



Neve
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**V Series Mk 3
Operator Handbook**

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In keeping with our policy of continuous development, we reserve the right to change the design of any unit forming part of this specification if

such a change will, in our opinion, improve the performance or produce any other advantage mutual to the customer and ourselves.

V3 Series Operator Handbook

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1. SYSTEM INFORMATION

1.1 Introduction

This handbook has three parts, system, I/O module, and monitor section information. System information provides an overview of the V Series console and includes a block diagram (Figure 1.1) showing the main functional blocks in the circuit. Next to each functional block in the diagram is the page number of the block description. Additional block diagrams show the various console configurations available to the operator.

Throughout the handbook, single key or button presses are shown upper case in <> brackets, e.g. <OFF>.

1.2 Modes of Operation

The console design is of the 'in-line' monitor type with each I/O module containing all the facilities for multitrack recording, overdubbing and mixdown. Two distinct signal paths are processed by each module. The channel signal path handles input sources during recording and tape playback during mixdown. The monitor path is used primarily for monitoring multitrack sends and playback and for effects sends or returns during mixdown. The monitoring path can also provide additional tape replay inputs for very large mixdown operations.

Versatile switching allows the various I/O module sections to be configured between the two paths, so that the operator can arrange each path to give the simplest and most efficient control. Figures 1.2 to 1.5 show, in block diagram form, the four modes of operation.

Input selection and output routing for the I/O module paths is determined by the console master status controls. The controls offer the unique feature of split console operation, where the console is split into two halves, to the left and right of the master control panel. Configuring the console in this manner offers many useful new facilities, including the capability of using half the desk for separate monitor operation. The resulting signal path flexibility allows the operator to concentrate on the creative aspects of the session rather than the inhibitions imposed by a restrictive system.

A universal bantam patchfield facilitates insertion and cross-patching of all signal paths. The patchfield is conveniently placed for rapid visual assessment and mounted vertically to minimize the ingress of dust and debris.

System Information

1.3 V Series System Configuration

Multitrack Recording

This configuration is shown in Fig 1.2. Input mic or line signals are fed via the channel path and large fader to the multitrack routing matrix. The inputs can be processed using the high and low pass filters, equalizer, and dynamics units. The channel path can be routed directly to the track send of the same number using <DIR>, or provide an audio subgroup by pressing the <GRP> button, allowing overall dynamic, equalization and level processing to be achieved on a mix of inputs before signals are recorded on tape. The track level control provides simple level adjustment for the track send.

Simultaneous monitoring of either the multitrack sends or returns is possible with switching performed on a master basis, controlled from the monitor section. The equalizer and dynamics may be configured in the monitor path from the switch matrix next to the small fader on the I/O module, and in a similar way the auxiliaries may be configured in the monitor path, prefade, precut for cue sends to the studio and postfade for monitor reverb sends.

The small fader is usually configured for monitoring but this can be reversed individually using <SWAP> next to the small fader or on a master basis using <FADER SWAP> in the monitor section. The monitor signal can then be panned and routed via the 4-track routing matrix to one of the two stereo main outputs.

Mixdown

This configuration is shown in Fig 1.3. In mixdown the configuration of the I/O module is effectively the opposite of the multitrack recording situation. The channel path feeds the 4-track routing matrix via the large fader and accepts primary multitrack return mix inputs with full in-path processing and auxiliary sends. The monitor path has three distinct purposes:

- it accepts secondary mix inputs with processing available if not used in the channel path. Access to the 2-track main outputs is provided on the multitrack routing matrix.
- In a similar way effects returns can be accepted by the monitor path.
- Conversely the path can be used for channel post-fade effects sends by pressing the <CHOP> button. The monitor path fader controls the send level to any one of the 48 groups available from the multitrack routing matrix.

Track Bouncing

This configuration is shown in Fig 1.4. Patch free track bouncing can easily be achieved on the console using the <BNCE> switch. The I/O module is configured so that the multitrack return feeds the monitor path but is routed back to the multitrack routing matrix. By simply selecting <BNCE> and making a routing selection on each track return to be bounced, the whole operation can be quickly achieved. Equalization and dynamics can be configured in the monitor path to allow processing while bouncing.

Overdubbing

Note: For clarification, the master overdub button is shown as <OD> and the individual overdub button is shown as <OD> in this section only.

The V-Series has a sophisticated monitoring and cue send system for tracklaying and overdubbing which allows the engineer total monitoring freedom in the control room whilst maintaining the correct cue sends to the studio.

The system works with interactive controls which cover the various monitoring requirements. To explain the system six diagrams are used which do not cover every situation but should give a good understanding of the system operation.

Five master controls operate the system with additional <OD> buttons on each I/O module. Master monitor status is controlled by three interlocking buttons <OP> <PB> <OD> and in addition there are <MIXED CUE> and <CUES POST EQ> options.

<OP> <PB> and <OD> switch control room monitoring on a master basis from multitrack send <OP>, to multitrack return <PB>, and overdub <OD> where multitrack send is selected on individual <OD> switched tracks and multitrack return is selected on the backing tracks. The individual <OD> buttons affect cues being sent to the studio as well as switching control room monitoring in the master <OD> monitoring mode. The multitrack send of any module switched into <OD> is applied to the cues. The backing track cues (no <OD> selected) receive multitrack return.

The cue sends on <OD> tracks can also be switched to <MIXED CUE>, a mix of multitrack send and return, which can be varied on an individual basis with a trimmer on each I/O module. The backing track cues can be assigned to a 'follow monitor' condition using <CUES POST EQ>, when any monitor equalization and dynamics are also heard on the cues. The facility automatically cancels should control room monitoring be switched to <OP> because the cues still require <PB>.

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<OP>

This configuration is shown in Fig 1.5. The control room monitors multitrack sends, cues monitor multitrack returns.

<PB>

This configuration is shown in Fig 1.6. Control room and cues monitor multitrack return.

<PB> and <OD>

This configuration is shown in Fig 1.7. Control room monitors multitrack return. Cues monitors multitrack return on backing tracks and multitrack send on selected overdub tracks.

<OD> and <OD>

This configuration is shown in Fig 1.8. Control room and cues monitor multitrack return on backing track and multitrack send on selected overdub tracks.

<OD> and <OD> and <MIXED CUE>

This configuration is shown in Fig 1.9. Control room monitors multitrack return on backing tracks and multitrack send on selected overdub tracks. Cues monitor multitrack return on backing tracks and mix of multitrack send/return on overdub tracks CUES.

<PB> or <OD> and <POST EQ>

This configuration is shown in Fig 1.10. The backing track in overdub or the complete mix in playback (no individual <OD> track selected) can feed the cues complete with monitor equalization and dynamics. The facility automatically cancels if <OP> is selected as the cues are still required to send multitrack return to the studio.

This diagram is not available at the time of issue

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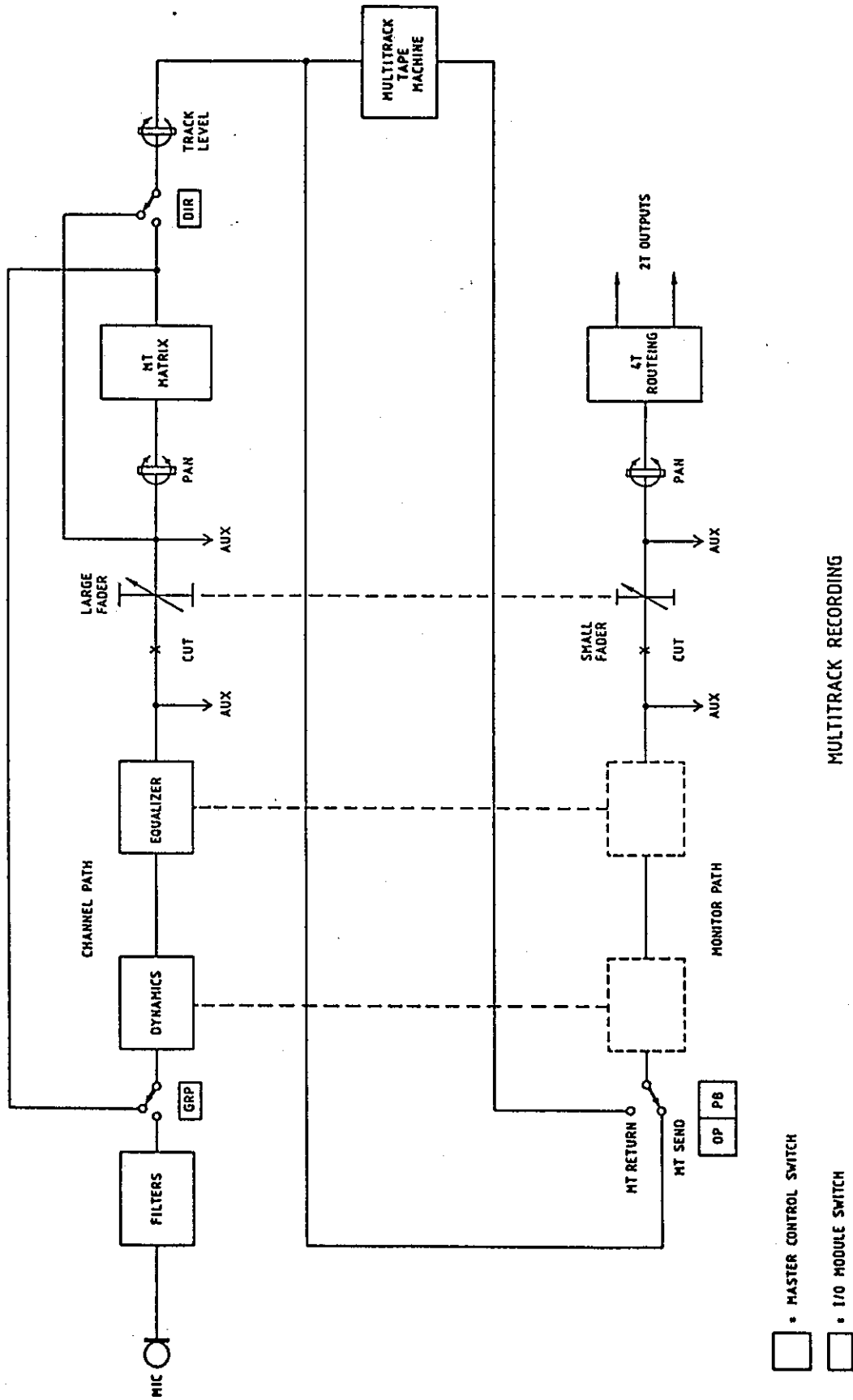
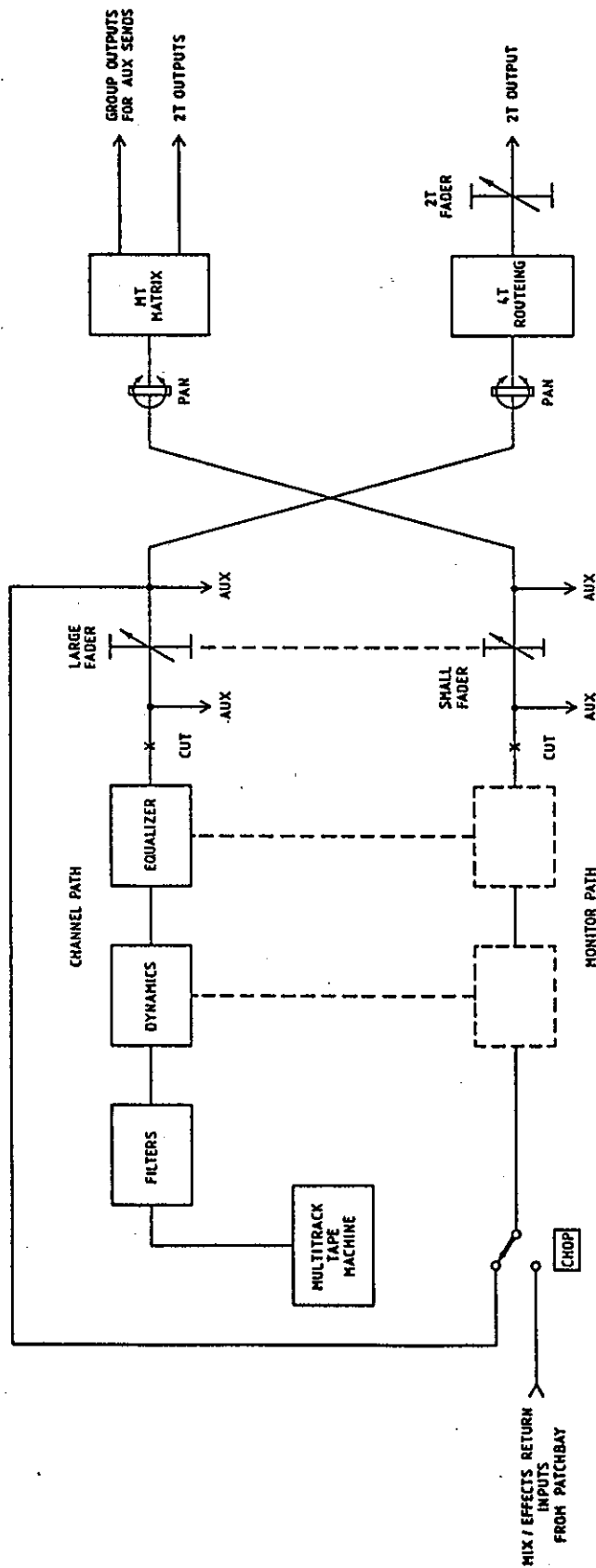


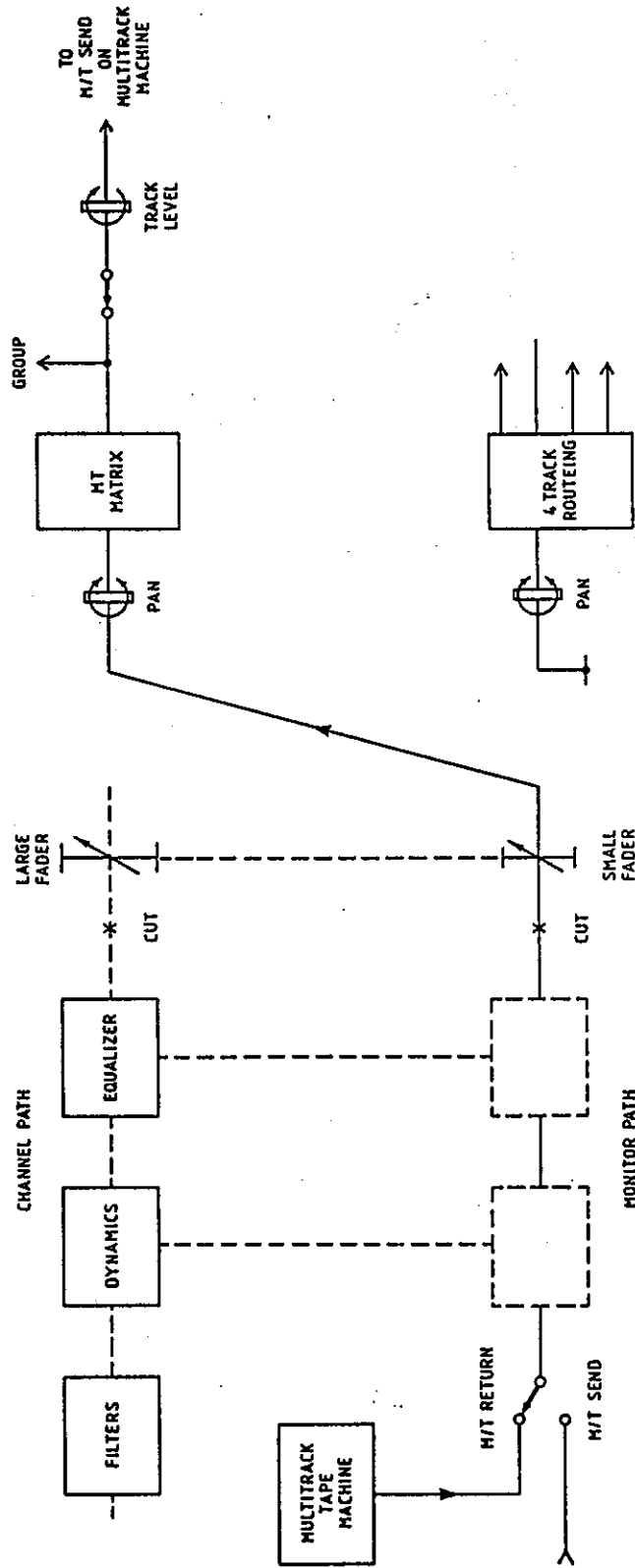
Figure 1.2



MIXDOWN

Figure 1.3

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 System Information



TRACK BOUNCING

Figure 1.4

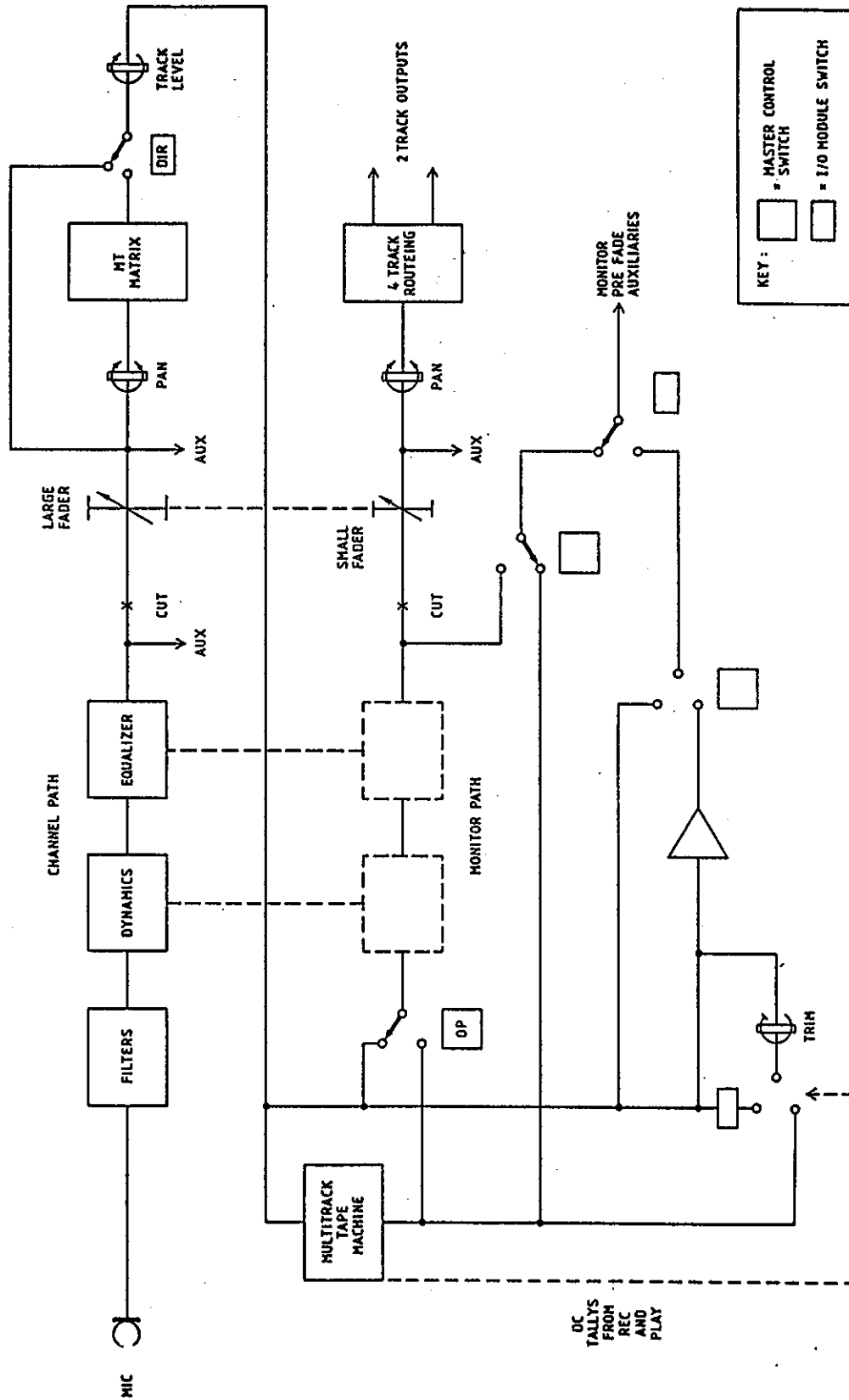
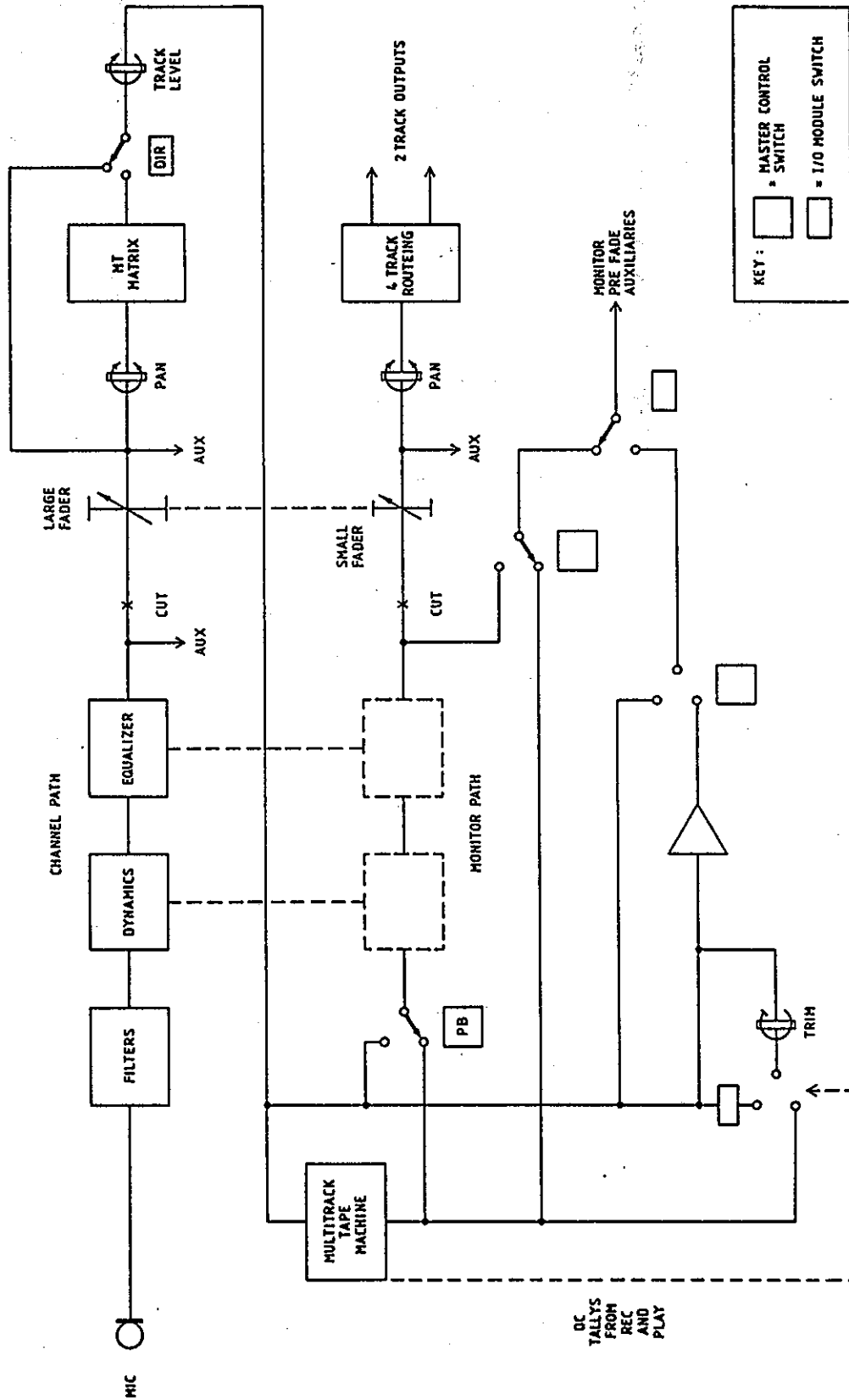


Figure 1.5

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System Information



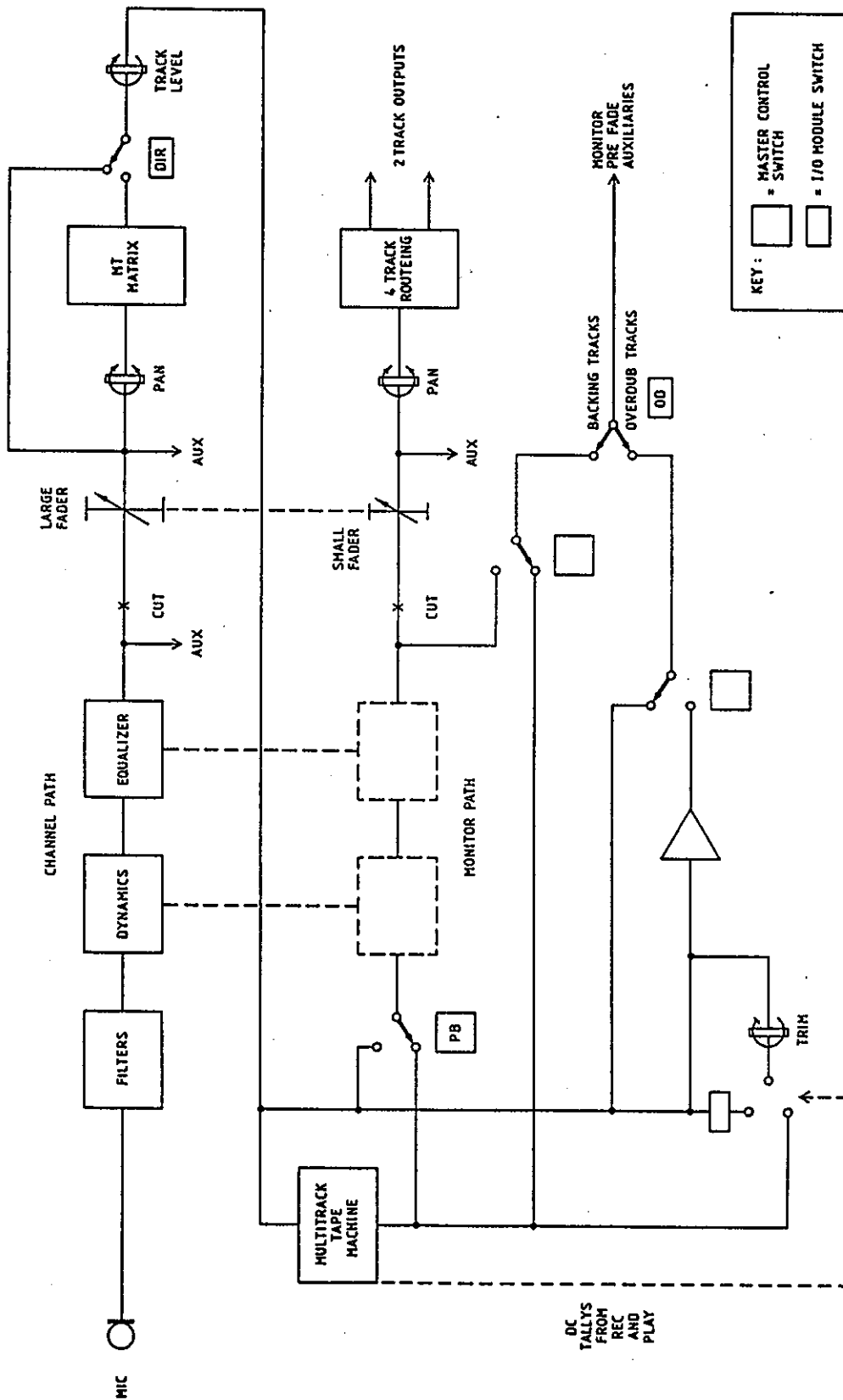


Figure 1.7

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System Information

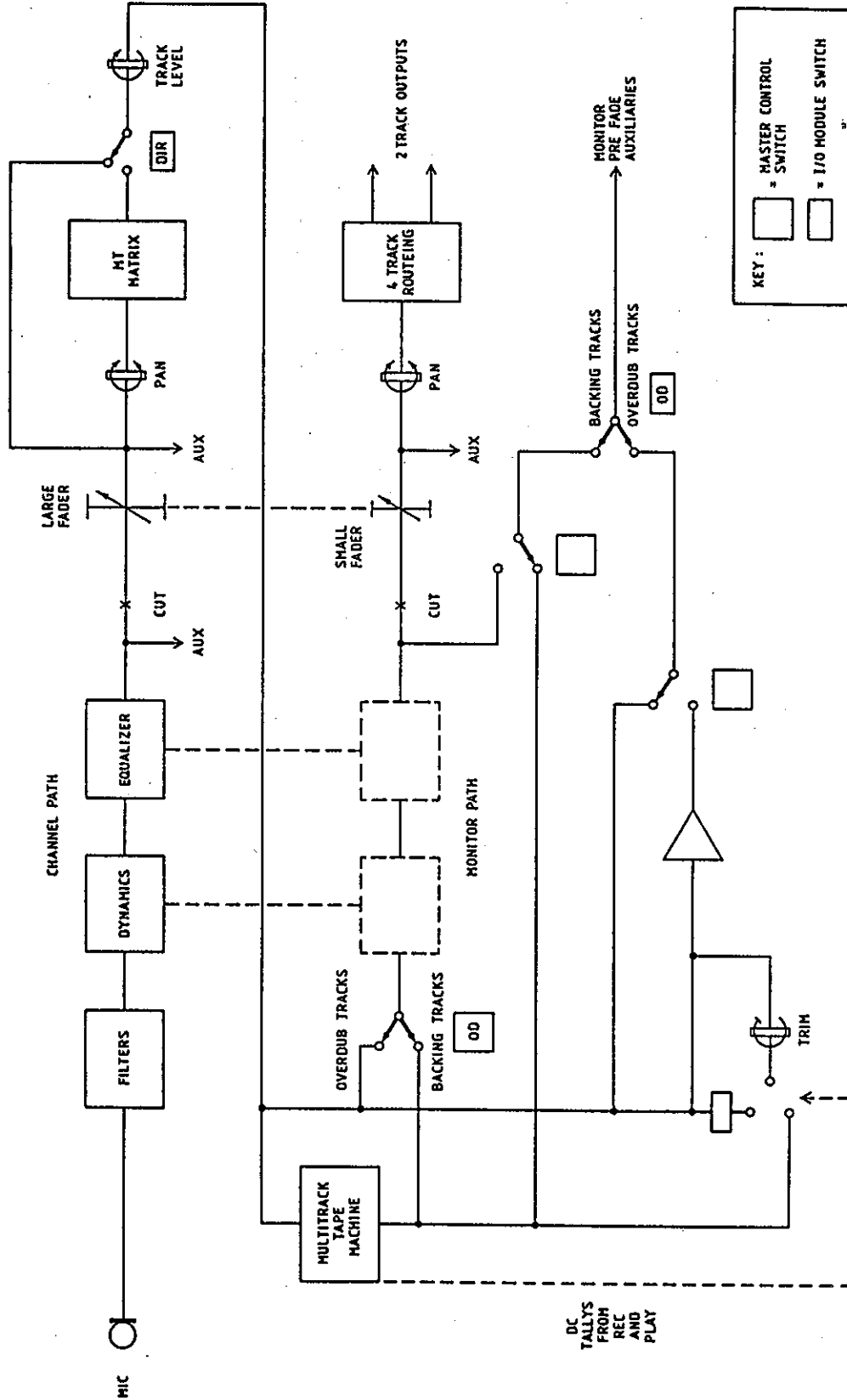


Figure 1.8

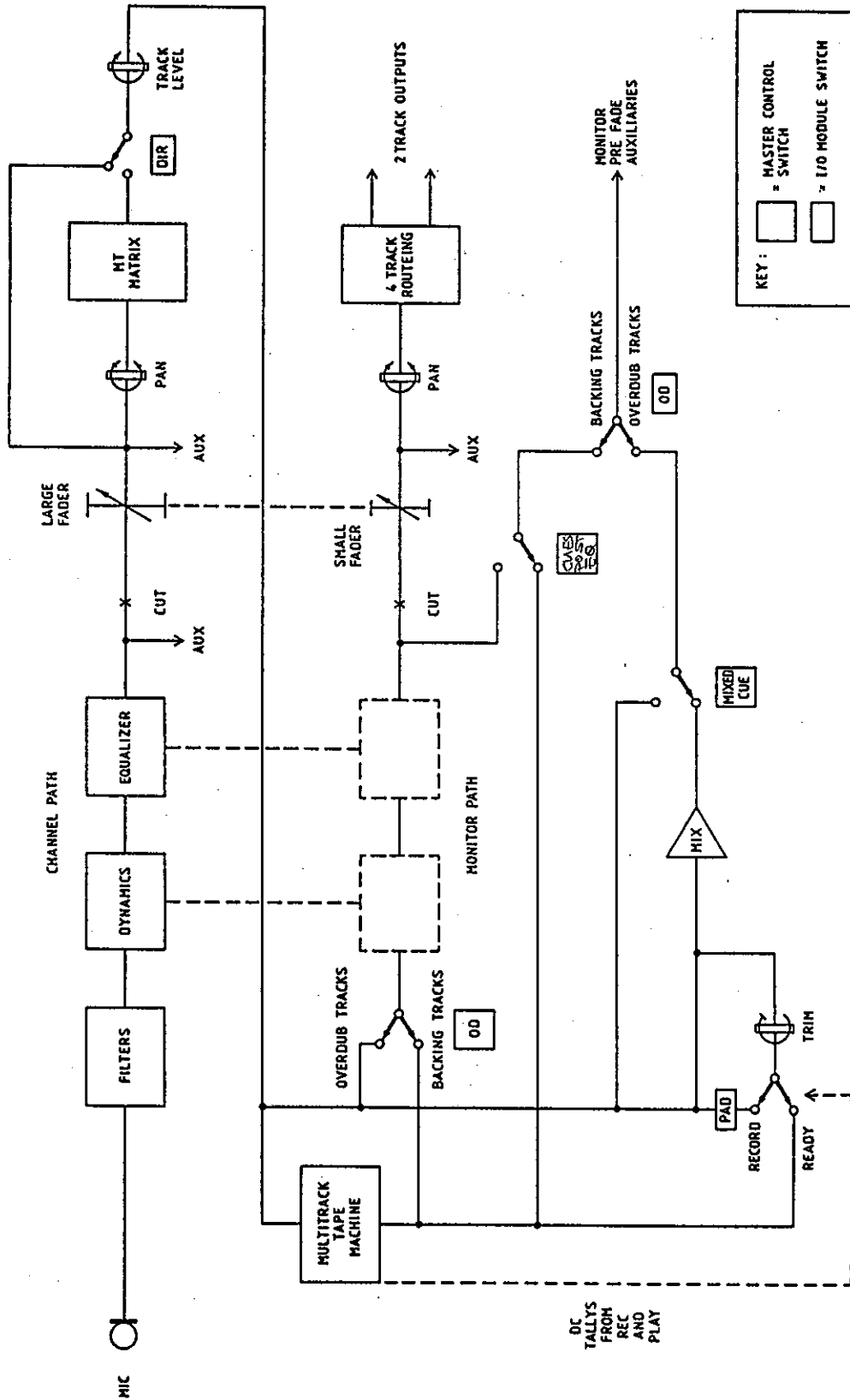
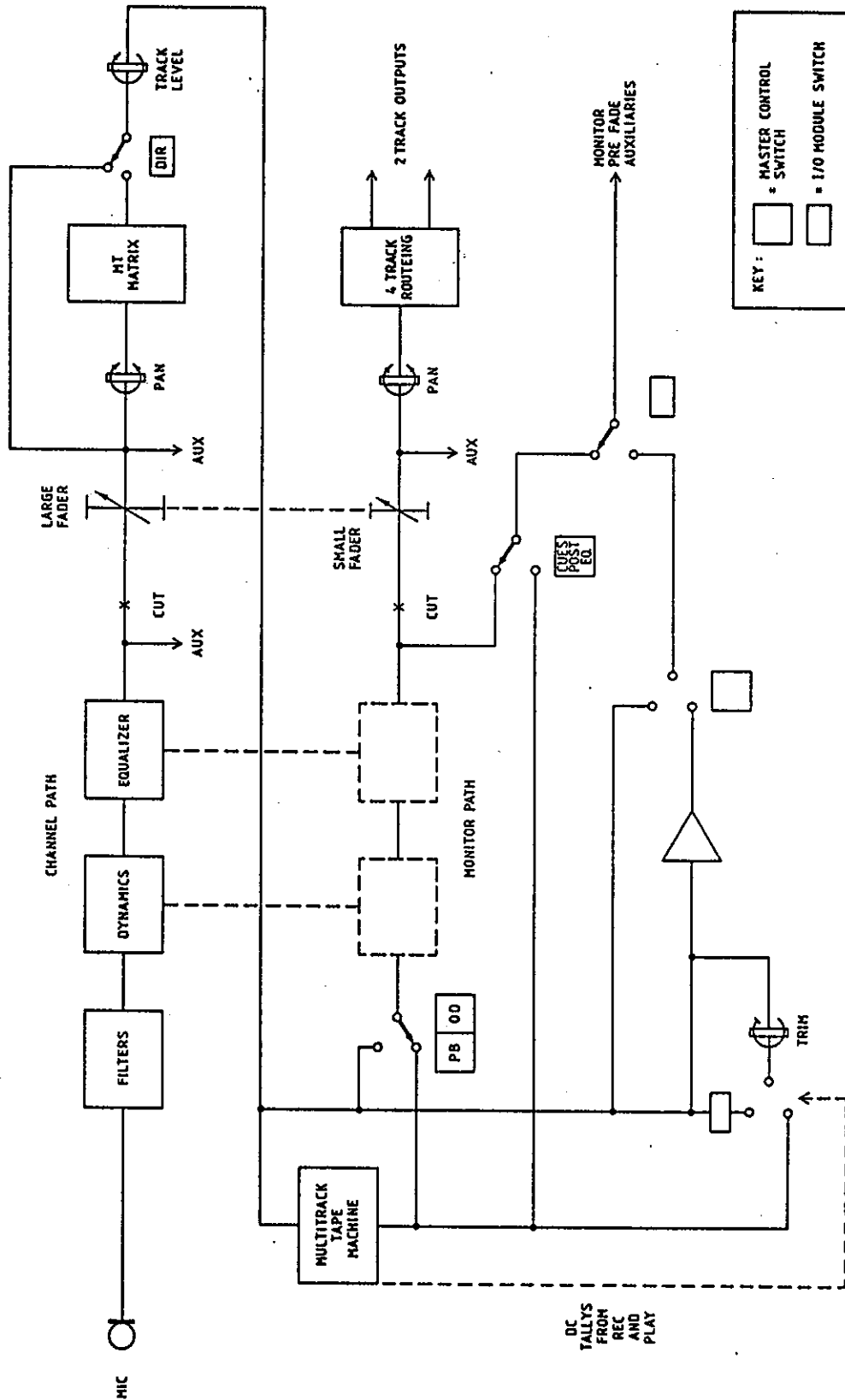


Figure 1.9

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System Information



1.4 Module Facilities

Multitrack Routeing Matrix

The routeing matrix offers 48-track routeing with pan selectable between odd and even track sends. Access is also offered to the main outputs to facilitate extra mix inputs and effects returns through the monitor path during mixdown. Track bouncing can easily be achieved with the <B'NCE> switch which sends the relevant multitrack return back to the routeing matrix via the monitor path. Routeing to the 2-track outputs is automatically cancelled to prevent doubling of the monitoring signal level. The bounce signal can be processed by placing the EQ and dynamics units in the monitor path.

Inputs

The gains of the mic and line inputs are varied on two continuously variable pots providing a total range of -10dB to +70dB (in conjunction with -30dB PAD) for mic and -10 to +10dB for line. Both inputs can also be phase reversed. Patch free audio subgrouping is available as the highest priority input allowing a group output signal to be processed as a channel signal before being rerouted.

Filters

12dB/octave high-pass and low-pass filters with frequencies 31.5 to 315Hz and 7.5 to 18kHz respectively can be switched into the channel path independently.

Dynamic Control

The sophistication and technical performance of the unit allow superb dynamic control whilst retaining a natural sound. Full limiter/compressor and gate/expander facilities are available with a fully flexible sidechain.

The gate/expander has a 70dB threshold range, 50dB gate range, switchable attack time, release from 30ms to 3s and variable hysteresis. Hysteresis control allows precise triggering on the wanted signal whilst still allowing the correct amount of signal 'tail' through. The expander has a 2:1 expansion ratio.

The limiter/compressor attack and release times are dependent on programme material i.e. impulse or steady overload. The 'anti pumping and breathing' circuitry allows the unit to operate on the source musically whilst retaining absolute control over the dynamic range. The control ranges are 50dB threshold range, ratio 1:1 to limiting, release from 30ms to 3s with an end stop fully programme dependent auto release and 30dB of gain make-up.

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I/O Module Facilities

The module equalizer can EQ the dynamic sidechain to provide frequency dependent dynamic control effects such as de-essing.

A simple metering function is performed by the tri-coloured LED labelled 'Gain rdn'. The LED indicates green for a small gain reduction, orange for medium and red for large (1, 5, and 10dB respectively).

Auxiliaries

Eight auxiliary sends are available which can be configured with a large amount of flexibility. Either channel or monitor path can be the signal source and the sends can be pre- or post-fader, mono or stereo (four stereo pairs with pan).

Operationally, the pre-auxs send signal to the artists in the studio in tracklaying mode and also some effects sends in mixdown. The source point for the two functions is arranged so that in tracklaying mode the signal is taken precut to enable cut solos to be performed in the control room and still retain cue sends, whilst in <MIXDOWN> the signal is taken postcut so that the effects send is cut with the source.

Insert

The insert can be positioned in either the channel or monitor path independent of the equalizer. Configuration pre-equalizer and pre-dynamics is also possible.

Formant Spectrum Equalizers

The sound of Neve equalizers is the result of years of research and extensive studio experience. The no compromise design philosophy has made it possible to produce a 4-band parametric unit with generous +/-18dB cut and boost, midband Q variable from 0.5 to 9, switchable Q (0.71/2) and peak/shelving characteristics on the outer bands without the problems associated with interactive control ranges. The result is a truly musical equalizer.

Track Level Control

The track level signal can be controlled between -∞ and +10dB. The channel signal can also be routed directly to the corresponding track send using the <DIR> button thus avoiding the multitrack routing matrix. In this mode signals from other channels cannot be routed to this track send.

Module Status

Individual fader and status swaps can be achieved on an individual module basis. The flexibility offered by these facilities can be realized in many session situations and allows the operator to concentrate on creativity without being constrained by the console's ability. Two small LEDs indicate

the small fader assignment to aid status clarification.

Monitor Path Selectors

The selectors assign the module dynamics <DYN>, insertion <INS>, Equalizer <EQ>, and auxiliaries <1-2> <3-4> <5-6> <7-8> to the monitor signal path. <CH-OP> connects the channel postfade output to the input of the monitor path and can allow additional effects sends to be set up via the multitrack routing matrix.

All of these selector buttons are grouped for easy viewing so that the signal structure of each module may be quickly assessed.

Monitor Path Switching

The console has a sophisticated monitoring system allowing monitoring freedom in the control room whilst retaining the correct cue sends. The system works in conjunction with master monitor selection.

Solos and Cuts

The solo system on the console is very sophisticated with selectable momentary, interlocking and latching action buttons performing either in-place solo, or PFL or APL type solos. The two identical systems for the channel and monitor paths work regardless of fader swap. The modules can be isolated from solo mute action to provide effects returns in both paths. Groups of large faders can be cut on a master basis by selecting one of two mute groups. This action is always on the large fader regardless of positioning.

4-Track Routing Matrix

Selectable access to the main outputs for mixdown and simultaneous monitoring during recording is available from the 4-track routing buttons with pan between odd and even outputs.

1.5 Central Facilities

Console Status Configuration

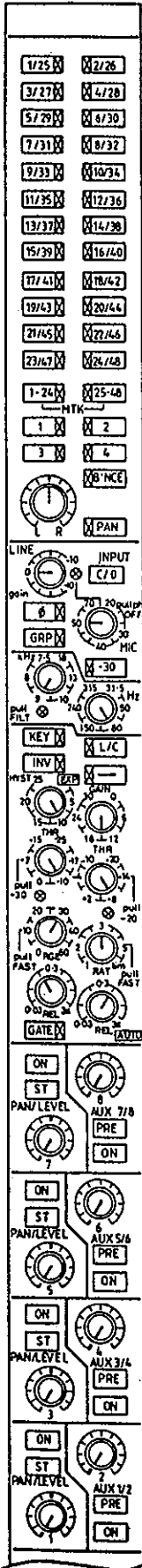
Using the master mode selectors <MIC> (mic/line switching) <FADER SWAP> <MIXDOWN> (tracklaying/mixdown status switching) and <BROADCAST> the console can be configured with great versatility including status assignment to allow split monitor operation. Console status can also be changed on each I/O on an individual basis). Broadcast mode provides 'simulcast' mixing allowing simultaneous multitrack and broadcast production work to be easily accomplished.

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I/O Module Facilities

Solo System

The V Series has a remarkable solo system combining the monitoring facilities of prefade listen (PFL), after-pan positional listen (APL) and solo-in-place (cut solo) in a flexible and simple control system.

All console solo buttons are electronically latched providing individual but identical solo facilities for both signal paths regardless of fader swap. <CHAN SAFE> and <MON SAFE> provide individual path solo-safe controls which can be linked to tape machine record functions or 'on air' signalling for auto changeover.



Multitrack Routing Section
(Refer to page 2 - 9)

Insertion and Equalizer Section
(Refer to page 2 - 6)

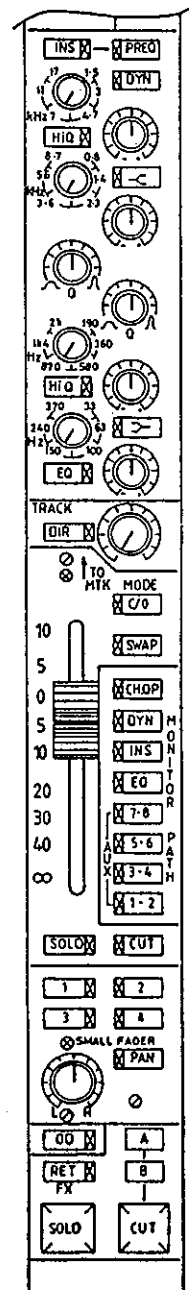
Input Section
(Refer to page 2 - 5)

Dynamics Section
(Refer to page 2 - 2)

Small Fader Section
(Refer to page 2 - 10)

Auxiliary Section
(Refer to page 2 - 1)

Mixdown and Large
Fader Section
(Refer to page 2 - 7)



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I/O Module Facilities

1.6 Specification

Microphone input (Transformer balanced)	Input Impedance	- greater than 1k ohm balanced
	Input Balance	- greater than 70dB @ 1kHz
	Input Gain Range	- Continuously variable between -10dB and +70dB
	Input Headroom	- greater than +26dB above nominal input level referred to 0dBu
High Level Inputs (Electronically balanced except for modules which have transformers)	Input Impedance	- greater than 10k ohm
	Input Balance	- greater than 50dB
	Input Gain Range	- continuously variable between -10dB and +10dB
Track Outputs (Electronically balanced)	Input Headroom	- greater than +26dB above 0dBu
	Maximum Output	- greater than +26dBu into 600 ohms
Main Output (Unbalanced)	Output Impedance	- less than 15 ohms
	Output Balance	- greater than 40dB
Dynamics Section	Maximum Output	- greater than +26dBu into 600 ohms
	Output Impedance	- less than 15 ohms
Gate	Input Threshold Range	+15dBu to -55dBu
	Attack Time	1ms, normal; 100us
	Release Time	fast
	Hysteresis Depth	30ms to 3s
Compressor	Input Threshold Range	+20dBu to -30dBu programme dependent
	Attack Time	1ms/7ms normal 100us/7ms fast
	Release Time	30ms to 3s with automatic 'hold' and impulse release circuits. Also with automatic release giving programme dependent release time.
	Compression Ratio	variable between 1:1 and limiting

Overall Performance	Microphone EIN	- better than -125dBu (20Hz to 20kHz) when sourced from 200 ohms
	Line Input Noise	- better than -79dBu (20Hz to 20kHz) with equalizer, dynamics and insertion in circuit but not actively processing (measurements made at track outputs)
	Frequency Response	- flat +0.5dB - 1.0dB in the band 20Hz to to 20kHz reference 1kHz
	Total Harmonic Distortion	- better than 0.04% (20Hz to 20kHz) (0.09% if console fitted with VCA faders)
	Multitrack Crosstalk	- typically better than -80dB (20Hz to 20kHz)

NOTE: 0dBu = 0.775V rms regardless of circuit impedance

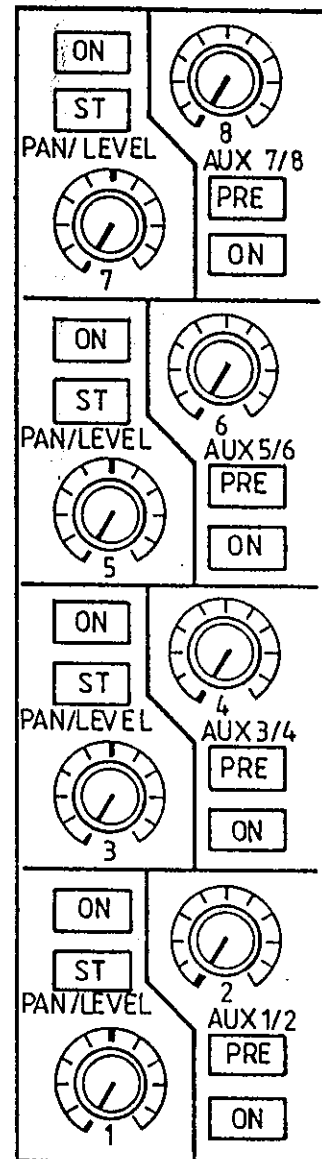
2.1 Auxiliary Section

This section can be configured as eight mono auxiliary sends or four stereo pairs with panning facility and pre/post fader switching.

Pressing the <ST> button selects which pairs are switched to stereo in the corresponding section. The level control immediately below the <ST> button becomes a pan pot, and the level control on the right hand side of the pair becomes a stereo level control.

The <ON> buttons act as individual switches for Left and Right in stereo mode or 1 and 2 in mono mode. The <PRE> button switches the pair of auxiliaries pre-fader in both mono and stereo mode. Whether <PRE> auxiliaries are affected by the source path <CUT> button is controlled automatically by the master mixdown/record switching. In record mode the auxiliaries are taken pre-path <CUT> to allow in-place solos to be performed whilst sends to cues are unaffected.

In mixdown the auxiliaries are taken post-path <CUT> so that effects sends are cut with source. The auxiliaries may be selected in pairs to the monitor path by pressing the buttons marked AUX <1/2> AUX <3/4> etc. alongside the small fader. The auxiliaries stay assigned to monitor or channel path independent of the fader swap system.



REL

The release time for the gate/expander is continuously variable from 30ms to 3s.

<GATE>

Switches the gate/expander into circuit separately from the limiter/compressor.

The limiter/compressor controls are:

<L/C>

Switches the limiter compressor into circuit separately from the gate/expander.

< ->

When the arrow button is pressed, it links the control voltage of the limiter/compressor to the next module to the right for stereo or quad ganging. The control voltage is still generated if the limiter/compressor is not in circuit and can therefore be used for a stereo/quad link even if it is not actively processing.

GAIN

Gain makeup of up to 30dB is provided to enable an excellent signal to noise ratio to be maintained throughout the path even under heavy compression.

THR

Threshold level can be controlled over 50dB in two overlapping ranges. Pulling the pot adds -20dB to the panel values and this action is indicated by a red LED.

RAT

Controls the compression ratio with a conveniently arranged law between 1:1 and limiting. Pulling the pot nominally changes the impulse attack time from 1ms to 100us. However the attack time is programme dependent, normally having a 7ms time constant, with faster time constants being applied to transient programme.

REL

The release time can be varied from 30ms to 3s with the additional benefit of automatic 'hold' and impulse release circuits to remove pumping and breathing effects. The fully clockwise position switches the release control to a triple time constant program dependent release time.

I/O Module

Gain Reduction LED

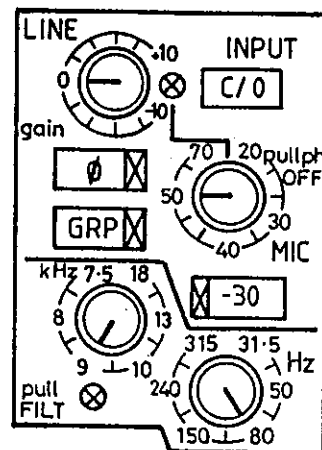
A simple metering function is performed by the tri-coloured LED labelled 'Gain rdn'. The LED indicates green for a small gain reduction, orange for medium and red for large (1, 5, and 10dB respectively).

Sidechain Equalizing

The module equalizer may be inserted in the control sidechain of the dynamics unit by pressing the <DYN> button in the equalizer section. (The key input, being a separate path, is not equalized).

2.3 Input Section

Mic/line switching is master controlled and set depending on console status. <C/O> flips the inputs locally in the opposite sense to the master status. Both mic and line have continuously variable controls. The range of the line trim is -10dB to +10dB. For the mic input the range is +20 to +70dB with the addition of a <-30>dB pad. With a total range of -10 to +70 the mic input can be used for line level signals if desired.



<C/O>

Performs mic/line changeover switching. When mic is selected the red next to the line trim is illuminated.

<GRP>

This button provides a patch free audio sub-grouping facility. On selecting <GRP> on any of the modules 1-48, the channel path picks up the multitrack bus of the same number, allowing the EQ, filters, insert, and dynamics to be used on the multitrack signal as if it were a conventional channel path input signal. The channel fader now acts as an audio subgroup fader and the signal can be routed in the usual manner. Routing back to the associated multitrack send can be achieved using the <DIR> button (situated above the small fader). The associated LED lights when subgroup is selected.

< ∅ >

The phase-reverse button operates on both mic and line inputs (but not subgroup). The associated LED lights when the button is pressed.

Filter Section

The high-pass filter has a range of 31.5 to 315Hz and the low-pass a range of 7.5 to 18kHz. Both filters are smooth controls and are individually selected by pulling the corresponding knob. The LED indicates when either or both filters are selected. The filter slopes are 12dB/octave in both cases.

I/O Module

2.4 Insertion and Equalizer Section

Each module contains an independently switchable patch insertion.

<IN>

This button selects the insertion to either the channel or the monitor path; if the <INS> key next to the small fader is pressed then the insertion is assigned to the monitor path. The insertion is 'hot wired' and so always provides an output regardless of the <IN> button states.

<PREQ>

The insertion, when selected, is normally post EQ. Pressing <PREQ> switches the insertion point pre equalizer and dynamics.

Switching the equalizer and dynamics into circuit and then transferring them to the monitor path does not affect the insertion assignment.

Equalizer

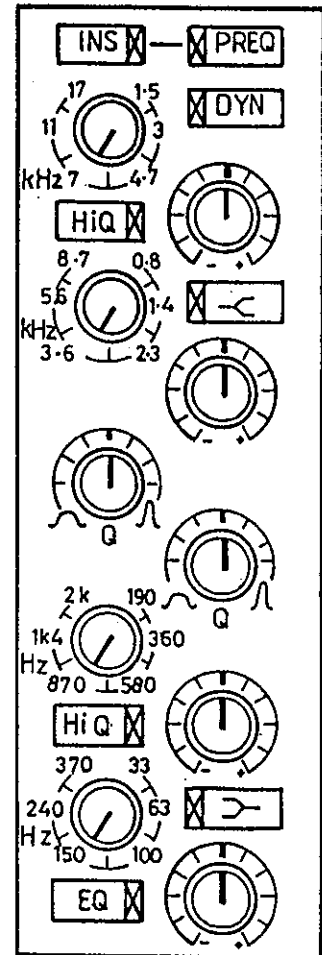
The equalizer comprises four continuously variable overlapping frequency control bands with a peaking characteristic. The two mid bands have variable Q with a range of 0.5 to 9 and a centre detent at Neve FSE traditional settings. The Q and characteristics of the high and low bands can be switched from 0.71 to 2 using the <HiQ> switches and from peak to shelving using the <-> and <-<> switches. Each band has 18dBs of cut or boost on a smooth control. The equalizer design is such that the Q automatically varies with gain on all bands in peaking and shelving modes. As the gain is increased, so is the Q.

The ranges of the frequency controls are as follows:

Low:	33	to	370Hz	Mid2:	0.8	to	8.7kHz
Mid1:	190Hz	to	2kHz	High:	1.5	to	17kHz

<IN>

Pressing the <IN> button selects the equalizer to either the channel or the monitor path; when <EQ> is pressed (next to the small fader) the equalizer is inserted into the monitor path. The LED next to the <IN> button indicates when the equalizer is selected.



2.5 Mixdown and Large Fader Section

Selecting <1>, <2>, <3> or <4> gives access to the main 2-track outputs for mixdown and simultaneous monitoring during multitrack recording.

<PAN>

When pressed this button enables the pan pot opposite and allows panning between odd and even tracks selected on the routing buttons.

Effects <RET>

This button allows the I/O module to be used as an effects return. When a path with effects send is soloed, the operator needs to hear the 'effect' of the return mixed in with the source; the return's path therefore must not be cut. This facility allows any path to be an effects return path. In mixdown mode the monitor path may also be an effects return or send. The associated LED lights when <RET> is selected.

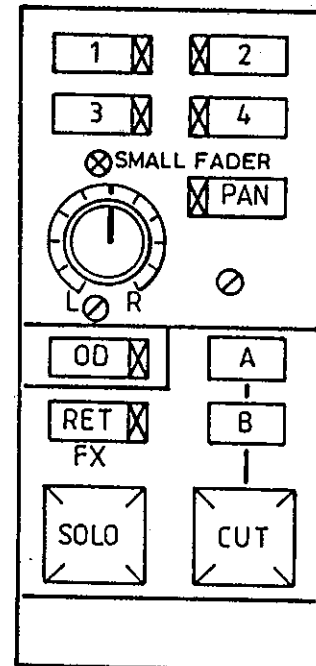
<SOLO>

The button function is dependent on master selection and record status. The switch can be selected to have a momentary, interlocking (<I/L>), or latching (<LATCH>) action and can be assigned to operate as a cut solo, positional AFL or PFL. If the tape machine is in record, solo safe is automatically set on the channel path and solo monitoring continues via the AFL/PFL buses.

The solo and cut functions remain permanently attached to their corresponding faders regardless of <SWAP> condition.

<CUT>

The cut circuit can be operated individually, remotely, or by master controls in conjunction with the < A > and < B > buttons immediately above. If the <CUT> button is operated individually then the lamp glows at full brightness; if the circuit is activated remotely or by master control the lamp glows at half brightness. If both master and individual cuts are activated the lamp glows at full brightness, indicating that if the master is released the path will still be cut.



2.6 Multitrack Routeing Section

48-track Routeing

A matrix of 24 multitrack assignment buttons and two 48-track routeing buttons select one or more of 48 output buses. Each assignment button selects either or both of two output buses, depending on the state of the two 48-track routeing buttons. If the <1-24> routeing button is pressed, the assignment buttons select buses in the range 1-24; if the <25-48> routeing button is pressed the range is switched to 25-48. If both routeing buttons are pressed each assignment button selects the appropriate bus in both ranges. Each button has an LED indicator associated with it.

4-track Routeing

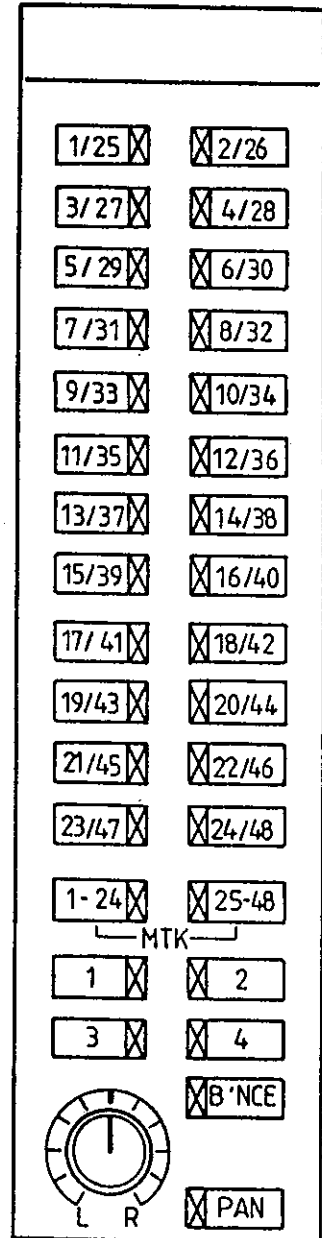
The <1>, <2>, <3> and <4> buttons, located immediately below the multitrack switching matrix, allow effects returns to be switched via the monitor path to one or both of the 2-track outputs during mixdown. This arrangement effectively doubles the number of available line level inputs available.

<B'NCE>

Pressing the <B'NCE> (Bounce) button connects the corresponding multitrack return, via the monitor path, to the multitrack routeing matrix. The bounce down track can then be selected on the assignment buttons. The 2-track routeing is automatically cancelled to prevent any doubling of the signal level. The associated LED lights when <B'NCE> is pressed.

<PAN>

When pressed this button enables the pan pot and allows panning between odd and even selections on the assignment buttons. The LED lights when the button is pressed.



I/O Module

2.7 Small Fader Selection

<DIR>

This button bypasses the multitrack assignment matrix and selects the channel path output to multitrack send of the same number. Signal level is adjusted on the adjacent rotary control which has a detented centre position at line-up level and 10dB of in-hand gain. <DIR> is used when a single channel path signal is all that is required to be sent to tape and that channel path can be configured on the same I/O module as the required track send.

<C/O>

The <C/O> button has an electronically latched changeover function which reverses master status for record and mixdown modes on a local basis. The associated LED indicates that the local status is opposite to the master.

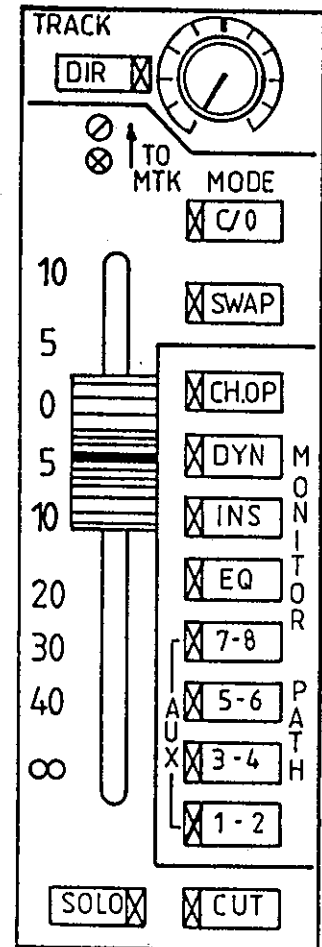
<SWAP>

This is an individual fader swap control that transposes the small fader with the large fader; the associated solo and cut functions are also transposed. There is also a master <FADER SWAP> control in the main monitor section. The position of the small fader is indicated by two LEDs, one above the fader has an arrow with 'To MTK' indicating that the fader is feeding the multitrack assignment matrix, the other above the main pan pot indicates that the small fader is feeding the 4T routing matrix.

The auxiliaries remain assigned to the channel or monitor path independent of the swap function. Therefore the operator can replace a small fader with a large fader, or a manual fader with an automated fader, without any reassignment of auxiliaries.

<CHOP>

This connects the input of the monitor path to the channel postfade output offering up to 48 additional effects sends during mixdown.



Monitor Path Assignment

The seven buttons <DYN> (dynamics), <INS> (insert patch), <EQ> (equalizer) and <1-2>, <3-4>, <5-6>, <7-8> (auxiliaries) in the rectangular box by the small fader enable these facilities to be assigned independently to the monitor path. The associated LED lights when one of the buttons is selected.

<SOLO>

The button function is dependent on master selection and record status. The switch can be selected to have a momentary, interlocking (<I/L>), or latching (<LATCH>) action and can be assigned to select cut solo, positional AFL or PFL. If the tape machine is in record, solo safe is automatically set on the channel path and solo monitoring continues via the AFL/PFL buses.

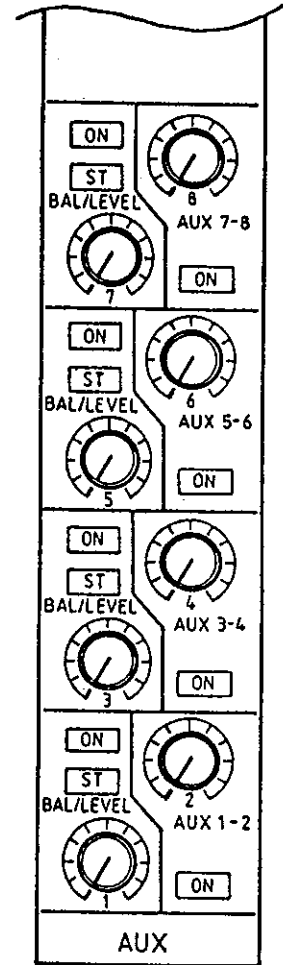
The solo and cut functions remain permanently attached to their corresponding faders regardless of path condition.

3.1 Auxiliary Master Outputs

The auxiliary sends are configured as eight mono sends or switched to four stereo pairs. This is achieved by pressing the <ST> button next to each pair. The level control immediately below becomes a pan control and the adjacent level control becomes a stereo level control.

The master level controls feed the cue mix system, allowing the operator to build up a mix of auxiliary outputs as a cue mix.

The master level controls also adjust the level to the reverb send outputs. The <ON> buttons enable the cue/reverb send outputs. Each send has a patch insertion.



Monitor Section

3.2 Control Room Monitor

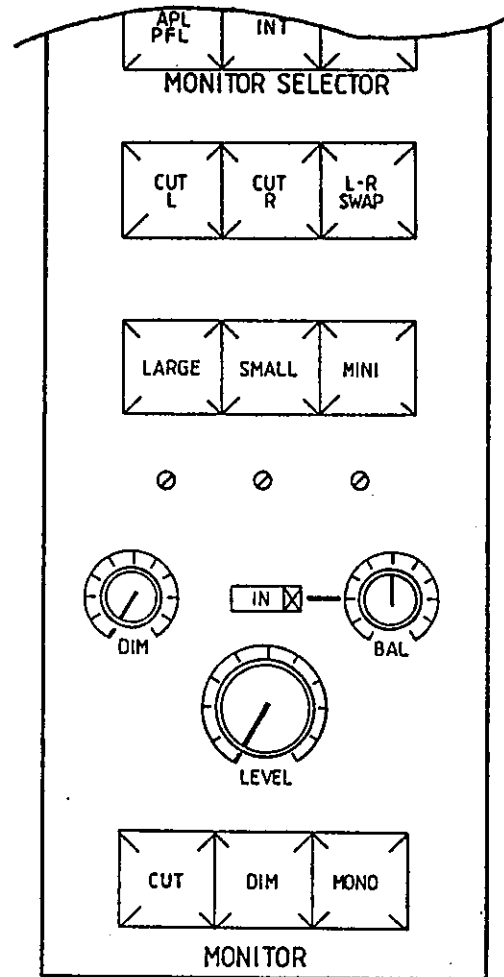
This section allows stereo monitoring of the sources selected on the monitor selector. The feeds to the control room monitor loudspeakers have insertions on the patchfield; monitoring can be cut, dimmed or mono-mixed by selection of:

<CUT>, <DIM> or <MONO>

depending on the function required.

The <DIM> level can be varied using the associated rotary control and the monitor signal can be offset by +/-6dB using the <IN> switch and the balance pot above the master level control. Monitor level of PFL/APL signals can be adjusted with the rotary control above the PFL/APL indicator monitor cut. Individually Left and Right monitor cut can be selected with <CUT L> and <CUT R> and momentary <L-R SWAP> can also be selected.

The buttons marked <LARGE>, <SMALL> and <MINI> allow selection between three different loudspeaker systems. The preset trimmers immediately below these buttons allow the level of each system to be adjusted individually. The rotary control below the presets is the master level control and adjusts all three systems.



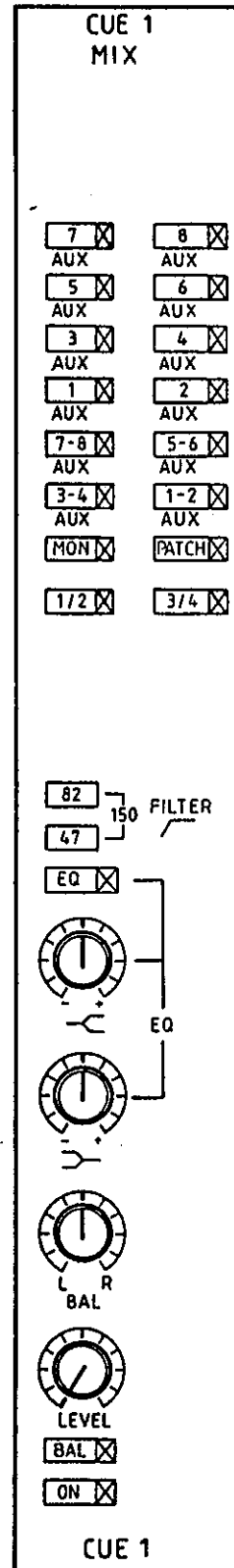
3.3 Cue Mix System

This module provides two stereo cue sends with stereo equalization, filtering, level and balance control.

Pressing the <EQ> button inserts the equalizer. A high pass filter with three selectable cut-off frequencies is activated using either the <47> or <82> buttons above the <EQ> in/out. Pressing both buttons together inserts the filter with cut-off at 150Hz. Balance and level adjustment are provided by the appropriate rotary controls. The <BAL> switch inserts the balance control while the <ON> button switches the signals through to the cue outputs.

A mix of any of the auxiliary outputs (mono < 1 > to < 8 > or stereo <1-2> to <7-8>) with the console 2-track outputs, control room monitor output, or dedicated patchbay input can be built up by the selector buttons at the top of the module.

Each cue output has a patch insertion for direct injection.



Monitor Section

3.4 Master Status Selector

Pressing the arrowed buttons on either <MIC>, <FADER SWAP> or <MIXDOWN> changes the status of channels for the left hand side of the desk (left hand arrow) or the right hand side of the desk (right hand arrow). This allows the console to be configured with a separate monitor.

Pressing the centre button of each row resets the whole console for that function. Each of these master controls has individual module by module buttons which reverse the status of an individual I/O module. An LED next to each module button indicates when that channel has reversed status compared with the master status.

<MIC>

This button operates as a master mic/line changeover; the lamps indicate mic selection.

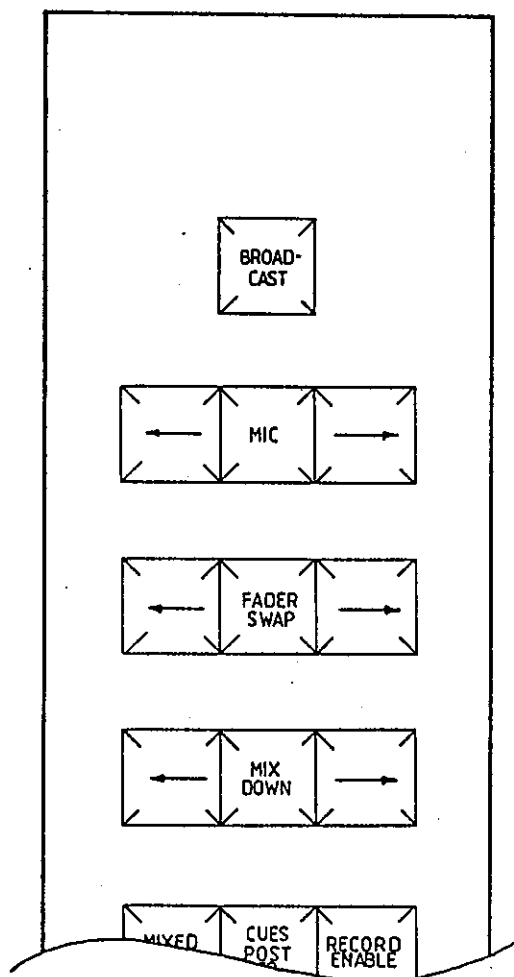
<FADER SWAP>

Pressing this button exchanges the large fader plus its solo and cut with the small fader plus its solo and cut. The normal power-up state (multitrack recording) is for the large fader to be in the channel path and the small fader to be in the monitor path, the master fader swap button reverses these positions and the lamps light indicating that reversal has taken place.

<MIXDOWN>

Pressing the <MIXDOWN> button alters the state of the paths from tracklaying mode to mixdown mode for multitrack tape playback and mixdown to two track.

The channel input is automatically set to line and the channel path is directed to the main 2-track outputs via the pan control (closest to the operator). In <MIXDOWN> mode the monitor path is directed to the multitrack pan and routing buttons so that the small fader can control additional effects sends or returns. Conversely, in tracklaying mode, the monitor path is directed to the main 2-track outputs for simultaneous monitoring.



Solo and Master Cut System

Separate monitor and channel solo systems are provided. The systems are normally in 'cut solo' mode unless the tape machine is in RECORD or one of the corresponding <CHAN SAFE> or <MON SAFE> buttons is pressed.

When an individual solo button is pressed in the cut solo mode, all other channels which have no <SOLO> or effects <RET> buttons pressed are automatically cut, leaving the solo selected signal at the 2-track output.

In solo safe mode the path is not cut and the solo monitoring is achieved by a separate stereo bus via the main monitor. The system normally provides positional APL (after pan listen) solo but PFL (pre fade listen) can be selected by a master <PFL> button (situated next to the <SAFE> buttons).

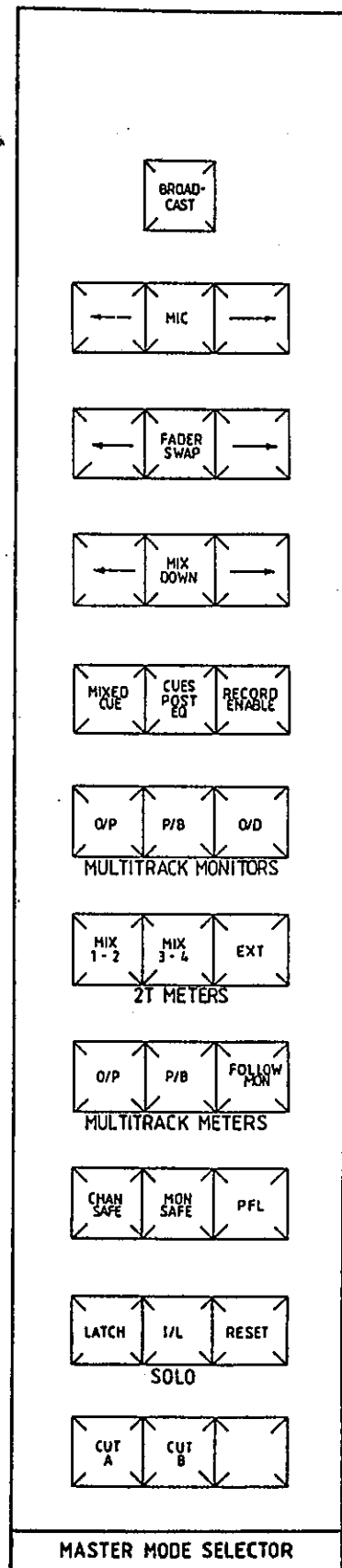
The <SOLO> buttons can be configured in the following modes:

<LATCH> switches provide the normal push-on push-off action with the addition that all solos may be cancelled by the master <RESET>.

<I/L> interlocking solo which releases as the next <SOLO> is pressed. A group solo can be formed by holding one button down whilst other solos are selected; all are cancelled by pressing another <SOLO> button, or by <RESET>.

Momentary action solo. A group solo can be formed by holding one button down whilst the group is selected, but the group is cancelled when the last button is released.

<CUT A> These button cut all large fader paths that have their corresponding <CUT A> or <CUT B> buttons pressed. This facility mutes or enables a group of paths simultaneously.

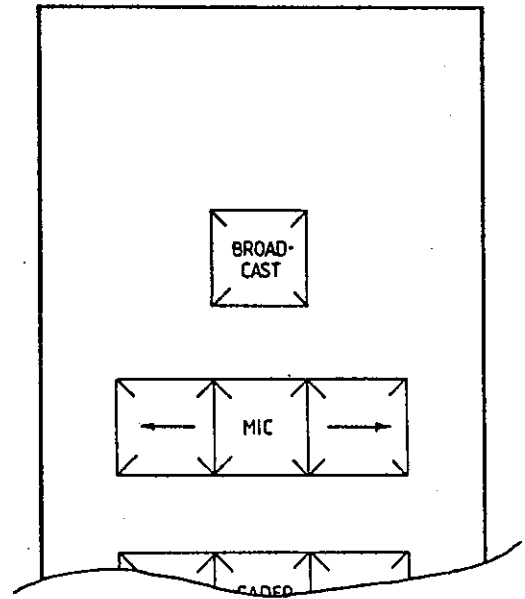


Monitor Section

<BROADCAST> Allows simultaneous broadcast and multitrack recording. When <BROADCAST> is pressed the signal is taken prefade, past EQ and applied to the input of the secondary path. Fader swap is automatically engaged at the same time.

This allows the small fader to control the multitrack mix, and the large fader to control the broadcast signal.

Fader swap can be cancelled whilst <BROADCAST> is still engaged.



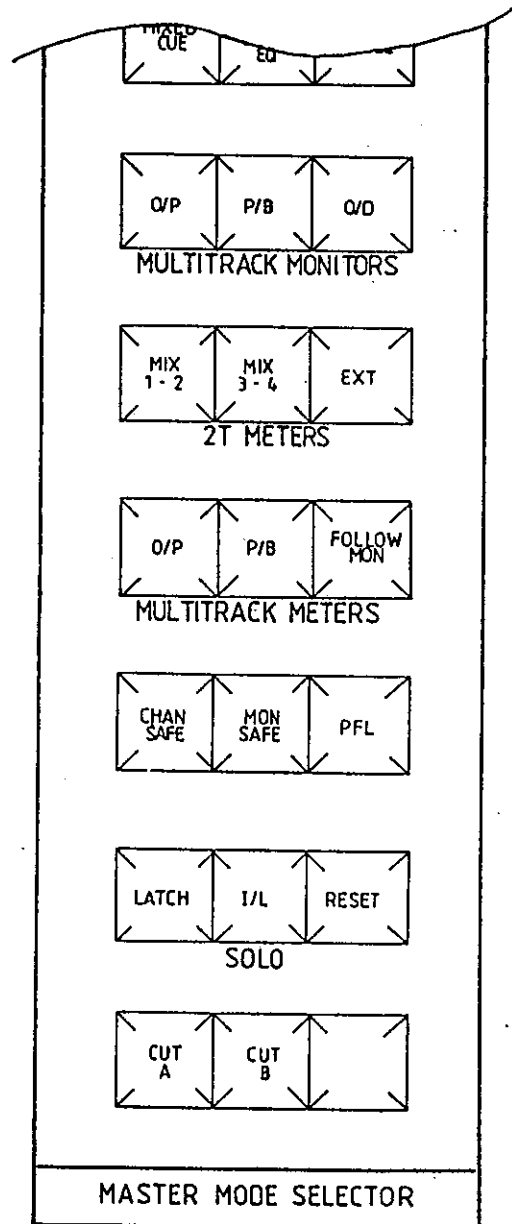
3.5 Meter Selector

2-track Meters

There are four bargraph meters fitted to the 2-track metering system; two of these are permanently attached to the control room monitor for metering any of the desk sources or 16 external sources as selected for control room monitoring. The other two meters follow the 3-button interlocked selector, to allow metering of the 2-track console outputs by selecting <MIX 1-2> or <MIX 3-4> and also metering of the external source selector on the control room monitor by pressing <EXT>.

Multitrack Meters

- <O/P> Pressing this button allows metering of the multitrack send signal.
- <P/B> This button allows metering of the multitrack return.
- <FOLLOW MON> This button allows the metering to follow multi-track monitor selection.



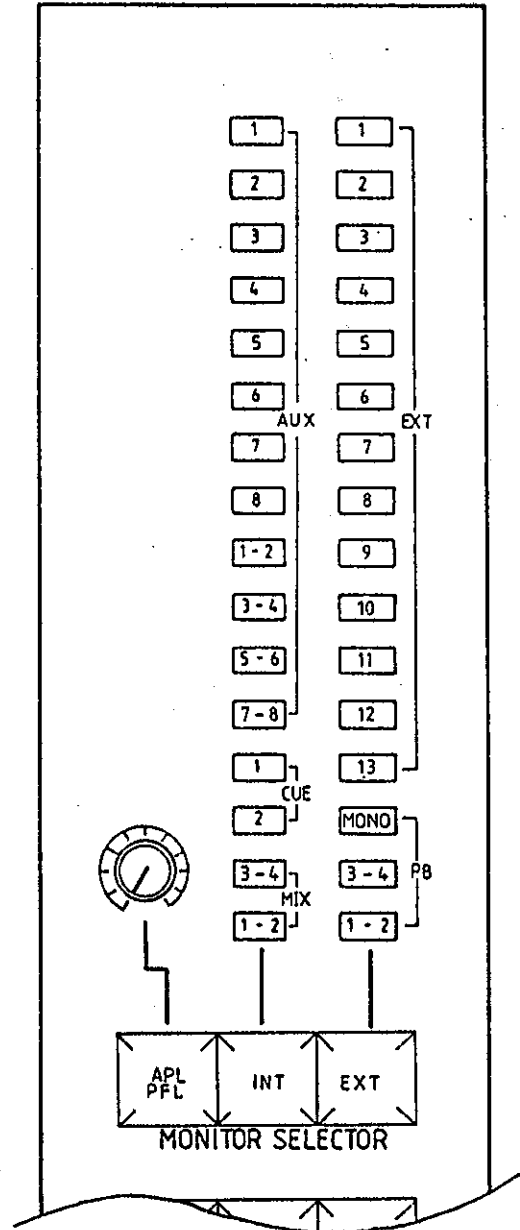
Monitor Section

3.6 Monitor Selector

<EXT> When pressed this button allows selection of any one of 16 external stereo sources for 2-track playback using the selection buttons above it.

<INT> This button is interlocked with <EXT> (described above). It allows monitoring of the console sources, auxiliaries, cues and 2-track outputs via the 16-button selector above it.

When the console is in <CHAN SAFE> or <MON SAFE> and an individual channel/monitor solo button is pressed, the AFL/PFL lamp next to <INT> <EXT> lights indicating that the main monitor has switched over to solo monitoring. The solo level can be adjusted with the rotary control above the AFL/PFL indicator.



3.7 Multitrack Monitoring and Overdubbing

Multitrack Monitor Selector

The multitrack monitor selector switches the I/O module monitor paths between multitrack send and return. In overdub mode the modules that have the individual overdub buttons pressed are monitored as multitrack send; all other modules are monitored as multitrack return.

<O/P> Selects multitrack send. Interlocked with <P/B> and <O/D>.

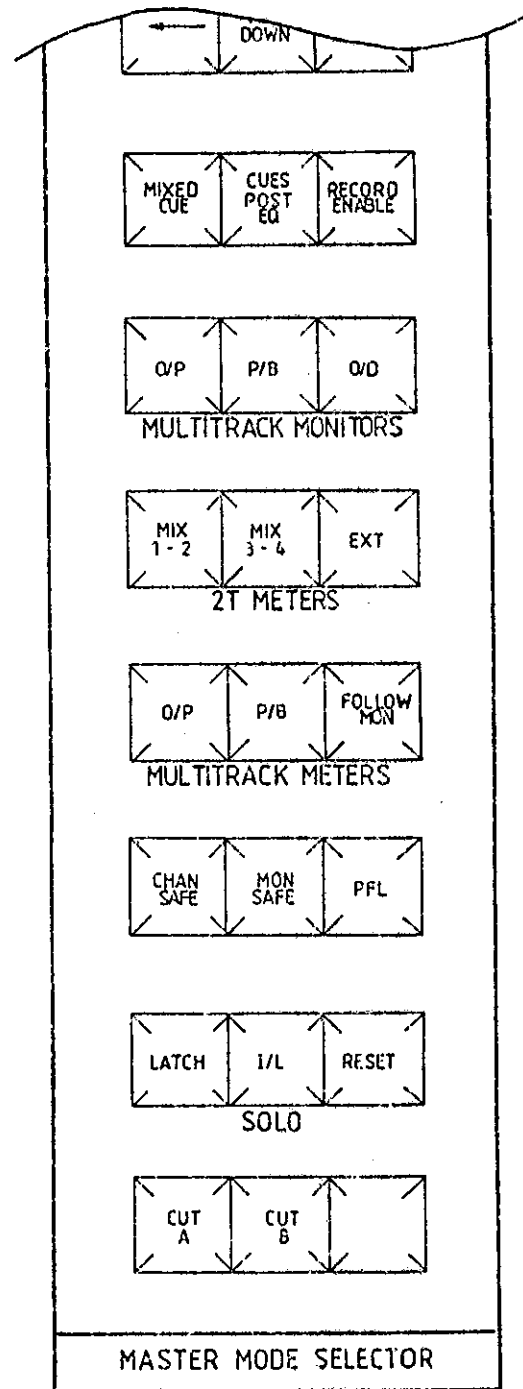
<P/B> Selects multitrack return. Interlocked with <O/P> and <O/D>.

<O/D> Selects overdub. Interlocked with <O/P> and <P/B>. Refer to <OD> explanation in mixdown and large fader (Section 2.5).

<MIXED-CUE> When this button is pressed a mix of multitrack send and multitrack return is sent to the monitor prefade cues on the I/O modules which have individual <OD> buttons selected. Switching the control room monitor to cues allows this mix to be monitored.

<CUES POST EQ>

This button switches the cue sends on the paths that do not have individual <OD> selected to a 'follow monitor' condition, to allow backing tracks to be heard with the same frequency/dynamic correction as the control room monitor mix. The facility automatically cancels should the engineer decide to monitor the console output using the master <OP> button. The backing track cue mix is still available to the artist (without processing) as it is now taken straight from the multitrack return. With this system any loss of cue signal is completely prevented regardless of control room monitor condition.



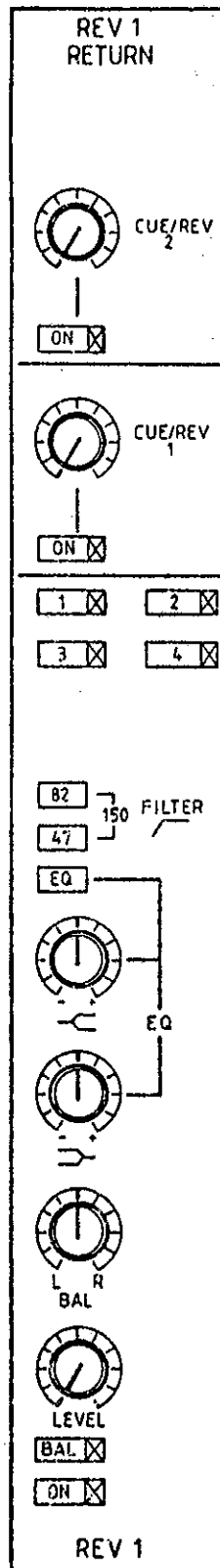
Monitor Section

3.8 Rev Returns

The rev returns section provides facilities for four stereo reverberation/effects returns with stereo equalization, filtering, level, and balance control.

Pressing the <EQ> button inserts the equalizer. A high-pass filter with three selectable cut-off frequencies is activated using either the <47> or <82> buttons above the <EQ> in/out. Pressing both buttons together inserts the filter with cut-off at 150Hz. Balance and level adjustment are provided by the appropriate rotary controls. The <BAL> switch inserts the balance control while the <ON> button switches the return signal onto the 2-track outputs Selected by <1>, <2>, <3> and <4>.

Reverberation can be added to the cue mixes using the cue/rev control. An <ON> switch located under the controls enables these sends.



3.9 Oscillator and Signal LED Threshold Control

The oscillator can be switched to frequencies of 40Hz, 100Hz, 400Hz, 1kHz, 4kHz, 10kHz and 15kHz using the switch in the centre of the oscillator panel. Output level is controlled from the knob directly above the frequency selector switch.

<MTK> switches the oscillator signal onto the console group outputs to allow easy line-up of multitrack machines.

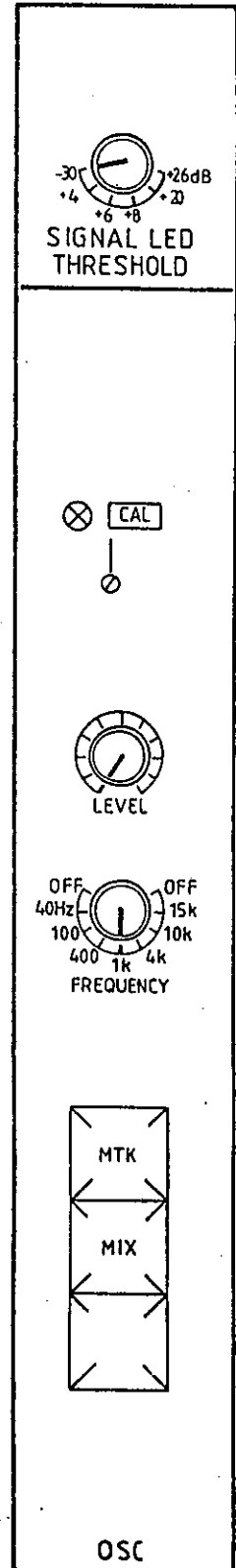
<MIX> switches the oscillator signal onto the main 4-track outputs.

The oscillator output is also available on the patchbay.

<CAL> This button switches a calibrated level (controlled by the trimpot under the panel) to the selected oscillator outputs.

Signal LED Threshold

The LED threshold level master is variable in steps between -30dB and +26dB. This master controls the level indicated by the signal threshold LED for the channel path.



Monitor Section

3.10 Studio Monitor

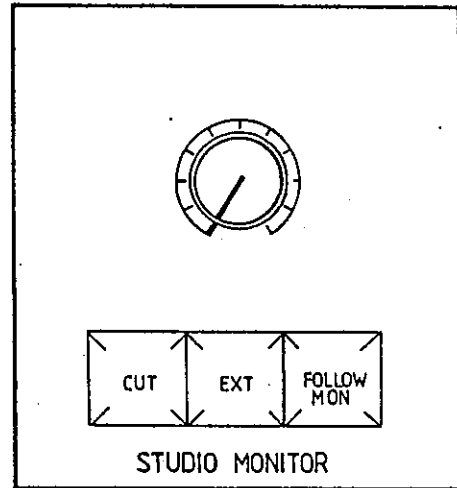
<CUT> Pressing this button cuts the studio monitor.

Note: the studio monitor is automatically cut when the <Red light> button is engaged.

<EXT> This button selects the studio monitor to follow the control room monitor external source selector.

<FOLLOW MON> Pressing this button selects the studio monitor to follow the control room monitor.

Level adjustment is provided by the rotary control above the switches.



3.11 Talkback System

Talkback to various destinations is available as follows:

<CUE 1> Pressing either of these
<CUE 2> buttons sends talkback to CUE 1 and CUE 2 respectively.

<ALL> Pressing this button sends talkback to all possible destinations.

<SLS> This button sends talkback to the studio loudspeakers.

<SLATE> Pressing this button sends a 30Hz tone with talkback to the multitrack and two track outputs.

The above buttons are all momentary action (press and hold to talk).

<AUTO TB> This latching button opens Cue 1 and Cue 2 talkback channels when the multitrack is 'passive' (parked or winding) but closes the talkback when the transport is in <PLAY>.

<PHONES ON> This latching button switches signal on and off for the headphone jack socket on the front buffer of the console. Level adjustment is provided by the rotary control immediately above the <PHONES ON> button.

<RED LIGHT> The studio warning light e.g. 'Recording In Progress' lights when this button is selected.

<F/B 1-2> <F/B 3-4> <F/B 5-6> <F/B 7-8>.

Allows talkback to the auxiliaries configured as cue sends in pairs.

<RTB> This button is located adjacent to the console loudspeaker. Return talkback from the studio to the control room is enabled when this button is pressed. Level adjustment to the small console loudspeaker is provided by the rotary control immediately above the <RTB> button.

