R-Type

Audio Mixing Console

Installation & User Manual

cadac

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General Precautions

Damage
Do not place heavy objects on the control surface, expose it to sharp objects or handle the console in any way that may cause damage e.g. rough handling and/or excessive vibration.

Environment
Do not subject the equipment to dirt, dust, heat or vibration during operation or storage. Never expose the console to rain or moisture in any form. Should the console become wet, turn it off and disconnect from mains without further delay. The console should be given sufficient time to dry out, before recommencing operation.

Cleaning
When cleaning the console, never use chemicals, abrasive substances or solvents. The console control panels should be cleaned using a soft brush and a dry lint-free cloth. For persistent marks, use a soft cloth and isopropyl alcohol. Switches and potentiometers do NOT require cleaning or lubrication. For faders, see below.

Transport
Transport the console in its purpose built flight-case; whilst at the same time taking precautions to protect the control surface from any damage. Always make sure adequate manpower is available and correct lifting methods are taken when moving the console.

Safety Instructions
Read the following before using the equipment:


```
CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
```

Instructions
Keep these instructions for future reference. Follow all warnings in this manual and those printed on the power supply units.

Installation
The console must be installed following the guide lines in this manual. Never connect power amplifier outputs directly to the console. Connectors and plugs must never be used for any other purpose than for what they are intended.

Covers
Never use the power supply units without covers fitted. All service work must be carried out by qualified personnel only.

Power
The power supply units must always be connected to correctly rated mains power as referred to in this manual and marked on the power supply units. The power supply units must, at all times, be connected to the local mains power supply using the supplied power cord. In cases where the supplied plug does not fit, a qualified electrician must be consulted.

Power cord
The power cord must be routed in such a way that the risks of accidentally stepping on it, stretching it or it being pinched, are minimized.

Warning
THIS EQUIPMENT MUST BE EARTHED !

Moisture
In order to minimize risks of fire hazards and/or electric shock, the power supply unit must never be exposed to moisture or water in any form; or be used in a damp or wet environment. Never place liquid containers, such as for instance coffee/tea mugs, on the power supply unit, so as to avoid spillage into openings.

Ventilation
Ventilation slots on the power supply or the console must never be covered or in any other way obstructed. Air flow required for safe operation may otherwise be restricted. Where the console is to be operated in its flight-case, then this must be located in such a way that it allows for proper ventilation.

Service
Refer servicing to qualified technical personnel only.

Introduction

CADAC would like to thank you for purchasing this R-Type console which will bring many trouble-free years for you to enjoy.

The CADAC R-Type live production touring console is designed to be used as a Front of House Board or as a Monitor Board. It offers a comprehensive range of features that vastly support and enhance the job of the Sound Engineer and represents the ultimate choice for the live touring environment as well as for theatres and fixed installations. The R-Type mixing console is entirely modular and fully user configurable, at the same time offering legendary CADAC sound quality and reliability. The compact light-weight design makes it easy to handle, thus allowing rapid load-in and load-out for touring applications.

The standard R-Type frame size encompasses 24 positions of which a maximum of 16 may be bussed together to give a total of 384 spaces where 363 may be dedicated mono or stereo input channels. There are 16 pairs of sends for each input; sends 1 to 8 may be switched between mono (16 sends) and stereo (8 sends). Sends 9 to 12 and 13 to 16 may be configured as 8 mono sends or 8 conventional stereo groups receiving information from the main module pan pot. Direct routing can be performed to matrices 13 to 16. In addition to a stereo bus, both channels also incorporate a left, centre and right bus which may be used either as a stereo bus with separate centre level or with full L-C-R panning. The mono channel has a level controlled direct output.

All modules can be upgraded to incorporate motorized faders.

The module width for the CADAC R-Type is only 35mm, contributing to a compact footprint and a reduced overall width for improved ergonomics and feature accessibility.

This manual provides information on the installation of an R-Type console and includes functional descriptions of the modules with enhanced automated functions.

1   The R-Type concept
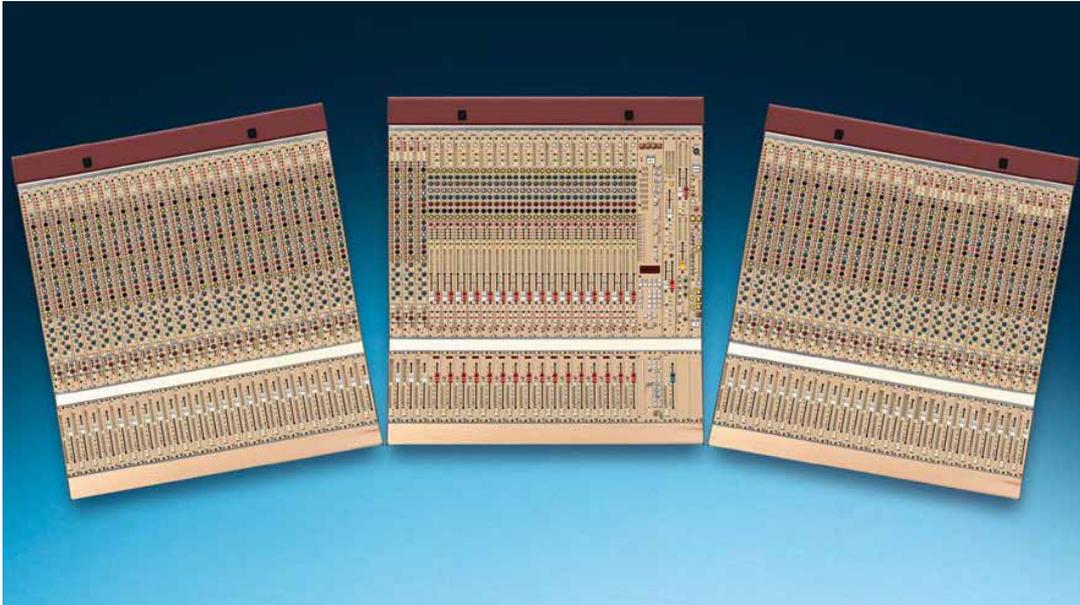
simply the best

CADAC is renowned world-wide for their state-of-the-art theatre consoles. The CADAC sound and build quality, along with extensive features and automation has made the company a household name in the theatres in London's West End, Broadway in New York and most major theatres throughout the world. Manufacturing arguably the best mixing consoles in the world, however, also comes at a price.

for Rock'n'Roll

For a long time, the traditional "rock'n'roll" touring sound and hire companies and engineers have been asking for the same quality at an affordable price, with specifications and features more suited to general live performances. We have now taken the best parts of the CADAC ethos and designed them into a new console dedicated to the live touring, conference and event industry.

this is what they asked for...

The R-Type development from a very early stage took into account the needs and requirements of this industry, with useful ideas and feed-back from the world's top sound companies. 24 slot lightweight mono-coque frames can be loaded with input or output modules in any order or configuration allowing for maximum flexibility when configuring for a show or a tour. The smaller module size and overall weight of the frames allows easily for a smaller crew set up and also with intelligent flight case design takes up less truck space.

and more...

Add to this the knobs and switches part of the design. In brief, any number of mono or stereo input modules, a maximum of 32 aux or (16) group outputs, and a 16 output matrix. 16 mute group and 16 DC masters, plus an on-board 128 scene automation snapshot/scene memory, plus the classic CADAC sound, reliability and performance. All this together makes us believe that, in designing the R-Type, we have now made the ultimate touring console.

2   System overview

2.1   The console

Mixing consoles consist of a number of input channels and output groups with associated faders, monitoring and control functions - organised in a way to allow the operator to do the particular job that the console has been designed to achieve. When module positions are fixed in relation to the frame structure, various operational compromises occur during the life of the console. The R-Type console system allows the owner or operator to move any module into any frame position and to change the number of frames associated with the system to increase or decrease the number of input channels and output groups to meet the needs of a particular project. The number of inputs, outputs, faders and control functions can be varied during the life of the console, extending the system as work loads increase, and/or to change the function of the console (for example, to change from FoH configuration to monitor layout). Experience gained with our "J", "F" and "M-Type" series consoles has shown that this type of structure extends the useful life of the mixer by at least one order of magnitude.

Each R-Type frame has 24 module positions (slots) and there can be as many as 16 frames in any one console system. Each frame has provision for main and backup power supply inputs and any two adjacent frames have full audio bus and control function interconnection on a single multi-way bus loom. Digital control functions are automatically mapped on power-up.

The standardised frame wiring provides a total of 55 balanced busses. Thus a fully equipped console system can have 32 sends - 16 of which can be switched as 8 stereo sends for in-ear monitoring or stereo FX applications; 16 matrix sends; simultaneous L-C-R and stereo outputs; stereo monitoring and PFL. Standard (and optional motor) channel VCA faders can access up to 16 VCA master faders and 16 mute groups. Additional MIDI, EVENT and alpha-numeric display functions for master faders can be programmed and stored in 128 user memories (cues) associated with the CCM.

Extended programmable functionality will be offered, using an external PC (via USB ports on the CCM) running SAM, at a later date.

2.2   The Modules

2.2.1   Input channels, 8241- Mono, 8231- stereo.

Both mono and stereo modules are available. The modules have balanced insert ports (send and return connectors); four band parametric EQ and high-pass filter - selectable pre or post insert; balanced direct output - selectable pre or post fader. Full details of the functionality offered on these modules is discussed in chapters 7 Mono Input Channel 8241 and 8 Stereo Input Channel 8231. Also see Appendix D. Jumper to disable direct output muting.

2.2.2   Channel faders, 8246 mono, 8236 stereo.

Both mono and stereo VCA channel faders are available to control the input channels. Each fader has an input level meter (with dual input meters on the stereo) and DC master/Mute group display.

Full details of the functionality offered on these modules is discussed in sections 7.3 Mono Channel Fader 8245/8246 (motor fader) and 8.3 Stereo Channel Fader 8235/ 8236 (motor fader).

2.2.3 Dual Output group modules, 8251

Each of the output modules provides two identical OUTPUT channels, that can be used as either a 'stereo pair' or dual mono format, and additionally a 16-way level controlled MATRIX output. The left section of the module controls the A send. The right section of the module controls the B send.

Up to 16 output modules may be specified per console and can be placed anywhere in the multi-frame console structure (they do not need to be placed adjacent to each other, or even in the same frame). Visual monitoring of output levels is provided on LED bar meters and audio monitoring is provided by pressing the required LISTEN button on the Output (see 2.2.6 below).

The master faders of either the send group or the matrix level can be controlled from a selected DC master fader by switching on the appropriate VCA and assignment.

Additionally an external signal may be mixed with either send output by using the INJECT function. Pre fader balanced insert ports are provided on all three outputs.

The module mix bus coding for the Output and Matrix is manually selectable using 8-way and 4-way jumpers.

See chapter 9 Outputs and Matrix 8251 for details of the module functions and appendix B. Jumpers to select Output and Matrix for mix bus coding.

2.2.4 DC Master faders, 8255

A maximum of 16 DC master faders may be included in the console system. Each master fader must be mounted directly below an output group module, but output group/master fader combinations may be placed in any of the console system frames, as suggested in 2.2.3 above. LED assignment displays are fitted to each master fader. When the "VCA" switch is selected on a send or matrix section of a group module, the LED bar on the left side of the master fader directly below the module indicates which of the DC master faders has control of the selected group module fader.

See section 9.3 DC Master fader 8255 for details of the fader module functions and appendix C. Jumpers to select VCA Master for DC master bus coding.

2.2.5 L-C-R Master output module, 8261

This module provides the amplifiers for the L-C-R outputs, together with master faders and output level metering. All three master faders may be put under VCA control of a standard channel VCA fader, which must be located directly below the module. An external signal may be mixed with any of these outputs by using the INJECT function.

Audio monitoring of each output is accessed by pressing one, or all three LISTEN buttons (see 2.2.6 below).

Full details of the module functions are discussed in chapter 10 L-C-R Output 8261.

2.2.6 Listen and Stereo output module, 8305

The R-Type console offers the console operator the choice of two audio monitoring functions. The LISTEN section is for local loudspeaker monitoring and the HEADPHONES section is for personal monitoring.

For the LISTEN section, there are two output connectors (XLR) on the rear of the module that are designed to feed the user's choice of external power amplifiers and loudspeakers. The output level is adjusted using the 60mm fader and the output level is displayed on a pair of LED-meters. The source selection into the loudspeaker monitoring are: PFL (from input channels), LISTEN (from output modules) and EXTERNAL - which is provided as a convenient input to listen to an external source.

Each selection has an input trim to adjust the balance of the levels. The output can be DIMmed or MUTEd using the appropriate switch.

The HEADPHONE section provides the same three source selections as the Listen section. The monitoring level in the headphones is adjusted with the potentiometer provided and can also be MUTEd.

Full details of the module functions are discussed in chapter 12 Listen & Stereo Output 8305

2.2.7 Oscillator and Communications module, 8271

The oscillator section contains a low distortion sine wave oscillator, a pink noise generator, plus an additional input for an external oscillator - for testing and line-up purposes. The signal level meter can be switched to monitor each source. The oscillator section can be routed to channels and/or groups.

The communications section is equipped with a standard microphone amplifier with phantom power and a high pass filter. The output of the microphone amplifier can be routed to the TALK; LINE and REMOTE bus', each of which is equipped with a send level potentiometer. The associated LED meter can be switched to monitor any of the communication lines.

The remote calling section also has a microphone amplifier with phantom power and routing to the LISTEN and TALKBACK bus'. Additional visual signalling and monitoring circuits is also included.

The CHECK button, at the top of the module, controls the console SOLO function.

Chapter 11 Osc & Communications 8271 has full details of all the module functions.

2.2.8 CCM, 8282 and FCM, 8285

The CCM and FCM form the control centre for the R-Type console system. The CCM handles the memory and communication functions for the console and the FCM handles the fader programming facilities.

Additionally, the CCM contains control functions for: Master Mutes (channel, outputs, matrix and LCR); send 1 to 8 stereo pairing; EVENT and MIDI programming; module LED illumination control; Littlite illumination control; fan speed control.

A QWERTY keyboard can be plugged into the rear panel for inputting of alpha numeric information for use by master fader displays, and software programming functions. An external computer can be connected to the system via a USB port.

The CCM/FCM combination can be placed in any frame in the console system, but they must always be located together. Only one CCM and FCM are allowed in a single console system.

See chapter 6 Central Control Module 8281 and section 6.3 Fader Control Module (FCM) for a full description of how to use the CCM and FCM.

3   Connecting the mixer frames

3.1   Setting up the touring console

Each console frames is shipped in a flight-case to provide full protection against any possible transit damage. The following procedure describes how to set up the console.

FIG 3-1. 8U case with front and rear covers removed.

1.   Select the 8U case containing the power supplies and remove the front and rear covers. If using an 8U drawer case, note that this has only a front cover. On both types of cases the wheels fitted with brakes are at the front.

FIG 3-2. Detail, showing the locating bars on base of console case.

2.   Note the locating bars on the base of the console case. These are the guides for locating the console case securely onto the 8U PSU or drawers case.

FIG 3-3. Alignment of front of console with front of PSU case.

3. Turn a console flight-case to align the front of the console, as indicated by the name plates, with the front of the power supply or drawers case.

FIG 3-4. Console case on its base.

4. Lay the console case onto its base.

FIG 3-5. Lifting the console case onto the 8U case.

5. With one person at each corner, lift the console case, and centre the case by fitting the locating bars around the top of the 8U-case.

FIG 3-6. Removing the wheels.

6. Unlock the latches and remove the wheels. NOTE: On a centre frame remove both the wheels and the lid.

FIG 3-7. Removing the case lid.

7. Unlock the latches and remove the lid by lifting vertically until clear of the console.

FIG 3-8. Position the frame.

8. Roll the frames into correct positions and join the console frames together using the latches on the bottom of the case.

FIG 3-9. Frames ready for cabling together

9. Begin to cable together the frames. See sections 3.2 - 3.4 on pages 3-5 through to 3-11 for instructions.

3.2 Frame rear connections

FIG 3-10. R-Type frame rear connections

BUS EXTENSION   PSU 1   PSU 2   BUS EXTENSION

The connections on the R-Type console rear frame include the following (from left to right):

■ Frame to frame bus connection
■ PSU 1
■ PSU 2
■ Frame to frame bus connection

The use of these connectors is described in 3.3.5 Main and extension frame power connections, 3.4 Connecting the console frames and 3.5 Switching ON.

3.3 Connecting Power Supplies

3.3.1 Power supply description

The R-Type console is normally supplied with the model 8400 Power Supply Unit. Each 3U x 19" rack mount power unit supplies all 4 voltages required by the R-Type console. A single 8400 PSU will power 3 fully loaded R-Type frames.

NOTE: For console configurations with 4 or more frames, the 8019/8020 systems must be used, see 3.3.7 Switch-Mode Power Supply Units (8019 & 8020).

Cadac consoles are designed to allow the use of two independent power supply systems in a redundant configuration – "main" and "backup". Both power supply units are used to power the console system, so that under normal conditions, the 'load' is shared equally between the "main" and "backup" PSU. If a fault occurs in one of the power units (causing it to 'shut-down'), the remaining power unit will power the console (see fig. 3-11).

Designate one power supply unit as "PSU 1" and the other as "PSU 2". PSU 1 and PSU 2 should be connected to the same *phase* and on the same 'spur', wherever possible. In situations where it is necessary to provide a separate 'feed' to each PSU system, make sure that the cable lengths are the same. This is to minimize any induced a.c. power input noise by ensuring that the "EARTH IMPEDANCE" is the same for both PSU-systems.

The a.c.-input connectors on each power supply unit have three conductors: 'LIVE' (brown), 'NEUTRAL' (blue) and 'EARTH' (yellow/green). For safety and electromagnetic compatibility considerations, it is essential that the 'EARTH' conductor is connected on all PSUs **and** the a.c. supply has an 'EARTH' conductor that has a continuous circuit to the "zero-signal reference potential" point in the building. The ZSRP point in a building is usually found near the place where the a.c. 'mains' supply enters the building (often referred to as the "MAIN GROUND REFERENCE EARTH ELECTRODE SYSTEM"). The basic concept for correct a.c. mains wiring distribution is shown in figure 1-1. If you need further information about this complex subject, please refer to "Grounding Systems and their Implementation" by Charles Atkinson and Philip Giddins published in the AES Journal Vol. 43, No. 6 – June 1995.

The grounding scheme in CADAC consoles is designed to meet the rigorous EEC *Electromagnetic Compatibility* requirements (EMC Directive - 1996). Any RF noise induced in the console frame(s) is directed to the "local" ZSRP, which is the metalwork of the power supply units. In order to take full advantage of the "RF noise immunity" capability of the CADAC system, PSU a.c. mains cables and the a.c. mains supply EARTH conductor must be connected correctly.
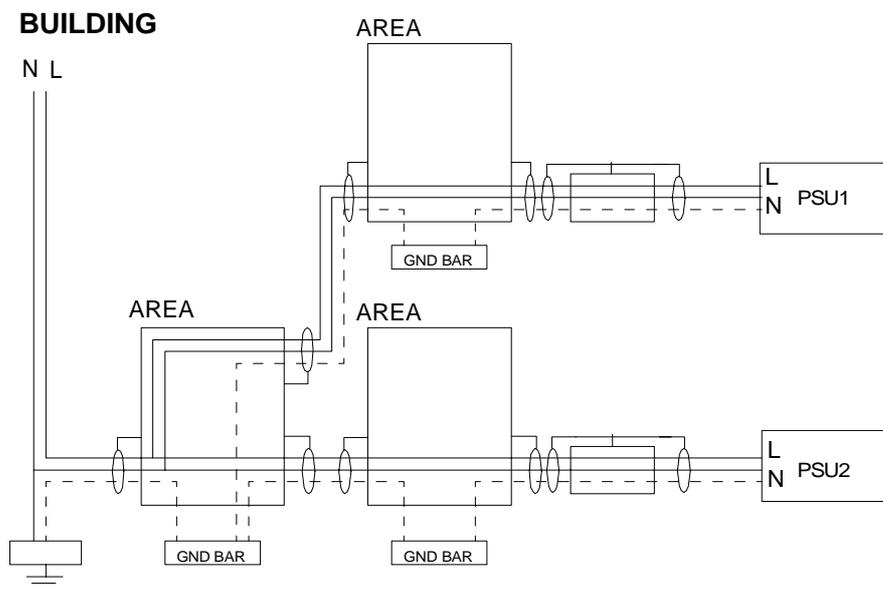
FIG 3-11. AC mains grounding diagram (single phase 208-240V)

3.3.2   AC power requirements

CADAC power supply units are designed to run from a minimum of 208V up to a maximum of 260V, 50/60Hz a.c. In many parts of the world, the normal single-phase a.c. supply is 100-127V, this means that the CADAC power supply units must be connected across two of the phases in the three-phase a.c. supply, see 3.3.4 Connecting to a 3-phase outlet
.

3.3.3   Switch-Mode Power Supply Units (8400)

CADAC 8400 switch-mode power supply units are designed to run from a minimum of 208V up to a maximum of 260V a.c, 50/60Hz.

The 8400 is rated thus +13V @ 92A, ±18V @ 44A and 48V @ 5A. This is sufficient to supply power to a 3 frame configuration, where 4 frames or more are used, the 8019/ 8020 PSUs should be used, see 3.3.7 Switch-Mode Power Supply Units (8019 & 8020).

The a.c. input is connected to the PSU via a 3-core cable, CMA reference 3183TQ – BASEC approved, rated at 20A.

8400 switch-mode power supply unit

The 8400 unit is based on one POWER ONE RPMS-ETETGDGD1ETK Power block, with additional circuitry as shown on CADAC drawing number C3.8397.

FIG 3-12. 8400 switch-mode power supply unit

⚠ **NOTE:** Under no circumstances, should the 8400 PSU be used without a SAFETY EARTH connection. Failure to comply with this instruction may result in personal injury and/or damage to equipment.

3.3.4   Connecting to a 3-phase outlet

Connection to a 3-phase outlet is required on sites where the system voltage between any one of the phases and neutral is 100-127V and the voltage between any two of the phases is 200-240V. Before connecting to any 3-phase outlet, please refer to a qualified electrician who understands your particular installation and the local safety and wiring regulations. Under no circumstances should the 8400 switch-mode power supply units be operated without the green/yellow safety earth conductor connected to the building safety earth conductor system. Each power unit is equipped with an input supply filter whose reference ground conductor is the chassis. Failure to connect the green/yellow safety earth conductor to the correct earth/ground building reference is a safety and fire hazard.

1. Connect the LIVE (Brown) conductor on the "system 1" 8400 unit to the phase 1 (L1, RED) terminal on the 3-phase power outlet connector.

2. Connect the NEUTRAL (Blue) conductor on the "system 1" 8400 unit.

3. Connect the EARTH (Yellow/Green) conductor on the "system 1" 8400 unit to the SAFETY EARTH (Yellow/Green) terminal on the 3-phase power outlet connector.

4. Repeat 1-3 for the "system 2" power units.

FIG 3-13. Connecting to a 3-phase outlet
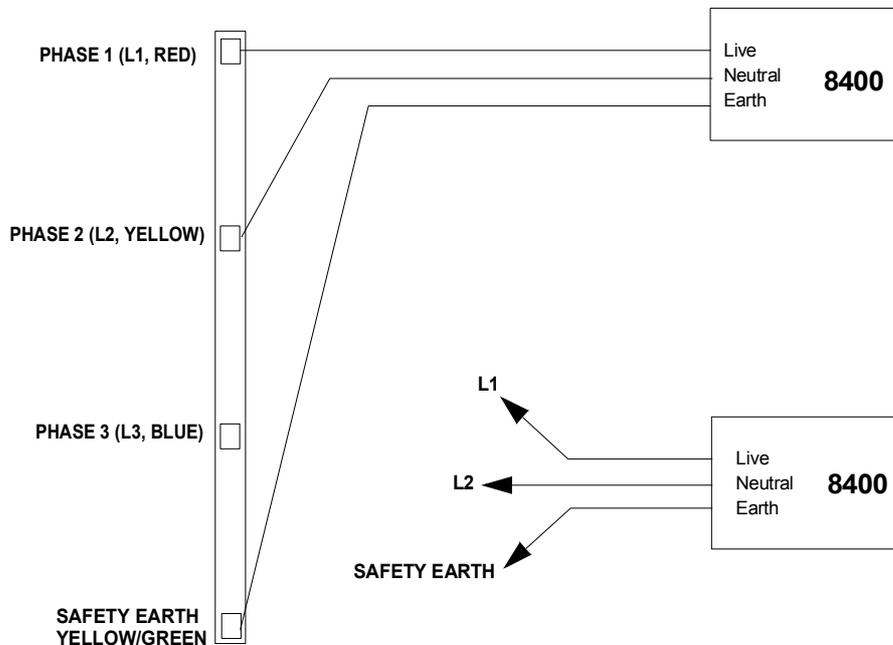(100-127V/200-240 system voltages)

NOTE: Connection between two phases in a 3-phase outlet should under no circumstances be carried out where the single-phase voltage (the voltage between one of the phases and neutral) exceeds 127V. The installation should be carried out by a qualified electrician who understands your particular installation and the local safety and wiring regulations.

3.3.5 Main and extension frame power connections

See fig 1-4 below for schematics of the frames power connections.
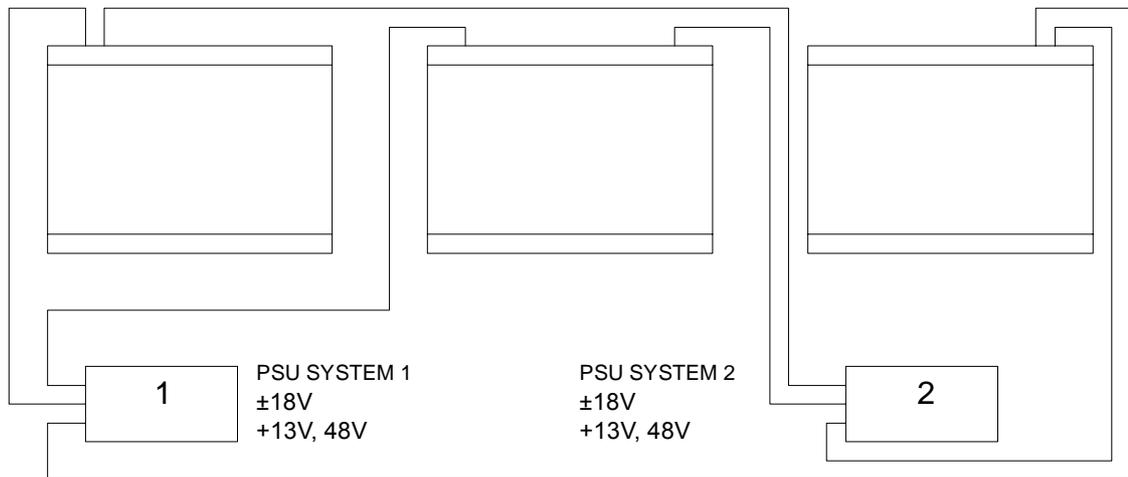
FIG 3-14. Power connections

1. Connect a PSU cable between the "SYSTEM 1" rack and the "PSU SYSTEM 1" connector on the MAIN FRAME.

2. Connect a PSU cable between the "SYSTEM 2" rack and the "PSU SYSTEM 2" connector on the MAIN FRAME.

3. Connect a PSU cable between the "SYSTEM 1" rack and the "PSU SYSTEM 1" connector on the EXTENSION FRAME 1.

4. Connect a PSU cable between the "SYSTEM 2" rack and the "PSU SYSTEM 2" connector on the EXTENSION FRAME 1.

5. Repeat procedures 3 and 4 for EXTENSION FRAME 2 (a 3 frame console).

The 8400 also provide a 4th output connector for linking a 4th frame into the system.

3.3.6 Remote start of 8400 PSU

Each 8400 switch-mode power supply provides the following outputs: 13v, ±18v and 48v. Each PSU is fitted with a front panel mounted 9-way 'D-type' connector labelled 'Connections for Remote Start'. If a remote start facility is used, Power Failure and Over-Temperature LEDs may also be fitted with the remote start switches if required.

Fig 3-15 shows the circuit for starting up a "system" with a single switch. This has proved to be the most popular method of connecting the remote start facility. This circuit can easily be extended to provide a single switch remote four all four PSUs if required. If muliple switches are to be used, see fig 3-14.

NOTE:

■ The remote start switch must be a 'momentary' type. You can use 3 separate single pole switches for each Power Supply to turn on 13v,±18v and 48v outputs of the PSU alternatively use one single pole for the whole lot.
■ The remote switch(es) must be mounted on a metal panel.
■ Use shielded cable for the remote switch wiring.

■ The 9-way 'D-type' free plug must have a conductive shell. This is to ensure that the cable shield connects directly to the PSU unit chassis.
■ Connect the cable shield to the metal panel where the remote start switch(es) are mounted.
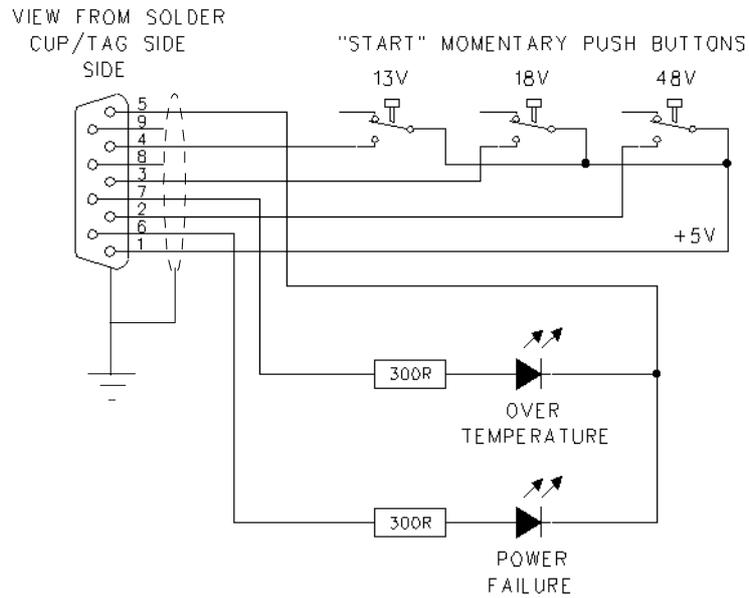
FIG 3-15. Remote start with multiple switches

Great care must be taken with the wiring of the switch(es) to ensure that no short-circuits can occur between any two power supply units.
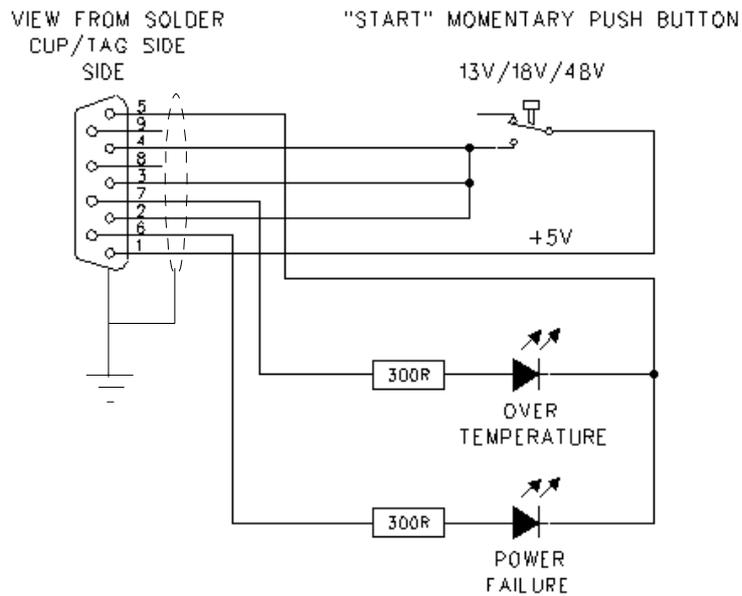
FIG 3-16. Remote start with a single switch

3.3.7 Switch-Mode Power Supply Units (8019 & 8020)

Where a console comprises 4 or more frames, the power supplies 8019 & 8020 MUST be used. CADAC 8019 and 8020 switch-mode power supply units are designed to run from a minimum of 208V up to a maximum of 260V a.c, 50/60Hz.

The 8019 "18V" unit is rated at 100A per rail and the 8020 "13V" unit is rated at 100A.

8019 "18V" & 8020 "13V" switch-mode power supply unit

The 8019 ±18v unit and the 8020 +13v/48v unit are based on two PowerOne PSUs each with additional circuitry as shown on CADAC drawings C3.8393 (8019) and C3.8392 (8020).

The a.c. inputs are connected to the PSUs via two 3-core cables, CMA reference 3183TQ – BASEC approved, rated at 20A.
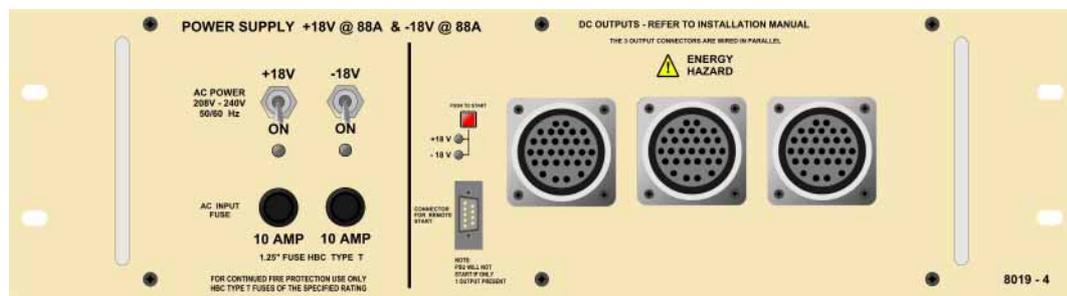
FIG 3-17. 8019 PSU
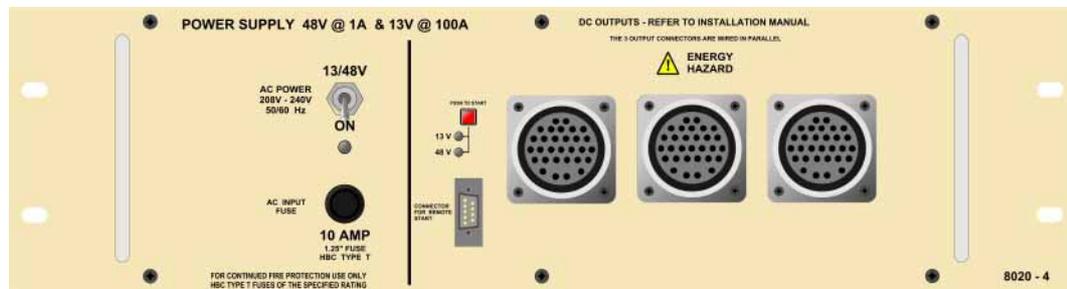
FIG 3-18. 8020 PSU

Replacing a power supply unit

If replacing a switch-mode power supply unit is required, please note the following:

■ Make sure that the power supply system's power switches are in the position OFF and disconnected from the mains.
■ The work should only be carried out by a suitably qualified electrician.
■ Be careful to observe correct polarity when connecting the new PSU.
■ Note that a console must never have one voltage without the other, for example +18V must never be fed into the console without -18V.

When switching the power supply system back ON after replacement has taken place, make sure that both LEDs on the front of the PSU-system come on. If only one LED comes on, let go of the ON push-button immediately. Failure to do so may lead to fire hazard and major damage to the console.

3.3.8 Remote start of 8019/8020 PSU

Each 8019/8020 switch-mode power supply provides the following outputs: 13v, ±18v and 48v. Each PSU is fitted with a front panel mounted 9-way 'D-type' connector labelled 'Connections for Remote Start'. If a remote start facility is used, Power Failure and Over-Temperature LEDs may also be fitted with the remote start switches if required.

Fig 3-17 and 3-18 shows the circuit for starting up a "system" with a single switch. This has proved to be the most popular method of connecting the remote start facility. This circuit can easily be extended to provide a single switch remote for all four PSUs if required.

NOTE:

■ The remote start switch must be a 'momentary' type. You can use 3 separate single pole switches for each Power Supply to turn on 13v,±18v and 48v outputs of the PSU alternatively use one single pole for the whole lot.
■ The remote switch(es) must be mounted on a metal panel.
■ Use shielded cable for the remote switch wiring.
■ The 9-way 'D-type' free plug must have a conductive shell. This is to ensure that the cable shield connects directly to the PSU unit chassis.

Connect the cable shield to the metal panel where the remote start switch(es) are mounted.
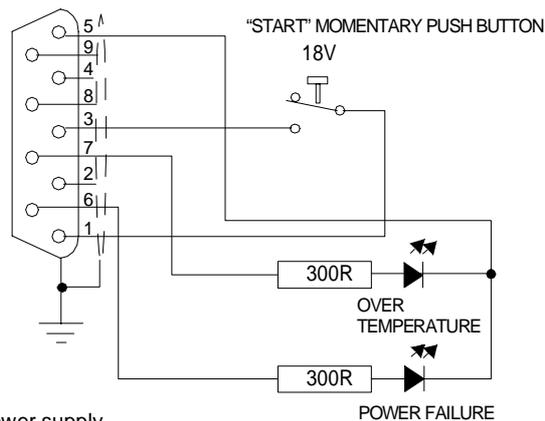
FIG 3-19. Remote start of 8019 power supply
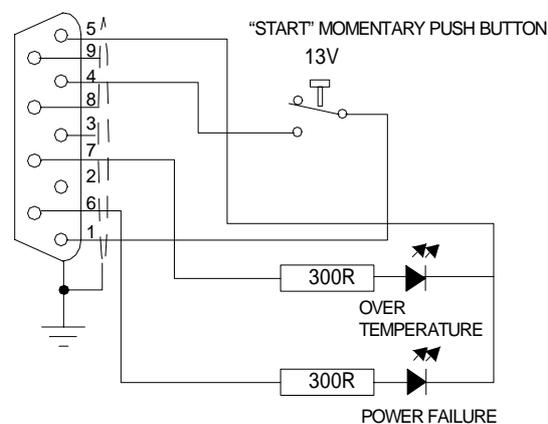
FIG 3-20. Remote start of 8020 power supply

3.4 Connecting the console frames

3.4.1 Frame to frame bus cable

When linking frames, plug the frame to frame bus cable as shown in the diagram below.
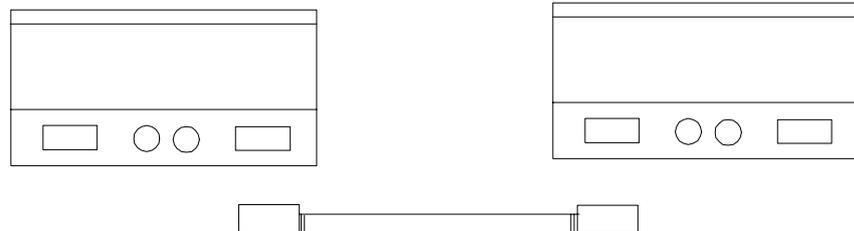
FIG 3-21. Audio Bus connections.

See also Appendix A. Important information regarding EMC.

3.4.2 Earth, 0V, GND and Frame Connections

Figure 3-20 shows the rear panel of the power supply units in a single PSU system. A 0V stud is provided on the back of the PSU for grounding external equipment.

FIG 3-22. 8400 PSU system.

In addition to the terminal on the back of the PSUs, there is an *0v* connection on the rear of each console frame. This connection is included for connecting external equipment.

3.5 Switching ON

3.5.1 System power-up procedure

CADAC consoles are designed to work continuously with two power supply systems - 'main' and 'backup'. The 'main' power supply unit is designated 'System 1'. The 'backup' power supply unit is designated 'System 2'

On each power supply, turn all AC input switches to the ON-position.

Start the PSUs (in one PSU system) simultaneously, by pressing and holding the START-buttons until you hear the relay click. The CCM will cycle through its self-test routines and any Master Mute switches previously selected will be set ON, thus protecting external equipment from possible DC pulses when the ±18V PSUs are started.

Repeat for PSU system 2. If you cannot start the PSUs simultaneously, start the 13V/48V first. However, do NOT operate the console for long periods without all power lines on.

3.5.2 Powering-up sequence of PCs

Always use the following procedure:

■ Power-up console
■ Select PC1 on the CCM and power up the first computer. Wait until the PC1 computer has completed its boot-up routine, then...
■ Switch to PC2 on the CCM and power-up the second computer and wait until it has completed its boot-up routine.

Once both computers have booted correctly, they should allow the keyboard and monitor to be switched back and forth without problems.

If the overall cable length for the keyboard and monitor are very long (greater than 5m), it may be necessary to use a keyboard and a monitor booster unit to retain keyboard reliability and a clean monitor display.

3.5.3 System power-down procedure

1. On the CCM, press all Master Mute switches to the ON (down) position.

2. Close down the SAM software on each PC, shut down Windows® and switch the computers off.

3. Switch off the AC mains supply to PSU system 1.

4. Switch off the AC mains supply to PSU system 2.

4   How to use the R-Type

This section of the manual provides instructions and information on how to use the R-Type and may be seen as a practical guide as to how specific procedures are carried out.

The very nature of the R-Type is such that its flexibility allows for several ways to achieve the same end result. To avoid confusion, this means that in this section you will learn how to carry out certain procedures to achieve a desired outcome. This does not, however, imply that the same outcome cannot be achieved by taking a different route.

In order to assist you in the most effective way to quickly become familiar with the operation of the R-Type, we recommend that you initially follow the directions given below and as you gain experience you may well find that alternative routes suit your work practice better.

The directions given assume that the power supplies are in position ON, the buttons for 13V, 18V and 48V are pressed and that the console is in its default condition. Preferably, the CCM memory should be cleared and finally, the display on the CCM should read 'Welcome to the R-Type'.

4.1   Channel assignment

4.1.1   How to assign an I/P channel to a DC Master

■ Press the DC button on the FCM

The DC LED in the array of LEDs on the channel fader modules will illuminate, indicating that DC assignment can start.

■ Press the SET button on the FCM

The DC and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■ Using the numerical buttons on the FCM, select the DC Master to which you want to assign the input channel.
■ On the chosen input channel, press the SET button once. The LED associated with the DC Master will then illuminate.
■ Press SET on the FCM to take the FCM out of assignment mode.

4.1.2   How to assign a number of I/P channels to a DC Master

■ Press the DC button on the FCM

The DC LED in the array of LEDs on the channel fader modules will illuminate, indicating that DC assignment can start.

■ Press the SET button on the FCM

The DC and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■ Using the numerical buttons on the FCM, select the DC Master to which you want to assign the group of input channels.
■ On the chosen input channels, press the SET button once. The LED associated with the DC Master will then illuminate.
■ Press SET on the FCM to take the FCM out of assignment mode.

NOTE: The A & B outputs and matrix output on each O/P module use the same DC assignment. Each output or matrix output can be controlled only when its VCA switch is in position ON.

4.1.3 How to assign an I/P channel to a MUTE group

■ Press the MG button on the FCM.

The MG LED in the array of LEDs on the channel fader modules will illuminate, indicating that MUTE group assignment can start.

■ Press the SET button on the FCM.

The MG and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■ Using the numerical buttons on the FCM, select the MUTE group to which you want to assign the input channel.
■ On the chosen input channel, press the SET button once. The LED associated with the MUTE group will then illuminate.
■ Press the SET button on the FCM to take the FCM out of assignment mode.

To mute or unmute the selected MUTE group, press the corresponding numerical button on the FCM. (Make sure the FCM is not in assignment mode.)

NOTE: To avoid muting the direct output when hard-muting an input channel, the motherboard contains a link that has to be repositioned - see App D.

4.1.4 How to assign a number of I/P channels to a MUTE group

■ Press the MG button on the FCM.

The MG LED in the array of LEDs on the channel fader modules in the group will illuminate, indicating that MUTE group assignment can start.

■ Press the SET button on the FCM.

The MG and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■ Using the numerical buttons on the FCM, select the MUTE group to which you want to assign the group of input channels.
■ On the chosen input channels, press the SET button once. The LED associated with the MUTE group will then illuminate.
■ Press the SET button on the FCM to take the FCM out of assignment mode.

To mute or unmute the selected MUTE group, press the corresponding numerical button on the FCM. (Make sure the MUTE group is not in assignment mode.)

NOTE: Outputs and DC masters cannot be part of MUTE groups.

4.2   Adding channels

4.2.1   How to add an I/P channel to a DC Master

■   Press the DC button on the FCM.
■   Press the SET button on the FCM.

The DC and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■   Select DC Master by pressing the corresponding numerical button on the FCM.
■   On the channel you want to add, press and release the SET button immediately.

Holding the SET button for approximately 2 seconds will **replace** all previous assignments with the current selection.

■   Press the SET button on the FCM to take the FCM out of assignment mode

4.2.2   How to add a group of I/P channels to a DC Master

■   Press the DC button on the FCM.
■   Press the SET button on the FCM.

The DC and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■   Select DC Master by pressing the desired numerical button on the FCM.
■   On the input channels you want to add, press and release the SET button immediately.

Holding the SET button for approximately 2 seconds will **replace** all previous assignments with the current selection.

■   Press the SET button on the FCM to take the FCM out of assignment mode

4.2.3   How to add an I/P channel to a MUTE group

■   Press the MG button on the FCM.
■   Press the SET button on the FCM.

The MG and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■   Select MUTE group by pressing the desired numerical button on the FCM.
■   On the input channel you want to add, press and release the SET button immediately.

Holding the SET button for approximately 2 seconds will **replace** all previous assignments with the current selection.

■   Press the SET button on the FCM to take the FCM out of assignment mode

To mute the altered MUTE group press the corresponding numerical button on the FCM. (Make sure the MUTE group is not in assignment mode.)

4.2.4   How to add a group of I/P channels to a MUTE group

■   Press the MG button on the FCM.
■   Press the SET button on the FCM.

The MG and SET buttons will start to flash and the SET buttons on all channels will illuminate.

■ Select MUTE group by pressing the desired numerical button on the FCM.
■ On the input channels you want to add, press and release the SET button imme-
   diately.

Holding the SET button for approximately 2 seconds will **replace** all previous assign-
ments with the current selection.

■ Press the SET button on the FCM to take the FCM out of assignment mode

To mute the altered MUTE group press the corresponding numerical button on the
FCM. (Make sure the MUTE group is not in assignment mode.)

4.3   Using the SENDS

4.3.1   How to set sends 1-8 to be stereo pairs

■ Press SYS on the CCM
■ Press the up or down arrow key until the display shows:

             User Setup

■ Press ENTER
■ Press the up or down arrow key until the display shows:

             Bus Config

■ Press ENTER

The displays shows:

             SEND BUSSES
             Bus 1 - mono/stereo
             (use the up or down arrow key to select required bus number)

■ Toggle between mono/stereo by pressing the ENTER button
■ Press the up arrow key to go to

             SEND BUSSES
             Bus 2 - mono/stereo

■ Toggle between mono/stereo by pressing the ENTER button
■ Repeat for remaining SENDS (up to eight (8).
■ Press ESC until your back at the Welcome-display or memory-number display

4.3.2   How to use sends 9-16 as stereo sub-groups

Using sends 9-16 as stereo groups can be achieved in two ways:

**A) By using this method, it follows that the input channel pan-pot has no
impact on the final sound image.**

■ Push Send ON on channel
■ Open the A channel SEND and set to suitable level (using the inner of the send's
   pot on the channel)
■ Repeat for the B channel (using the outer pot)

The sub-output level can then be adjusted using the sub-group faders.

B) By using this method, the sub-group will mimic the input channel's panning

■ Press stereo pan buttons 9-12 and 13-16 on selected input channels
■ Open the A channel SEND and set to suitable level (using the inner of the send's
   pot on the channel)
■ Repeat for the B channel (using the outer pot)

The sound image can then be designed using the pan-pots on selected input channels.

NOTE: If any of the sends 9 - 16 are set to PRE-fade, setting the "STEREO PAN TO - GRPS 9 -12 or GRPS 13 - 16" switches will set the sends to post-fade.

4.3.3   How to send the O/P from the I/P directly to the matrix

■ Press the desired D/O matrix button 13-16 at the top of the input channel module
■ Adjust the level using the matrix O/P level pots on the output & matrix modules.

This arrangement gives you four additional busses for monitoring purposes or 2 additional stereo mixes for broadcast/recording/routing to an individual musician etc.

Alternatively Matrix-sends can be routed from the output & matrix module using the matrix send level controls at the top of the output & matrix module.

4.4   How to use the L-C-R and L-R + C switches

4.4.1   How to achieve true L-C-R panning

■ Press the L-C-R button on the input channel

This will route the input signal to either to the L-C or R outputs on the L-C-R module, depending on the setting of the PAN-pot.

■ Use the input channel PAN-pot to alter the sound image to meet your requirements.

Another way of achieving this is to route any number of input channels/groups of input channels to one or more sub-groups and then control the L-C-R panning with the sub-group PAN-pot.

NOTE: The L-C-R switch overrides the L-R+CEN selections.The stereo bus follows the L-C-R pan pot.

4.4.2   How to use the L-R + C switches

■ Press the L-R switch to route the input signal to either the Left or Right output on the L-C-R module, thus enabling L-R panning.
■ To insert the Centre channel, press the CEN-switch and adjust the level with the associated pot.

4.5   How to use the Stereo bus and its output

To use the dedicated stereo bus and its output, press the Stereo button on the input channel. This routes the signal to the Stereo output on the Listen module via the module stereo master faders.

4.6   How to assign outputs

4.6.1   How to assign an output to a DC Master

If you want to assign an output channel or a matrix output to a specific DC Master:

■ Press the DC button on the FCM

■ Press the SET button on the FCM

The DC and SET buttons will start to flash and the SET buttons on all outputs will illuminate. The DC LED in the array of LEDs on the DC Master will also illuminate, indicating that DC assignment can start.

■ Select the DC Master (using the numerical buttons on the FCM) to which you want to assign the output channel or matrix output.
■ Press the VCA switch on the desired output or matrix.
■ Press the SET button on the selected output channels once. The LED associated with the selected DC Master will illuminate.

Please note that both output & matrix and the matrix output in each module share a common DC Master assignment. Also, the output & matrix VCA LED-section is independent of the VCA fader.

4.6.2   How to assign an output to a matrix output

■ Press the desired D/O matrix button 13-16 at the top of the input channel module
■ Adjust the level using the matrix O/P level pots on the output & matrix modules.

4.6.3   How to assign an output to the Stereo output

To use the dedicated stereo bus and its output, press the Stereo button on the input channel. This routes the signal to the Stereo output on the Listen module via the module stereo master faders. This assigns a channel to the stereo output.

To assign an output to the Listen module, press the stereo buttons on the sub outputs.

4.7   How to SOLO a channel

■ Press the MUTE button on the selected input channel
■ Press CHECK on the Osc and Comms module

WARNING: Using destructive SOLO in this way mutes every module in the console.

This SOLO-in-place means SOLO will continue to have its panning information. Both L-C-R and Stereo outputs are affected when pressing the CHECK button.

4.8   How to apply PFL and LISTEN

4.8.1   How to apply PFL to a channel

■ Press the PFL-button on the selected channel.
■ Ensure the PFL-button on the Listen module is pressed.
■ Ensure level is up on Master faders for monitoring through monitor speakers.

The signal to feed the monitor amplifier is taken from the Listen output on the rear of the Listen module.

To monitor via headphones, press the PFL button next to the headphone level control at the bottom of the Listen/Stereo/ output module.

4.8.2   How to apply PFL to a group of channels

■ Press PFL/LISTEN CHAN HOLD on the FCM.

■ Press the PFL buttons on the selected input channels which will add the PFL-signals together.

4.8.3   How to apply Listen to an output

■ Press the Listen button on the selected sub output module
■ Ensure the Listen switch on the Listen module is pressed
■ Ensure level is up on Master faders for monitoring through speakers.

The signal to feed the monitor amplifier is taken from the Listen output on the rear of the Listen module.To monitor via headphones, select PFL next to the headphone level control.

4.8.4   How to apply Listen to a group of outputs

■ Press PFL/LIsten output HOLD on the FCM
■ Press the Listen buttons on the selected output channels, which will add the signals together.

4.9   How to operate HOLD/CHANNEL PRIORITY/ CLEAR & TALKBACK TO LISTEN

4.9.1   FCM PFL/LISTEN HOLD is OFF

This mode provides INTERCANCEL - which cancels any active PFLs or Listen signals when a new signal is selected. Note that even if INTERCANCEL mode is active, pressing a PFL or Listen button, while at the same time holding down any of these buttons on another module, will cause the signals to mix.

4.9.2   FCM PFL/LISTEN HOLD is ON

This mode provides an ADDITIVE function, which mixes each new PFL or Listen signal with the previous signal.

4.9.3   CHANNEL PRIORITY

Selecting Channel Priority mode causes an input PFL to override an output Listen, but will not cancel it.

4.9.4   FCM CLEAR

The CLEAR buttons will, in any mode, illuminate if a PFL or Listen is active and can be used to cancel the current selection. The CLEAR buttons will also illuminate when the Listen buttons are selected on the T/B module, in which case the CLEAR button will have no effect.

4.9.5   CHANNEL PFL to AFL

This function converts all channel PFL buttons to AFL. Left and Right signal are routed in stereo to the Listen module.

4.10   The CCM memory

4.10.1   How to store a console snapshot to the memory

■   Press MEM on the CCM
■   Enter snapshot number 1-128
■   Press SAVE

4.10.2   How to recall a console snapshot from the memory

■   Press MEM on the CCM
■   Enter snapshot number 1-128
■   Press RECALL

4.10.3   How to clear a memory from the CCM

■   Press MEM on the FCM
■   Enter memory number
■   Press CLEAR

4.10.4   How to clear all memories from the CCM

■   Press MEM on the CCM
■   Press CLEAR

The display responds:

                    Clear all memories?

■   Press ENTER to confirm

The display responds:

                    Are you sure?

■   Press ENTER to confirm

4.10.5   How to name the DC Master displays

To name the displays on the DC Masters, the name has to be written into the a CCM
memory:

■   Press MEM on the CCM
■   Select MEM number
■   Press EDIT
■   Press down arrow key until the display shows MSTR 1(use left/right arrow keys if
    alternative MSTR is to be edited
■   Press EDIT
■   Select desired characters using the left/right arrow keys to move from one char-
    acter to another.
■   Press ENTER
■   Press Esc twice to return to the main menu

When recalling the memory, data (the name of the DC Master) will appear on the
fader displays.

4.10.6 How to name the DC Masters using a keyboard

A   Enabling the keyboard

■ Plug in the keyboard
■ Press SYS on the CCM
■ Press the up/down arrow keys until the display on the CCM reads User Setup
■ Press ENTER
■ Press up/down arrow keys until the display reads PS2 keyboard
■ Press ENTER

The CCM display now reads OFF

■ Press ENTER

The CCM display changes to read ON and the keyboard is enabled.

B   Edit names using the keyboard

■ Press MEM on the CCM
■ Select MEM number
■ Press EDIT
■ Press down arrow key until the display shows MSTR 1 (use left/right arrow keys
    if alternative MSTR is to be edited).
■ Press EDIT
■ Type in the name of the MSTR fader
■ Press ENTER
■ Press Esc twice to return to the main menu

When recalling the memory, data (the name of the DC Master) will appear on the
fader displays.

4.10.7 How to move a scene in the memory list

■ Press COPY
■ Enter number of source memory
■ Press ENTER
■ Enter number of destination memory
■ Press ENTER

5 Software and automation

5.1 General overview

The console automation can be operated in one of two ways:

1. Internal to the CCM, which has no need for an external PC.

2. External control of an R-Type system from SAM software running on a PC under Windows O/S.

NOTE: SAM software for R-Type management is NOT currently implemented.

5.2 Internal

Within the CCM, there are 128 snapshot/scene memory locations. These can be upgraded to 256 with an add-on card. Additionally, an external PC can be used via a RS232 or USBport, to bulk dump or retrieve the entire CCM memory.

You can name snapshots/scenes, cut, copy, delete and paste to different memory locations. As the development of software progresses, it will be possible to upgrade the onboard software to the latest version via the RS232 or USB port.

NOTE: USB operation is not currently implemented.

5.2.1 Snapshot definition

A snapshot is defined as a single memory location within the CCM, which takes an instantaneous snapshot of the current console setting, i.e. stores and can recall the following information:

■ Snapshot name
■ Currently selected DC master membership
■ Current DC master name if DC master are labelled
■ Currently selected Mute Group membership and Mute group status
■ Currently selected soft key mute and bypass status
■ Current "snap-to" fader position (when motor faders are implemented, which will be an option. See also 5.2.4 P-Fade definition.

5.2.2 Scene definition

A Scene includes all the snapshot information as described above with the addition of user programmable "effects" which include:

■ MIDI and Event information
■ Moving fader automation. (Motorized faders is to be implemented as an option. See also 5.2.4 P-Fade definition.)
■ Step to another scene after a period of time set by the user.

A Scene also contains user defined global settings as listed below.

5.2.3 Global settings

Fan speed, LED and Littlite brightness.
Mono/Stereo settings for Auxiliary bus 1-8 A and B.

5.2.4   P-Fade definition

P-Fade stands for "programmable" fader movements. With the implementation of the optional moving faders, it will be possible to add user programmable fader movements to a scene memory. This feature is not yet implemented.

5.3   Sound Automation Manager (SAM)

SAM management of R-Type control is not currently implemented, however, SAM will greatly increase the number of snapshot/scene memories and user functions, currently found in the internal CCM.

6   Central Control Module 8281

6.1   Functionality

The Central Control Module provides all Scene Memory and operating functions for the console. The basic functions of the CCM control buttons are described in 6.2 CCM front panel switches and displays. The CCM operations are carried out with the buttons below the alphanumeric display. A description of CCM operations follows below (note that the order in which they are listed is not significant).

6.2   CCM front panel switches and displays

Please refer to fig 5-1 below for the location of the switches and displays on the R-Type CCM front panel 8261 described in the following:

!

CAUTION:
Do not plug two CCMs or FCMs into the same system, even if they are located in different frames which are then bussed together. Although this should do no damage to the system, the automation software will not work under these conditions.
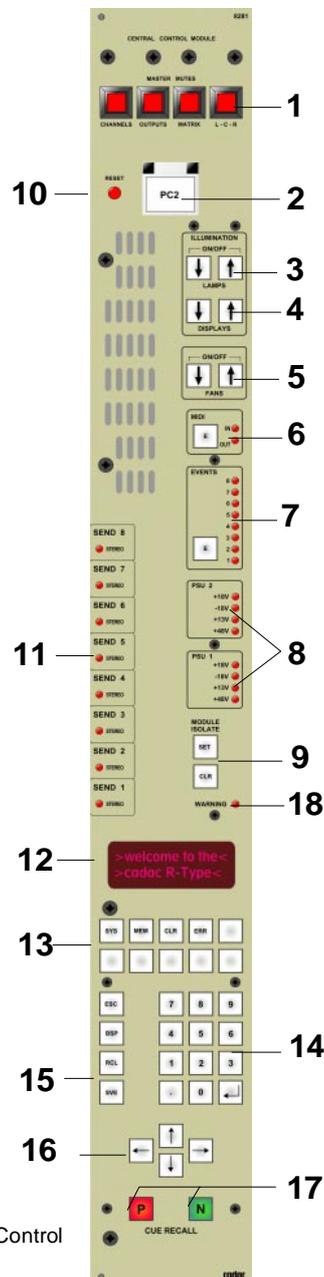

FIG 6-1. R-Type Central Control Module

1   Master MUTE switches

Four separate illuminated switches to globally mute the Input channels, Outputs, matrix and Left-Centre-Right outputs. All four switches work independently, so that any combination of Master muting can be selected at any time. The switches are intended for manual operation only and will not be recorded with a scene state.

2   PC2

Illuminated and hooded switch that changes the console automation control main PC to the back-up PC in the event of a failure in the main PC.

3   Console illumination

These illuminated switches control the console illumination lamps ON/OFF and their brightness.

4   LED brightness

These illuminated switches control the brightness of the console LEDs.

5   Fans

These illuminated switches control the cooling fans ON/OFF and their speed.

6   MIDI

These two LEDs indicate the presence of data at either the MIDI input or output. The illuminated switch enables the MIDI.

7   Events

This illuminated switch enables the EVENTS relays to operate on a scene. An illuminated LED indicates that an EVENT has been activated.

8   PSU System 1 & PSU System 2

The R-Type console is designed to be able to use two sets of power supplies simultaneously. These eight LEDs continuously show the status of the two power supply systems.

9   All modules Isolate set and clear

These two illuminated switches globally SET or CLEAR the ISOLATE function in all modules.

10   Reset

Resets the console system. Pressing reset does not clear the internal memories, maps etc.

11   Sends

Each of the first eight pair of SENDS to GROUPS from the input channels may be enabled on the Central Control Module to act as dual mono or stereo sends.

12   Alphanumeric display

This 24-character alphanumeric display is used for automation control and console setup. It also displays the current scene status.

13   Access keys

These dedicated keys provide access to the System Setup and Central Control Module locations. The keys permit the user to CLEAR both the display and keyboard entry. The ERR button enables any ERROR messages to be displayed.

14   Keypad

The numeric keypad together with ESC + BSP are used for scene number entry and basic editing functions.

15   Save & Recall

These buttons are used for saving and recalling scene memories from local memory or a PC system.

16   Arrow keys

These keys are intended for CCM Menu navigation.

17   Previous and Next

The Scene Memory Automation system is stepped by pressing either the Previous or Next button. The P and N buttons are duplicated on the 8285 panel.

18   Warning

This LED indicates that a problem has appeared in the system. Details may be viewed by pressing the ERR button.

6.3   Fader Control Module (FCM)
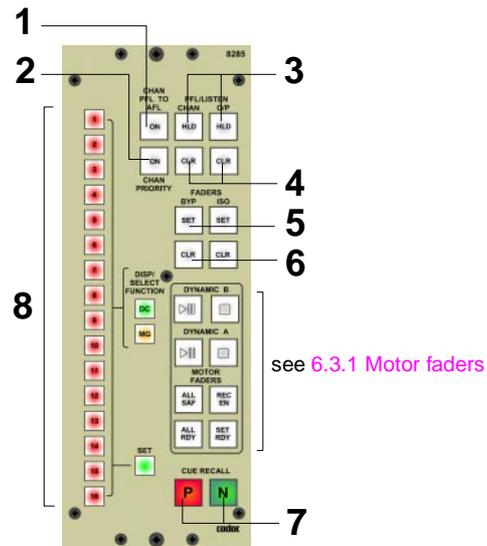
FIG 6-2. CCM Control Panel

⚠ **CAUTION:**
Do not plug two CCMs or FCMs into the same system, even if they are located in different frames which are then bussed together. Although this should do no damage to the system, the automation software will not work under these conditions.

---

1   Channel PFL to AFL - ON

Press this button to convert all channel Pre Fader Listen buttons to After Fader Listen. Left & Right signals appear in the LISTEN module in stereo.

2   Channel priority - ON

Press this button to enable any channel PFL or AFL selection to override other selections made in any GROUP, MATRIX OR L-C-R output section of the console.

3   Hold

The R-Type's PFL/LISTEN system can be set up to work in one of three ways:

1. HOLD is not ON - provides INTERCANCEL cancels any present PFLs or LISTEN signals.

2. HOLD is ON - provides an additive function - each new PFL or LISTEN signal mixes with the previous.

3. CHANNEL PRIORITY - an input PFL overrides an output LISTEN but does not cancel it.

4   Clear

In any of the modes described in (c) above, the CLEAR buttons will illuminate if a PFL or LISTEN is active and can be used to cancel the current selection.

5   Set

Illuminated switches to SET the BYPASS or ISOLATE functions in all faders.

---

6   Clear

Illuminated switches to CLEAR the BYPASS or ISOLATE functions in all faders.

7   Previous & Next

The Scene Memory Automation system is stepped by pressing either the Previous or Next button. These buttons are duplicated on the Central Control Module, see bullet (q) in section 2.1.

8   Assignment buttons

The illuminated buttons 1 to 16, in conjunction with SET, DC and MG are used to select and control:

1.   The Muting state of each of the 16 "MUTE GROUPS".

2.   Assignment of the faders to a DC Master.

3.   Assignment of the faders to a MUTE GROUP.

NOTE: See section 5.6 for operational description

6.3.1   Motor faders

When motor faders are fitted, this group of eight push-buttons may be used to control two dynamic sequences A and B. Dynamic B is used only when an additional dynamic is being played. Both dynamics can run simultaneously. The motor faders can be set to safe and ready mode respectively. In safe mode, touching the fader knob will have no impact on the recorded sequence. In ready mode, touching the fader knob will cause the motor fader to toggle between ready and write mode. Thus, editing of the recorded sequence (dynamic A only) goes on for as long as the fader knob is actually touched and the fader remains in ready mode.
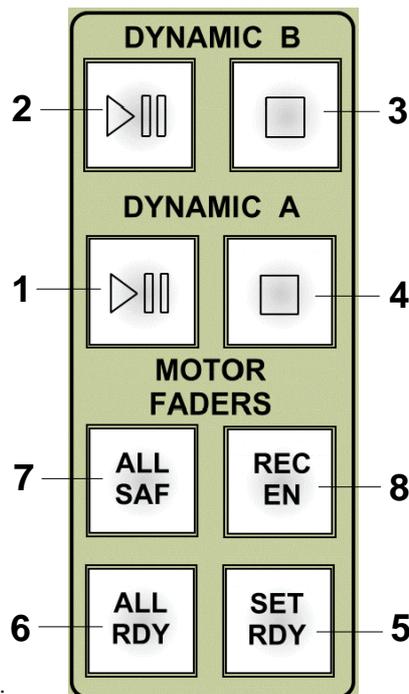

FIG 6-3. Keypad for controlling dynamics.

PLAY/PAUSE (1) Plays, pauses or continues a recorded sequence of motor fader movements associated with dynamic A. If recording is enabled with the push-button (8), then this button starts either a new recording, or starts an update of an existing dynamic.

PLAY/PAUSE (2) Plays, pauses or continues a recorded sequence of motor fader movements associated with dynamic B.

STOP (3, 4) Stops the recorded sequence of motor fader movements.

SET READY (5) This mode allows individual faders to be "toggled" between safe and ready mode by touching the fader knob.

ALL READY (6) Sets all motor faders to ready mode.

ALL SAFE (7) Sets all motor faders to safe mode.

RECORDING ENABLED (8) Prepares the computer for recording of a dynamic sequence. Pressing button (1) starts the actual recording.

6.4   Configuring the console system

Many aspects of the way the R-Type system performs may be set and changed by the user. The settings are then held in the battery-backed memory.

FIG 6-4. R-Type Central Control Module (lower section)

6.4.1   Send Bus settings

The first 8 pairs of send busses may be configured to be stereo or dual mono. The choice is made as follows:

- Press the SYS button
- Use the up and down arrow buttons until the display reads USER SETUP
- Press the return button
- Use the up and down arrow buttons until the display reads BUS CONFIG
- Press the return button
- Use the up and down arrow buttons to select the required bus
- Press the return button to toggle between mono or stereo

The corresponding LED on the CCM front panel should illuminate to show a bus selected to be stereo.

The following options are also available via the SYS ->User Setup menu:

6.4.2 P&N buttons

The Previous and Next buttons are perhaps the most important buttons during the performance of a show. In conditions where a dark environment makes these buttons difficult to see, you may program their illumination to be "Always Off", "Always On" or "flash". The flash setting flashes the LED on when a scene memory is recalled, particularly useful if you are using the Remote P & N feature of the Keys connector.

6.4.3 Isolate (ISO)

Global Isolate Set and Clear buttons make it possible for the user to set the state of all faders simultaneously. These buttons may be set to be momentary or latching through the following menu entry.
Press SYS (see fig 6-4), followed by the up or down arrow buttons to display the USER SETUP menu and then press Enter. Use the down arrow button to go to ISO buttons. Press Enter. The display will show the settings for this feature. Further pressing Enter toggles between the buttons being set to either momentary or latched mode. Press ESC to go back one level in the menu.

6.4.4 PS2 keyboard

To assist the user in entering alphanumeric information a PS/2 keyboard (QWERTY) can be plugged into the CCM. This keyboard is enabled as follows:

Press SYS (see fig 6-4) to display the USER SETUP menu and then press Enter. Use the up or down arrow buttons again to have the display show PS2 keyboard, then press the Enter key to show the current setting. Further pressing the Enter key will toggle the setting between ON or OFF.

If you switch on the console with no keyboard attached and the setting is ON, the CCM will recognise that it is not attached and the setting reverts to OFF.

A QWERTY-keyboard makes it considerably easier for you to enter text when naming Scene Memories and Master faders. In addition, some of the keys on the keyboard duplicate the buttons on the CCM keypad:

F1 = SYS	F6 = CPY	F11 = RCL
F2 = MEM	F7 = BLK	F12 = SVE
F3 = CLR	F8 = INS	Page Down = 'N'
F4 = ERR	F9 = DEL	Page Up = 'P'
F5 = STOP	F10 = EDIT	

You will also find that the Esc, Backspace (←) and Enter (↵) keys on the keyboard copy the corresponding button functions on the CCM, and, when appropriate, the Insert and Delete keys on the keyboard will perform these functions.

6.4.5 MIDI menu

MIDI functions are accessed via the MIDI Setup menu. This is obtained by pressing the SYS button followed by pressing the up or down button until the display reads:

> System Menu
> User Setup

Press the Enter button and then use the up or down arrow buttons again until the display reads:

> User Menu
> MIDI Menu ⇒

Press the Enter button to access the MIDI menu, where the following functions can be found:

6.4.5.1   MIDI Program Change filter

The MIDI Program Change filter can be selected on or off.
When the MIDI Program Change filter is "on", only the first Program Change message for a specific MIDI Channel is sent. Any identical PC messages to the same channel are filtered out.

Alternatively, when the MIDI Program Change filter is "off", **all** PC messages are sent, whenever they appear in the data.

The reason for including this option, is that some types of MIDI controlled equipment "close down" for a short time when a PC message is received, causing a brief loss of the audio signal. It is therefore unnecessary and undesirable to repeat the same PC number.

Press SYS to use the System menu. Using the up or down arrow keys until USER SETUP appears on the CCM display. Select the sub-menu by pressing Enter and the CCM display will respond with

> USER SETUP.

Press the up or down arrow keys again until MIDI filter *a*ppears in the CCM display. Then press Enter to select the option.

The CCM display will show:

> "filter On or filter Off"

Press Enter to toggle between on and off. When the required option is set, press **[Esc]** to return to one of the "root" displays.

6.4.5.2   MIDI Scene recall

The Scene Recall feature can be controlled from an external device sending an appropriate MIDI message to the R-Type CCM.

When the display is showing:

> MIDI Setup
> Scene recall

Press the Enter (↵) button and the display will change to show:

> MIDI Recall
> Disabled

Use the up or down arrow key to scroll through the possible Channel numbers that can be enabled. Each channel will be displayed as:

> MIDI Recall
> on Chan 1
> (the number scrolls through 1 to 16 then the display shows
> 'Disabled')

When the desired MIDI channel has been selected, pressing Esc will step back one level in the menu system. External equipment may now send a "MIDI Program Change" message on the selected channel number to recall Scene Memory 1 to 128.

6.4.6 Debug Menu

The debug menu provides a number of facilities to assist in fault finding and preventive maintenance.

Press SYS and use the down arrow key to go to Debug. Press Enter to show the debug menu.

6.4.6.1 Show temp

Using the arrow key, go to Show Temp. Press Enter and the display will show the temperature in the console. Press ESC to leave.

6.4.6.2 Show time

Press the down arrow key to go to Show Time. Press Enter to have the display show the Time. The Edit button will at this point be flashing to indicate the time shown may be edited. To edit the Time, press EDIT and using the arrow key, go to Set Time. When completed press Enter.

Press ESC to go to the previous menu level.

6.4.6.3 Show date

Using the down arrow key, go to Show Date, then press Enter to show the Date. To Edit the date, press EDIT.

Pressing ESC takes you back to the menu.

6.4.6.4 Show PSU's

Press SYS and use the arrow key to go to the Debug menu, press Enter and then the up or down arrows again to go to Show PSU's. Press Enter and the display will show:

+18V
actual = xx.x

Using the arrow keys allow you to move around and check the carious voltages supplied by the PSU's. Pressing ESC takes you back to the menu.

6.4.6.5 Show version

Press SYS and use the down arrow key to go to the Debug menu, press Enter and then the up or down arrows again to go to Show version. Press Enter and the display will show the software version number and date when it was compiled.

Press ESC to go to the menu.

6.4.6.6 Show errors

The R-Type is equipped with an error log that stores brief information about faults that occur and the date/time when they occurred. This feature is useful to CADAC engineers in diagnosing a fault after the event.

Press SYS, then using the down arrow key, go to the Debug menu, press Enter and then the up or down arrows again to go to Show errors and press Enter. The display will show the type of error and the Date/Time when it occurred. Navigate the list of errors using the up/down arrow keys.

The CLR button flashes, indicating that the error log can be cleared. Press Enter and the display shows Error log cleared. Press ESC to go back to the menu.

6.5   Viewing and Changing DC and Mute Groups assignment of the faders

Each fader in the R-Type console has16 LEDs indicating to which DC Groups or Mute Groups it has been assigned. The faders can be set to display either DC Group or Mute Group membership by pressing the DC or MG button on the FCM.

To change membership, press the SET button on the FCM. This will cause the SET button to flash in addition to either of the DC or MG buttons, depending on which was active. At the same time, the 16 Master buttons will extinguish and all the faders will illuminate their SET buttons. NOTE: Master faders do not engage in Mute Groups, so when MG is active, only the SET buttons on the channel faders will illuminate.

At this point, you may choose the group/groups to which faders will be assigned/un-assigned. You do this by pressing the appropriate master button, which then will illu-minate. Pressing the SET button on a fader will then change that fader's settings for the selected groups from ON to OFF or from OFF to ON.
Finally, pressing the SET button on the FCM will return the system to its normal oper-ating mode.

6.6   CCM operations

After power-on of the console the CCM performs a self-test during which process all of the frames are scanned to verify the location of both input and DC Master fad-ers.This information is crucial to enable correct recall of previously saved module information for console snap-shots for the scene recall system.

If a console configuration is changed (i.e.inputs,outputs, or the CCM are placed in different locations within a frame, or more frames with input modules are added to an existing console), scenes or snapshots, that have been stored in the original show file may recall the faders/modules incorrectly in the new configuration.

A console configuration that does not agree with the map in the CCM will result in an error message. In this case the user will have to invoke a memory modification func-tion, in order that the CCM correctly recalls the data for inputs and outputs.

>WELCOME TO<
>THE R-TYPE<

6.6.1   Memory set-up and editing

A selection of the buttons will then illuminate to indicate they may be used to perform a certain function.

The CCM has 128 Scene Memories stored in RAM, which is backed up with a 3V lithium battery. A scene can be recalled either by pressing the P or N button or by pressing the MEM button. The CCM display will then change to show the Number and Name of the scene recalled:

l:<MEM001>

This scene is called the Current Scene and is the point of reference for choices made using the P or N buttons, except when the system has just started and there is no Current Scene. If this is the case, pressing the N button will recall Scene Memory 1 and pressing the P button results in an error message.

To recall a non-sequential Scene Memory, press the MEM button. The display changes to show:

SCENE MEMORY
_ :

The numeric keyboard illuminates to indicate that you may enter a Scene Memory number, which will appear at the flashing cursor as you type the numeric digits. You

can also select a Scene Memory by scrolling the Scene Memory list, using the up or down arrow keys. When a valid number for the Selected Scene has been entered, several buttons will illuminate to show that each has certain function that can be applied to the Selected Scene.

SCENE MEMORY
12: <MEM012>

The most obvious functions of these are RCL and SVE, which recalls or saves the current console settings to the Scene. Other functions available include:

CLR   Clear the selected Scene Memory
INS   Insert a new (blank) memory before the selected
DEL   Delete the selected memory
EDIT   Edit the various parts of the selected Scene Memory

Note: If you press the CLR button before a Selected Scene number has been entered, the system offers you the option of clearing ALL Scene Memories. To prevent accidental deletion of Scene Memories, this function requires double confirmation before it can be executed.

6.6.2   Editing the contents of Scene Memories

Most of the contents of a scene memory represents settings for the faders, there are, however, also elements of the memory that can be entered by the User.

Press the MEM button
Scroll to or enter desired Selected scene
Press the EDIT button
The display will show:

EDIT MEM: 4
NAM:<MEM004>

Select using the up and down arrow keys:

NAM: Edit the name assigned to this Scene Memory
MSTR 1:   Edit up to 16 Master fader names
MIDI 1:   Assign up to 4 MIDI events to be issued
EVT: Select up to 8 relay Event operations
STEP: Define a time-value to automatically step to another Scene
XFADE: Define a Cross-fade time (motorised faders only)

If you press the EDIT button again, a further display and button set offers a suitable method to edit the Scene Section

6.6.3   Editing the Scene name

If the display is showing:

EDIT MEM: 4
NAM:<MEM004>

and you press the EDIT button, the display changes to show:

MEM: 4: NAME
      <MEM004>

and a cursor appears flashing below the first character. Each character can be changed by using the arrow keys or, if a QWERTY-keyboard has been installed and enabled, by typing the required string. When the text string is as required, press the return-key to store it. If you want to abandon the edit, press the ESC button.

6.6.4   Editing the Master Fader names

If the display is showing:

EDIT MEM: 4
MSTR 1:   <nn>

Use the L and R arrow buttons to choose which of the 16 master fader names you intend to edit.

Then press the EDIT button and the display changes to show:

MEM: 4: NAME
MSTR: 1   <nn>

and a cursor appears flashing below the first character. Each character can be changed by using the arrow keys or, if a QWERTY-keyboard has been installed and enabled, by typing the required string. When the text string is as required, press the return-key to store it. If you want to abandon the edit, press the ESC button.

6.6.5   Editing MIDI

If the display is showing:

EDIT MEM: 4
MIDI 1:   --

then, using the arrow buttons, you may scroll round 4 MIDI events. If they are Off, the display will show two dashes as above, otherwise a suitable Mnemonic will be displayed. To edit a MIDI event, select it with the arrow buttons and then press EDIT.

The display shows:

MEM   4: MIDI
  -- -: --- : ---

and the cursor will flash below the leftmost cell. This selects the type of MIDI event whereas the arrow buttons scroll through NF (Note Off), NO (Note On), CC (Controller Change) or PC (Program Change). Once an event type has been selected, you may change to the other cells and enter suitable numbers. Working from left to right, the cells represent:

Event type   Channel number   Data Item 1   Data Item 2 (if required)

6.6.6   Editing Events

If the display is showing:

EDIT MEM: 4
EVT: -------

pressing EDIT allows you to change the state assigned to the 8 events. The display will change to show:

MEM 4: EVENT
- - - - - - - -

The 8 characters in the bottom row of the display represent the state of the 8 relays (leftmost being event 1). A line at the bottom means "turn the relay off", a line at the top means "turn the relay on" and a slanted icon means pulse the relay on for 1 second. The icons may be changed by moving the cursor to them with the left or right arrow buttons and then select the required function with the up and down arrows. When completed, press the return button to store it or press ESC to abandon.

6.6.7   Editing Step time (and destination)

The Scene Recall system has a timer that may be programmed to start when you recall a Scene. After the pre-set time has elapsed, the system will automatically recall another Scene, which usually is the Next Scene. The system may, however, be programmed to jump to any other scene. The time may be programmed for any or all Scene Memories. If the display is showing:

EDIT MEM: 4
STEP   :   --.-

pressing EDIT will display:

RCL MEM: ---
AFTER :   --.-

and a time value may be entered in the "after-space". Normally Rcl MEM will show: Nxt, but the cursor may be moved to this item using the up arrow button and a Scene Memory number may be entered.

6.6.8   Editing X-fade time

X-fades are performed on motorized faders, details of which will be given when motor faders are available.

6.6.9   Copying Scene Memories

See fig 6-4 for illustration. To copy a Scene Memory press CPY on the CCM. The display shows COPY MEM ___ and the number of the source memory can be entered. After the memory number has been entered the Enter-button illuminates indicating it is active. Press Enter after which the display shows TO: ____. Enter memory number using the numerical keypad. When the screen shows MEM number, press Enter to copy the Scene Memory to that location. The display flashes, showing copy operation OK and returns to the standard menu.

6.6.10   Block

The purpose of this function is to define a block or blocks of memory to be manipulated. (more details to follow)

6.6.11   Insert/Delete

Press MEM and enter the desired Scene number. Press INS or DEL depending on what operation you wish to perform.
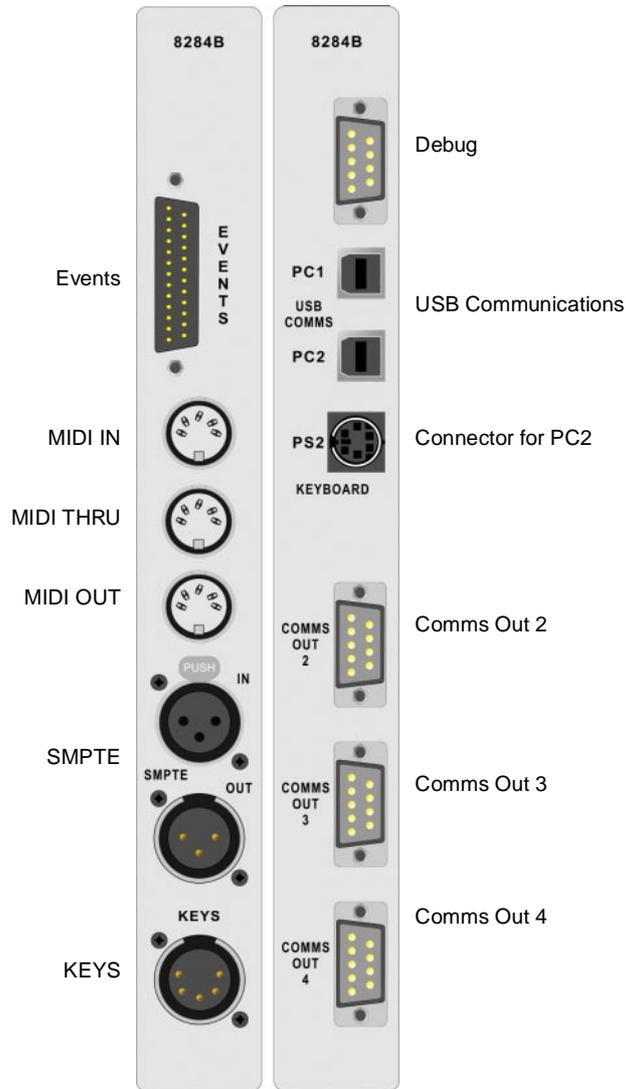
Pressing INS inserts a blank memory space before the displayed memory number. NOTE: If you have stored a memory in location 128, this memory will be erased when the action above is performed.

To delete a memory, press MEM, enter the desired Scene number and press DEL. The selected Scene will be removed from the list and all subsequent scenes will be moved up one step. Location "128" will be made blank.

6.6.12   Dynamic actions in Scene Memories

It has been described above how motor faders may be programmed to perform a timed X-fade. Once this (or any other dynamic action) has been started, it will run to its conclusion. If you would like to terminate it early, press the STOP-button. (more to be added).

6.7   CCM rear panel connectors

	8284B
	Debug
Events	
	PC1 USB COMMS
	USB Communications
	PC2
MIDI IN	PS2 KEYBOARD
	Connector for PC2
MIDI THRU	
MIDI OUT	COMMS OUT 2
	Comms Out 2
SMPTE	COMMS OUT 3
	Comms Out 3
	COMMS OUT 4
KEYS	Comms Out 4

7   Mono Input Channel 8241
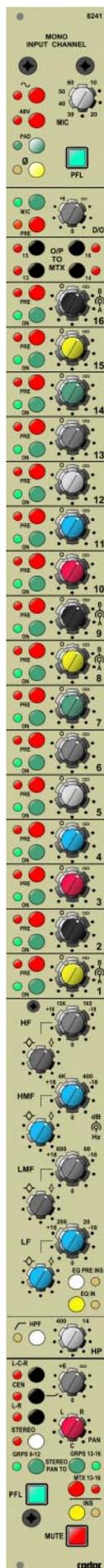
The mono input channel is intended for microphone level sources and has controls for gain, 20dB pad, phase-change, phantom power, ON/OFF and PFL. A Line-up tone can be injected into the input amplifier and the direct output may be selected to come from the MIC amplifier or pre or post the channel fader.

Routing switches to all the 16 dual groups (32 busses) are provided. (In mono mode there is one switch for each pair of sends.) Sends 1A/B to 8A/B may be switched between stereo (level on upper control, pan below) or dual mono (A level on upper control and B level below) on a bus by bus basis. Sends 9A/B to 16A/B are dual mono busses, which can be selected to receive module pan information in two groups 9A/B to 12A/B and 13A/B to 16A/B, hence providing a traditional sub group scenario for FoH use. It is also possible to route directly to matrices 13 to 16 which then can be enabled to receive module pan information.

In addition, the module has access to a dedicated stereo bus and also a L-C-R bus. L-C-R can be used either as L-R panning with unpanned centre with level control or as full L-C-R panning.
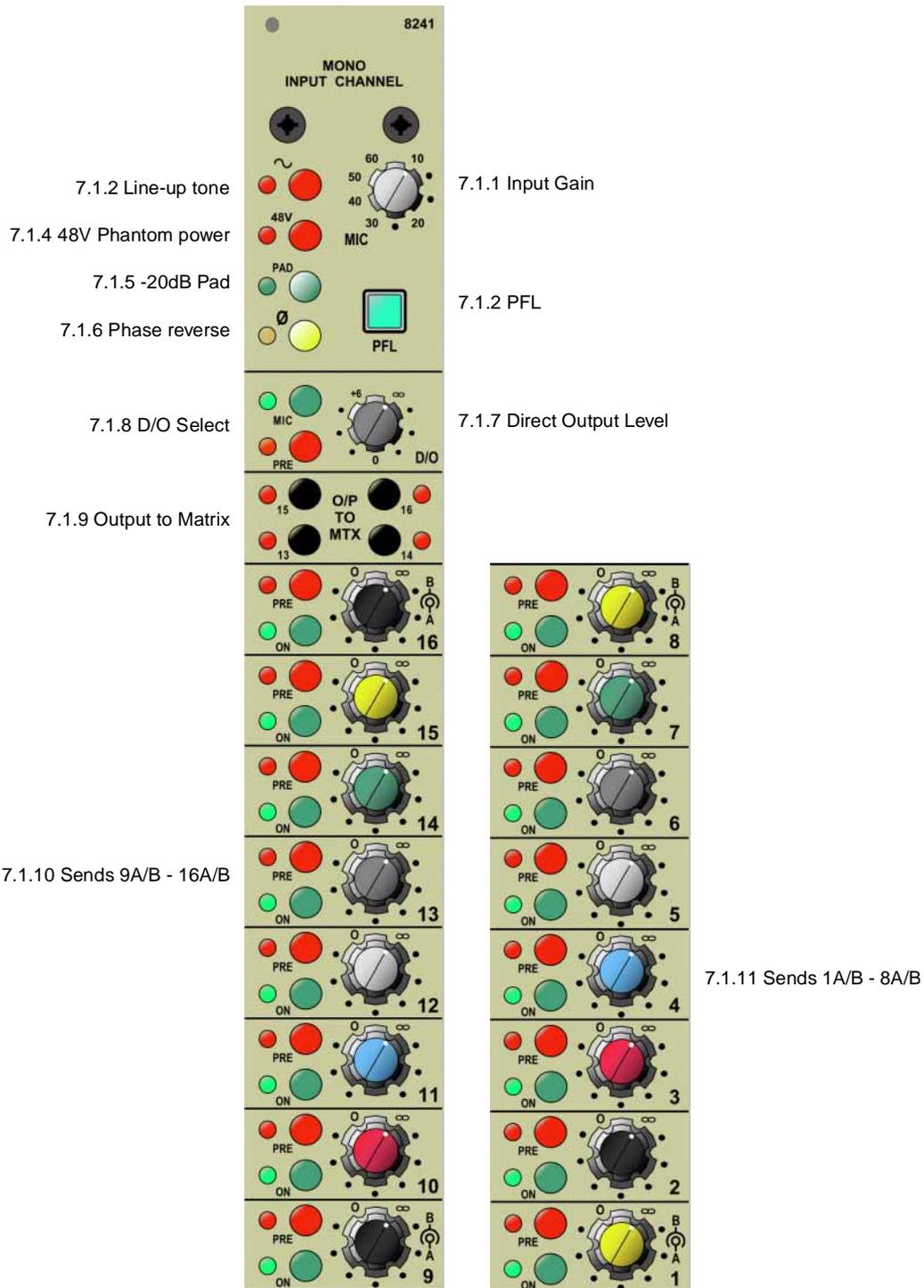
PFL can be changed globally to function as AFL with pan information or can be used in the more traditional mono pre fader listen mode.

The module also includes a fully parametric 4-band equalizer with controls for each band of ±18dB cut and boost, variable frequency and variable 'Q'. The module also contains a variable frequency high-pass filter which is switched independently from the equalizer.

All audio inputs and outputs are electronically balanced.

Following pages describes the 8241 module in detail.

7.1 Mono Input Channel 8241 - front panel

7.1.2 Line-up tone

7.1.4 48V Phantom power

7.1.5 -20dB Pad

7.1.6 Phase reverse

7.1.8 D/O Select

7.1.9 Output to Matrix

7.1.10 Sends 9A/B - 16A/B

7.1.1 Input Gain

7.1.2 PFL

7.1.7 Direct Output Level

7.1.11 Sends 1A/B - 8A/B

7.1.1 Input Gain

The MIC Input Gain is adjustable between 10 and 60dB

7.1.2 PFL

Press this button to monitor the output signal from the MIC amplifier in mono on the L & R busses of the PFL via the LISTEN module. This button will cause any other

selected PFLs/Listens to be cancelled, unless PFL hold has been selected or another PFL/Listen button is still pressed. See 6.3 Fader Control Module (FCM) 1 - 4 and 12.1.8 PFL - select through to 12.1.22 Headphones - MUTE.

7.1.3   Line-up tone

Press this button to apply a Line-up tone to the input. The frequency and level of the line up tone applied is controlled from the OSC/Comms module 8271, see 11.1 Osc & Communications 8271 - front panel. Pressing this button will also disable the 48v phantom power if selected, see 6.1.4.

7.1.4   48V Phantom power

Press this button to switch on the 48V Phantom power to any connected microphone. Notice that the 48 v phantom power is disabled on this channel if the line-up tone is selected (see 6.1.3).

7.1.5   -20dB Pad

Press this button to apply -20dB attenuation to the input signal to the microphone amplifier. If the gain potentiometer (see 7.1.1 Input Gain) is set for 20dB and the pad applied, this allows for the use of line level (0dB nominal) devices instead of having a separate line input.

7.1.6   Phase reverse

Press this button to reverse the phase of the signal coming into the module.

7.1.7   Direct Output level

Use this rotary control to adjust the Direct Output level. This control has 6dB in hand with a 0dB centre detent position.

7.1.8   Direct Output Select

The direct o/p send is normally fed from post fader. Press PRE will take the signal from pre-fader but post INS/EQ. Pressing MIC will override the PRE button (the PRE LED will go out) taking the d/o directly from the o/p of the MIC amp. In this condition the Highpass filter is still available if needed.

7.1.9   Output to Matrix

These buttons are used to select direct routing to matrix busses 13 to 16 from POST fader, with or without stereo panning. See 7.1.32 Matrix 13 - 16 and 7.1.27 PAN Control.

7.1.10   Sends 9A/B - 16A/B

Sends 9A/B - 16A/B are dedicated mono sends, each with its own level control. Each pair has its own PRE/POST FADER and ON/OFF switch.

Sends 9A/B - 12A/B and 13A/B - 16A/B can be selected to follow the STEREO PAN-NING by using the buttons in the panning section at the bottom of this module. See 7.1.27 PAN Control, 7.1.29 Stereo PAN to groups 9 - 12 and 7.1.32 Matrix 13 - 16.

Mono Input Channel 8241 - front panel
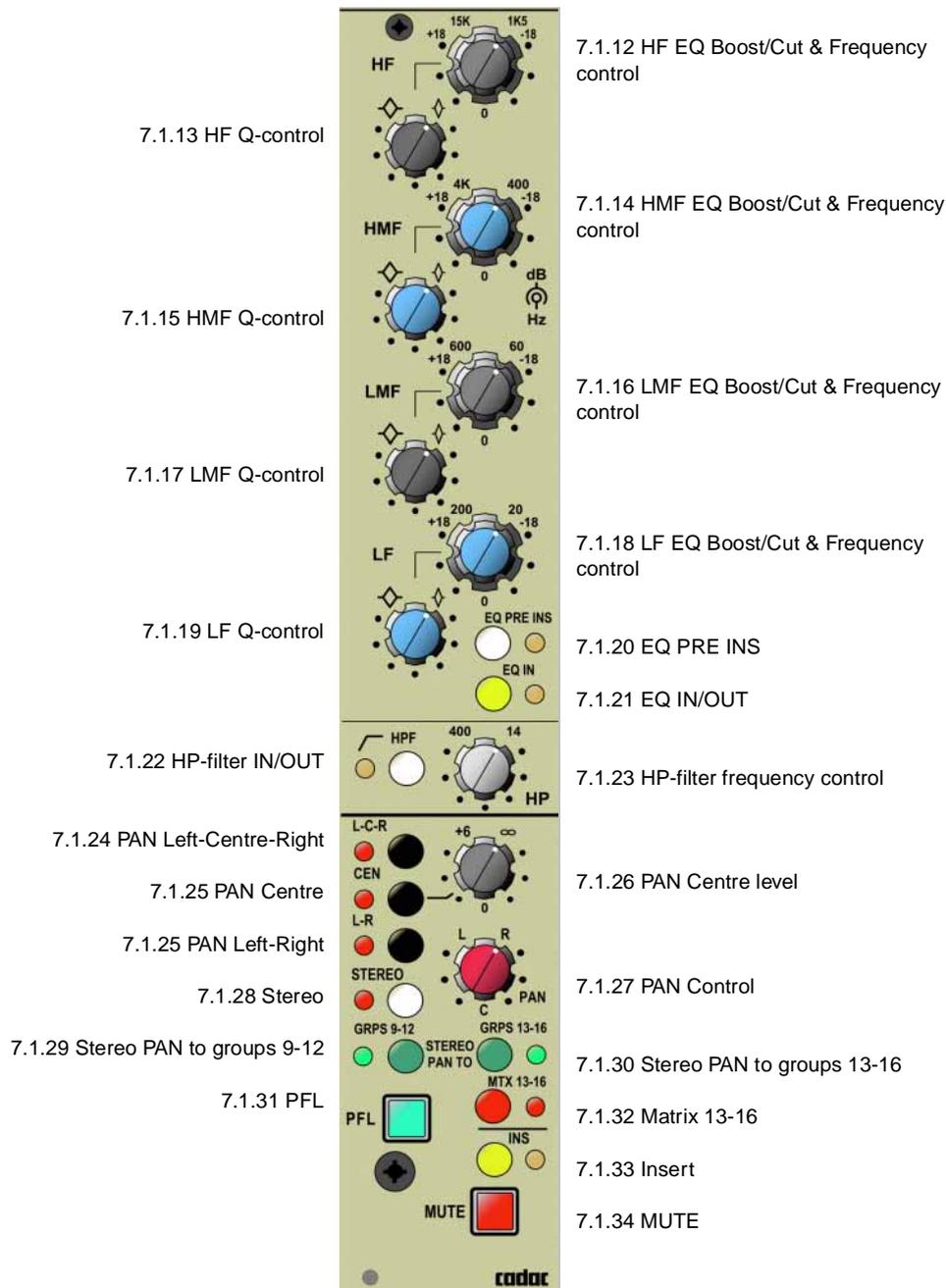
7.1.11   Sends 1A/B - 8A/B

Sends 1A/B - 8A/B can be switched between stereo and dual mono. In stereo, adjust the level with the upper control and panning with the lower one. In dual mono, adjust A level with the upper control and B level with the lower control.

Each pair has its own PRE/POST FADER and ON/OFF switch.

Switching between mono and stereo is performed and displayed in the CCM (Central Control Module). See 6.4.1 Send Bus settings for information how to do this.

Equalizer functionality

Each band of the equalizer consists of 3 controls. Two controls are combined on a dual concentric control. The top knob controls the Cut and Boost and the bottom knob controls the centre frequency. The third control of each section varies the 'Q' factor.
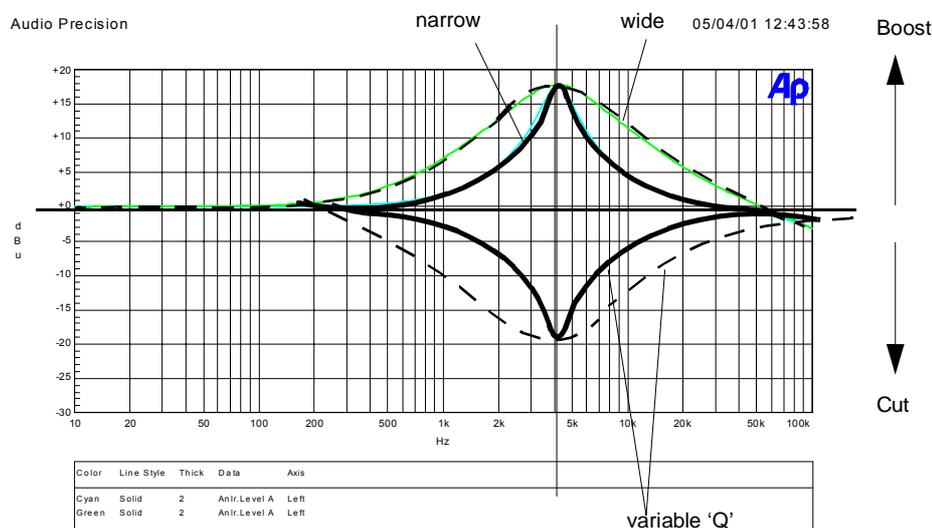
7.1.12   HF EQ Boost/Cut & Frequency control 1K5Hz - 15 KHz

This dual concentric control allows the centre frequency to be adjusted between 1K5Hz to 15 KHz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

7.1.13   HF Q-control

The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 6.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

7.1.14   HMF EQ Boost/Cut & Frequency control 400Hz - 4KHz

This dual concentric control allows the centre frequency to be adjusted between 400Hz to 4KHz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

7.1.15   HMF Q-control

The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 6.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

7.1.16   LMF EQ Boost/Cut & Frequency control 60Hz - 600Hz

This dual concentric control allows the centre frequency to be adjusted between 60Hz to 600Hz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

7.1.17   LMF Q-control

The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 6.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

7.1.18   LF EQ Boost/Cut & Frequency control 20Hz - 200Hz

This dual concentric control allows the centre frequency to be adjusted between 20Hz to 200Hz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

7.1.19   LF Q-control

.The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 6.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

7.1.20   EQ PRE INS

In normal operation the equalizer is situated after the channel INSERT. Press this button to put the EQ before the channel INSERT.

7.1.21   Equalizer IN

Press this button to switch the Equalizer in circuit.

7.1.22   HP Filter IN

Press this button to switch the HP-filter in circuit. Note that the HPF is situated immediately after the MIC-amp and is not switched with the equalizer.

7.1.23   HP Filter Frequency control

This is a variable control for selecting the frequency at which the filter starts to "turn over" (also known as the knee or -3dB point for the filter). The "turn-over" frequency is continuously variable between 14 and 400 Hz and provides a cut of 12dB/oct (2nd order

7.1.24   PAN Left - Centre - Right

When selected, this switch overrides selection of the Centre and L-R switches. This will route the input signal to the three main LCR outputs on the LCR module (see 10 L-C-R Output 8261) via the pan control. The PAN control then behaves in a true LCR fashion, panning the post-fade signal from left through centre to the right outputs.

7.1.25   Centre switch

Routes the post-fade signal directly to the centre output of the LCR module via the Centre level control. If the LCR switch is activated, this switch is inactive. See 7.1.26 Centre level.

Left - Right switch

Sends the post-fade signal to the main L-R outputs on the LCR module via the PAN control, which behaves in a normal fashion, panning the signal between left and right. See 7.1.27 PAN Control.

7.1.26   Centre level

This control has 6dB in hand and is centre detented at 0dB. This control is used to set the post-fade signal level to the centre output of the LCR module if the Centre-switch is activated. This can be used to mix or balance signal levels when the centre output is used as a separate mono bus in conjunction with the standard L-R bus. If the LCR switch is activated this control is inactive.

7.1.27   PAN Control

The PAN control affects 3 different sections of the module:

For the LCR sends:

The control pans the post-fade signal from Left through Centre to Right on the LCR module master outputs. In L-R mode, the control pans the post-fade signal from Left through Right on the LCR module master outputs without affecting the centre sends.

For the Stereo-send:

The control pans the signal between Left and Right on the PFL/Listen module stereo outputs.

For the matrix sends and Group sends 9 -12 & 13 - 16:

The control will pan the signal between A and B group outputs as determined by "Stereo Pan to GRPS" switch status and level setting of Aux/Group sends, and will pan the signal between matrices 13/14 and/or 15/16 as determined by the "Stereo Pan to MTX" switch setting and "OP to MTX" direct to matrix routing switches.

7.1.28   Stereo

Sends the post-fade signal via the pan control to the stereo L-R outputs located on the PFL/Listen module. This is a separate and additional stereo bus from the main LCR outputs located on the LCR module. The LCR-switch has no effect on the operation of this additional bus.

7.1.29   Stereo PAN to groups 9 - 12

If selected, this switch will route the auxiliary/group send from the aux/group send

level control via the pan control to the aux/group outputs. These can be selected in two banks of 8, sends 9 A & B to 12 A & B and/or 13 A & B to 16 A & B allowing for a maximum of 16 (8stereo) traditional subgroups.
See also 7.1.10 Sends 9A/B - 16A/B.

7.1.30   Stereo PAN to groups 13 - 16

See 6.1.29 above.

7.1.31   PFL

Press the PFL button to send the pre-fader signal to the LISTEN module where it can be checked on speakers or headphones. The PFL button is an electronically latching switch which is controlled by the PFL/SOLO switches on the panel of the 8285 module located beneath the CCM. The PFL-function can be globally changed on all channels (mono and stereo) to function as AFL after fader and PAN, see 7.1.9 Output to Matrix.

7.1.32   Matrix 13 - 16

If selected, this switch will route the direct to Matrix selection from the "O/P to MTX" switches to the matrix outputs via the pan control, allowing matrix outputs 13/14 and/or 15/16 to be used as further stereo outputs. See 7.1.9 Output to Matrix.
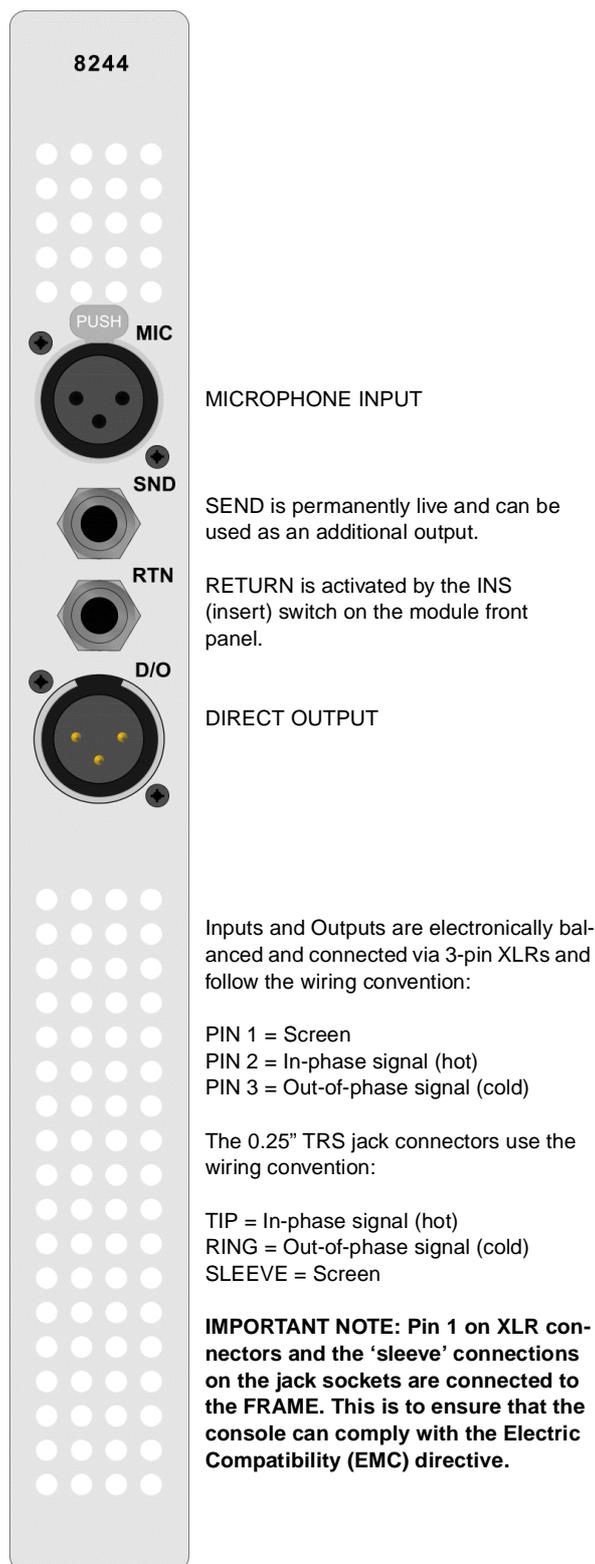
7.1.33   Insert

Press this switch to insert external equipment connected to the insert send and return jack sockets on the rear panel of the module, see 7.2 Mono Input Channel 8241 - rear panel. Please note that the insert send is permanently live and that the jack sockets are NOT normalized. The insert point can only be enabled by the front panel button. Also note that it is possible to make the insert point post the equalizer circuit by pressing EQ PRE INS, see 7.1.20 EQ PRE INS.
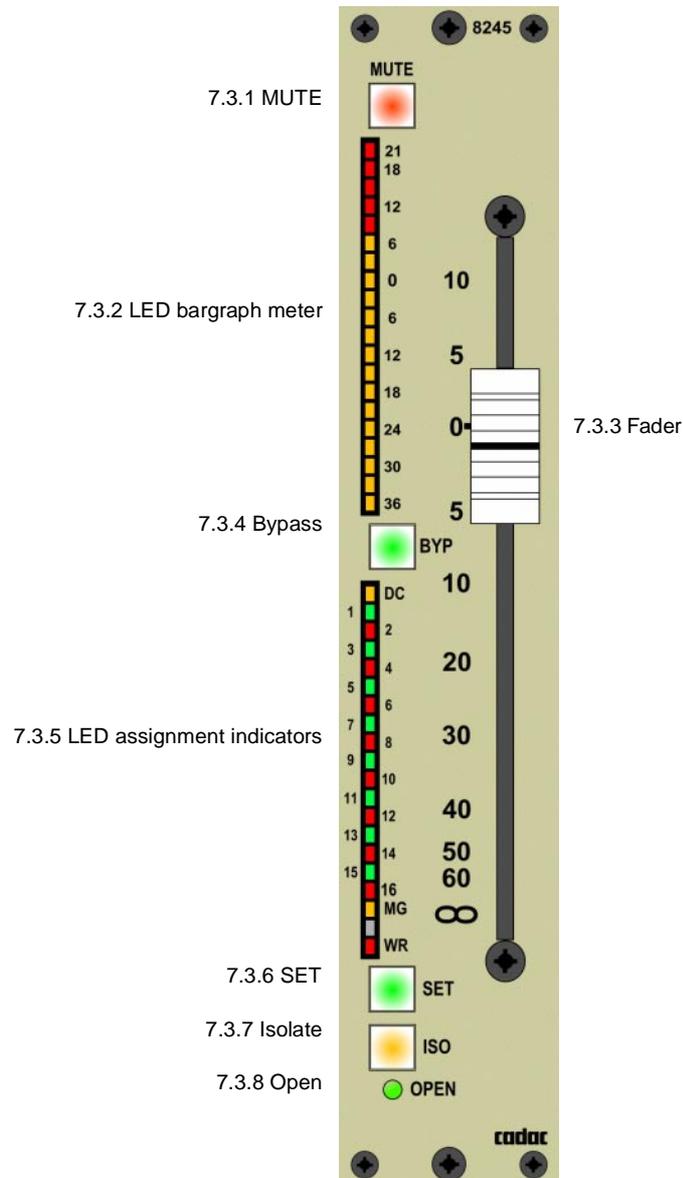
7.1.34   MUTE

Press this button to mute all POST-FADE signals from the Input channel except for AFL send.

7.2   Mono Input Channel 8241 - rear panel

8244

MIC

MICROPHONE INPUT

SND

SEND is permanently live and can be used as an additional output.

RTN

RETURN is activated by the INS (insert) switch on the module front panel.

D/O

DIRECT OUTPUT

Inputs and Outputs are electronically balanced and connected via 3-pin XLRs and follow the wiring convention:

PIN 1 = Screen
PIN 2 = In-phase signal (hot)
PIN 3 = Out-of-phase signal (cold)

The 0.25" TRS jack connectors use the wiring convention:

TIP = In-phase signal (hot)
RING = Out-of-phase signal (cold)
SLEEVE = Screen

IMPORTANT NOTE: Pin 1 on XLR connectors and the 'sleeve' connections on the jack sockets are connected to the FRAME. This is to ensure that the console can comply with the Electric Compatibility (EMC) directive.

7.3   Mono Channel Fader 8245/8246 (motor fader)

7.3.1 MUTE

7.3.2 LED bargraph meter

7.3.3 Fader

7.3.4 Bypass

7.3.5 LED assignment indicators

7.3.6 SET

7.3.7 Isolate

7.3.8 Open

7.3.1   MUTE

The MUTE button is programmable and mutes all the post fader outputs.

7.3.2   LED bargraph meter

20-segment LED bargraph meter showing the channel level immediately pre-fader.

7.3.3   Fader

100 mm fader used to control the signal level.

7.3.4   Bypass

Press this button to stop the channel VCA from being controlled by the DC Master faders.

7.3.5   LED indicators

LEDs 1-16 indicate either the DC Master or MG assignments.

LED marked DC indicates that LEDs 1-16 are displaying DC Master assignments.

LED MG indicates that LEDs 1-16 are displaying MUTE GROUP assignments,

LED WR when ON indicates that the Fader is READY to record dynamic movements. This LED will flash in WRITE mode and when the fader is actually generating record-able information.

7.3.6   SET

This button is used with the assignment panel 8285 beneath the CCM to assign the fader to DC Master or MUTE Groups.
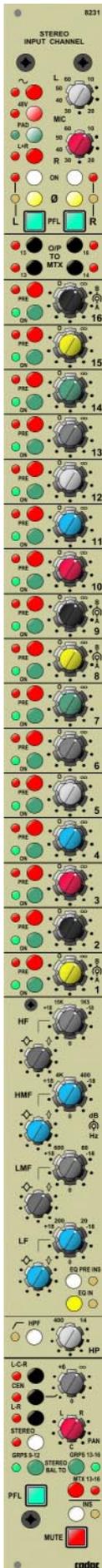
7.3.7   Isolate

Press this button to isolate the entire fader module from the automation system.

7.3.8   Open

The OPEN LED illuminates when the channel VCA is open and not muted locally or by assignment to a DC Master or MG.

8 Stereo Input Channel 8231

The stereo input channel is intended for microphone level sources. The left and right inputs have separate controls for gain, phase-change, on/off and PFL. Switches for enabling a 20dB pad and 48V phantom power are provided. A Line-up tone can be injected into the input amplifier and the direct output may be selected via internal jumpers to come from the MIC amplifier or pre or post the channel fader.

There are different ways to set up functions of the stereo module by removing or setting jumper options for jumpers 33 and 34 on the stereo channel motherboard. Both jumpers are in place by factory default.

Routing switches to all the 16 stereo groups (32 busses) are provided. Sends 1A/B to 8A/B can be switched between stereo (level on upper control, pan below) or dual mono (A level on upper control and B level below) on a bus by bus basis. Sends 9A/B to 16A/B can be selected to receive module pan information in two groups 9A/B to 12A/B and 13A/B to 16A/B, thus providing a conventional sub group scenario for FoH use. It is also possible to route directly to matrices 13 to 16 which then can be enabled to receive module pan information.

In addition, the module has access to a dedicated stereo bus and also a L-C-R bus. L-C-R can be used either as L-R panning with unpanned centre with level control or as full L-C-R panning.

NOTE: The signal that feeds the pan pot and centre send is a summed version of the L & R signals.
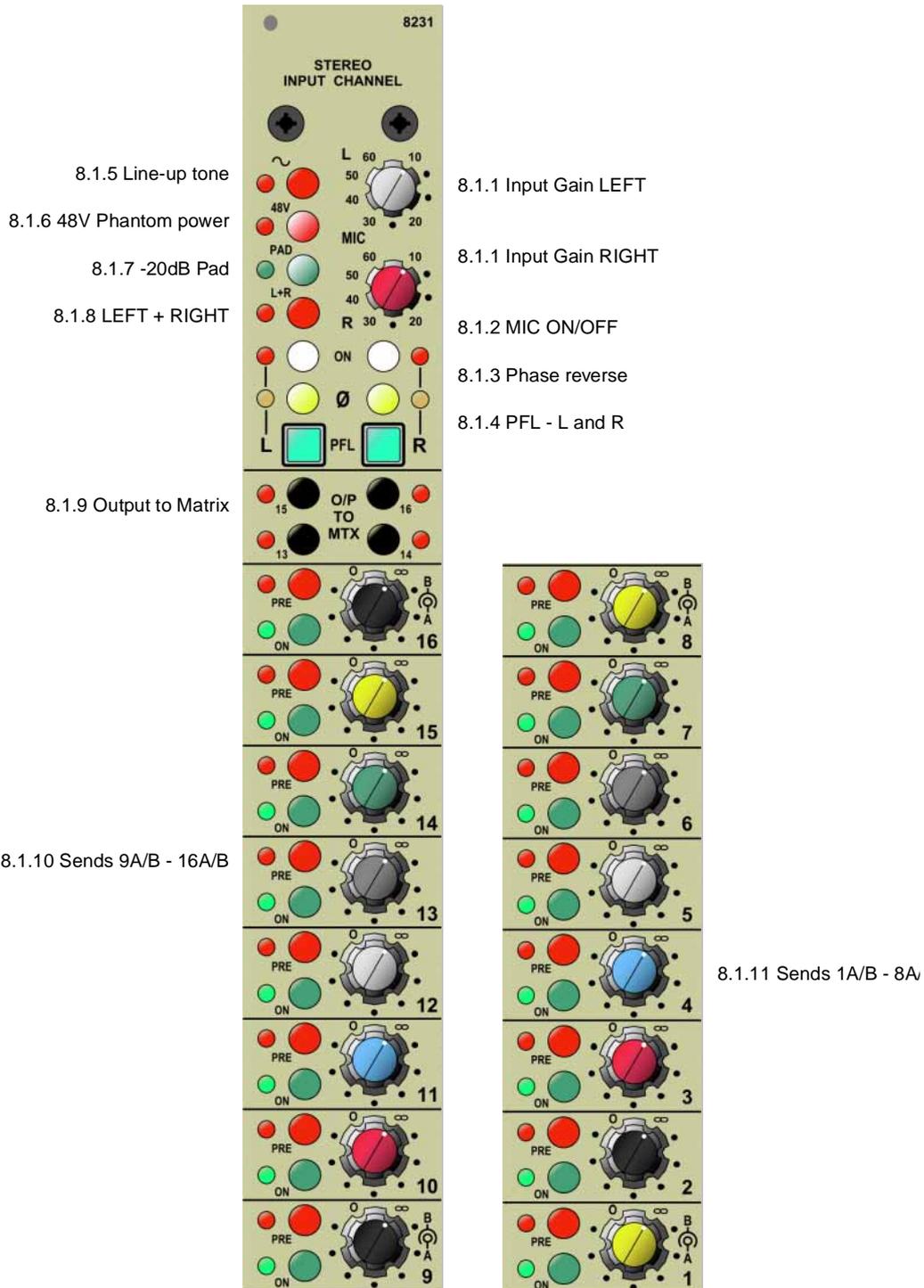
PFL can be changed globally to act as AFL with pan information or to provide a mono pre fader listen mode.

The module also includes a fully parametric 4-band equalizer with controls for each band of ±18dB cut and boost, variable frequency and variable 'Q'. The module also contains a variable frequency high-pass filter which is switched independently from the equalizer.

All audio inputs and outputs are electronically balanced.

Following pages describes the 8231 module in detail.

8.1   Stereo Input Channel 8231 - front panel

8.1.5 Line-up tone

8.1.6 48V Phantom power

8.1.7 -20dB Pad

8.1.8 LEFT + RIGHT

8.1.1 Input Gain LEFT

8.1.1 Input Gain RIGHT

8.1.2 MIC ON/OFF

8.1.3 Phase reverse

8.1.4 PFL - L and R

8.1.9 Output to Matrix

8.1.10 Sends 9A/B - 16A/B

8.1.11 Sends 1A/B - 8A

8.1.1   Input Gain LEFT/RIGHT

The MIC Input Gain is adjustable between 10 and 60dB

8.1.2   MIC ON/OFF

These buttons enable you to switch the left and right MIC amp inputs on or off independently or together.

8.1.3   Phase reverse

These buttons enable you to reverse the phase of the incoming signals of the left and right MIC amps independently or together.

8.1.4   PFL - L and R

Pressing this button enables you to monitor the left and right MIC amps via the PFL system. Pressing L or R will send a mono signal to the left and right busses of the Listen module. Pressing both buttons together will send a true stereo image to the L & R of the PFL-bus.

8.1.5   Line-up tone

Press this button to apply a Line-up tone to the input. The frequency and level of the line up tone applied is controlled from the OSC/Comms module 8271, see 11.1 Osc & Communications 8271 - front panel. Pressing this button will also disable the 48v phantom power if selected, see 7.1.6.

8.1.6   48V phantom power

Press this button to switch on the 48V Phantom power to any connected microphone. Notice that the 48 v phantom power is disabled on this channel if the line-up tone is selected (see 7.1.5).

8.1.7   -20dB Pad

Press this button to apply -20dB attenuation to the input signal to the L & R microphone amplifiers. If the gain potentiometer (see 8.1.1 Input Gain LEFT/RIGHT) is set for 20dB and the pad applied, this allows for the use of line level (0dB nominal) devices instead of having a separate line input.

8.1.8   LEFT + RIGHT

Press this button to sum the LEFT and RIGHT MIC amp signals to MONO.

8.1.9   Output to Matrix

These buttons are used to select direct routing to matrix busses 13 to 16 from POST fader, with or without stereo panning. See 8.1.33 Matrix 13 - 16 and 8.1.28 PAN Control.
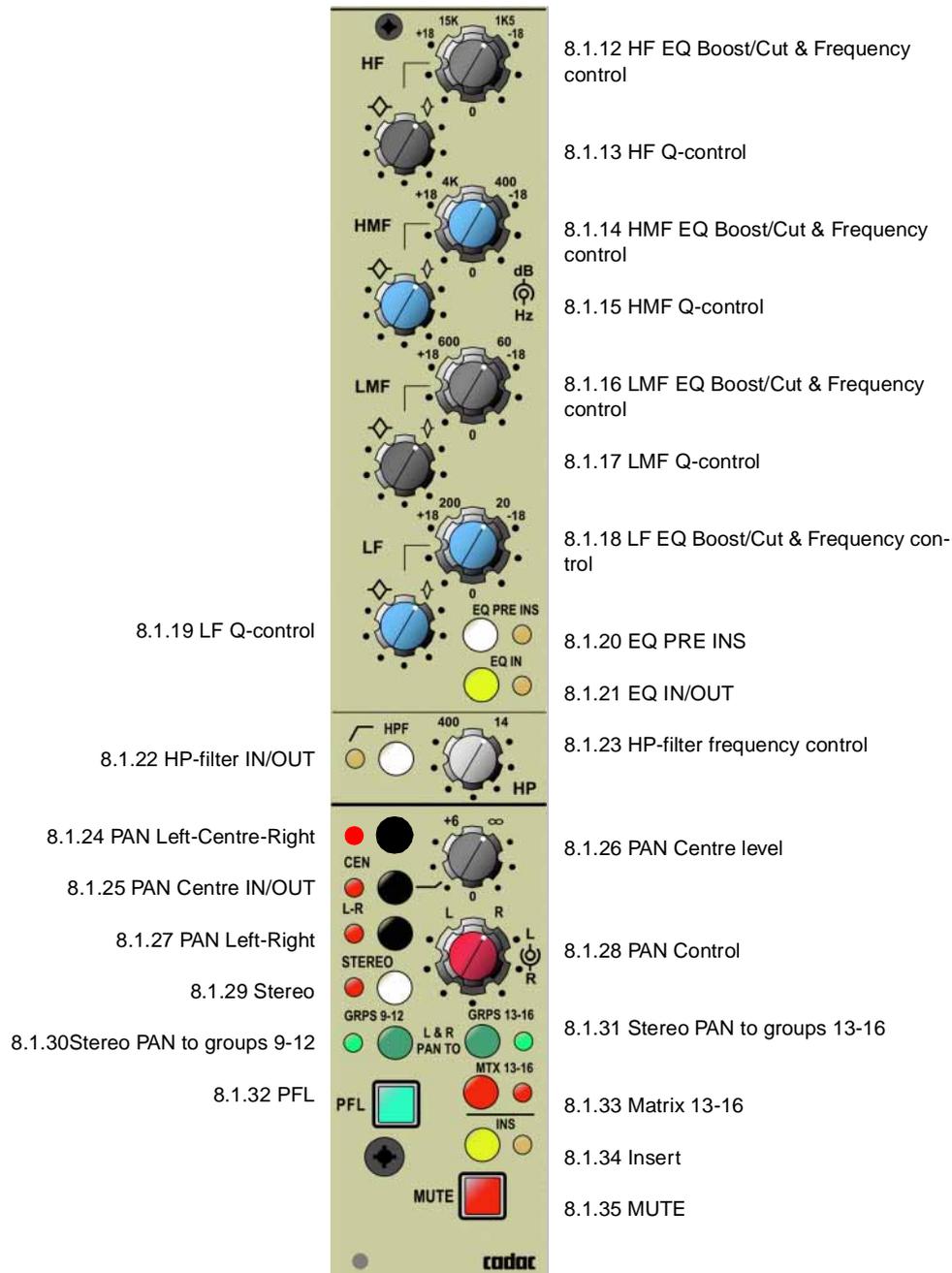
8.1.10   Sends 9A/B - 16A/B

Sends 9A/B - 16A/B are dedicated mono sends, each with its own level control. Each pair has its own PRE/POST FADER and ON/OFF switch.

Sends 9A/B - 12A/B and 13A/B - 16A/B can be selected to follow the STEREO PANNING by using the buttons in the panning section at the bottom of this module. See 8.1.28 PAN Control, 8.1.30 Stereo PAN to groups 9 - 12 and 8.1.33 Matrix 13 - 16.

8.1.11   Sends 1A/B - 8A/B

Sends 1A/B - 8A/B can be switched between stereo and dual mono. In stereo, adjust the level with the upper control and panning with the lower one. In dual mono, adjust

Stereo Input Channel 8231 - front panel

8.1.12 HF EQ Boost/Cut & Frequency control

8.1.13 HF Q-control

8.1.14 HMF EQ Boost/Cut & Frequency control

8.1.15 HMF Q-control

8.1.16 LMF EQ Boost/Cut & Frequency control

8.1.17 LMF Q-control

8.1.18 LF EQ Boost/Cut & Frequency control

8.1.19 LF Q-control

8.1.20 EQ PRE INS

8.1.21 EQ IN/OUT

8.1.22 HP-filter IN/OUT

8.1.23 HP-filter frequency control

8.1.24 PAN Left-Centre-Right

8.1.26 PAN Centre level

8.1.25 PAN Centre IN/OUT

8.1.27 PAN Left-Right

8.1.28 PAN Control

8.1.29 Stereo

8.1.30 Stereo PAN to groups 9-12

8.1.31 Stereo PAN to groups 13-16

8.1.32 PFL

8.1.33 Matrix 13-16

8.1.34 Insert

8.1.35 MUTE

A level with the upper control and B level with the lower control.

Each pair has its own PRE/POST FADER and ON/OFF switch.

Switching between mono and stereo is performed and displayed in the CCM (Central Control Module). See for information how to do this.

8.1.12 HF EQ Boost/Cut & Frequency control 1K5Hz - 15KHz

This dual concentric control allows the centre frequency to be adjusted between 1K5Hz to 15 KHz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

8.1.13   HF Q-control

The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 8.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

8.1.14   HMF EQ Boost/Cut & Frequency control 400Hz - 4KHz

This dual concentric control allows the centre frequency to be adjusted between 400Hz - 4KHz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

8.1.15   HMF Q-control

The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 8.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

8.1.16   LMF EQ Boost/Cut & Frequency control 60Hz - 600Hz

This dual concentric control allows the centre frequency to be adjusted between 60Hz - 600Hz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

8.1.17   LMF Q-control

The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 8.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

8.1.18   LF EQ Boost/Cut & Frequency control 20HZ - 200Hz

This dual concentric control allows the centre frequency to be adjusted between 60Hz - 600Hz by the bottom knob and the cut and boost to be adjusted by ±18dB by the top knob. The top knob also has a centre detent which disables this section of the equalizer.

8.1.19   LF Q-control

The 'Q'-control varies the bandwidth of the cut/boost frequency selected as per 8.1.12. As indicated on the front panel when turned towards the low 'Q' symbol ('Q' approximately 1.0) will cause a wide bandwidth of frequencies to be affected around the selected center frequency. When set towards the high 'Q' symbol ('Q' approximately 3.0) a narrow band of frequencies will be affected around the centre frequency.

8.1.20   EQ PRE INS

In normal operation the equalizer is situated after the channel INSERT. Press this button to put the EQ before the channel INSERT.

8.1.21   Equalizer IN

Press this button to switch the Equalizer in circuit.

8.1.22   HP Filter IN

Press this button to switch the HP-filter in circuit. Note that the HPF is situated immediately after the MIC-amp and is not switched with the equalizer.

8.1.23   HP Filter Frequency control

This is a variable control for selecting the frequency at which the filter starts to "turn over" (also known as the knee or -3dB point for the filter). The "turn-over" frequency is continuously variable between 14 and 400 Hz and provides a cut of 12dB/oct (2nd order

8.1.24   PAN Left - Centre - Right

When selected, this switch overrides selection of the Centre and L-R switches. This will route the input signal to the three main LCR outputs on the LCR module (see 10 L-C-R Output 8261) via the pan control. The PAN control then behaves in a true LCR fashion, panning the post-fade signal from left through centre to the right outputs.

L-R and Stereo Bus

Jumper 33 sums the Left and Right input signal which then inputs to the PAN control allowing a summed mono signal to be panned between Left and Right on the L-R and Stereo busses.

Removing jumper 33 allows a true stereo signal to bypass the PAN control allowing the Left signal to feed the left side of the L-R and Stereo bus only, and the Right signal to feed the right side of the L-R and Stereo bus only. (With this jumper removed the PAN control will be inactive.)

8.1.25   Centre switch

Routes the post-fade signal directly to the centre output of the LCR module via the Centre level control. If the LCR switch is activated, this switch is inactive.

8.1.26   PAN Centre level

This control has 6dB in hand and is centre detented at 0dB. This control is used to set the post-fade signal level to the centre output of the LCR module if the Centre-switch is activated. This can be used to mix or balance signal levels when the centre output is used as a separate mono bus in conjunction with the standard L-R bus. If the LCR switch is activated this control is inactive

8.1.27   Left - Right switch

Sends the post-fade signal to the main L-R outputs on the LCR module via the PAN control, which behaves in a normal fashion, panning the signal between left and right. See 8.1.28 PAN Control.

L-R and Stereo Bus

Jumper 33 sums the Left and Right input signal which then inputs to the PAN control, allowing a summed mono signal to be panned between Left and Right on the L-R and Stereo busses.

Removing jumper 33 allows a true stereo signal to bypass the PAN control allowing the Left signal to feed the left side of the L-R and Stereo bus only, and the Right signal to feed the right side of the L-R and Stereo bus only. (With this jumper removed the PAN control will be inactive.)

8.1.28   PAN Control

The PAN control affects 4 (depending on the settings of internal jumpers) different sections of the module:

a) L-R Stereo Bus

Jumper 33 on the stereo module motherboard sums the Left and Right input signals which then inputs to the pan control allowing a summed mono signal to be panned between Left and Right on the L-R and Stereo busses.

Removing jumper 33 allows a true stereo signal to bypass the PAN control allowing the Left signal to feed the left side of the L-R and Stereo bus only, and the Right signal to feed the right side of the L-R and Stereo bus only. (With this jumper removed the PAN control will be inactive.)

b) Aux/Groups 9-16

Jumper 34 on the stereo module motherboard sums the Left and Right input signals which then input to Aux/Group sends 9-16, allowing a summed mono signal to these Aux/Groups.

Removing jumper 24 AND enabling the "Stereo Pan to Grps" switch (located under the pan control) allows a true stereo signal to input to the groups, that is the Left input to feed the A send and the Right input to feed the B send.

c) Aux/Groups 1-8

Regardless of jumper options, Aux/Grps 1-8 can be set to true stereo by activating stereo mode from the CCM. Select "SYS" then "User Setup" followed by "Bus Config" and the up/down keys to select the bus number and the Enter key to toggle between mono/stereo mode.

d) Direct to Matrix switches

Regardless of jumper options, by default the odd number switches, 13 and 15 will output the Left signal to the 13 and/or 15 matrix output and even numbered switches, 14 and 16 will send the Right signal to the 14 and/or 16 matrix output. Enabling the "Mtx Stereo pan to" switch (located under the PAN control) will send a summed mono signal to the Matrix outputs via the PAN control.

8.1.29   Stereo

Sends the post-fade signal via the pan control depending on the internal jumper settings (see 7.1.28 PAN Control) to the stereo L-R outputs located on the PFL/Listen module. This is a separate and additional stereo bus from the main LCR outputs located on the LCR module. The LCR-switch has no effect on the operation of this additional bus.

L-R and Stereo Bus

Jumper 33 sums the Left and Right input signal which the inputs to the PAN control allowing a summed mono signal to be panned between Left and Right on the L-R and Stereo busses.

Removing jumper 33 allows a true stereo signal to bypass the PAN control allowing the Left signal to feed the left side of the L-R and Stereo bus only, and the Right signal to feed the right side of the L-R and Stereo bus only. (With this jumper removed the PAN control will be inactive.)

8.1.30 Stereo PAN to groups 9 - 12

If selected, this switch will route the auxiliary/group send depending on internal jumper settings from the aux/group send level control via the pan control to the aux/group outputs. These can be selected in two banks of 8, sends 9 A & B to 12 A & B and/or 13 A & B to 16 A & B allowing for a maximum of 16 (8stereo) traditional sub-groups.
See also 7.1.10 Sends 9A/B - 16A/B.

Aux/Groups 9-16

Jumper 34 sums the Left and Right input signals which then input to Aux/Group sends 9-16, allowing a summed mono signal to these Aux/Groups.

Removing jumper 24 AND enabling the "Stereo Pan to Grps" switch (located under the pan control) allows a true stereo signal to input to the groups, that is the Left input to feed the A send and the Right input to feed the B send.

8.1.31 Stereo PAN to groups 13 - 16

See 7.1.30.

8.1.32 PFL

Press the PFL button to send the pre-fader signal to the LISTEN module where it can be checked on speakers or headphones. The PFL button is an electronically latching switch which is controlled by the PFL/Listen switches on the panel of the FCM located beneath the CCM. The PFL-function can be globally changed on all channels (mono and stereo) to function as AFL after fader and PAN, see 7.1.9 Output to Matrix.

8.1.33 Matrix 13 - 16

Regardless of jumper options, by default the odd number switches, 13 and 15 will output the Left signal to the 13 and/or 15 matrix output and even numbered switches, 14 and 16 will send the Right signal to the 14 and/or 16 matrix output. Enabling the "Mtx Stereo pan to" switch (located under the PAN control) will send a summed mono signal to the Matrix outputs via the PAN control. (See 7.1.28 d) Direct to Matrix switches.)
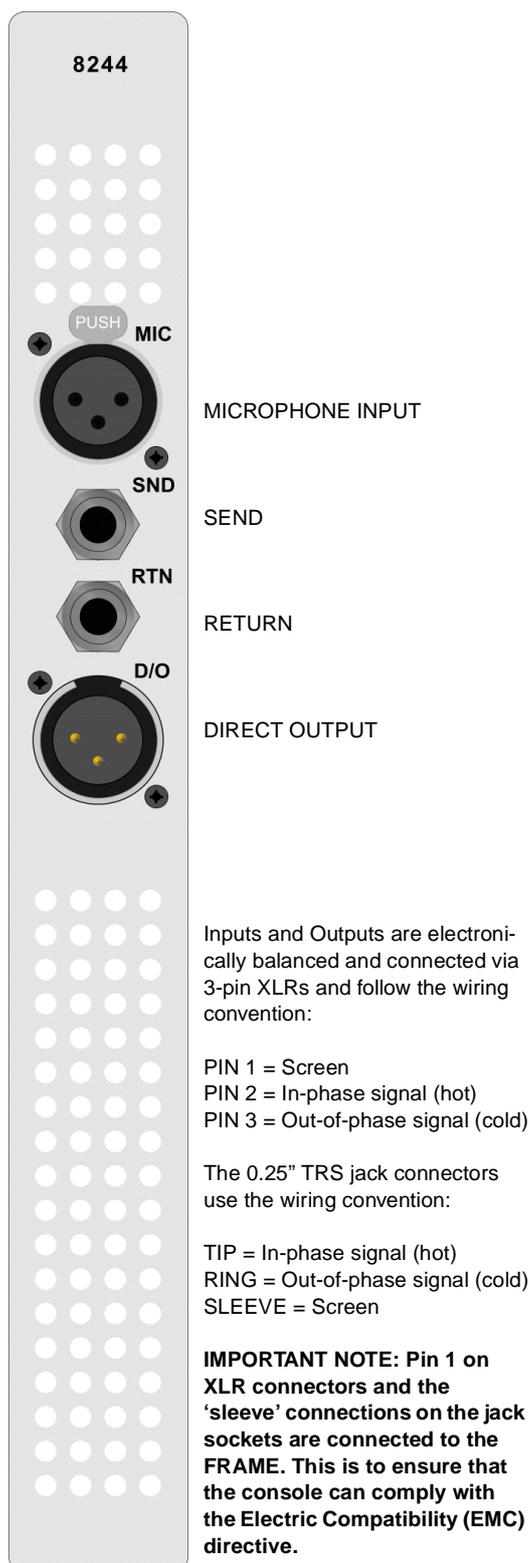
8.1.34 Insert

Press this switch to insert external equipment connected to the insert send and return jack sockets on the rear panel of the module, see 7.2 Mono Input Channel 8241 - rear panel. Please note that the insert send is permanently live and that the jack sockets are NOT normalized. The insert point can only be enabled by the front panel button. Also note that it is possible to make the insert point post the equalizer circuit by pressing EQ PRE INS, see 7.1.20 EQ PRE INS.

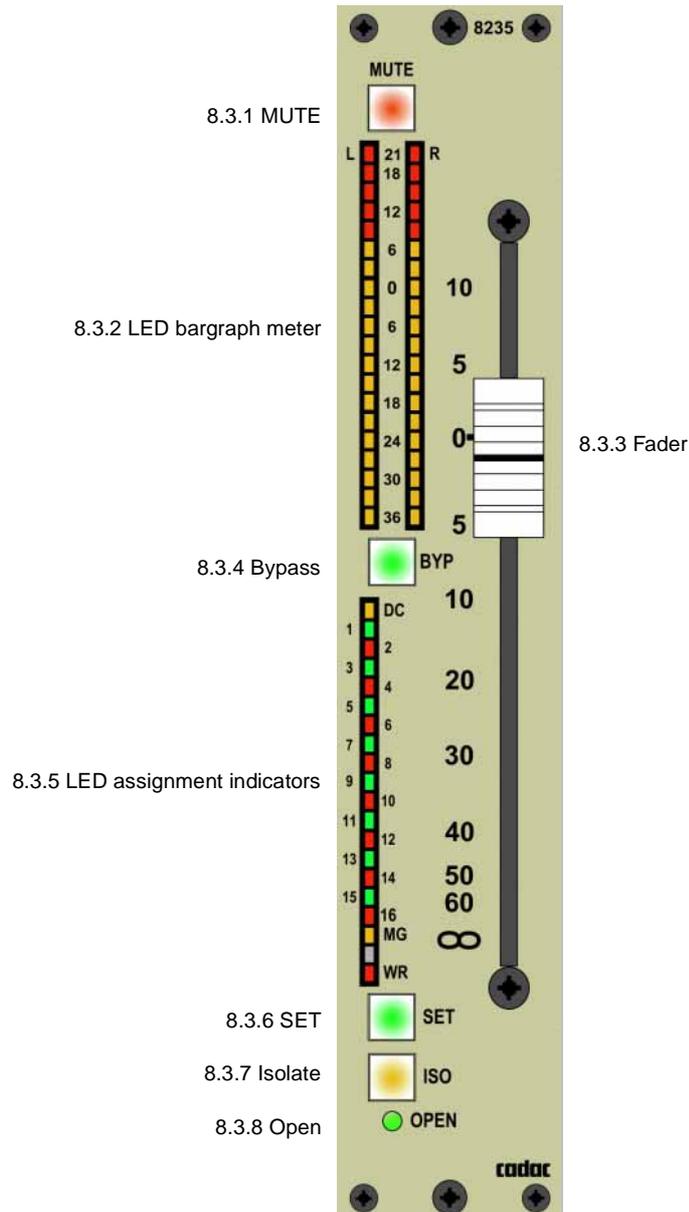### 8.1.35 MUTE

Press this button to mute all POST-FADE signals from the Input channel except for AFL send.

8.2   Stereo Input Channel 8231 - rear panel

8244

MIC — MICROPHONE INPUT

SND — SEND

RTN — RETURN

D/O — DIRECT OUTPUT

Inputs and Outputs are electronically balanced and connected via 3-pin XLRs and follow the wiring convention:

PIN 1 = Screen
PIN 2 = In-phase signal (hot)
PIN 3 = Out-of-phase signal (cold)

The 0.25" TRS jack connectors use the wiring convention:

TIP = In-phase signal (hot)
RING = Out-of-phase signal (cold)
SLEEVE = Screen

IMPORTANT NOTE: Pin 1 on XLR connectors and the 'sleeve' connections on the jack sockets are connected to the FRAME. This is to ensure that the console can comply with the Electric Compatibility (EMC) directive.

8.3   Stereo Channel Fader 8235/8236 (motor fader)

8.3.1 MUTE

8.3.2 LED bargraph meter

8.3.3 Fader

8.3.4 Bypass

8.3.5 LED assignment indicators

8.3.6 SET

8.3.7 Isolate

8.3.8 Open

8.3.1   MUTE

The MUTE button is programmable and mutes all the post fader outputs.

8.3.2   LED bargraph meter

20-segment LED bargraph meter showing the channel level immediately pre-fader.

8.3.3   Fader

100 mm fader used to control the signal level.

8.3.4   Bypass

Press this button to stop the channel VCA from being controlled by the DC Master faders.

8.3.5   LED indicators

LEDs 1-16 indicate either the DC Master or MG assignments.
LED marked DC indicates that LEDs 1-16 are displaying DC Master assignments.

LED MG indicates that LEDs 1-16 are displaying MUTE GROUP assignments,

LED WR when ON indicates that the Fader is READY to record dynamic movements. This LED will flash in WRITE mode and when the fader is actually generating record-able information.

8.3.6   SET

This button is used with the assignment panel 8285 beneath the CCM to assign the fader to DC Master or MUTE Groups.

8.3.7   Isolate

Press this button to isolate the entire fader module from the automation system.

8.3.8   Open

The OPEN LED illuminates when the channel VCA is open and not muted locally or by assignment to a DC Master or MG.

9   Outputs and Matrix 8251
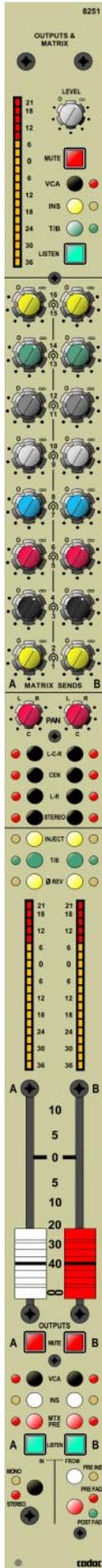
The R-Type mixing console is designed to include a maximum of 16 output modules: each module providing 2 OUTPUTS (dual mono/stereo) and 1 MATRIX output. Additionally, the module features INSERT which connects the pre-fader send/return insert jacks into the signal path. The T/B function allows the talkback to be picked up by each matrix mix bus. Post-fader level meters following the MUTE switch display the MATRIX output signal.

A maximum of 16 Output & Matrix modules may be used in any configuration at any time. Each module features a dual output (A/B) which can be either mono or stereo depending on how the input channel sending bus has been configured and a matrix output. All three outputs on the module include push-buttons to select fully balanced Insert point, MUTE, VCA enable, and Talkback. The two subgroups also have a balanced inject point and phase reversible outputs.

Each output features post fader metering. A 60mm fader controls the group output level, whereas the matrix level is adjusted using a rotary pot. The Matrix sends in mono to the Listen bus post fader while the output groups have a more comprehensive listen facility.

A signal can be sent pre/post fader or pre-insert. When sending in mono the signal is sent to the Listen bus in mono as normal. If the module is sending in stereo, pressing both A & B Listen buttons simultaneously sends a true stereo signal to the Listen bus. If only one of the buttons is pressed, a mono signal is sent to the Listen bus.

Each of the 3 Output groups has direct access to the stereo bus and the L-C-R-feature with full panning. Sends from the output groups to the matrix can be pre/post fader with individual sends on dual concentric pots.

NOTE: The module mother-board is fitted with two jumpers. The position of each of the jumpers is determined by the selected group and matrix (see Appendix B. Jumpers to select Output and Matrix)

The following pages contains detailed information about the Output and Matrix module.

9.1   Outputs and Matrix 8251 - front panel

9.1.1 Matrix Output level

9.1.7 Output level meter

9.1.2 MUTE

9.1.3 VCA

9.1.4 Insert

9.1.5 T/B

9.1.6 Listen
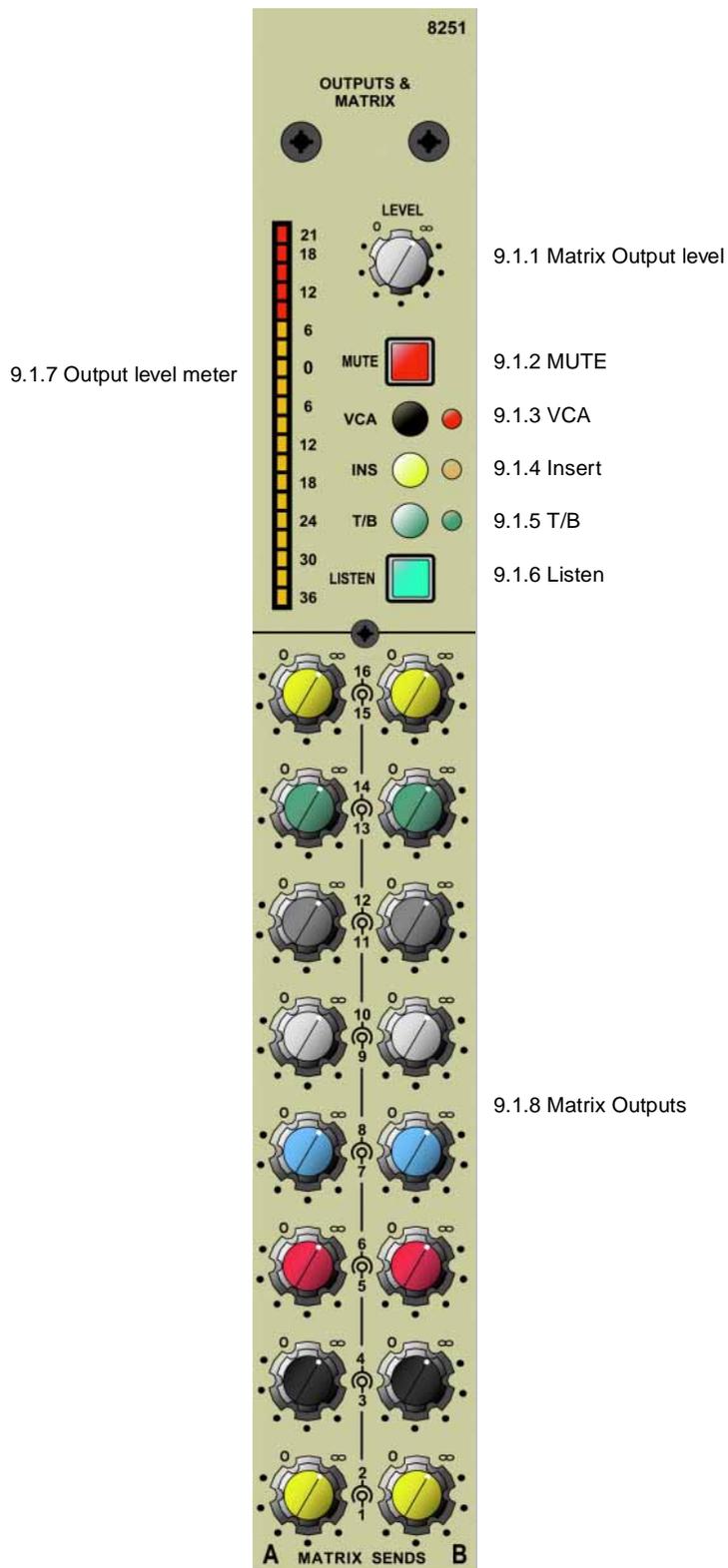
9.1.8 Matrix Outputs

9.1.1   Matrix Output level

The matrix output level provides 0dB gain when turned fully clock-wise.

9.1.2 MUTE

Press this button to MUTE the matrix output signal.

9.1.3 VCA

Press this button to enable each MATRIX to be connected to the DC and MG assignments via the fader below.

9.1.4 Insert

Press this button to connect the pre-fader send/return insert jacks to into the signal path.

9.1.5 T/B

Press this button to allow the talk-back to be picked up by each MATRIX mix bus.

9.1.6 Listen

Press this button to monitor each matrix output via the LISTEN module.

9.1.7 Output level meter

This post-fader level meter displays the MATRIX output signal. The meter follows the MUTE- switch.

9.1.8 Matrix Outputs

The OUTPUTS are routed to MATRIX 1 to 16 via 8 dual concentric controls. The gain is 0dB when turned fully clock-wise.

Outputs and Matrix 8251
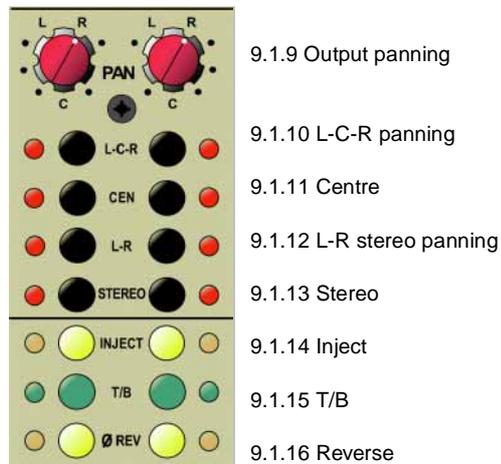
9.1.9 Output panning

9.1.10 L-C-R panning

9.1.11 Centre

9.1.12 L-R stereo panning

9.1.13 Stereo

9.1.14 Inject

9.1.15 T/B

9.1.16 Reverse

9.1.9 Output panning

The outputs can be re-routed to the LEFT-CENTRE-RIGHT and/or the stereo busses.

9.1.10 L-C-R panning

Press this button to allow panning across the three modules L-C-R.

9.1.11 CENtre

Press this button to route the OUTPUT straight to the centre bus. CEN does not work in L-C-R.

9.1.12 L-R stereo panning

Press this button to allow stereo panning across the L-R busses.

9.1.13 Stereo

Press this button to allow stereo panning across the separate stereo busses.

9.1.14 Inject

INJECT provides a balanced input to each OUTPUT mix bus.

9.1.15 T/B

Press this button to allow the talk-back to be picked up by each OUTPUT mix bus.

9.1.16 Reverse

Press this button to reverse the phase of each OUTPUT.

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Outputs and Matrix 8251
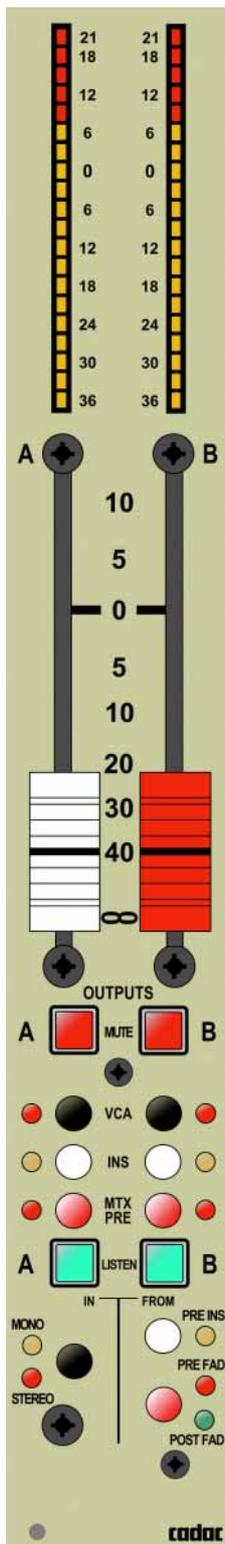
9.1.17 Level-meters

9.1.18 Fader

9.1.19 MUTE

9.1.20 VCA

9.1.21 INSert

9.1.22 MTX PRE

9.1.23 LISTEN

9.1.26 MONO/STEREO

9.1.24 Pre-INS monitor select

9.1.25 Pre/Post fader monitor select

9.1.17 Level meters

These post-fader level meters indicate the OUTPUT signal level. The meters are affected by the MUTE switch.

9.1.18 Faders

These are 60mm conductive plastic faders which are used to adjust the level of the A and B OUTPUTS.

9.1.19 MUTE

Press to MUTE each OUTPUT.

9.1.20 VCA

Press to enable each OUTPUT to be connected to the DC and MG assignments in the fader below.

9.1.21 INSert

Press to connect the pre-fader send/return insert jacks into the signal path.

9.1.22 MTX PRE

Press to enable the OUTPUT to be routed to the MATRIX from pre-fader.

9.1.23 LISTEN

Press to monitor each output A or B.

9.1.24 Pre-INS monitor select

Press to select the monitored output to be Pre-insert.

9.1.25 Pre/Post fader monitor select

Press to select the monitored output to be Pre/Post fader.

9.1.26 MONO/STEREO

Press to select MONO for independent operation of A and B buttons, or STEREO to have them act as a pair.

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9.2   Output & Matrix 8251 - rear panel
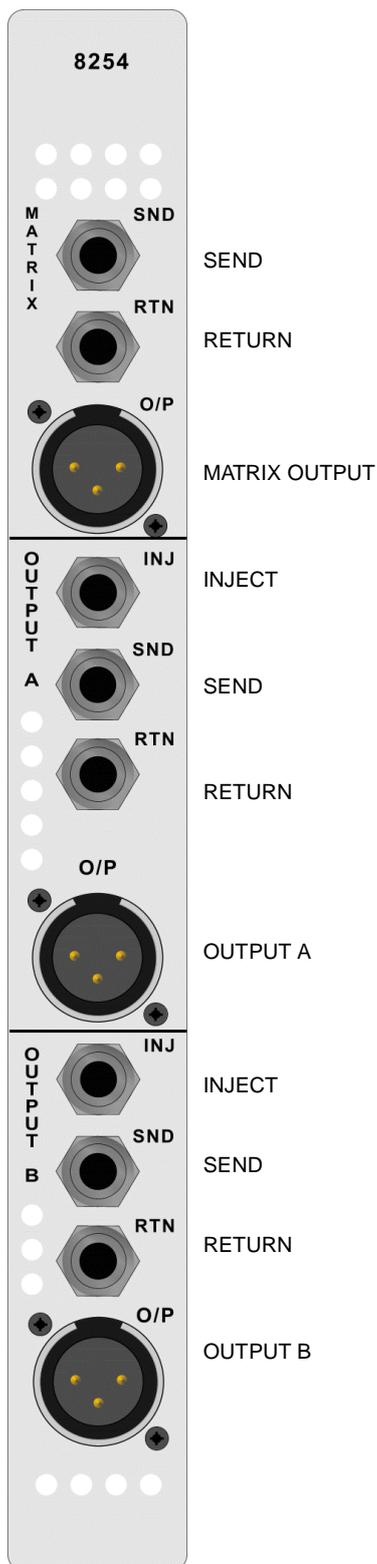
8254

SEND

RETURN

MATRIX OUTPUT

INJECT

SEND

RETURN

OUTPUT A

INJECT

SEND

RETURN

OUTPUT B

Inputs and Outputs are electronically balanced and connected via 3-pin XLRs and follow the wiring convention:

PIN 1 = Screen
PIN 2 = In-phase signal (hot)
PIN 3 = Out-of-phase signal (cold)

The 0.25" TRS jack connectors use the wiring convention:

TIP = In-phase signal (hot)
RING = Out-of-phase signal (cold)
SLEEVE = Screen

IMPORTANT NOTE: Pin 1 on XLR connectors and the 'sleeve' connections on the jack sockets are connected to the FRAME. This is to ensure that the console can comply with the Electric Compatibility (EMC) directive.

9.3   DC Master fader 8255

9.3.1 MUTE

9.3.2 Alphanumeric display

9.3.3 Fader

9.3.4 Bypass

9.3.5 LED assignment indicators

9.3.6 SET

9.3.7 Isolate

9.3.8 Open
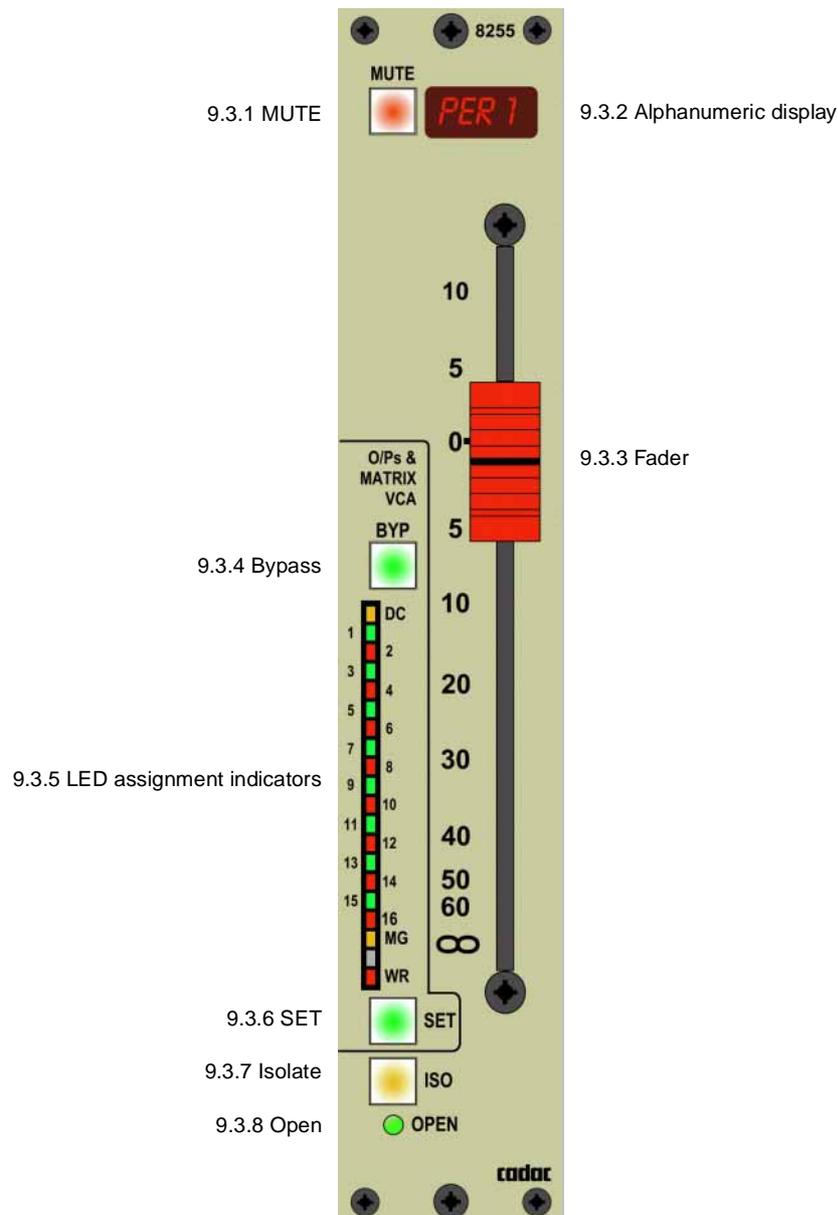
NOTE: The DC-Master mother-board has a jumper that has to be fitted according to the selected VCA-Master (see Appendix C. Jumpers to select VCA Master)

9.3.1   MUTE

The MUTE button is programmable and mutes all the post fader outputs.

9.3.2   Alphanumeric display

The DC Master can be named in the alphanumeric display on a scene by scene basis. Data entry is via a QWERTY-keyboard that plugs into the console.

9.3.3   Fader

100 mm fader used to control the signal level.

9.3.4   Bypass

Press this button to stop the OUTPUT and MATRIX VCAs from being controlled by DC Master faders.

9.3.5   LED indicators

LEDs 1-16 indicate either the DC Master or MG assignments.

LED marked DC indicates that LEDs 1-16 are displaying DC Master assignments.

LED MG indicates that LEDs 1-16 are displaying MUTE GROUP assignments,

LED WR when ON indicates that the Fader is READY to record dynamic movements. This LED will flash in WRITE mode and when the fader is actually generating recordable information.

9.3.6   SET

This button is used with the assignment panel 8285 beneath the CCM to assign the fader to DC Master or MUTE Groups.

9.3.7   Isolate

Press this button to isolate the entire fader module from the automation system.

9.3.8   Open

The OPEN LED illuminates when this DC MASTER is open and not muted locally.

10   L-C-R Output 8261

The inputs to the L-C-R busses come from either a channel or output. Post-fader level meters display the Left-Centre-Right output signals; the meters are affected by the MUTE switches. The module has separate functions for CENTRE and LEFT - RIGHT e.g. Inject, Insert, VCA and Listen. The module functions each has an ON/ OFF switch; the Inject feature also has a level control. The Left and Right outputs each has their own MUTE button.

Following pages describes the 8261 module in detail.

10.1   L-C-R Output 8261 - front panel
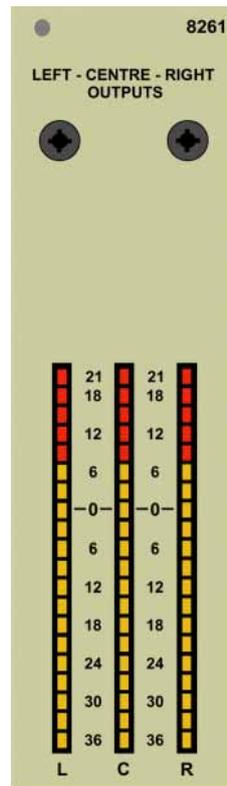
10.1.1 L-C-R Output levels

10.1.1   L-C-R Output levels

These Post-fader level meters show the LEFT-CENTRE-RIGHT output signals. The meters are affected by the MUTE switches.

10.1.2   Inject

The outputs can be re-routed to the LEFT-CENTRE-RIGHT and/or the stereo busses.

10.1.3   Fader

Press this button to allow panning across the three modules L-C-R.

10.1.4   Insert

Press this button to route the OUTPUT straight to the centre bus. CEN does not work in L-C-R.

10.1.5   VCA

Press this button to allow stereo panning across the L-R busses.

Centre Output, L-C-R

CENTRE

INJECT

9.1.2 Inject

10.1.3 Fader

INSERT   10.1.4 Insert

VCA   10.1.5 VCA

LISTEN   10.1.6 Listen
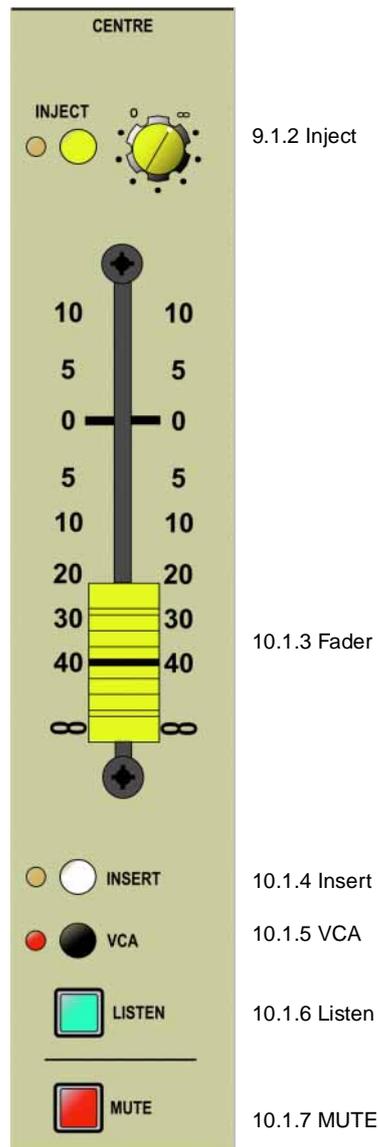
MUTE   10.1.7 MUTE

10.1.6   Listen

Press this button to allow stereo panning across the separate stereo busses.

10.1.7   MUTE

INJECT provides a balanced input to each OUTPUT mix bus.

L + R Output
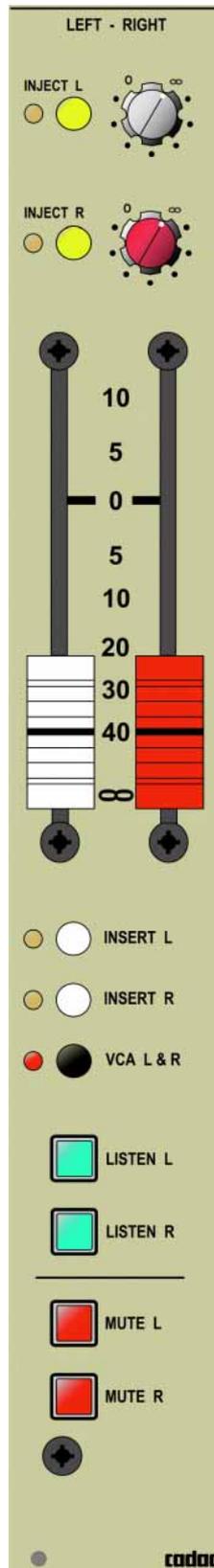
10.1.8 Inject LEFT & RIGHT

10.1.9 Faders

10.1.10 Insert L

10.1.11 Insert R

10.1.12 VCA L & R

10.1.13 Listen

10.1.14 MUTE

10.1.8 Inject LEFT & RIGHT

The Inject feature provides a balanced input to the L & R mix busses.

10.1.9 Faders

60mm conductive plastic faders are used to adjust the level of the LEFT and RIGHT outputs.

10.1.10 Insert LEFT

Press this button to connect the pre-fader send/return insert jacks into the LEFT signal path.

10.1.11 Insert RIGHT

Press this button to connect the pre-fader send/return insert jacks into the RIGHT signal path.

10.1.12 VCA L & R

Press this button to enable L and R to be connected to the DC and MG assignments and controlled by the fader below.

10.1.13 Listen

Use these buttons to monitor the LEFT/RIGHT outputs via the Listen module.

10.1.14 MUTE

Use these buttons to mute the LEFT/RIGHT outputs.

10.2   L-C-R Output 8261 rear panel

```
                              8264

                          L      ⊙     ⌐ I
                                        N
                          C      ⊙      J
                                        E
                          R      ⊙     ⌐ C
                                        T

                                 ⊙     S    LEFT SEND
                                       N
                                       D
                          L
                                 ⊙     R    LEFT RETURN
                                       T
                                       N

                                 ⊙     S    CENTRE SEND
                                       N
                          I      C     D
                          N
                          S      ⊙     R    CENTRE RETURN
                          E            T
                          R            N
                          T

                                 ⊙     S    RIGHT SEND
                                       N
                          R            D

                                 ⊙     R    RIGHT RETURN
                                       T
                                       N

                                       L    LEFT OUTPUT
                          O

                          U            C    CENTRE OUTPUT
                          T
                          P
                          U
                          T            R    RIGHT OUTPUT
```

INJECT

Inputs and Outputs are electronically bal-
anced and connected via 3-pin XLRs and
follow the wiring convention:

PIN 1 = Screen
PIN 2 = In-phase signal (hot)
PIN 3 = Out-of-phase signal (cold)

The 0.25" TRS jack connectors use the wir-
ing convention:

TIP = In-phase signal (hot)
RING = Out-of-phase signal (cold)
SLEEVE = Screen

**IMPORTANT NOTE: Pin 1 on XLR con-
nectors and the 'sleeve' connections on
the jack sockets are connected to the
FRAME. This is to ensure that the con-
sole can comply with the Electric Com-
patibility (EMC) directive.**

10.3   L-C-R Channel Fader 8265

10.3.1 MUTE

10.3.2 Fader

10.3.3 Bypass

10.3.4 LED assignment indicators

10.3.5 SET

10.3.6 Isolate

10.3.7 Open
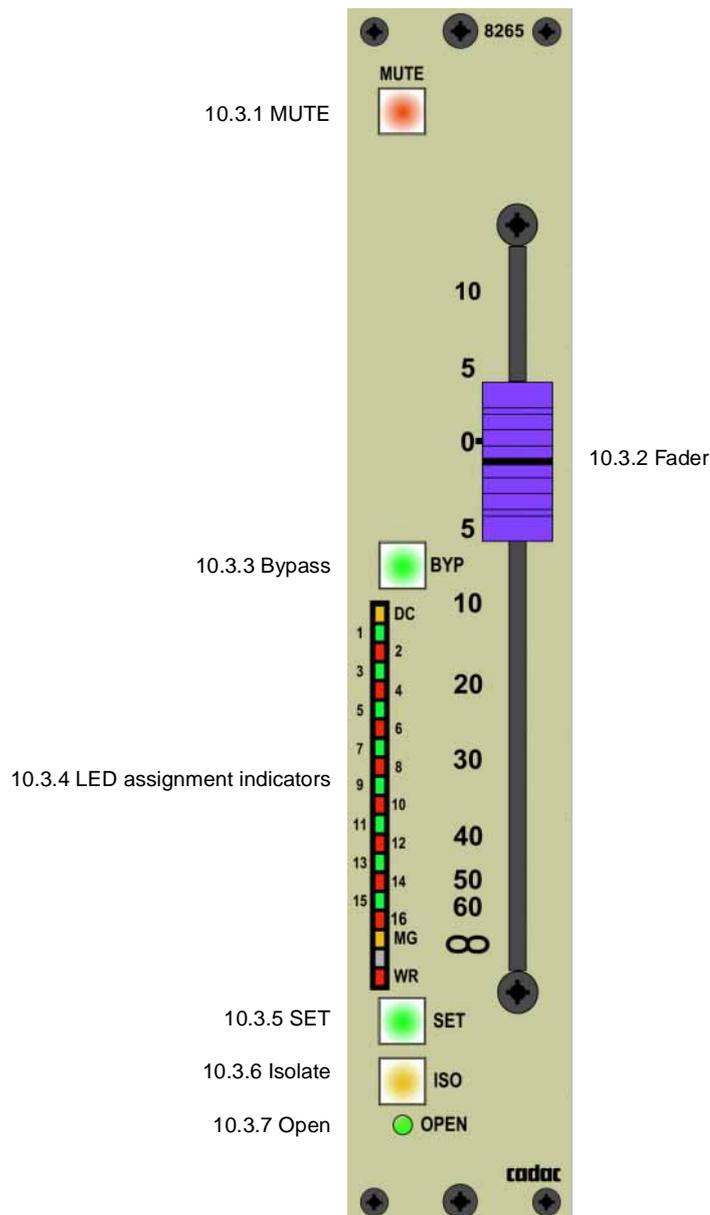
10.3.1   MUTE

The MUTE button is programmable and mutes all the post fader outputs.

10.3.2   Fader

100 mm fader used to control the signal level.

10.3.3   Bypass

Press this button to stop the L-C-R VCAs from being controlled by the fader.

10.3.4   LED indicators

LEDs 1-16 indicate either the DC Master or MG assignments.

LED marked DC indicates that LEDs 1-16 are displaying DC Master assignments.

LED MG indicates that LEDs 1-16 are displaying MUTE GROUP assignments,

LED WR when ON indicates that the Fader is READY to record dynamic movements. This LED will flash in WRITE mode and when the fader is actually generating recordable information.

10.3.5   SET

This button is used with the assignment panel 8285 beneath the CCM to assign the fader to DC Master or MUTE Groups.

10.3.6   Isolate

Press this button to isolate the entire fader module from the automation system.

10.3.7   Open

The OPEN LED illuminates when this DC MASTER is open and not muted locally.

11 Osc & Communications 8271

This module has oscillator, remote calling and communication functions. A balanced XLR input is provided for a communications talkback microphone and switchable phantom power is provided.

The oscillator section includes a switched oscillator with a range of 31Hz to 16kHz in addition to a PNG and XLR for an external test signal source. The selected test signal can be routed to the INPUT CHANNELS and OUTPUTS and MATRIX OUTPUTS.

The REMOTE CALLING feature includes a gain control for a remote microphone signal that may be routed to the LISTEN L & R outputs and the console's talkback bus. A push-button to switch on a call light at the remote location is also provided.

Note that a 8359 (dummy fader module) must be mounted directly below the module to control the LED brightness level.

Following pages describes the 8271 module in detail.

11.1   Osc & Communications 8271 - front panel

11.1.1 Comms MIC Input

11.1.2 Check

11.1.4 Oscillator

11.1.5 PNG

11.1.6 XLR

11.1.7 ON

11.1.3 LED meter

11.1.8 Coarse

11.1.9 Fine

11.1.10 Osc frequency select

11.1.11 OSC/PNG to CHANNELS

11.1.12 OSC/PNG to GROUPS
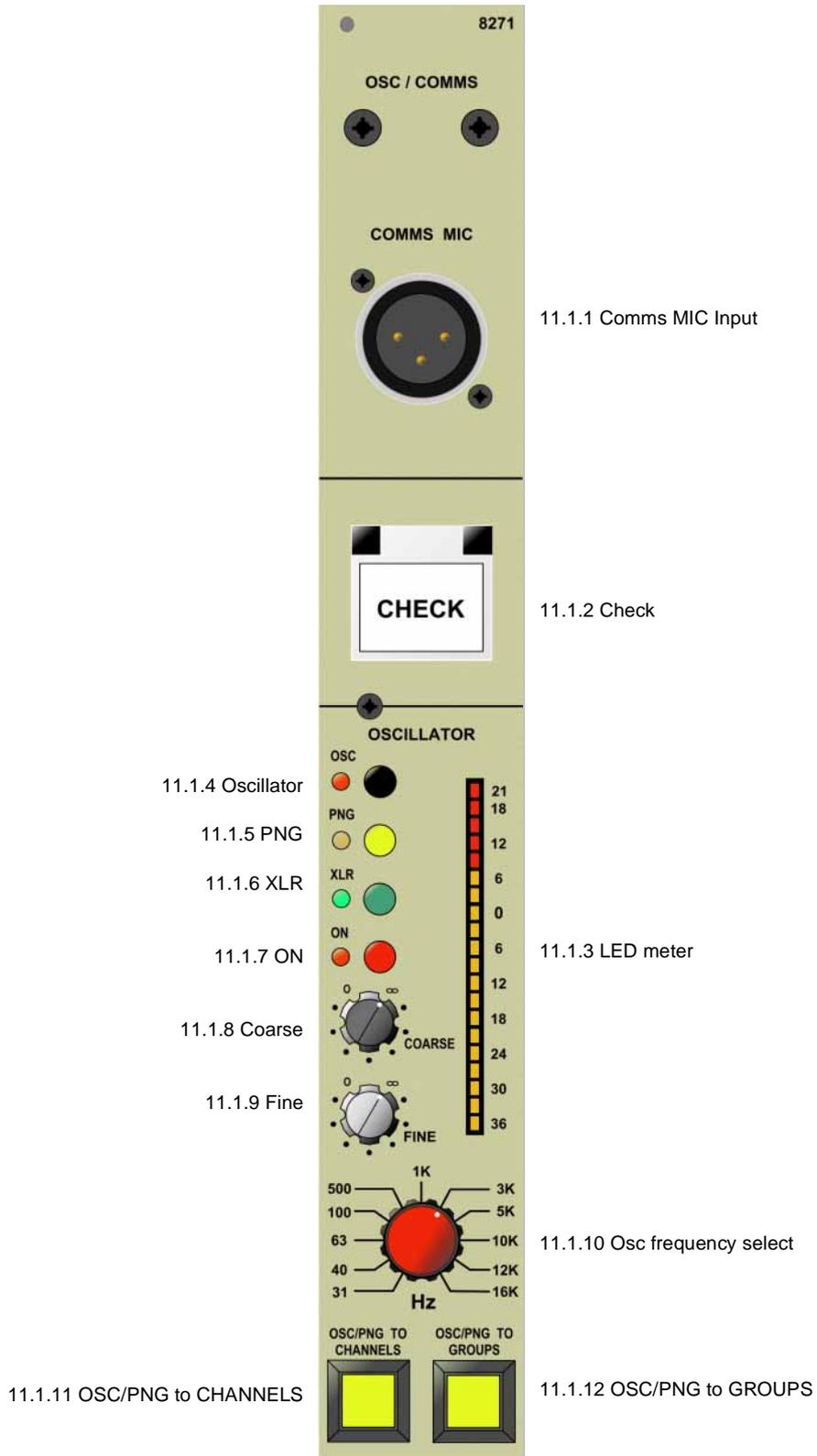
11.1.1   Comms MIC Input

The Comms MIC input is provided for communications talk-back microphone. The microphone amplifier gain control is located in the lower section of this module.

11.1.2 Check

The CHECK function allows an operator use input channel MUTE buttons as a 'solo-in-place' for trouble-shooting.

11.1.3 LED meter

The assignable LED meter shows the level of the signal source selected by the buttons on the left of the module.

11.1.4 Oscillator

Press this button to select the oscillator as the test signal source.

11.1.5 PNG

Press this button to select the Pink Noise Generator as the test signal source.

11.1.6 XLR

Press this button to select the external test signal source connected to the XLR on the rear of the module.

11.1.7 ON

Press this button to enable a test signal source to be selected.

11.1.8 Coarse

This rotary control is intended for coarse adjustment of the level of the test signal selected in 7.1.4 - 7.1.6.

11.1.9 Fine

This rotary control is intended for fine adjustment of the level of the test signal selected in 7.1.4 - 7.1.6.

11.1.10 Osc frequency select

This stepped rotary control selects oscillator frequency from 31Hz to 16kHz.

11.1.11 OSC/PNG to CHANNELS

Press this button to route the selected test signal to the INPUT CHANNELS.

11.1.12 OSC/PNG to GROUPS

Press this button to route the selected test signal to the MATRIX OUTPUTS.

Osc & Communications 8271

11.1.13 Remote Calling LED

11.1.14 Remote MIC 48V Phantom power ON

11.1.15 Remote MIC Gain

11.1.17 Remote MIC routing

11.1.16 Remote Fine level

11.1.18 Call Remote

11.1.19 Comms MIC

11.1.20 Talk to bus

11.1.21 Talk to line

11.1.27 LED meter

11.1.22 Talk to remote

11.1.23 Talk from remote

11.1.24 Comms MIC 48V Phantom power ON

11.1.25 HP-Filter IN/OUT

11.1.28 T/B MIC Input Gain

11.1.26 PFL
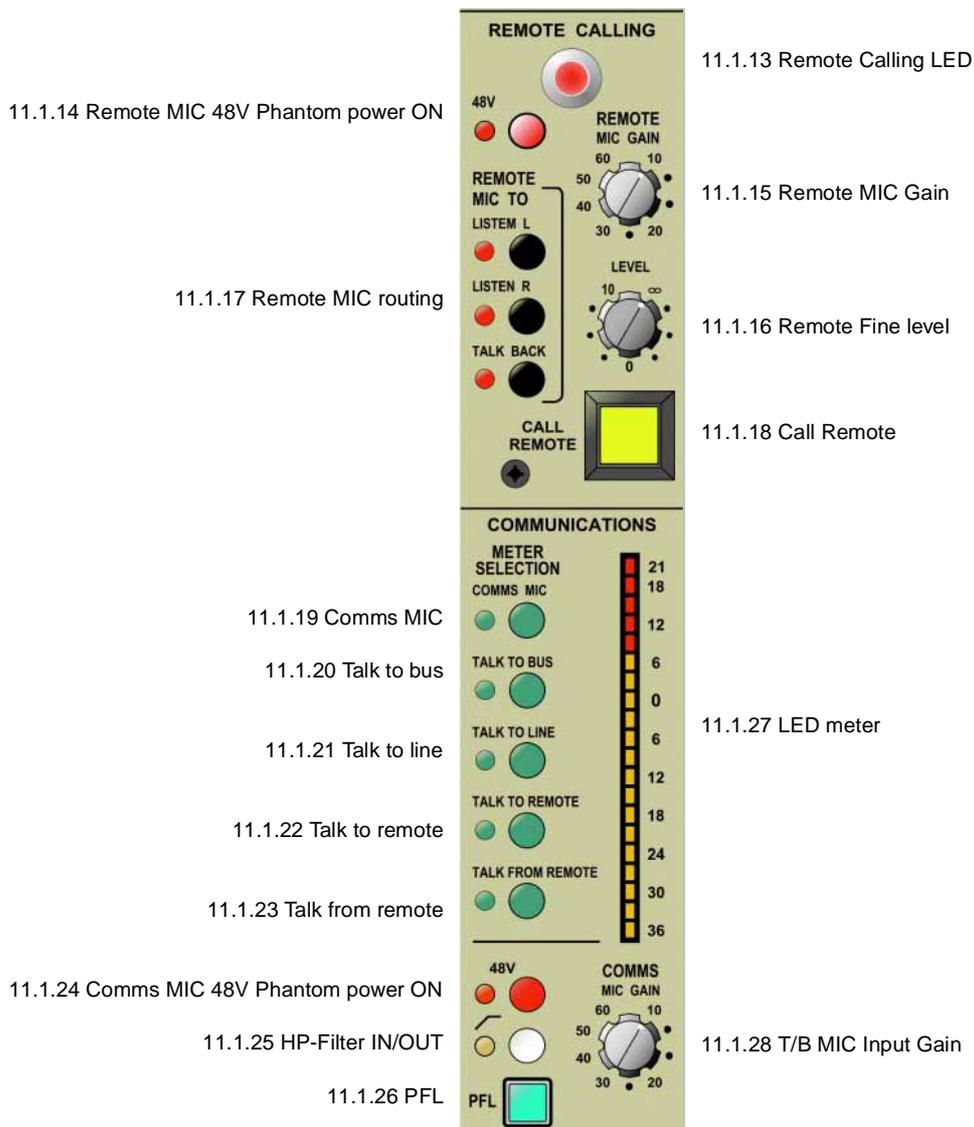
11.1.13 Remote calling LED

This large LED is used to indicate that a REMOTE position wishes to attract the operator's attention.

11.1.14 Remote MIC 48V Phantom power ON

Press this button to switch the 48V phantom power for the remote MIC ON.

11.1.15 Remote MIC Gain

This rotary control is used to adjust Input Gain for the remote MIC.

11.1.16 Remote Fine level

Fine level control for the Remote input.

11.1.17 Remote MIC routing

These three buttons are used to route the Remote Input signal to LISTEN L and R and the console's TALKBACK bus.

11.1.18 Call Remote

Press this button to activate a call light at a REMOTE location.

11.1.19 Comms MIC

Press this button to assign the LED meter to the Comms MIC signal source.

11.1.20 Talk to Bus

Press this button to assign the LED meter to the Talk to bus signal source.

11.1.21 Talk to Line

Press this button to assign the LED meter to the Talk to line signal source.

11.1.22 Talk to Remote

Press this button to assign the LED meter to the Talk to remote signal source.

11.1.23 Talk from Remote

Press this button to assign the LED meter to the Talk from remote signal source.

11.1.24 Comms MIC 48V Phantom power ON

Press this button to switch the 48V Phantom power for the T/B microphone plugged into the XLR at the top of this module.

11.1.25 HP-Filter IN/OUT

Pressing this button will insert a highpass filter into the Comms Mic signal path.

11.1.26 PFL

Press this button to monitor the output of the T/B microphone amplifier.

11.1.27 LED meter

This is an assignable LED meter showing the level of the signal source selected by the buttons on the left of the module.

Osc & Communications 8271

11.1.29 Talk to bus - level adjust   11.1.30 Talk to bus - select

11.1.31 Talk to Line - level adjust   11.1.32 Talk to Line - select

11.1.33 Talk to remote - level adjust   11.1.34 Talk to Remote - select

11.1.35 MUTE

11.1.36 T/B
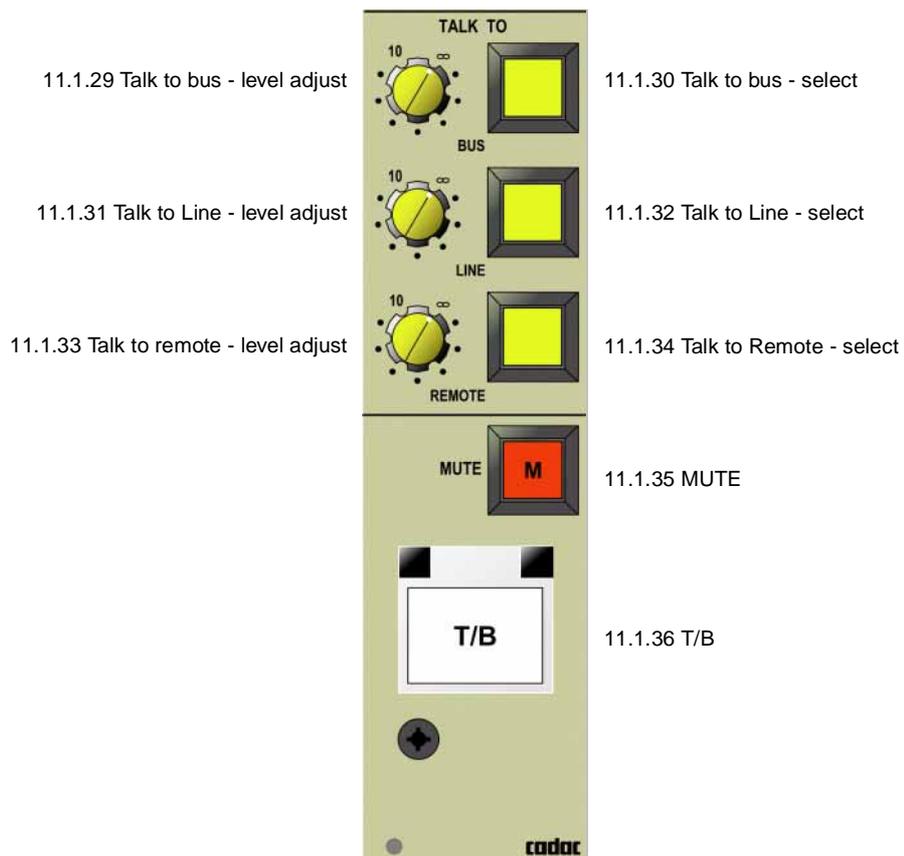
11.1.28 T/B MIC Gain

This rotary control adjusts the gain for a T/B microphone plugged into the XLR at the top of the module.

11.1.29 Talk to Bus - level adjust

When Talk to Bus is selected, you can adjust the level with this rotary control.

11.1.30 Talk to Bus - pre-select

Press this locking push-button to select Talk to Bus. Each of the Output and Matrix modules has its own ON/OFF switch to receive Talkback.

11.1.31 Talk to Line - level adjust

When Talk to Line is selected, you can adjust the level with this rotary control.

11.1.32 Talk to Line - pre-select

Press this locking push-button to select Talk to Line. Each of the Output and Matrix modules has its own ON/OFF switch to receive Talkback.

11.1.33 Talk to Remote - level adjust

When Talk to Remote is selected, you can adjust the level with this rotary control.

11.1.34 Talk to Remote - pre-select

Press this locking push-button to select Talk to Line. Each of the Output and Matrix modules has its own ON/OFF switch to receive Talkback.

11.1.35 MUTE

If any of the three push-buttons described above is ON, it can be muted by pressing this button.

11.1.36 T/B

When pressed, this large illuminated and hooded non-locking push-button un-mutes the MUTE button in 7.1.35.

11.2   Osc & Communications 8271 - rear panel

8274

Connector for external Oscillator

OSC I/P

Oscillator Output

OSC O/P

REMOTE CALL LIGHTS

Inputs and Outputs are electronically balanced and connected via 3-pin XLRs and follow the wiring convention:

PIN 1 = Screen
PIN 2 = In-phase signal (hot)
PIN 3 = Out-of-phase signal (cold)

Connector for Remote Call Lights

T/B FROM REMOTE

The 0.25" TRS jack connectors use the wiring convention:

TIP = In-phase signal (hot)
RING = Out-of-phase signal (cold)
SLEEVE = Screen

Connector for Talk-Back from Remote

T/B TO REMOTE

IMPORTANT NOTE: Pin 1 on XLR connectors and the 'sleeve' connections on the jack sockets are connected to the FRAME. This is to ensure that the console can comply with the Electric Compatibility (EMC) directive.

Connector for Talk-Back to Remote

T/B LINE O/P

Connector for Talk-Back to Line

12   Listen & Stereo Output 8305

The stereo output post-fader level meters show the stereo signal output level. Pressing the MUTE switch will mute both left and right channel and switch off the meters. Two conductive plastic faders are used to adjust the left and right output signal levels. Monitoring the outputs can be done via the Listen module, using the Listen L and R buttons.

The meters in the Listen section show the Listen levels pre-fader and pre-trim controls. A 60mm conductive plastic fader is used to adjust the overall level of Listen L and R outputs.

The module includes three trim controls - PFL, Listen and Ext I/P - which are used to compensate for differences in input and output listening levels. The PFL signal comes from the input channels and may be selected to be AFL by using a switch on the 8285 panel beneath the Central Control Module. The LIsten signal comes from Output, Matrix L-C-R and Stereo outputs. The Ext I/P signal comes from a pair of XLR sockets on this modules rear panel. There are two sets of XLR outputs for Listen, designed to be connected to loudspeaker amplifiers. Pressing the Alt O/P selects the second set of XLRs.

Switches L to L & R and R to L & R affect Headphones and Listen outputs. A DIM switch attenuates the Listen L/S outputs 1 and 2 by approximately 20dB. A Mute button for the L/S outputs 1 and 2 is provided. The Headphones output has its own source selection switch, level control and Mute switch.

Note that an 8359 (dummy fader module) must be mounted directly below the module to enable control of the LED brightness level.

Following pages describes the 8305 Listen & Stereo Output module in detail.

12.1   Listen & Stereo Output 8305 - front panel

12.1.1 LED level meters

12.1.2 Faders

12.1.3 Listen LEFT

12.1.4 Listen RIGHT

12.1.5 MUTE
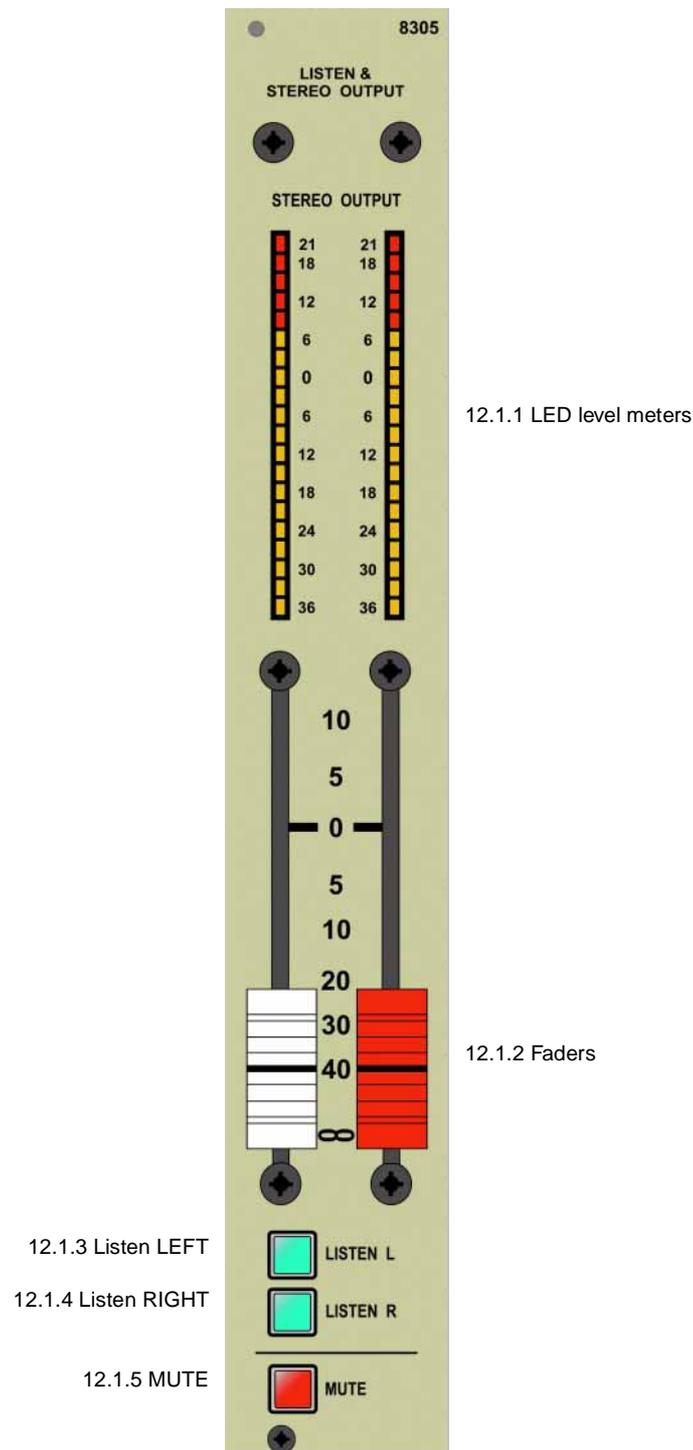
12.1.1   LED level meters

These post-fader level meters show the STEREO output signals. The meters are affected by the STEREO MUTE switch.

12.1.2   Faders

These 60mm conductive plastic faders are used to adjust the level of the LEFT and RIGHT STEREO outputs.

12.1.3   Listen LEFT

Press this button to monitor the LEFT channel in the Listen module.

12.1.4   Listen RIGHT

Press this button to monitor the RIGHT channel in the Listen module.

12.1.5   MUTE

Press this button to MUTE the STEREO output.

Listen & Stereo output 8305
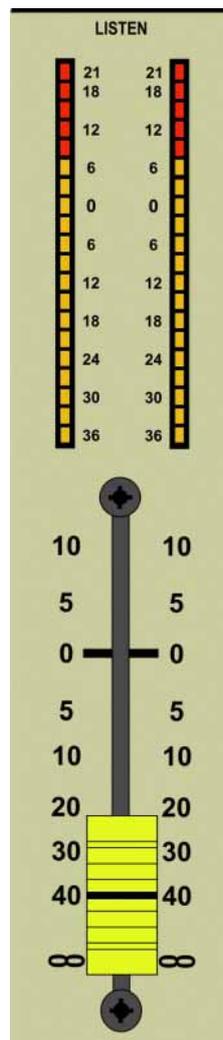
12.1.6 LED level meters

12.1.7 Fader

12.1.6 LED level meters

These LED meters show the LISTEN levels pre-fader and pre-trim controls.

12.1.7 Fader

This 60mm conductive plastic fader is used to adjust the overall level of the LISTEN LEFT and RIGHT outputs

12.1.8 PFL - select

This is a trim control, provided to compensate for differences between input and output listening levels. The overall level is controlled by a single 60mm fader described in 7.3.7. PFL comes from the input channels. It can be selected to be AFL (After Fader Listening) on the panel 8285 beneath the Central Control Module.

Listen & Stereo output 8305

12.1.8 PFL - select

12.1.10 Listen - select

12.1.12 Ext I/P - select

12.1.14 Left output - Phase reverse

12.1.15 ALT O/P

12.1.16 L to L & R

12.1.17 R to L & R

12.1.18 DIM

12.1.19 MUTE

12.1.20 Headphones - source select

12.1.22 Headphones - MUTE

12.1.9 PFL - Level adjust

12.1.11 Listen - level adjust

12.1.13 Ext I/P - level adjust

12.1.21 Headphones Output
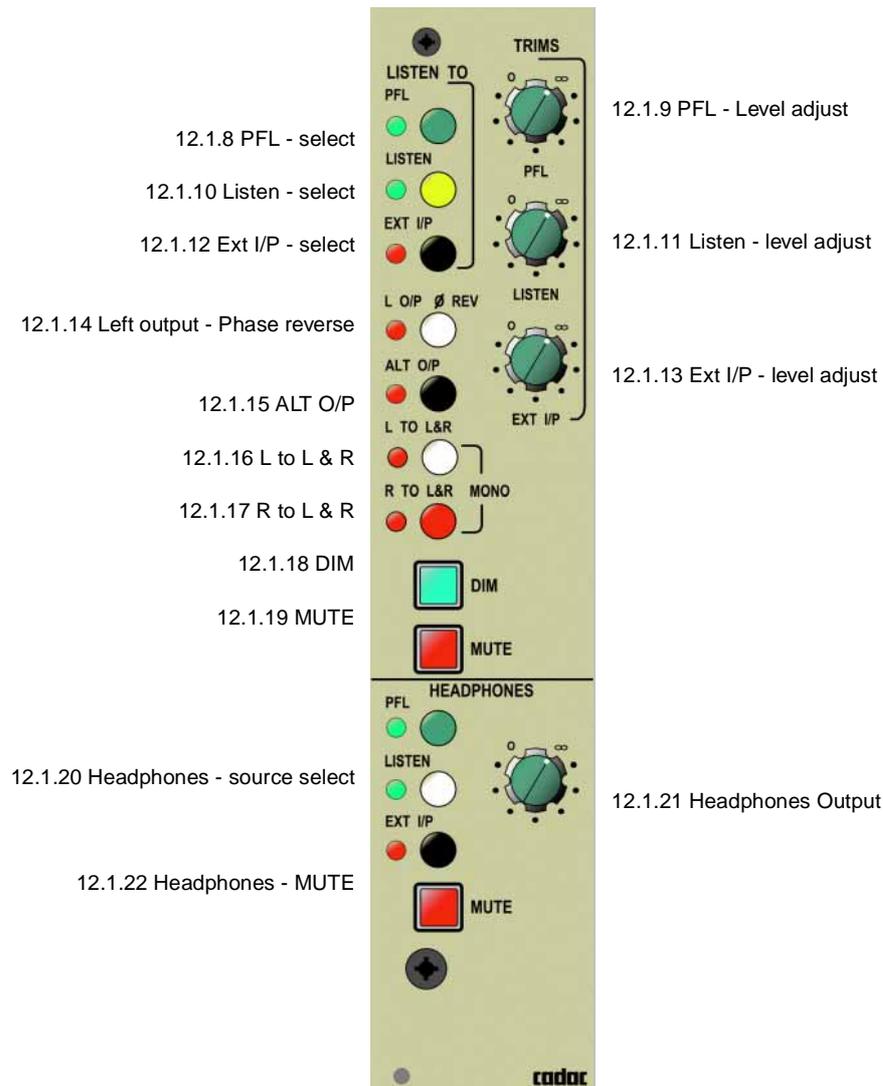
12.1.9   PFL - Level adjust

This rotary control is used to adjust the PFL-level.

12.1.10 Listen - select

This is a trim control, provided to compensate for differences between input and output listening levels. The overall level is controlled by a single 60mm fader described in 7.3.7. Listen comes from OUTPUT, MATRIX, L-C-R and STEREO outputs.

12.1.11 Listen - level adjust

This rotary control is used to adjust the Listen-level.

12.1.12 Ext I/P - select

This is a trim control, provided to compensate for differences between input and output listening levels. The overall level is controlled by a single 60mm fader described in 7.3.7. EXT I/P comes from a pair of XLR sockets on the module's rear panel.

12.1.13 Ext I/P - level adjust

This rotary control is used to adjust the EXT I/P-level.

12.1.14 Left output - Phase reverse

Pressing this button will reverse the polarity of the Left O/P.

12.1.15 ALT O/P

The Listen section has two sets of XLR outputs, designed to be connected to loudspeaker amplifiers. Pressing this button selects the second set of XLRs.

12.1.16 L to L & R

Pressing this button will send the signal from the left channel to both the L & R channel outputs.

12.1.17 R to L & R

Pressing this button will send the signal from the right channel to both the L & R channel outputs.

12.1.18 DIM

Pressing the DIM button attenuates the LIsten L/S outputs 1 and 2.

12.1.19 MUTE

Pressing the MUTE button mutes Listen L/S outputs 1 and 2.

12.1.20 Headphones - source select

These three switches allow you to select the Headphone output as PFL, Listen or Ext I/P.

12.1.21 Headphones output

This rotary control adjusts the headphones signal level.

12.1.22 Headphones - MUTE

Pressing this MUTE switch will mute the headphones signal.

12.2   Listen & Stereo Output 8305 - rear panel

8307

STEREO O/P

Stereo Output - Left and Right

LISTEN O/P 1

Listen Output 1 - Left and Right

Inputs and Outputs are electronically balanced and connected via 3-pin XLRs and follow the wiring convention:

LISTEN O/P 2

PIN 1 = Screen
PIN 2 = In-phase signal (hot)
PIN 3 = Out-of-phase signal (cold)

Listen Output 2 - Left and Right

The 0.25" TRS jack connectors use the wiring convention:

TIP = In-phase signal (hot)
RING = Out-of-phase signal (cold)
SLEEVE = Screen

PUSH I/P L

IMPORTANT NOTE: Pin 1 on XLR connectors and the 'sleeve' connections on the jack sockets are connected to the FRAME. This is to ensure that the console can comply with the Electric Compatibility (EMC) directive.

PUSH I/P R

Input - Left and Right

Appendices

A. Important information regarding EMC

On the 1st January 1996, new European legislation known as the EMC Directive came into force. The EMC Directive requires that all electronic equipment manufactured or imported for sale in the EEC must not emit electromagnetic interference that can impair the performance of other systems or sub-systems. Similarly, the product must also be immune to a wide range of natural and man-made electromagnetic interference in its operating environment. Many countries outside the EEC are also developing or have already put into place similar legislation. In order to conform to these rules, a number of changes were required to the basic design of our consoles and modules. One of the main changes is:

All cable 'screen' connections are bonded to the frame.

The figure below shows the required connection scheme for XLR connectors.

Please note that in the case of 'line' or 'free' connectors (XLRs on cables), the 'pigtail' formed from the cable screening braid should be as short as practical and soldered to the *shell ground tag*. Pin 1 is then connected to the 'pigtail' approximately halfway between the *shell ground tag* and the start point of the cable screening braid. The twisted pair should be left 'twisted' right up to the signal solder tags.
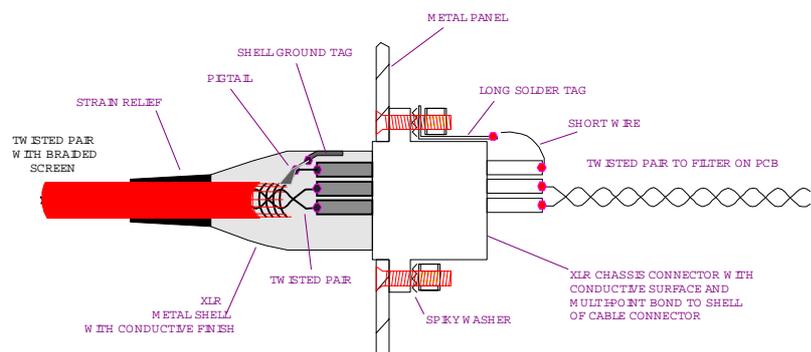
FIG A-1. XLR connections.

The chassis half of the connector is bonded to the metalwork with the usual nuts, bolts and spiky washers. The solder tag should be as long as possible so that the length of the 'short wire' is a minimum. The twisted pair (from the signal pins - pin 2 & pin 3) are soldered onto the motherboard adjacent to the 'input RF filter' components.

B.   Jumpers to select Output and Matrix
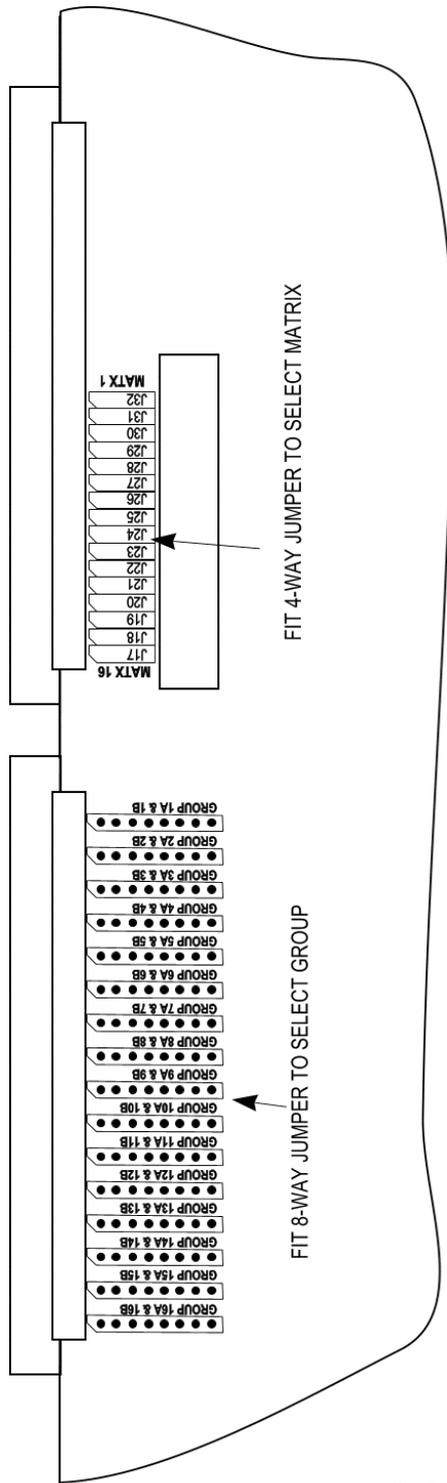
8251 OUTPUT AND MATRIX SELECTOR

C.   Jumpers to select VCA Master

Fit jumper to select VCA master.
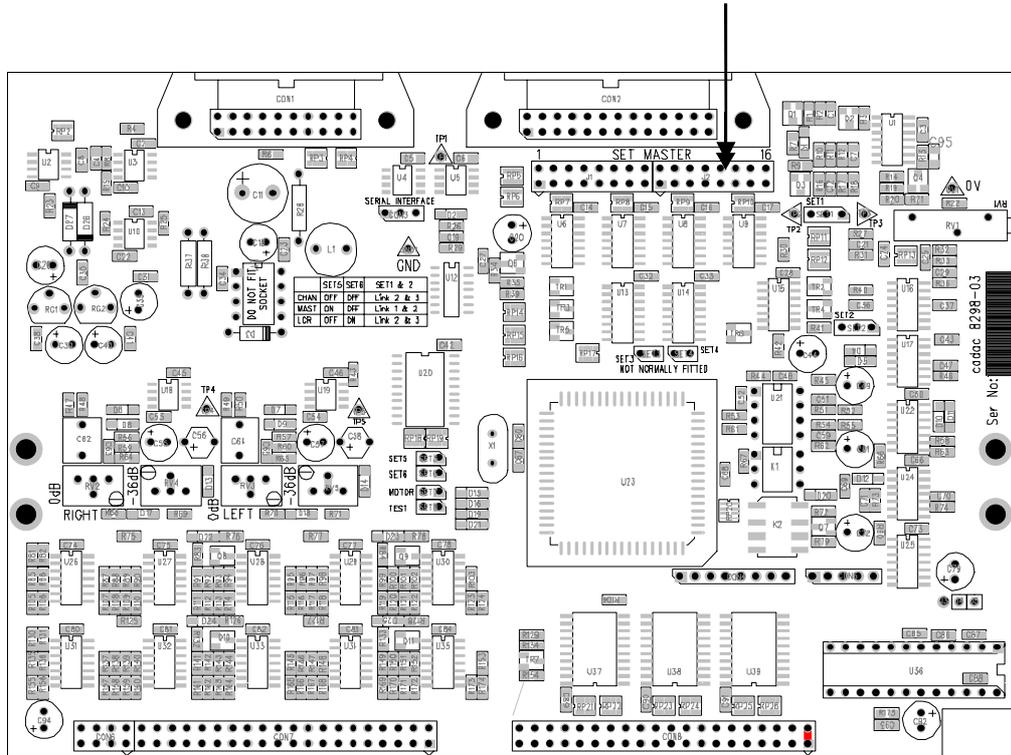
D.   Jumper to disable direct output muting
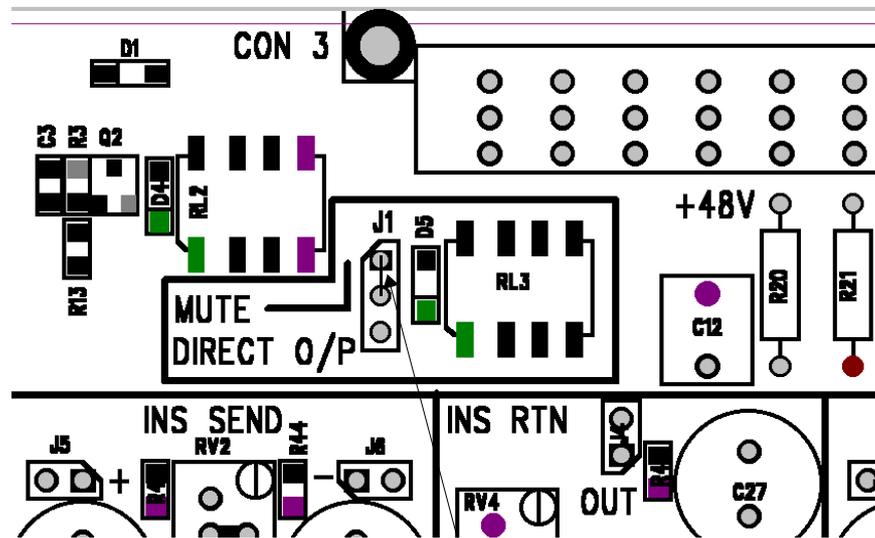
Reposition link from 1 and 2 to 2
and 3 to avoid muting the D/O
when hard-muting the input
channel.

Glossary

TERM	DEFINITION
A & B Listen buttons	A and B listen buttons are located near the bottom of the 8251-3 Outputs & Matrix module. Pressing either or both allows monitoring of A or B or A + B signals.
A-channel	The odd numbered mix group on a group module (ex. 8257-3). When working in stereo, the left channel is reproduced by channel A and the right channel by channel B.
Access keys	Located on the Central Control Module (CCM), 10 keys provide access to the System setup and the CCM memory locations.
ADDITIVE function	When the FCM's PFL/LISTEN HOLD is activated, an additive function is provided in that every new PFL or Listen signal is mixed with the previous one.
add-on card	E.g. a card that increases the total possible number of memory locations in a CCM from 128 to 256.
AFL send	AFL is an abbreviation of After Fader Listen. In this mode the signal level being monitored follows the fader position.
arrow buttons	Buttons on the CCM that are used to navigate the menus.
assign	The process of, for example, allocating a Master fader to control a number of input channels. The input channels can then be said to be assigned to that specific Master fader.
assignable LED meter	LED-meter that measure the signal level of more than one source.
assigned	See *assign* above.
assignment	See *assign* above.
Assignment buttons	Buttons that need to be pressed to assign input channel faders to a DC Master fader or a Mute group. The assignments buttons include the numerical buttons (1 - 16), SET, DC and MG, located on the FCM and the channel modules.
assignment panel	Panel on which the Mute Group and DC Master assignment buttons are located (see Fader Control Module).
automation software	Software designed to record and replay any programmable functions on the console.
aux group	A mixing group for signals that are not part of the main audio outputs on a console.
aux output	Level controlled output of the resulting mixed signals of the auxiliary mixing group.

B-channel	See **A-channel** above.
Balanced line	A balanced line consists of two identical conductors that carry the same signal but have opposite polarity with respect to ground. Balanced lines are very useful in reducing or eliminating unwanted interference. Interference induced in each conductor signals have the same polarity in both lines and the noise currents flow in the same direction. At the load end of the line, noise currents are found to be opposite in polarity, but equal in amplitude, so in theory, they cancel completely. In practice, interference signals do not cancel completely due to small differences in the inductance of each conductor.
bargraph meter	Meter that indicates the signal level by means of LEDs.
Boost	To increase the level of amplification of a certain frequency (-range).
boot-up	Start-up procedure.
bus cable	Cable that inter-connects the frames in a console system.
BUS CONFIG	Option in the CCM menu system. Send busses 1 - 8 can be configured for either mono or stereo.
bussed together	Console frames that are inter-connected by means of a bus cable are said to be bussed together.
By-pass	By-passing something is the same as skipping it, for example, stopping the channel VCA from being controlled by the DC Master fader requires the DC Master fader to be by-passed.
Call Remote	Feature of the Osc&Comms module that activates a call light at a remote location.
CC	Continuous Controller (MIDI-function).
CCM	Abbreviation of Central Control Module.
CCM memory	Memory space in the Central Control Module (at present the CCM has 128 memory locations).
CEN	Abbreviation of Centre channel
Central Control Module	See **CCM** above
Centre channel	The middle channel in a Left - Centre - Right (LCR) system.
Centre level	Located on all Input Channel modules, the Centre level control is used to set the post-fade signal level to the centre output of the LCR module if the Centre-switch is activated. This can be used to mix or balance signal levels when the centre output is used as a separate mono bus in conjunction with the standard L-R bus. If the LCR switch is activated this control is inactive
Centre switch	Switch on all Input channel modules used to route the output directly to the Centre bus.

channel	Input or output signal that forms a part of the final mix.
CHANNEL PRIORITY	Mode in which an input PFL overrides an output Listen.
channel VCA	Voltage controlled amplifier for controlling the input channel or output group signal. The degree of amplification is determined by the VCA drive voltage, derived from a fader or potentiometer.
CHECK	Feature that allows the operator to use an input channel MUTE button as a 'solo-in-place' button.
CLEAR	CLEAR buttons are used to cancel a selection or to clear the CCM of one or more memories.
CMRR	Common mode rejection ratio is the ratio of response for a normal mode signal to the response for a common mode signal of the same amplitude. CMMR is usually specified in decibels.
cold	Refers to pin 3 on an XLR-connector. The signal on pin 3 is opposite in polarity to pin 2 and hence is referred to as cold.
Common mode	Where all currents (signal and interference) flow in the same direction in each conductor. Normally, interference currents are an unintended by-product of the cable connection and the main cause of cable interference problems.
comms functions	Functions that allow an operator to communicate with remote locations.
Comms MIC	Microphone used for communicating with remote locations.
Comms MIC input	Microphone input located on the Osc & Comms module used for various talkback and communications functions.
communication functions	Refers to the Osc & Comms module, which in addition to its oscillator functions also has communication functions as described under **Comms MIC** and **Comms MIC input** above.
configuration	The arrangement of features to produce a certain outcome.
Configuring	See **configuration** above.
console mapping	Information stored in the CCM as to how the console is configured.
console modularity	Frame design concept allowing any module to be put in any position in the frame.
console snapshot	Scene memory with no dynamic contents.
COPY MEM	Message displayed on the CCM when CPY is pressed. The message prompts an input from the user as to which memory number to copy.
Current Scene	Point of reference when using the functions Previous and Next on the Central Control Module.

D/O	Direct Output.
DC Group	A direct current bus that controls the VCA drive voltage.
DC Master	DC controlled fader serving as a master fader to which one or more channel faders has been assigned.
DC Master assignment	Assignment of one or more channel faders to a Master fader.
DC master membership	Channel fader assigned to a certain DC Master fader.
debug menu	Menu with a number of options to assist in fault finding and preventive maintenance.
dedicated stereo bus	Bus exclusively used for stereo signals
destructive SOLO	Pressing CHECK will invert the MUTE-function so that all unmuted channels will become muted and the muted channel will become unmuted. A form of SOLO function.
Differential mode	Currents flowing in a pair of signal lines that are pricipally concerned with the signals themselves. Any induced interference on either line appears to be in common mode with respect to the signal currents (differential or normal mode) and thus cancel.
DIM	Feature on the Listen & Stereo output module that attenuates the Listen L/S outputs 1 and 2 by approximately 20dB.
Direct Output Select	The direct output signal is normally post fader. Pressing the PRE button will take the signal from pre-fader but post INS/EQ. Pressing MIC will override the PRE button (the PRE LED will go out) taking the d/o directly from the o/p of the MIC amp. In this state the highpass filter is still available if needed.
dual group	Group module with odd end even mixing amplifiers.
dual mono	A group module configured for dual mono operation.
Dynamic actions	A dynamic action is defined as data contained within a specific scene and lasting for a certain length of time.
EARTH IMPEDANCE	The total opposition to the flow of current in a dedicated earth conductor. At frequencies above 50/60 Hz, the total opposition to current flow will be more inductive than resistive in the context used (power supply mains connections), Best results are achieved if the length of the AC power input cables to the main and backup PSUs are the same.
EDIT button	Button on the CCM to be pressed when editing the contents of a scene.
electro-magnetic interference	Radiated and conducted phenomena associated with the electric and magnetic fields generated unintentionally by electronic circuits and systems.

electronically balanced input	An electronic amplifier stage used to amplify the difference voltage between two input signals. In the ideal case the output is entirely independent of the individual signal levels - only the difference matters. This type of circuit is also known as a differential amplifier. When the input signal is fed from a balanced line, the common mode rejection to interference signals is extremely good. In other words, a good differential amplifier has a high common mode rejection ratio (CMRR).
electronically balanced output	An electronic amplifier stage that produces two identical output signals, except that one output signal has the opposite polarity to the other.
EMC	Electro-magnetic compatibility. A series of regulations imposed by member countries of the European Union on manufacturers of electrical and electronic equipment, to control electro-magnetic emissions and susceptibility. The particular standard for audio equipment and systems is: EN55103-1 (emissions) and EN 55103-2 (immunity).
Enter	End command of a computer operation.
Enter button	Located either on the CCM or on a separate keyboard, this button is used to execute the command described previously.
EQ PRE INS	Input channel feature allowing the equalizer to be put in circuit before the Channel Insert.
equalizer	Input channel stage allowing the frequency response to be altered within ±18dB at four different frequencies.
error log	Feature of the CCM that allows the storage of fault information and the date/time when they occurred.
Escape (ESC)	Button on the CCM or keyboard function allowing an operation to be interrupted and return to the top of the menu tree.
Event	A function controlled by the CCM, which can be programmed as part of a cue. Each of the 8 events available per cue are associated with a relay which can be programmed to switch 'on', 'off' or 'pulse'.
EXT I/P	A connector allowing an external signal to be plugged into the Oscillator module.
external relay switched equipment	See *Event* above.
Fader Control Module	Located below the Central Control Module, this module controls assignments of channels to DC Masters and MUTE groups. It also has facilities for motorized faders when these are implemented.
fader display	Alphanumeric display on the DC Master faders showing the allocated number for each DC Master.
fader panel	Located below the input/output channel modules, the fader panel contains the fader itself and LEDs for indicating DC or MG assignment. It

		also has buttons for MUTE, Bypass, SET, Isolate and input level bargraph meter.
	fader tray	Area of the console surface that accommodates the fader modules.
	FCM	See **Fader Control Module**.
	FoH	Abbreviation of Front-of-House. Refers to the location/configuration of a console in a production setup.
	frame	The part of the console that holds modules and fader panels.
	full L-C-R panning	Panning mode that allows the signal from an input channel or output group to be positioned between left, centre or right outputs.
	Global listen	All channels set to Listen mode.
	global PFL	All channels set to PFL mode.
	group	Module where signals are mixed together from appropriately assigned input channels
	HF	High Frequency control located in the EQ-section of each input channel.
	high-pass filter	Filter that cuts off undesired low frequencies.
	HMF	Higher Mid-Frequency control located in the EQ-section of each input channel.
	HOLD	Applies to the PFL/Listen feature. If HOLD is OFF, any new selected PFL or Listen signal will cancel the previous one (intercancel function). When HOLD is ON, it is possible to mix the new signal with the previous one if any of the buttons PFL or Listen is pressed on another module.
	hot	Refers to pin 2 on an XLR-connector. The signal on pin 2 always has positive polarity and is hence referred to as hot. See also **in-phase signal**.
	HP Filter	Filter that cuts off undesired low frequencies.
	HP Filter Frequency control	A rotary control to set the cut-off frequency for the HP filter.
	I/P	Abbreviation of Input.
	I/P channel	Input channel
	Inject	An additional input connector for an output group. This facility is also available on the L-C-R module.
	In-phase signal	A signal is said to be in-phase if the positive and negative parts of the waveform follow the positive and the negative parts of a source waveform to which it is being compared.
	Input module	Module in a (console)-frame into which the input signal is fed.
	input RF filter	Input filter that absorbs Radio Frequencies.
	Insert send/return	A point where the signal in an input channel or output group may be sent out to, and returned

		from an external processing device.
	INTERCANCEL	Used in conjunction with PFL and LIsten functions, this term means that any active PFL or Listen will be cancelled when a new signal is selected. Note that even if the INTERCANCEL mode is active, pressing a PFL or Listen, while at the same time holding down any of the same buttons on another module, will cause the signals to mix.
	internal jumper	Used internally in the console, jumpers can be configured by the user to obtain a certain result.
	internal jumper settings	The configuration of jumpers required for a certain result.
	ISO	Abbreviation of ISOlate. This function is used to isolate a fader from the automation system.
	Isolate	See **ISO** above.
	jumper options	Various ways to fit a jumper depending on what result is desired.
	L to L & R	Mode selected on the Listen & Stereo output module that allows sending the signal from the Left channel to both the L & R outputs.
	L-C-R bus	Mixing busses for the left, centre and right group. The bus can be used either for unpanned centre with level control or full L-C-R panning.
	LCR Master output module	Master module for the L-C-R bus.
	LED WR	LED-indicator on a fader, indicating that the fader is ready to record dynamic movements.
	Listen LEFT	When selected, this feature on the Listen & Stereo Output module allows monitoring of the LEFT channel.
	Listen module	Module for monitoring LISTEN and PFL selection.
	Listen RIGHT	When selected, this feature on the Listen & Stereo Output module allows monitoring of the RIGHT channel.
	L-R panning	Panning between Left and Right channels with unpanned centre with level control.
	MAIN FRAME	Frame in a console setup that accommodates the Central Control Module.
	Main output	See **Matrix output.**
	map	A description of the console layout stored in the CCM.
	master	Fader controlling a group of channels.
	Master DC fader	See **DC Master.**
	Master Fader names	Appears on a display above the DC Master fader. The fader name is stored in the CCM.
	Master MUTE	Located on the CCM, the Master MUTE switches globally mute Input channels, outputs, matrix and L-C-R outputs.
	matrix	Collective name for all the matrix send potenti-

	ometers.
matrix group	Module where signals are mixed together from appropriately assigned matrix sends.
matrix output	Level controlled output of the resulting mixed signals of the matrix.
matrix send	A potentiometer for sending signal from a group module to a matrix bus.
memory location	Scene memories are held in the CCM which currently has space for 128 memories. This number can be increased to 256 by using an add-on-card.
MG	Abbreviation of **Mute Group**
MG assignment	The process of assigning an input channel to a Mute Group.
microphone level	The signal strength of the microphone output.
MIDI	Abbreviation of Musical Instrument Digital Interface
MIDI Program Change filter	MIDI-feature of CADAC's console automation software SAM.
MIDI Scene Recall	MIDI-feature of CADAC's console automation software SAM.
MIDI Setup menu	Accessible via the CCM, this menu contains various options for MIDI setup.
mixing bus	An electrical conductor or pair of conductors for adding electrical signals together.
Mnemonic	Defined as something that supports memory.
module	A structure for housing electronic circuits and components. A mixing console is built up from a number of different modules, each having a certain function such as an input module, output module, stereo module or it may involve other functions.
monitor amplifier	Amplifier connected between a console output (usually the LISTEN module) and the monitor speakers.
monitored output	Console output that is being monitored (listened to), either via headphones or an external amplifier and speakers.
mono-coque	Without seams; cast or moulded in one piece.
motorized fader	A motor driven fader, the movements of which may be preprogrammed.
Moving fader automation	Software for recording and replaying data for use with motor faders.
MSTR	Abbreviation of Master.
MTX PRE	Feature of the Output & Matrix module allowing the OUTPUT to be routed directly from the group to the MATRIX pre-fader.
MUTE group	Group of channels that have been assigned to

		one Mute Group and can be muted by pressing one button.
	Mute group assignments	The process of assigning channels to one mute group i.e. all channels in that group may then be muted by pressing only one button.
	NF	Abbreviation of Note OFF - this term relates to MIDI-functions that are controlled by CADAC's software package for console automation (Sound Automation Manager).
	NO	Abbreviation of Note ON - this term relates to MIDI-functions that are controlled by CADAC's software package for console automation (Sound Automation Manager).
	O/P	Abbreviation of OutPut.
	O/P to MTX	Feature of the Mono Input channel module allowing direct routing to matrix busses 13-16 from POST fader (with or without stereo panning).
	on-board jumpers	Inter-connects that may be configured by the user to suit a certain application.
	OPEN LED	Located on a fader panel, this LED illuminates when the channel VCA is open and not muted locally or by assignment to a Mute Group.
	Osc frequency	Feature of the Oscillator & Communications module allowing the integral module oscillator to be set to generate a certain frequency within the range of 31Hz to 16kHz, as indicated by the switch.
	oscillator	An electronic circuit used to generate a single frequency or noise spectrum.
	Oscillator/Comms module	Module that features an oscillator, remote calling and communication functions.
	Out-of-phase signal	A signal is said to be out-of-phase if the positive and negative parts of the waveform are opposed to the positive and the negative parts of a source waveform to which it is being compared.
	Output to Matrix	Feature of the Mono Input channel module allowing direct routing to matrix busses 13-16 from POST fader (with or without stereo panning).
	override	Bypass or cancel a function.
	P&N	Abbreviation of Previous & Next. Refers to the associated buttons on the CCM . Press P to back to the previous scene or N to go to the Next scene.
	pad	Electronic circuit that attenuates an input signal to allow for a line-level source to be connected to a microphone input.
	PAN Control	The control pans the post-fade signal from Left through Centre to Right on the LCR module master outputs. In L-R mode, the control pans the post-fade signal from Left through Right on the LCR module master outputs without affecting the centre sends.

The control will pan the signal between A and B group outputs as determined by "Stereo Pan to GRPS" switch status and level setting of Aux/Group sends, and will pan the signal between matrices 13/14 and/or 15/16 as determined by the "Stereo Pan to MTX" switch setting and "OP to MTX" direct to matrix routing switches.

panning	See ***PAN control***
pan-pot	See ***PAN control***
PC	Abbreviation of Personal Computer.
P-Fade	Programmable fader function.
PFL	Abbreviation of Pre Fader Listen.
PFL to AFL	Conversion of Pre Fader Listen to After Fader Listen.
phase-change	Change of the polarity of the in-coming signal.
PNG	Abbreviation of Pink Noise Generator.
Pink noise	Electronically generated noise that has equal noise power per octave. This means that the power per Hz drops at 3dB per octave.Thus the power spectrum is similar to live music.
post fader metering	The signal level displayed on the meter indicates the level of the signal after the fader.
POST-FADE	Indicates after fader.
post-fade signal	The signal that is available after the fader.
Pre/Post fader monitor	Function that allows the signal to be monitored either before or after fader.
pre-fader signal	A signal that is not controlled by the fader.
Pre-INS monitor	A monitoring point before the insert stage.
PSU fault indicators	LEDs on the CCM that illuminates when a power supply system is connected to the console.
PSU SYSTEM	One or more power supply systems that provide power to the console.
Q-control	The Q-control varies the bandwidth of the cut/boost frequency selected on the equalizer, thereby narrowing or widening the frequency band affected by the EQ-section.
QWERTY-keyboard	Standard keyboard used to communicate with a personal computer.
R to L & R	The right channel is sent to both the left and right output.
RAM	Abbreviation of Random Access Memory; this memory is located in the CCM and holds the information contained in each of the 128 possible scene memories.
READY mode	Indicates that a motorized fader is ready to send position data to the CCM.
redundant configuration	Cadac consoles are designed to allow the use

of two independent power supply systems in a ***redundant configuration*** – "main" and "backup". Both sets of power supply units are used to power the console system so that under normal conditions, the 'load' is shared between the "main" and "backup" PSU's. If a fault occurs in one of the power units (causing it to 'shut-down'), the remaining power unit will continue to power the console.

reference ground conductor	A conductor or area that provides the lowest possible transfer impedance to the internal circuits and/or equipment, normally assumed to be at a potential of 0V.
transfer impedance	The voltage developed within a victim circuit (for instance, a cable carrying a sensitive signal) divided by the interference currents flowing in a source circuit.
remote calling	Function on the Osc & Comms module that allows communication between the operator and a remote location.
Remote MIC routing	Function on the Osc&Comms module used to route the Remote Input signal to LISTEN L and R and the console's TALKBACK bus.
re-route	To take an existing signal route and re-direct it to another output.
Reset	Bring back to original status.
RING	Part of the 0.25" TRS jack connector that carries the out-of-phase (cold) signal.
route	Signal path; direct a signal along a certain path.
Routing switches	Switches used to direct the signal along a certain path.
SAFE mode	Indicates that a motorized fader will not send position data to the CCM.
SAM	Abbreviation of Sound Automation Manager.
Scene memory	RAM location in the CCM where the scene memory is held. The CCM can currently hold 128 different scene memories
Scene name	The Scene name can be anything up to 8 characters in length (the default Scene name is <MEMxxx> where x represents a location between 001 and 128).
Screen	Part of a cable (also known as braid) that protects the signal conductors from electro-magnetic interference.
self-test	After power-up of the console the CCM performs a self-test during which process all of the frames are scanned to verify the location of both input and DC Master faders.This information is crucial to enable correct recall of previously saved module information for console snapshots for the scene recall system.
Send	A potentiometer and/or switch on a module which sends a signal onto a mixing bus.

Send Bus	A set of wires accessible to all sends.
SET button	SET buttons are found on the FCM and the channel faders and are used for DC Master and Mute Group assignments.
SLEEVE	The part of a 0.25" TRS jack connector which is connected to the cable screen to provide earth connection.
snapshot	A snapshot is defined as a single memory location within the CCM, which takes an instantaneous snapshot of the current console setting, i.e. stores and can recall the following information:
	Snapshot name Currently selected DC master membership Current DC master name if DC master are labelled Currently selected Mute Group membership and Mute group status Currently selected soft key mute and bypass status Current "snap-to" fader position (when motor faders are implemented, which will be an option.
	A snapshot has no dynamic contents.
SOLO	See **solo-in-place** below.
solo-in-place	Pressing the CHECK function on the Osc&Comms module allows an operator to use input channel MUTE buttons as a 'solo-in-place' for trouble-shooting.
spur	A console PSU-system in a **redundant configuration** should be connected to the same phase and circuit **(spur)**.
stereo group	Group module configured for stereo operation.
stereo master bus	Dedicated stereo mix bus.
STEREO MUTE	Function on the Listen & Stereo module that mutes the stereo output.
stereo pair	Sends 1 -8 can be set to be stereo pairs; e.g. sends 1A and 1B reproduces L & R instead of a mono signal that is identical for A and B.
string	Combination of characters constituting the name of a memory location.
sub-group	Normally receives a signal via an on/off switch only, with no independent level control.
sub-output	Level controlled output of the resulting mixed signals of the sub-group.
summed signal	One or more signals that are electronically added together.
switch-mode power supply	A power supply whose operation is based on high-frequency switching and may or may not include an input transformer stage. The switch-mode power supply output voltage variations are filtered out by an LC filter.
test signal	A signal that has a known voltage or power level.

timed X-fade	Feature of CADAC's console automation software that allows a cross-fade to be set between two or motor faders.
TIP	Part of the 0.25" TRS carrying the in-phase-signal (hot).
trim control	The Listen & output module includes three trim controls - PFL, Listen and Ext I/P - which are used to compensate for differences in input and output listening levels.
TRS jack connectors	A type of input or output connector where: TIP = In-phase signal (hot) RING = Out-of-phase signal (cold) SLEEVE = Screen
true L-C-R panning	Achieved by pressing the L-C-R button on the input channel. This will route the input signal to either to the L-C or R outputs on the L-C-R module, depending on the setting of the PAN-pot. Use the input channel PAN-pot to alter the sound image to meet your requirements. Another way of achieving this is to route any number of input channels/groups of input channels to one or more sub-groups and then control the L-C-R panning with the sub-group PAN-pot. **NOTE:** The L-C-R switch overrides the L-R+CEN selections.The stereo bus follows the L-C-R pan pot.
USB port	Abbreviation of Universal Serial Bus port; used for the transmission of data.
User Setup	Menu option in the CCM.
VCA	Abbreviation of Voltage Controlled Amplifier
VCA switch	Allows the A & B outputs and matrix output on an O/P module to be controlled by the VCA fader directly below the module.
WRITE mode	Indicates that a motorized fader is sending position data to the CCM.
X-fade	Also referred to as cross-fade, this feature of CADAC's console automation software allows programmed cross-fading
XLR connectors	A type of input or output connector where: PIN 1= ground PIN 2= + phase PIN 3= - phase
zero-signal reference potential	The potential of a point or area in a circuit, system or sub-system that is conventionally taken as 0 volts with respect to all other local voltages.

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