR SELECT
2TRACK RETURN LEFT
2TRACK RETURN RIGHT
STEREO RETURN LEFT
STEREO RETURN RIGHT
40Hz FILTER
FADER
REC. O/P L
REC. O/P R
AUX 1 LEVEL
AUX 2 LEVEL
INPUT TRIM
MIX INSERT LEFT
MIX INSERT RIGHT
MAIN
PFL
POWER AMP LEVEL
AUX 1 PRE
EFFECTS
PFL RIGHT
PFL LEFT
AUX 1 POST BUS
AUX 1 PRE BUS
AUX 2 BUS
RIGHT BUS
LEFT BUS
MONO INPUT CHANNEL (1-8)
PAN
LEXICON
AUX 2
POST
AUX 1
PRE
PFL
FADER
EQ
100Hz HIGH PASS
GAIN
PHANTOM POWER
MIC INPUT
LINE INPUT
INSERT
STEREO INPUT CHANNEL (9-12)
BALANCE
FADER
LEXICON
AUX 2
POST
AUX 1
PRE
PFL
EQ
GAIN
PHANTOM POWER
+48V
STEREO LEFT
STEREO RIGHT
MASTER SECTION
MIX O/P L & R
MAIN PFL
MONITOR LEVEL
LEFT METER
RIGHT METER
PHONES

Notes:

Notes: