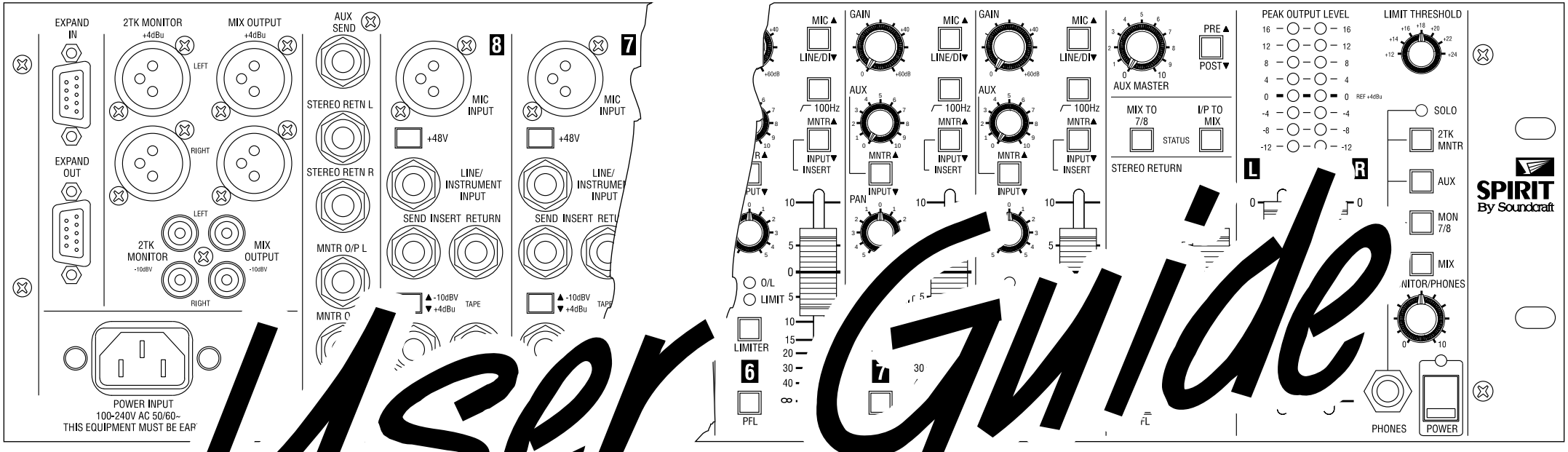
SPIRIT

pro TRACKER



User Guide

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INTRODUCTION

Thank you for buying a **SPIRIT** *Pro*Tracker mixer, brought to you with pride by the **SPIRIT** team of Trevor, Martin, Gary, Ian, Martin, Peter, George, Colin, Mukesh, Andy and Simon. We hope you have as much fun as we did!

Owning a **SPIRIT** console brings you the expertise and support of one of the industry's leading manufacturers and the results of over 22 years experience supporting some of the biggest names in the business.

Built to the highest standards using quality components, *Pro*Tracker offers superbly clean sound for live recording direct-to-tape, simultaneous recording and monitoring of live concerts, small scale PA or high quality overdub mixing in the smaller studio or bedroom.

*Pro*Tracker packs tremendous flexibility into a small unit and is designed to be as easy to use as possible, but some time spent NOW, looking through this manual and getting to know your new mixer will give you lots of helpful tips and confidence, away from the pressures of an important session. Don't be afraid to experiment to find out how each control affects the sound - this will only extend your creativity and help you to get the best from your mixer.

SAFETY PRECAUTIONS

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

The *Pro*Tracker mixer must only be connected to a mains supply in the range 100-240V AC, 50-60Hz and must be earthed.

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

Earth:	Green and Yellow	(Green/Yellow - US)
Neutral:	Blue	(White - US)
Live:	Brown	(Black - US)

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.

The wire which is coloured Brown must be connected to the terminal in the plug which is marked with the letter L.

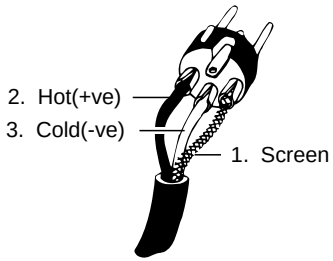
Ensure that these colour codings are followed carefully in the event of the plug being changed.

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

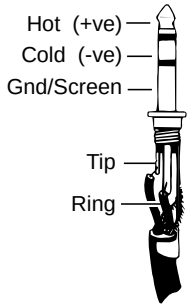
CONNECTIONS

*Pro*tracker uses three types of audio connector - XLR, 3-pole jack and RCA phono. XLR and jack connectors may be used in balanced and unbalanced configurations as shown below:

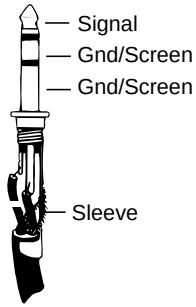
Balanced Mic Input
2TK Monitor Input
XLR

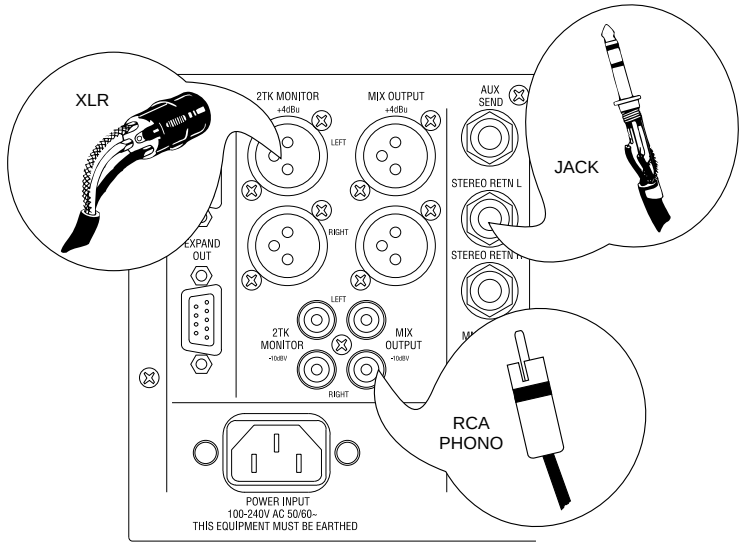


Line/Instrument Inputs
Insert Returns
Tape Sends

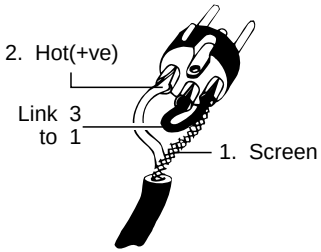


Unbalanced
Line Input

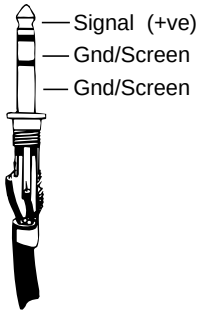




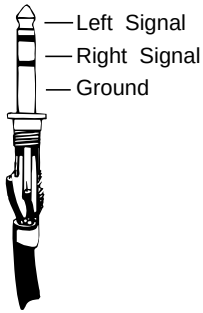
Unbalanced Mic
XLR



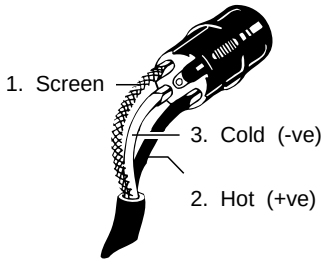
Monitor, Aux Outputs
Insert Sends



Headphones

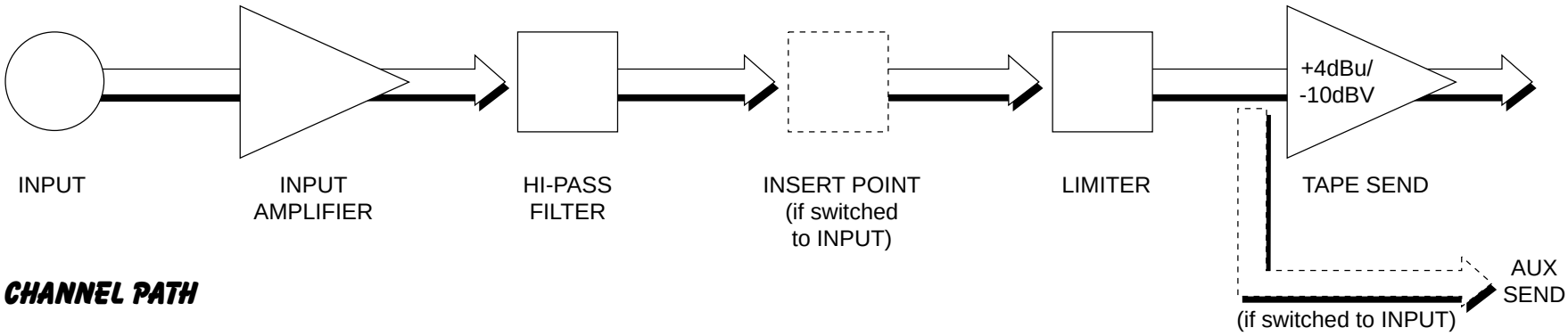


Mix Outputs
XLR

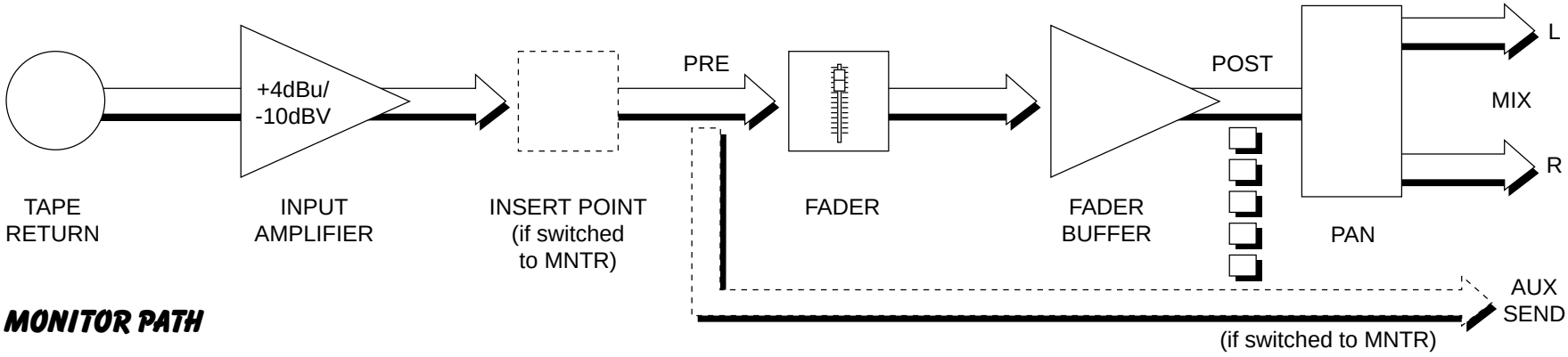


SYSTEM OVERVIEW - THE BASIC SIGNAL PATHS

The ProTracker is designed as a very high quality in-line mixer for recording direct to tape. The basic signal paths provide a minimum route from input to tape, and versatile monitoring off tape as shown below:



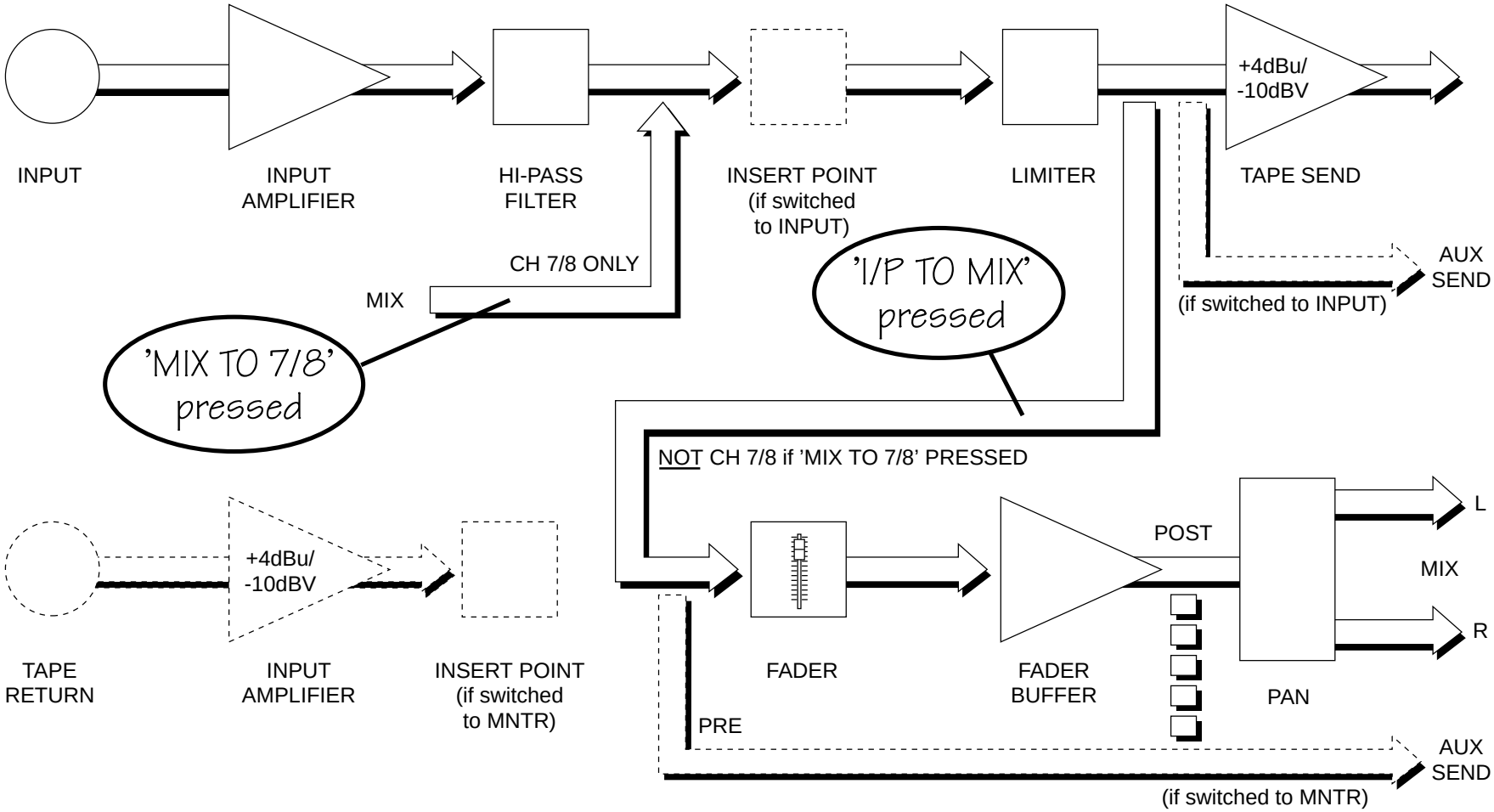
CHANNEL PATH



MONITOR PATH

SYSTEM OVERVIEW - LIVE RECORDING

*Pro*tracker incorporates advanced features to allow the mixer to be used simultaneously for recording and live mixing. Two status buttons on the Master section, 'I/P to MIX' and 'MIX to 7/8' enable the channel signal to bypass the normal tape send/return loop and feed direct to the stereo mix output to drive a PA system, and the Mix signal to be brought back to the tape send path on channels 7 & 8 to feed to tape. These features are illustrated below:



CONTROLS IN DETAIL

*Pro*Tracker is an in-line format mixer, combining a channel path (normally feeding direct to tape) and a monitor path within the same vertical strip. The Insert point and the Auxiliary send may be swapped between the two paths for flexibility, which together with some advanced features controlled from the Master section make the mixer suitable for a wide range of applications.

For clarity, facilities are numbered differently to show which channel path they normally serve.

● normally in Channel path ■ normally in Monitor path

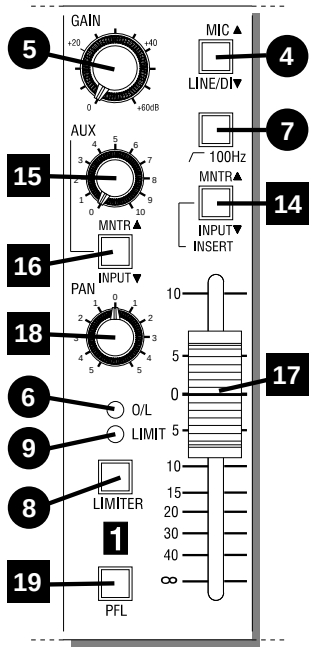
CHANNEL PATH

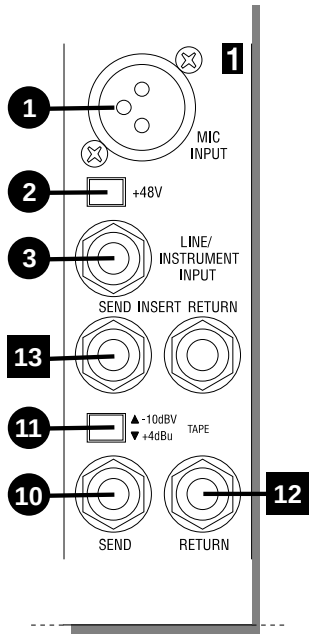
1 The Microphone input is via a standard female XLR-3 connector and is available when the Mic-Line/DI switch (4) is released. It is designed to suit a wide range of BALANCED or UNBALANCED low-level signals, whether from delicate vocals requiring the best low-noise performance or close-miked drum kits needing maximum headroom. Professional dynamic, condenser or ribbon mics are best because these will be LOW IMPEDANCE. While you can use low-cost HIGH IMPEDANCE mics, you do not get the same degree of immunity to interference on the microphone cable and as a result the level of background noise may be higher.

2 The +48V switch applies PHANTOM POWER to the mic input socket providing a suitable powering voltage for professional condenser mics.

DO NOT use unbalanced sources with the phantom power switched on. The voltage on pins 2 & 3 of the XLR connector may cause serious damage.

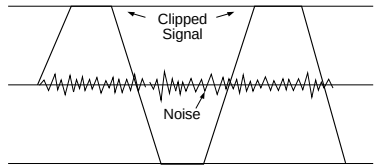
3 The Line/Instrument input accepts 3-pole or 2-pole `A' gauge (TRS) jacks. Use this input for sources other than mics, such as keyboards, drum machines, synths, tape machines or guitars. The input is BALANCED for low noise and immunity from interference, but you can use UNBALANCED sources by wiring up the jacks as shown on page 2 of this manual, although you should then keep cable lengths as short as possible to minimise interference pick-up on the cable.



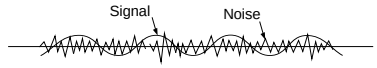


4 The Mic-Line/DI switch selects between the Mic input socket (switch released) and the Line/Instrument socket (switch pressed).

5 The GAIN control sets the level of the selected input feeding the tape send. Too high, and the signal will distort as it overloads the channel and causes clipping within the mic amp. 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 feed the tape machine adequately. This is shown in the diagram on the right:



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.

6 The red O/L (Overload) LED monitors the channel source signal at the output of the input amplifier and the monitor signal at the output of the fader buffer amplifier, giving a visual warning if the signal exceeds a safe working level.

7 Pressing the 100Hz switch inserts a 12dB per octave Hi-Pass Filter into the signal path. Use this in live recording applications to reduce stage rumble or 'popping' from microphones.

8 A built-in Limiter with an attack time of 300µsec is always available in the path to the tape send, to avoid the possibility of transients overloading the inputs of a digital tape machine. The Limiter threshold is set globally from the Master section, but the Limiter may be switched in individually on each channel using this switch.

9 The yellow LIMIT LED lights when the Limiter is active.

10 The balanced TAPE SEND jack is fed from the output of the Limiter.

11 The output level of the Tape Send may be switched between a nominal +4dBu to match professional tape machines, or a nominal -10dBV to suit semi-professional equipment. The position of this switch simultaneously changes the input level of the Tape Return.

MONITOR PATH

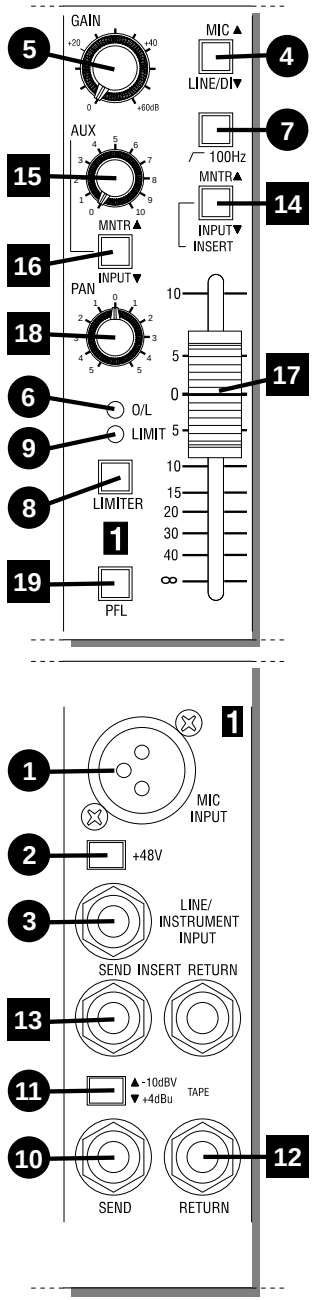
12 The electronically balanced Tape Return is the input to the Monitor path, and has switchable input level as set by the -10dBV/+4dBu switch.

13 An Insert Point is provided for the connection of external processing equipment. The Send is unbalanced, and the the Return is balanced. The Insert is normally in the Monitor path, but may be switched to the Channel path if required (see 14 below).

The Insert Send and Return are on separate jacks which are normalled together, but the non-breaking Send allows a separate feed to be taken from the channel path, for instance to feed a PA desk.

14 The Insert is normally in the Monitor path, but may be swapped to the Channel path if required by pressing this switch.

15 A single Auxiliary Send is provided, normally in the Monitor path (but see 16 below) which may be used to set up a separate mix for Foldback or Effects. The combination of all the Aux Sends is mixed to the Aux output at the rear of the unit. The Send may be globally switched as pre-fade (ideal for foldback applications) or post-fade (ideal for effects, so that the send follows the fader position). Leave the knob turned fully anticlockwise when not in use.



16 The Aux Send is normally in the Monitor path, but may be swapped to the Channel path if required by pressing this switch. When switched to the Channel path the Send is always effectively pre-fade.

17 The Fader sets the overall level of the Monitor signal path. Unity gain is at the '0' position, with 10dB gain in hand.

18 The PAN control sets the amount of the Monitor signal feeding the stereo Mix output, allowing you to move the signal smoothly across the stereo image. Rotation fully anticlockwise feeds the signal solely to the Left mix buss, while rotation clockwise sweeps the image to the Right.

19 When the PFL switch is pressed, the pre-fade signal is fed to the Monitor/Phones outputs, where it replaces the selected source. The meters follow the monitor source to display the PFL signal. The SOLO LED lights to warn that the monitor and meters are now responding to the PFL selection.

AUX MASTER

1 The Aux Master control sets the output level of the combined input Aux Sends. The output is unbalanced at a nominal 0dBu.

2 The input Aux Sends may be globally switched to be pre-fade (for foldback, switch released) or post-fade (for effects, switch pressed). Note that when the Aux Send is switched to the Channel path ('INPUT') this switch has no effect.

STEREO RETURN

3 The balanced Stereo Return, on 3-pole jacks, is an ideal place to connect the output of an Effects unit. The Fader sets the level of the signal fed directly to the MIX.

4 When the PFL switch is pressed, a mono pre-fade signal is fed to the Monitor/Phones outputs, where it replaces the selected source. The meters follow the monitor source to display the PFL signal. The SOLO LED lights to warn that the monitor and meters are now responding to the PFL selection.

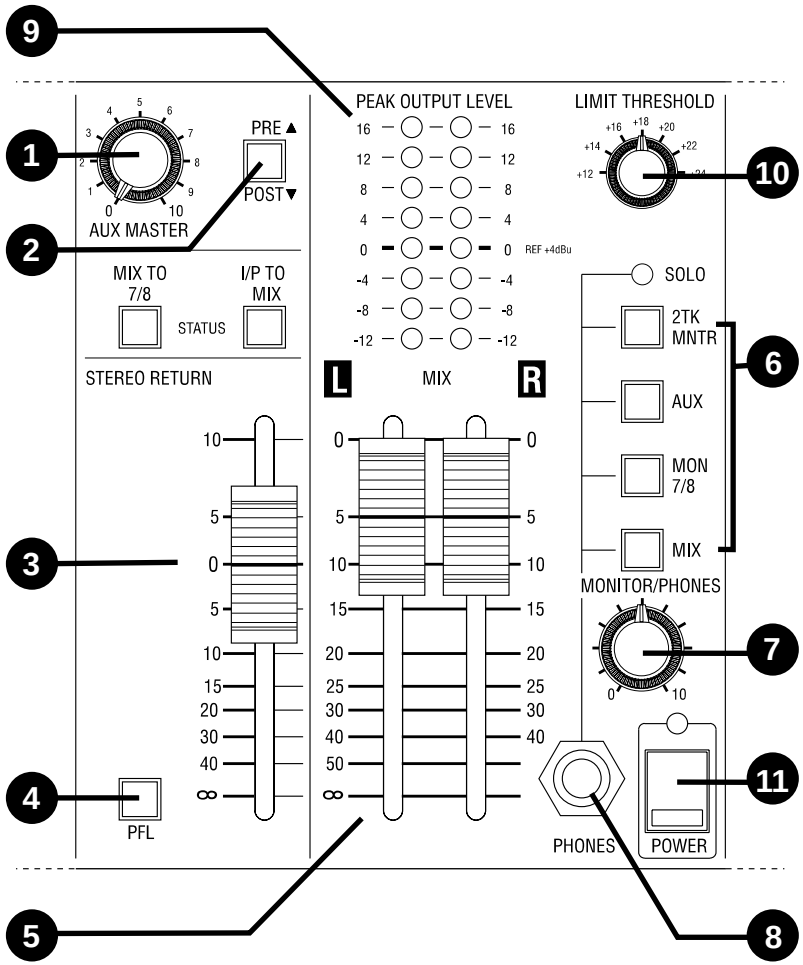
MIX OUTPUTS

5 Two Faders control the output level of the stereo Monitor Mix. The outputs are balanced on XLR-3 connectors at a nominal +4dBu, or -10dBV on RCA phono connectors.

MONITORING AND METERING

6 The stereo monitor outputs (3-pole jacks) and phones output may be sourced from four signals, selected on these switches. The source may be the 2Track Tape Monitor (balanced on 3-pole XLR at +4dBu, or unbalanced on RCA phone at -10dBV), Aux output, Tape Returns on inputs 7 & 8 (MON 7/8) or the stereo Mix output. In all cases the meters follow the monitor selection.

When a PFL is active, the selected monitor source is replace by a the mono PFL signal on both meters and both sides of the monitor and phones. The SOLO LED lights to show that a PFL is active.



7 The Phones and Monitor outputs are controlled by the MONITOR/PHONES control.

8 A standard 3-pole 'A' gauge jack socket feeds headphones (100Ω or greater). The monitor outputs are muted when headphones are connected.

9 Two 8-segment LED Bargraph meters display the level of the selected monitor source or PFL when active.

LIMITER

10 The seven position switch sets the common threshold of the built-in fast Limiter on each input channel. This should be set to 1-2dB below the clipping level of the tape machine.

Note that although the threshold is set globally, the Limiter on each channel may be activated individually.

11 The main Power switch for the mixer. The LED illuminates when power is switched on.

ADVANCED FEATURES

*Pro*Tracker incorporates additional features to give versatilty as a mixer in live recording applications, while still providing a clean direct to tape signal.

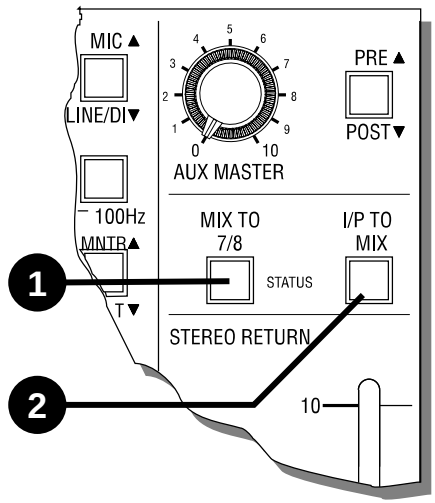
MIX TO 7/8

1 When the MIX TO 7/8 switch is pressed, the stereo mix output is fed to channels 7 & 8 pre-insert (if switched to INPUT) to replace the normal channel source. This allows a mix to be fed to tape from tape sends 7/8, while still recording tracks direct from channels 1-6.

I/P TO MIX

2 When the I/P TO MIX switch is pressed, the post-filter channel signal bypasses the normal tape send/return loop and is fed to the top of the fader, allowing inputs to be sent direct to the stereo mix. The tape send is not interrupted, enabling recording of individual sources as normal.

Note that when MIX to 7/8 is pressed it cuts off the feed from the Tape Return to the mix bus on channels 7 & 8 to avoid internal feedback.



EXPAND IN/OUT

9-way 'D'-type Expansion connnectors are included on the rear panel to allow a number of *Pro*Tracker units to be cascaded to provide more than 8 inputs. Connection is simply made by 'daisy-chaining' the EXPAND OUT on one unit with the EXPAND IN on the next unit.

The last unit in the chain provides a mix of all units and a sum of all PFLs. Local submixes can still be taken from individual *Pro*Trackers if required.

The Limit Threshold is set by the local control on each unit.

INITIAL SETTING UP

You will probably use your **SPIRIT** *Pro*Tracker with a wide range of different types of sound source, and these will be at varying signal levels. It is important to set the GAIN of the inputs correctly to give the best performance.

Set up the individual channel inputs as follows:

- ❏ Plug in the chosen source (usually the MIC socket for mics and the LINE jack for anything else). Plug in phantom powered mics before switching the phantom power on using the rear panel switch. **Keep all faders down when switching on phantom power.**
- ❏ Set the Mix Master Faders fully down and press the 'I/P TO MIX' button on the Master section to route the channel signals to the monitor path.
- ❏ Provide the chosen source with a typical signal level and press the latching PFL button by the fader. The level of signal will be shown on the Bargraph Meters and can be monitored on Headphones or the Monitor outputs.
- ❏ Adjust the input GAIN until the meter is just reaching the amber LED (0dB) at a typical maximum source level with a steady signal. Since the internal LED meters have a true peak-reading response, when the source signal is rich in high-level transients (e.g. drums) a rather higher meter reading of +6/+9 will be needed to achieve an equivalent average level. This leaves enough headroom to cope with peaks in the signal without distortion for live work or analogue recording. If you are using the mixer to record to a DAT machine, remember that, unlike analogue tape machines, they will not tolerate any overload whatsoever before distortion occurs. It is therefore advisable to set a working level of -6 or -12 dB to allow a margin of safety, or preferably to set the level using the meters on the digital multitrack.
- ❏ Adjust each input channel in the same way.

If you find that you cannot set a reasonable level within the range of the GAIN control when using a MIC input, try the LINE input instead.

The Stereo Return does not have a GAIN control, since the typical source for these inputs will be external keyboards or effects units which have a much more predictable signal level. The signal may be checked with the PFL switch as described above.

- ❏ Once all channels have been adjusted, release the I/P TO MIX button.

SETTING UP FOR RECORDING

Following the procedure above will ensure that the input channels are correctly adjusted for particular source signals. Multitrack Recording makes additional demands because the mixer is not only required to mix down input signals but also to provide a monitor mix for artists to hear previously recorded tracks when overdubbing new parts. A typical set-up is as follows:

- ❏ Connect input sources and set gain as described above. Connect channel Tape Sends to as many tape inputs as required. A switch on each channel, above the Tape Send and Return jacks, allows the Tape Send and Return to be matched to either -10dBV signal levels (switch OUT) or +4dBu (switch IN). This enables the mixer to be used with both professional and semi-professional machines.
- ❏ If a compressor or effects processor is to be used, connect this to the insert points and switch the Insert to INPUT.

  While it is often useful to add a little compression to vocals to keep the level as even as possible, it should only be used sparingly during recording, because it cannot be undone later. You can always add more during mixing if necessary.
- ❏ Connect the tape outputs to the Tape Returns. This brings the tape outputs up on the faders to create a monitor mix if required.
- ❏ Connect a monitor amplifier and speakers to the MIX OUTPUTS and set the amplifier volume to a normal listening level.
- ❏ Use the FADERS to set up a monitor mix. Select MIX as the Monitor/Phones source.
- ❏ Connect any effects required using the Aux Send, and return them to the mixer on the STEREO RETURN to allow the effect to be balanced with the original source. Set Aux 1 PRE to select pre-fade sources if the send is being used for foldback.
- ❏ The built-in limiter may be used on any channel by pressing the local LIMITER button, with the threshold set globally across the mixer by the LIMIT THRESHOLD control.

APPLICATIONS

*Pro*tracker provides a very flexible and compact solution to many live and location recording applications. The following diagrams show typical set-ups to illustrate how the features may be used.

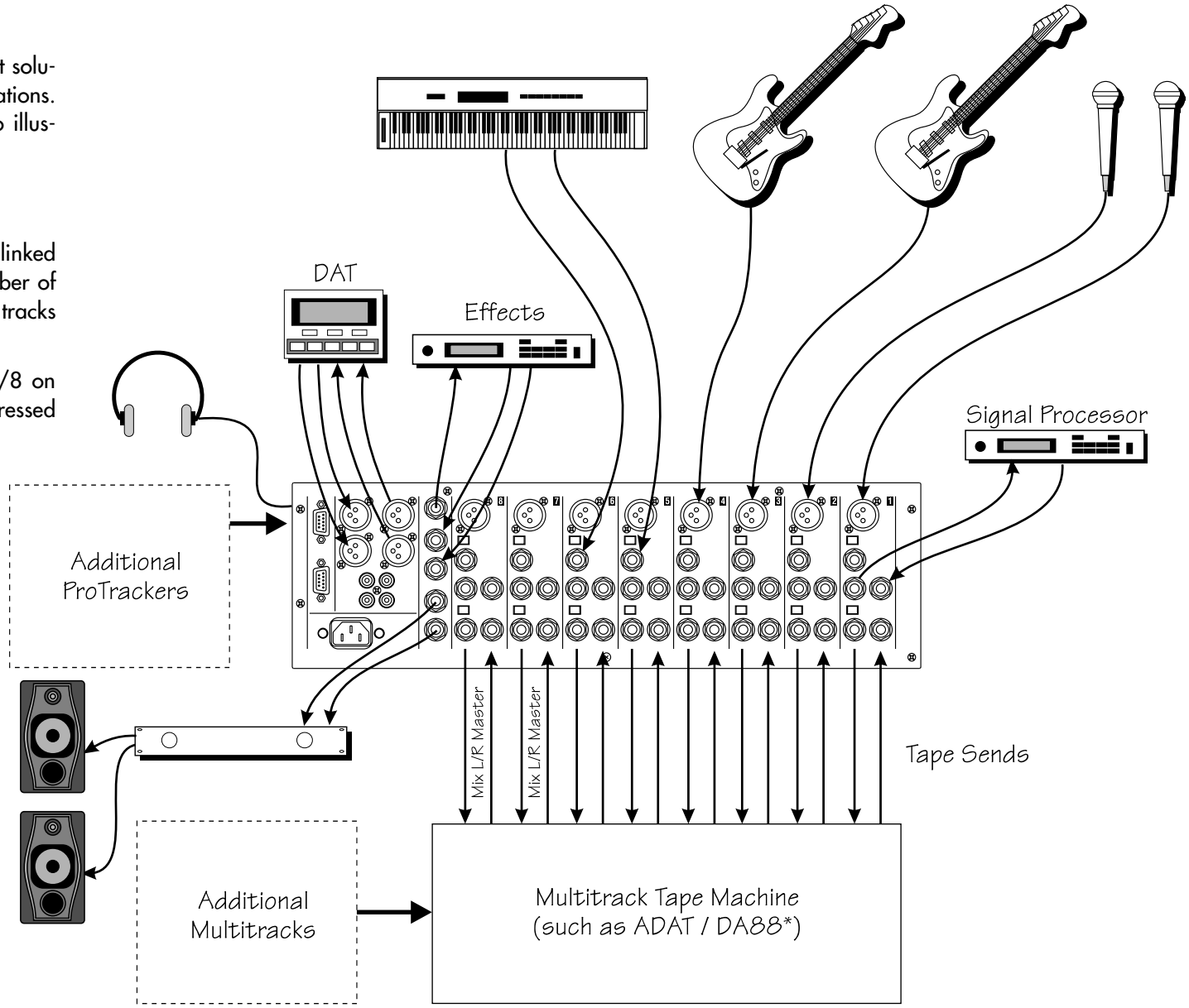
EXAMPLE 1 - LOCATION RECORDING

In this example a single *Pro*tracker, or several linked units may be used to simultaneously lay a number of tracks to tape and also record an initial mix on tracks 7/8.

Sources are connected to any inputs except 7/8 on the last *ProTracker* unit which has MIX to 7/8 pressed to route the stereo mix to tape tracks 7 & 8.

A DAT recorder is also shown connected to the Mix output to make an additional back-up copy of the mix in DAT format. The output of this machine is fed back to the 2TK Return for monitoring if required. Alternatively the -10dBV phono outputs may be used if recording on a cassette machine is required, with monitoring on the 2TK Monitor phono connectors.

Effects may added to individual channels using the insert points (switched to INPUT to record signal + effect to tape, or switched to MNTR to add effects to the monitor mix only), or via the Aux send, fed to mix from the Stereo Return.



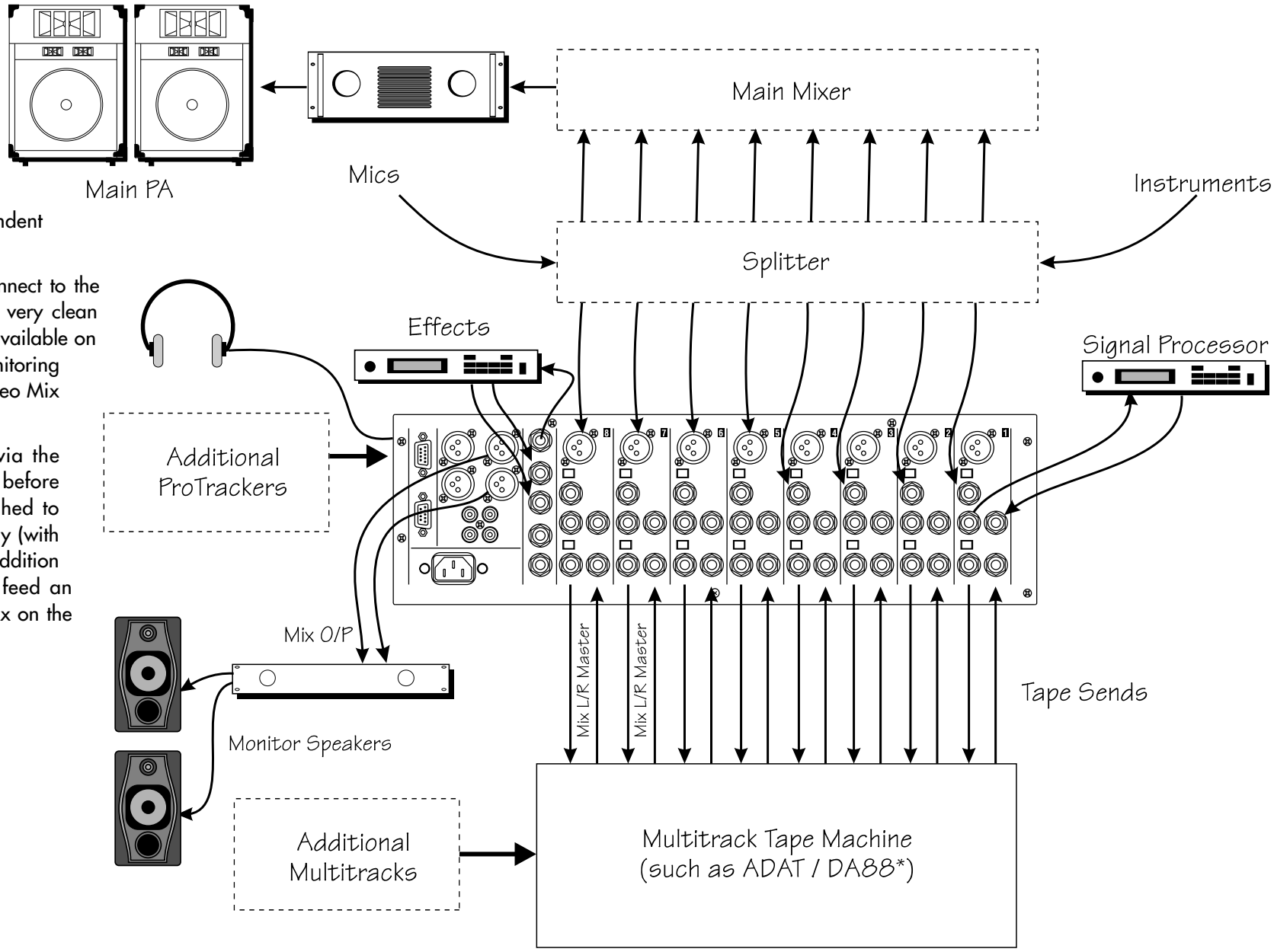
* ADAT is a trademark of the Alesis Corporation
DA88 is a trademark of Tascam

EXAMPLE 2 - PROFESSIONAL/ LIVE RECORDING

In this example the *Pro*Tracker (or several linked units) receives a split feed from microphones, instruments or other sources, independent of the main PA mixer.

The Tape Sends and Returns connect to the recording machine, providing a very clean path direct to tape (with limiter available on each track if required) and monitoring off tape on the faders, to the stereo Mix output.

EQ or effects may be added via the Insert points if required, either before the tape send (with Insert switched to INPUT) or to the monitor mix only (with Insert switched to MNTR). In addition the Aux send may be used to feed an effects device, returned to the mix on the Stereo Return.



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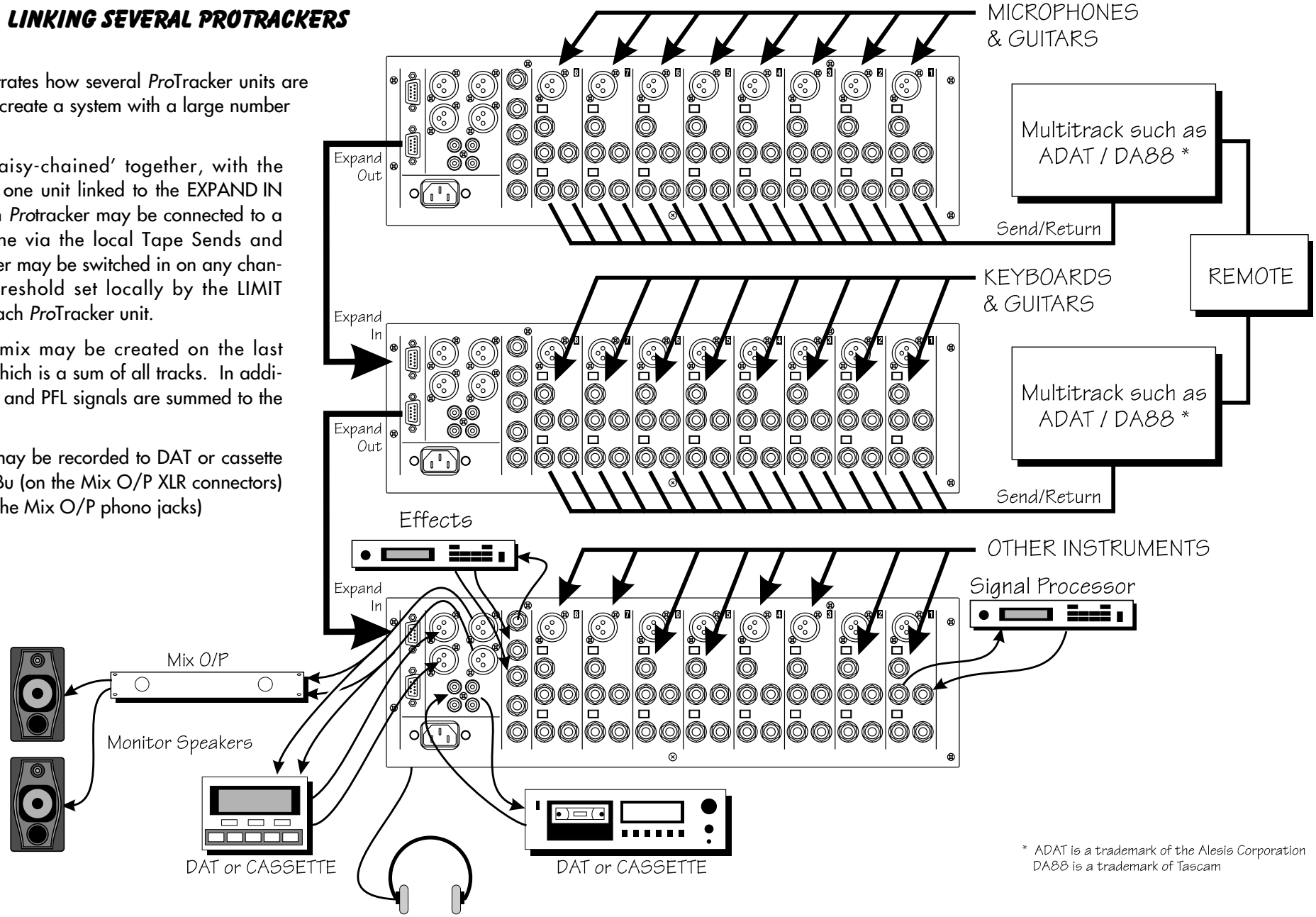
EXAMPLE 3 - LINKING SEVERAL PROTRACKERS IN DETAIL

This example illustrates how several *Pro*Tracker units are linked together to create a system with a large number of channels.

The units are 'daisy-chained' together, with the EXPAND OUT on one unit linked to the EXPAND IN on the next. Each *Pro*tracker may be connected to a recording machine via the local Tape Sends and Returns. The limiter may be switched in on any channels, with the threshold set locally by the LIMIT THRESHOLD on each *Pro*Tracker unit.

A tape monitor mix may be created on the last *Pro*Tracker unit, which is a sum of all tracks. In addition the Aux Send and PFL signals are summed to the last unit.

The monitor mix may be recorded to DAT or cassette at a nominal +4dBu (on the Mix O/P XLR connectors) or at -10dBV (on the Mix O/P phono jacks)



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DA88 is a trademark of Tascam

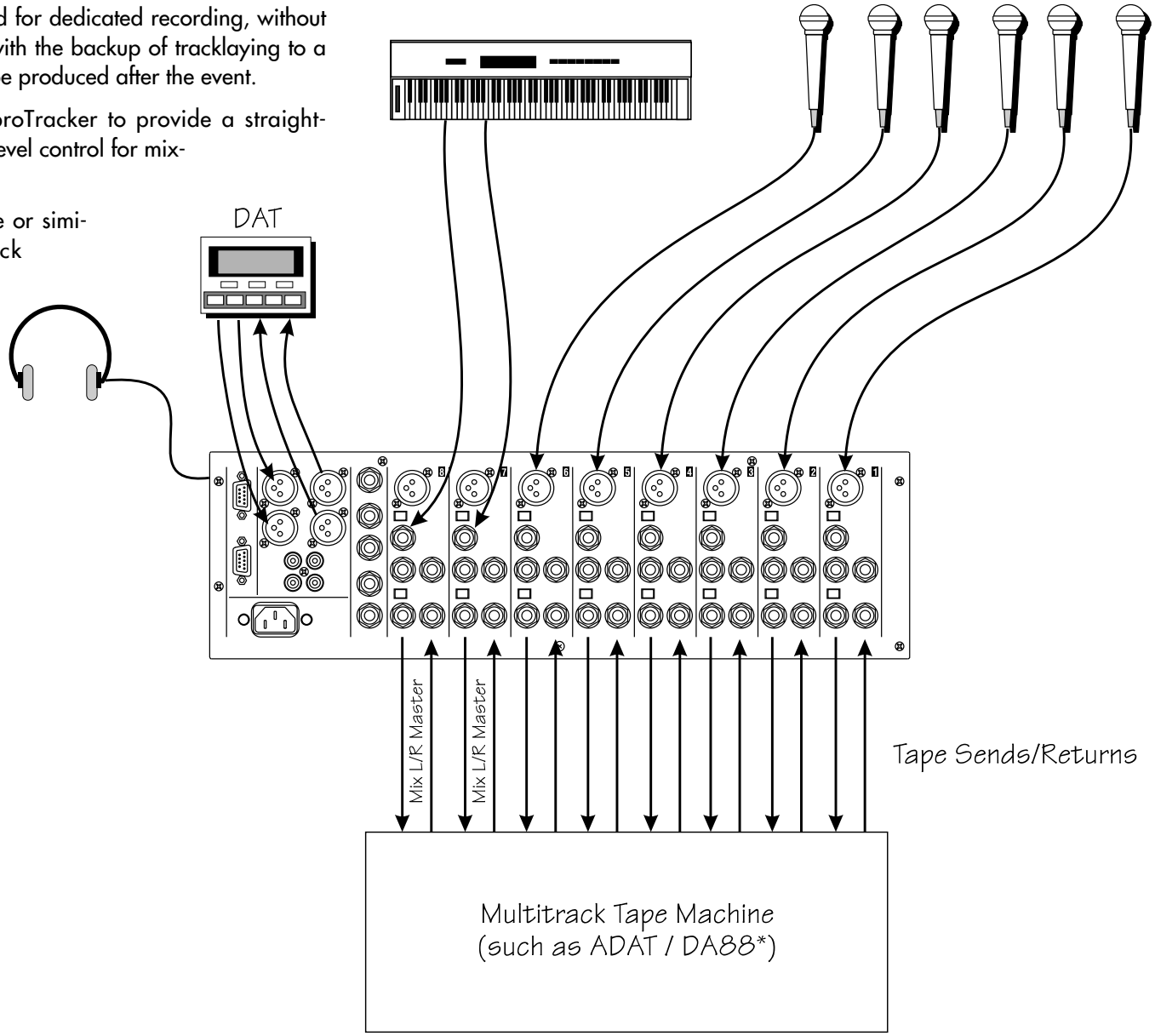
EXAMPLE 4 - BASIC LOCATION RECORDING

In this example the proTracker is used for dedicated recording, without PA, doing a 'straight-to-stereo' mix with the backup of tracklaying to a multitrack to enable further mixes to be produced after the event.

INPUT TO MIX is selected on the proTracker to provide a straight-through path to the mix output, with level control for mixing on the faders.

The mix output feeds a DAT machine or similar, with monitoring via the 2Track Monitor inputs.

EQ or effects may be added to the inserts if required (switched to INPUT).



PRELIMINARY SPECIFICATIONS

T.H.D.

Mic In to Tape Send @1kHz, +20dBu Output, 40dB Gain	<0.003%
Tape Return to Mix Output @ 1kHz, +20dBu Output	<0.003%

NOISE

Mic In Rs=150Ω, 22Hz - 22kHz RMS, 60dB Gain	<-128dBu
Line In Rs=50Ω, 22Hz - 22kHz RMS, 0dB Gain	<-95dBu
Mix, Pans centre	<-92dBr
Aux	<-88dBr

FREQUENCY RESPONSE

Mic In to Tape Send @ 5Hz-150kHz, 40dB Gain	+0/-3dB
Tape Return to Mix Output @ 5Hz-150kHz, 0dB Gain	+0/-3dB

LIMITER

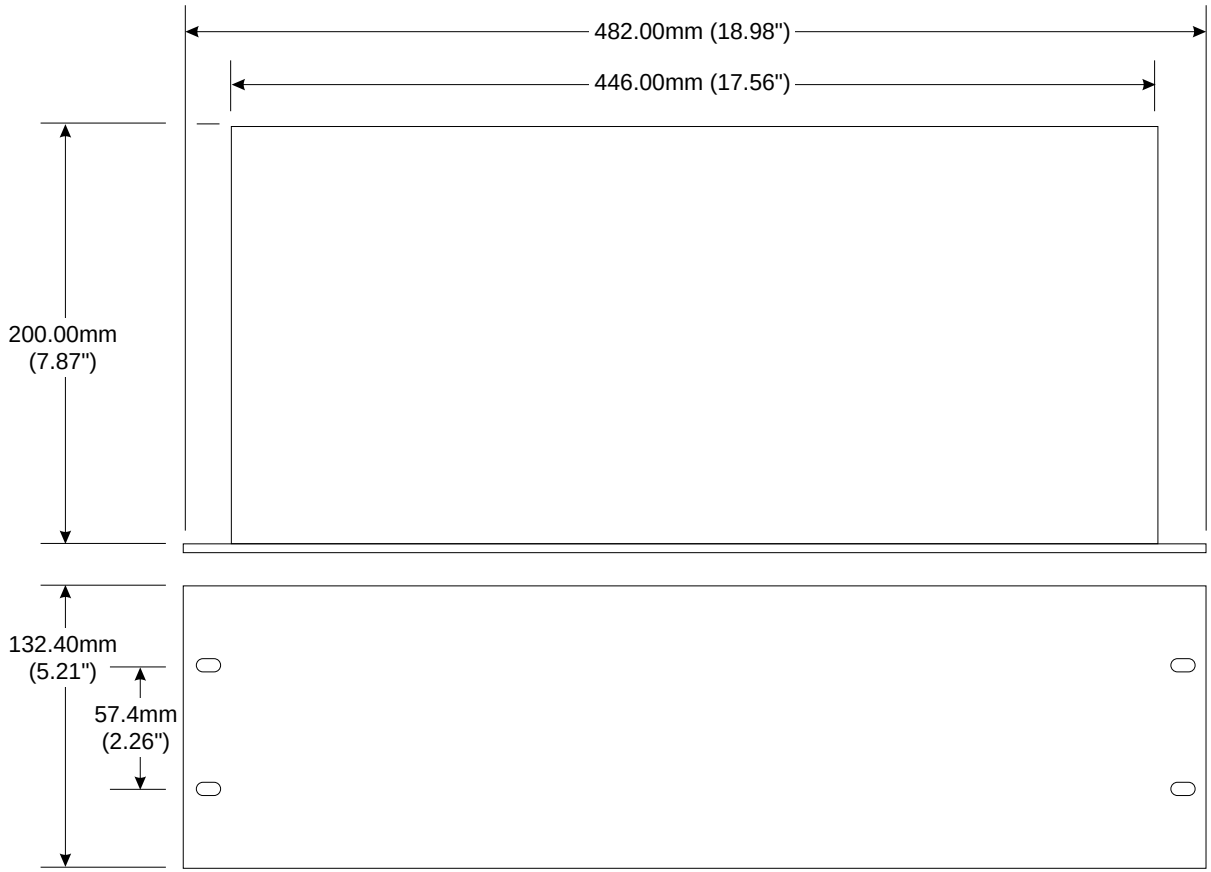
Attack Time	<300μSec
Release Time	<3 Sec
Flatness	<2dB

OFFNESS, CROSSTALK

(All measured with +20dBu on Source Input or Output)

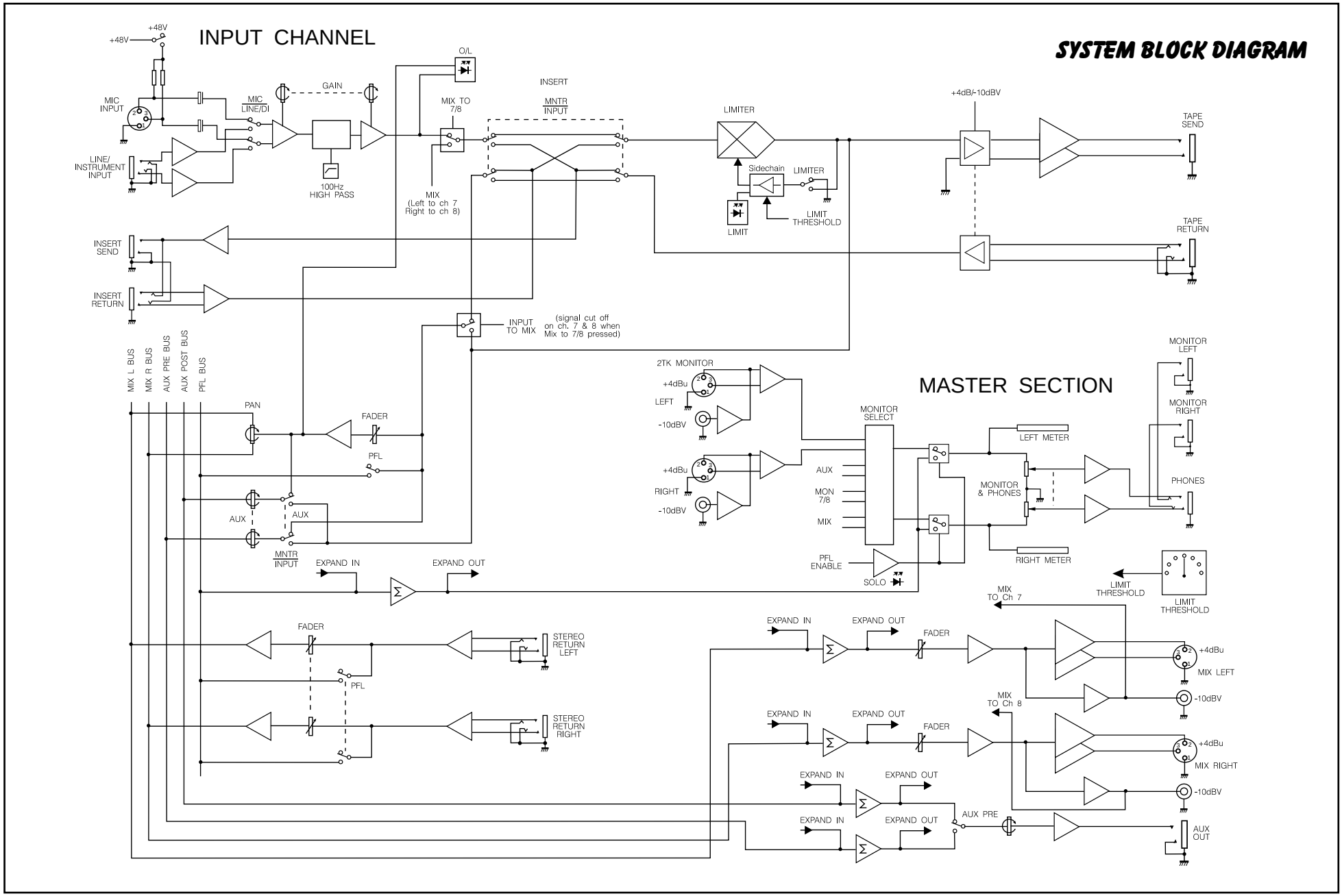
Channel Faders @ 1kHz	>90dB
Pan (=Mix L-R Crosstalk) @1kHz	>70dB

DIMENSIONS



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. Ideal for foldback or effects.
balance	the relative levels of the left and right channels of a stereo signal.
balanced	a method of audio connection which 'balances' the signal between two wires and a screen which carries on signal. Any interference is picked up equally by the two wires, but out of phase, resulting in cancellation of the interference signal.
bus	a mix of a number of audio signals, feeding to a common output.
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.
DAT	Digital Audio Tape, a cassette-based digital recording format.
dB (decibel)	a ratio of two voltages or signal levels. Adding the suffix 'u' denotes the ratio is relative to 0.775V RMS. Adding the suffix 'V' denotes the ratio is relative to 1V 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.
equaliser (EQ)	a device that allows the boosting or cutting of selected bands of frequencies in the signal path.
effects	the use of devices to alter or process the sound to add special effects, e.g. reverb, normally as a mix of the original ('dry') sound and the treated version.
fader	a linear control providing level adjustment
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.
gain	the variation in level of the signal
headroom	the available signal range above the nominal level before clipping occurs.
highpass filter	a filter that rejects low frequencies.
insert	a break point in the signal path to allow the connection of external devices, for instance signal processors or to another mixer.
instrument input	an input for keyboards, drum machines and other electronic instruments. Also suitable for guitars with a high output level, not requiring connection through a DI box.
limiter	a device which clamps the level of the audio signal below a preset limit, to avoid the possibility of overloading other parts of the signal chain.
line level signals	at a nominal level of -10 to +6dBu, usually coming from a low impedance source.
pan (pot)	abbreviation of 'panorama': controls levels sent to left and right outputs.
peak	the high point in signal level
PFL (pre-fade listen)	a function that allows the operator to monitor the pre-fade signal in a channel independently of the main mix.
phantom power	the +48V power supply, available at the channel mic inputs, for condenser microphones and active DI boxes.
post-fade	the point in the signal path *after* the monitor or master fader and therefore affected by fader position.
pre-fade	the point in the signal path *before* the monitor or master fader position and therefore unaffected by the fader position.
splitter	a device which splits the audio signal to feed two or more inputs, providing isolation between those inputs.
stereo return	an input specifically designed to receive the output of effects or other external processing devices
tape return	a line level input provided specifically to receive the playback output of a tape machine for monitoring.
transient	a momentary rise in the signal level.
unbalanced	a method of audio connection which uses a single wire and the cable screen as the signal return. This method does not provide the noise immunity of a *balanced input* (see above).


INPUT CHANNEL
SYSTEM BLOCK DIAGRAM
+48V
+48V
MIC INPUT
LINE/ INSTRUMENT INPUT
MIC LINE/DI
GAIN
100Hz HIGH PASS
O/L
MIX TO 7/8
MIX (Left to ch 7 Right to ch 8)
INSERT
MNTR INPUT
LIMITER
Sidechain
LIMITER
LIMIT
LIMIT THRESHOLD
+4dB/-10dBV
TAPE SEND
TAPE RETURN
INSERT SEND
INSERT RETURN
INPUT TO MIX
(signal cut off on ch. 7 & 8 when Mix to 7/8 pressed)
MIX L BUS
MIX R BUS
AUX PRE BUS
AUX POST BUS
PFL BUS
PAN
FADER
PFL
AUX
AUX
MNTR INPUT
EXPAND IN
EXPAND OUT
MASTER SECTION
2TK MONITOR
+4dBu
LEFT
-10dBV
+4dBu
RIGHT
-10dBV
MONITOR SELECT
AUX
MON 7/8
MIX
PFL ENABLE
SOLO
LEFT METER
MONITOR & PHONES
RIGHT METER
MONITOR LEFT
MONITOR RIGHT
PHONES
LIMIT THRESHOLD
LIMIT THRESHOLD
MIX TO Ch 7
MIX TO Ch 8
FADER
STEREO RETURN LEFT
STEREO RETURN RIGHT
EXPAND IN
EXPAND OUT
FADER
+4dBu
MIX LEFT
-10dBV
EXPAND IN
EXPAND OUT
FADER
+4dBu
MIX RIGHT
-10dBV
EXPAND IN
EXPAND OUT
EXPAND IN
EXPAND OUT
AUX PRE
AUX OUT



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