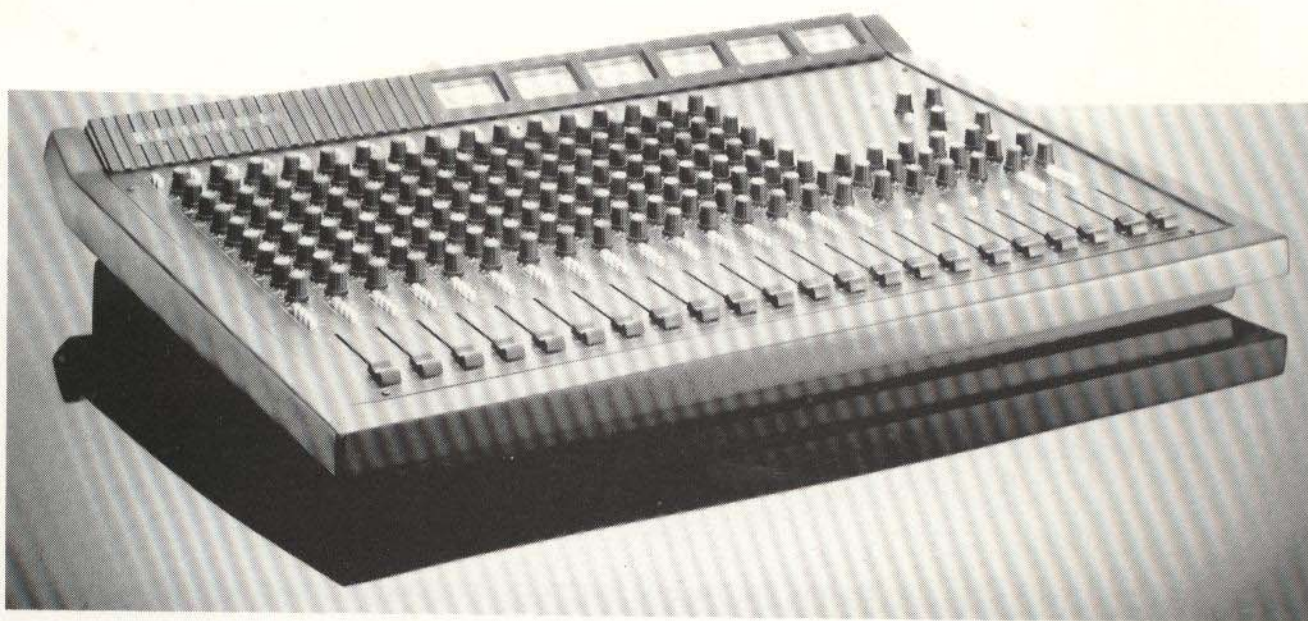


The 16-4-2 Mixing Console



OPERATING MANUAL

AHB

ALLEN AND HEATH BRENNELL LTD.

INTRODUCTION

The Allen and Heath 16.4.2 is a highly compact and light-weight Mixing Console which incorporates all the facilities normally required for live sound mixing and for multi-track recording.

Up to six separate outputs can be used by utilising the direct output sockets of each of the four sub-groups, as well as the main stereo outputs. This will provide six different mixes - often useful when mixing theatre sound.

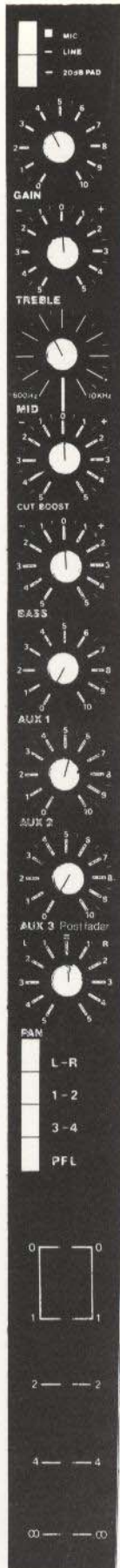
In the studio, the 16.4.2 can be used in conjunction with a stereo recorder and a multi-track recorder. Metering and monitoring can be switched from the console to any tape input by using the channel routing push-buttons.

IMPORTANT

BEFORE OPERATING THE UNIT, CHECK THE MAINS VOLTAGE SETTING AS PRINTED ON THE PACKAGE LABEL. THE CONSOLE HAS BEEN FACTORY SET FOR 110 - 120 VOLTS AC OR 220 - 240 VOLTS AC, 50/60 HZ. TO ALTER THE OPERATING VOLTAGE, CONTACT AN AHB SERVICE AGENT.

INPUT CHANNEL

THE INPUT CHANNEL AMPLIFIES, EQUALISES AND ROUTES INCOMING SOUND. THE SEPARATE MIC AND LINE CONNECTORS ARE ON THE REAR PANEL.



LEVEL MATCH

MIC/LINE switch. When pressed in, it selects the Line input to the channel. When out, it selects microphone.

ATTENUATOR PAD. When pressed in, it reduces the level of a Line input by 20 dB and a microphone input by 12 dB.

GAIN PRESET. Varies the gain of the input amplifier.

EQUALISATION

TREBLE. Lifts or cuts High Frequencies.

MID SWEEP. Varies the centre frequency of the tone control.

CUT/BOOST. Lifts or cuts Mid Frequencies.

BASS. Lifts or cuts Low Frequencies.

FOLDBACK & EFFECTS CONTROLS

AUX 1 SEND. Mixes channel pre-fade into Aux 1 output. Primarily intended for foldback use.

AUX 2 SEND. Mixes channel pre-fade into Aux 2 output.

AUX 3 SEND. Mixes channel post-fade into Aux 3 output. Primarily intended for Echo Send.

PAN. Controls the relative levels to Left and Right of Channel's stereo output.

CHANNEL ROUTING SWITCHES

L-R. When pressed, sends Channel output from the Pan control to the Left and Right master outputs.

1-2. When pressed, sends Channel output to sub-group pair 1 & 2

3-4. When pressed, sends Channel output to sub-group pair 3 & 4

PFL. When pressed, changes over monitor output to hear the individual channel pre-fader.

CHANNEL FADE

Controls the Channel level to Aux 3 and to the Pan control.

INPUT CHANNEL

Two inputs are provided on each of the 16 input channels. The balanced MICROPHONE input is on a 3-pin XLR-type connector, and suits a low-impedance source such as a 200 Ω Dynamic, Moving-coil or Ribbon microphone (or the output from a Direct-Injection box). The Microphone connector is wired with Pin 1 to screen, Pin 2 out-phase and Pin 3 in-phase. To connect an unbalanced source, strap Pin 1 to Pin 2.

The LINE input is on an unbalanced jack-socket, which will accept 2-pole or 3-pole 1/4-inch plugs. IT IS NOT SUITABLE FOR USE WITH 3-POLE GAUGE 8 (POST OFFICE TYPE) PLUGS. Line level signals may be expected from tape machine outputs and from the outputs of certain effects devices.

The MIC/LINE switch is an alternate-action push switch. Only one input per channel can be selected.

The ATTENUATOR PAD should be switched in when the input signal level is too high, or when the source includes peaks which would otherwise overload the input channel amplifier. A live source of sound contains peaks whose duration is too short to register on the VU meters. The Pad is effective when the button is pressed in.

The GAIN PRESET control, used together with the Mic/Line switch and Attenuator Pad, allows a wide range of input signal levels to be brought to a uniform operating level. The Mixer should operate at a level well above the equipment's inherent noise, yet below the Mixer's overload level. The VU meters are calibrated to indicate 0 VU at the recommended operating level, which corresponds to an output of 1.21 V rms at the XLR connector with the master fader full up.

EQUALISATION is used to change the 'colour' of the sound, either to make a correction for acoustics or to produce some required effect. When recording a solo input, equalisation is often kept to a minimum. Full equalisation can then be added during mixdown.

One or both AUX 1 & 2 controls may be used for sending to an external foldback amplifier or an external effects device. AUX 3 is mainly used for Echo Send, to keep the level in the echo mix in proportion to the level in the main mix.

The PAN control gives control over the position of the sound image in the stereo mix. At the centre position, the Pan control sends a mono signal to the output pair selected, and at either end it cuts off one side completely.

The three push-buttons for CHANNEL ROUTING are labelled L-R, 1-2, 3-4. The L-R button connects the pair of outputs from the input channel Pan control to the Left and Right master outputs. The other two buttons route to the Sub-groups. A channel can be routed to a single sub-group by selecting the appropriate routing button and turning the Pan control fully to one end.

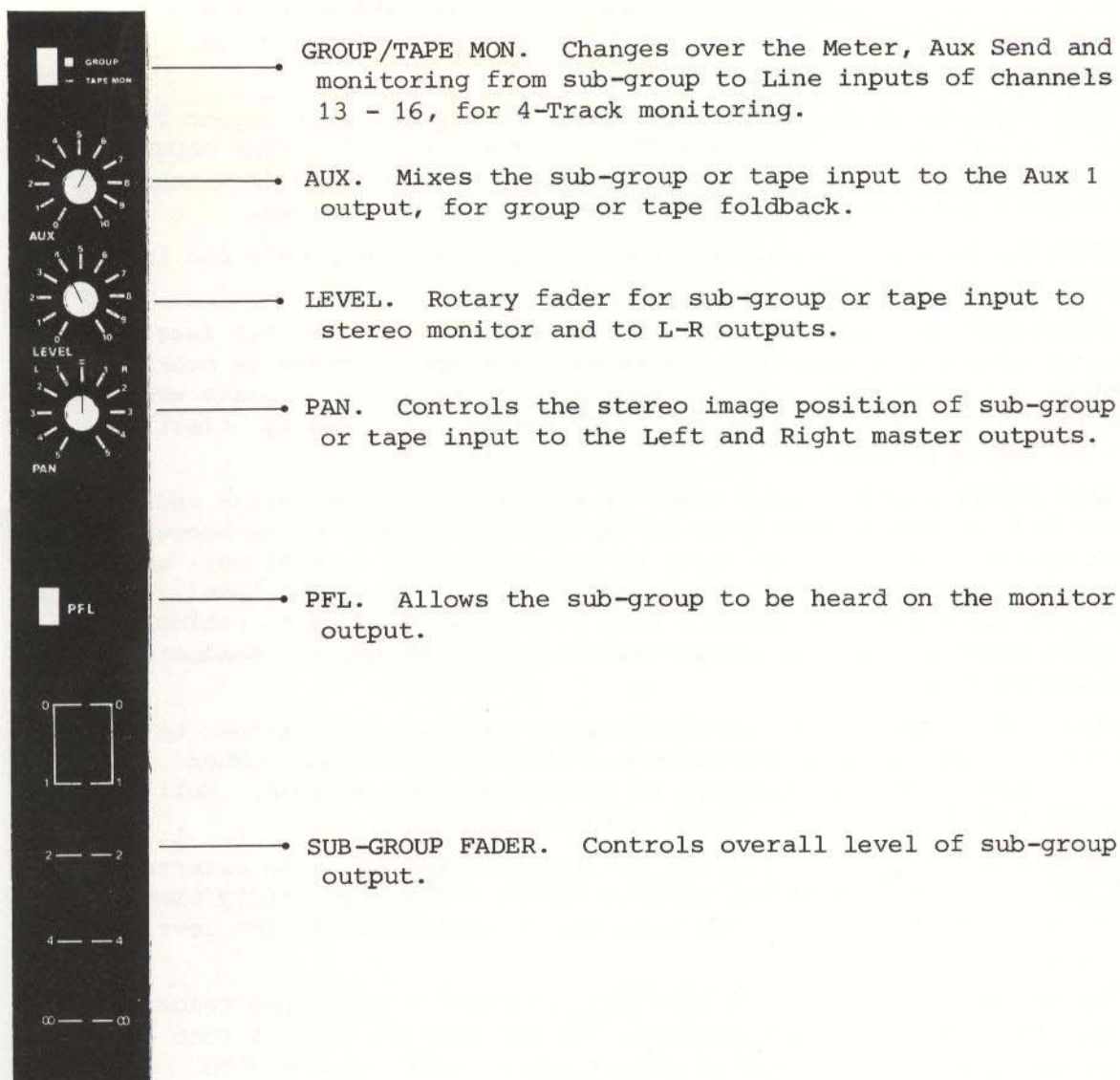
When any PFL button is pressed, the output from that channel appears on the monitor output (unless the desk is monitoring Tape Replay). If more than one PFL button is pressed at one time, the monitor output will include a mix from all the channels with PFL buttons pressed. As the name suggests, the PFL level will be independent of the position of the channel fader..

The CHANNEL FADER controls the output level to the master outputs or to one or more sub-groups. The maximum position of the fader is at the top, marked '0'. The normal position for a fader is halfway down, allowing it to be increased or decreased as necessary. Any channels not in use should have their faders fully down.

Each channel is identified by its channel number, printed on the panel between the PFL button and the channel fader.

SUB - GROUPS

THERE ARE FOUR SUB-GROUPS AND EACH HAS AN INDEPENDENT OUTPUT ON THE REAR PANEL



The sub-groups combine the signals from the routing switches of the input channels, and feed them to the Left and Right master outputs via the sub-group fader and pan control.

The sub-group outputs on the rear panel are always the mix produced by the routing buttons, channel pan controls and channel faders. They are unaffected by the selection of the GROUP/TAPE MON buttons. The sub-group outputs on the rear panel are on XLR-type panel plugs, wired Pins 1 & 2 to Earth, Pin 3 Signal.

The sub-group outputs are shown on the four sub-group VU meters only when the GROUP/TAPE MON buttons are out. With the sub-group fader at full, 0 VU on the sub-group meter corresponds to an output of 1.21 V Rms at the XLR-type plug on the rear panel.

Provided that the four outputs of a 4-Track tape machine are plugged into the Line inputs of channels 13 - 16, the GROUP/TAPE MON switches allow the Sync or Replay outputs of the 4-Track to be brought up to the sub-group VU meters, and to be panned to the L-R outputs for monitoring during recording. No Equalisation of the tape outputs is provided in this condition.

When the PFL button above a sub-group fader is pressed, the monitor output changes over to hear that sub-group's output pre-fader.

USING THE 16.4.2 AS A STAGE MIXER

When mixing a number of instruments together, it is common to form a sub-group to reduce the number of faders critical to the final balance. For example, several microphones may be used for backing vocals. All these microphone channels are routed to the same sub-group and a mono mix of the vocal backing is set up, using the sub-group PFL button to hear the sub-mix. The sub-group pan control positions the sound in the master L-R mix and the single sub-group fader controls the level of all the microphones in the sub-mix. The same technique may be used for mixing together microphones on a drum kit. It is common to use two sub-groups to produce a stereo drum sub-mix, which is then sent to the master outputs using two sub-group faders.

The sub-group independent outputs can be used to drive most types of Stage amplifier, so even if the sub-groups 1 & 2 are used for a drum sub-mix, sub-groups 3 & 4 and the master L-R outputs are free to drive four separate amplifiers, producing a discrete four-channel output.

USING THE 16.4.2 AS A STUDIO MIXER

When working with a multi-track recorder, the four sub-groups are often used for feeding the Record inputs of the tape machine. When the recorder is a 4-Track, sub-group 1 can be permanently plugged up to record on track 1, sub-group 2 to track 2, 3 to 3 and 4 to 4. The four playback outputs should be plugged into the Line inputs of channels 13 - 16. Using the mixer with an 8-Track or 16-Track recorder will require a Patching Panel to make recording and replay assignments.

All tape channels should have their Record gain controls set to match 0 VU on the recorder with 0 VU on the Mixer, with the master faders at '1'. The tape replay levels are set for unity gain through the recorder from input to sync and replay outputs.

RECORDING BACKING TRACKS

Multiple microphones on one instrument are all routed to the same sub-group, and therefore to the same tape track. Solo microphone inputs use the other sub-groups to route to their separate tracks. Channel pan controls should be turned to the extreme left or right. Recording levels are controlled by channel faders and by sub-group faders. The sub-group VU meters show the recording level onto each track. A balance for monitoring can be set up by using the sub-group level and pan controls. In order to monitor the recording output, the Group/Tape mix buttons and the Remix/Tape replay buttons must all be out. To hear playback, all four Group/Tape mix buttons should be pressed in.

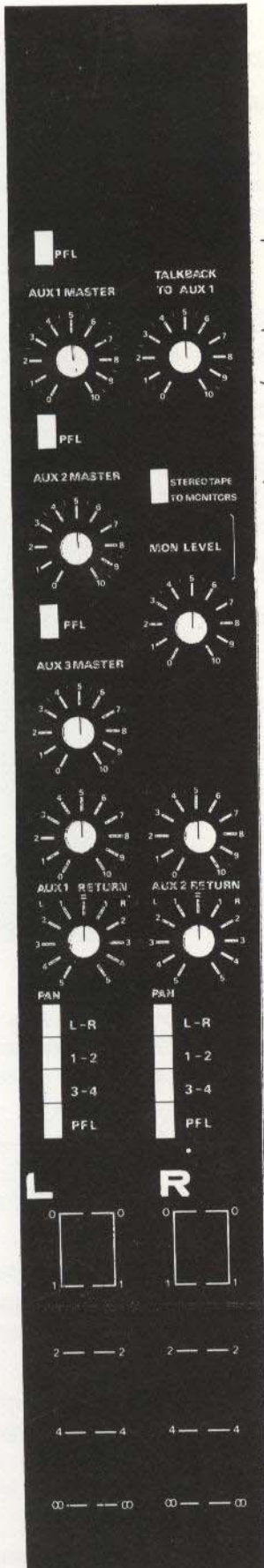
OVERDUBBING

To record on one track while listening to a previously recorded backing track, the output of the tape machine must be synchronous with the Record input (i.e. the tape machine is switched to INPUT or SYNC, not to REPLAY). Studio foldback on AUX 1 is provided by the sub-group AUX controls, and Control Room monitoring is produced via the sub-group level and pan controls. Three of the sub-group faders have no effect, and one sub-group fader controls the overall level of the track being recorded. The VU meter associated with that sub-group will indicate recording level. The Group/Tape mix buttons should be down on all sub-groups except the one feeding the track in Record. When replaying a Take, the last Group/Tape mix button is pressed and the tape machine is switched over to REPLAY. Both foldback and monitors should hear all tracks in the same balance as during recording. If there is a marked level difference between Record and Replay, the tape machine input and output levels are incorrectly set.

MIXDOWN

The multi-track recorder is replayed into the Line inputs of the Mixer. L-R routing is selected, and a stereo mix of the tracks is produced using the channel faders for balance and the pan controls for routing tracks to left, right or between the two. A stereo recording is made on the stereo tape machine connected to the L-R outputs. The L-R VU meters indicate recording level. The stereo recording can be reviewed simply by pressing the STEREO TAPE TO MONITORS button.

MASTER OUTPUT AND MONITOR SECTION



AUX SEND MASTERS

• PFL. When pressed, the monitor changes over to hear the outgoing signal, before the Aux master control.

• AUX MASTER. Controls overall level of Auxiliary output.

MONITORING, METERING AND TALKBACK

• TALKBACK to Aux 1. Talkback microphone level control.

• STEREO TAPE TO MONITORS. When pressed in, this switch changes over the monitor and L-R meters to hear the tape replay input.

• MONITOR LEVEL. Controls volume of headphones or external monitor loudspeaker amplifiers.

AUX RETURN MASTERS

• AUX RETURN. Controls level of the Return input.

PAN. Controls Aux Return between the pairs of routing switches.

• L-R. Routes Aux Return to the L-R master outputs.

• 1-2. Routes Aux Return to sub-group pair 1 & 2

• 3-4. Routes Aux Return to sub-group pair 3 & 4

• PFL. When pressed, changes over monitors to hear Aux Return input.

MASTER OUTPUT FADERS

LEFT MASTER FADER. Controls Left master output level.

RIGHT MASTER FADER. Controls Right master output level.

MASTER CONTROLS

The two faders marked 'L' and 'R' control the level of the mix reaching the master output. Both faders will normally be at similar positions, often between '0' and '1'. Their main use is in producing effects and fade-outs, but they are also important in correcting the overall level and balance. The L-R master outputs are not affected by PFL, Monitor/Remix changeover or Tape Monitor changeover. The L-R meters indicate the master output level, tape replay level or pre-fade level, depending on push-buttons selected.

The master controls for AUX 1, 2 & 3 vary the levels appearing at the AUX outputs on the rear-panel jacks. Each AUX master has its own PFL button.

AUX 1 is intended for foldback, as any channel or sub-group can mix to it. AUX 2 can be used for a second foldback channel or for effects feeds. AUX 3 is most suitable for Echo Send, being a post-fade mix.

The AUX RETURN controls combine the external effects outputs into the master L-R mix or to individual sub-groups. AUX RETURN 1 and AUX RETURN 2 are independent inputs each with pan control, full routing and PFL. Some echo plates have a stereo output, and these should be connected to AUX RETURNS 1 & 2, with the two pan controls turned to opposite ends for maximum echo image width.

MONITORING

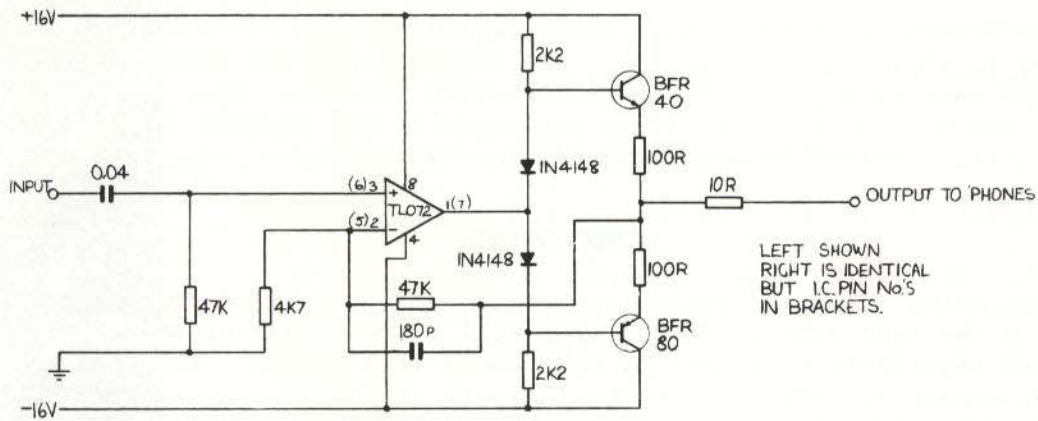
For monitoring the Mixer during operation, a 3-pole standard jack socket is included on the rear panel. This output will drive a pair of studio monitor loudspeaker amplifiers or a pair of headphones from 8-200Ω. All monitoring is in stereo, except for PFL. A push-button near the Monitor Level control changes monitoring from the L-R master outputs to the stereo tape replay jack. This is a 3-pole standard jack socket for connection to the replay output of a stereo tape recorder. When monitoring tape replay, PFL is not available.

TALKBACK

Communication from the Mixing console to the performers' area is Talkback and is not intended to be mixed to a recording output. The talkback XLR-type socket on the rear panel suits any high-impedance microphone. The talkback level is adjustable at the desk, and is mixed to the AUX 1 output, which feeds the external foldback amplifiers to drive either studio headphones or on-stage monitor loudspeakers.

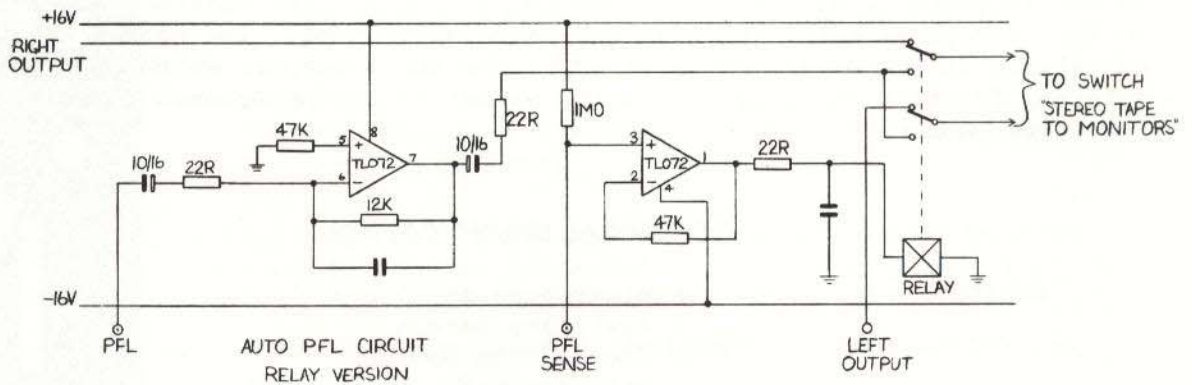
TECHNICAL SPECIFICATION

INPUTS:	16 Microphone or Line 2 Auxiliary Return 1 Stereo Tape Monitor 1 Talkback Microphone
SUB-GROUPS:	4
OUTPUTS:	2 Master L & R 4 Sub-group Independent 3 Auxiliary Return 1 Stereo Monitor
FREQUENCY RESPONSE:	25 Hz to 20 kHz \pm 1 dB
DISTORTION:	Better than 0.05%
NOISE:	-126 dB, 25 Hz to 20 kHz.
DIMENSIONS (cm):	90 x 70 x 19 (Road version) 99 x 75 x 23 (Studio version)
WEIGHT:	31 kg (Road version) 40 kg (Studio version)

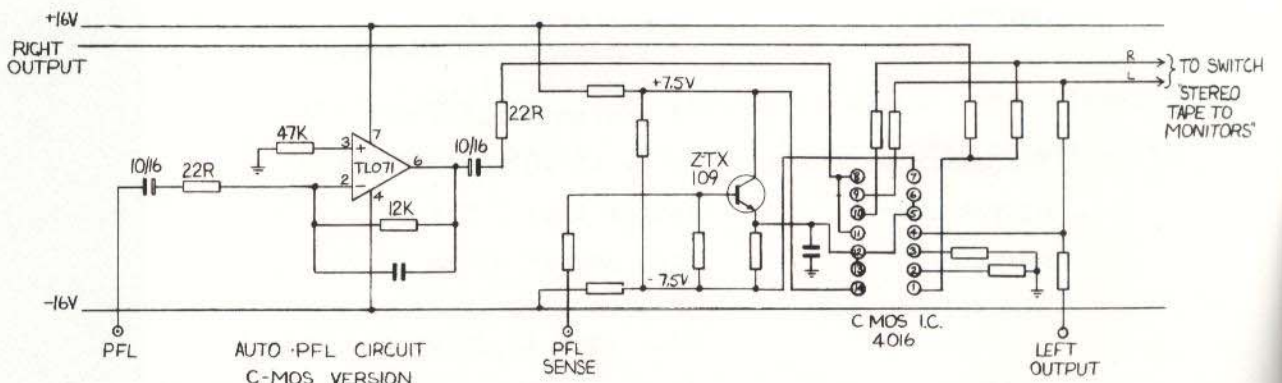


MONITOR AMPLIFIER

LEFT SHOWN
RIGHT IS IDENTICAL
BUT I.C. PIN No.'S
IN BRACKETS.



AUTO PFL CIRCUIT
RELAY VERSION



AUTO PFL CIRCUIT
C-MOS VERSION

