# OPERATOR MANUAL (Product V1.28)
## ISSUE 5

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Whilst the Company takes the utmost care in ensuring that all details in this document are correct at the time of publication, we reserve the right to alter specifications & equipment without notice. Any changes we make will be reflected in subsequent issues of this document. The latest version will be available upon request.

This publication is for International usage.

*Please complete and return the User Registration page at the end of this manual.*

Please observe the following:-

**After Sales Modifications**

Modifications to this equipment by any party other than Calrec Audio Limited may invalidate EMC and safety features designed into this equipment. Calrec Audio Limited can not be liable for any legal proceedings or problems that may arise relating to such modifications.

If in doubt, please contact Calrec Audio Limited for guidance prior to commencing any such work.

**ESD (Static) Handling Procedures**

In its completed form, this equipment has been designed to have a high level of immunity to static discharges. However, when handling individual boards and modules, many highly static sensitive parts are exposed. In order to protect these devices from damage and to protect your warranty, please observe static handling procedures, for example, use an appropriately grounded anti-static wrist band. Calrec will supply an electrostatic cord and wrist strap with all of it's digital products.

All modules and cards should be returned to Calrec Audio Limited in anti-static wrapping.
Calrec Audio Limited can supply these items upon request, should you require assistance.

This applies particularly to digital products due to the types of devices and very small geometries used in their fabrication, analogue parts can however still be affected.

## IMPORTANT HEALTH AND SAFETY INFORMATION

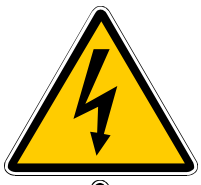
- This equipment must be EARTHED.
- Only suitably trained personnel should service this equipment.
- Please read and take note of all warning and informative labels.
- Before starting any servicing operation, this equipment must be isolated from the AC supply (mains).
- Fuses should only be replaced with ones of the same type and rating as that indicated.
- Operate only in a clean, dry and pollutant-free environment.
- Do not operate in an explosive atmosphere.
- Do not allow any liquid or solid objects to enter the equipment. Should this accidentally occur then immediately switch off the unit and contact your service agent.
- Do not allow ventilation slots to be blocked.
- Do not leave the equipment powered up with the dust cover fitted.
- The rack mounting parts of this equipment must be fitted into an enclosure which complies with local regulations.

### Cleaning

For cleaning the front panels of the equipment we recommend anti-static screen cleaner sprayed onto a soft cloth to dampen it only.

### Explanation of Warning Symbols

The triangular warning symbols below contain a black symbol on a yellow background, surrounded by a black border.



The lightning flash with arrow head symbol within an equilateral triangle is intended to alert the user to the presence of dangerous voltages and energy levels within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock or injury.

The exclamation mark within an equilateral triangle is intended to prompt the user to refer to important safety, operating or maintenance (servicing) instructions in the documentation supplied with the product.

## POWER SUPPLY BLANKING PLATES (ZN4849-3 and ZN6020)

If you are in receipt of a ZN4849-3 or ZN6020 power supply unit please do not remove the blanking plates which are fitted to the unused output connectors on the rear of the unit. The maximum potential between the terminals exceeds 60 volts, the blanking plates are fitted to avoid the risk of electric shock.

**CONTENTS**

*Continued...*

## TECHNICAL CUSTOMER SUPPORT

Should you require any technical assistance with your Calrec product then please contact your local distributor, if outside the U.K. and Ireland. For a list of Worldwide distributors please see the Calrec Web site at www.calrec.com or contact Calrec UK.

For technical assistance within the UK and Ireland, please contact the Customer Support Team at :-

Customer Support
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Tel: +44 (0) 1422 842159
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Email: support@calrec.com
Website: www.calrec.com

We can deal with all technical after sales issues, such as :-

- Arrange repairs
- Supply of replacement or loan units while repairs are being carried out
- Service / commissioning site visits
- Operational training courses
- Maintenance training courses
- Supply of replacement components
- Supply of documentation
- Technical advice by telephone

**Customer Support Hours**
Factory based customer support engineers can be contacted by telephone during normal office hours, or outside hours, a message can be left on the answering machine. All messages are dealt with promptly on the next working day. Alternatively a message can be sent to them by email.

**Product Warranty**
A full list of our conditions & warranties relating to Goods & Services is contained in the Company's standard Terms and Conditions. A copy of this is available on request.

**Repairs**
If you need to return goods to Calrec, for whatever reason, please contact the Company beforehand in order that you can receive advice on the best method of returning the goods, and that a repair order reference number can be issued.

**Standard of Service**
Ensuring high standards is a priority, if you have any comments on the level of service, product quality or documentation offered to you by Calrec, then the Customer Support team would be pleased to receive your comments through any of the normal contact numbers, email or on the User registration form located at the end of this manual. If you have any other issues regarding your Calrec purchase, then please contact us and we will do our best to help. Calrec welcomes all Customer feedback.

# Overview




## INTRODUCTION

Zeta is Calrec's third all digital production console designed for the most critical broadcast production and on-air applications. It is designed for use in television and radio production studios and outside broadcast vehicles where broadcast facilities cannot be compromised but space is restricted. Based on the well established Alpha and Sigma digital system architecture, Zeta provides comprehensive features and functionality, with sophisticated failure protection systems.

System Plus celebrates a milestone in the evolution of Calrec consoles, providing increased functionality, which is upgradeable to existing consoles. Zeta continues to meet the changing requirements demanded by the on-set of surround sources in live production, providing sophisticated monitoring solutions and encompassing flexible TFT style metering.

The introduction of digitally controlled assignable systems in 1980 has allowed for their ergonomics to be continuously refined by user input and the Zeta reflects this in its user interface. Fully assignable control means that any fader can control any channel or group. A dual layer design allows for single or dual path operation, and 2 Wild controls per fader allow allocation of assignable channel controls. The flexibility offered by digital control and a computer-aided memory system has been harnessed to provide greater functionality and ease of use.

Zeta is available in a number of cost-effective processing / input configurations and three frame sizes, with a variety of additional input and output interface options. These packages provide focused levels of technical provision at a reasonable cost, without sacrificing reliability, ergonomics or technical specification.

Calrec has a world-wide customer base which includes many of the world's most prestigious broadcasters. By consistently focusing upon purely broadcast products, Calrec offers consoles with the most comprehensive combination of performance and features available. The high level of reliability of all Calrec products, many of which are still in daily use after 20 years service, reflects a clear awareness of the critical nature of the operating environment.

This understanding of the real issues of broadcast operations is one of the many reasons why operators and management alike prefer Calrec. Zeta is designed to ensure this level of confidence will continue in the digital era.

### ISO 9001 Registration

Calrec Audio Ltd has been issued the ISO9001: 2000 standard by the Governing Board of ISOQAR.

The award, for both UKAS and RAB registration, is the most comprehensive of the ISO9000 international standards. Granted in recognition of excellence across design, development, manufacture and after-sales support, the certification follows a rigorous and thorough review of Calrec's internal and external communication and business procedures.


## PRINCIPAL FEATURES

### Format

Up to 48 faders, with A and B layers of control, plus 2 main output faders.
108 equivalent channels: Up to 42 stereo or mono plus 24 mono channels, or
112 equivalent channels: 56 stereo.
Table-top or floor stand mounting.
Comprehensive surround panning and monitoring.
Flexible TFT screen-based meters with total user-configurability.
Optional I/O expansion via a wide area interface such as MADI or Hydra, Calrec's sophisticated audio networking system.

### Channel / Group Facilities

All channels have 4-band EQ/Filters, Compressor/Limiter and Expander/Gate.
All groups have Compressor/Limiter.
8 mono or 4 stereo auxiliary outputs.
Pre configured inserts are assignable to any channel or group.
Inserts can be pre or post fader.
All channels and groups have direct outputs.
Direct outputs can be pre EQ, pre fader or post fader.
Every direct output can be a mix minus feed.
Automatic cross-fading facility, with user-definable fade out and in times.
Assignable input delay function.
Two assignable Wild controls per fader.
All faders are motorised and touch-sensitive.

### Routing

8 stereo or 8 mono audio groups, or 4 stereo and 4 mono audio groups.
Additional VCA style grouping system.
16 outputs for multi-track or general purpose feeds.
Tracks can be fed from pre EQ, pre fader, post fader or direct output.
Pan to tracks.
Mono to tracks on stereo channels and groups.
2 main stereo or 2 main 5.1 surround outputs with Compressors/Limiters.
Simultaneous LCRS, stereo and mono outputs available from each 5.1 main output.
Every channel can route to every bus, at the same time, without restrictions.
Direct input available to group, mains, aux and mix-minus busses.

### System

On board Flash ROM memory system allows 99 full console snaphot or partial memories.
PC backup allows an unlimited number of memories.
Comprehensive GPIO facility.
Console operates independently of PC.
Independent DSP operation ensures audio continuity even during PC or control reset.
Console and racks boot from power on in less than 20 seconds.
Full control system reset in less than 15 seconds.
Last settings fully restored on power-up or reset.
Automatic change over to hot spares for PSU's, control cards and DSP cards.
All cards and modules are designed to be Hot Plugged.
All cards and modules are designed to initialise upon insertion.

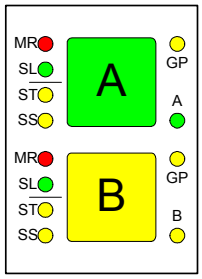
## IMPORTANT CONCEPTS

### Layering

Each fader can control two independent audio signal paths, named A and B. These signal paths can be either channels or groups, although for easy reference, the faders are simply known as channel faders. B signal paths are fully equipped with all the same facilities as an A path. The faders are motorised, so when switching between A and B, the fader will move to the correct position.

Less important signals can be placed on the B layer. Even then, only one button press is required to access them again. Using the ALL A and ALL B buttons is like moving to a different section of a single layer design. This arrangement allows more channels to be fitted into the space available in the frame.

### Assignable Control




Each fader has an Assign button for each audio path. The Assign buttons are labelled A and B for channel or group paths, and M1 and M2 for the main output paths on the main faders. Pressing the Assign button causes the central control panels (the Assign panels) to display and control the settings for that fader's channel, group or main path.

In this way a large number of controls can be accessed, for each audio path, from the central listening position. As there is less need to move around a large control surface, controls can be accessed more efficiently.

A number of controls and displays are also provided on a per fader basis, to allow important information to be even more easily available.

In addition to the above, the channel faders are assignable, in that the operator can choose which faders to use for the mono channels, which for the stereo channels, and which for the groups.

### Paths and Ports

On an analogue desk, the channel inputs are physical connections to the channel module or card. They are fixed. Channel 1's input is always channel 1's input (even though it may be possible to control channel 1 from a different fader). Every channel will probably have both a mic and a line input, even though most will only use one of them at any one time.

In a digital desk, there are two basic types of input: mic/line and digital. However, it is not necessary to provide both types for every channel, as only one input will be used at any one time. To provide both types for each channel would increase the cost, size and power consumption of the desk unnecessarily.

Instead, a "pool" of each type is available, plus an internal matrix to allow any of them to be connected to any channel. This provides more flexibility than is possible with analogue designs. The matrix can be thought of as an electronic patch-bay with the advantage that any connections made will be stored with the console's memories. A similar matrix and "pool" is provided for the outputs which is also stored with the memories.

Each channel can select from two inputs (1 and 2), which can be any combination of mic/line and digital. Both inputs can be set up independently, using separate input controls ( input gain, phase reverse, phantom power, etc). The switching between the two inputs takes place after these controls.

The basic terminology is that channels, groups and mains are referred to as “paths” within the digital processing system, and the inputs and outputs are referred to as “ports” through which the audio signals have to pass. Ports are connected to paths via the Matrix.

All ports are optional, including those for the monitoring. The system can be supplied with any combination of mic/line and digital ports. Calrec digital consoles are available in a number of configurations known as Audio Packs, which are a suggested complement of ports. The Audio Pack which most closely matches the requirements of the installation can be chosen, and the port quantities can be fine tuned appropriately.

**Port Labels**

During installation, all the ports on the system are labelled to match the studio wiring. Some rules are imposed on this labelling:

- Inputs and outputs should be labelled in pairs.
- The label must be no more than six characters (to fit on the console’s displays).
- The same label cannot be used more than once (but an input can have the same label as an output) - to avoid confusion.

Inputs and outputs are labelled in pairs for easier use with any type of signal; mono, stereo or surround. As digital inputs and outputs are wired in pairs and it makes sense to deal with all the inputs and outputs in the same way.

The system automatically adds a left (L) and right (R) suffix to the label to distinguish the two halves of the pair, or an LR suffix when the pair is used together.

The pairs can be used either for two mono signals, or a stereo signal, or parts of a surround signal. This includes the digital ports if the external circuit allows them to be used for two mono signals.

Those inputs or outputs which are dedicated externally to mono signals only (telephone lines, mono reverbs, mono distribution feeds, etc), can be specified as being mono. In this case, the two halves of the pair have separate labels and the L & R suffixes are not applied. Inputs and outputs labelled in this way cannot be connected in pairs to stereo paths.

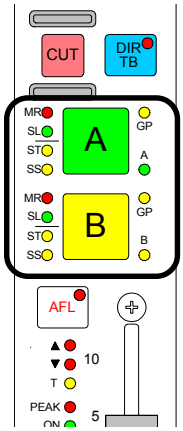
**Port Lists**

In addition to labelling, each port may be allocated to one of a number of lists during the Set up Application. This allows inputs and outputs which are wired for similar purposes to be grouped together for selection. There can be up to 12 lists for input ports, and up to 8 lists for output ports. Each list can contain a mixture of normal inputs or outputs (labelled in pairs) and inputs or outputs dedicated to mono signals. Each list is given a six character label, and automatically sorted alphabetically/numerically.

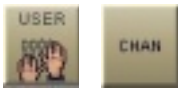
The lists can be sorted into the order in which they appear on the selection screens. The lists will appear in the same order on the Input/Output panel and I/O screens. It is possible to restrict the lists which appear on the panel using the Options - Misc screen. This reduces the number of times the pot needs to be pushed, to go through all the available lists. All lists are always available on the I/O screens.

## GETTING STARTED

As a safety measure, ensure that all faders are minimised, and the control room level control is no more than half way up.

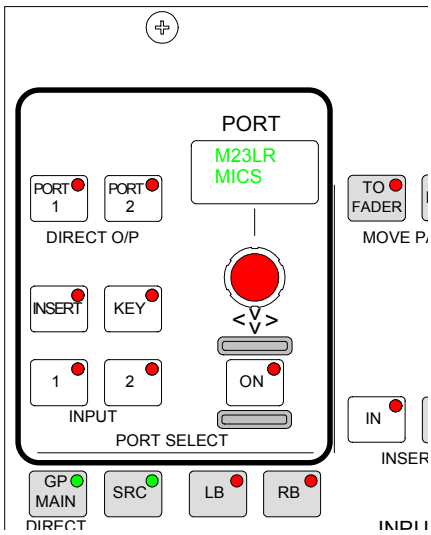



Assuming that the basic system ports have been set up and the control room monitor speakers are connected to the appropriate outputs, firstly choose a **channel fader** by pressing the A (or B) button on the channel fader module.


Next, go to the **USER-CHAN** screen by selecting USER and then CHAN on the touch screen. and, if a Path Type is not already indicated, select either the mono or stereo button to assign a mono or stereo channel to the fader, or select one of the group buttons to assign a group to the fader.

Connections are made using either the Input/Output controls or the I/O screens. Each fader can select between 2 inputs. Using the Input/Output controls, select Input 1 or 2 in order to assign a port to that input. Turning the selector control knob will scroll through the available ports. Pressing and turning the rotary control will scroll through other lists of available ports. Once you have arrived at the required port, press the ON button to connect it to the selected input (This is like inserting the patch cord).



Once Input 1 or 2 are selected on the Input /Output controls, the port assignment can also be carried out using the I/O screens.

Go to the **Input Ports Screen** by clicking **I-O** and then **INPUT**. 

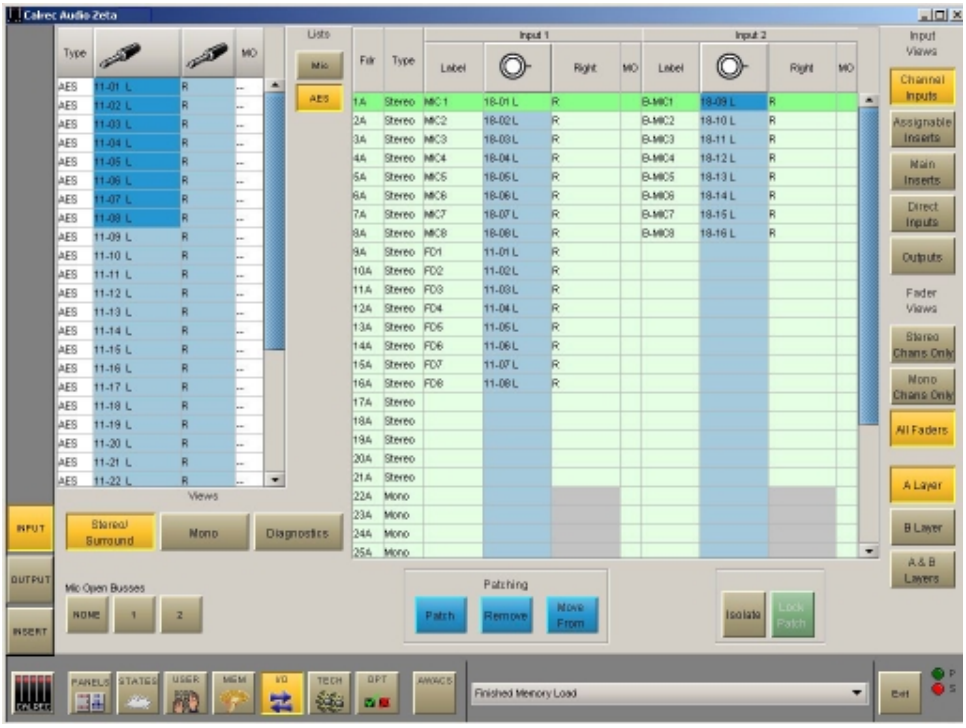

Connections are made by selecting:

- An Input Source  and...
- A Channel Input 

...and clicking PATCH. 


The Input Source label will appear in the label field and on the fader display on the console.

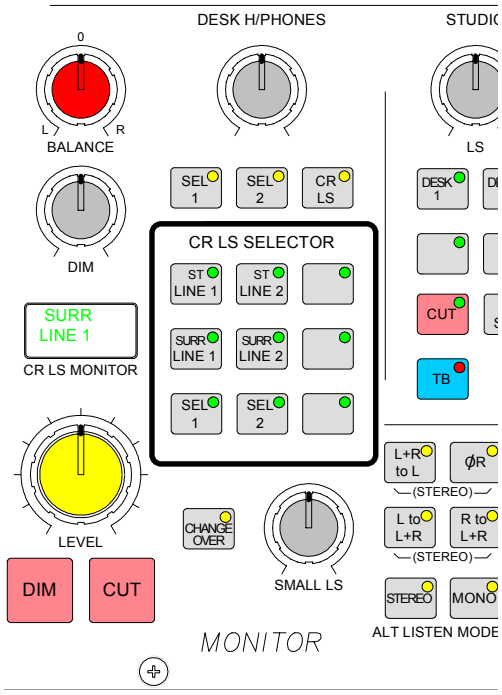
By clicking on one of the Name cells, the input name can be edited. The PC keyboard slides out from the front of the console.




You are now ready to use the channel as you would on any other desk. Set the Input Gain, Panning, etc, in the Input/ Output controls, the EQ and Dynamics on their panel, and route the signal to Main 1, using the routing controls.

Now fade up the Main 1 fader and select **ST Line 1** on the LS selector (**Monitor LS** panel). If the channel fader and LS volume controls are set correctly you should hear the signal.

Refer to the descriptions of the individual control panels and screens for a more detailed description.



## TOUCH SCREEN LAYOUT

The system is designed to minimise the need for the operator to use the screen once the console has been preset. A logical user interface provides easy and quick access to the functions and information on the touch screen. Failure of the screen's computer has no effect on the operation of the control surface or the audio.

The Front End screens are divided into groups which are accessed using the buttons along the bottom of the display. Within each group there are a number of screens accessed by buttons up the left side of the display. On some screens, there are additional buttons to access subsets of the screen's function.

Operational reproductions of EQ, dynamics and auxiliary controls. Input Delay controls.

Sets the current state of various functions (these are not stored with the user memories or options - only in the live (hidden) memory.)

Operational screens which enhance the controls on the console and for setting options which are stored with the user memories.

Memory control screens to supplement the panel controls.

Set up and display of all the I/O connections stored with the user memories.

Entry to and control of password-protected operational modes, trouble-shooting screens.

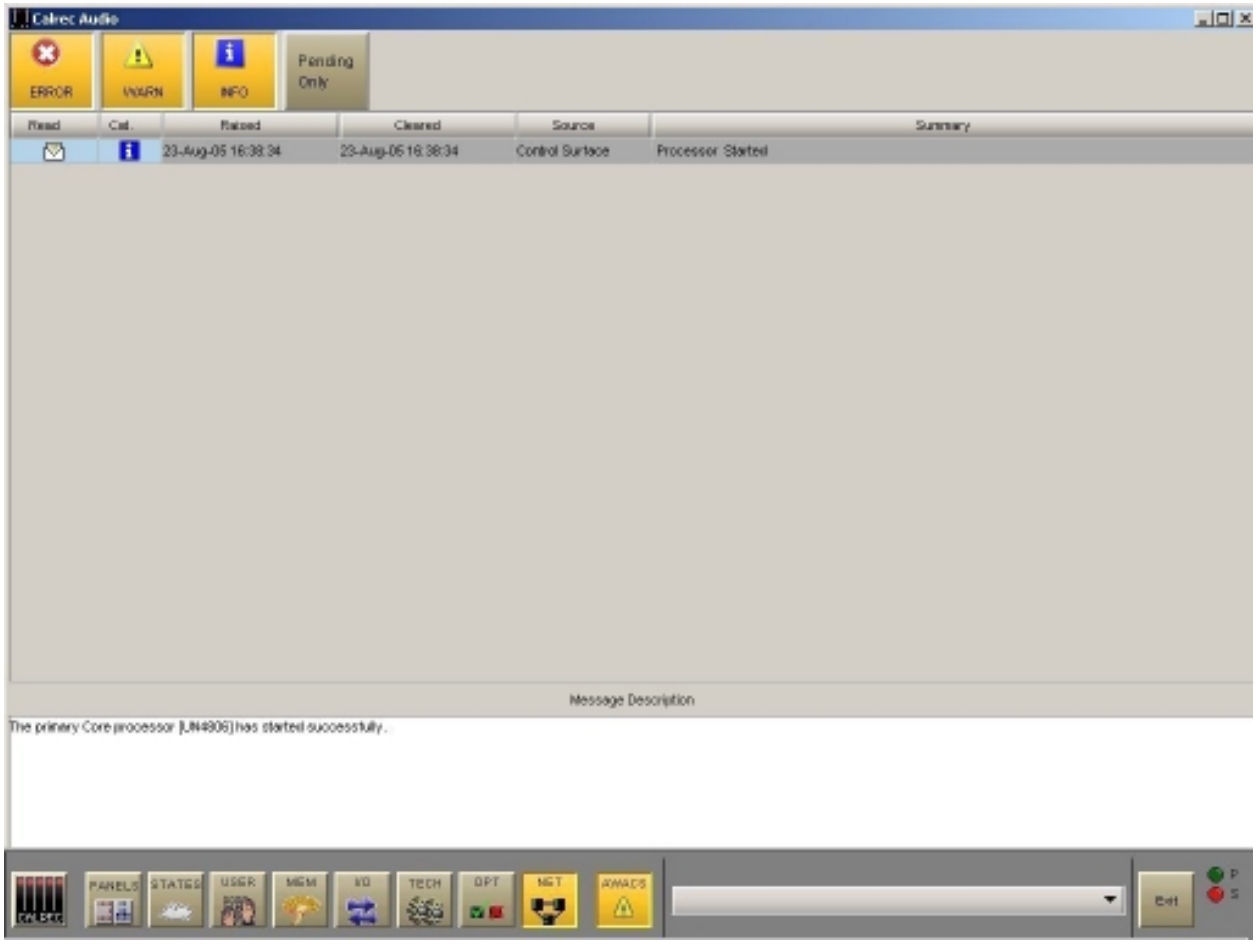
The Options screens are used to pre-set the system to the studio's required settings. Includes set up of monitor inputs, talkback and tone inputs, meter configurations, monitor panel configurations, serial interface and label associations, GPIO set up, and condition switching.

Options settings are not stored in the individual console memories but are saved and loaded separately using the buttons on each Options screen. This allows changes to be made without invalidating any saved memories. Changes to options take effect as soon as they are made, however if they are not saved, the next time the desk boots up the options will revert to their previous settings. Upon loading the options settings from the file on the hard disk, any changes made will be overwritten unless they have been saved. This allows changes to be tried without losing the original settings and the original settings can be restored without having to re-boot the system.

Screens for setup and control of an audio network system (Only visible if the Hydra audio networking system is installed).

The "EXIT" button at the bottom corner of the screen will exit the application. Next to this button are two indicators which show the status of the primary and secondary control processors. During normal operation, the primary processor will be in use, and its indicator will be green. When busy, the processor's indicator will be amber, during which time, no changes can be made to the control screens (Although changes to the control surface can be made, and will take immediate effect).

## ERROR MESSAGES (AWACS)


If a problem does develop, messages will be delivered on the Automatic Warning and Correction System (AWACS) screen. The AWACS button at the bottom of the screen will flash to alert the user that a message has been reported. Selection of this button will open the AWACS page, where messages can be viewed. Selecting a message will reveal a more detailed description. Message history is saved to the PC's hard disk for future analysis.

Three types of messages are reported:


Information messages, eg "Control surface processor started successfully"


Warning messages, where the system back-up has taken over


Fatal Error messages, where the system cannot recover by itself (perhaps because the back-up is already in use)

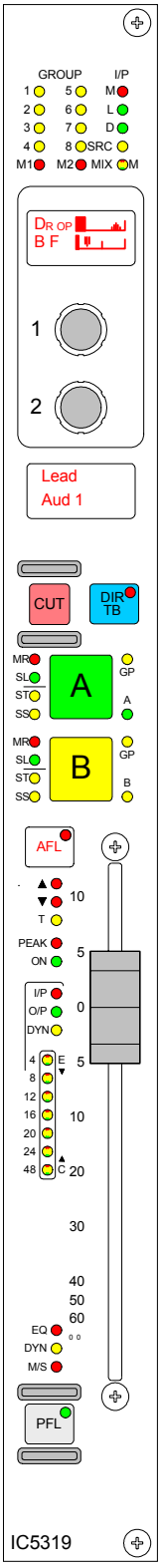
Because the system has many back-up features, it is possible to continue operating after errors are reported. If un-cleared errors are still present, an icon will flash in the AWACS button. Selecting this button at any time will switch back to the AWACS screen. Information messages can be cleared by selecting them and then leaving the AWACS screen. Warning and Fatal Error messages can only be cleared by clearing the error and restoring the system to its normal operational state.

It is also possible to set the PSU Fail Indicator button on the Broadcast Facilities panel, to flash when an error message is reported. This is set up on the Options - GPO screen.

# Fader Area




## CHANNEL AND GROUP FADERS




Channel and group paths are controlled by the console's faders. Any fader can control any channel or group path. Main paths have their own dedicated faders.

Each fader can control two independent audio signal paths, named A and B. The A and B buttons are used to select either of the channel paths. Selecting a path will "call" it to the Assign Panels and the button will light up. Any changes made to the Assign Panels will affect the selected path only. When switching between the two paths, the indicative displays and fader position will change to match the settings of each path.

The label in the display is the name associated with the input assigned to the path, or the group number if the path is a group. The input labels default to the Port ID but can be changed to a more suitable label using the I/O screens. Path A's label is shown in the top half of the display, and path B's label is shown in the bottom half of the display. The colour of the display indicates the active path. If path A is active, the label will be green. If path B is active, the label will be amber.

The CUT button's effect is the same as fading out the channel or group. Alternatively, there can be ON buttons instead, which switch the channel on.

Talkback is available to direct output using the DIR TB button. All Talkback buttons are subject to On-Air inhibits, set up on the TX/REH screen.

### Assign Button LEDs

- MR - The fader path is a master of a VCA style group.
- SL - The fader path is a slave within a VCA style group.
- ST - The path is a stereo channel or group.
- SS - This LED is not used.
- GP - A group is assigned to the path.
- A - Path A is active.
- B - Path B is active.

AFL will be heard in surround provided that surround panning is in use to a surround main, and the loudspeaker system is surround.

The ▲ and ▼ Null LEDs will only illuminate when the position of the fader knob is not the same as the level of the audio. For example, if a VCA Master is moved away from the `0' position, the null LEDs on the slaves will light. When illuminated they indicate whether the audio is above or below the position of the fader.

The T LED indicates that the console has recognised that the fader has been touched. The PEAK LED will light if the channel or group signal is within 3 dB of the clipping level. The ON led lights when the audio level is not at the ∞ position.

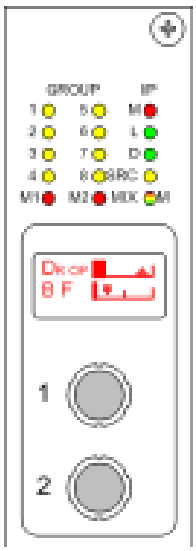
The fader bargraph can be set to display either the input level, direct output level or the amount of gain reduction being applied by the dynamics setting. This is selected using the USER-CHAN screen.

The EQ, DYN and M/S LEDs indicate that these functions are active (settings may be flat).

PFL is provided on the fader overpress and on the button. It will be heard on the PFL LS or the Small LS, depending on how these are set in the Set-up application. PFL will be heard on the main LS (stereo only) if PFL to Mon is selected on the States screen.

**Channel Control**

Situated above the channel fader, there is a set of indicative LEDs and two user-definable rotary controls (Wild controls) for each fader path.




A set of LEDs provide good visual feedback of :

- Routing to groups and mains
- The currently selected input type (mic, analogue line, or digital)
- If the Sample Rate Convertor (SRC) is switched in (for AES inputs)
- Whether the direct output is feeding the mix minus bus (indicated in red), and whether the direct output is being fed with a mix minus feed (indicated in yellow).

**Wild Controls**

There are two Wild controls per fader, to which Assign Panel rotary control functions for the selected path can be assigned. These include:

- Input Gain
- Pan and Balance
- Track Output Level
- EQ
- Aux Send Level
- Stereo Width
- Dynamics
- Direct Output Level
- Fader Level (opposite layer A or B)

Functions are assigned to Wild controls from the USER-CHAN screen. Once assigned, the Wild controls “FLIP” with the fader providing the same function for each of the two paths.

The fader for the alternate layer can be assigned to a Wild control. The colour of the Wild control display will show which fader the control is related to: Green for A, Amber for B.

**Wild Control Push-Switch Option**

If a wild control has Input Delay, Aux Send or Front Pan controls assigned to it, the user can control the ON/OFF or IN/OUT status of these controls using the Wild control push-switch. This feature is optional, so it can be enabled or disabled using the Options - MISC screen.

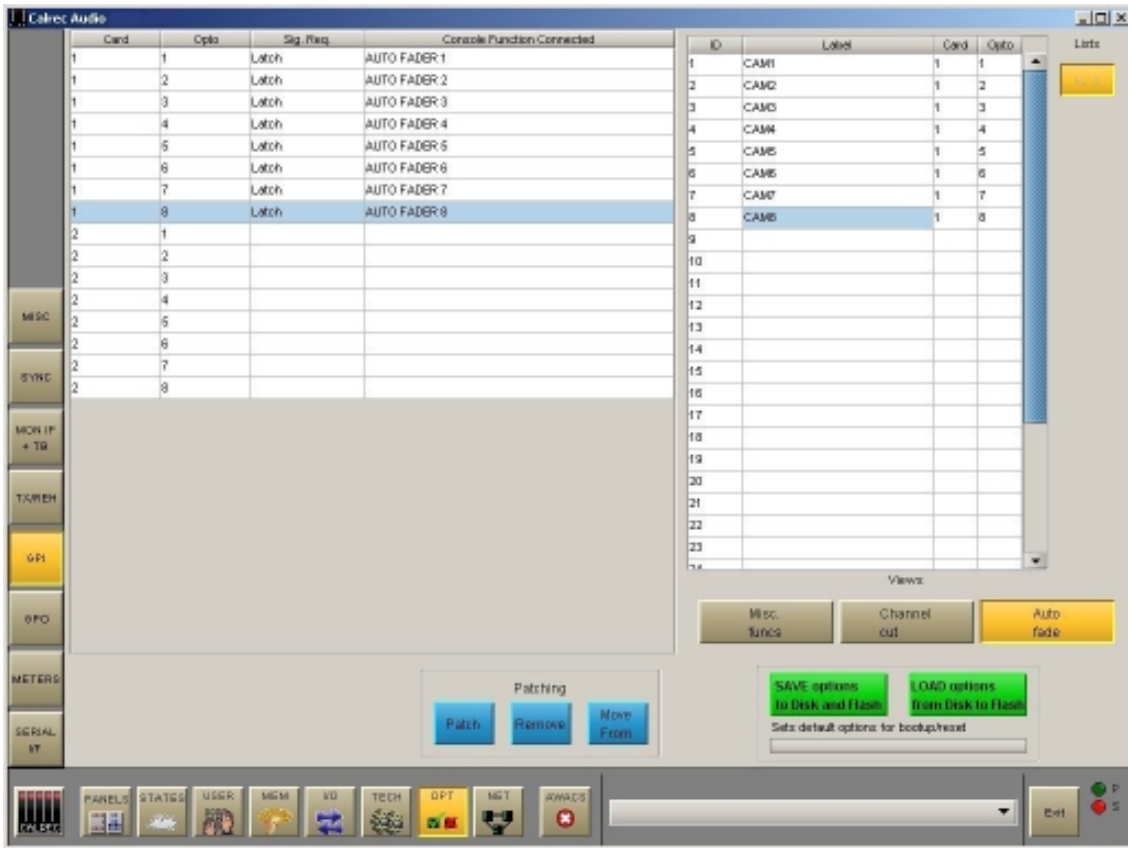
## AUTOMATIC CROSS-FADING

This feature allows the user to automatically fade channel and group faders in or out under the control of an external signal. Cross-fades may be achieved by driving two or more optos with one fader being faded out while a second fader is being faded in.

### Assignable Auto-Faders

32 assignable auto-faders are available. Each auto-fader provides the ability for one path to be faded up to and down from the current fader level.

### Assigning Auto-Faders to Opto Inputs

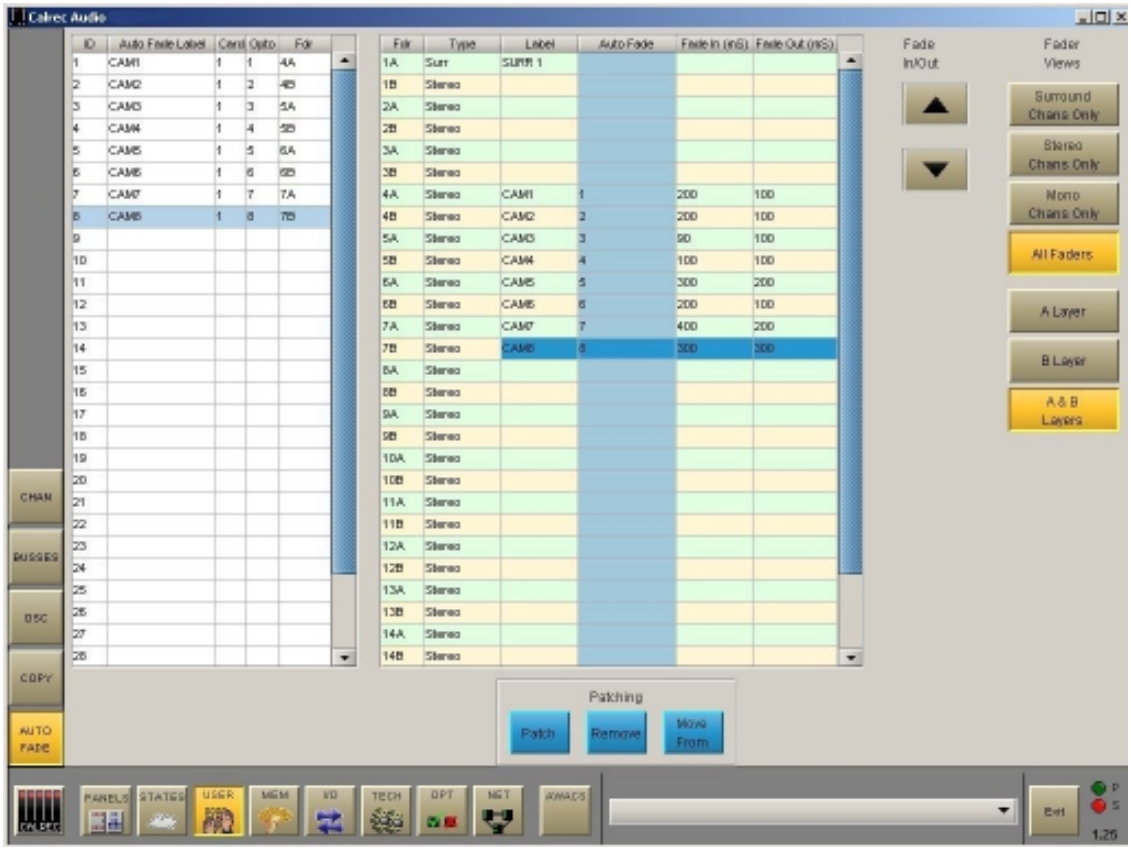




Each auto-fader can be assigned to any one opto input using the Options-GPI screen. Select an Opto from the available list on the left, and an auto-fader from the auto-fader list on the right, and then select "Patch". Each autofader has a 6 character user editable label.

### Auto-Fade Screen


The User-Auto Fade screen is used to allow assignment of each auto-fader to a channel or group fader. A list of auto-faders is on the left hand side of the screen, and shows auto-fader number, auto-fader label, assigned Opto card and circuit, and assigned fader number. Only faders with valid channel or group paths will be available for assignment although other faders may be displayed.

Auto-faders are assigned to channel and group paths by selecting an auto-fader and a channel or group from the available lists, and selecting "Patch".




**Fade In/Out Times**

The fade in and out times of each auto-fader are individually adjustable either by typing a value in the relevant cell in the fade in/out columns, or by using the nudge buttons. The range for both parameters are 10 ms to 5secs, as follows:

- 10ms to 100ms in 10ms steps
- 100ms to 1sec in 100ms steps
- 1sec to 5s in 500ms steps

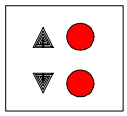
**Operation**

Once an autofader has been assigned to an opto input, and has a channel or group path assigned, it is possible to automatically fade in or out the assigned channel or group fader under the control of the assigned opto input. When the opto input is fired, the path connected to the opto will be automatically faded in to the current fader level (after taking into account any VCA fader adjustment). When the opto is not fired, the fader connected to the opto will be automatically faded out.

An auto-fader without an assigned opto will remain inactive, its operation will have no effect on the audio but it may still be assigned to a path.

**Indication of an Auto-Fade**

Indication of an auto-fade is provided by illuminating the down NULL LED on the fader strip when the fader is or is currently being faded out. If the current physical position of the fader is OFF then this will not apply. The down NULL LED will revert back to its original state as the path is faded back to its current position. If the path's fader is also a VCA master, the NULL LED operates only if the fader is in VCA interrogate mode thereby exposing the status of the slaved path.

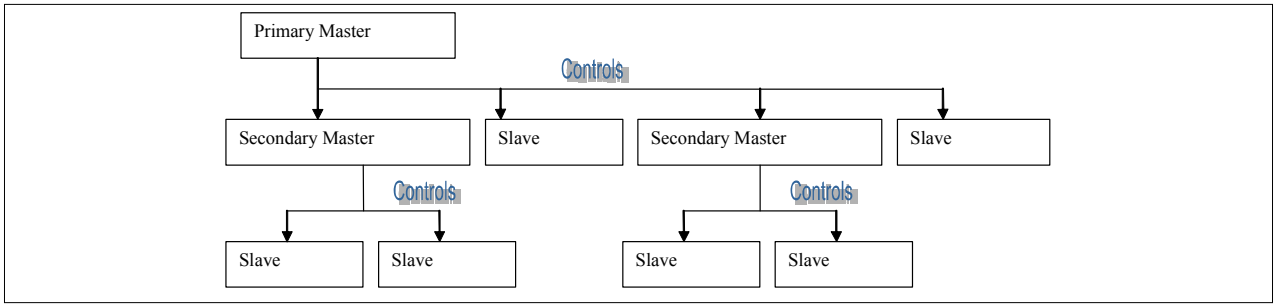


## VCA GROUPING

VCA groups allow the audio level, CUT, AFL and PFL functions of several slave faders to be controlled from one master fader. A VCA group is made or edited by holding down the Assign Button (A or B) of the fader to be master and pressing the Assign buttons of faders to be added or removed as slaves. The slave faders will not move when their master is adjusted, but the Null LEDs will illuminate to indicate whether the audio is above or below the position of the fader.

### VCA Masters as Slaves of another VCA Group

It is possible to select a VCA master as a slave of another VCA group. When this happens, the slave master is known as the secondary master, and its master is known as the primary master.




When the level of a primary master is adjusted it will change the audio level of its own slaves and the level of its secondary master's slaves by the same amount. Changing the CUT, AFL and PFL settings of a primary master applies the settings to the slaves, secondary masters and their slaves.

When the level of a secondary master is adjusted, the audio level of all its slaves changes by the same amount. Its adjustment will not affect the level of the primary master or its slaves. Changing the CUT, AFL or PFL of a secondary master applies the settings to the secondary master's slaves only.

The number of slaves in VCA group with a primary master would include all the primary master's slaves and the slaves of all its secondary masters. There can be up to 48 members of a VCA group.

A slave can be made into a secondary master by adding slaves to it. If a slave added to the VCA group is already a master, it will become a secondary master.

The MR and SL LEDs next to the Assign buttons on the fader strip indicate whether that fader is a master or a slave. A secondary master fader has both the MR and SL LED lit.

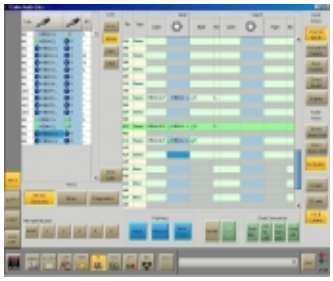
### VCA Group Interrogation

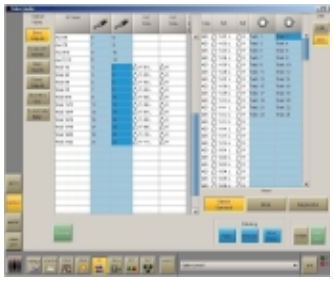
Interrogation provides a clear way of indicating VCA group assignments. Interrogation is performed by holding down the Assign button of a VCA group member, which causes the assign buttons of all members of the same group to light. Interrogation of a Primary Master will light the Assign buttons of its primary slaves and secondary masters. Interrogation of a secondary master will light the Assign buttons of its secondary slaves, and the primary master's Assign button will flash.

### Enabling VCA Group Editing


The editing of VCA groups can be enabled and disabled using the States screen. This provides protection against accidental changes.

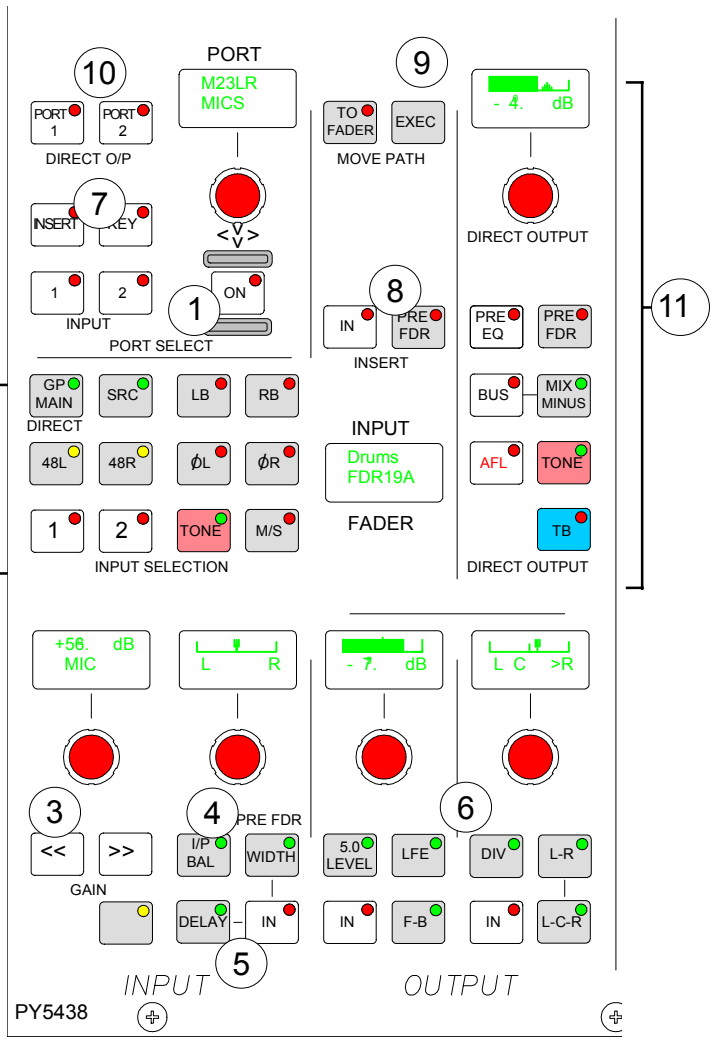
# Input and Output Controls



## INPUT/OUTPUT CONTROLS

The INPUT controls in the Input/Output section allow separate settings for the two channel inputs, port assignment and gain, and ON/OFF for the group and main direct inputs.




### (1) Input Port Assignment

Each channel path has two inputs. Ports are assigned to inputs for the currently assigned fader as follows:

- Press Port Select 1 or 2 to select an input. (Note: This does not switch the channel from input 1 to 2, or 2 to 1).
- Use the rotary control to scroll through the lists of available input ports.
- Upon reaching the desired input port, press the ON button to assign the chosen input port to the input 1 or 2.
- Pressing ON again will de-assign the port .

Port assignment can also be done on the I/O screens.

Pressing and turning the rotary control gives access to lists of other types of input port which are set up during installation of the console.

### (2) Input Settings

Input Selection buttons 1 and 2 select between the two available inputs for the selected path.

SRC switches the sample rate converter on AES inputs.

48L and 48R switch phantom power on mic/line inputs. 48L is used for mono channels.

LB and RB provide Left to Both and Right to Both on stereo channels and groups.

ØL and ØR buttons reverse the phase of the channel inputs. ØL is used for mono channels.

TONE switches tone to the input of the channel or group.

M/S converts a sum and difference (mono/stereo) input to left and right on stereo channels.

### (4) Input Balance and Width

With I/P Bal selected, the rotary control controls input balance on stereo channels. In this mode, when LB or RB are selected, the control acts as an input pan control. With WIDTH selected, the rotary control adjusts the width from mono, through stereo, to wide on stereo channels and groups. The control is switched in and out of the path using the IN button.

### (3) Gain Adjustment

Gain adjustment comprises 2 buttons for coarse ranging plus a knob for fine adjustment. Pressing both buttons at the same time sets the gain to 0 dB. For a group or main path, the controls set the gain of the direct input. Gain is adjustable from -18dB to +78dB for mic/line inputs, -18dB to +24dB for AES inputs, and ∞ to +10dB for direct inputs.

The gains of inputs 1 and 2 can be linked such that if either input's gain is adjusted, the change in gain is applied to both inputs. The lower and upper level endstops still apply, and are dependant upon the input type. If one of the inputs reaches an endstop during adjustment, this will stop both gains going any lower or higher. To link the gains, hold down one input selection button and then press the other. This function has to be enabled using the STATES screen.

### (7) & (8) Assignable Inserts

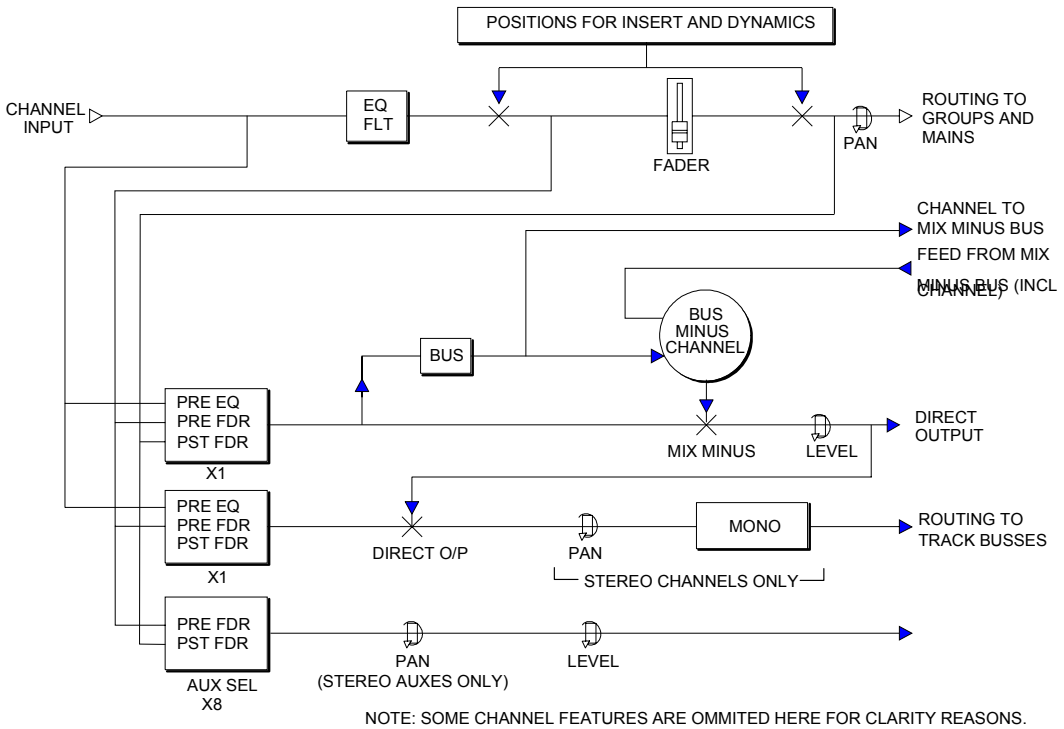
Pressing the INSERT button allows the rotary control and ON button to control assignment of assignable inserts to channel and group paths. Assignable inserts can then be patched in and out of the channel or group path, using the IN button. A button allows selection for the patch to be made pre-fader. The send and return ports must first be set up using the I/O screens.

### (10) Direct Output Port Assignment

Selecting PORT1 or PORT2 allows the rotary control and ON button to control assignment of 2 ports to channel and group direct outputs.

### (11) Direct Output and Mix Minus Buss

The channel or group's direct output can be Pre-EQ or Pre-fader using the selection buttons (It is post-fader with none selected), and its level is adjusted using the rotary control. BUS feeds the direct output signal to the mix minus bus. The output of the mix minus bus feeds back into the channel or group, where its own signal is subtracted. MIX MINUS then feeds the resulting signal to the direct output. Therefore, every channel and group can produce a mix minus output which is a mix of all the signals routed to the bus apart from itself. MIX MINUS and BUS are independent buttons, so the track routing selector and the direct output can be fed with the mix minus bus, even if the channel is not feeding the bus.




NOTE: SOME CHANNEL FEATURES ARE OMMITED HERE FOR CLARITY REASONS.

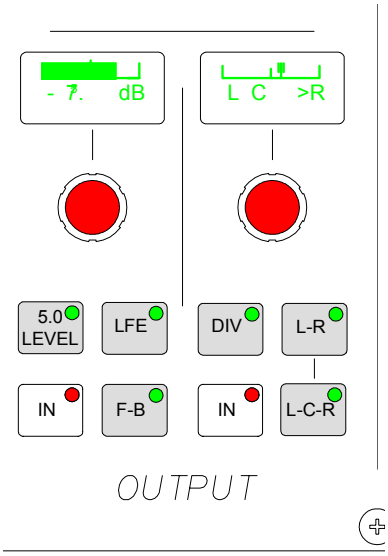
(3048-9)

### (6) Stereo and Surround Panning

Stereo and surround panning is provided for channels and groups. Signals can be panned to both stereo groups and 5.1 outputs simultaneously. AFL can be heard in surround, post the pan controls, if the main outputs and monitoring are surround.

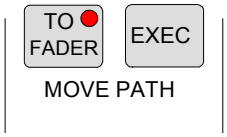
The L-C-R Pan allows the signal to be panned from left, through centre, to right.

The L-R pan pan allows the signal to be panned between L and R and Ls and Rs simultaneously. On stereo channels and groups, the L-R PAN acts as a balance control.



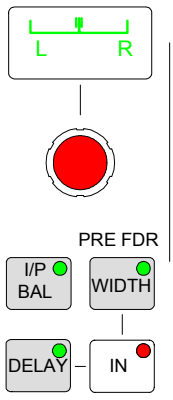

The LFE button allows the rotary control to adjust the level of the LFE independently of the rest of a surround signal. With 5.0 LEVEL selected, the control adjusts the level of all the surround legs except for the LFE. The 5.0 level is independent of the LFE level.

Divergence sets an amount of the centre signal to also feed to the left and right. Divergence does not operate on stereo channels and groups.




### (9) Moving Paths

Paths can be moved from one fader to another, using the MOVE PATH buttons. Select the fader assign button of the path that you want to move, and press TO FADER. Then select the destination fader assign button, and press EXEC. The two paths will swap over, and any Wild control assignments will move with them. Paths can also be moved on the USER-CHAN screen.




### (5) Input Delay

The delay button when pressed allows the rotary control, IN button and display to control adjustment of the Input Delay values assigned on the Panels-Delay Screen. These controls are in addition to the controls on the Panels-Delay screen.

Delay must first be assigned to an input using the Panels-Delay screen before the controls here can be used.

Input delay controls can be assigned to the channel fader's Wild controls. When this happens, the wild control's rotary push switch can be used to switch the delay in and out of the channel's path. This function is enabled and disabled on the Options-Misc screen.

## PANELS - DELAY SCREEN


This screen allows specific amounts of delay to be applied to each channel path. There can be up to 24 legs of delay available for channel assignment, depending upon which audio pack is used. Stereo channels use two legs. Each leg provides up to 1365 ms of delay.

**Assigning Delay to a Path**

Select the fader path either by pressing its assign button or by selecting it from the screen, then select ASS. The delay value is adjustable in 0.1ms steps using the rotary control, and 10ms steps using the nudge buttons. The RESOURCE USED display shows the number of legs assigned. The IN button switches the set value of delay in and out of the channel's path.

Delay resources can be assigned seperately to both input 1 and input 2 of each channel. The delay screen shows information relevant to the active input. When the delay is interrogated the fader assign button will light if either input 1 or input 2 has delay assigned.

Selecting INTER on the screen will indicate the channels which have delay assigned by lighting their fader assign buttons.

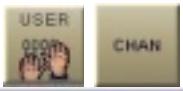
The selection buttons on this screen allow the information to be displayed in ms, PAL frames or NTSC frames. Changing the display units also affects the resolution of the delay shaft, nudge up and nudge down buttons accordingly.

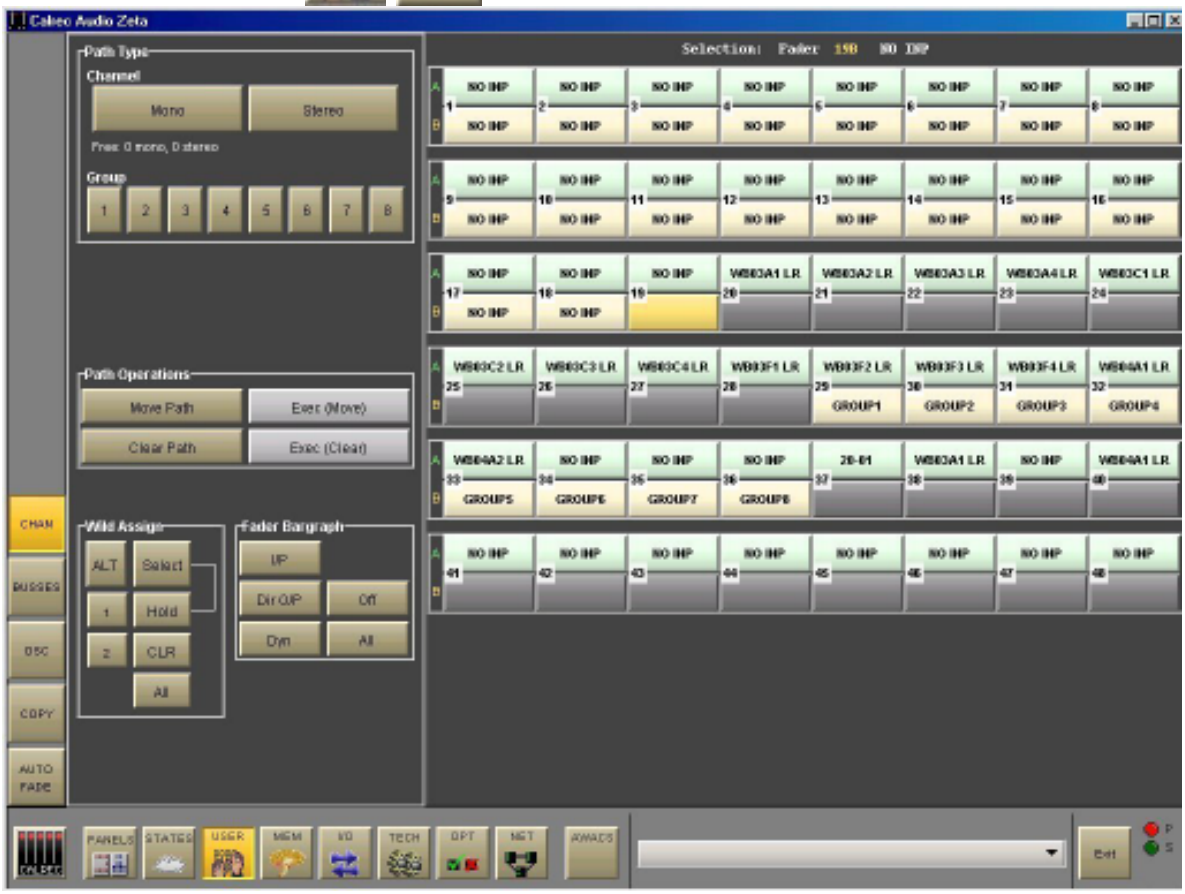
The Delay button in the Input/Output controls section allows delay values and IN/OUT status to be controlled from the control surface.

# Channel Controls




## USER-CHAN SCREEN




This screen provides controls for path functions, some of which are not available on the control surface. The right side of the screen shows the faders with buttons for paths A and B. To make changes, select the required fader either from the screen or by pushing its fader assign button. Then use the controls on the left side of the screen.

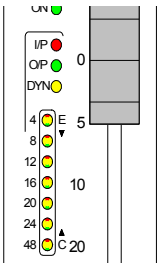
### Path Type Selection

The path type can be selected either as a mono or stereo channel using the mono and stereo buttons, or as a group, using the numbered buttons. Groups are designated as mono or stereo in blocks of four using the User-Busses screen.

### Moving or Clearing Paths

Paths can be moved or swapped from one fader to another, using the Path Operations controls. To move paths, select the assign button of the path you wish to move, and press TO FADER (the assign button will flash). Then select the assign button of the destination fader, and press EXEC to move the path. The two paths will swap over, and any Wild control assignments will move with them. To clear a path, select the assign button of the path you wish to clear, and select CLEAR PATH and then EXEC. Paths can also be moved and cleared using the controls on the Input Output panel.

### Fader Bargraph Assignment




The fader bargraph can indicate the level at the channel input (post the input gain, input switching and tone switching), the channel direct output, or the gain reduction of the dynamics. Buttons I/P, DIR O/P, DYN and OFF on the USER-CHAN screen will set the function of the fader bargraph on the currently assigned fader. If ALL is pressed first (flashes) all fader bargraphs will be set to the selected functions.

**WILD ASSIGN**


The Wild controls above each fader are assigned from the USER-CHAN screen. All the Assign panel rotary controls incorporate a switch which is operated by pushing the control. These switches are used to assign the control to a Wild control as follows:

- Select a fader path from the right side of the screen or by pressing its assign button (A or B).
- Select WILD ASSIGN 1, or 2 on the screen.
- Push one Assign panel rotary control. For example, Aux 1 Send.

.The control is now assigned and changes will show in the display. The colour of the Wild control display will show which fader the control is related to: Green for A, Amber for B. The two Wild controls “FLIP” with the fader, providing the same function for each of the two paths.

If the fader is touched instead of pushing a rotary control, then the fader for the alternate layer will be assigned to the Wild control.

The gains of the two inputs 1 and 2 can be assigned seperately to Wild controls, by holding down the required input button on the Input/Output panel before pushing the gain adjustment rotary control.

CLR will clear the selected Wild control from its assignment.

Auxiliary output controls cannot be assigned to Wild controls.

**Multiple Wild Control Assignment**

Wild controls can be assigned to multiple fader paths, either by selecting individual fader assign buttons (A or B), or by defining a “block” or “Region” of faders. The button above HOLD toggles between SELECT mode and REGIONS mode.

In SELECT mode, select Wild 1 or 2 on the screen and HOLD. Any number of fader paths can then be selected individually by pressing their fader assign buttons. Pushing an Assign Panel rotary control will then assign that control to Wild 1 or 2 for all selected fader paths.

In REGIONS mode, select Wild 1 or 2 on the screen and HOLD. A block or region of faders can then be defined by pressing the fader assign buttons of the first and last fader path in the required region. Pushing an Assign Panel rotary control will then assign that control to Wild 1 or 2 for all fader paths in the selected region.

CLR can be used to clear regions of faders of their wild control assignments.

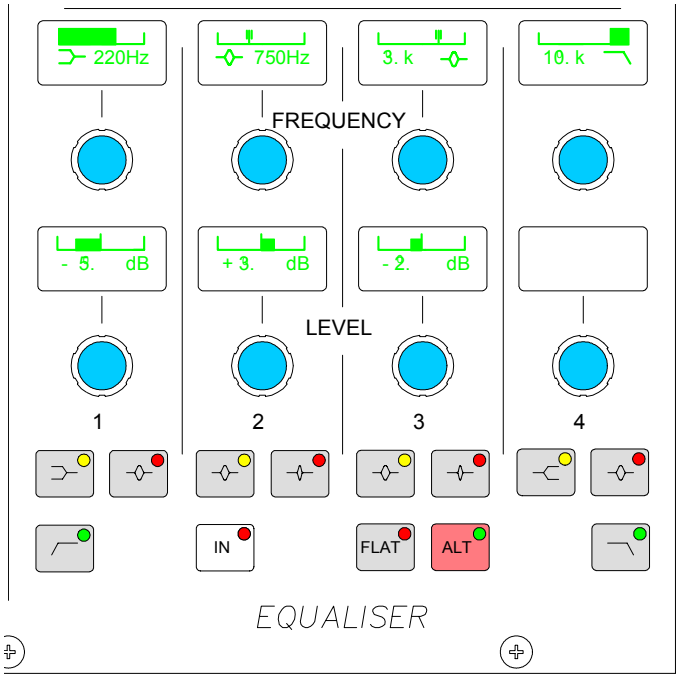
It is possible to assign the same control to Wilds 1and 2 for all fader paths by selecting ALL before pushing the required Assign panel rotary control.

If the Track output level control is assigned to a block of wild controls, each fader’s wild control will have a different numbered track output level control, beginning with the track currently selected on the first fader in the block.

**Alternate Wild Controls**

The ALT button will be visible if the Alternate Wild Control button option has been taken. This allows switching between two complete sets of alternate wild settings. This would then allow up to 4 available wild controls per fader.

## EQ AND FILTERS




The Equaliser section of the module controls EQ and Filters on the channels.

As console processing is not pooled, EQ is assigned to every channel, without fear of running out.

EQ level controls are adjustable by +/-15dB and are switched in and out of the signal path using the IN button. Bands overlap to allow greater flexibility of settings.

The currently assigned channel's frequencies can be adjusted using the following controls:

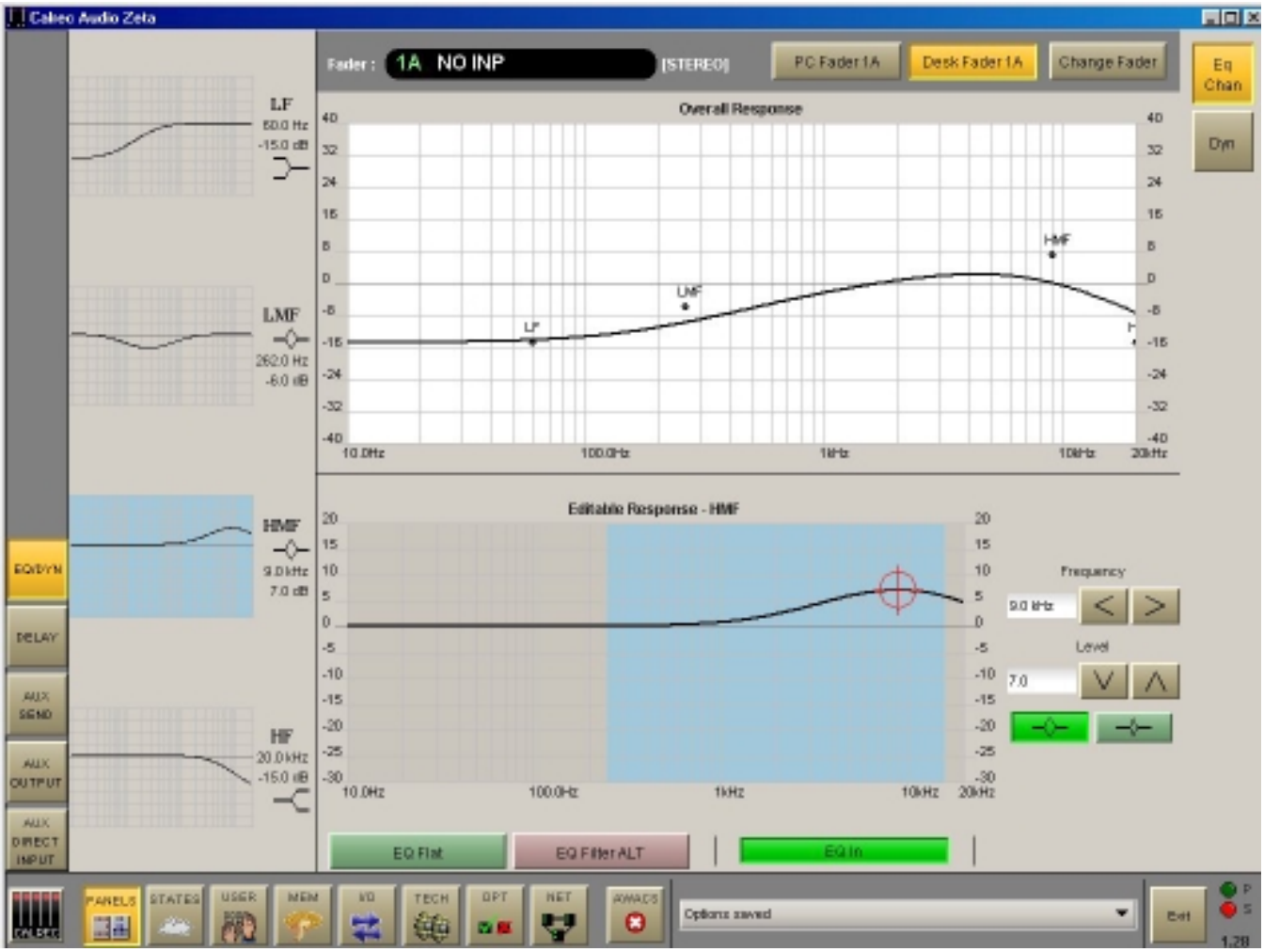
**LF** 20Hz to 470Hz, shelf, bell (Q of 1) or High Pass Filter (12 dB/octave).
**LMF** 50Hz to 3.2kHz, Q = 1 or High Q = 3.
**HMF** 250Hz to 16kHz, Q = 1 or High Q = 3.
**HF** 1kHz to 20kHz, shelf or bell (Q of 1) or Low Pass Filter (12 dB/octave).

The ALT EQ FLTR button allows switching between two complete sets of EQ and Filter controls.

EQ FLAT will clear any EQ settings to flat. The button must be pressed and held down, this prevents against accidental flattening of settings.

## PANELS - EQ SCREEN


The user can view and manipulate the EQ and filter response curves, using the Panels-EQ screen. All of the controls available on the EQ panel are also available on this screen. In addition, the user can choose whether to control the EQ and filters of the currently assigned fader path, or to select a different fader, known as the “PC Fader” to which EQ and filter settings can be applied independently of the current assignment.




The required band is selectable from the left side of the screen. When selected, that band’s response curve is shown in the Editable Response window, with the adjustable area highlighted in blue. Its frequencies can be adjusted using the touch screen, or trackball, by selecting the crosshair and moving it around within the editable area. As it moves, the frequency and level values of the selected path (or PC fader path) will change. Nudge buttons to the right of the editable response window can also be used to make adjustments.

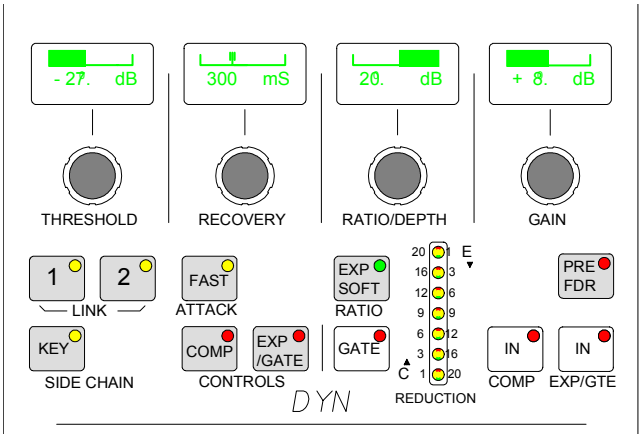
The overall response window shows the overall response curve for the selected path. The curve itself is only visible if EQ is switched into the path.

## DYNAMICS

The Dynamics section of the module controls the side chain, providing a Compressor/Limiter and Expander/Gate on channels, and a Compressor/Limiter on groups and main outputs

The COMP and EXP/GATE buttons switch the controls between the two functions. The IN buttons switch the Compressor/Limiter and Expander/Gate in and out of the signal's path.

As console processing is not pooled, dynamics are assigned to every path, without fear of running out.




The currently assigned path's dynamics can be adjusted using the following controls.

### Compressor/Limiter:

Threshold +20dB to -20dB
Recovery 75ms to 4 sec + AUTO (Max anti-clockwise setting)
Ratio 1 to 50 (Limiter)
Fast Attack = 250µs (normal 5ms)

Make up gain between 0dB to +20dB can be applied.

### Expander:

Threshold 0dB to -40dB
Recovery 75ms to 4 sec + AUTO (Max anti-clockwise setting)
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)
Ratio 2/1 or SOFT

### Gate:

Threshold 0dB to -40dB
Recovery 75ms to 4 sec + AUTO (Max anti-clockwise setting)
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)

### Dynamics Linking

It is possible to have the dynamics of many channels linked by assigning them to one of two available link busses. This is useful for when the same dynamics settings need to be applied to more than one channel. With the channel selected, press 1or 2 to assign the channel to the bus.

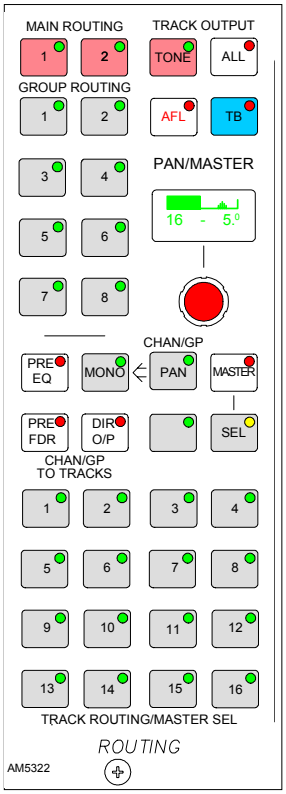
## PANELS - DYNAMICS SCREEN


The user can view and manipulate the dynamic response, using the Panels-Dynamics screen. All of the controls available on the dynamics panel are also available on this screen. In addition, the user can choose whether to control the dynamics of the currently assigned fader path, or to select a different fader, known as the “PC Fader” to which dynamics settings can be applied independently of the current assignment.


Compression or expansion settings can be adjusted using the touch screen, or trackball, by selecting the required crosshair and moving it around within the editable area. As it moves, the values will change. Nudge buttons to the right of the editable response window can also be used to make adjustments.

The dynamics response is only visible if dynamics is switched into the path. Otherwise, it remains flat.

## ROUTING




Routes to tracks, groups or main outputs for the selected channel can be made or removed by pressing the numbered buttons in the routing section of this panel.

### Track Output

The Track Output section controls the output to the multi-track, after the track mix. The 16 track outputs can also be used as IFB or general purpose bus outputs.

The track output being controlled is selected by pressing SEL plus the required track routing button 1-16. Tone or Talkback can be fed to the selected track using the TONE and TB buttons. ALL makes the control a Master, controlling all the tracks at once.

The CHANNEL/GP TO TRACKS section selects the signal feeding the track routing selector to be post-fader (All OFF), pre-EQ, pre-fader or a copy of the direct output (post the mix minus and direct output level controls).

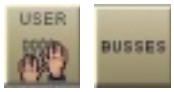
Pan (Balance on stereo channels and groups) pans the signal between odd and even tracks. Mono (on stereo channels and groups only) makes the signal mono after the pan.

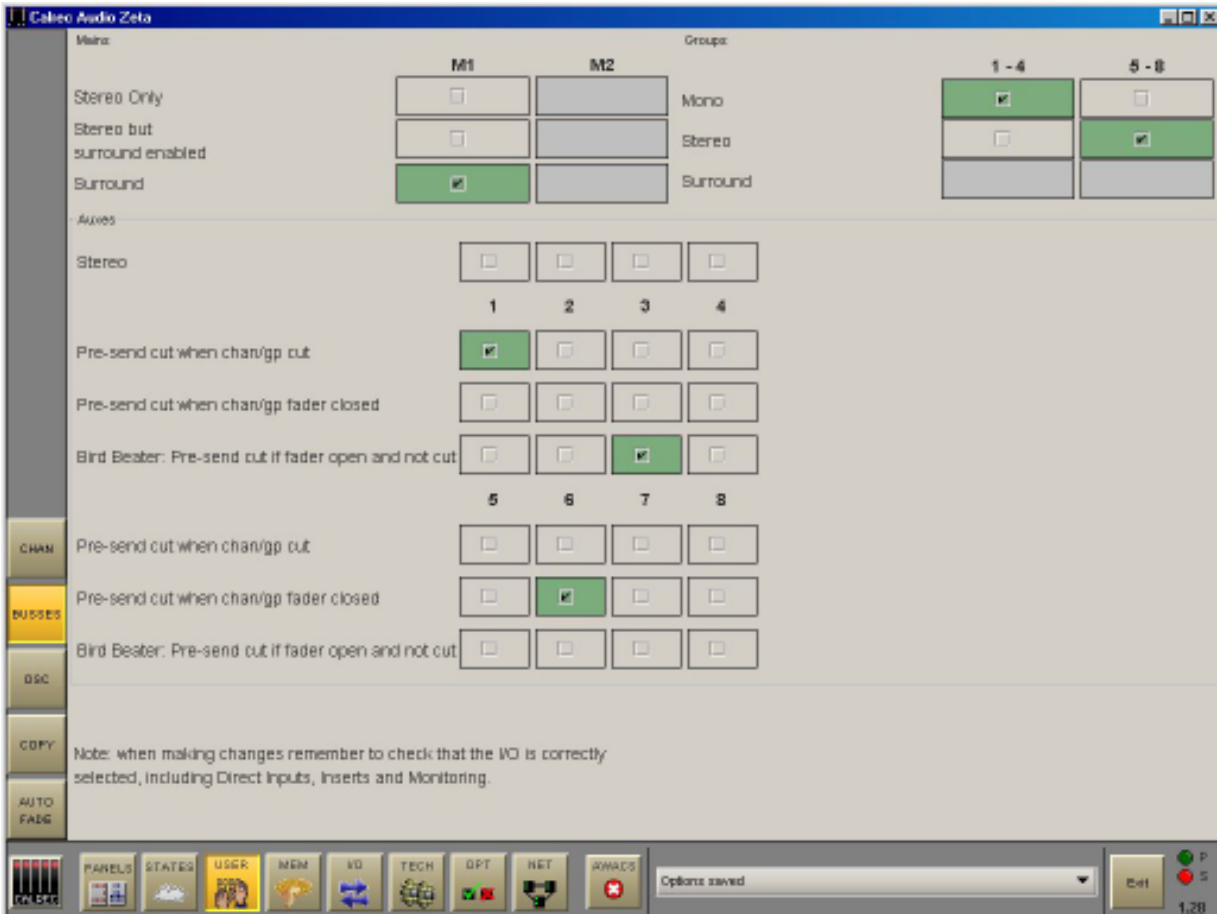
### Interrogate Mode


It is possible to discover which fader paths are feeding each of the routing busses by putting the panel into “Interrogate” mode. This is done by pressing the INTER button in the Auxiliaries section. If any of the routing buttons (Groups, Mains, Tracks) buttons are held down, the fader assign buttons of all the paths feeding that bus will light. auxiliary and mix minus busses can also be interrogated in this way.

When in Interrogate mode, it is possible to add or remove paths to and from the bus under interrogation. With the required routing button held down, simply select or de-select the path by pressing its fader assign button. This is known as “Reverse Routing”.

## USER - BUSSES SCREEN




**Mains**
The two main outputs can be set as stereo only, stereo but surround enabled or surround. Both main outputs must be the same.

**Groups**
Grroup busses can be selected to be mono or stereo in blocks of four. Stereo channels feed a mix of left and right to mono groups. Mono channels pan L/R to stereo groups.

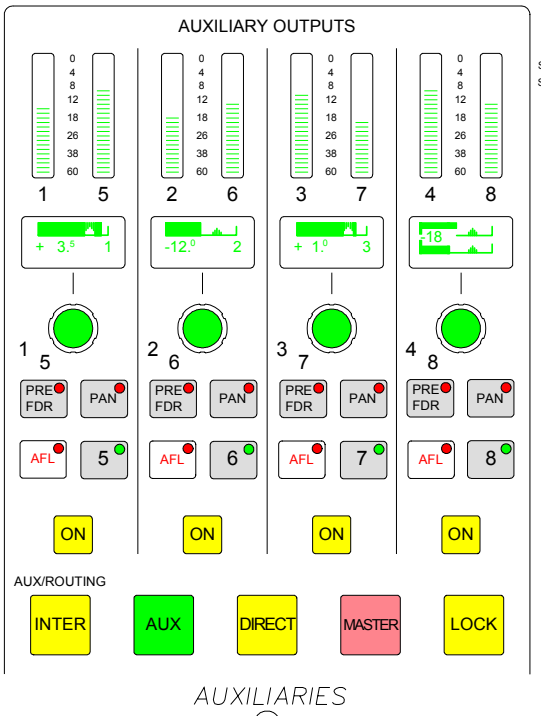
**Auxiliary Busses**
8 mono auxiliary busses can be paired up to make 4 stereo busses. When a pair of auxes are changed in this way, all settings of the pair are cleared.

**Pre-send Cut**
Options are available for the pre-send to be cut :

- when the channel or group is cut
- when the channel or group fader is closed
- when the fader is open and not cut (Bird Beater). This option cancels the other two pre-send cut options.

The bird beater option mutes the auxiliary pre-fader send when it's fader is open and not cut. Therefore, closing the fader or using the cut switch enables the auxiliary pre-fader send. One use of this feature is to give the producer a feed to the "cue speaker" when the announcer or commentator microphones are closed during a commercial or other break in a live broadcast.

## AUXILIARIES




There can be 8 mono or 4 stereo Auxiliary output busses. They are pre-set to be mono or stereo using the User - Busses screen. If, for example, aux 4 is set to be stereo, then aux 8 will not be available (and Aux 8 will not work on the monitor selector).

On mono auxiliaries, buttons 5 to 8 switch the control to that numbered aux send.

The **ON** buttons switch the feed to the Aux on. Each feed can be pre or post the channel or group fader.

The bargraphs at the top of the panel display the Aux output levels.

**PAN** makes the control into a Pan control (balance on stereo channels) if the Aux is stereo. Any pan offset will be shown as an offset between the two bars of the display when controlling the level.

INTER — This latching button puts the panel into Interrogate mode. If the Aux ON buttons are held down, the fader assign buttons of all the paths feeding that bus will light. It is also possible for interrogation of the routing busses to take place by holding down any of the routing buttons (Groups, Mains, Tracks).

**AUX, DIRECT, MASTER** and **LOCK** influence the function of the controls.

AUX — When AUX is selected, these controls adjust the feeds from the channels or groups to the auxiliary output busses.

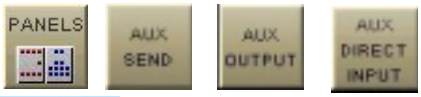
DIRECT — When DIRECT is selected, these controls adjust the auxiliary direct inputs. The pre fader and pan controls will be in-operative.

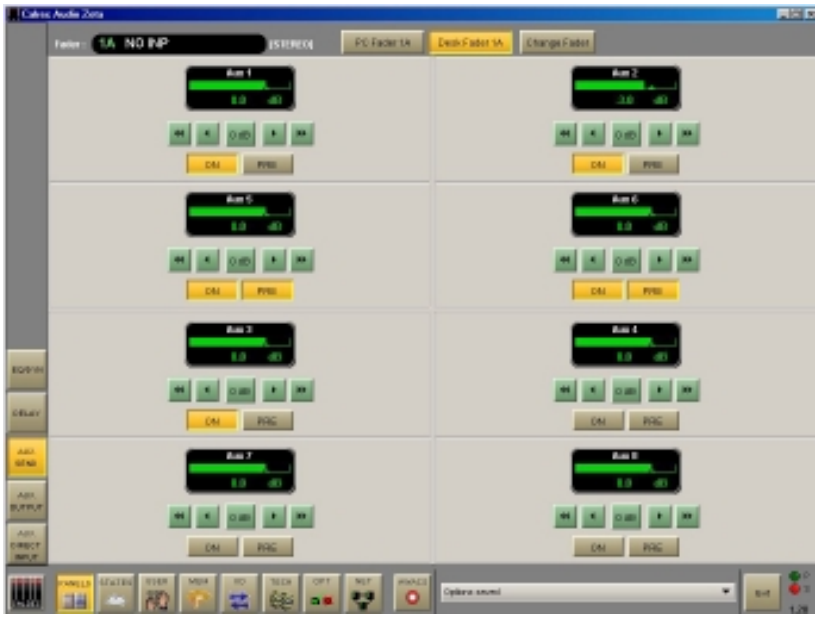
MASTER — When MASTER is selected these controls adjust the auxiliary outputs. On stereo auxiliaries a dual level display will be shown. There cannot be a level offset on the output display. The ON buttons switch the output on and off. Please note that auxiliary output controls cannot be assigned to the wild controls on the fader strip.

LOCK — Locks the panel into MASTER mode. If LOCK is not selected, the panel reverts to AUX mode if a fader assign button is pressed.

When DIRECT or MASTER are selected, the displays above each rotary control show a bargraph of the gain, and what is being controlled (e.g O/P or DIR) . This remains until they are adjusted, when the dB value of the gain is then displayed. A short time after the adjustment has been made, the display will show the bar and label again.

## PANELS - AUXILIARY CONTROL SCREENS



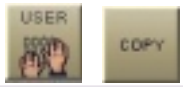


The user can view and adjust the Auxiliary send and output controls using the Panels - Aux Send screen and Panels - Aux Output screen. All of the auxiliary controls available on the control surface are available on the screens.

In addition, the user can choose whether to adjust the Aux send and output settings of the currently assigned fader path, or to select a different fader, known as the “PC Fader” to which aux send and output settings can be applied independently of the current assignment.

A similar screen exists with which to control the Aux direct input.

## CHANNEL COPY





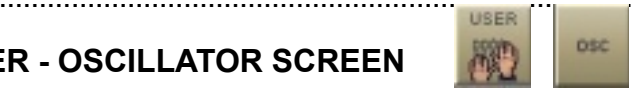
Eight sections of a channel or ALL together can be copied to another channel or channels using the User-Copy screen. First select the fader path you wish to copy, by pressing its fader assign button.

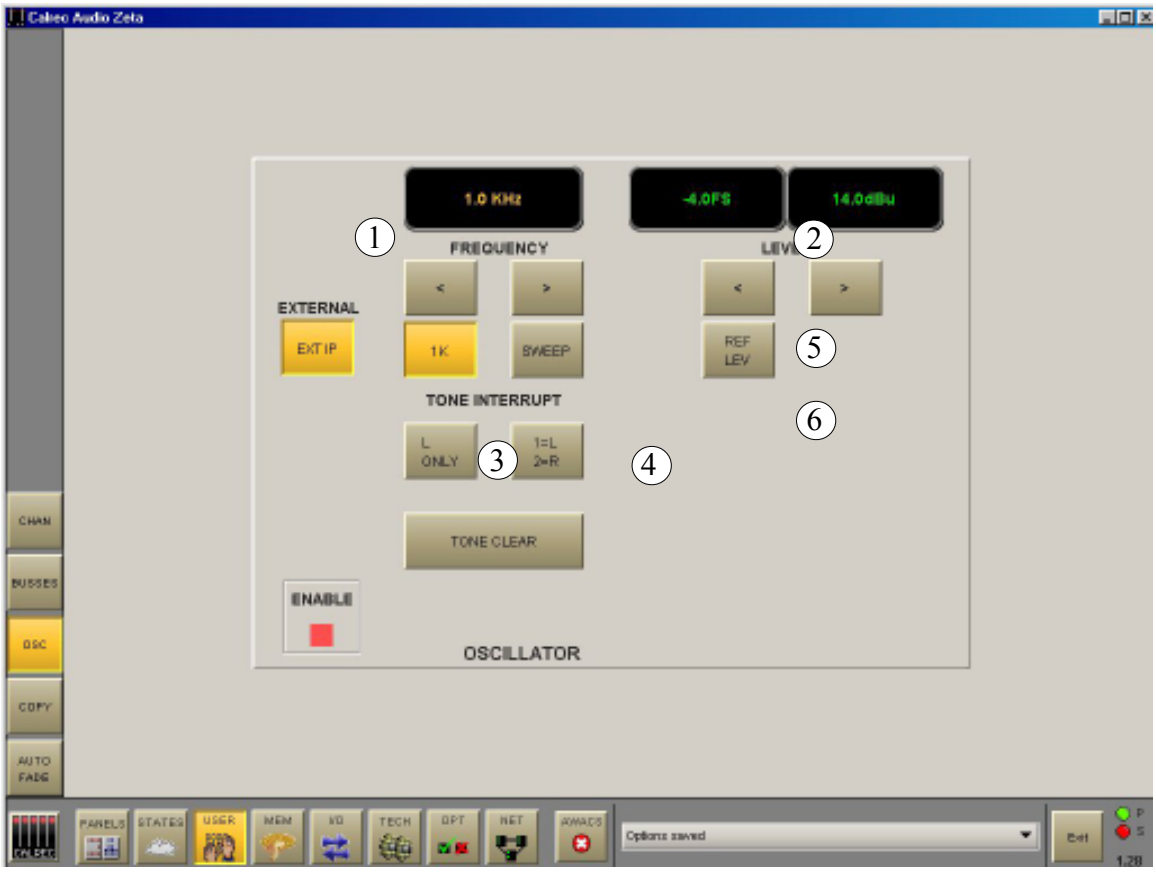
Use the selection buttons to select the controls you want to copy. Pressing TO FADER (flashes) then allows the destination/s to be chosen. Destinations are chosen by selecting fader assign buttons, or using the ALL A or ALL B buttons. Once all destinations have been chosen, EXEC executes the Copy.

If a stereo channel's settings are copied to mono channels, only the relevant settings are copied. Other settings on the mono channels will be reset to the cleared down state. Any groups or main outputs included in the selected destinations will be ignored.

- I/Ps copies LB, RB, ∅L, ∅R, M/S and balance settings (only ∅ for mono channels) for inputs 1 and 2, and also the input gains, SRC or phantom power when inputs are of the same type.
- EQ/FLTR copies EQ and filter settings (includes IN/OUT, Alternate and CH/DYN settings).
- DYN copies the dynamics settings but not whether the EQ or filters are switched in the dynamics.
- PAN copies pan and width settings as appropriate.
- FDR copies fader and CUT settings, but not PFL/AFL or VCA group assignments.
- RTG copies the routing to main outputs and groups but not the routing to tracks.
- AUX copies the routing and levels to the auxiliaries.
- WILDS copies the Wild assignments but not their settings.
- ALL copies all of the above.

## USER - OSCILLATOR SCREEN




The Oscillator controls are used to generate test tones for alignment and testing.

**(1) Frequency**
The frequency of the tone can be adjusted from 20Hz to 20KHz in  in incremental steps using the nudge buttons, or set to 1KHz using the 1K button.  Alternatively, the sweep button will set the oscillator to sweep through all frequencies.

**(2) Level**
The level of the test tone can be adjusted from -60dBFS to 0dBFS using the nudge buttons, or set to the reference level using the REF LEV button.

**(3) Tone Interrupt**
The Tone Interrupt buttons are useful for testing stereo paths. They allow the tone to be interrupted on the left side only, or on the left and right sides in an alternating pattern.

**(4) Clearing Oscillator Routes**
CLEAR clears all oscillator routes made, providing an easy way of removing test tones from all paths.

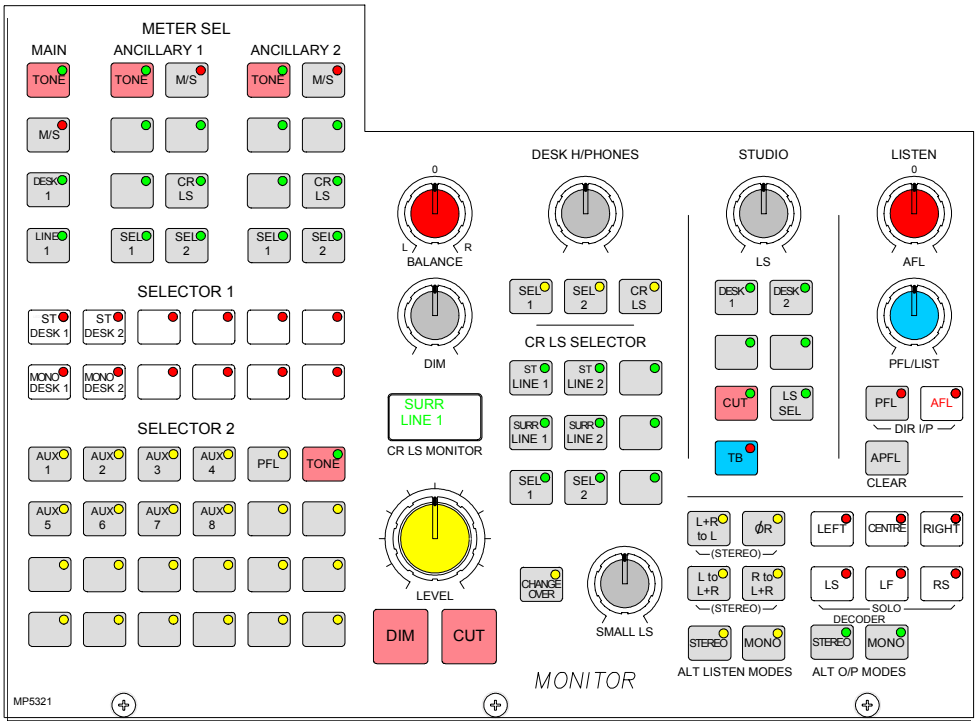
**(5) External Input**
EXT I/P replaces the tone with a mono or stereo external source of your choice. This allows for external oscillators to be used if preferred.  The ports for this are set up on the OPTIONS - MON TB & TONE screen.

**(6) Enable Indicator**
The Enable indicator shows that the Oscillator controls are enabled.

# Monitoring, Main Outputs and Console Functions




## MONITORING, METER SELECT AND LS CONTROL




The Monitor Selector is used to select the source to monitor, and the Meter Selector is used to select what to display on the meters. If the loudspeaker system is surround, stereo and mono sources will still be heard in stereo and mono, with no signals on the other speakers. Selector 1 and Selector 2 are sub-selectors which feed the other selectors. All selector external inputs can be mono, stereo or 5.1. Mono inputs are fed to L and R.

For surround signals to be monitored using stereo loudspeakers or metering, a stereo downmix is created in the monitoring. If a main output is surround, the stereo monitor buttons for that main output will monitor the stereo (downmix) output of that main output. The surround monitor buttons for a stereo main output will be disabled.

The Small LS level control is in series with the Main LS level control. The “change over” button diverts the monitor output to the Small LS for near field, or domestic check monitoring. Both Main and Small LS can be stereo, 3 stereo, or 5.1 independently.

DIM, CUT and SOLO operate on both sets of loudspeakers. DIM and CUT can be externally operated and controlled from the TB.

AFL (post the surround panning controls) feeds the Control Room LS outputs , overriding the LS SEL. PFL is available on Selector 2, or alternatively, there can be a separate stereo PFL LS output. An external RTB input can mix with PFL to the PFL LS output. APFL CLEAR, clears any latched buttons.

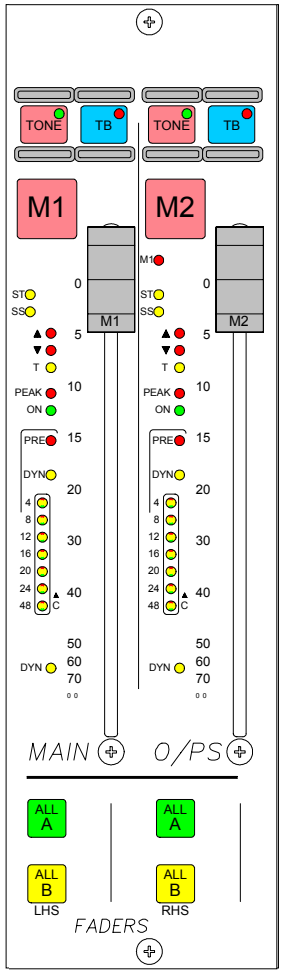
### Alternative Listening Modes

All off indicates NORMAL (mono, stereo or surround depending on the source selected and the LS arrangement). ØR, L+R to L, L to L+R, and R to L+R will work in any mode, but are really designed for use in STEREO mode or when monitoring stereo sources. MONO feeds L, C, R, LS and RS to L and R.

### User-Definable Buttons

Monitor sources can be allocated to the user-definable buttons on this panel, using the Options-MON, TB + Tone screen. This can only be done in Technician Mode.

## MAIN OUTPUTS




Unlike channel faders, the main fader design is not dual path.

The ASSIGN buttons (M1, M2) call main output 1 or 2 to the Assign panels to allow:

- Routing of one Main to another.
- Insert ON/OFF.
- Control of the Compressor and direct input.

### Surround and Stereo Main Outputs

Both main outputs can be pre-set to be either surround or stereo. Surround mains are 5.1 plus a rear downmix to allow a simultaneous LCRS. There is also a stereo downmix and a mono downmix (potentially 10 outputs for each surround main). The insert and direct input are also surround.

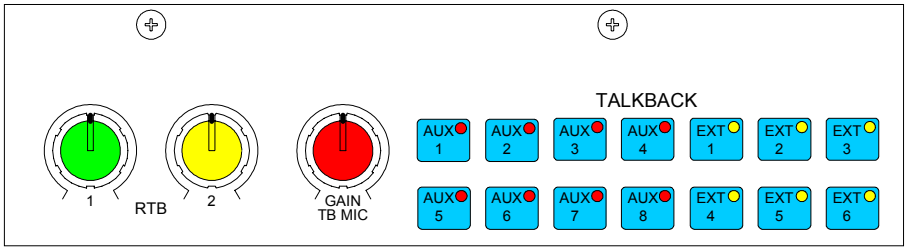
The function of the fader bargraph can be set to display either the pre fader level or the amount of gain reduction applied by the Dynamics setting.

### Faders Section

The ALL A and ALL B buttons switch all the channel faders to display either their A path or their B path. Using the ALL A and ALL B buttons is like moving to a different section of a single layer design.

## TALKBACK

Talkback is available to all 8 Auxes and 6 externals (via GPO switching) using the buttons in this section. Talkback is also available using the buttons on the fader modules, the Input/Output section and the Track output section, to direct outputs and individual tracks. Talkback is available to Studio LS using the button in the monitor selector section.



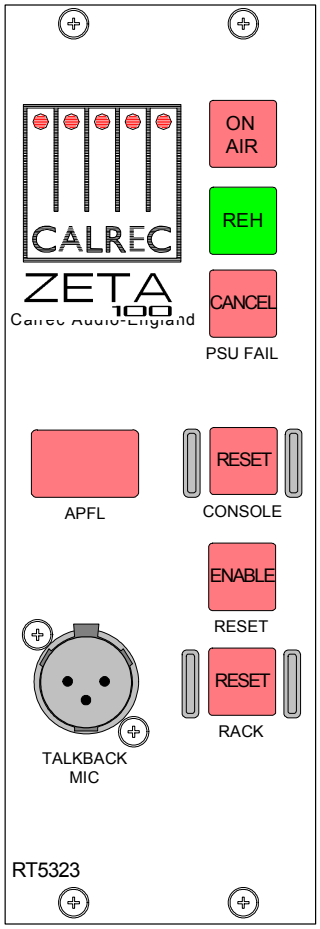

Talkback inputs are patched using the Options - MON TB + Tone screen.

All Talkback buttons are subject to On-Air inhibits, set up on the Options - TX-REH screen.

The GAIN control sets the level of the TB Mic.

2 rotary controls set the level of 2 RTB (Reverse Talkback) signals.

## BROADCAST FACILITIES




This module controls the Transmit/Rehearse state of the console; allows rack and console reset, and houses the connector for the Talkback microphone.

### Condition Switching

There are three modes which the system can be in: Transmit (TX or On Air), Rehearse, or neither. These are controlled from the ON AIR and REH buttons on this panel, or from external inputs set up on the Options-GPI screen.

The OPTIONS-TX REH screen allows the condition switching for the system to be set up. Functions can be set to be active, or not, in any of the three states. This can significantly reduce the risk of human error, making the whole system a more robust, less stressful, user friendly environment for operators to work in.

### Console and Rack Reset

The Console Reset button resets the control system only. Independent DSP operation ensures audio continuity during console reset. The most recent console settings will be fully restored in less than 15 seconds.

The Rack Reset button reboots the racks only, without affecting the control surface.

As the console operates independantly of the PC, rebooting or failure of the PC will affect neither the audio nor the operation of the console.

### Power Supply Monitoring

The rack mounted Power Monitoring and Distribution module monitors the power supplies for failures and ensures “hot” changeover to the spare should a fault develop. The PSU FAIL Indicator/Cancel button on this panel will flash if any one PSU fails (the hot spare PSU would prevent the desk from being affected). Pressing this button will change the flashing to a steady lit condition. In this mode, in the unlikely event of a second PSU failing, the light will begin to flash again.

The PSU Fail Indicator can be set to flash when an AWACS message is received. This is done using the Options-GPO screen.

## CONSOLE FUNCTIONS

The console function buttons provide an easy way of clearing down console settings. These buttons are located above the meter selector controls.


CHANNEL CLEAR - Clears the currently assigned channel from all settings apart from the port assignment.


CHANNEL AUX CLEAR - Clears the Auxiliary send settings for the currently assigned channel.


DEFAULT SET UP - Recalls the default set up configuration for the console, replacing all settings.

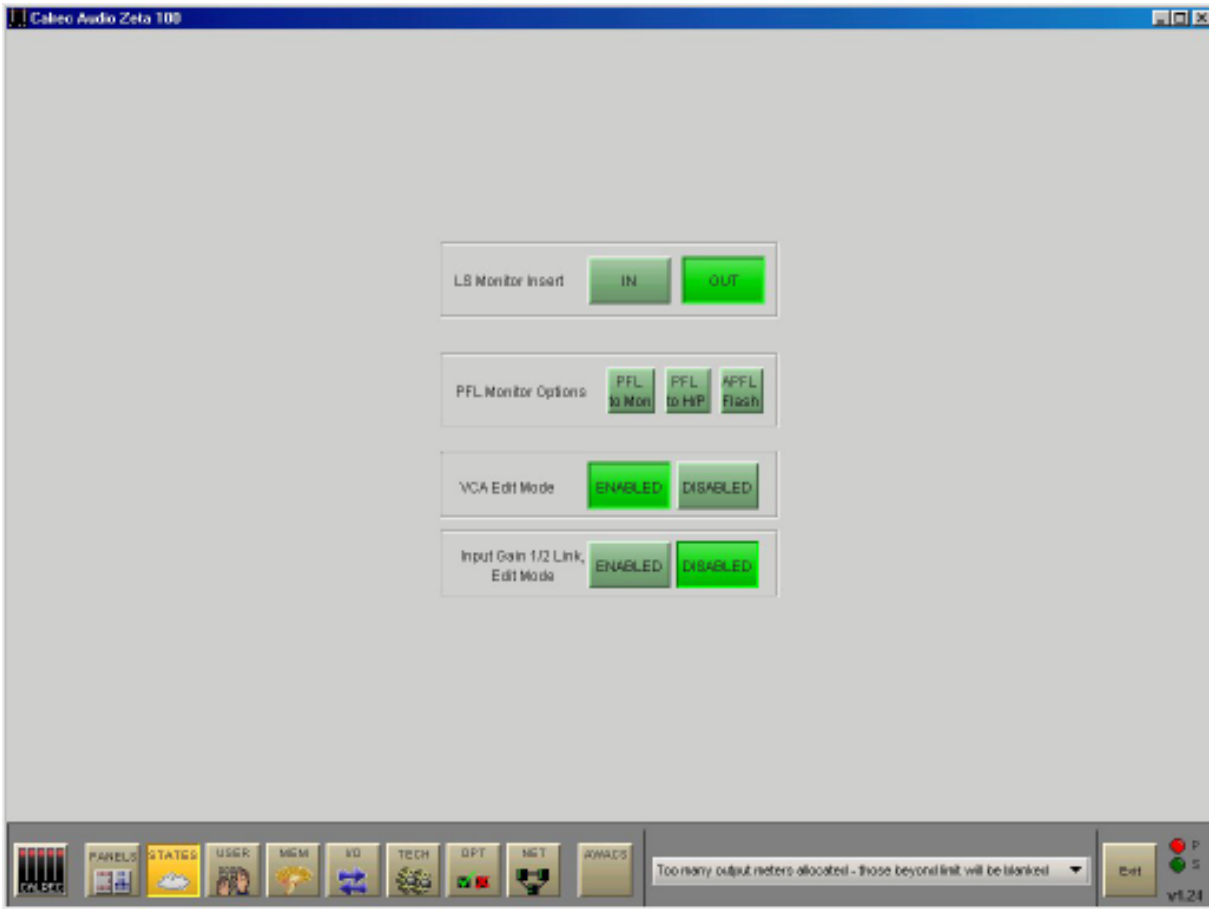
The default set-up will usually be created upon installation of the console using the TECH-INFO screen. This is a default memory, which could contain the fixed port set-ups which match the studio wiring, and any other settings which hardly ever change. It could have all channel settings OFF or flat, with no routes made, and would be available as a start up memory, from which more specific memories could be created.


GLOBAL CONSOLE CLEAR - Clears the console of all settings


REPLAY - This button is not used.


Clear, Aux Clear, Default Set-up and Console Clear flash when pressed and require the EXEC button to be pressed before the operation is carried out. It is recommended that settings are saved to memory before these functions are used.

## STATES SCREEN




### LS Monitor Insert

The LS Monitor insert is switched in and out using the buttons on this screen. Return ports for the LS monitor insert are patched on the Options - MON TB + Tone- External Inputs screen. The send ports are patched on the I/O - Outputs - Mon TB & Osc Screen.

### PFL Monitor Options

If PFL TO MON is selected PFL feeds the Control Room Loudspeaker outputs (post the surround panning controls), overriding the LS Selector. When PFL to MON is not selected, PFL overrides the Small LS. Alternatively, there can be a separate stereo PFL LS output. An external RTB input can mix with PFL to the PFL LS output. PFL from Surround Mains is a stereo downmix of the surround signal.

PFL to H/P feeds the PFL signal to the headphones.

APFL Flash enables or disables the flashing of the APFL indicator on the Broadcast Facilities panel.

### VCA Group Editing

The editing of VCA groups is enabled and disabled using the buttons on this screen. This provides protection against accidental changes.

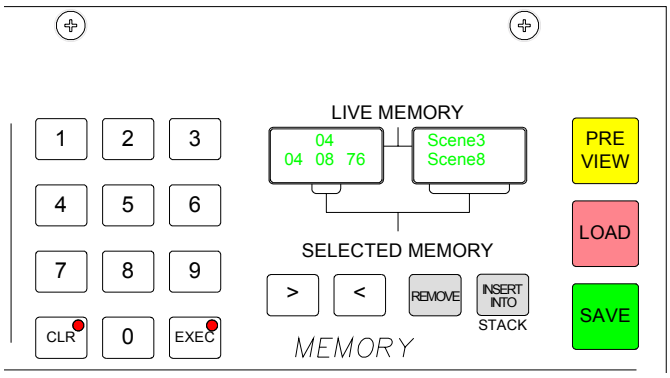
### Input 1 and 2 Gain Linking

The gains of inputs 1 and 2 can be linked such that if either input's gain is adjusted, the change in gain is applied to both inputs. This function is enabled and disabled using the buttons on this screen. The gains are linked using the input 1 and 2 buttons in the Input/Output section on the control surface.

# Memory System




## MEMORY CONTROLS




99 memories can be held in the Flash ROM for different console arrangements. In addition to this, the PC back-up can allow an unlimited number of memories, which can be restored into the Flash ROM as required. Memories can also be stored to external media, which can be useful for when several operators use the same consoleor when the console is used to broadcast many different weekly productions.

### Live and Selected Memories

The display at the top of the panel shows the “Live Memory” on the top half, and the “Selected Memory” on the bottom half.

The Live Memory shows the last memory loaded onto the console. Changes made since this memory was loaded will not be stored in this memory number unless it is re-saved. They will however be stored in the “Hidden” memory so that they are restored after a power down.

The buttons on this panel will affect the Selected Memory. The Selected Memory can be thought of as the “Ready” position, where the next memory can be placed until it is needed.

Pressing LOAD+EXEC will launch the Selected Memory into the Live Memory position, overriding the previous settings.

### Choosing the Selected Memory

Enter the two digit memory number followed by EXEC on the keypad to call that memory number into the Selected Memory position. In addidtion, selecting the required memory from the list on the left of the MEM - Setup screen will call it into the Selected Memory position.

### Saving Memories

SAVE + EXEC will save console settings to the memory occupying the Selected Memory position. Alternatively, SAVE+Memory Number + EXEC will save into that memory number.

To create a new memory, choose an empty memory either by selecting it from the list on the left of the MEM -Setup screen, or by typing its number on the keypad. Memories can be given a user-friendly label.

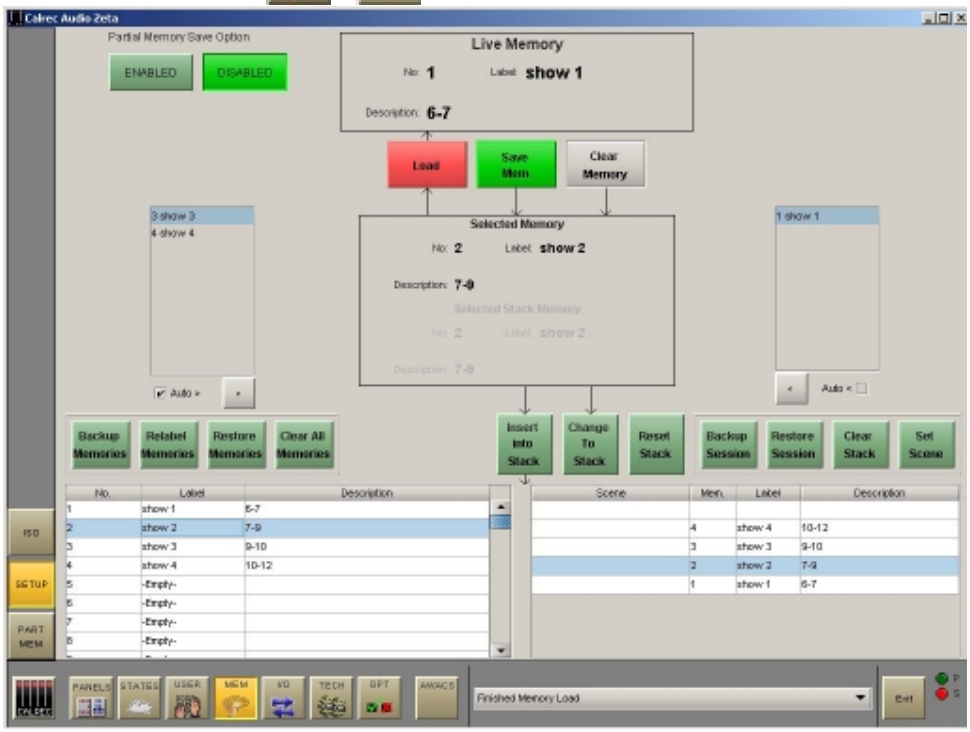
### Preview Memory

When the Preview button is held down, the Selected Memory settings will be displayed on the control surface. The Assign panel displays will be blanked out. Upon release of the Preview button, the control surface will display the live settings again.

### Stacked Memories

The memories can be arranged into a pre-set list, known as a stack. This can be useful for setting up an easy-to-access shortlist of specific memories for use during a show. INSERT INTO STACK adds the Selected Memory to the stack. The > and < buttons scroll through the stack, and pressing both > and < together, will reset the position so that the last number loaded is back in the central position. Pressing REMOVE will remove a Stack memory from the Stack, or in the case of a non-stack memory will remove it from the Selected Memory position.

## MEMORY SET UP SCREEN




The Memory Setup screen duplicates the memory functions available on the control surface, and allows management of stored memories and stacks.

The display at the top of the panel shows the Live Memory, which is the current memory loaded onto the console. The Selected Memory is shown in the centre of the screen. All the available Flash ROM memories are listed on the left of the screen, and when selected will occupy the Selected Memory position. To create a new memory, choose an empty memory from the list. When SAVE is selected to save the new memory, it can be given a label. The contents of the Selected Memory can be cleared by selecting Clear Memory.

When loading, saving or clearing memories from the memories screen, a confirmation box must be accepted before the action is carried out to prevent memories from being accidentally overwrittten, cleared or loaded onto the console at an inappropriate time. When a stored memory is loaded, the system checks that the current desk configuration matches that of the stored memory. If there are discrepancies, a warning message is reported.

With the Auto > or Auto < check box ticked, the next memory in the stack will move to the Selected Memory position after the previous Selected Memory has been loaded.

### Managing Memories in the Flash ROM List

It is possible to back up all memories to the hard disk by selecting “Backup Memories”. Previously backed up memories can be restored from the hard disk or other media into Flash ROM by selecting “Restore Memories” . Memories can be re-named by selecting “Re-Label Memories”. Selecting “Clear All Memories” will remove all memories from the Flash ROM.

### Sessions

Stacks can be saved to the hard disk or removable media as sessions. Selecting “Back Up Session” backs up the stack and all the memories in it. “Restore Session” allows previously backed up sessions to be restored. Scene labels can be applied to positions in the stack by highlighting a stacked memory and selecting SET SCENE. “Clear Stack” will remove all memories from the stack.

## MEMORY ISOLATION


The Isolate screen allows some console settings to be isolated from memory recall. This means their current settings will not be over-written when a different memory is loaded.

The right side of the screen shows all fader paths. Paths can be selected from here or by pressing the fader assign button. The buttons on the left side of the screen allow settings for the selected path to be chosen for isolation. ISOLATE ALL selects all the settings to be isolated for the selected channel or group.

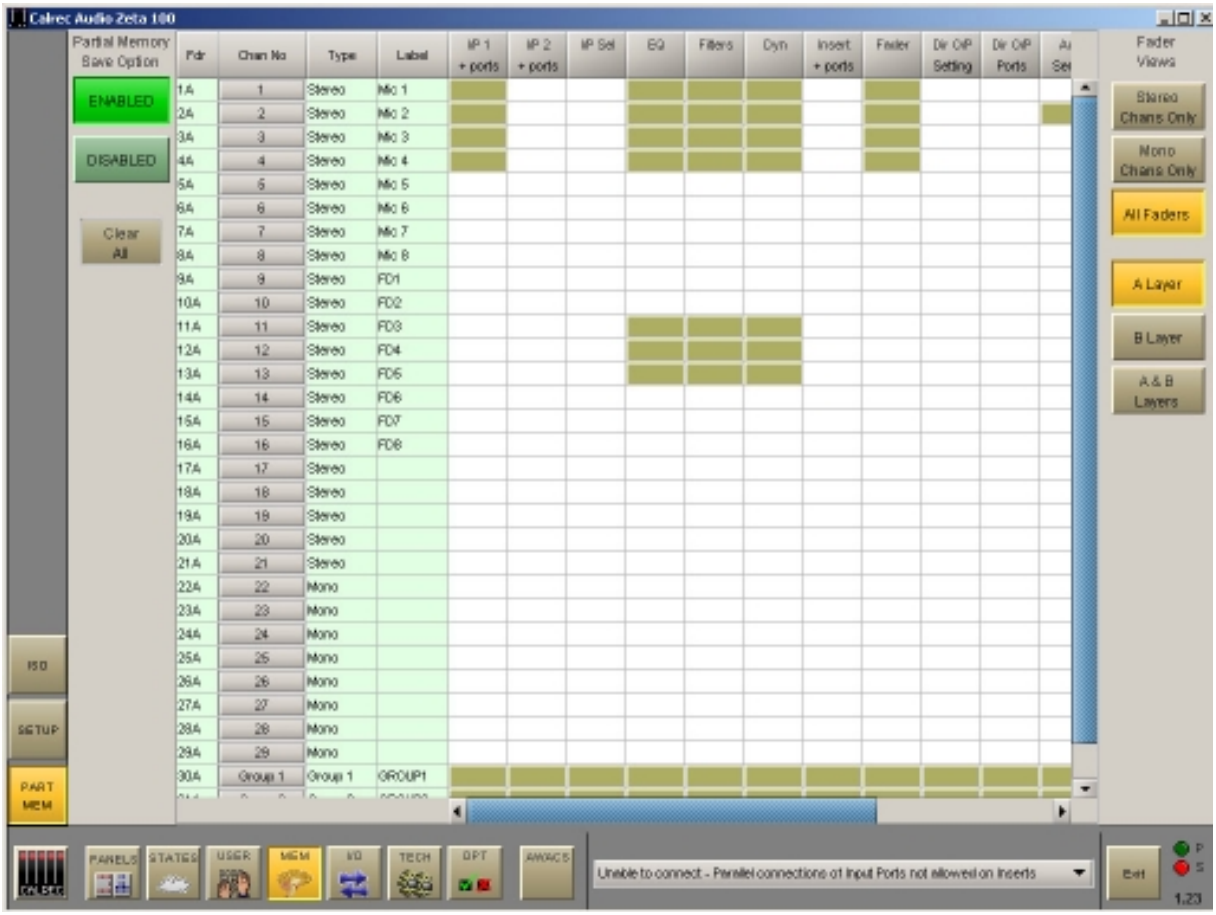
APPLY TO ALL applies the selected isolation settings to all channels and groups. To clear all isolation settings from all channels and groups, ensure all settings are de-selected, and select APPLY TO ALL.

When an input is isolated or de-isolated, its port will also be isolated or de-isolated. However, the I/O screens allow port isolation to be turned on and off independantly. Isolated ports are highlghted in brown on the I/O screens.

If an isolated port connection is changed, any isolation setting will be cleared, unless one of the console-wide isolation options is selected and contains that port.

If an output connection in the memory cannot be made because it needs to use an isolated port, this will be reported via AWACS.

## PARTIAL MEMORIES




The Partial Memories function allows components of console settings to be saved in the same way as full console memories. The partial memories screen provides a mechanism for selecting channels or sub-components of channels to be saved in a partial memory. When a partial memory is recalled, only the settings saved will be updated.

Partial Memories mode is enabled and disabled using the buttons on this screen or the MEM-Setup screen. When enabled, all memory saves are partial memory saves. When disabled, all saves are full console saves. Once partial memory mode is active, the save buttons on the screen and control surface are used to save partial memories in the same way as full console memories.

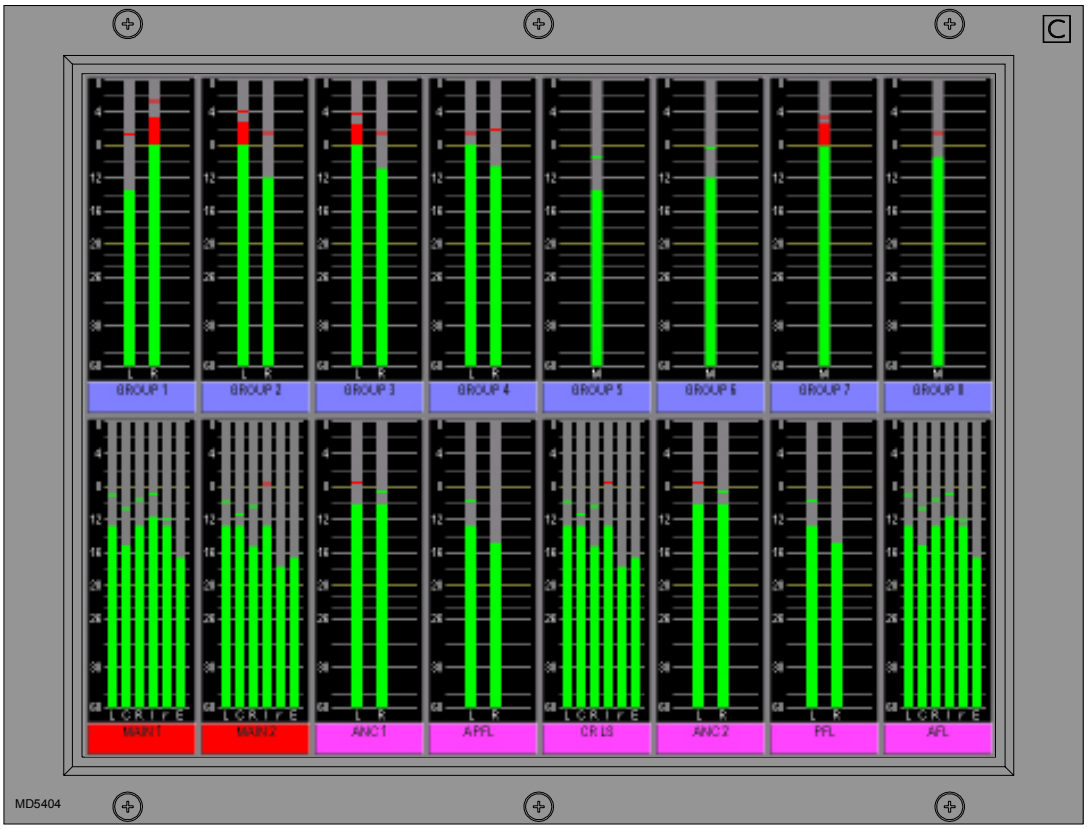
The partial memory screen contains a table with rows of channel numbers and columns of partial memory components. The sequence of the channels is in fader number order. Partial memory component selections are made by selecting the intersection of a channel and a console setting. The Channel Number field in the fader table is a selectable button, which selects or deselects all partial memory components for the channel occupying that fader.

Partial memory selections are stored and recalled if a console reset occurs.

A partial memory only loads those channels or components on the control surface that were selected using the partial memory selections. A partial memory load does not affect the currently assigned fader and the A/B layer assignments.

# Metering System

## TFT METERING SYSTEM




The TFT metering system allows high quality TFT screen based meters to be incorporated into the console upstand, either instead of, or alongside the existing bargraph, moving coil VU and PPM meters. These TFT meter panels allow a greater density of meter functions to be displayed, and the user can dynamically change the meters and their arrangement using the Options-Meter screen. Meter configurations can be saved and recalled, so that different users can have their own preferred meter arrangements. Each meter can be mono, stereo, M/S, Surround, or phase display, and the following functions can be metered:

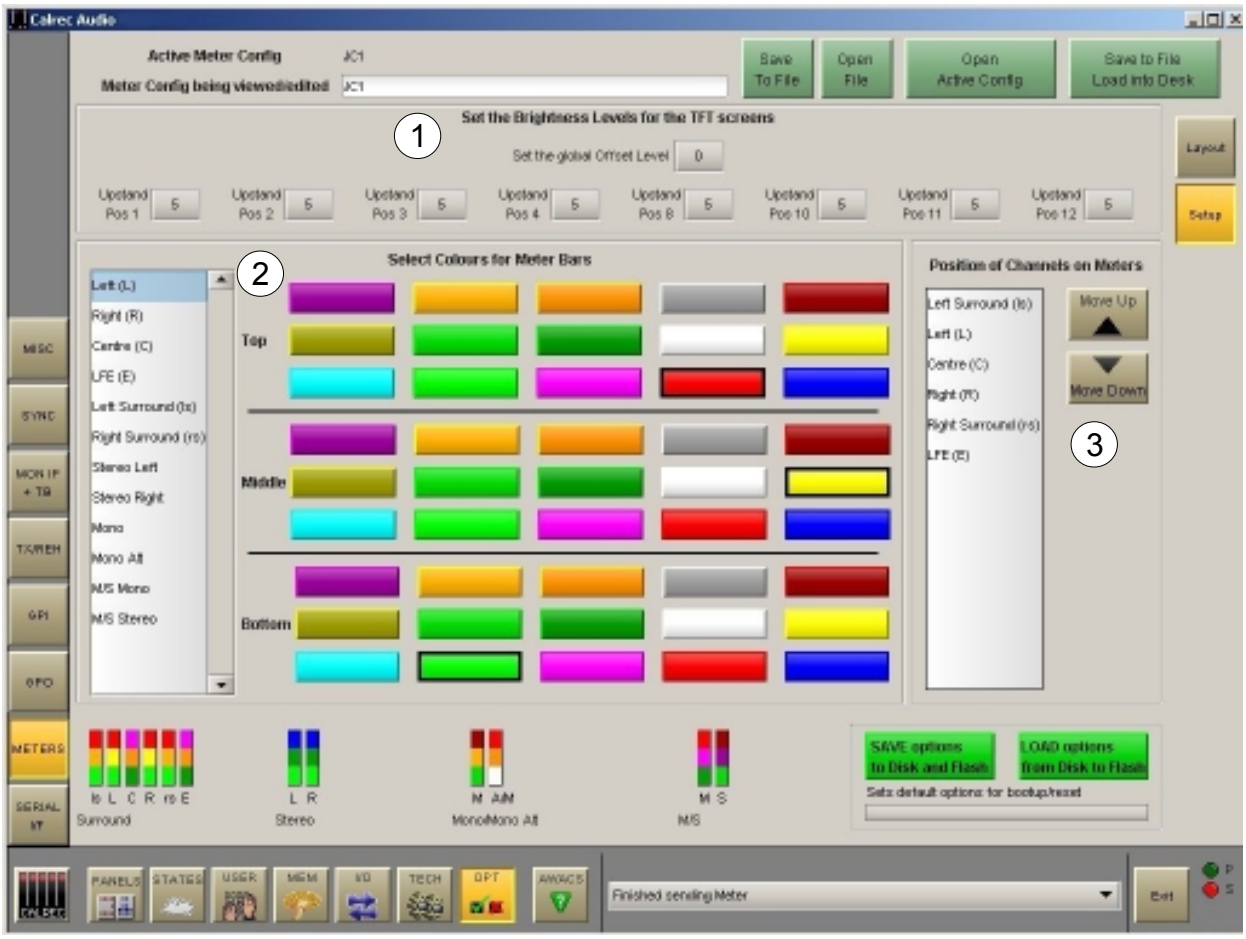
- Main Outputs
- Auxiliary Outputs
- Meter Selectors
- Miscellaneous functions
- Group Outputs
- Track Outputs
- External Inputs

The screen layout is configured in halves, such that each half of the screen can have 4 or 6 columns, allowing 8 or 12 meter positions across the width of a TFT meter screen. Each column can then be split into up to three rows to contain meter positions which can be 1/3, 1/2, 2/3 or full height of the TFT meter panel. Therefore, Each TFT meter screen can display up to 36 meters within the space usually taken up by just two standard meter panels.

The number of meters configurable on the TFT screens is governed by the 58 meter data signals available. If an audio signal is metered on a TFT meter and a standard meter at the same time, it will use up two signals in the meter data stream.

## TFT Meter Setup Screen


The Setup screen contains options to set global metering settings.




### (1) Screen Brightness


Over time, the brightness of TFT screens can degrade. For this reason, a set of controls are provided to adjust the brightness of each screen individually and globally. The screen in each upstand position can be adjusted from 0-9 using the selection buttons(0 is off). A selection window will appear with the current level highlighted. Selecting a different level will close the window and the new level will be shown on the screen. The global offset level will adjust the brightness of all screens by the value selectable in the same way, from -5 to +4.

### (2) Bar colours

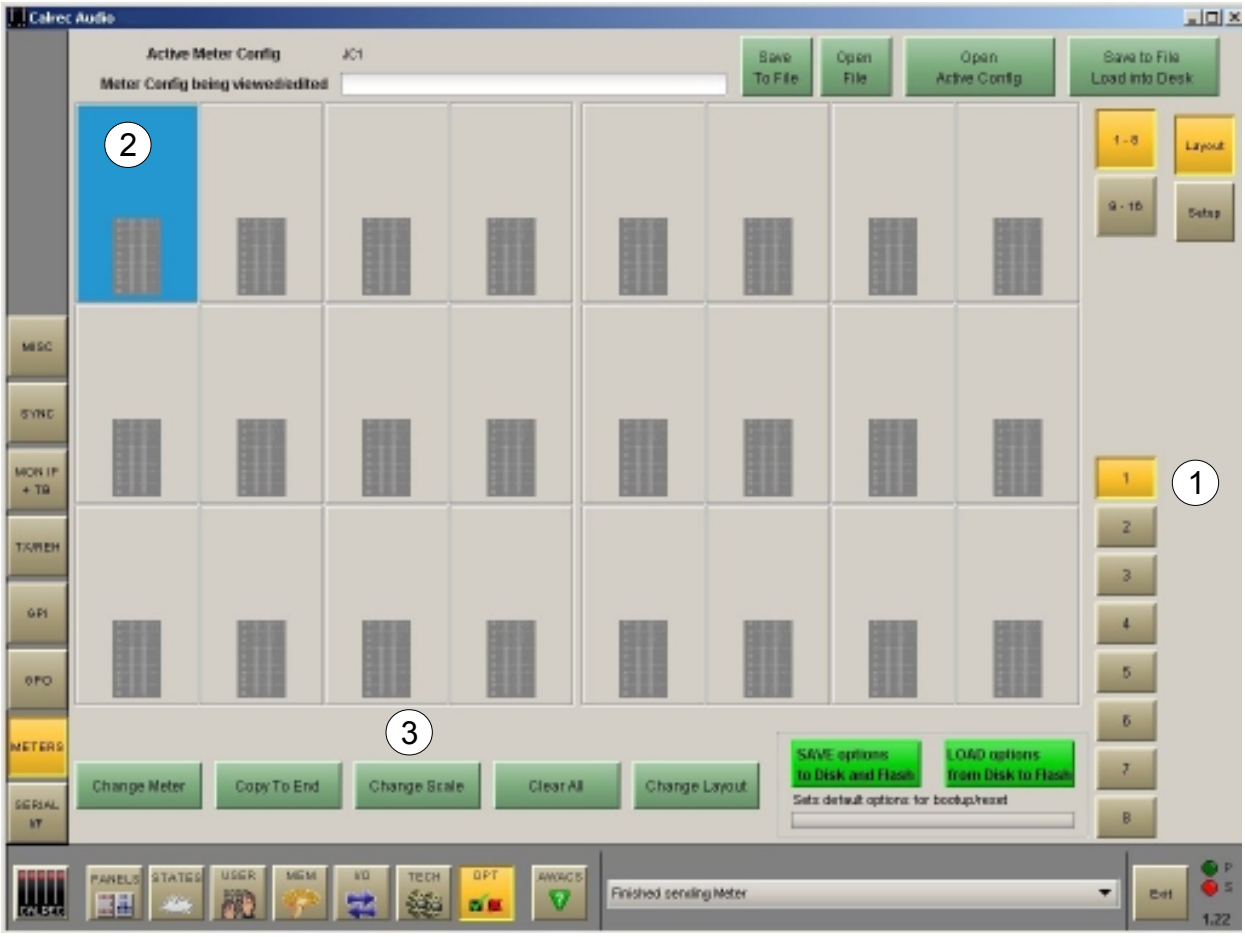
The user can select the colours to be used on the meters. The top,middle and bottom colours for each signal can be selected independently using the pallette. The selected colours for each signal are shown at the bottom of the screen.

### (3) Signal Order

The user can select the order that the surround signals appear. The order can be shuffled by selecting a signal from the list and using the Up and Down buttons. The order chosen will be used for all surround meters.

## OPTIONS - METERS - LAYOUT SCREEN


The user can (with some rules) control the layout of the screens.

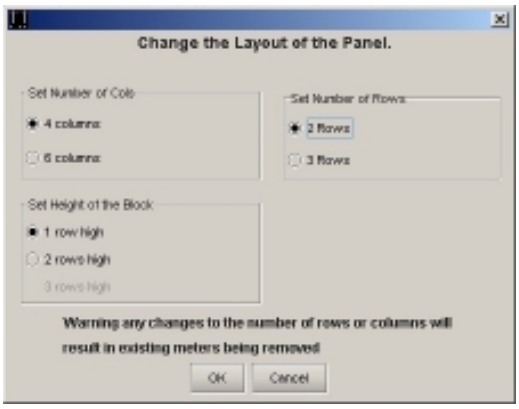



**(1) Meter Selection**
The Set up Application provides an interface with which to tell the console which meter panels occupy which position along the upstand. The numbered buttons on the above front end screen allow the meter panel in that upstand position to be selected for set-up.

**(2) Meter Layout**
The selected meter will be shown in the main section of the screen, where the meter positions will be greyed out until the user defines the type of meter to show in that position. Before the meters are defined, it is a good idea to define the layout of the rows and columns on the screen. Some of the meter positions can be left unused.

**(3) Functions**
The controls at the bottom of this screen allow changes to the meter to be made. The layout of the graphs to be displayed on the screen can be arranged using CHANGE LAYOUT. The type of meter and its source can be defined using CHANGE METER. The scale can be set using CHANGE SCALE. COPY TO END copies the selected meter across the rest of the meters in the row. CLEAR ALL resets the meter arrangement, clearing all settings.

## CHANGING TFT SCREEN LAYOUT


Select a meter (its background will turn blue) and select CHANGE LAYOUT. A dialogue box will appear to allow the number of columns and rows in the selected meter's half of the screen to be chosen.

The selected meter's height is also determined here. The meter's height can span the rows available in the column.

### Rows

The number of rows within the selcted meter's column can be selected here. Each half of the screen can have two or three rows, and the meters within each column can be set to take up 1, 2 or 3 rows, to achieve different row heights for different columns. Changing the number of rows will affect meters in the selected meter's half of the TFT meter screen only.

### Columns

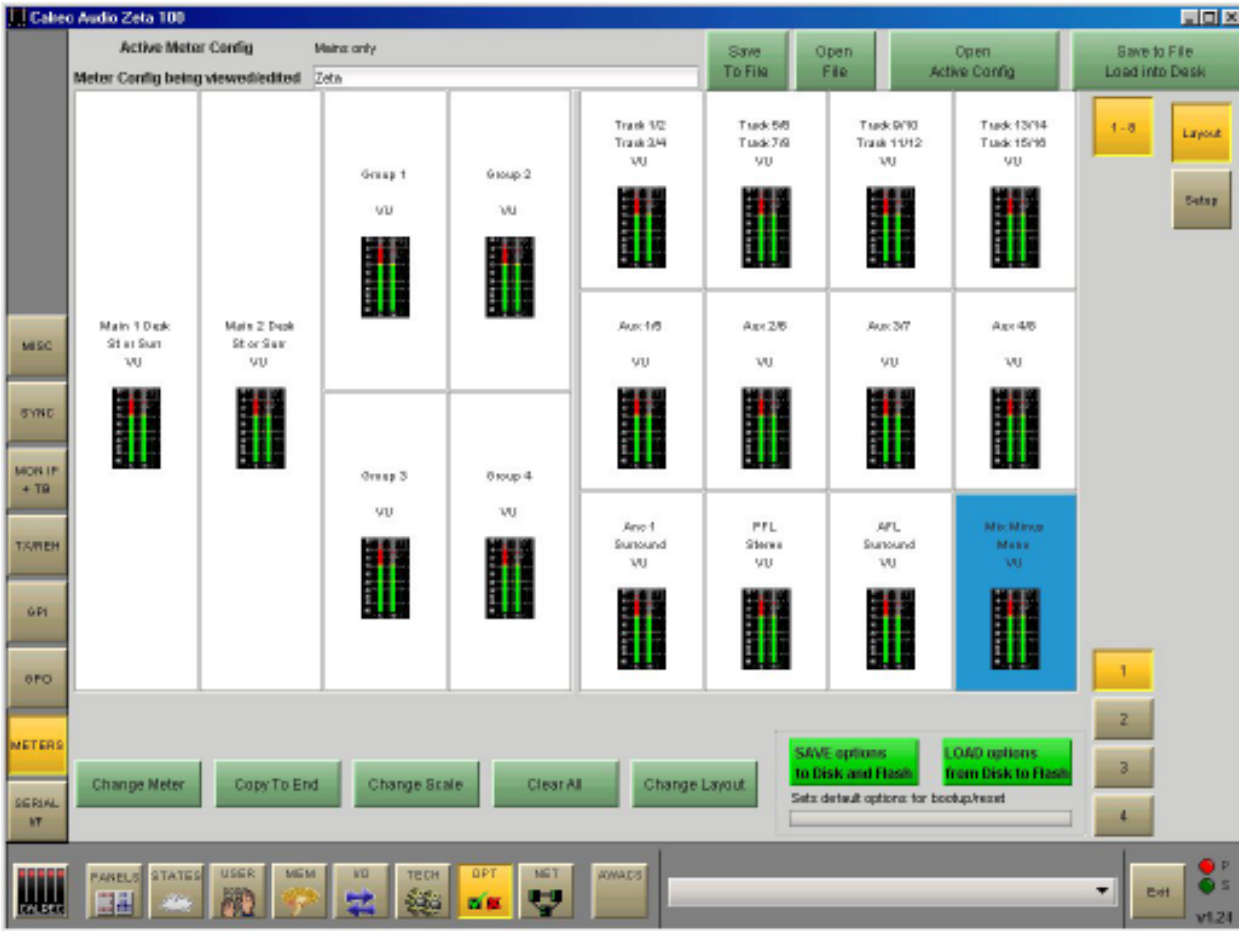
There can be either 4 or 6 columns in each row across each half of the screen. As the screens are set up in halves, this means that there can be different column widths on each side of one screen. Changing the number of columns will affect meters on the selected meter's row only (Unless the change affects meters already set up on the other rows). This allows rows to be set up with different numbers of columns.

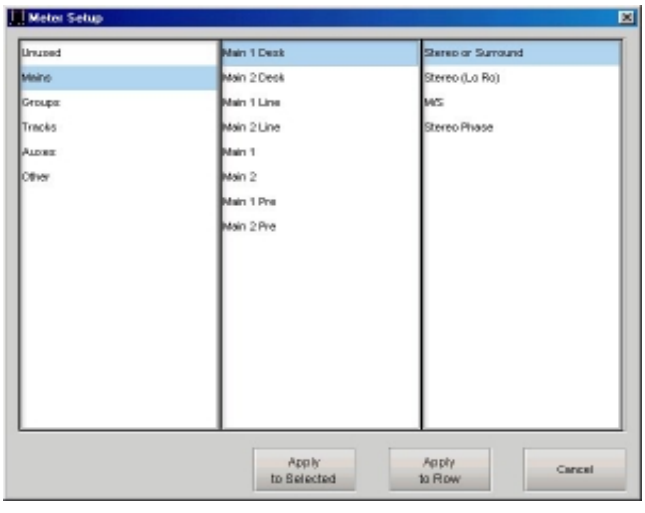
### Block Height

In a column with 2 rows, selecting 1 row high makes the meter take up one half of the column it occupies. Selecting 2 rows high makes the top meter position take up the full height of the column it occupies.

In a column with 3 rows, selecting 1 row high makes the meter take up just one row (1/3 of the column height) in the column it occupies. Selecting 2 rows high allows the meter to take up the row it is on and the row below it within its column. Selecting 3 rows high makes the meter the full height of the column it occupies.

## CHANGE METER


Select a meter position (its background will turn blue) and select CHANGE METER. A dialogue box will appear which allows the meter source to be chosen. Select the required source to monitor, from mains, groups, auxes or other. Subsequent columns will list the available options for that source.

When all options are selected, APPLY TO SELECTED will apply the source to the selected meter position only. APPLY TO ROW will apply that source to the selected meter position, and subsequent sources in the list will be applied to all the meter positions to the right of the selected meter position in the row, until the row is full, or you run out of sources in the list.

## Change Scale


Each bargraph can be PPM, VU or Phase. Phase is selected using CHANGE METER. There can be up to 3 phase meters assigned in the configuration, after all three have been assigned the option will no longer be available. The scale type can be selected on either an individual basis or an “apply to all”. This applies for both standard and TFT meters. Scales available to the user are chosen in the Set up Application.

## METER OPTIONS

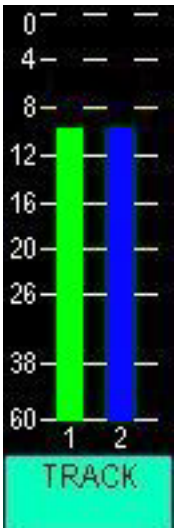
The table below shows the options available for display.

| Source | Option 1 | Option 2 |
|---|---|---|
| **Unused** | | |
| **Mains** | Mains 1-2 Desk<br>Mains 1-2 Line<br>Mains 1-2 Pre<br>Mains 1-2 | Stereo or Surround, Stereo (Lo Ro), M/S, Stereo Phase<br>Stereo or Surround, Stereo (Lo Ro), M/S, Stereo Phase<br>Stereo (Lo Ro), M/S, Stereo Phase<br>Stereo or Surround, Stereo (Lo Ro), M/S, Stereo Phase |
| **Groups** | Groups 1-8 | Mono or Stereo, Phase |
| **Tracks** | 1-16 | Tracks 1/2 - pairs or in fours |
| **Auxes** | Aux 1-8 | Aux 1/5, Aux 2/6 etc |
| **Other** | Main Meter Sel<br>ANC 1 Mtr Sel<br>ANC 2 Mtr Sel<br>PFL<br>AFL<br>APFL<br>CRLS<br>Mix Minus<br>External | Surround, Stereo (Lo Ro), M/S, Stereo Phase<br>Surround, Stereo (Lo Ro), M/S, Stereo Phase<br>Stereo (Lo Ro), M/S, Stereo Phase<br>Stereo, M/S, Stereo Phase<br>Surround<br>Stereo, M/S, Stereo Phase<br>Surround, Stereo (Lo Ro), M/S, Stereo Phase<br>Mono<br>Stereo, M/S, Stereo Phase |

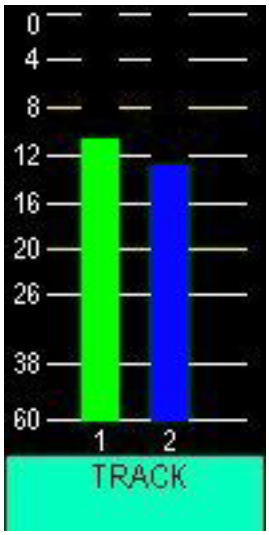
The input sources for external input meters can be patched, moved and removed on the Options - Mon, Tb + Tone screen. Up to 6 external input sources can be metered.

### Tracks

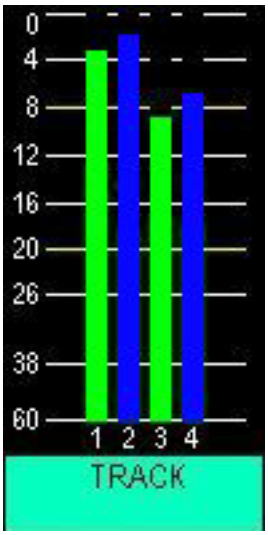
2 Tracks can be displayed in any single meter position. However, if the meter position occupies a column which is 1/8 of the screen width (that half of the screen being set to 4 columns wide), then 4 tracks can be displayed allowing the track metering to occupy a smaller space. When selecting Tracks to meter, the first available options column allows two tracks to be selected for display in that meter position. The next available options column will then allow selection of the




**1/12 wide meter, displaying 2 tracks**




**1/8 wide meter, displaying 2 tracks**




**1/8 wide meter, displaying 4 tracks**

next two tracks (provided that the selected meter position is 1/8 screen width). If selected, all four tracks will be displayed within that meter position. It is useful to change the colours for

## SAVING AND RESTORING METER CONFIGURATIONS

Once the user has the meters set up as desired, the configuration can be saved to the PC's hard disk, so that it can be recalled at a later date. A configuration consists of the values set on the SETUP screen and the layouts designed on the LAYOUT screen. The currently active configuration will be shown at the top of the Setup and Layout screens, and the configuration currently being viewed/edited on the screens will be shown underneath.


**Save to File, Load into Desk**
Changes to the configuration being viewed/edited will not take effect until SAVE TO FILE LOAD INTO DESK is selected. Then the changes will be transmitted to the console and saved to **C:/ zeta/cust1/meter**. If any changes are made to the configuration, the SAVE TO FILE LOAD INTO DESK button will flash (until selected) to indicate that the changes to the configuration being viewed/edited have not yet been saved and loaded onto the console.

**Open File**
Open File will allow a previously saved meter configuration to be chosen. When a file is opened, the configuration will be loaded into the front end screens as "the meter configuration being viewed or edited", it is not sent straight to the control surface. The settings can then be edited if desired and when they are ready to be used by the control surface select SAVE TO FILE LOAD INTO DESK, and the revised file will be saved and the settings sent to the control surface.

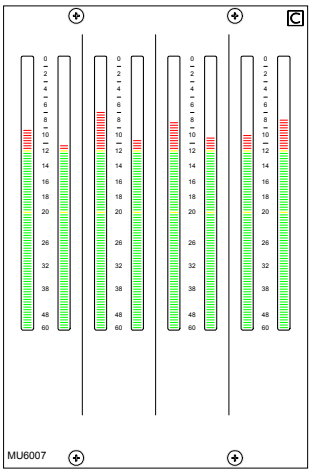
**Save to File**
Save to File will save the configuration being viewed/edited to **c:/sigma 100/cust1/meter** without loading it onto the console.

**Open Active Config**
Open Active Config retrieves the settings that the control surface is using and displays them on the front end screens replacing the current configuration being viewed/ edited.

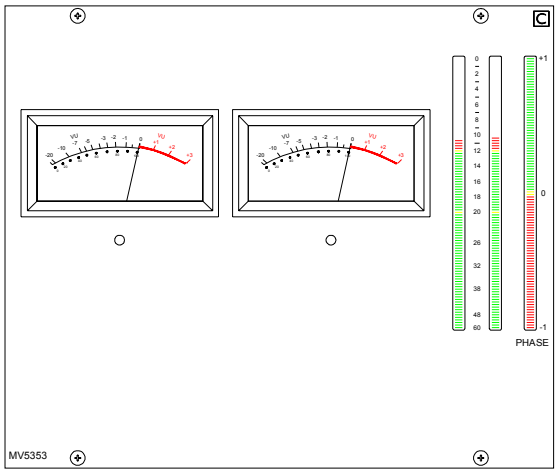

**Save Options to Disk and Flash**
As the meter setup screens are part of the options set of screens, it is important to save the options to disk and flash once the meter arrangement is set up. The Options screens are used to pre-set the system to the studio's required settings. These settings are not stored in the individual console memories but are saved and loaded separately using the buttons at the bottom of the screen. Although the meter arrangement itself is saved seperately, its active state on the console has to be saved using these buttons.

Changes to options take effect as soon as they are made. However, if they are not saved, the next time the desk boots up the options will revert to their previous settings, which could mean that a different meter arrangement is loaded onto the console. This could cause problems should the console have to be reset during a live broadcast. It does however allow changes to be tried out without losing the original settings and these original settings can be restored without having to re-boot the system.

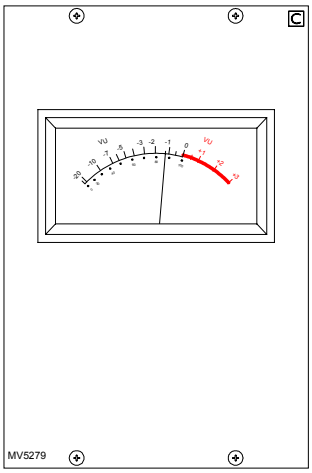
## STANDARD METERING OPTIONS



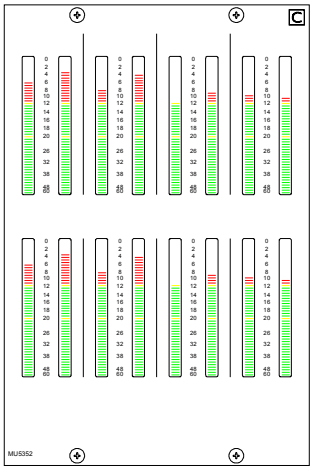

4 x Twin Bargraph



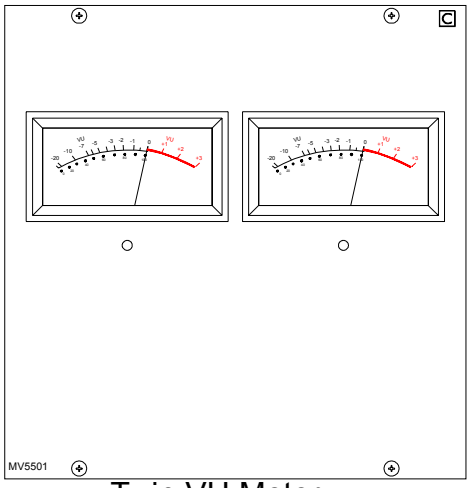

Twin VU, Bargraph & Phase Meter



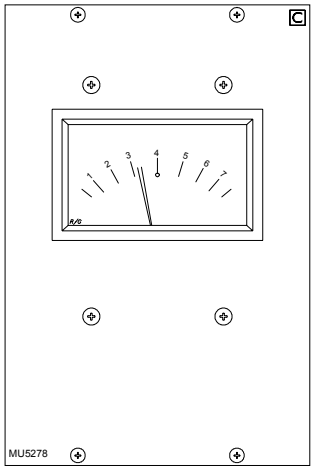

VU Meter



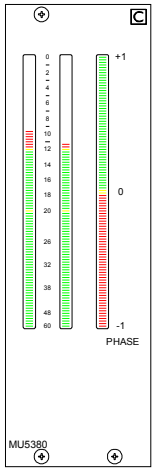

8 x Twin Bargraph




Twin VU Meter




PPM Meter R/G (A/B)




Phase Meter

Sources are allocated to bargraph and moving coil meters using the Options-Meters screen.

**Main and Ancillary 1 Meters**

The Main and Ancillary 1 Meters can each be stereo only, surround only, or surround plus stereo (displaying a downmix of the surround signal). There can be a separate M/S meter (fed from the same downmix). They can be PPM's, VU's, Bargraphs, Phase displays incorporating bargraphs, third party meters or a mixture of these.

The MAIN METERS are fed from the Main meter selector which is on the Monitor Selector module. The two selection buttons can be pre-set to either Main 1 or 2 Desk (pre Tone and TB), or Main 1 or 2 Line (which can be an external input). An M/S button can be fitted if there is a stereo meter and no separate M/S meter.

All meters in the meter bridge, including moving coil types, are fed directly from the internal meter system, except for any phase displays which will require audio outputs from the I/O rack. The meter bridge is continental height allowing alternative European bargraph meters to be fitted. These would need additional audio outputs from the I/O Rack.

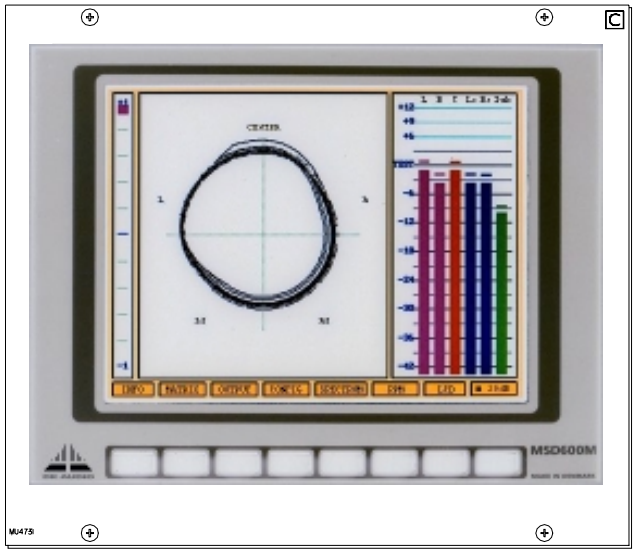
**Other Meters**
A comprehensive set of optional meters are available, for example:

- Track Bargraphs displaying the Track output levels, post Tone andTalkback.
- ANCILLARY 2 Meter: This is Stereo only. It can be PPM's, VU's or bargraphs.
- Stereo APFL or surround AFL Bargraph. AFL is monitored post the channel/group panning. The APFL meter will display the stereo downmix of these signals.
- Single bargraph displaying signal on the mix minus bus (mono).
- 8 stereo bargraphs for the groups. For mono groups, the meter will display the left bar only.

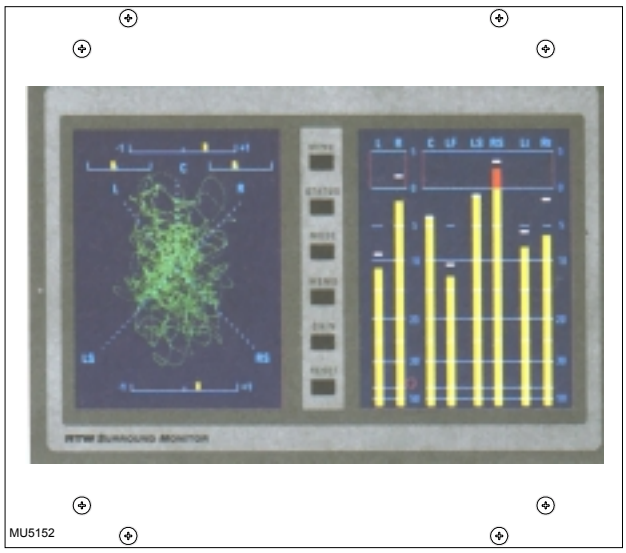
Calrec can supply either bargraphs, Moving Coil VU or PPM meters. All Calrec meters, including moving coil types, are fed directly from the internal meter system. There are external meter outputs which allow other meters to be used.

Calrec bargraphs provide a bar which can be set to either VU or PPM. In addition, there can be a True Peak spot (which incorporates a long release time). Together, these allow the operator to see the level of the signal using a familiar meter and at the same time to see how close the peaks of the signal are to the digital maximum. The bargraphs can have two yellow markers at specified points to mark the "nominal" and "peak" levels. The top of the bargraph always equals full scale digital level. The scale on the bargraph is normally 0 (at the top) to -60 in dB. Other scales can be provided to special order.

**Optional Third Party Metering**
It is possible to incorporate third party metering options into the console's upstand, this would require audio outputs from the I/O Rack.



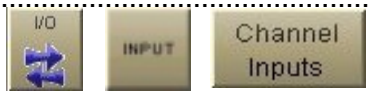
DK Audio MSD600M



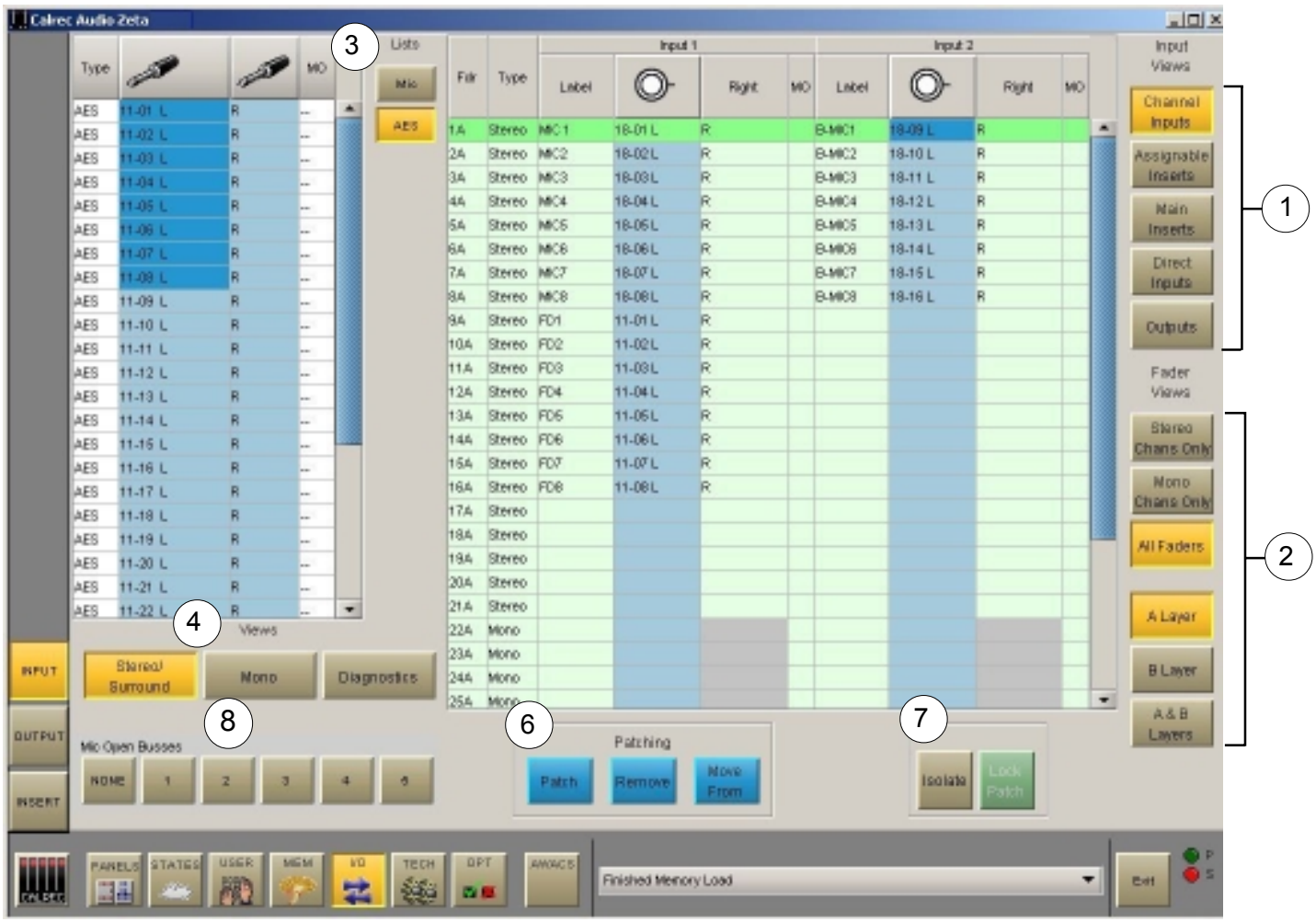
RTW 10810

# On-Screen Patching

## INPUT PORTS SCREEN




In addition to the port patching controls on the Input/Output Panel, the I/O-Input screens allow "Patching" of input sources to channel inputs, insert returns, direct inputs or to output ports.




**(1) Input Views**
These buttons select the different console path types which can have ports attached. (channel inputs, insert returns, direct inputs or outputs). They will then be displayed in the main section of this screen.

**(2) Fader Views**
It is possible to choose which set of faders are to be available on and altered by this screen.

**(3) Source Lists**
All of the available input ports can be grouped into suitable lists at the time of installation. These lists can then be accessed using the selection buttons. When selected, their sources are displayed on the left of the screen, ready to be patched to channels on the right.

**(4) Source Viewing Options**
The sources can be viewed as pairs (best for patching to stereo or surround paths), individual (best for patching to mono paths), or individual with rack number, card slot and input shown (for diagnostic purposes).

**(6) Patching**

Assignment is made by selecting a source,  and an input,  and selecting Patch. 


The input source label will appear in the channel input label field and on the fader's display (if that input, 1 or 2, is selected on the Input/Output controls). By selecting the label cell on the screen, the input name can be edited. The new name is stored with the channel input and replaces the source label on the fader display.

Once patches are made, they can be removed when selected by clicking REMOVE. Connections can be moved between channel inputs when selected using the MOVE FROM button. The Input 1 or 2 field will be highlighted and the PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO, and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.


**Multiple Patching -** It is possible to patch regions of sources.

- Select a list of input ports using the trackball by clicking and dragging down the column
- Select the fader to start patching to
- Select Patch

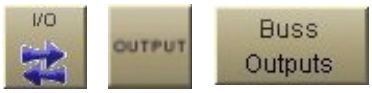
**(7) Port Isolation**

The ISOLATE button allows the selected port connection to be isolated from memory recall, so that its current settings will not be over-written by what is in the memory. Clicking the button a second time will de-isolate the connection. A brown cell in the Label column indicates that a port has been isolated. Other console settings can be isolated using the MEM - Isolate screen.

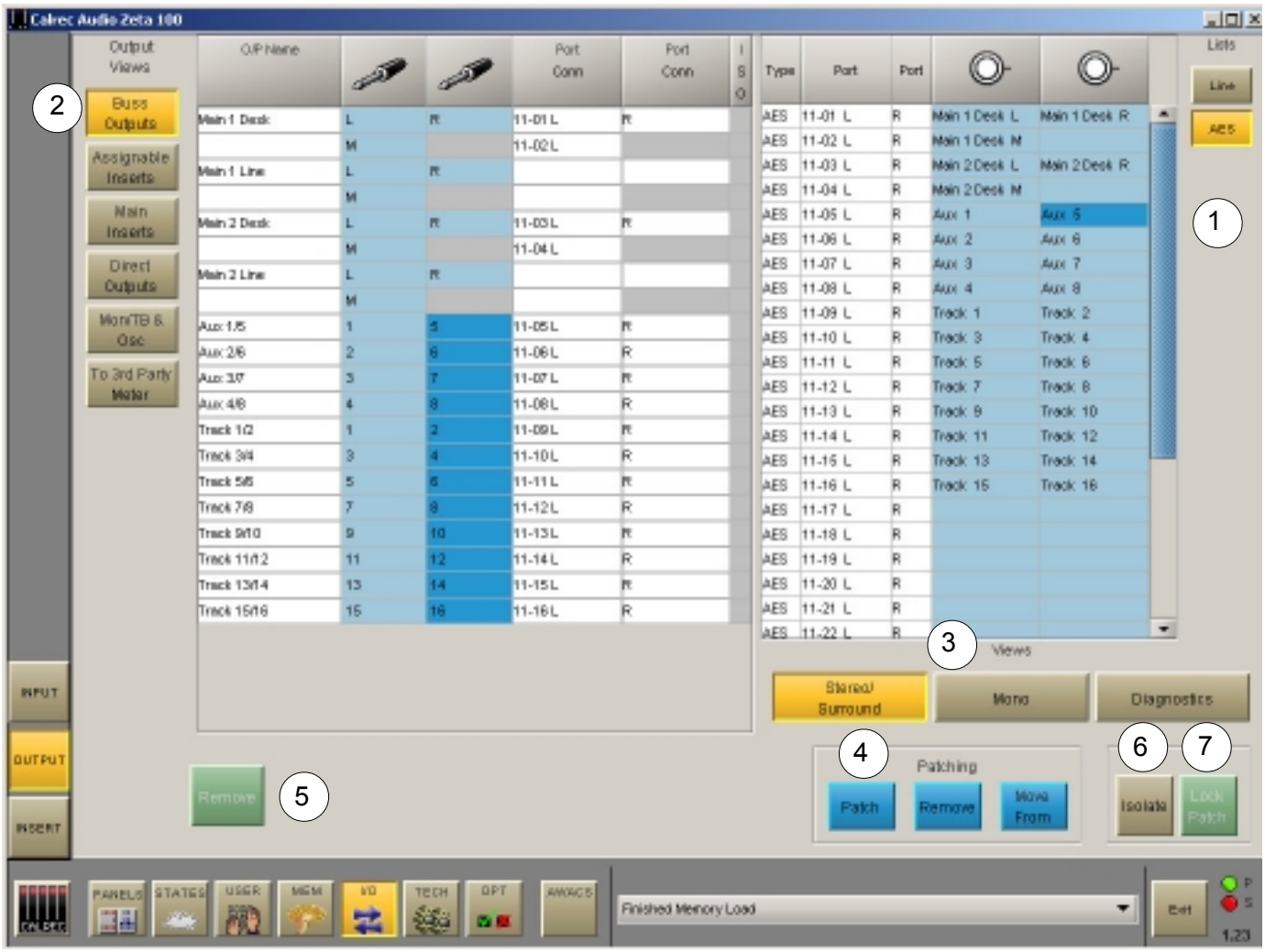
**(8) Mic Open Busses**

Each input port can be assigned to a MIC OPEN buss, such that if the input is patched to a channel input, it will operate the mic open circuit when that channel is faded up and routed to the programme output. First select the input and then select the required Mic Open Buss button. If a pair of inputs are patched to a stereo channel, the channel will operate the buss to which the left of the pair is assigned. Each buss can be set to automatically cut the studio loudspeaker output (two separately cut outputs are provided, one for each buss) and/or fire a relay. These are set on the OPTIONS screens: TX/REH and GPO. Please note that Hydra ports cannot be assigned to a mic open buss.

## OUTPUT PORTS SCREEN




The I/O - Output screens allow “Patching” of console output signals to main, auxiliary and track output ports, insert sends and direct outputs. It is also for setting up Monitor, Talkback ,Oscillator and external metering outputs.




### (1) Output Port Lists

All of the available ports can be grouped into suitable lists using the Set up application. These lists can then be displayed on the left of this screen, ready to be patched to channels on the right. Different lists are accessed using the selection buttons.

### (2) Viewing Options

The sources can be viewed as pairs (for patching to stereo or surround paths), individual (for patching to mono paths), or individual with the actual rack number, card slot and input shown (for diagnostic purposes).

### (3) Output Views

These buttons select the different categories of console output signals which can be patched to output ports (e.g. buss outputs, insert sends, direct outputs, monitoring outputs, Talkback outputs, oscillator outputs, external meter outputs). They will then be displayed in the main section of this screen.

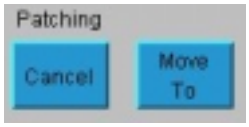
**(4) Patching**

To make an assignment, select an output,  and an output port,  and select Patch. 


Output signals can be patched to any number of output ports by repeating this procedure. (If groups are set to be mono, only the left output will have a signal on it).

Patches can be removed from output ports when selected using the REMOVE button. 


Connections can be moved between output ports when selected using the MOVE FROM button. The Name field will be highlighted and the PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.

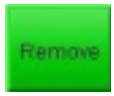




Multiple Patching - It is possible to patch signals to many outputs in one operation:

- Select a list of output signals using the trackball by dragging down the column
- Select an output port to start patching to
- Select Patch

**(5) Remove**

The green Remove button allows an output signal to be removed from its output port assignment or assignments, without needing to locate the output port or ports to which it is patched. Simply select the port connection from the “Port Conn” column on the list of output signals, and select Remove.




**(6) Port Isolation**

The ISOLATE button allows the selected port connection to be isolated from memory recall, so that it’s current settings will not be over-written by what is in the memory. Clicking the button a second time will de-isolate the connection. A brown cell in the Label column indicates that a port has been isolated. Other console settings can be isolated using the MEM - Isolate screen.

**(7) Output Port Locking**

Some output ports may need to be ‘locked’ once they have been set up to avoid accidental removal. For example - a technician may assign the mixing console’s Main 1 output signal to a particular output port. If this were the main studio transmitter output, it would be very undesirable to allow the assignment to be easily changed during normal operation. For this reason, a system of software locks is provided to protect critical parts of each configuration. The console can be in one of three modes, “User”, “Technician” and “Supervisor”. Operation of the locking system is only available in “Technician” or “Supervisor” mode which are password protected to add an extra layer of security. Modes are selected using the TECH - User Mode screen.

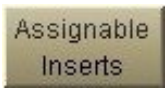
To lock an output port assignment, select an output port which has a source assigned to it (click on the green patch point column), and select the Patch LOCK button.

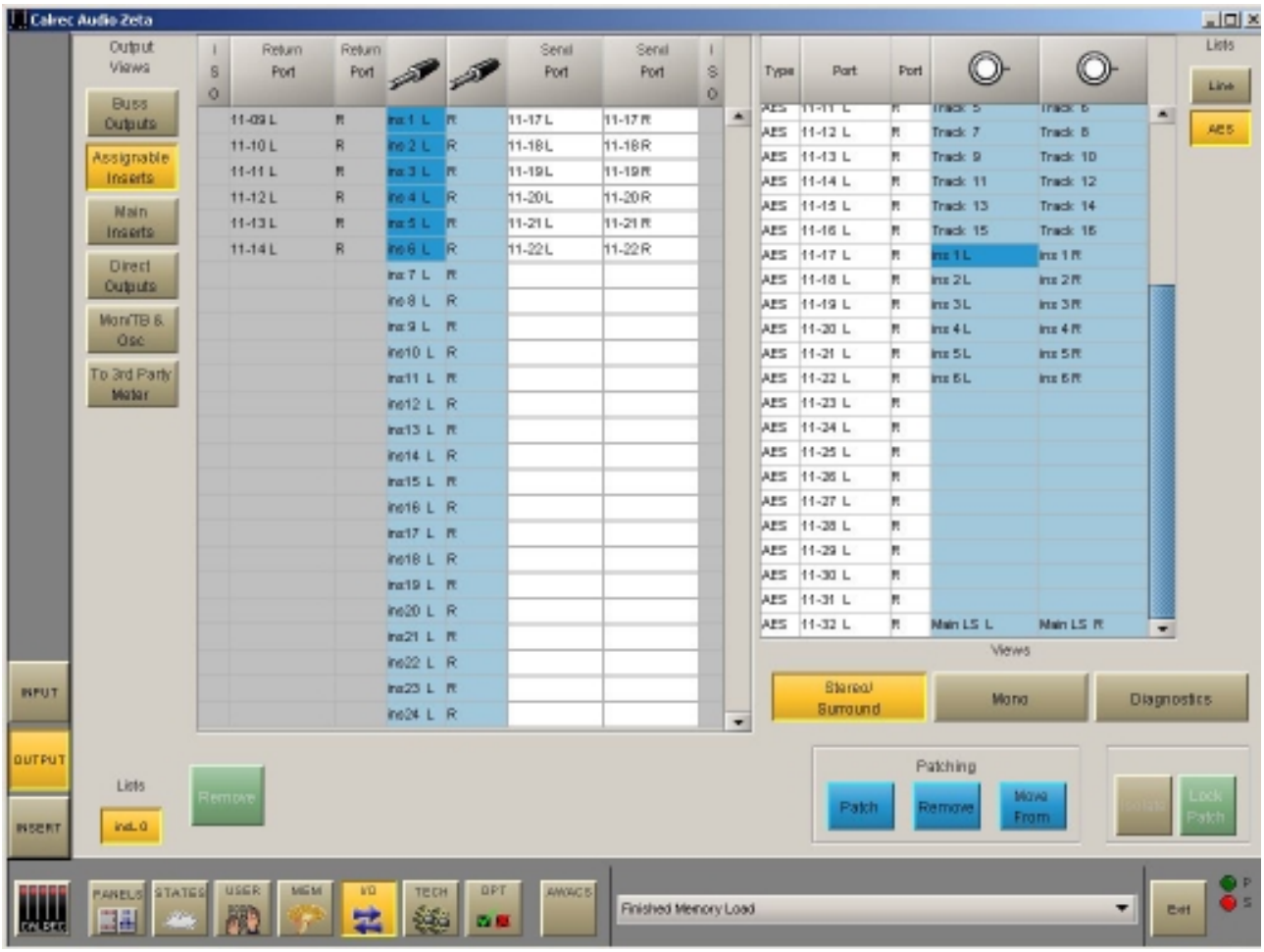
Provided that the desk is in “Technician” mode, the lock state will be toggled. If the lock is active, the port name will be highlighted in bright green text, otherwise the text will be shown in black.

Once a patch has been locked, any attempt to patch over it, move it, or remove it will cause an error dialog box to display “Patch locked!”

## ASSIGNABLE INSERT SENDS



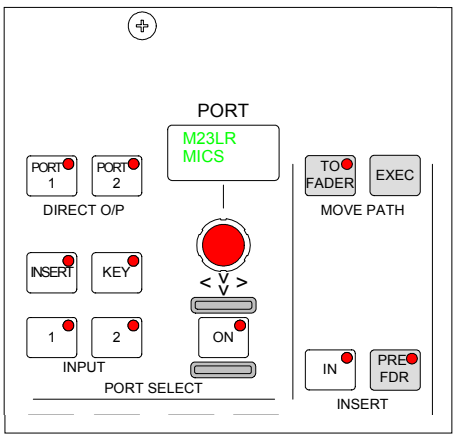


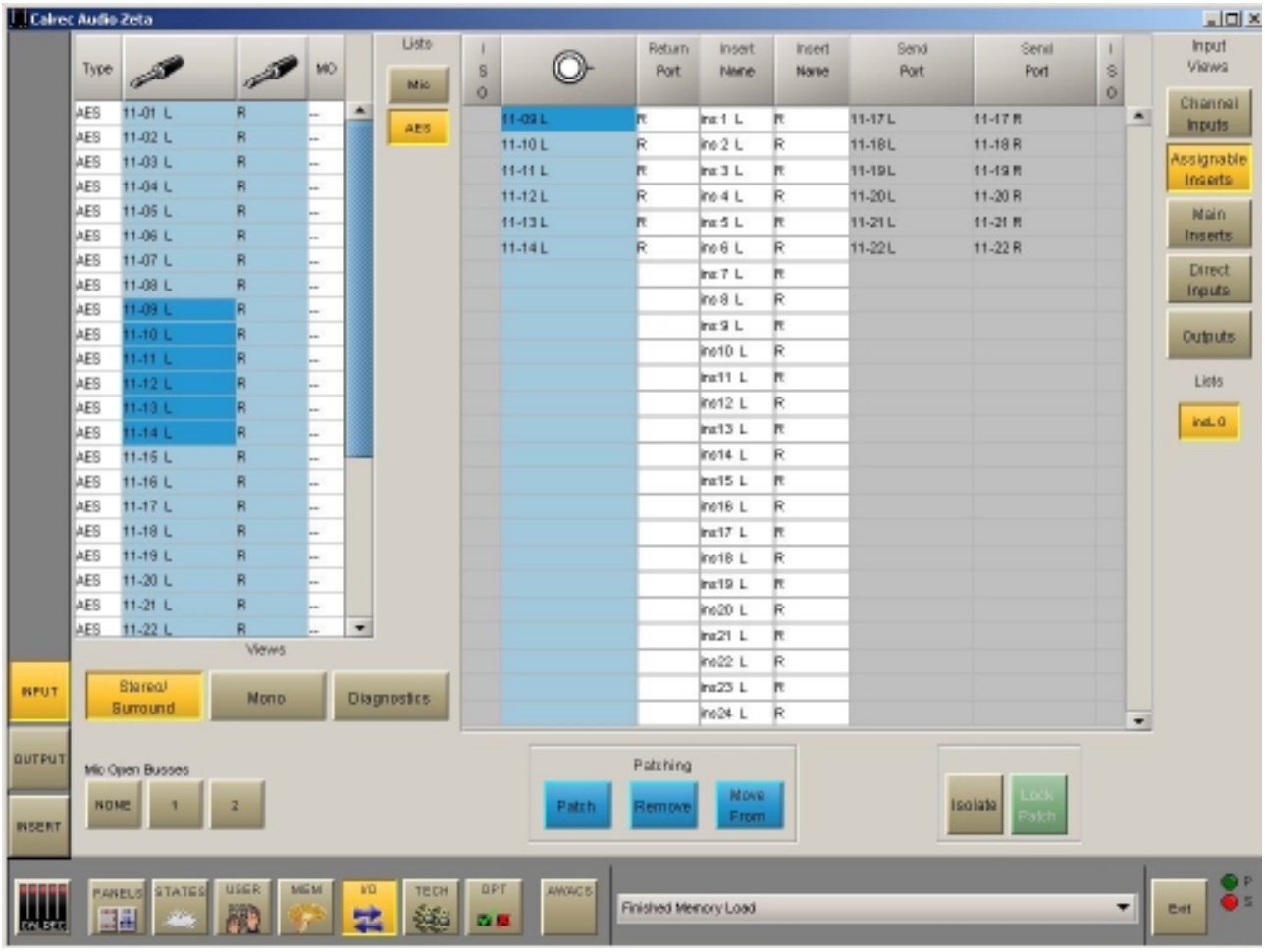

The output ports for assignable insert sends can be patched, moved and removed on the I/O - Output screen, by selecting “Assignable Inserts” from the list of output views. The input ports connected to the insert return can also be seen on this screen. These are set up on the I/O - Input screen.

Once this is done, inserts can then be patched to any channel or group using either the I/O - Insert screen or the selection controls in the Input/Output section of the control surface.

Once an insert is connected to a channel or group, it is switched into its path using the IN and PRE FDR buttons in the Input/ Output section of the control surface.



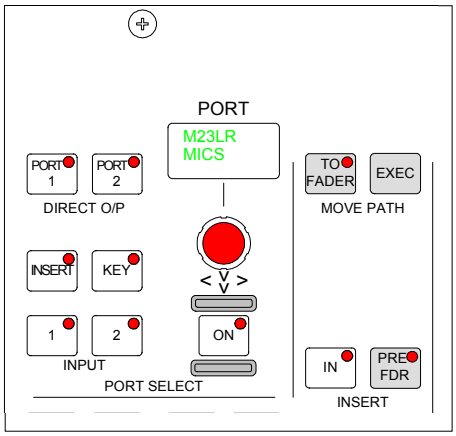
## ASSIGNABLE INSERT RETURNS

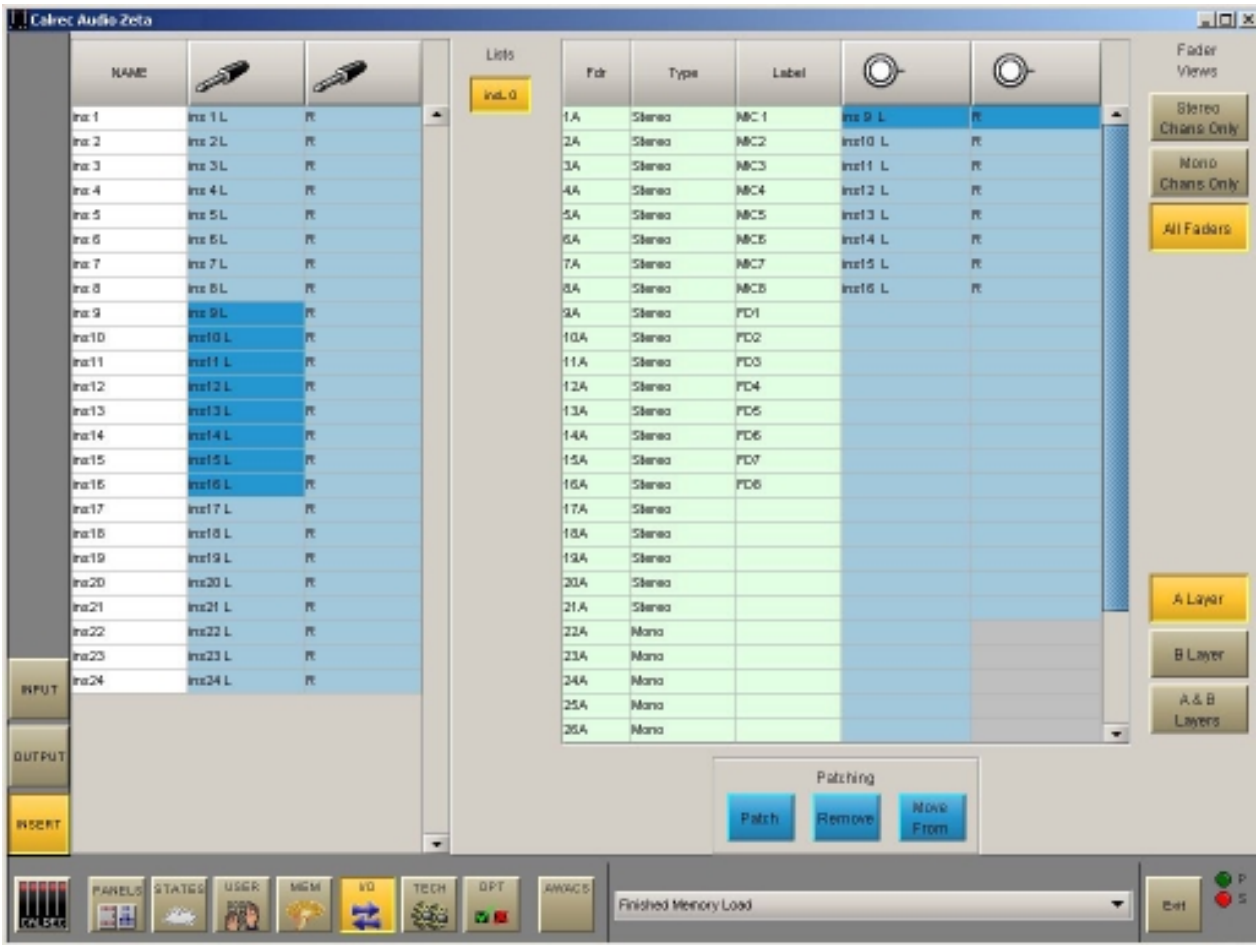

The input sources for assignable insert returns can be patched, moved and removed on the I/O - Input screen, by selecting “Assignable Inserts” from the list of Input Views. The output ports connected to the insert send can also be seen on this screen. These are set up on the I/O - Output screen.

Once this is done, the inserts can be patched to any channel or group using either the I/O - Insert screen or the selection controls in the Input/Output section of the control surface.

Once an insert is connected to a channel or group, it is switched into its path using the IN and PRE FDR buttons in the Input/ Output section of the control surface.

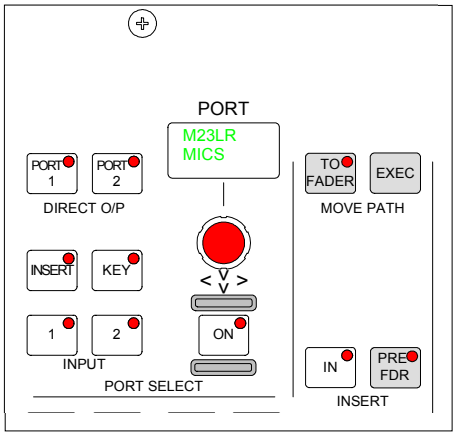


## INSERT SCREEN


Once the assignable insert sends and returns have been set up on the Input and Output screens, they can be patched to channels and groups on the I/O - Insert screen. The Fader View buttons select which paths are on display.

The assignable inserts can also be patched to channels and groups using the selection controls in the Input/Output section of the control surface. Once an insert is connected to a channel or group, it is switched into its path using the IN and PRE FDR buttons in the Input/Output section.

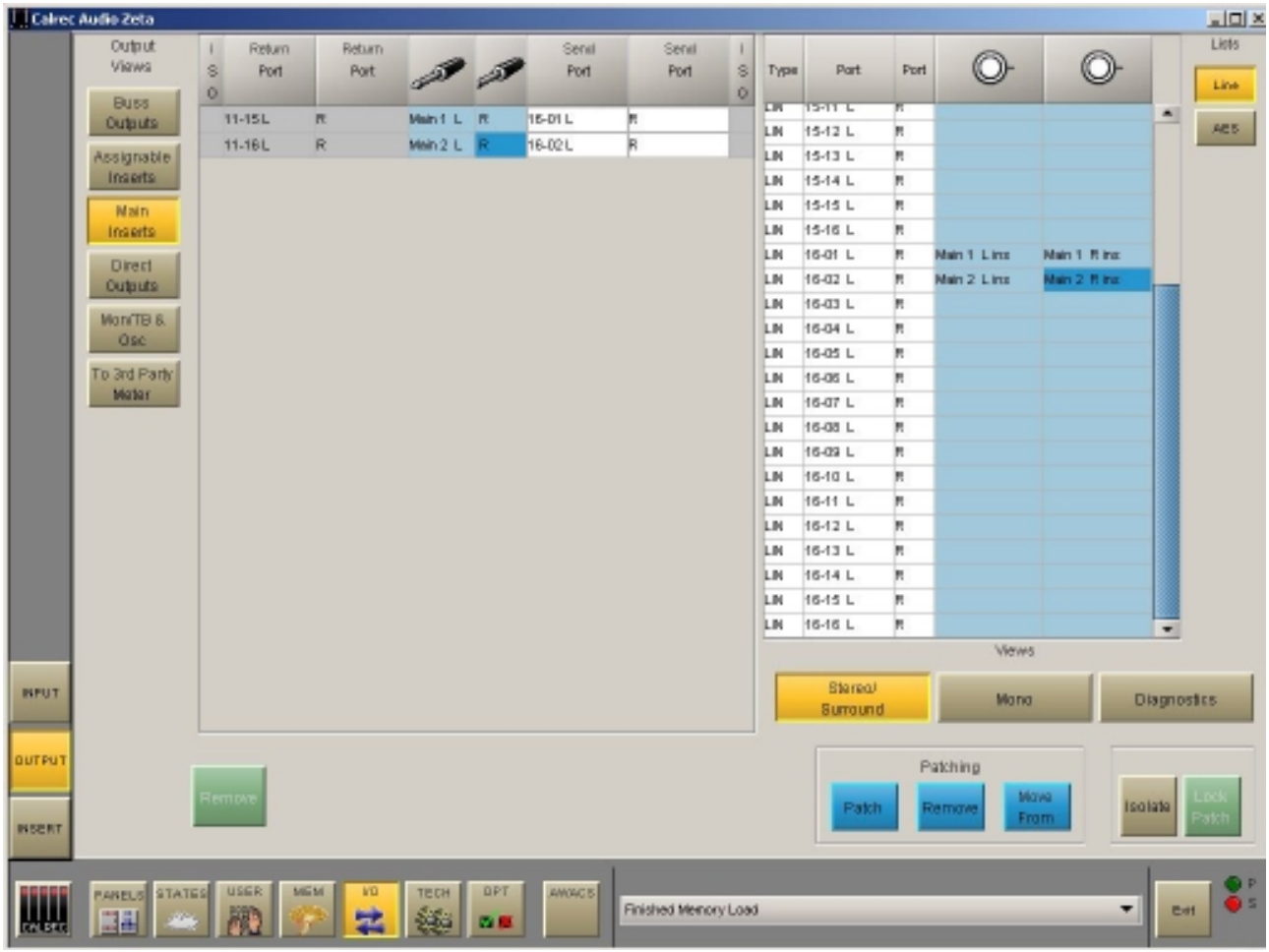



All the inserts can be accessed on the left hand side of the screen. Most inserts are treated as pairs in the labelling. L and R are used to distinguish the two halves of the pair. This makes it easier for them to be used as a stereo insert but does not necessarily mean they are stereo. The two halves of the pair can be used for separate mono signals.

Note: If groups are set to be mono, only the left insert will have a signal on it.

## MAIN INSERT SENDS

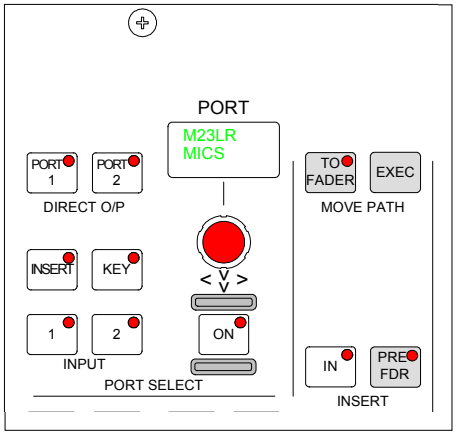



The output ports for main insert sends can be patched, moved and removed on the I/O - Output screen, by selecting “Main Inserts” from the list of output views.

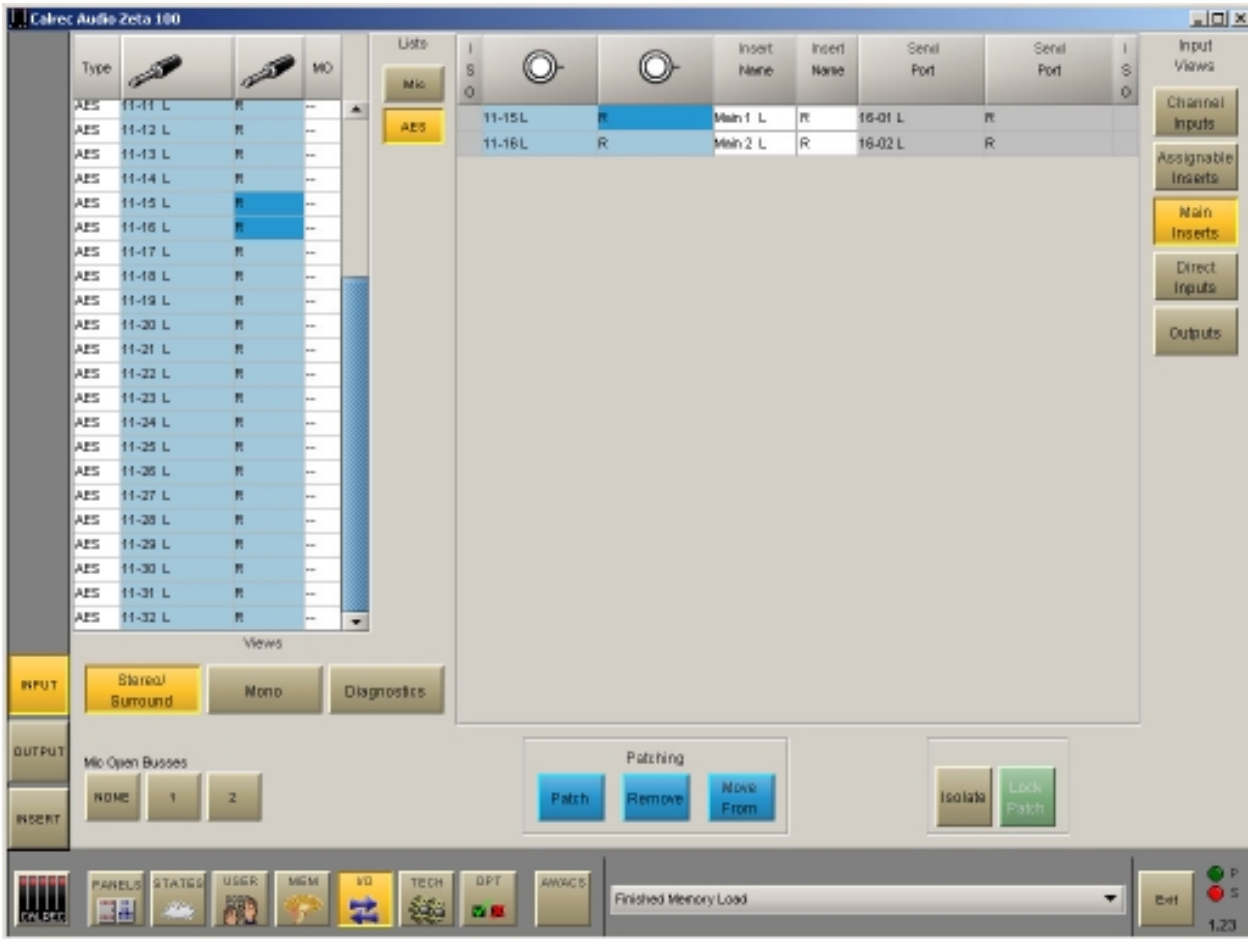
The Input ports connected to the main insert return can also be seen. These are set up on the I/O - Input screen.

The main inserts are dedicated to the main outputs. Once the ports have been set up the insert can be switched into the main path using the IN and PRE FDR buttons in the Input/Output section.



## MAIN INSERT RETURNS

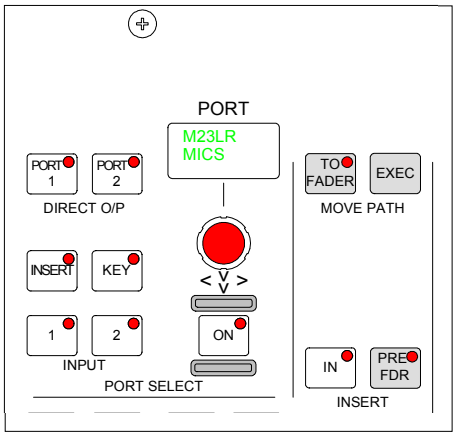


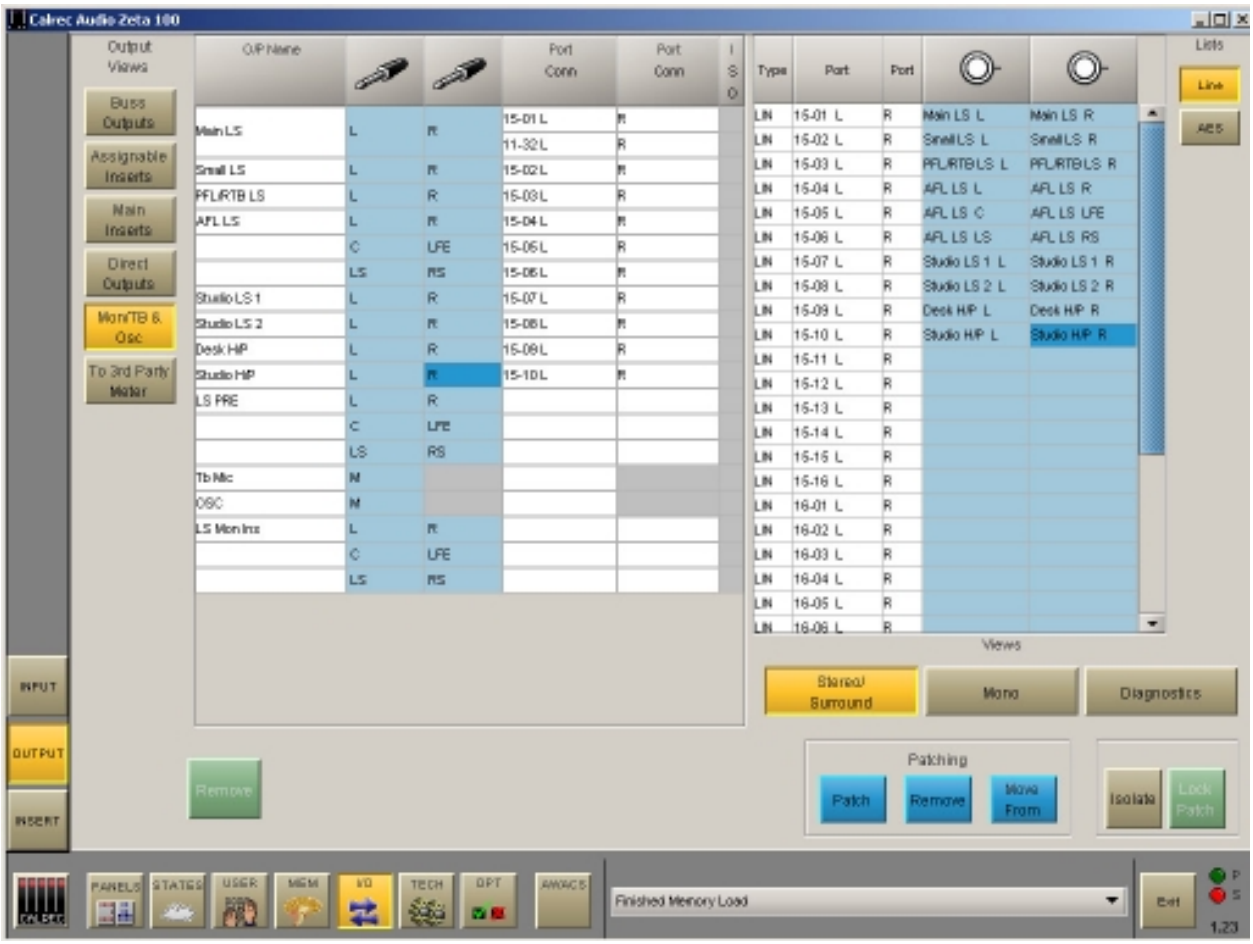

The input sources for main insert returns can be patched, moved and removed on the I/O - Input screen, by selecting “Main Inserts” from the list of Input Views.

The output ports connected to the main insert send can also be seen. These are set up on the I/O - Output screen.

The main inserts are dedicated to the main outputs. Once the ports have been set up the insert can be switched into the main path using the IN and PRE FDR buttons in the Input/Output section (shown).



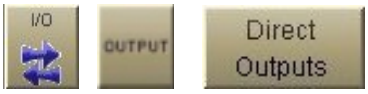
## MONITORING, TALKBACK AND OSCILLATOR OUTPUTS

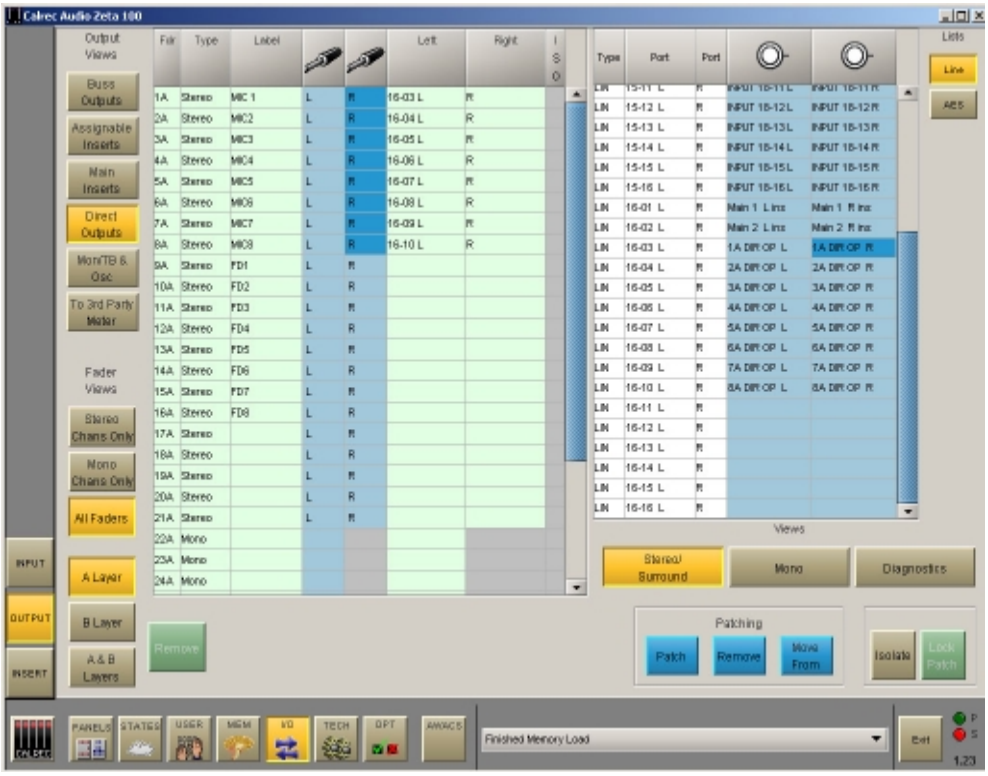

The output ports for monitoring, talkback and oscillator outputs can be patched on the I/O - Output screen, by selecting “Mon/TB & Osc” from the list of Output Views.

The send ports for the LS monitor insert are also patched on this screen. The return ports are patched on the Options - MON TB + Tonescreen.

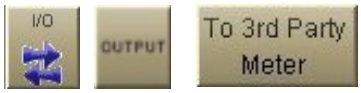
## DIRECT OUTPUTS



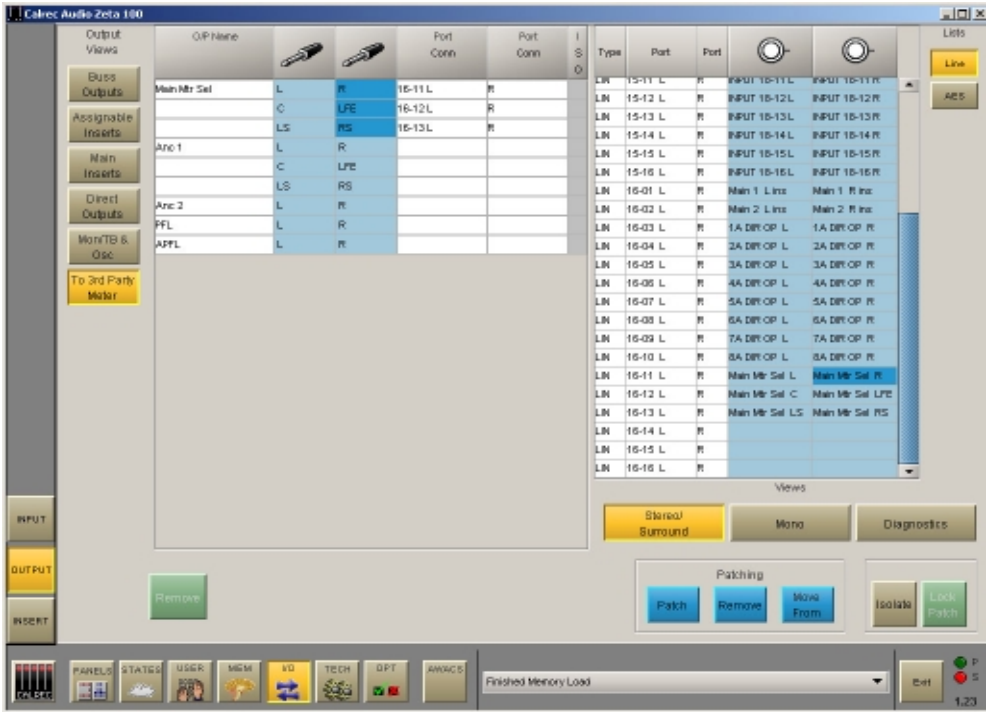

The output ports for direct outputs can be patched on the I/O - Output screen, by selecting “Direct Outputs” from the list of output views.



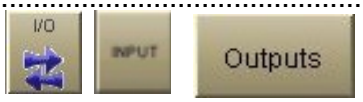

## 3RD PARTY METER



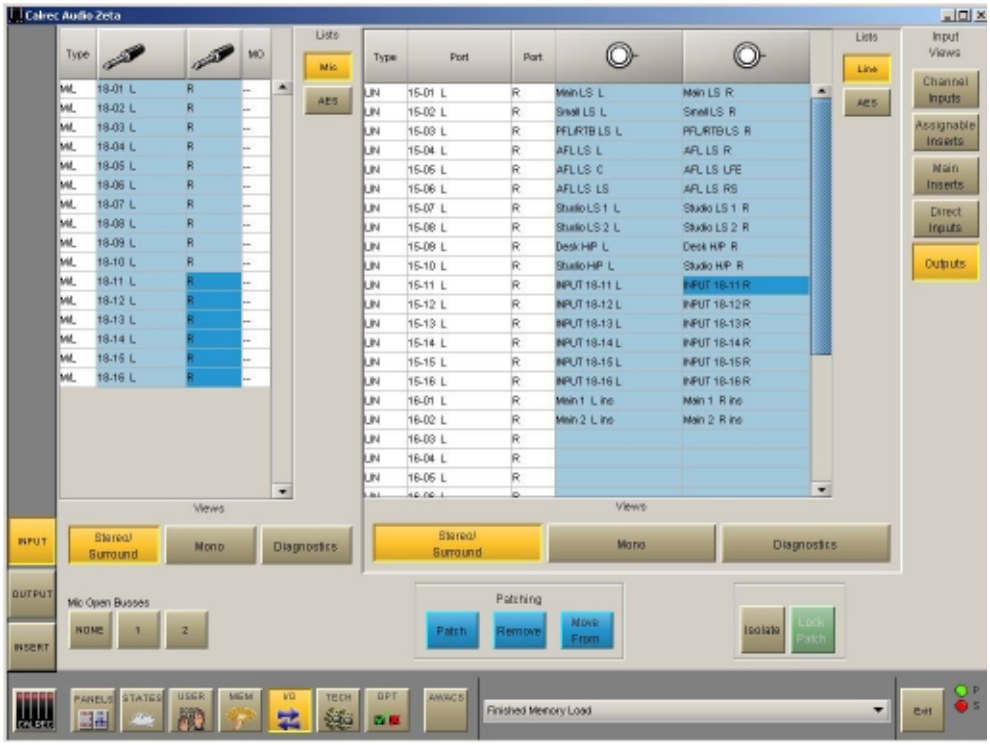

The output ports for the External Meters, such as a DK phase scope, can be patched on the I/O - Output screen, by selecting “To 3rd Party Meter” from the list of Output Views.  Most of the meters on the console are driven internally and do not require output ports.



## INPUTS TO OUTPUTS

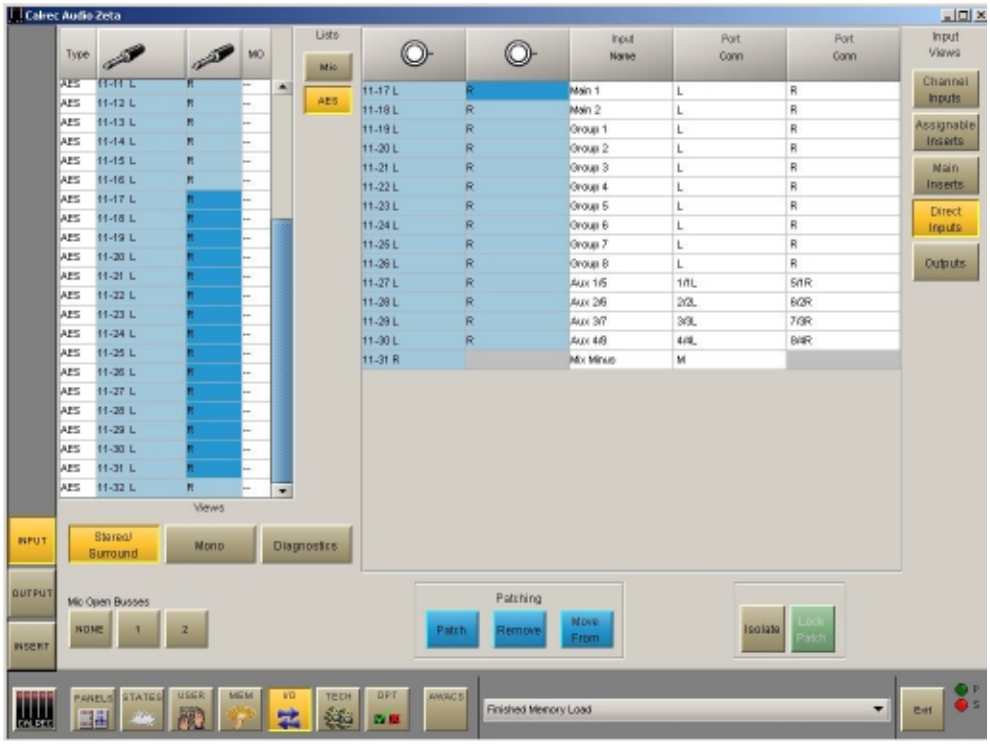



Input ports can be patched directly to output ports on the I/O - Input screen, by selecting “Outputs” from the list of Input Views.

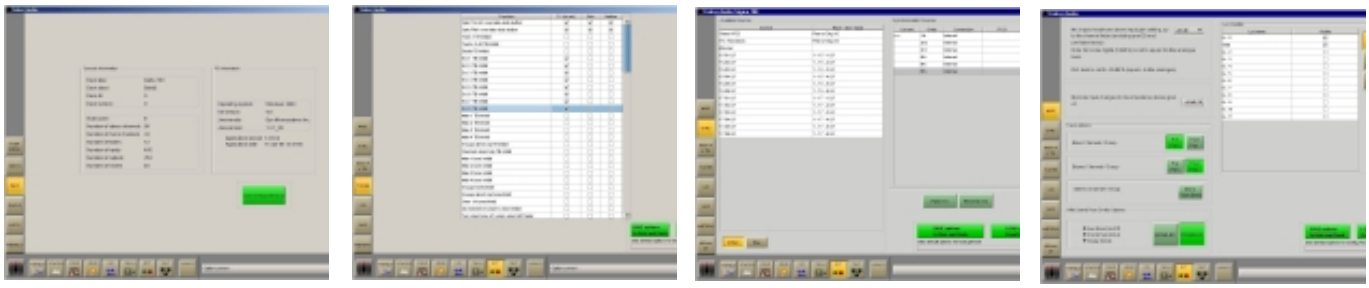



## DIRECT INPUTS


Input ports can be patched to Direct Inputs on the I/O - Input screen, by selecting “Direct Inputs” from the list of Input Views.



# Engineering Information



## TECH SCREENS

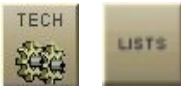
The TECH screens are for the studio technician and Calrec Support Engineers to diagnose problems, access system information such as lists and rack card configuration, save the default studio memory and enter password protected modes.


The Tech-User Mode screen allows the studio technician to enter the password protected "Technician" or "Supervisor" Modes allowing him or her to operate critical parts of the system, and set up passwords for other "Technicians" or "Supervisors".

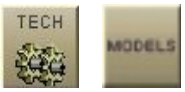

The Tech-MSGS screen reports messages, which form a history which can be used by Calrec engineers to diagnose any problems which may arise.


The Tech-Info screen (shown below) displays system information and allows the Default Memory to be saved.


The Tech-Racks screen gives details of the systems rack configuration.

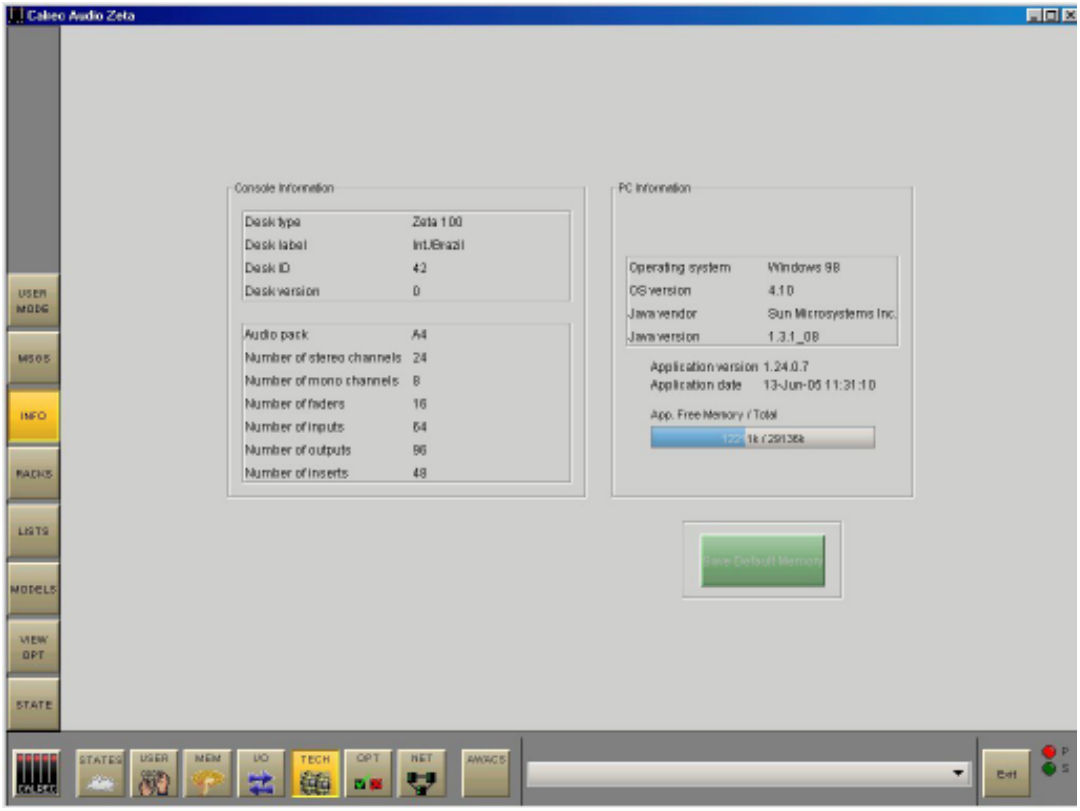



The Tech-Lists screen shows the contents of the lists of inputs, Outputs and Inserts which are available on the I/O Matrix and I/O screens. These will have been set up during installation.



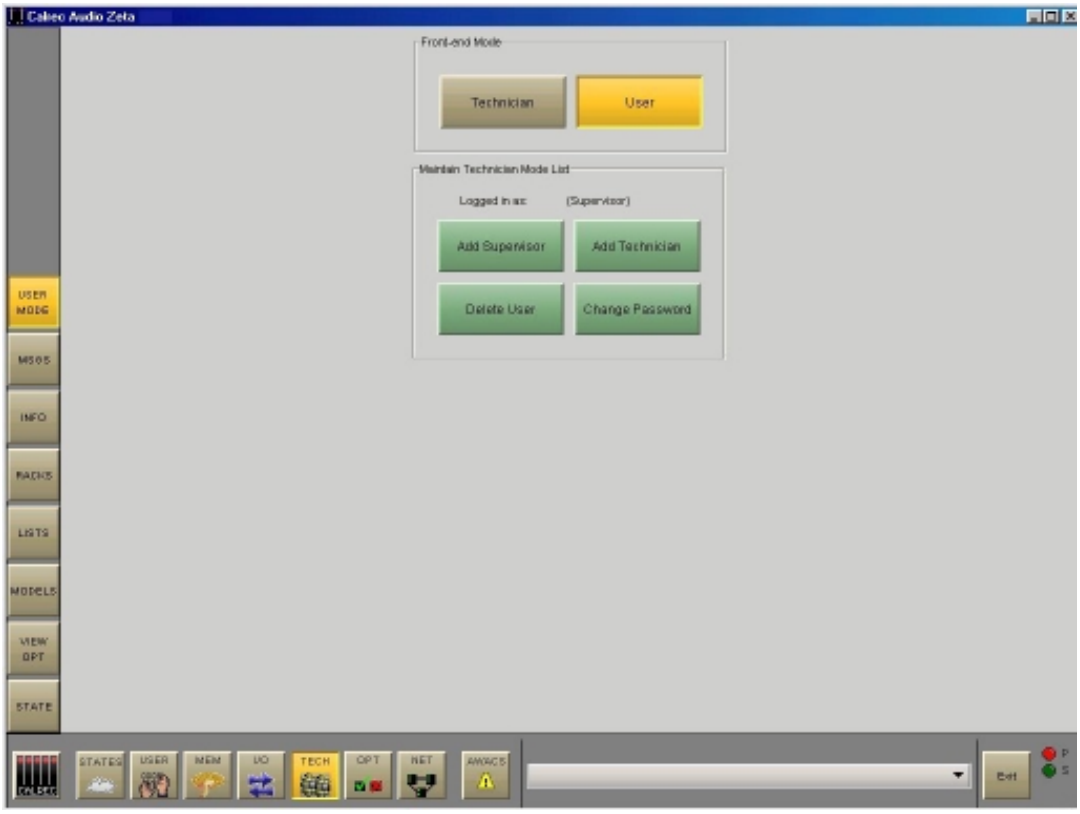

The Tech-Models screen shows fader and path models for the system.

### Info Screen and Default Memory




The Default Memory will usually be created upon installation of the console using the Save button on this screen. The default memory could contain the fixed port set-ups which match the studio wiring, and any other settings which hardly ever change. It could have all channel settings OFF or flat, with no routes made, and would be available as a start up memory, from which more specific memories could be created. It is recalled using the Default Set Up console functions button on the control surface.

## Tech - User Mode


The console can be in one of three modes, “User”, “Technician” and “Supervisor”. Operation of certain screen functions is only available in “Technician” or “Supervisor” mode. These modes are password protected to add an extra layer of security. The TECH-USER MODE screen is used to log in and out of different modes, and manage usernames and passwords for the different types of user.

It is intended that all set-up procedures and configuration may be carried out and maintained by an engineer or technical operator. Technician mode allows unrestricted access to all features of the system, permitting an authorised engineer to prepare the console for use. User mode restricts access to certain screen functions, to prevent accidental changes being made. Supervisor mode allows management of usernames and passwords for technicians and users.

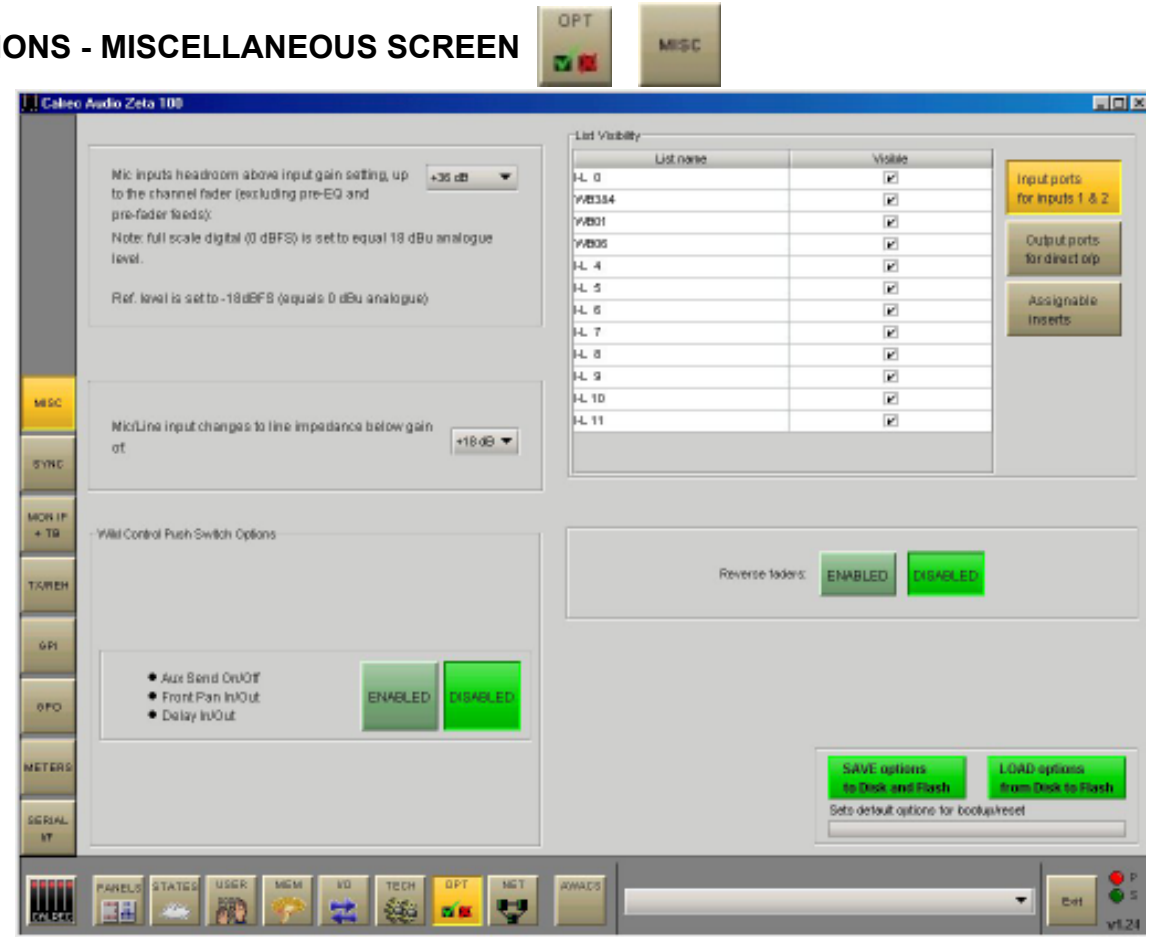
When the system is in Technician or Supervisor mode, the TECH icon at the bottom of the screen will flash.

### Usernames and Passwords

The PC will initially be set up with two sets of usernames and passwords:

| Username | Password | Description |
|---|---|---|
| CalrecAudio | (None) | This user can install and run programs, but not change PC hardware settings, (i.e. set-up network, install drivers). This user is intended to be used during normal operation of the PC. |
| CalrecAudioAdmin | calrec | This user has full rights to the PC, and can install and change PC hardware settings. This user is intended for use during re-configuration of the PC and to set up Hydra Audio Networking. |

## OPTIONS - MISCELLANEOUS SCREEN




### Microphone Input Headroom

The channel microphone input headroom can be selected here. This is the headroom available above the input gain setting, up to the channel fader. For example, if the input gain is set to 40 dB and the mic input headroom is 36 dB, then the channel will handle up to -4 dB up to the fader which can be backed off to avoid clipping of the programme output. Any pre-fader insert or pre-fader feeds to auxes, tracks, or direct outputs will not handle this level, so these should not be used where this headroom is needed. Selecting a high headroom value will compromise the noise spec slightly, but in practise this should not be noticeable.

### Mic/Line Input Impedance

The point at which the Mic/Line input Impedance changes can be set here.

### Port List Visibility

The studio engineer can set which port and insert lists can be accessed on the Input/Output section of the control surface. This makes selection easier, as it reduces the number of times the button has to be pressed to scroll through the available lists. All lists are always available on the I/O screens.

### Track Options

Global options can be set for how channels and groups feed the track routing selector. They can be pre or post the channel or group pan, and stereo channels and groups can be sent as mono.

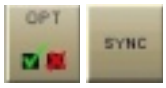
### Wild Control Push-Switch Option

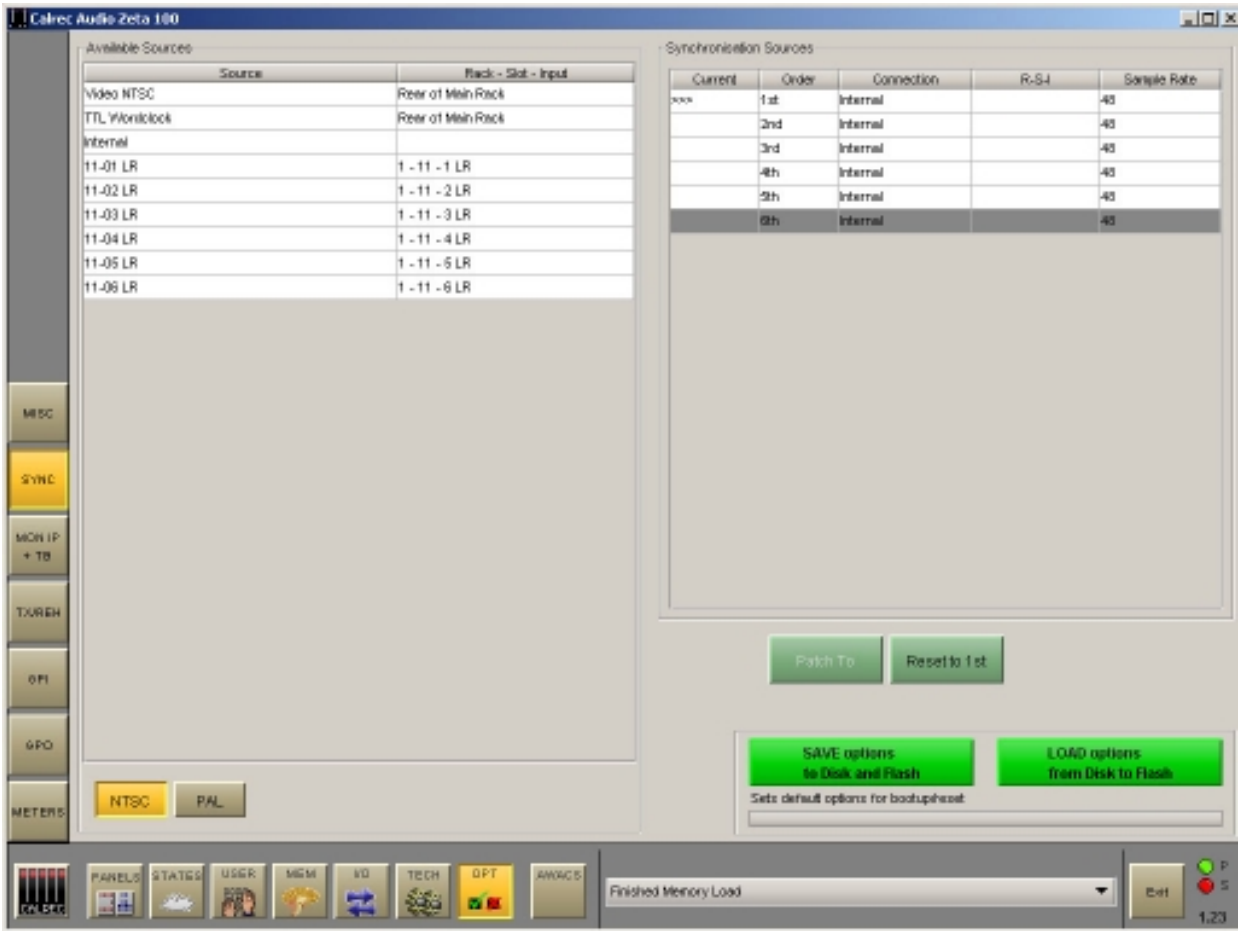
If the Aux Send, Input Delay or Front Pan controls are assigned to a wild control, their ON/OFF or IN/OUT status can be controlled using the wild control push-switch if enabled here.

### Reverse Faders

The console's faders can be set to work in reverse, using the enable button.

## OPTIONS - SYNCHRONISATION SCREEN




### Available Sources

The system can be pre-set with up to five external sync sources, plus internal, such that if the 1st source fails, it will automatically switch to the 2nd, and so on. One of the external sources can be Video, (PAL or NTSC). TTL wordclock is another possible external source.

AES inputs on the console can also be used as an external source. Please note that the facility for locking to external AES sources is restricted to the first six inputs of each AES card in the console. When using an AES input or wordclock as a source, the system will tolerate a variation of up to +/- 100 Hz in the frequency of the source.

### Assigning Synchronisation Sources

Synchronisation sources are assigned by selecting an available source from the list on the left side of the screen, then selecting one of the five places in the priority list on the right side of the screen, and selecting Patch To.

### Reset to 1st

If the system is running on any of the selections 2 to 6, because the lower numbered ones have failed, and the 1st source is repaired, the system can be RESET TO 1ST during any convenient off-air period.

## MONITOR LS PANEL SETUP



The screen allows the monitor LS user-definable buttons to be set up. The left side of the screen shows a representation of the monitor LS controls. The right side of the screen lists all the available monitor sources.

Monitor sources are allocated to the user-definable selection buttons as follows:

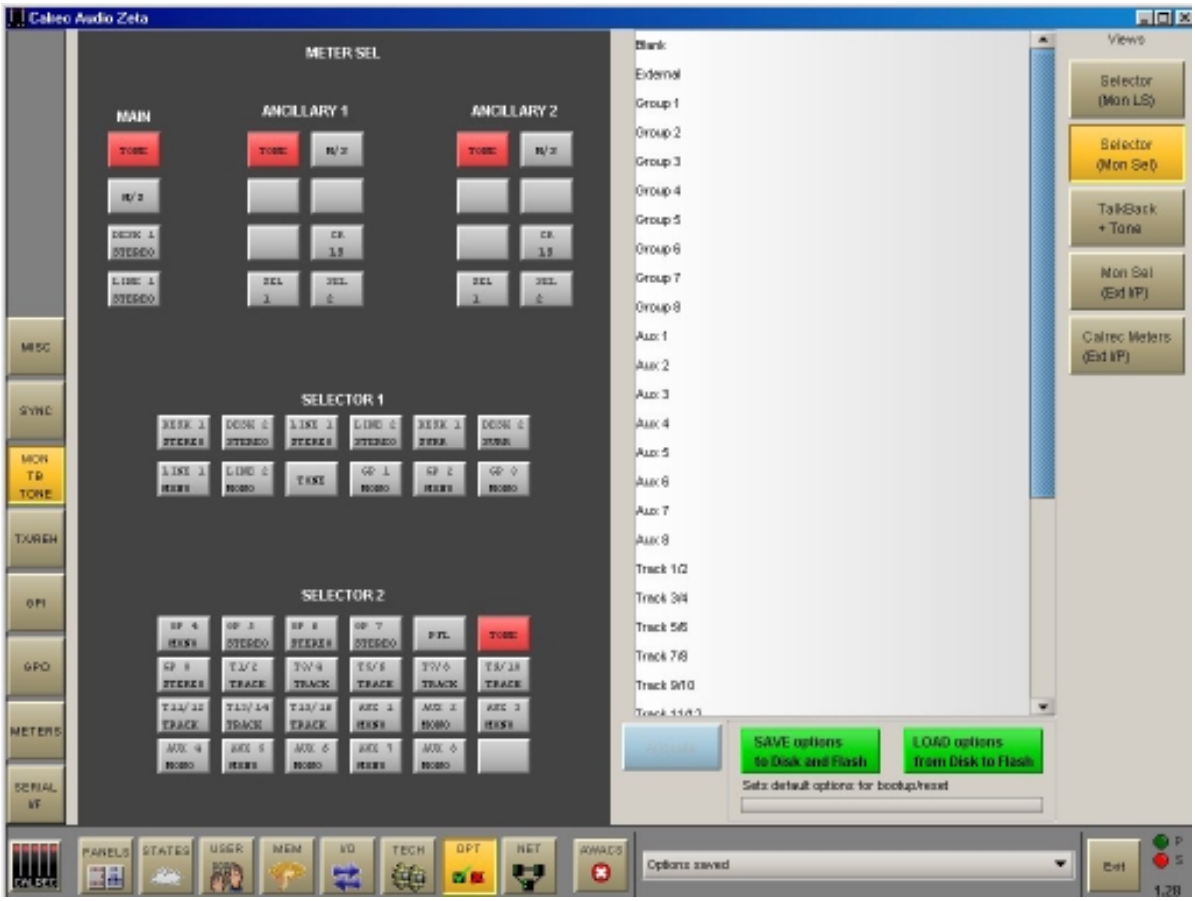
- Select the required selection button on the virtual monitor panel (screen button flashes)
- Select the required monitor soure from the list
- Select “Allocate” 


For external sources, a pop up window allows the user to enter a suitable label for the button, and allows the user to choose whether the source is mono, stereo or surround.


A similar screen exists to allocate monitor sources to the monitor selector buttons.

Changes to the monitor configuration on this screen can only be done in “Technician” Mode.

## MONITOR SELECTOR PANEL SETUP


The screen allows the monitor selector user-definable buttons to be set up. The left side of the screen shows a representation of the monitor selector controls. The right side of the screen lists all the available monitor sources.

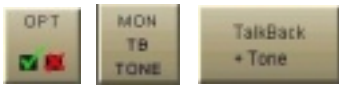
Monitor sources are allocated to the user-definable selection buttons as follows:

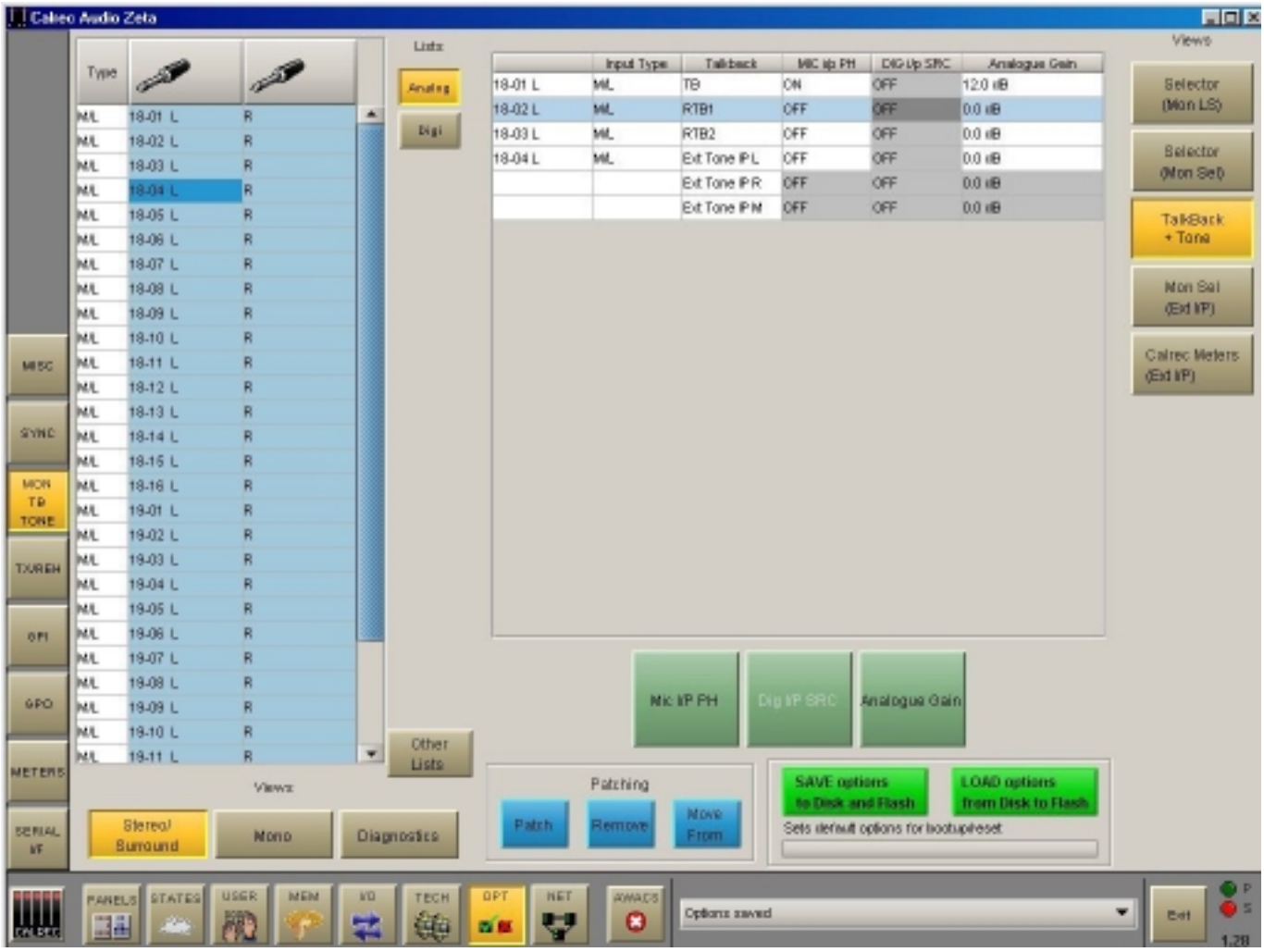
- Select the required selection button on the virtual monitor panel (screen button flashes)
- Select the required monitor soure from the list
- Select “Allocate” 


For external sources, a pop up window allows the user to enter a suitable label for the button, and allows the user to choose whether the source is mono, stereo or surround.


Changes to the monitor configuration on this screen can only be done in “Technician” Mode.

## TALKBACK AND TONE INPUTS

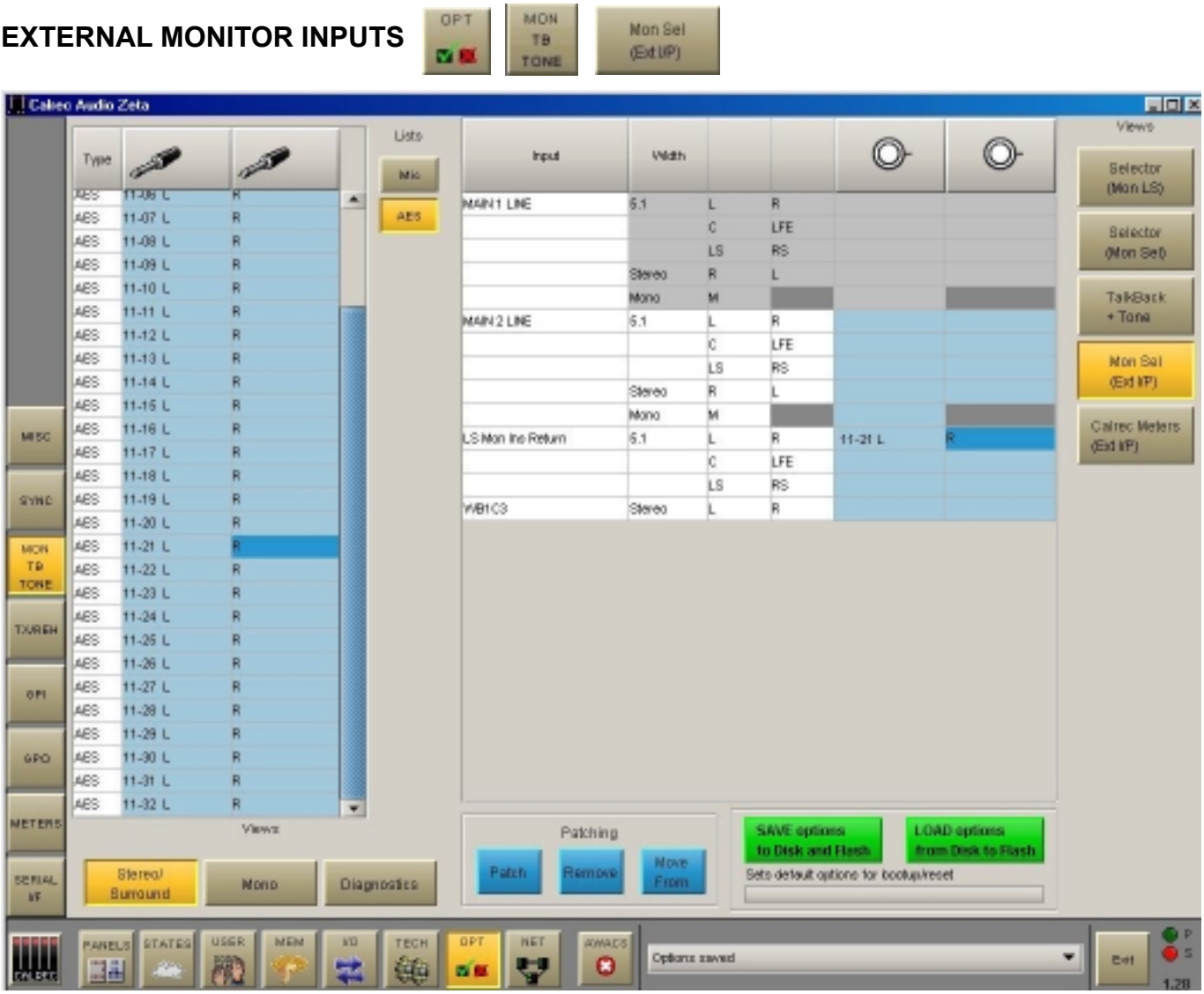



The input sources for Talkback, Reverse Talkback and external oscillator (tone) can be patched, moved and removed here. Assignment is made by selecting a source and a talkback or tone input, and selecting Patch. Talkback input ports can be any kind of port.

The parameter buttons provide controls for analogue gain control (coarse), Phantom Power (mic/line) and SRC switching for the input (AES). When selecting analogue gain, a box will appear where the gain can be selected. Selecting Mic i/p PH will turn phantom power on for mic/line inputs. Dig I/P SRC will switch SRC on for AES inputs.

## EXTERNAL MONITOR INPUTS

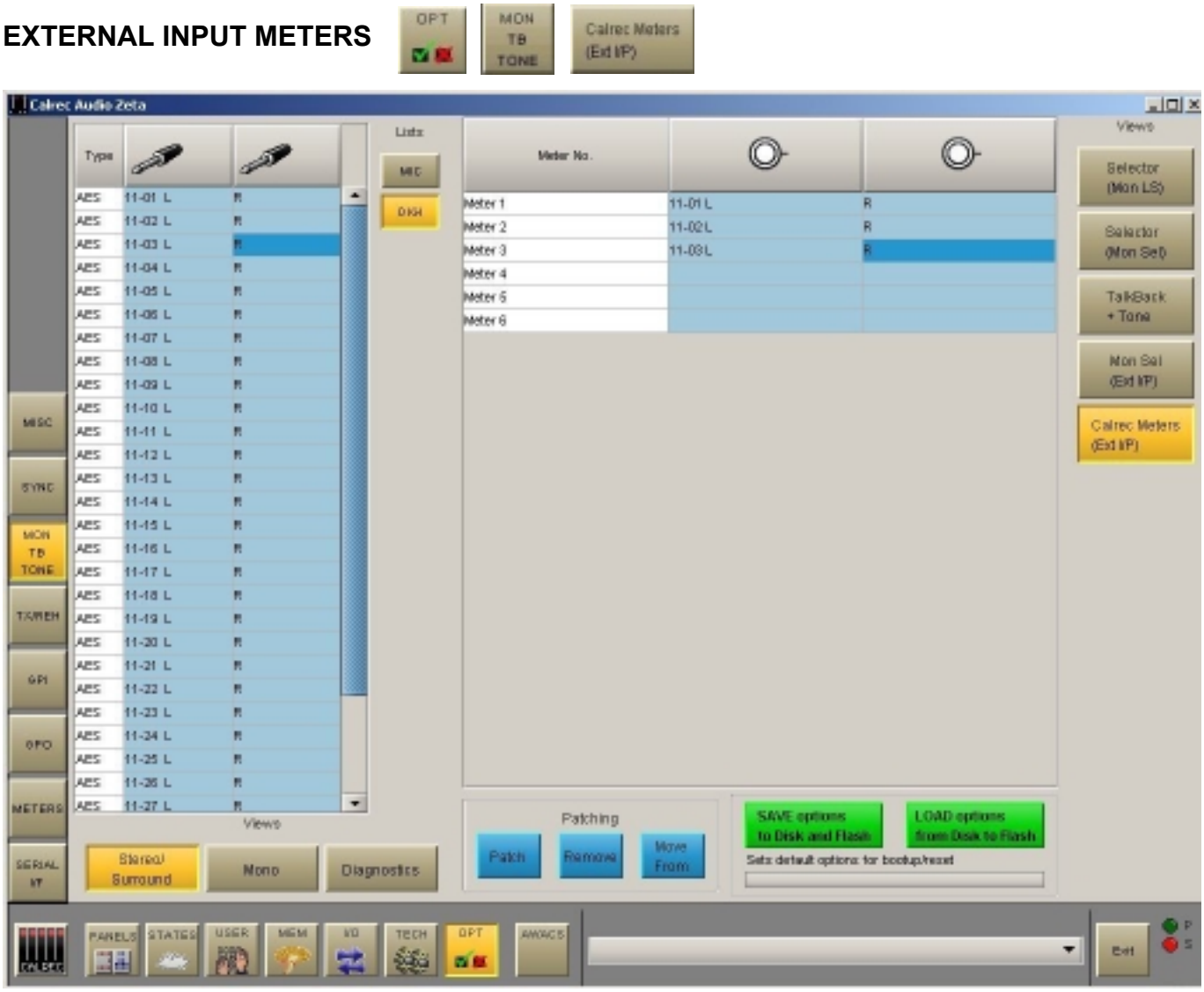



The input sources for external monitor inputs can be patched, moved and removed here. Assignment is made by selecting a source and a monitor input, and selecting Patch. The label of the external input will correspond to the text on the button as shown on the Monitor Selector View.

Return ports for the LS monitor insert are patched here also. The send ports are patched on the I/O - Outputs - Mon TB & Osc Screen. The LS monitor insert is switched in and out on the States screen.

The main line monitor inputs are applicable when the main line output monitor is set to be returned into the desk via an external distribution. Otherwise, the main line monitor points are taken from the main outputs within the desk, before they have passed though the output ports.

## EXTERNAL INPUT METERS

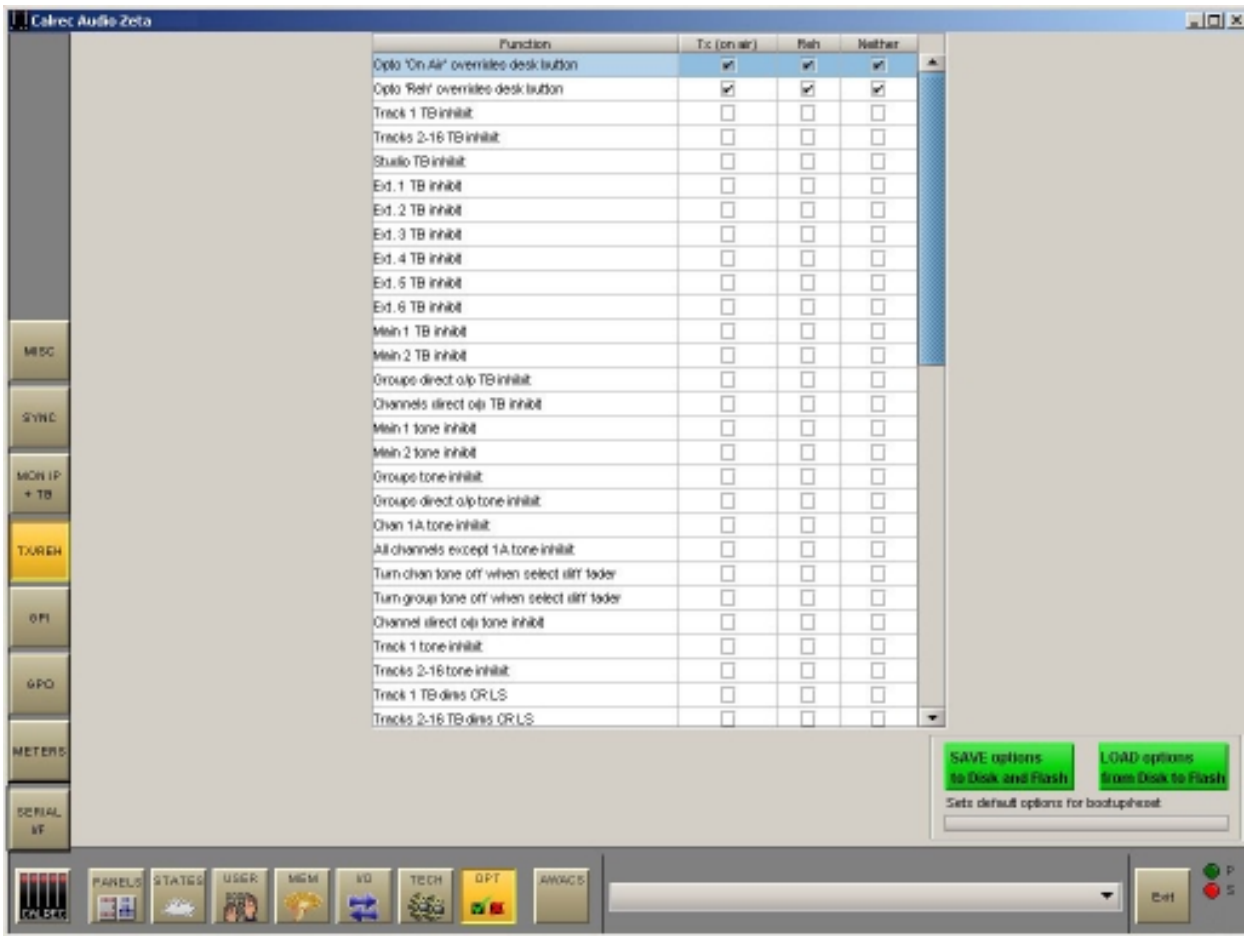



The input sources for external input meters can be patched, moved and removed here. Up to 6 external input sources can be metered.

External input ports are selected from the available lists on the left of the screen. Different lists are accessed using the selection buttons. Assignment is made by selecting an input source and a meter, and selecting Patch.

## CONDITION SWITCHING (TX/REH) SCREEN





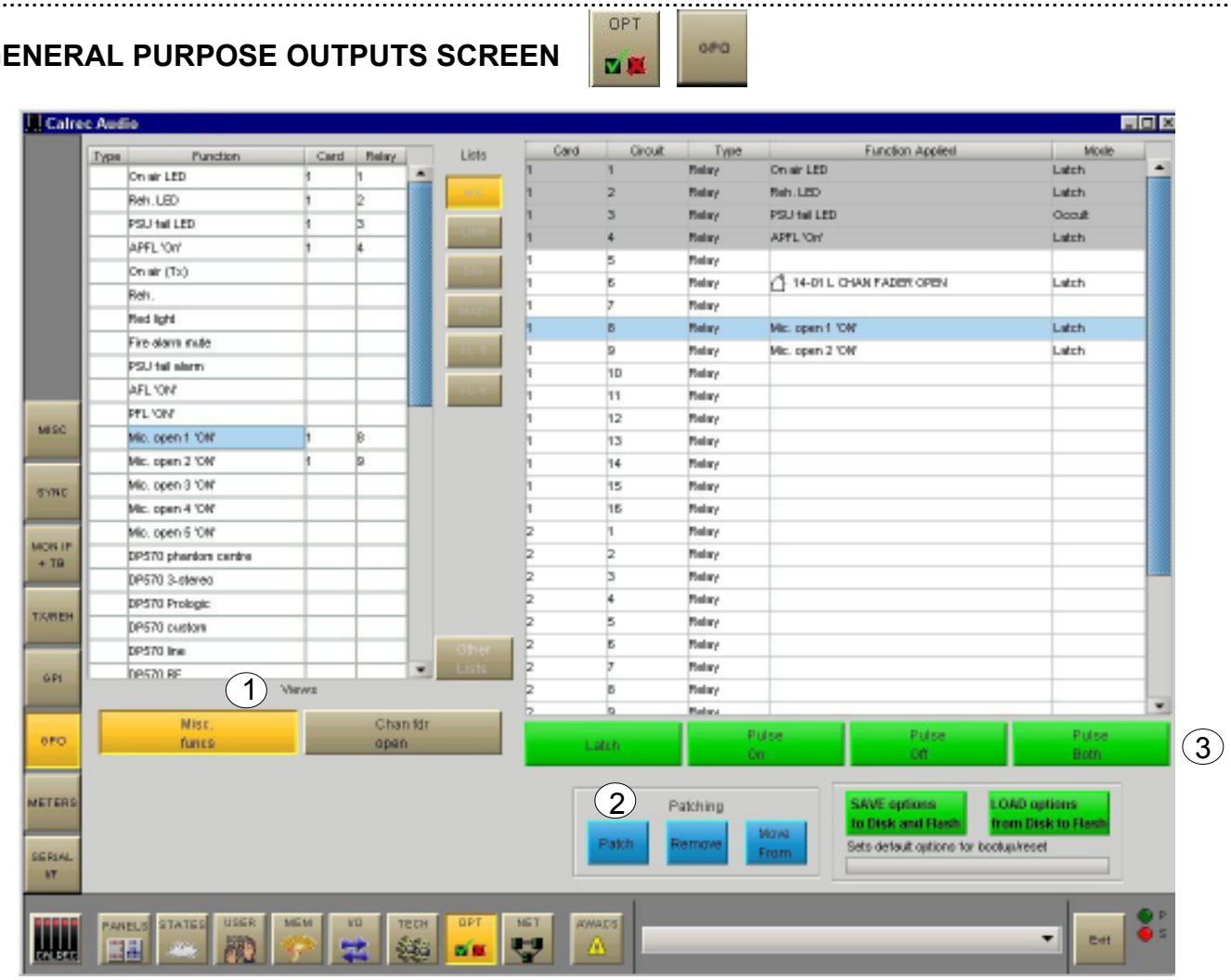

This screen allows the condition switching for the system to be set up.

There are three modes which the system can be in: Transmit (TX or On Air), Rehearse, or Neither. These are controlled from the ON AIR and REH buttons on the broadcast facilities panel, or from external inputs set up on the GPI screen.

Each function can be set to be active, or not, in any of the three states (except for the “On Air” and “Reh” optos which can only override the desk buttons or not).

The functions provided are to cater for different requirements. Therefore some combinations of settings will seem invalid.

## GENERAL PURPOSE OUTPUTS SCREEN




Up to 16 opto outputs and 40 Darlington outputs are available.

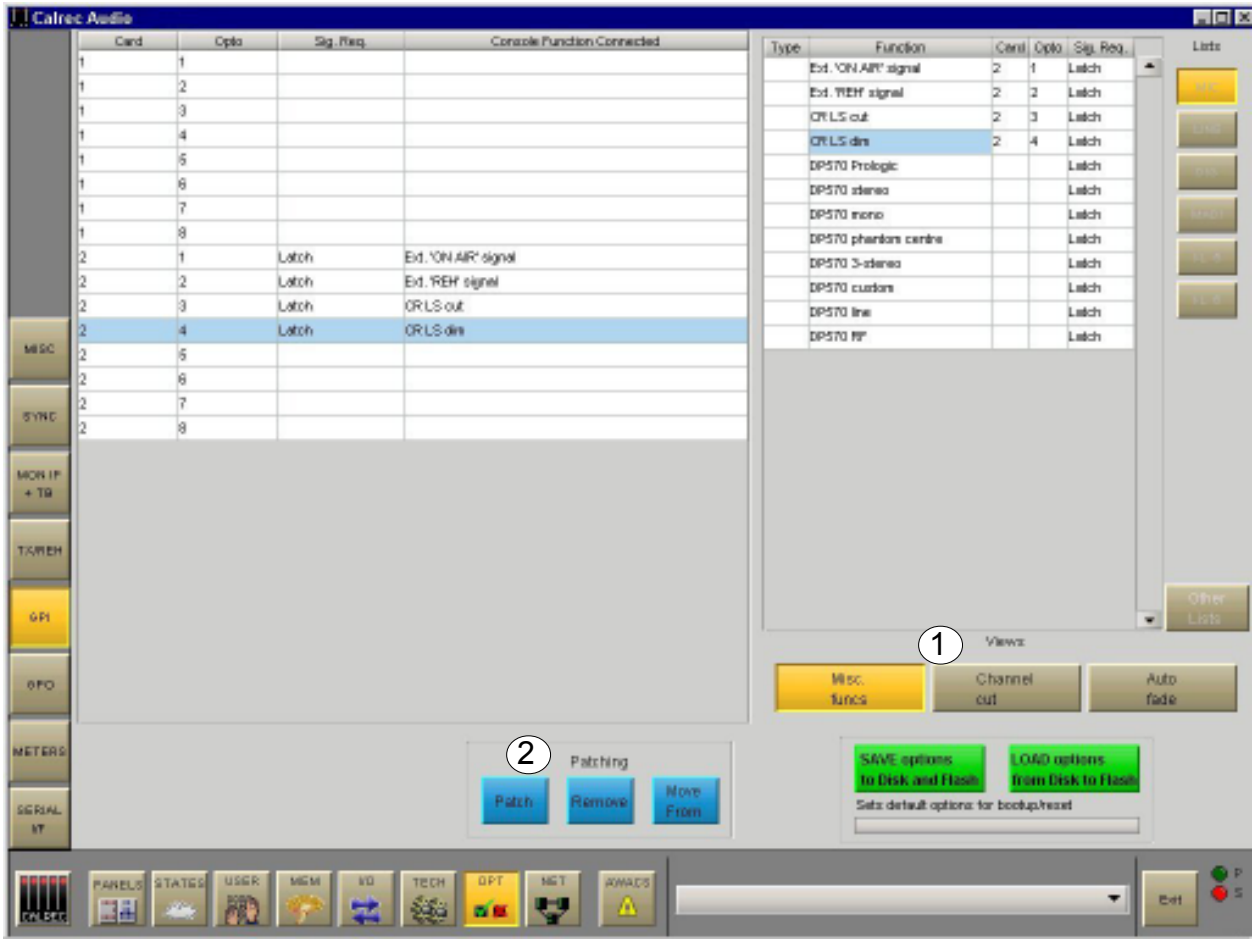
**(1) “Misc Functions” or “Channel Fader Open”**
The general purpose outputs can have various console functions assigned (with “Misc Functions” selected), or they can be set to operate when particular faders are opened (with “Channel Fader Open” selected). Console functions can be assigned to more than one general purpose output.

**(2) GPO Patching**
To make an assignment, select a function (left side of screen), and a general purpose output (right side of screen), and select Patch. Assignment can also be moved and removed, in a similar way to port connections.

**(3) Latch or Pulse**
The relay can be set to latch or pulse for 100 ms, when the console function is activated. When setting the relay to pulse, there are three different options.

| | |
|---|---|
| Pulse On | The relay is set to pulse when the function is activated. |
| Pulse Off | The relay is set to pulse when the function is de-activated. |
| Pulse Both | The relay is set to pulse once when the function is activated, and again when the function is de-activated. |

## GENERAL PURPOSE INPUTS SCREEN


Up to 32 general purpose inputs are available.

**(1) “Misc Functions”, “Channel Cut” or “Auto-Fade”**
The general purpose inputs can be assigned to various console functions (with “Misc Functions” selected), or they can be set to cut channels (with ‘Channel Cut’ selected). With “Auto Fade” selected, the general purpose inputs can be assigned to auto-faders to allow automatic cross-fading.

**(2) GPI Patching**
To make an assignment, select a general purpose input (left side of screen), and a function or channel (right side of screen), and select Patch. Assignment can also be moved and removed, in a similar way to port connections.

If general purpose inputs are patched to input ports, when fired externally, they will cut any channel to which that input port is connected.

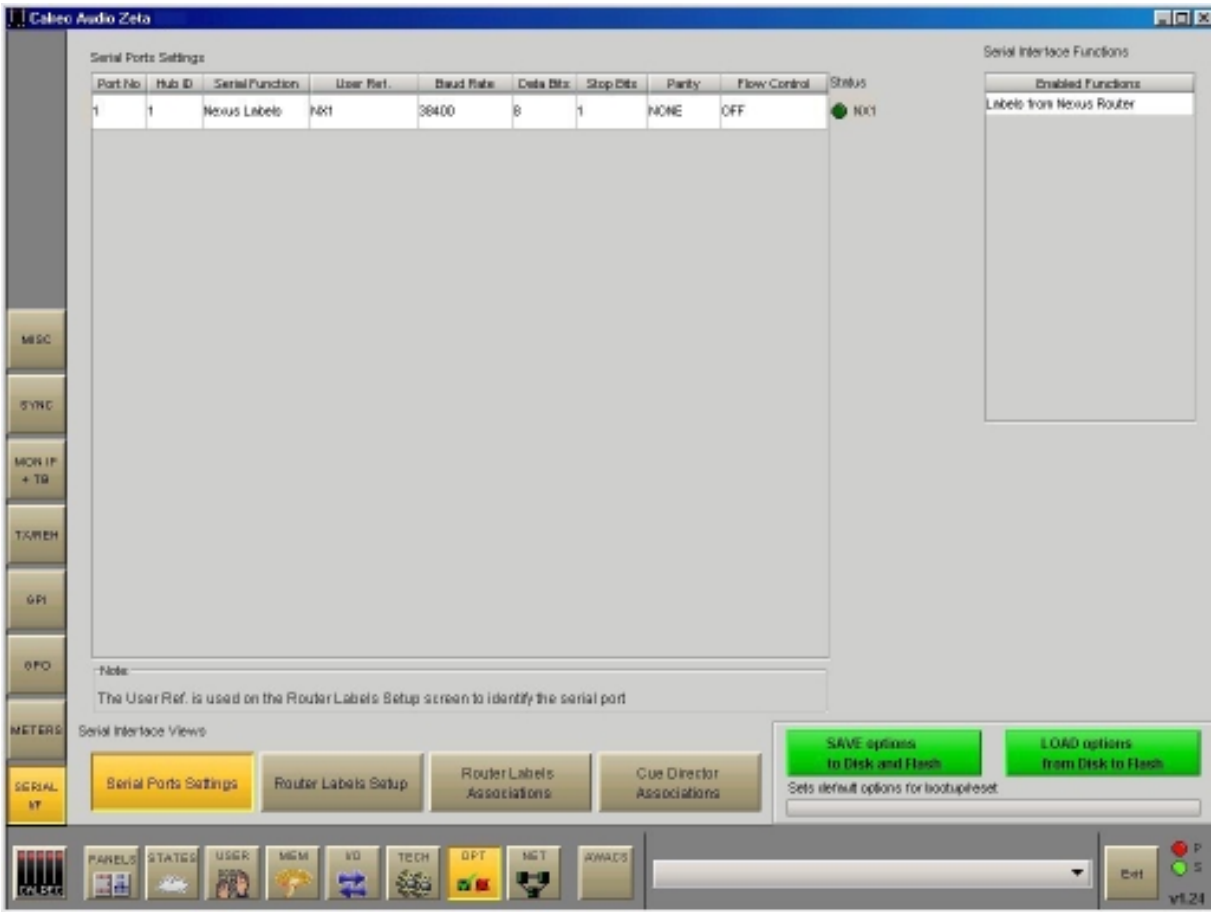
## SERIAL INTERFACE

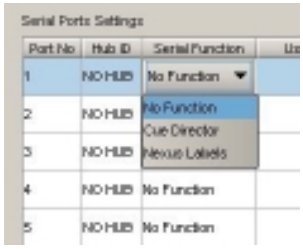

The system currently supports the following serial interfaces:

- Cue Director
- Nexus Router
- TSI Image Video 1000

Serial port setup and label associations are made using the Options-Serial I/F screens.

### Serial Port Settings Screen


The console has a serial interface port for allowing equipment to be connected to the system. The Serial Port Settings screen is used to tell the system what information it should receive from the serial interface port, by allocating a function to it from a drop down box in the Serial Function column. Only the serial functions which are enabled for the console will be available for selection.

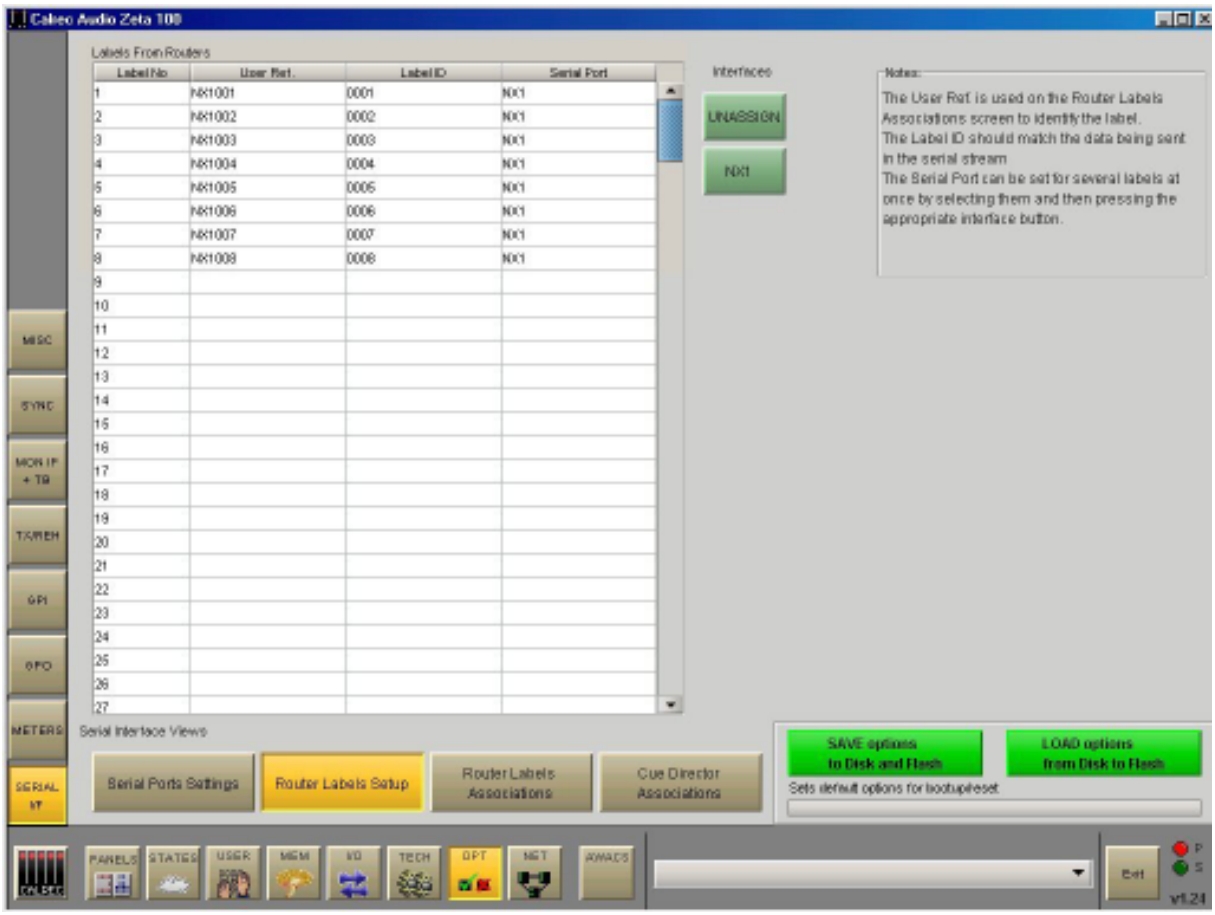
The function can be given a name by typing up to six characters in the USER REF column.

For each function there is an indicator which flashes when a valid message is received from the user serial port.

## Router Label Setup Screen


Some Routers incorporate a label interface which is used for the transmission of source (input) and destination (output) descriptions between itself and other equipment. When an audio signal from a Router is connected to the console, its associated label is transmitted to the console via a serial interface. The console can use these labels as input names, and they can then be displayed and used on the control surface and front end application.

The console can support up to 256 Router labels. This screen allows the link between messages from the router to be associated with one of the console's 256 labels.

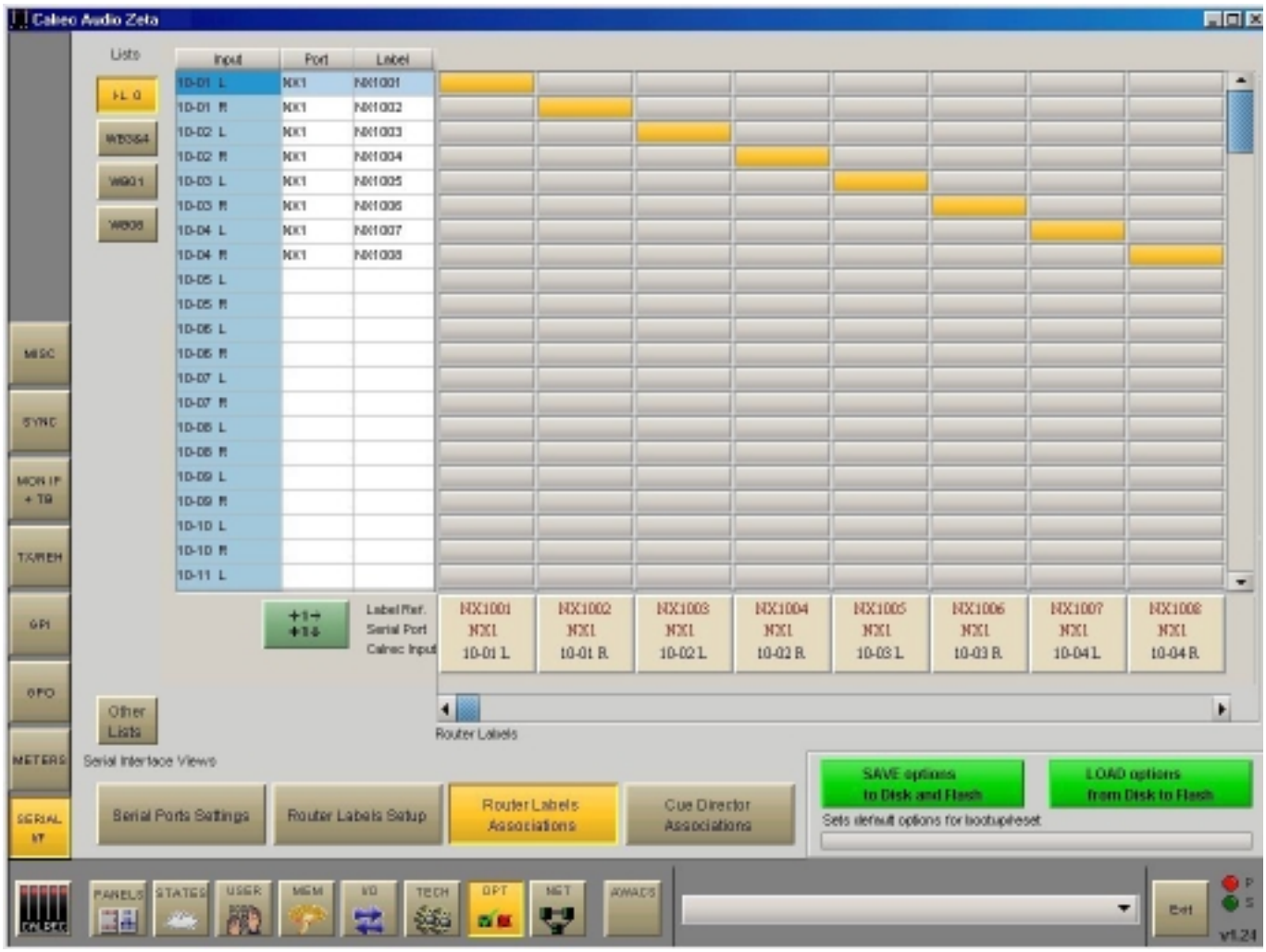



The serial port function previously set up on the Serial Port Settings screen will now have a selection button on this screen. To associate labels to the interface, select the label, or region of labels, and select the serial port function button. The serial port column tells the user which serial port function the label is linked to. The UNASSIGN button when selected will remove any assignment from the selected label(s).

A Router uses a reference code to define each of its output ports The user must enter these reference codes into the Label ID column for each label.

The User Reference column allows the user to give the label a friendly name of up to six characters.

## Router Label Association Screen


This screen allows each of the defined labels to be associated with one of the console's input ports. The input ports are shown down the left hand side of the screen, and the labels are shown along the bottom of the screen. This forms a grid, and associations are made by selecting the intersecting cell between input port and router label. Each leg of the input ports is always presented as if it were a mono port.

When an association is made, the cell will turn yellow. Associations can be unmade by selecting the cell again, whereby its colour will change back to grey. The +1 button is used to automatically move diagonally down the grid to the next association cell and toggle its condition. The action occurs out of sight even if you go beyond the viewed section of the screen.

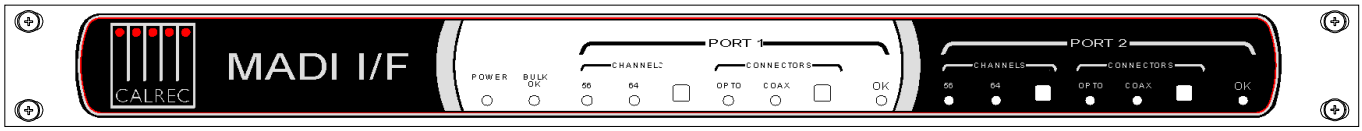
Once an input port is associated with a Router label, the labels will be visible on the fader label column on the I/O - Input screen on whichever channel the port is patched. If a new fader label is entered on the I/O - Input screen, it overrides the router label. The router label will also be displayed on the channel display on the fader module.

If the Router fails to communicate for longer than ten seconds then the Router label text is cleared and the fader labels revert back to displaying the input port label.

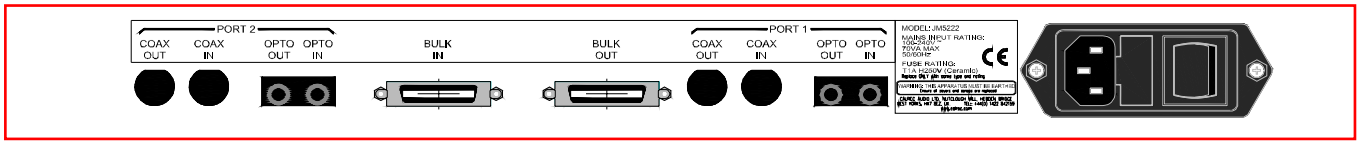
## MADI

The rack mounted MADI Interface unit contains two independent, AES10 MADI compatible interfaces.

### Front




### Rear



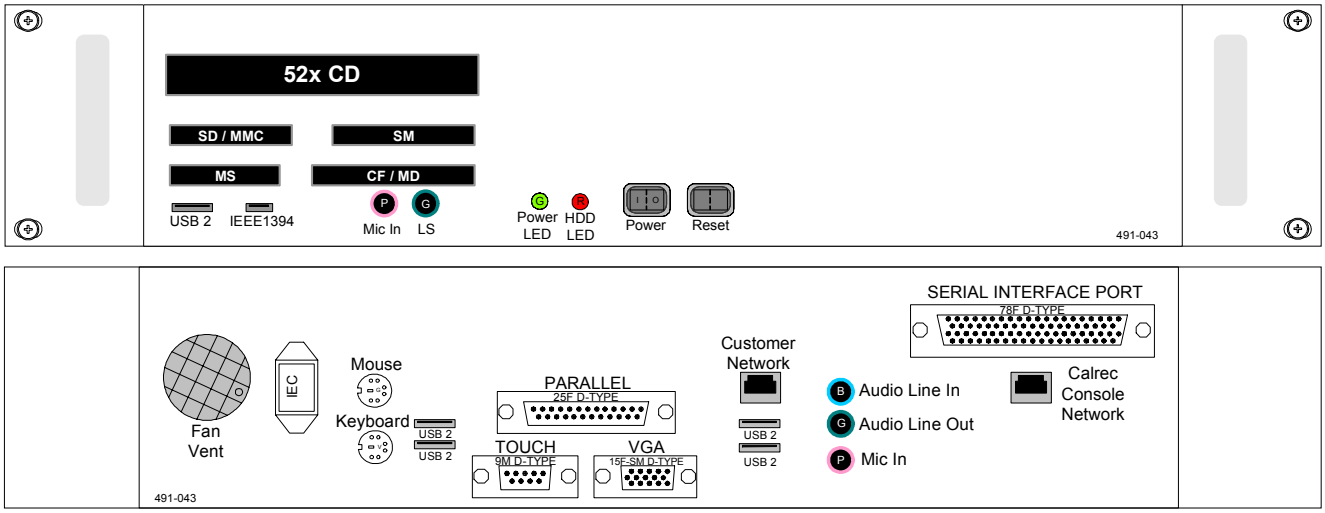

The two ports are interfaced to theconsole via a Wide Area Bulk (WAB) card, which occupies one of the AES/bulk card slots in the Processing Rack.

Each MADI interface can operate in either 56 or 64 channel mode and can transmit over a coaxial AND optical medium and receive over a coaxial OR optical medium. A switch allows receiver selection.

Sample Rate Conversion is not available on MADI inputs or outputs, therefore all equipment connected via MADI must be synchronised to the same source as the console.

## PC INFORMATION

| | |
|---|---|
| **Operating System** | Windows XP |
| **CPU** | Intel Celeron Processor (2GHz+) |
| **RAM** | 256 MB DDR RAM |
| **HDD** | 40GB |
| **CD ROM** | 52x |
| **Network Ports** | 2 x 10/100 |
| **Card Slots** | Compact Flash/Microdrive, SmartMedia, Memory Stick, Secure Digital/Multimedia Card |
| **USB 2 Ports** | 4 (Rear of Unit), 1 (Front of Unit) |
| **IEEE1394 Port** | 1 (Front of Unit) |
| **Additional Hardware** | 8 Port Serial Card |
| **Additional Software** | PC Anywhere |




### Remote Access

USB connectors are provided on both the front and rear of the PC for the option to add an external modem of your choice. If a modem is added, and a suitable telephone line installed, the console can be remotely accessed by Calrec Support Engineers to aid software upgrades and diagnostic work. This can greatly enhance the level of service and support we can provide. A dial-up facility must first be activated at the PC before this is possible, to ensure that connections are not made at inappropriate times or without the user's knowledge and consent.

### Network Ports

A network port is provided to enable the user to connect to their own LAN. Calrec will not be responsible for the configuration of this port or for any performance issues arising from its use. A second Ethernet port is provided to enable the PC to be connected to a Calrec Hydra Audio Network, which is an option which can either be purchased with the console or in the future.

### Software Supplied

An OEM PC Operating System license is supplied with each console, and the operating system software is pre-installed. The console software is also pre-installed, and supplied on a CD-ROM.

### 3rd Party Software

Calrec recommends that the PC is regarded as an integral control device for the console, and not as a general purpose PC. If 3rd party software is installed on the PC, care must always be taken to ensure that it does not interfere with the normal performance of the PC. The installation of inappropriate software on the PC may invalidate the console warranty.

## Usernames and Passwords

The PC will be set up with two sets of usernames and passwords:

| Username | Password | Description |
|---|---|---|
| CalrecAudio | (None) | This user can install and run programs, but not change PC hardware settings, (i.e. set-up network, install drivers). This user is intended to be used during normal operation of the PC. |
| CalrecAudioAdmin | calrec | This user has full rights to the PC, and can install and change PC hardware settings. This user is intended for use during re-configuration of the PC and to set up Hydra Audio Networking. |

## File Backup

A number of flash card slots are provided on the front of the PC for file backup. In addition, backup could also be to a customer's LAN or to a USB device which can be plugged into the front or rear of the PC. The following files are not installed from the CD-ROM as they are specific to each individual console. As such, a backup copy should be kept of these files in-case of PC or hard-drive failure:

| Filename | Description |
|---|---|
| **C:\Zeta\Cust1\Config.ini** | This file should only be altered by an approved Calrec engineer using a specifically designed application. The file can be copied but any unauthorised changes made will render it inoperable, including changing the date stamp of the file (such as saving even if not edited). If the file needs to be e-mailed to Calrec for any reason it should always be zipped to protect the file time/date stamp. A new backup copy of this file should be made after a console upgrade. |
| **C:\Zeta\Cust1\Setup.ini** | This file is updated when changes to console settings are made and saved using the set-up application. It should not be altered by any means other than by using the set-up application. A new backup copy of this file should be made after such changes are made or after a software upgrade. |
| **C:\Zeta\Cust1\Options\Options.bin** (Or **C:\Zeta100\Cust1\Options.bin** in earlier software versions) | This file is updated and a new backup should be made when changes to any of the sub-pages of the options screen are made and saved. |
| **C:\Zeta\Cust1\memories** | This is the default location for the user memories. However, operators can choose to save them to any location they desire. The maintenance department should keep a backup of the important default memories, whilst operators should be encouraged to keep their own backups of their own memories and to update them whenever they make important changes to them. After a software upgrade the main set of memories will be upgraded and checked by the engineer carrying out the upgrade. A new backup should then be made of these memories. |
| **C:\Zeta\Cust1\Meter** | This is the default location for the user-definable meter configurations. If your console uses these, you should also keep a backup copy of the files in this folder. |
| **C:\Zeta\Cust1\Network** | If your console uses Hydra Audio Networking, you should also keep a backup copy of the files in this folder. These are the configuration settings for the network units. |
| For customers using Compaq PC's only:<br>**C:\Zeta100\Cust1\A100fe1.ini**<br>**C:\Zeta100\Alphaprg\Alphaprg.ini** | These files are installed from the CD-ROM in a default format. The settings in these files can vary in different Compaq PCs. The backup of these files should be updated after a software upgrade. If a new hard-drive is fitted to the original Compaq PC, these files should be used to over-write the versions installed by the CD-ROM. |

# Hydra Audio Network Set Up and Operation

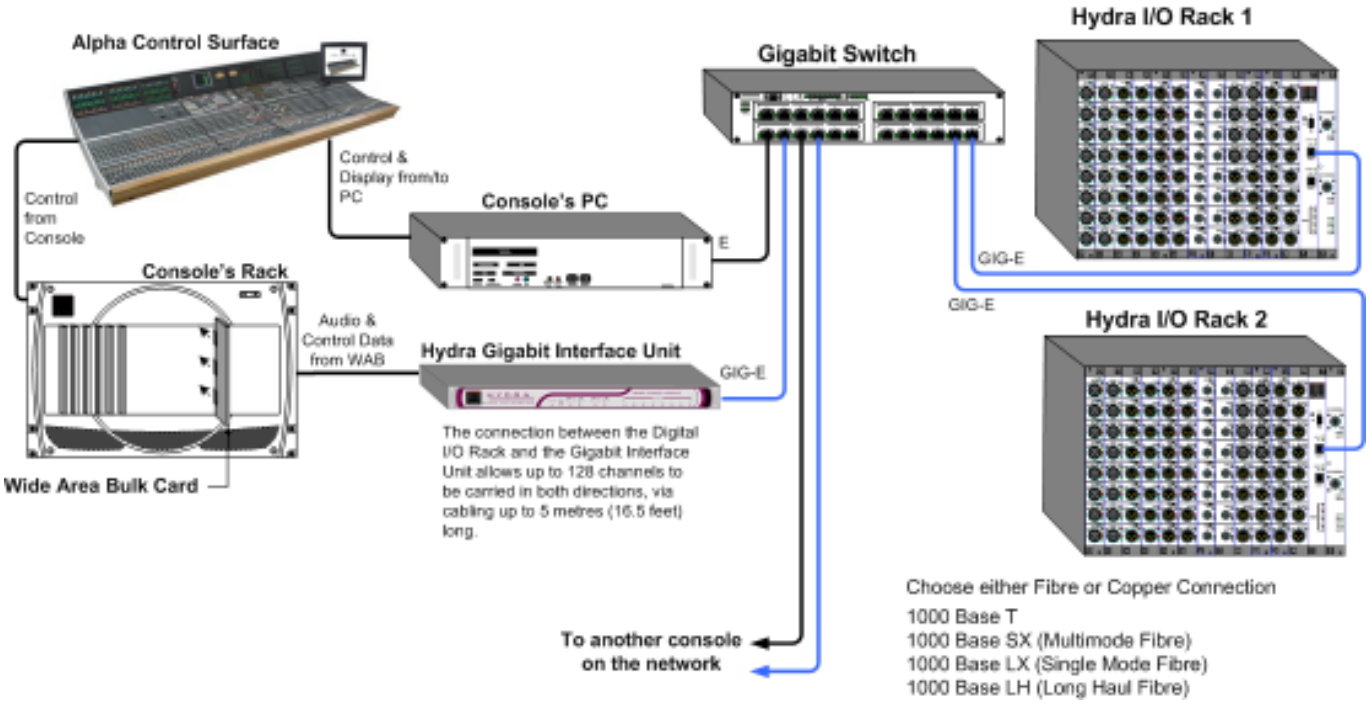

## TECHNOLOGY

The Hydra Audio Networking System provides a powerful network for sharing of I/O resources and control data between Calrec digital consoles. Hydra I/O units, with up to 96 inputs/outputs, analogue or digital, may be connected onto the network, providing remotely located sources and destinations that can be used by any or all mixing consoles. The console interfaces to the Hydra Gigabit Interface Unit via a Wide Area Bulk (WAB) card, which occupies one of the AES\bulk card slots in the Processing Rack.

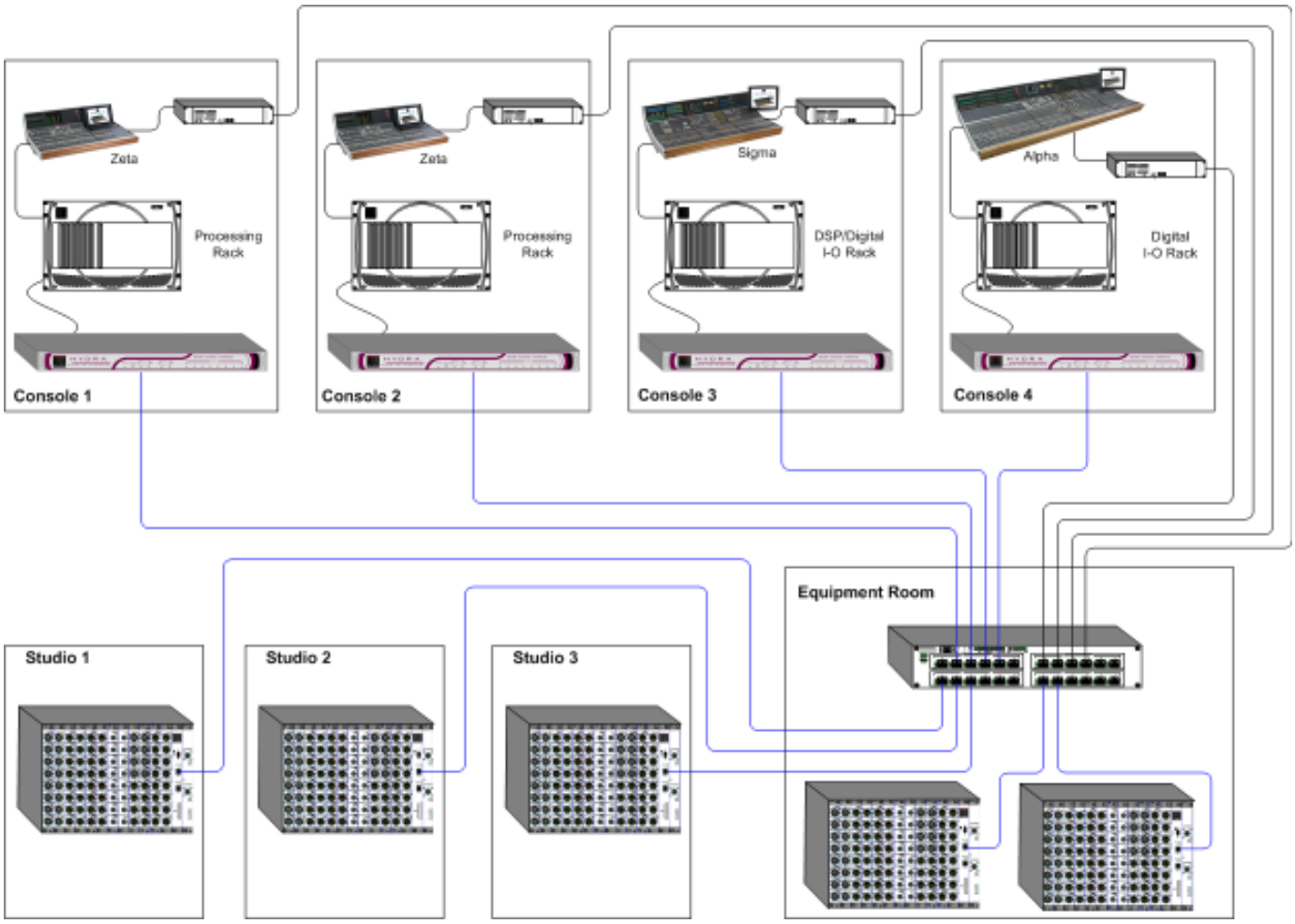
Gigabit Ethernet is founded on key principles of preceding Ethernet technologies and provides a data rate of 1000 Mbps over copper or optical fibre. Data is transferred using the Ethernet frame format over switched media in a network constructed from standardised structured cabling.

The Hydra Audio Network fabric is constructed using low-cost off-the-shelf hardware. The network topology is similar to that of an office LAN, being created out of a central switch with connections to each mixing console, in a star formation. Connections may be made with Category 5e UTP, up to 90 metres, or with optical fibre, to several kilometres.

There are many commercially available Gigabit switches, repeaters and media converters that can be used to build the network, however some proprietary hardware is required to interface the consoles and Hydra I/O Racks to the network. The diagram below shows a console and racks connected to a network via a Wide Area Bulk Card and Hydra Gigabit Interface Unit. 2 Hydra I/O Racks are also shown, each with up to 96 inputs/outputs available to any console on the network.



## TYPICAL HYDRA NETWORK EXAMPLE




The above diagram shows 4 control rooms, each with a Calrec digital console. Once powered, the Hydra I/O Racks broadcast “heartbeats” to advertise their presence. The Gigabit interface unit for each console transmits and receives audio data to and from the Hydra I/O Racks, via a Gigabit switch.

Consoles sharing sources must be synchronised (e.g. to station sync or video). The Hydra I/O Racks synchronise to one of the consoles via the network.

In order to guarantee fully deterministic performance, it is necessary to apply the restriction that the network must be kept private. This means that it must not be made to carry any data other than that generated by the audio network.

Local I/O in the console’s own racks can be used for connections to routers, monitoring, talkback, inserts, etc. It is not networked to the other consoles.

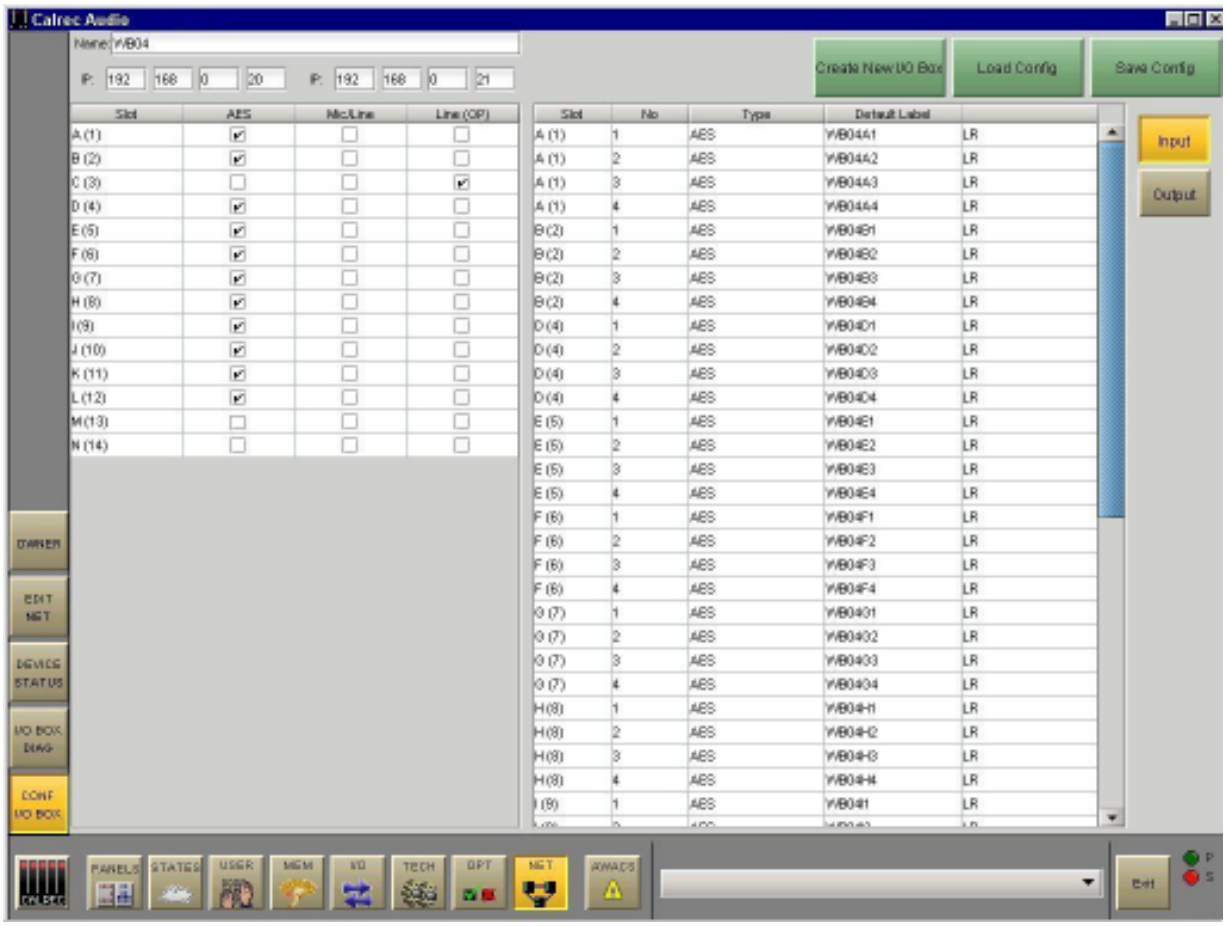
## NETWORK EDITOR 


For a network to be truly useful, it must be easy to use and maintain. The system's control software constantly monitors the network, performing essential administration functions, leaving the user free to creatively exploit network resources as easily as if they were locally connected. The Network Editor consists of a set of screens for :

- Configuration of Hydra I/O Racks
- Offline editing of Hydra I/O and Audio Network
- Graphical representation of the devices on the network
- Utility for forcing ownership to be dropped

The Network Editor can be run independently of the Front End (console application), allowing the Hydra I/O Racks and network to be configured offline. During this time, any operations which require a console are disabled.

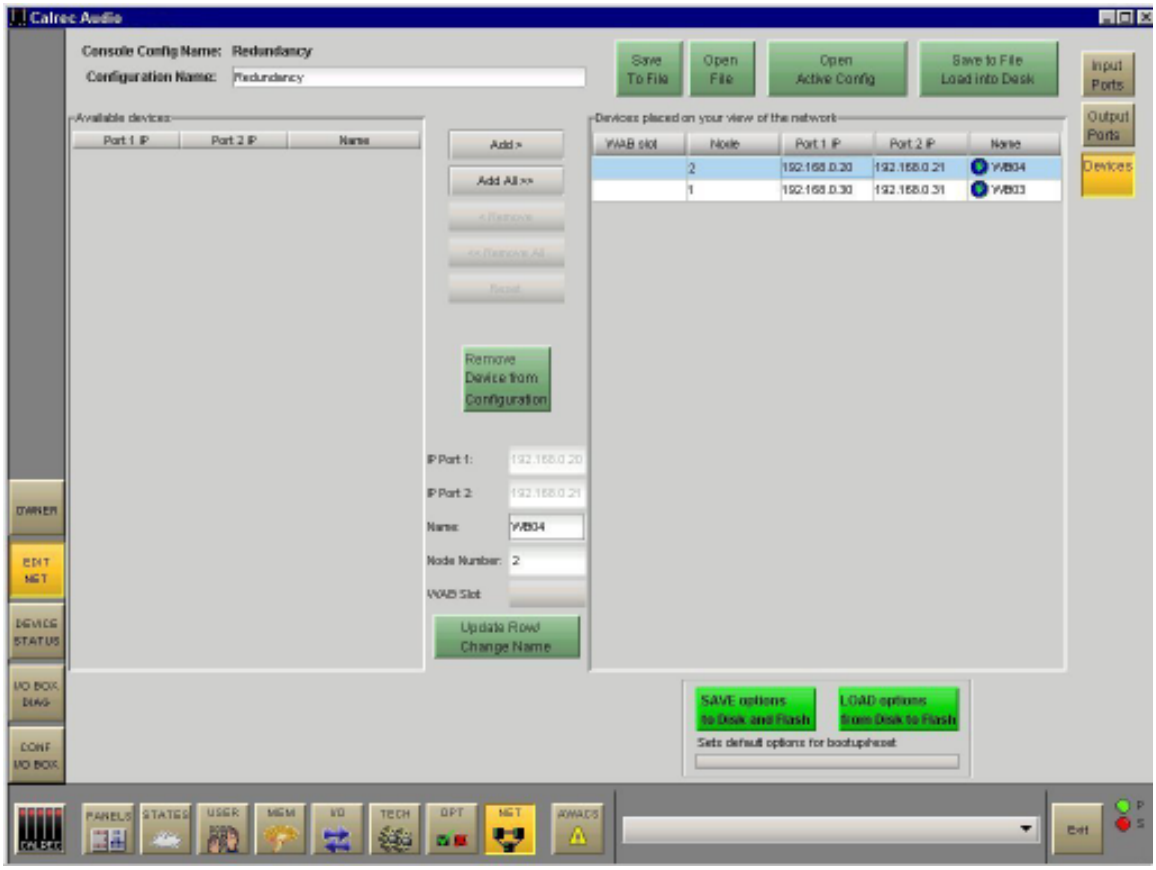
## HYDRA I/O RACK CONFIGURATION 


This screen allows the user to manually setup the type of input and output modules occupying each slot in a Hydra I/O Rack. In some situations, it may be necessary to reconfigure Hydra I/O Racks to meet the requirements of each program. This can be done offline, and the configurations can be saved and loaded, when online again.

The Hydra sources can be grouped into lists to make them easier to access either on the front end (FE) application or on the I/O matrix port assigment controls on the control surface (if available). This is done using the EDIT NET-INPUT PORTS screen.

## NETWORK CONFIGURATION


This screen allows the network to be configured. The window on the left side of the screen shows the devices available to the console. These devices will have been loaded via the CONF I/O BOX screen. The window on the right side of the screen shows the devices the user selected for this session. The Add and Remove buttons are used to add or remove devices to and from the session. Once the required devices are added, the input and output lists may be setup using the EDIT NET-INPUT PORTS screen. Configurations can be saved and restored, to allow use on a job by job basis. This allows multiple setups to be configured offline, and stored for later use.

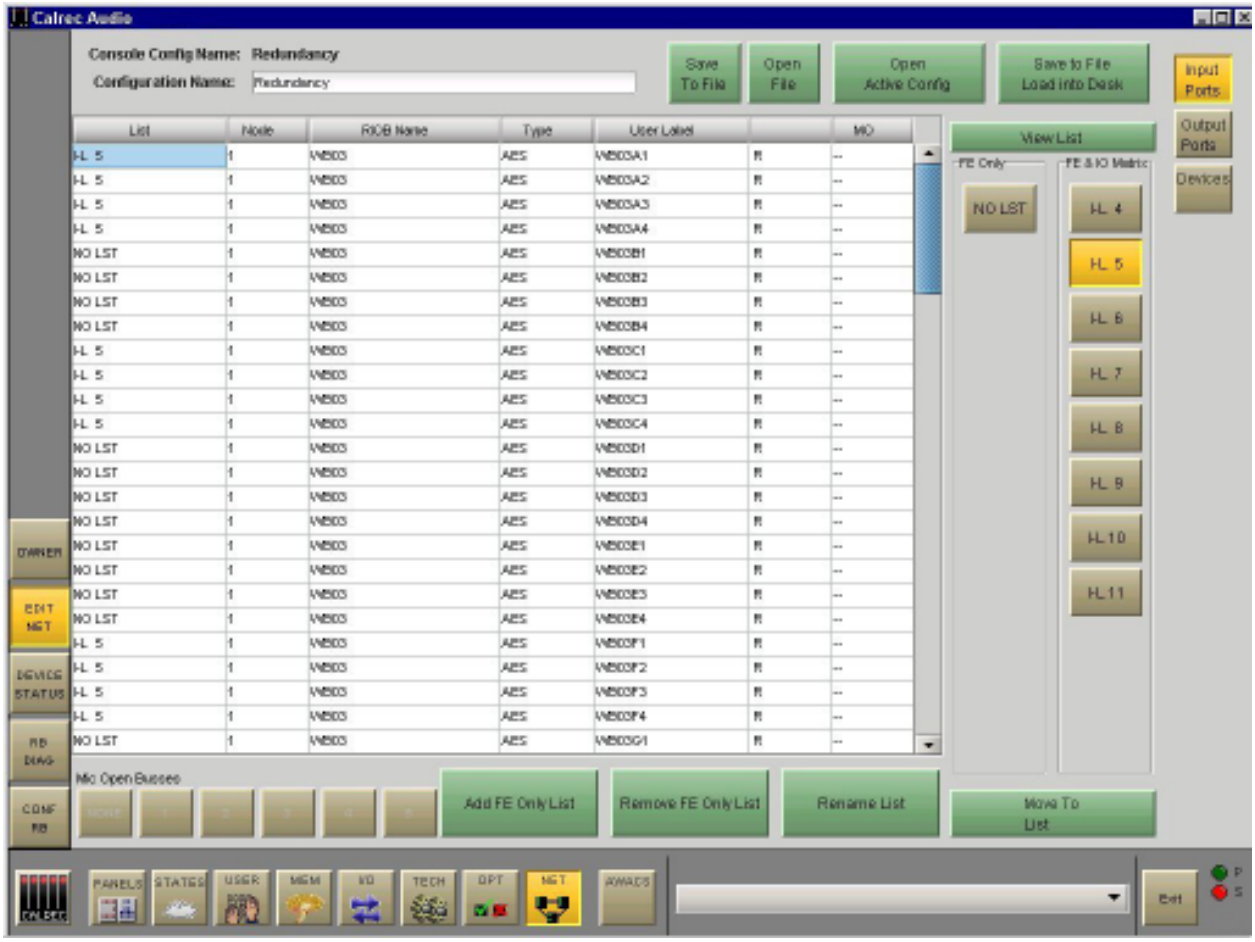
Changes to the network configuration will not take effect until “Save to File, Load Into Desk” is selected. Then, the changes become active and the configuration is saved to the hard disk. If any subsequent changes are made, the “Save to File, Load Into Desk” button will flash to indicate that the configuration on the screen does not match the active configuration.

Open File allows a previously saved configuration to be opened. When opened, the configuration will be loaded onto the screen, but will not take effect until “Save to File, Load Into Desk” is selected. The button flashes to indicate that the configuration on the screen is different to the active configuration. The console checks that the configuration is compatible with the system. If there are discrepancies, an “Error Showing Active Config” message will appear.

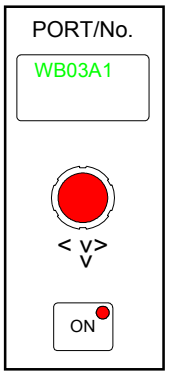
“Save to File” saves the configuration to the hard disk without loading it onto the console. “Open Active Config” retrieves the settings that the system is currently using and displays them on the screen, replacing the current configuration being viewed.

Network configurations are not saved with the user memories, so it is important to save the options to disk and flash once the network is configured using the buttons at the bottom of the screen. If they are not saved, the next time the desk boots up the console will revert to its previous settings, which could mean that a different network configuration is loaded. This could cause problems should the console have to be reset during a live broadcast. It does however allow changes to be tried out without losing the original settings and these original settings can be restored without having to re-boot the system.

## HYDRA I/O SOURCE LISTS


This screen allows the user to allocate the sources from the the Hydra I/O Racks into lists to allow similar I/O to be grouped together for selection. This also makes them easier to access either on the front end (FE) application or on the I/O matrix port assigment controls on the control surface (if available).



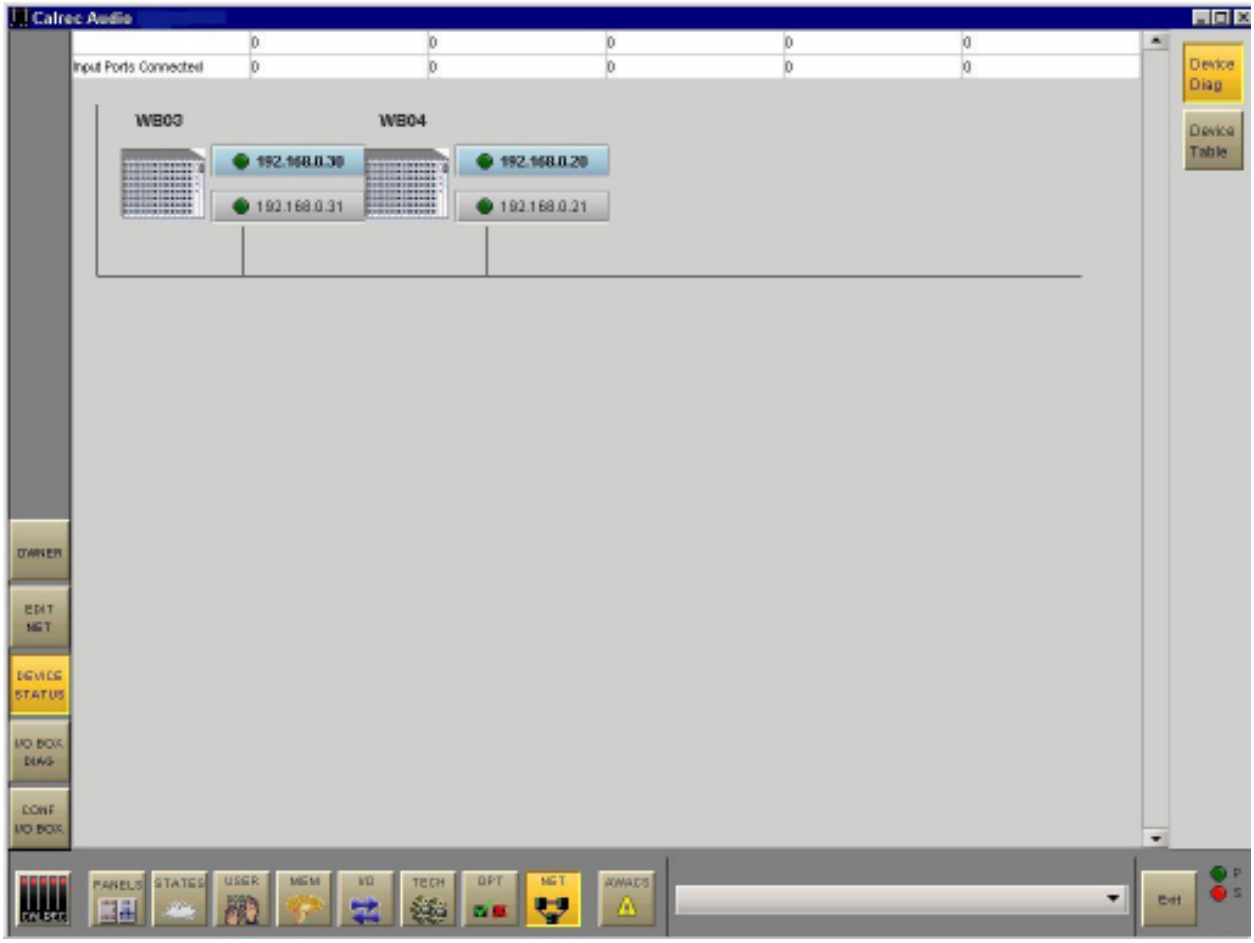

There are two types of lists, those which will appear on the FE screens only, and those available on the FE screens and the I/O matrix controls on the control surface (if available). Allowing lists to be accessed on the control surface, means that the user can still access the Hydra I/O without the use of the PC.

Lists of Hydra I/O are kept separate from the lists of local I/O. There can be up to 64 pairs of ports in a Hydra I/O list.

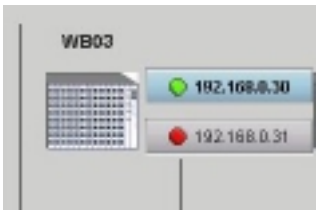
Hydra ports are always treated as pairs. They can be used for two mono signals, a stereo signal, or as part of a surround signal. Hydra port labels consist of the 4 character unit name (user-defined) plus the module letter (A-N), plus the port number (1-4), plus L or R.

A similar screen is used for output list allocation.

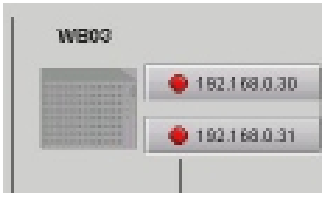
## DEVICE STATUS


The Device Status screen provides a graphical overview of the status of all devices configured on the network. Each port has a green indicator, which will “heartbeat” (flash bright green) to indicate that the unit is running and can be reached. If the device is not “heartbeating” then it cannot be reached and its graphic will be greyed out.



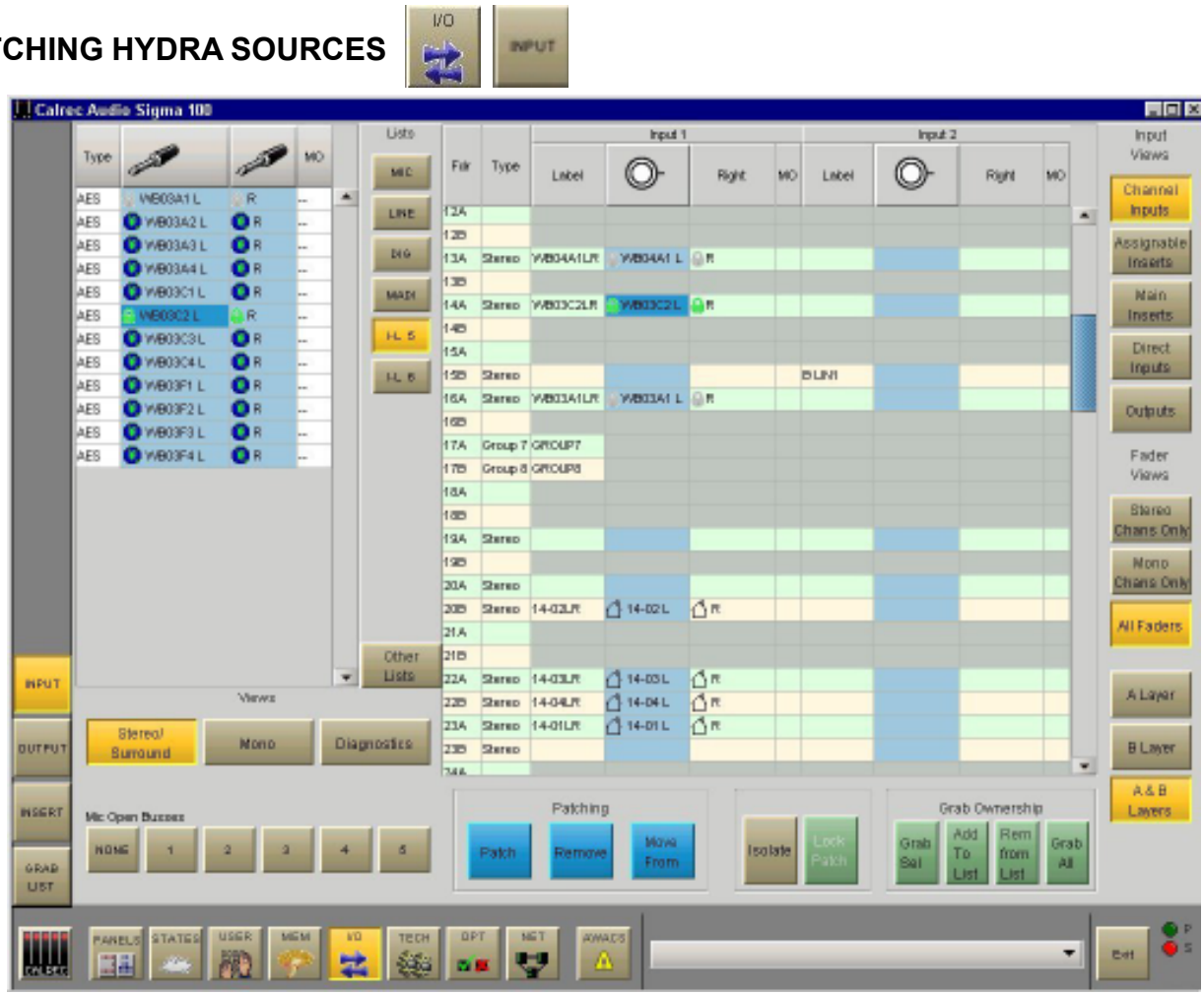

In the case of Hydra I/O Racks using both ports (for redundancy), each port will have its own heartbeat indicator. The preferred port will be highlighted. If a port is not heartbeating, its indicator will light red (But the device could still be in use through the other port).




If neither port is heatbeating, then the device is no longer available, and its graphic is greyed out.

If the device does not appear to be heartbeating, but it is not greyed out, then the console can access the device, but the PC cannot. This situation could arise in redundant systems, where the PC is connected to just one of two switches, and the connection between the switches has failed. The PC will only be able to “see” the devices connected to the same switch as itself. As the console will be connected to both switches, normal operation can continue.

## PATCHING HYDRA SOURCES




Once set up, Hydra sources are selectable on the I/O screens just like local sources, and can then be patched to faders on the console in the same way. A Hydra I/O list can be selected from the list selector buttons, just like local lists. “Other Lists” is used to access the FE only lists. When selected, the Hydra sources will be displayed on the left side of the screen. These sources can then be patched to faders on the console on the right side of the screen.

Sources have icons to denote their type, they are as follows:

House - A source which is local to the console

World - A Hydra source on a Hydra device which is heartbeating

World with a red cross - A Hydra source on a Hydra device which is not heartbeating

Green Padlock - The console has ownership of this Hydra source

Grey Padlock - Another console has ownership of this Hydra source

Black Padlock - The source has been added to a grab list.

The network has a system for source control prioritisation, to prevent several consoles gaining control over the same source at the same time.

Like local sources, networked sources and their settings are saved with the memories.

**Patching**

Assignment is made by selecting a source,  and an input or output,  and selecting Patch. 


By selecting the label cell on the screen, the source's name can be edited using the keyboard. The new name is stored with the channel input and replaces the source label on the fader display.

**Multiple Patching -** It is possible to patch regions of sources.

- Select a list of input ports using the trackball by dragging down the column
- Select the fader to start patching to
- Select Patch

Please note that Hydra inputs cannot be patched to Hydra outputs, and they cannot have a mic open bus assigned.

Once patches are made, they can be removed when selected by clicking REMOVE. Connections can be moved between channel inputs when selected using the MOVE FROM button. The Input 1 or 2 field will be highlighted and the PATCH, REMOVE and MOVE FROM buttons will be replaced with MOVE TO, and CANCEL. Upon selection of a new patch point, pressing MOVE TO will move the connection. CANCEL will cancel the operation.


**Grab Ownership**

When a networked source is patched, ownership of it assigned to the console. In the case where several consoles share sources on the same network, the console that connects to the source first will be given control (ownership) over that source. Other consoles that subsequently connect the same source will not be able to control it.

In circumstances when the ownership needs to be overridden, the grab buttons allow the console to grab ownership of the patched network sources, either altogether, individually, or by adding them to a "Grab List". When one or more hydra sources are added to the grab list, the "Grab All" button changes to "Grab List".



The grab list can be viewed on the Grab List screen, accessed on the left side of the I/O screens.

NOTES

USER REGISTRATION

Please complete this end user registration form as soon as you receive this manual. This will allow us to not only provide you with any manual update sheets and/or modification information, but also with information on new product developments which may be of interest to you. Completion of this registration form will ensure that we send all technical correspondence directly to you at the address you have indicated.

The form, once completed should be returned to Calrec at the following address.

**User Registrations**
Calrec Audio Ltd
Nutclough Mill
Hebden Bridge
West Yorkshire
HX7 8EZ
England
UK

or alternatively it can be faxed back to us on +44 (0) 1422 845244

Console Type: Zeta 100

Serial Number (located on the base panel):.....
Date Received: .....
Name: .....
Department: .....
Company: .....
Address: .....
.....
.....
.....
Post/Zipcode: .....
Tel No: .....
Fax No: .....
Email: .....

Customer comments:.....
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