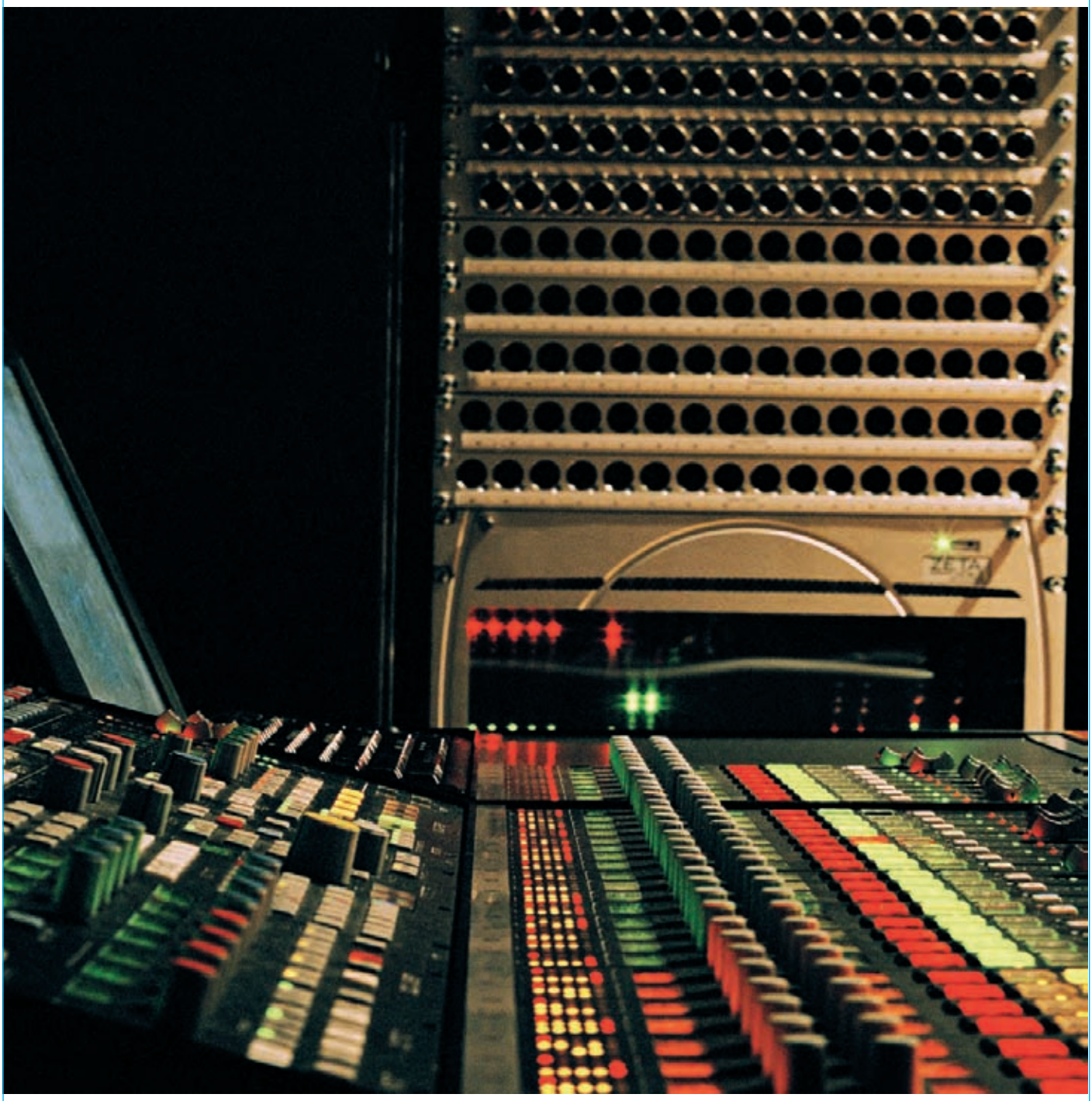
ZETA TECHNICAL SPECIFICATIONS



Digital Broadcast Production Console

CALREC

Putting Sound in the Picture

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ZETA
CONTENTS

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.

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 and RAB Registered
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.

ZETA
OVERVIEW

PRINCIPAL FEATURES

CHANNEL / GROUP FACILITIES

- Up to 108 mono equivalent channels: 48 stereo or mono channels plus 24 mono channels.
- Up to 112 mono equivalent channels: 56 stereo channels.
- 8 stereo or 8 mono audio groups, or 4 stereo and 4 mono audio groups.
- Table-top or floor stand mounting.
- All channels have 4-band EQ/Filters, Compressor/Limiter and Expander/Gate.
- All groups have Compressor/Limiter.
- Pre configured inserts are assignable to any channel or group. Inserts can be pre or post fader.
- All channels and groups can have a direct output or a mix-minus feed.
- Direct outputs can be pre EQ, pre fader, or post fader.
- Automatic cross-fading facility, with user-definable fade out and in times.
- Additional VCA style grouping system.
- Every channel can route to every bus, at the same time, without restrictions.

BUSSES

- 2 main stereo or 2 main 5.1 surround outputs with Compressors/Limiters.
- 8 auxiliary outputs which can be paired for stereo.
- 16 outputs for multi-track or general purpose feeds.
- Simultaneous LCRS, stereo and mono outputs available from each 5.1 main output.
- Direct input available to group, mains, aux and mix-minus busses.

SYSTEM

- Up to 48 faders, with A and B layers of control, plus 2 main output faders.
- All faders are motorised and touch-sensitive.
- Comprehensive surround panning and monitoring.
- Flexible TFT screen-based meters with total user configurability.
- Assignable input delay function.
- Optional I/O expansion via a wide area interface such as MADI or Hydra, Calrec's sophisticated audio networking system.
- On board Flash ROM memory system allows 99 full console or partial memories.
- PC backup allows an unlimited number of memories.
- Sophisticated GPIO facilities.

RESILIENCE

- 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 with no loss of audio.
- Last settings fully restored on power-up or reset.
- Automatic change over to hot spares for power supplies, 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.

LAYERING AND ASSIGNABLE CONTROL

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.

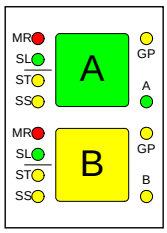
Less important signals can be placed on the B layer. Even then, only one button press is required to access them again. Using the ALL A and ALL B buttons is like moving to a different section of a single layer design. This arrangement allows more channels to be fitted into the space available in the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



PATHS AND PORTS

Paths and Ports
On an analog 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 analog 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 were for a time sold in a number of configurations known as Audio Packs, which included a number of DSP cards to give a specific channel and group capability and these were associated with a suggested complement of ports. Today the Zeta is normally supplied with the largest DSP system, the 'D pack' and with analog and digital I/O to match the requirements of the installation.

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)

Inputs and outputs are labelled in pairs for use with any type of signal; mono, stereo or surround.

The system automatically adds a left (L) and right (R) suffix to the label to distinguish between 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 using the Options - Port List screens. This allows inputs and outputs which are wired for similar purposes to be grouped together for selection. Each list can contain a mixture of normal inputs or outputs (labelled in pairs) and inputs or outputs dedicated to mono signals.

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 control surface and I/O screens. It is possible to restrict the lists which appear on the panel. This ensures that only the relevant lists are immediately available at the user's fingertips. All lists are always available on the screens.

SIGNAL PATHS

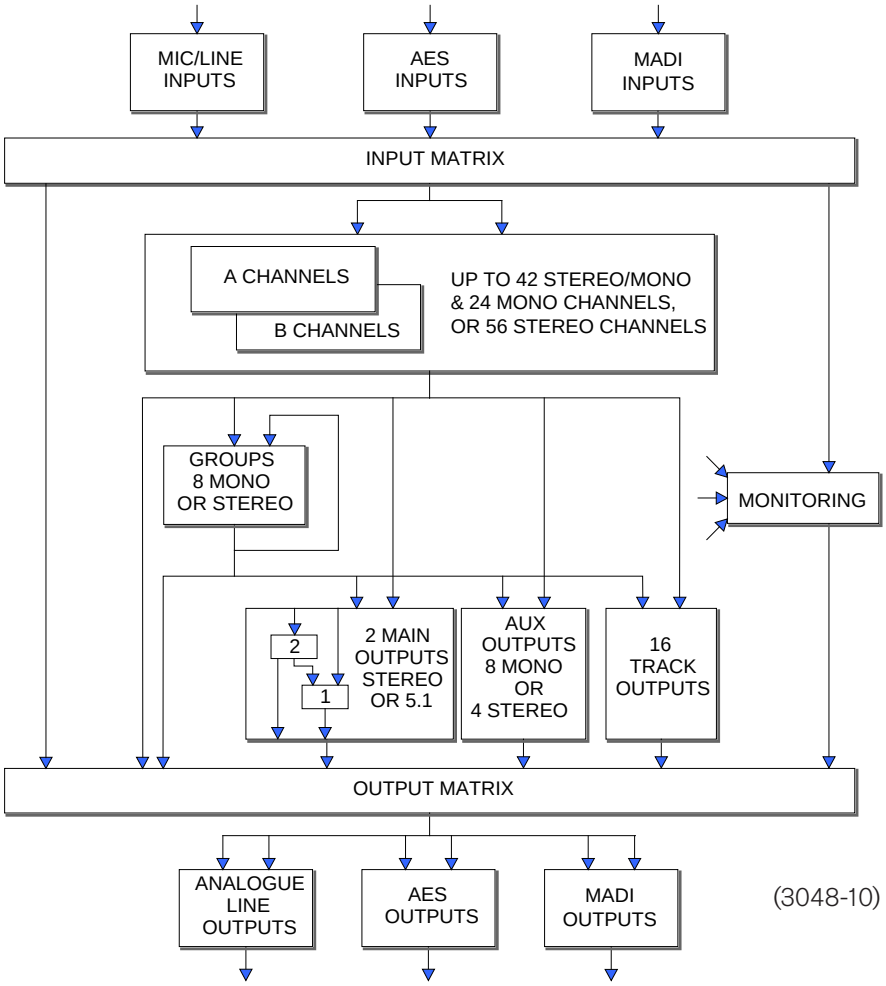
The console can have up to 42 stereo or mono plus 24 mono channels, or 56 stereo channels.

The 8 groups can be designated as stereo or mono in blocks of 4. In addition, as many VCA style groups as required can be created.

The 2 main outputs can be designated either as both stereo or both 5.1 surround. If they are 5.1 surround, then a mono rear is derived at each output to allow it to be used as LCRS mains. Stereo and mono downmixes of the 5.1 are also produced.

If a channel is panned to both a stereo group and 5.1 bus simultaneously, the pan law to each will be correct, as though the other bus did not exist, even though the same control is used to achieve the pan.

The 8 mono auxiliary outputs can be paired up to give up to 4 stereo auxiliary outputs.



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AUDIO PACKS

A standard Zeta system (where all AES slots are occupied by AES cards) has capability for:

- 96 Analog inputs
- 96 Analog outputs
- 128 AES inputs
- 128 AES outputs

Each Wide Area Bulk card can interface up to 128 remote inputs and outputs across a Hydra network.

Audio Packs

Current versions of the Zeta are normally supplied with D pack DSP systems, the largest size, which has 6 cards plus the hot spare. The DSP pack size determines the number of channels and groups the system provides, as well as the number of legs of delay that can be assigned to input channels. Earlier consoles can be expanded when required.

Zeta consoles are now provided with the required number of analog and digital input/output cards to meet customer requirements. Earlier systems cross referred the DSP pack size to I/O and although there is no longer any linkage, the I/O provisions that used to be provided are shown below for reference.

Audio pack	A1	A2	A3	A4	B1	B2	C1	C2	D1	D2
Stereo channels	24	30	20	26	30	36	32	48	42	56
Mono channels	8	0	8	0	10	0	24	0	24	0
Mono/stereo groups	4	4	8	8	8	8	8	8	8	8
Delay legs (mono)	8	8	8	8	15	15	24	24	21	21

Audio pack	A1	A2	A3	A4	B1	B2	C1	C2	D1	D2
Mic/line inputs	32	32	32	32	64	64	96	96	96	96
Line outputs	32	32	32	32	64	64	96	96	96	96
AES inputs	32	32	32	32	32	32	64	64	96	96

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 console PC 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 sub-sets of the screen's function.

Options Screens

Options settings are not stored in the 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 out without losing the original settings and these original settings can be restored without having to re-boot the system.

Screen controls for EQ/Filters, dynamics, routing, track output, aux send, aux output and input delay; providing alternative controls to those on the control surface, plus some extra functions.

Sets the current state of various console functions. (These settings are stored in the live (hidden) memory. They are not stored with the console memories or options.

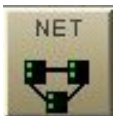
Operational screens which enhance the controls on the console and for setting options which are stored with the user memories.

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 and troubleshooting screens.

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



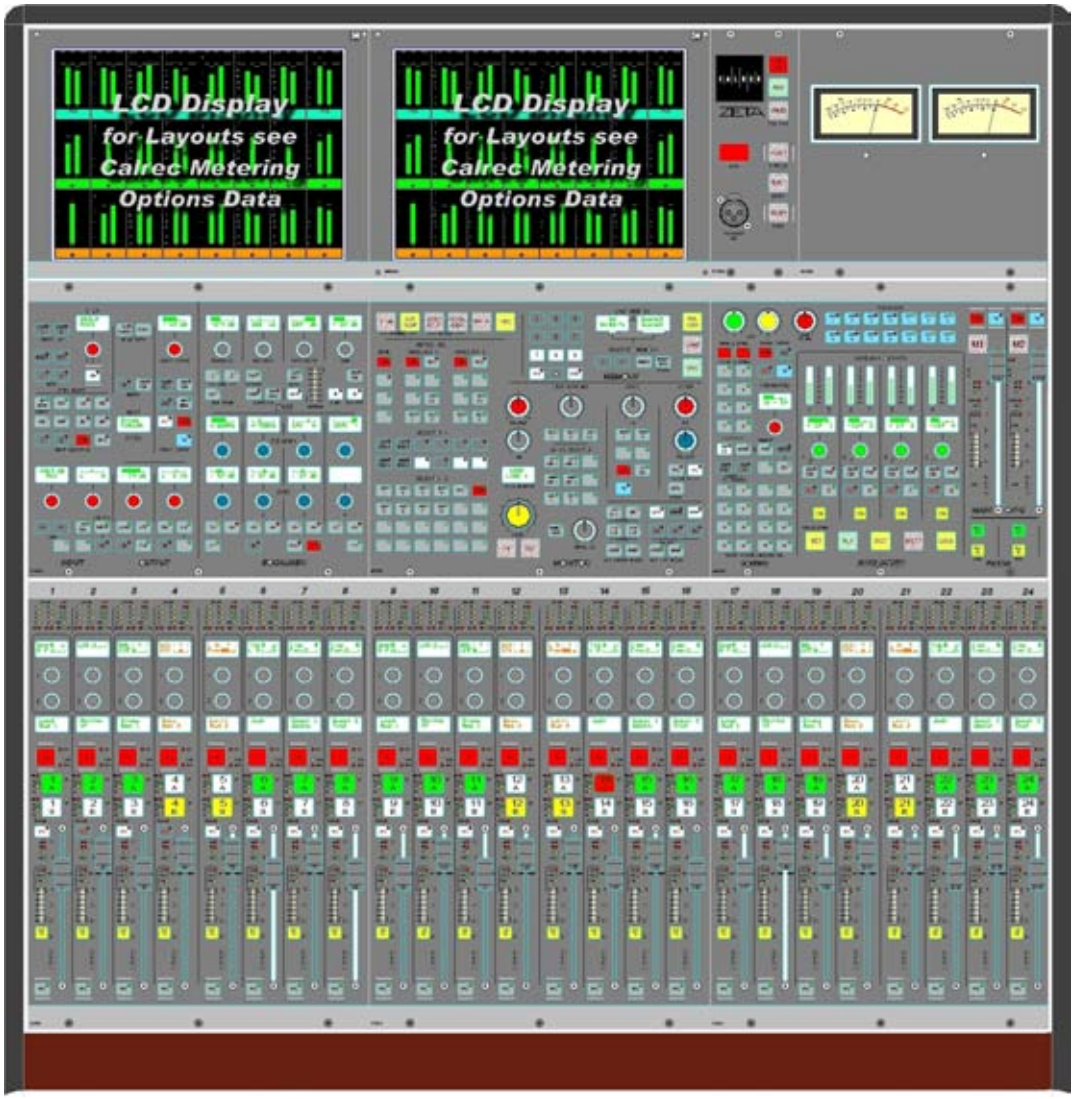
Screens for setup and control of a Hydra audio networking system These screens are only visible if Hydra audio networking is installed.

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 yellow, during which time no changes can be made to the control screens (changes to the control surface can be made, and will take immediate effect). Whilst the secondary processor is in standby, (ready to take over from the primary should a fault develop), its indicator will be amber. If the primary processor fails, its indicator will change to red. The secondary processor will take over, and its indicator will change to green. When the primary processor becomes available again, it will automatically take back control from the secondary processor, and the secondary processor will return to standby mode.

ZETA
FRAME OPTIONS AND DIMENSIONS

24 FADER FRAME TYPICAL LAYOUT



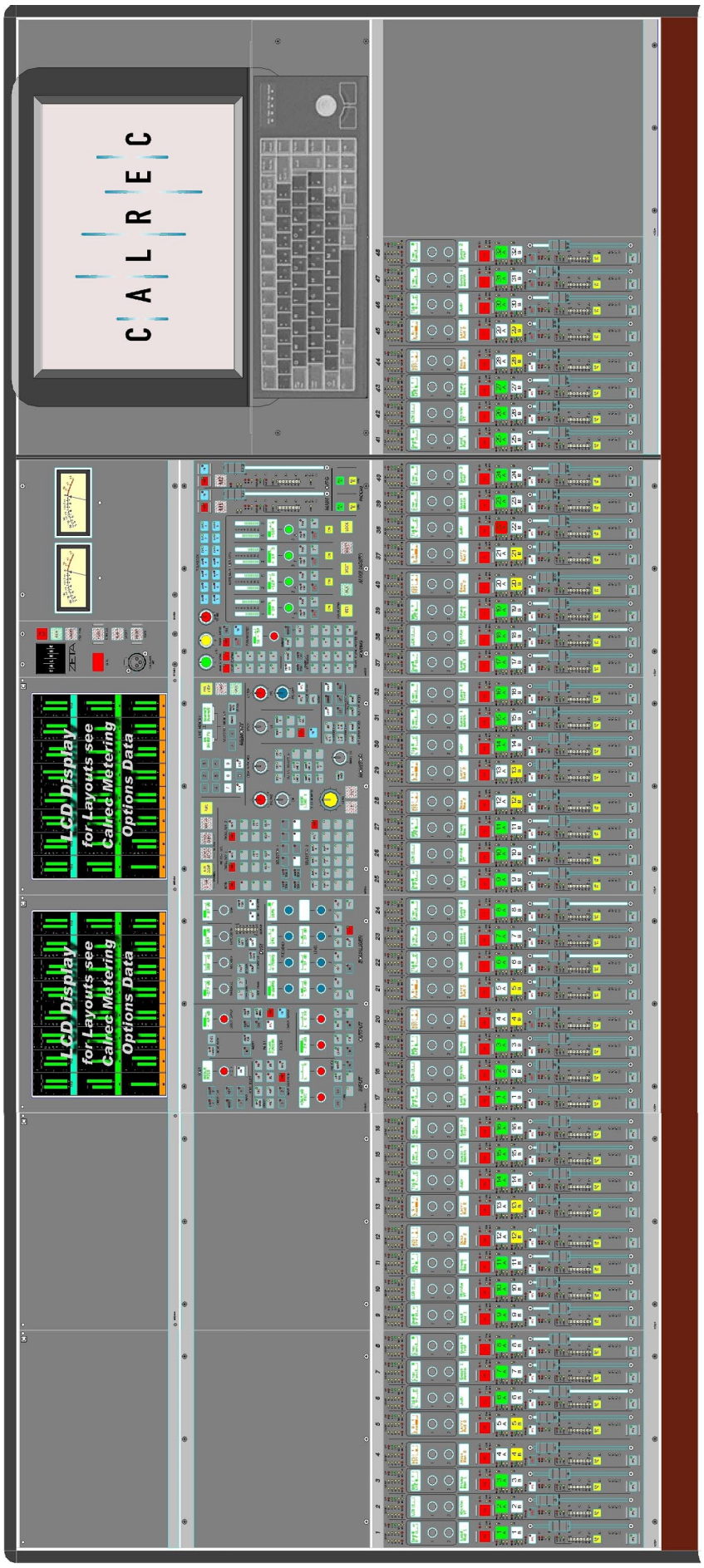
The smallest frame houses up to 24 faders, which allows up to 48 paths to be controlled within a frame only 784mm (30.9 inches) wide.

Due to the console's compact size, colour touch screen, keyboard and trackerball are supplied as separate items for locating as approrpiate.

40 FADER FRAME TYPICAL LAYOUT

The medium sized frame houses up to 40 faders, which allows up to 80 paths to be controlled within a frame only 1290mm (50.8 inches) wide.

48 FADER FRAME TYPICAL LAYOUT

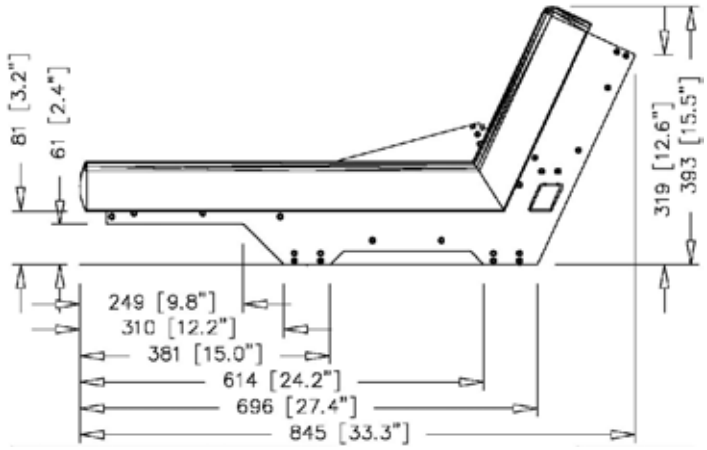


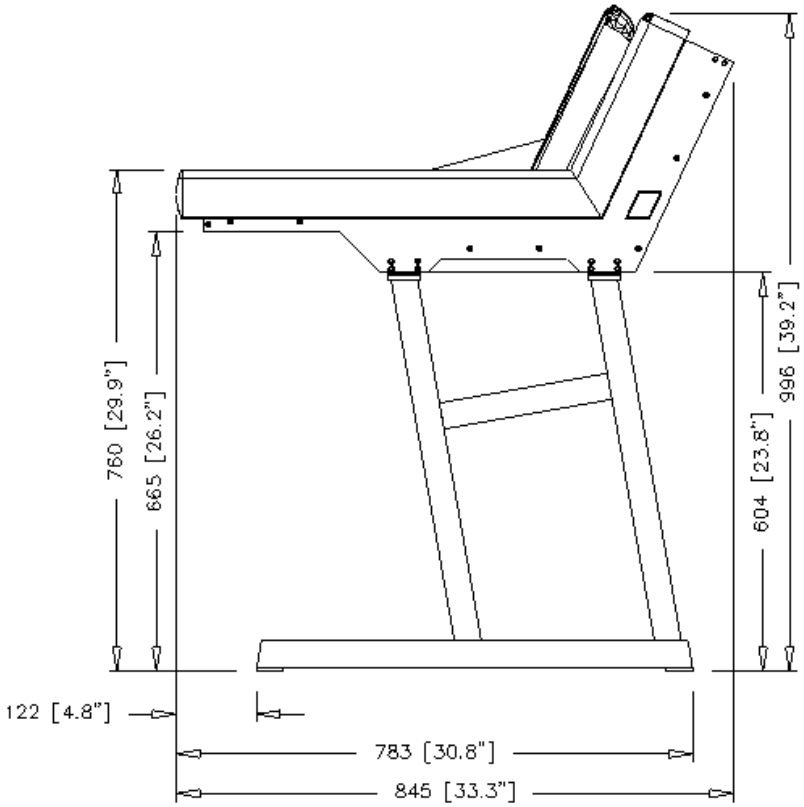
The largest frame houses up to 48 faders (the maximum number possible), which allows all of the 66 channels and 8 groups to be controlled within a frame only 1796mm (70.7 inches) wide.

CONSOLE PLAN AND ELEVATION

Frame Size	Length		Depth	
	inches	mm	inches	mm
24 Fader Frame	30.9	784	33.3	845
40 Fader Frame	50.8	1290	33.3	845
48 Fader Frame	70.7	1796	33.3	845

The end profile is the same for all three frame sizes. An optional floor stand is available.

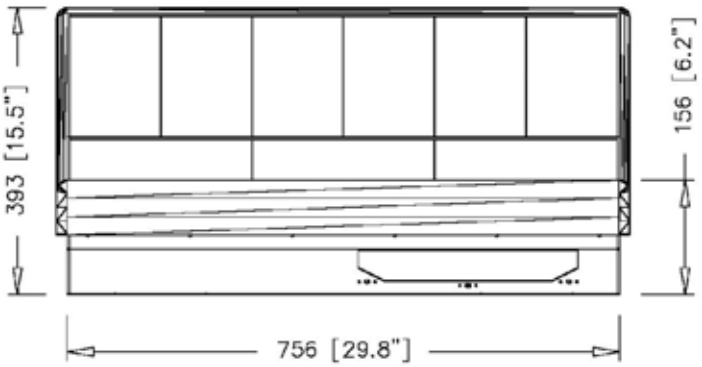




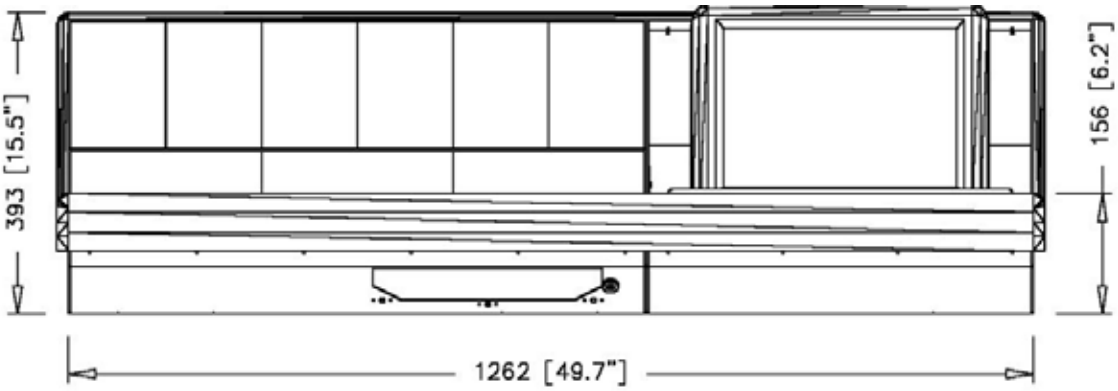
The floor stand shown is an extra cost option.

FRONT ELEVATION

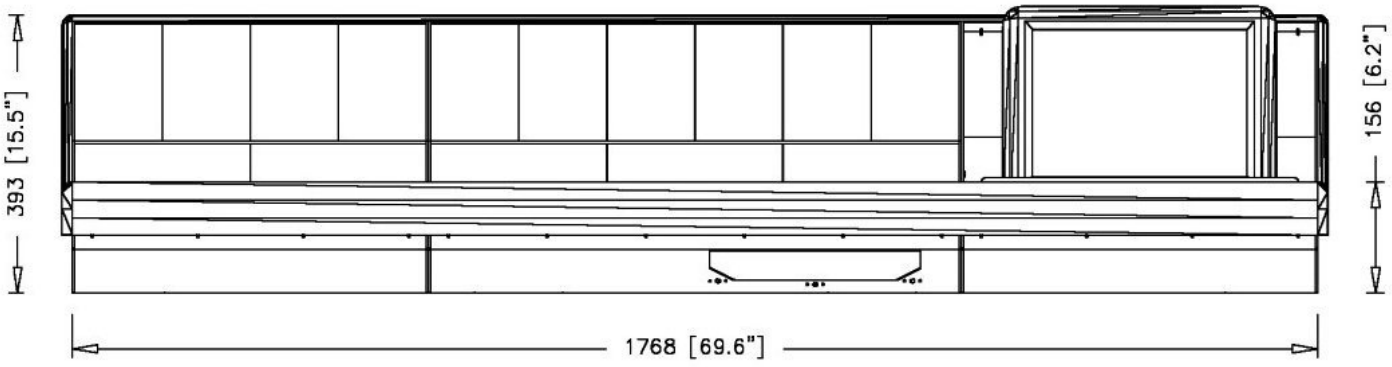
24 FADER



40 FADER



56 FADER



ZETA
FADER AREA

CHANNEL AND GROUP FADERS

Channel and group paths are controlled by the channel faders. Any fader can control any channel or group path. Main output paths have their own dedicated faders in the main outputs section.

Paths A and B

Each fader can control two independent audio signal paths, A and B. The A and B buttons are used to select the two channel paths. Selecting a path will "call" the fader to the Assign panels and its fader assign button will light in red. 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 change to match the settings of each path.

Display Labels

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. If path A is active, the A fader assign button and the label will be lit in green. If path B is active, the B fader assign button and the label will be lit in amber.

Channel/Group Cut

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

Assign Button LEDs

A set of indicative LEDs give more information about the path.

- 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

AFL

AFL will be heard through the monitor loudspeakers (main or small). AFL will be heard in surround provided that surround panning is in use and the loudspeaker system is surround.

Indicative LEDs

The ▲ and ▼ Null LEDs illuminate when the position of the fader 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 to indicate whether the audio is above or below the position of the fader.

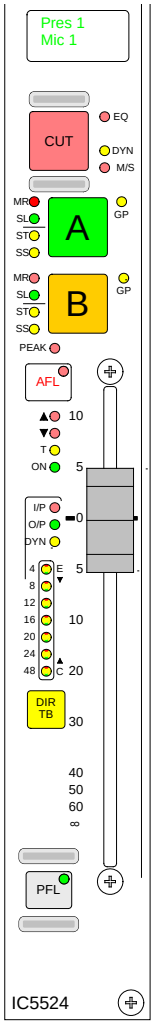
The T LED indicates that the console has recognised that the fader has been touched.

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.

Fader Bargraph

The fader bargraph indicates the level at the channel input (post the input gain, input switching and the tone switching), the channel direct output, or the gain reduction of the dynamics, indicated by the three LEDs. Selection is made using the User-Chan screen.

The EQ, FLTR, DYN and M/S LEDs indicate that these functions are active on the selected path (EQ, Filters and Dynamics settings may be flat - LEDs indicate that the function is switched IN).



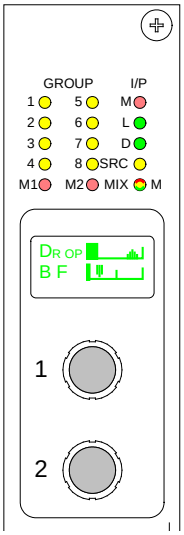
Talkback to Direct Output

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

PFL

PFL will be heard on the small LS (or the main LS if PFL to Mon is selected on the States screen), or PFL LS (depending upon the monitoring configuration). PFL is also provided on the fader overpress.

CHANNEL CONTROL



Above the channel fader section, there are a set of indicative LEDs and a set of 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, analog 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).
- Whether the direct output is being fed with a mix minus feed (indicated in yellow).

Wild Controls
There are two WILD controls per fader. Almost any assign panel rotary control for the selected path can be assigned to either Wild control on the fader, including:

- Input Gain
- Aux Send Level
- Dynamics
- EQ
- Direct Output Level
- Pan and Balance
- Stereo Width
- Track Output Level

Wild controls are assigned using the User-Chan screen. Once assigned, the Wild controls “FLIP” with the fader providing the same function for each of the two paths.

The A and B faders may also be assigned to a Wild control, in which case it will be the opposite fader which is being controlled.

The colour of the Wild control display will show which fader the control is related to: Green for A, Amber for B.

Multiple Wild Control Assignment
It is possible to assign controls to more than one fader path at a time, either by selecting individual fader assign buttons (A or B), or by defining a “block” or “Region” of faders. It is possible to assign the same control to Wilds 1 or 2 for all fader paths.

Wild Control Push-Switch Option
If a wild control has the 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.

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 fader's 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. There can be up to 48 members of a VCA group.

When the level of the VCA master is adjusted it will change the audio level of all its slaves by the same amount. Changing the CUT, AFL and PFL settings of a VCA master applies the same settings to its 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.

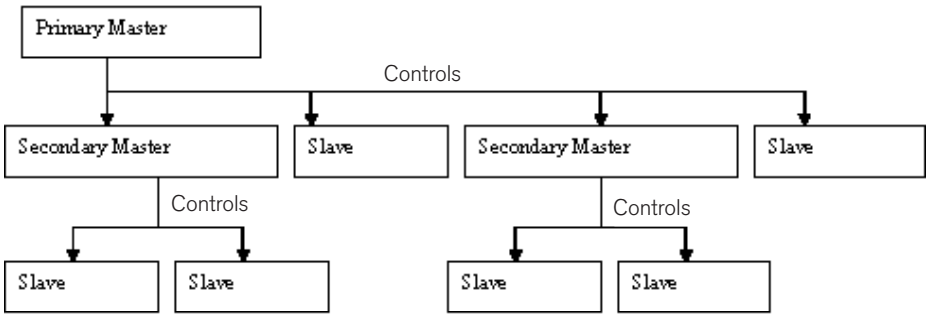
The MR and SL LEDs next to the assign buttons on the fader strip indicate whether that fader is a master or a slave.

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

Primary and Secondary VCA Masters

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. A secondary master fader has both the MR and SL LED lit.

It is possible to create the primary or secondary group in any order. 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.

VCA Group Interrogation

Interrogation provides a clear way of indicating VCA group assignments. When the fader assign button of a VCA group member is held down, the fader assign buttons of all members of the same group will be lit, and the fader assign buttons of paths which are not part of the group will cease to be lit.

Interrogation of a primary master will light the fader 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.

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.

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.

Auto-Fade Screen

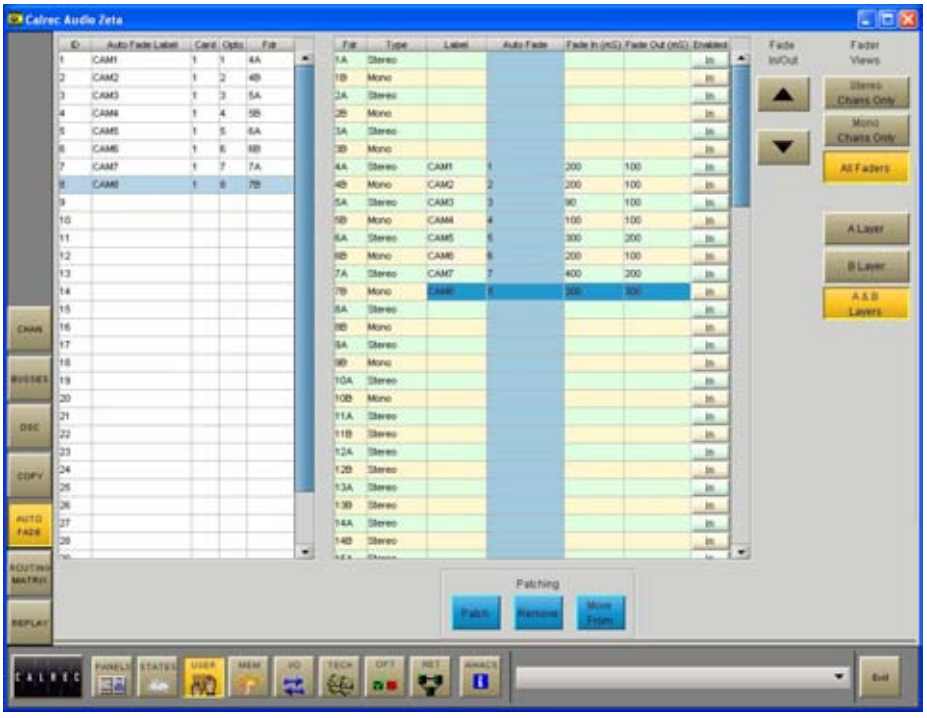
The User-Auto Fade screen is used to allow assignment of each auto-fader to a channel or group fader.

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 auto-fader 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.

The user can enable and disable each auto-fader by selecting the Enabled IN column.

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.

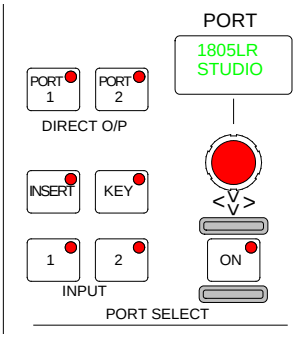
ZETA
INPUT AND OUTPUT CONTROLS

INPUT AND 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. Some of these functions can also be performed using the Panels - Input Output screen.

Input Port Assignment

Ports are assigned to inputs 1 or 2 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 .

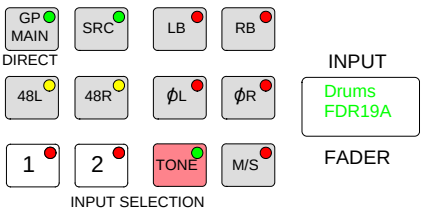
The port selection controls display shows the current port on the top half of the display, and the list it occupies underneath.

Pressing and turning the rotary control gives access to lists of other types of input port which are set up using the Options - Port Lists screens. Lists appear in the viewing order set on the Options - Port Lists - Sort Order screen.

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

Input Selection Settings

A set of buttons are provided to select settings for the currently assigned input. 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.

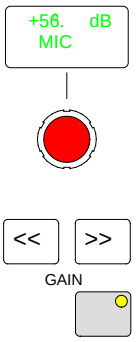
ØL and ØR buttons reverse the phase of the channel inputs. ØL is used for mono channels.

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.

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.

Input 1 and 2 Gain Linking

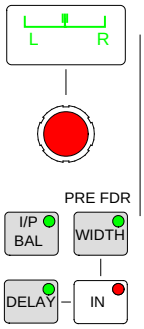
The gains of inputs 1 and 2 can be linked such that if either input's gain is adjusted, the change in gain is applied to both inputs.

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.

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.

Input Balance and Width

With I/P BAL selected, the rotary control adjusts input balance on stereo channels. In this mode, when LB or RB are selected, the control acts as an input pan control.



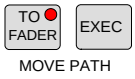
With WIDTH selected, the rotary control adjusts the width from mono, through stereo, to wide on stereo channels and groups. The control is switched in and out of the path using the IN button.

Input Delay

With I/P DELAY selected the rotary control and IN button control adjustment of Input Delay values. Delay must first be assigned to an input using the Panels-Delay screen before the controls here can be used.

Move Path and Move Strip

Paths can be moved or swapped from one fader to another, using the MOVE PATH buttons.



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.

It is not possible to move an isolated path.

The User-Chan screen can also be used to move paths. In addition, the whole fader strip can be moved to a different fader. This means that the A and B paths including any Wild Assignments will move to the selected destination fader strip.

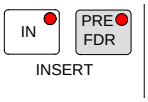
The Move Path function can be set to always perform Move Strip using the States screen.

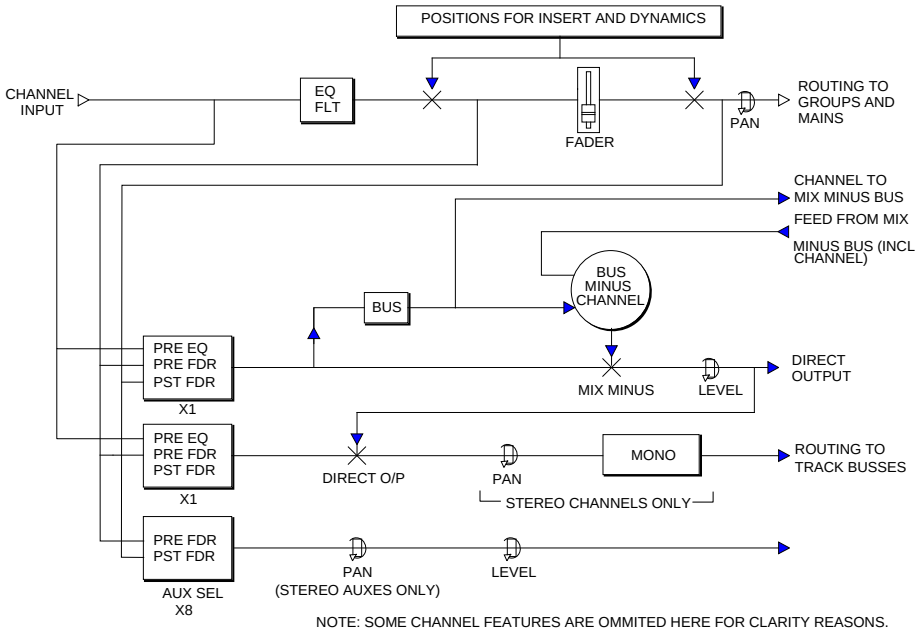
Assignable Inserts

The system provides a pool of assignable inserts which can be used in the stereo and mono channels and groups. In addition, the main outputs have their own dedicated inserts.

The send and return ports must first be set up using the I/O patching screens.

Pressing the INSERT port selection 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 Insert IN button. A button allows selection for the patch to be made pre-fader.

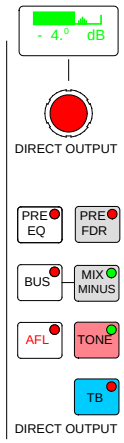




NOTE: SOME CHANNEL FEATURES ARE OMMITED HERE FOR CLARITY REASONS.

Direct Output and Mix Minus

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



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.

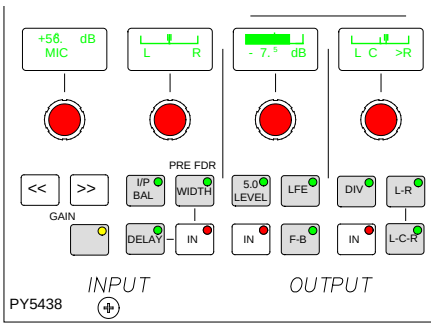
Stereo and Surround Panning

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 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. The 5.0 LEVEL button allows the rotary control to adjust the level of all the surround legs except for the LFE. In order to route a channel to only the LFE of a surround main then the 5.0 level can be turned off (faded out) and the LFE level turned up. The 5.0 level is independent of the LFE level.



Divergence

On mono channels, the divergence control sets an amount of the centre signal to also feed to the left and right.

Divergence is switched in, using the IN button.

The divergence control on a stereo channel determines its left, centre and right contribution to a surround path.

When the divergence control is fully anti-clockwise the signal will be present only in the centre, and "MONO" is shown in the display. The pan control balances the mono mix of left and right into the centre.

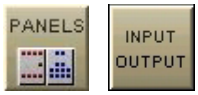
As the divergence control is rotated clockwise the level of audio in the left and right increases and the level in the centre decreases. The display shows a bar of increasing width. Adjusting the pan control balances the left and right mix to the centre, and simultaneously balances the left and right audio.

When the pan control is fully clockwise the signal is present only in the left and right, and "STEREO" is shown in the display. The pan control acts as a balance for the left and right levels.

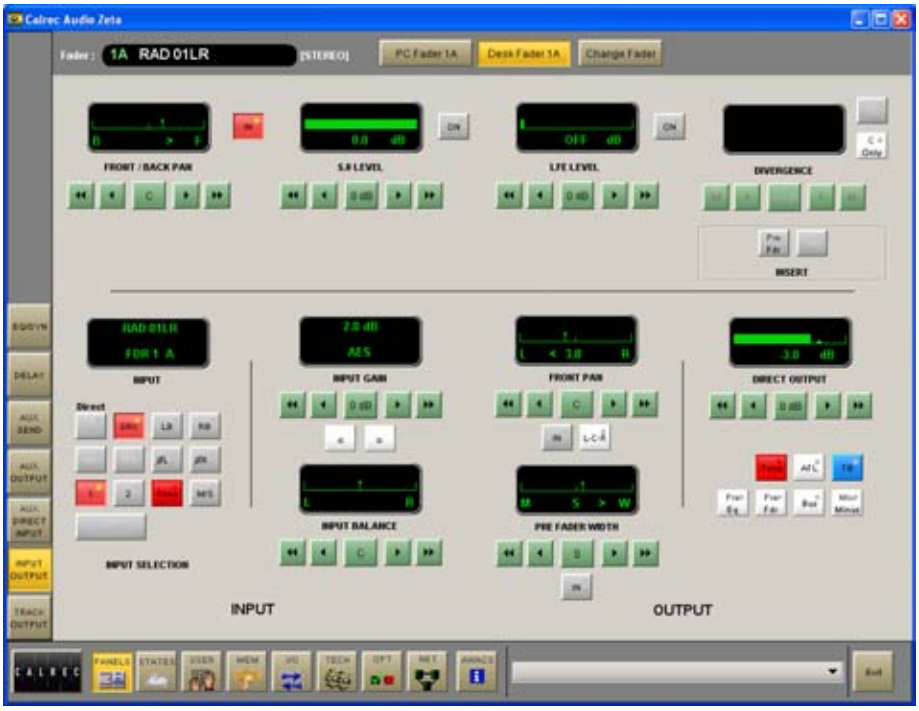
The overall audio level reduces as the pan position approaches the centre.

When LCR is switched out the divergence in of a mono channel is switched out.

The Panels - Input Output screen duplicates some of the input/output controls on the control surface.



In addition, the user can choose whether to control the currently assigned fader path, or to select a different fader, known as the “PC Fader” to which settings can be applied independently of the current assignment. Control is chosen using the selection buttons “PC Fader” and “Desk Fader”



INPUT DELAY

The Panels - Delay screen allows specific amounts of delay to be applied to the currently assigned channel path.

In addition, the user can choose to control a different fader, known as the “PC Fader” to which settings can be applied independently of the current assignment. Control is chosen using the screen’s selection buttons.

Up to 24 legs of delay are available for channel assignment, depending upon which audio pack your console is using. Each leg provides up to 1365 ms of delay. Stereo channels use two legs.

Assigning Delay

The ASS button is used to assign the delay, and the IN button switches the set value of delay in and out of the path.

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. If an attempt is made to assign more than the available delay resources a pop-up message will be reported on the screen.

Delay resources can be assigned separately to inputs 1 and 2 of each channel. The screen shows information relevant to the active input.

The I/P DELAY button in the Input/Output section of the control surface allows the rotary control and IN button to control adjustment and switching of input delay values.

Interrogation

Holding down the interrogate button will indicate the channels which have delay assigned by lighting their fader assign buttons. The button will light if either input 1 or input 2 has delay assigned. It is not possible to perform interrogation from the screen when controlling a “PC Fader”.

PAL Frames, NTSC Frames or ms

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

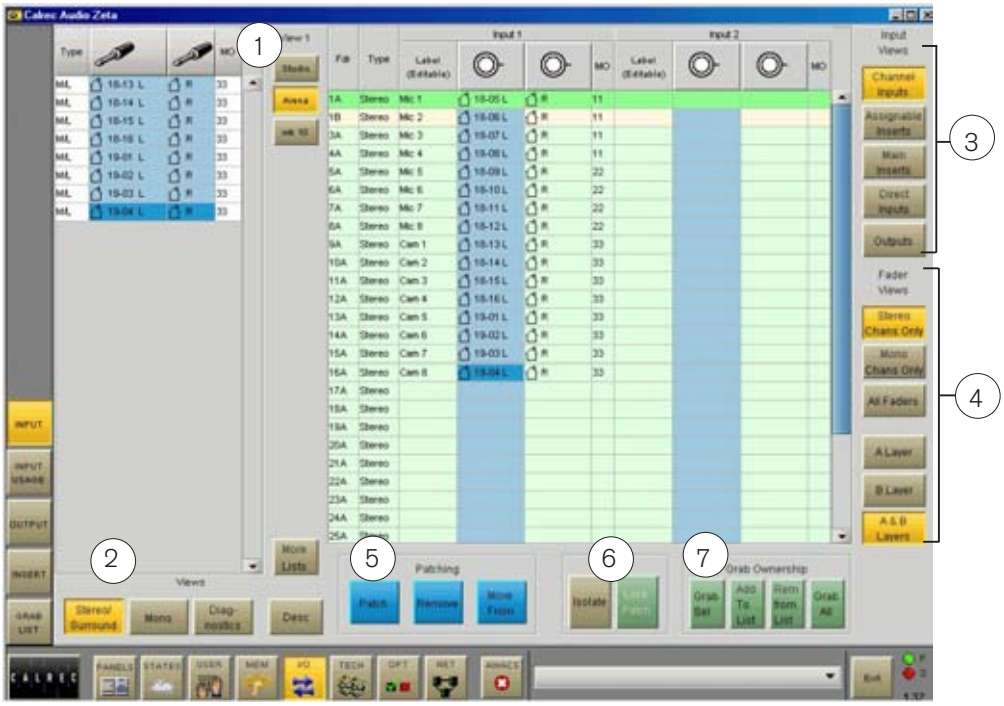
Wild Control Delay

When delay is assigned to a channel’s wild control, then the wild delay control shaft can be used to switch the delay in and out of the channel’s path. This behaviour is enabled and disabled using the Options-Misc screen.

Delay can also be assigned to Wild controls using the User-Chan screen. A screen button is provided, for use instead of the rotary control push-switch.

INPUT PORTS SCREEN

This screen allows patching of input sources to channel inputs, insert returns, direct inputs or to output ports. On the control surface, ports may also be assigned using the Port Select controls. This screen shows the patching for channel inputs.



(1) Source Lists

All of the available ports can be grouped into suitable lists using the Options - Port Lists screens. 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). When viewed as diagnostics, the list can be sorted alphanumerically, by selecting the column header.

(3) Input Views

These buttons select the console path types which can have input ports attached (channel inputs, insert returns, direct inputs or outputs). They are displayed in the main section of the screen.

(4) Fader Views

It is possible to choose which set of faders are to be available on and altered by this screen. When a fader assign button is selected, the screen will jump to the selected fader in the list. This behaviour is enabled using the States screen.

(5) Patching

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

The input source label will appear in the channel input label field and on the fader on the console By selecting the label cell on the screen, the input 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.

Patches can be removed when selected using REMOVE.

Connections can be moved between channel inputs when selected using MOVE FROM. 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 to a region of inputs.

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

(6) Port Isolation

Port connections can be isolated from memory recall, so that their settings will not be over-written when a different memory is loaded. Selecting Isolate a second time will de-isolate the connection. A brown cell in the Label column indicates that a port is isolated. Other console settings can be isolated using the Mem- Isolate screen.

(7) Grab Ownership

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

The grab buttons allow the console to override ownership of the network sources, either altogether, individually, or by adding them to a “Grab List”.

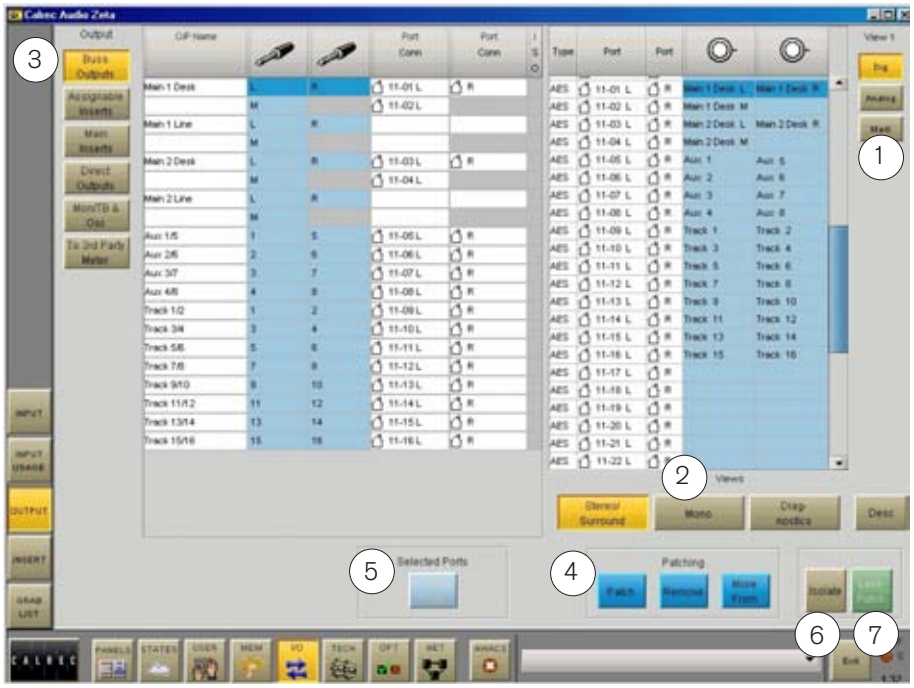
GRAB ALL allows the console to take ownership of all Hydra ports in the system.

GRAB SEL allows the console to take ownership of all Hydra ports selected on the screen.

ADD TO LIST and REMOVE FROM LIST will add or remove selected Hydra ports 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 I/O - Grab List screen. Selecting GRAB LIST allows the console to take ownership of all Hydra ports on the grab list.

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. This screen shows the patching for bus outputs.



(1) Output Port Lists

All of the available ports can be grouped into suitable lists using Options - Port Lists screens. These lists can then be displayed on the right of this screen, ready to have signals patched to them from the left. Different lists are accessed using the selection buttons.

(2) Viewing Options

The ports can be viewed as pairs (for patching from stereo or surround paths), individual (for patching from mono paths), or individual with the actual rack number, card slot and output 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. bus outputs, insert sends, direct outputs, monitoring outputs, Talkback outputs, oscillator outputs, external meter outputs).

(4) Patching

To make an assignment, select an output signal, 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 selected output ports using the REMOVE patching 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 first source point
- Select the output ports by dragging down the column, these have to be all in the same column
- Select Patch

(5) Remove Ports

This button allows an output signal to be removed from its output port assignment or assignments, without needing to locate the 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 Ports.

(6) 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.

(7) Output Port Locking

Some output ports may need to be ‘locked’ once they have been set up to avoid accidental removal. For example, the console’s Main 1 output signal may be assigned 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 locking system is provided to protect critical parts of each configuration.

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.

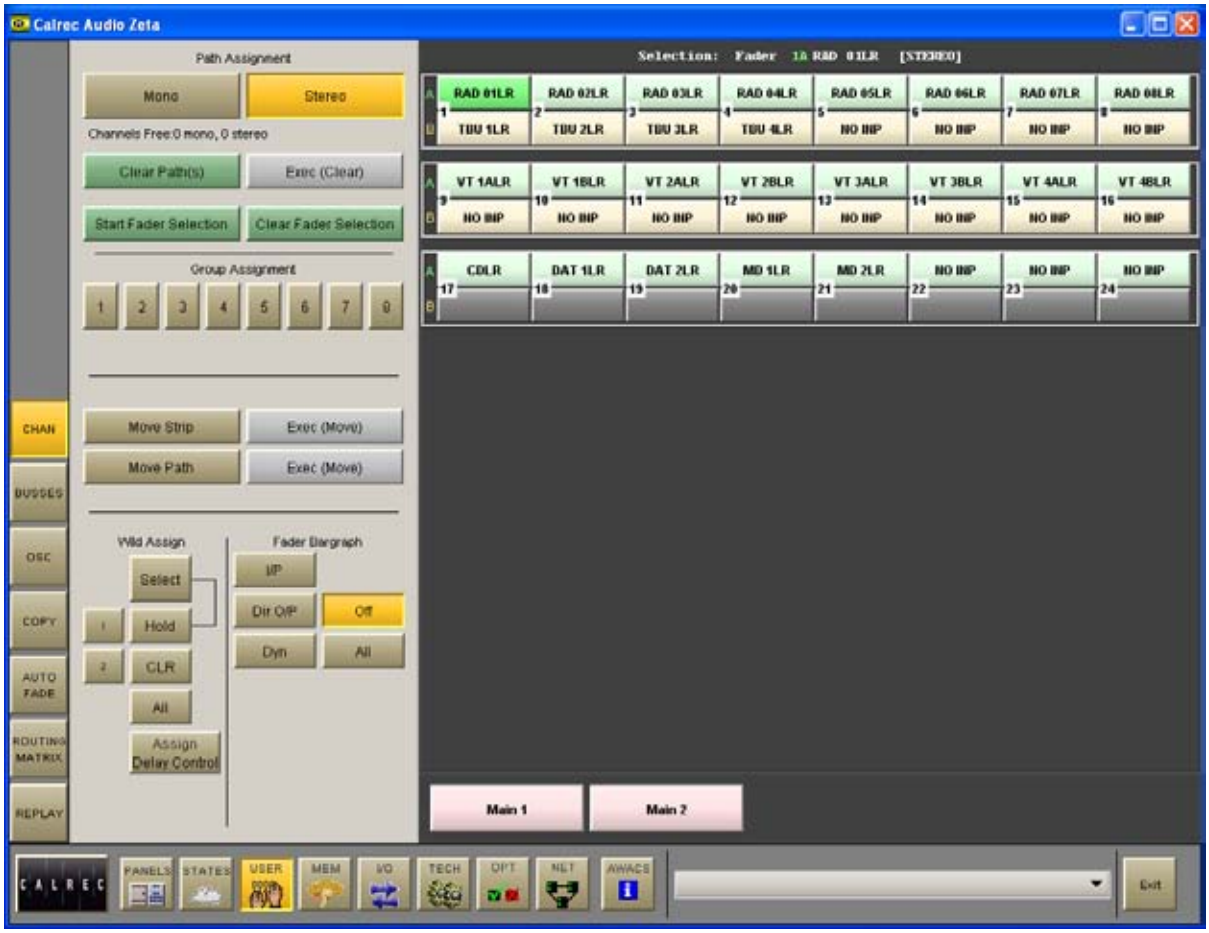
To lock an output port assignment, select an output port which has a source assigned to it, and select the LOCK PATCH button. Provided that the desk is in “Technician” mode, the lock state will be toggled.

If the lock is active, the port name will be highlighted in bright green text.

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!”

ZETA
CONSOLE FUNCTIONS

USER-CHAN SCREEN



This screen provides controls for channel functions, some of which are available on the control surface. The right side of the screen shows the fader paths A and B.

To make changes, select the required fader path either from the screen or by pressing its fader assign button, and use the controls on the left side of the screen.

Path Type Selection

The path type for the currently assigned fader 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.

Clearing Paths

To clear a path, select the assign button of the path you wish to clear, and select CLEAR PATH and then EXEC.

"Start Fader Selection" allows a number of fader paths to be selected, either from the screen, or by selecting their fader assign buttons. In this way, a number of fader paths can be cleared in one operation.

Multiple fader selection can also be used to allocate a path type to several paths at once. The multiple fader selection can be cleared using "Clear Selection".

Move Path and Move Strip

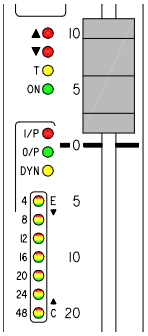
In addition to the controls on the control surface, paths can be moved or swapped from one fader to another, using the controls on this screen.

Select the required path, and select MOVE PATH (the assign button will flash). Then select the destination fader path, and select EXEC (Move). The two paths will swap over, and any Wild control assignments will move with them.

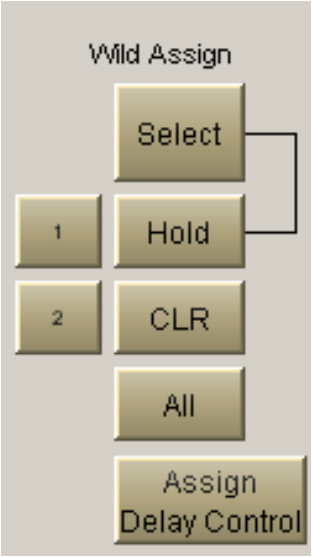
MOVE STRIP moves the whole fader strip to a different fader. This means that the A and B paths including any Wild Assignments will move to the selected destination fader strip.

Fader Bargraph Assignment

Buttons I/P, DIR O/P, DYN and OFF on this 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 function.



Wild Control Assignment
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 assign panel function to a Wild control as follows:

- Select a fader path
- Select WILD ASSIGN 1 or 2
- Push one Assign panel rotary control

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

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 separately to Wild controls, by holding down the required input button on the Input/Output panel before pushing the gain adjustment rotary control.

Please note that Auxiliary output controls cannot be assigned to Wild controls.

CLR will clear the selected Wild control from its assignment.

Multiple Wild Control Assignment
It is possible to assign controls to more than one fader path at a time, 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 (their fader assign buttons will illuminate). 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 1 and 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.

Adjustment of input delay values can also be done using Wild controls. A screen button is provided on the User-Chan screen., with which to assign this function.

Wild Control Push-Switch Option
If a wild control has the Aux Send, Input Delay 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.

EQ AND FILTERS

The Equaliser section of the module controls EQ and Filters on the channels. As console processing is not pooled, EQ can be assigned to every path, without fear of running out.

Once a channel has been selected by pressing its Assign button (A or B), its 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).

EQ level controls are adjustable by ±15dB. Bands overlap to allow greater flexibility of settings.

EQ and Filters are switched in and out of the signal path using the IN button.

Alternate EQ

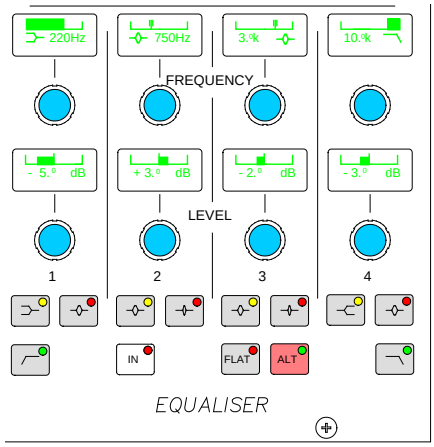
The ALT button allows switching between two complete sets of EQ and Filter controls.

EQ Flat

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/DYN Screen

The user can view and manipulate the EQ and filter response curves, using the Panels-EQ/DYN 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 controls adjust the compressor/limiter and expander/gate on channels, and the compressor/limiter on groups and main outputs. As console processing is not pooled, dynamics can be assigned to every path, without fear of running out.

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.

Once a channel has been selected by pressing its Assign button (A or B), its dynamics can be adjusted using the following controls.

Compressor

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

Make up gain is adjustable from 0dB to +20dB.

Expander

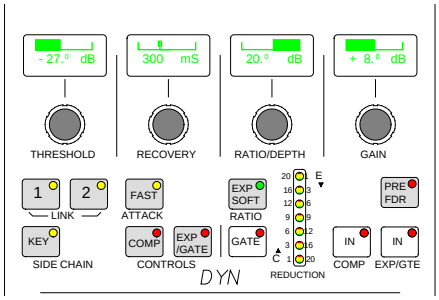
Threshold 0dB to -40dB
Recovery 75ms to 4 sec + AUTO (Max clockwise setting)
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)
Ratio 2/1 or SOFT

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

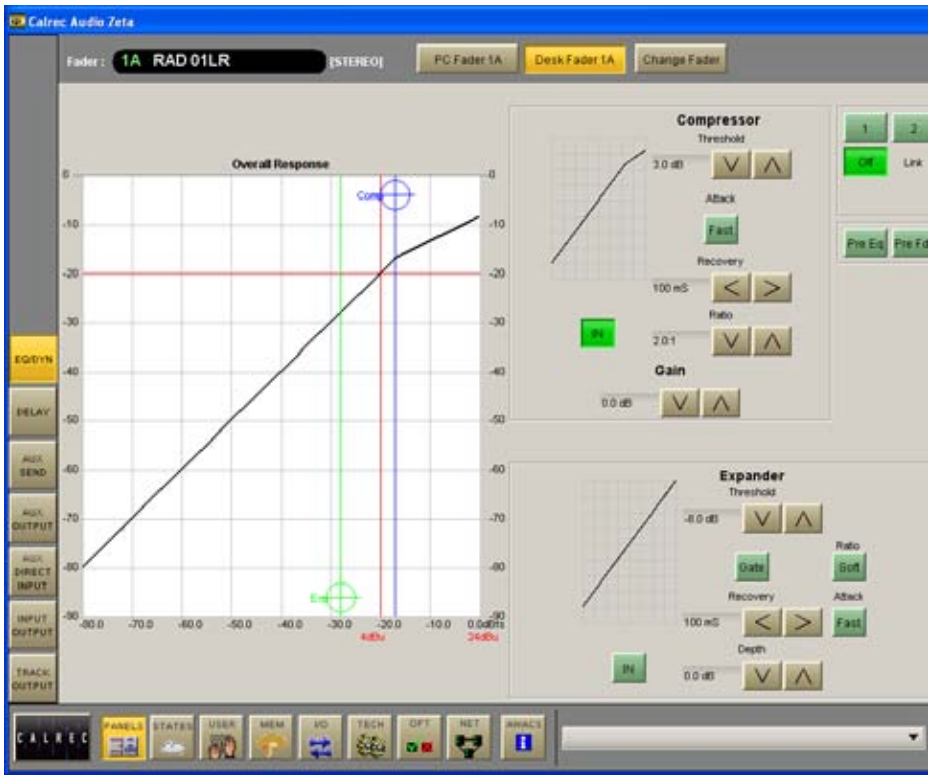


is useful for when the same dynamics settings need to be applied to more than one channel. With the channel selected, press Link 1 or 2 to assign the channel to the bus.

Panels - EQ/DYN Screen

The user can view and manipulate the dynamic response, using the Panels-Dynamics screen.

All of the dynamics controls available on the control surface 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 AND TRACK OUTPUT CONTROLS

Routes to tracks, groups or main outputs for the currently assigned path can be made or removed by pressing the numbered buttons in the routing section. In addition to the indicative LEDs on the fader strip, the button LED will light to indicate that the route is made.

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.

Buttons allow the signal feeding the track routing selector to be 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 of the control surface.

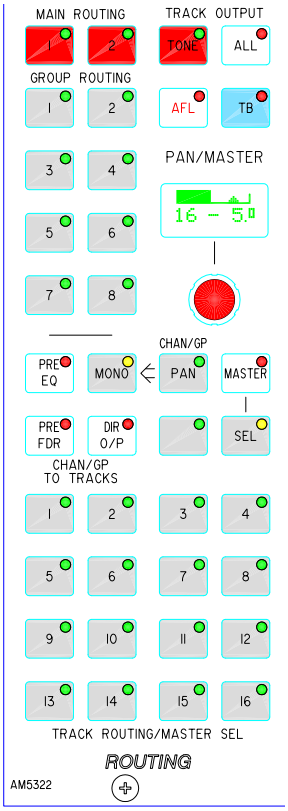
When any of the routing buttons (groups, mains, tracks) are held down, the fader assign buttons of all the paths feeding that bus will remain lit. The fader assign buttons of paths which are not feeding the bus will cease to be lit. This button can also be used to interrogate mix minus feeds using the BUS button on the Input/ Output panel.

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 paths by pressing their fader assign buttons. This is known as "Reverse Routing".

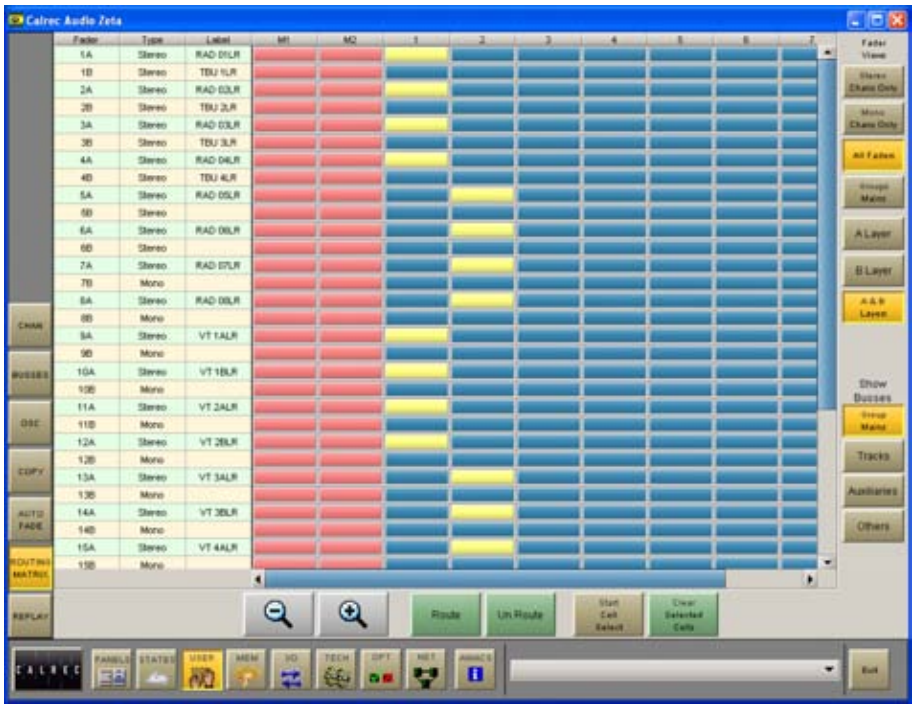
User-Routing Matrix Screen

This screen allows whole channels or individual spill paths of surround channels to be routed to mains, groups, tracks and auxiliaries, using a selection table. This screen not only provides alternative

controls to the routing buttons on the control surface, it also gives a comprehensive visual representation of the routes made in the system, and allows the user to evaluate and control the routing more effectively.



Zoom controls are provided to allow the user to adjust the viewable area.



Panels - Track Output Screen

The Panels-Track Output screen allows the user to control each of the 16 track output levels using virtual faders.

Each track output has its own screen-based fader, which can be adjusted by dragging the fader using the touch screen or trackball. In addition, the selected track output can be adjusted using a larger fader at the side of the screen, or using the coarse or fine nudge buttons. The default button can be used to set the selected track output to 0dB.

A master fader allows the level of all the tracks to be controlled simultaneously.

Tone or Talkback can be fed to the selected track or all at once using the selection buttons.

AUXILIARIES

8 mono auxiliary output busses are available. These busses can be paired up for stereo, using the User-Busses screen.

The displays above each rotary control show what is being controlled (e.g O/P or DIR) until they are adjusted, when the level is then displayed. A short time after the adjustment has been made, the display will show the label again.

The buttons at the bottom of the Auxiliaries section influence the function of the controls.

Auxiliary Sends

AUX

When AUX is selected, these controls adjust the feeds from the channels or groups to the auxiliary output busses. The ON button switches the feed from the currently assigned channel or group to that auxiliary output bus. Each feed can be pre or post the channel or group fader, selectable using the PRE button.

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 stereo auxiliaries, PAN makes the control into a pan control (balance on stereo channels). Any pan offset will be shown as an offset between the two bars of the display.

On mono auxiliaries, buttons 5 to 8 switch the control to that numbered aux send. The Pan button will be inoperative.

Aux Direct Inputs

DIRECT

When DIRECT is selected, this section controls the auxiliary direct inputs. The pre fader and pan controls will be inoperative.

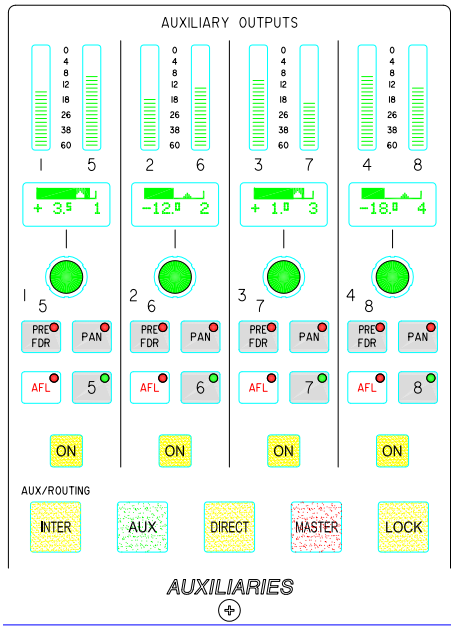
Auxiliary Outputs

MASTER

When MASTER is selected these controls adjust the auxiliary outputs. The ON buttons switch the output on and off.

On stereo auxiliaries a dual level display will be shown. There cannot be a level offset on the output display.

Please note that auxiliary output controls cannot be assigned to wild controls.



LOCK will lock the panel into MASTER (output) mode. If LOCK is not selected, the panel reverts to Aux if a fader assign button is pressed.

LOCK

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.

Interrogate Mode

INTER (latching) 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 remain lit. The fader assign buttons of paths which are not feeding the bus will cease to be lit.

Paths can be added or removed from the bus under interrogation, by selecting or de-selecting their fader assign buttons.

Panels - Auxiliary Control Screens

The user can view and adjust the auxiliary send, auxiliary output and auxiliary direct input controls using the Panels - Aux Send, Panels - Aux Output and Panels - Aux Direct Input screens.

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.

MAIN OUTPUTS

Unlike channel and group faders, the main fader design is not dual path. Mains 1 and 2 have their own dedicated faders.

The ASSIGN buttons (M1 or M2) call the path to the Assign Panels to allow:

- Routing (of one main to another - indicated on the routing LEDs next to the main fader assign buttons)
- Insert on/off
- Control of the compressor and direct input

Tone and Talkback can be fed to each main output using the TONE and TB buttons.

Surround and Stereo Main Outputs

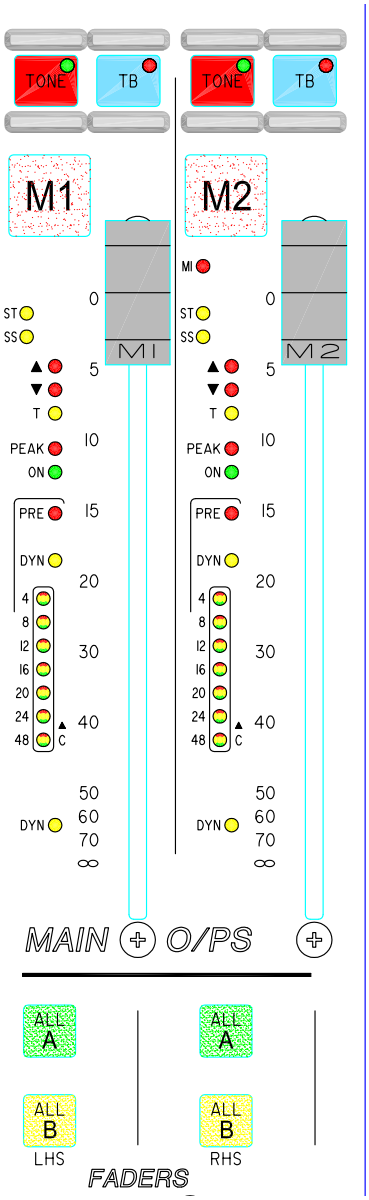
Each main output can be pre-set to be either surround or stereo. Surround mains are 5.1 plus a rear downmix to allow a simultaneous LCRS.

There is also a stereo downmix and a mono downmix (potentially 10 outputs for each surround main). If a surround main is routed to a stereo main, the stereo downmix will be routed.

The insert and direct input are also surround.

Fader Bargraph

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. This is done on the User-Chan screen.



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.

All A/All B Action

A short press on the ALL A and ALL B buttons will switch all the channel faders to display either their A path or their B path permanently.

Buttons on the Options - Misc screen set the functionality of the All A and All B buttons when using a long press (press and hold).

If set to change layer, a long press on the ALL A and ALL B buttons will switch all the channel faders to display either their A path or their B path permanently.

If set to “Momentary View”, a long press of an All A or All B button will display and control those paths on the control surface until the button is released. The console will then revert back to the previously displayed layer on each fader. The console’s A/B display pattern is not lost.

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.

Select the controls you want to copy, using the selection buttons I/PS, EQ/FLTR, DYN, PAN, FDR, RTG, AUX, WILDS or ALL.

Press TO FADER (flashes) then select the required destination/s. Destinations can be chosen by selecting fader assign buttons, or using the ALL A or ALL B buttons.

Once all destinations have been chosen, the EXEC button 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.

Copy Options

I/Ps copies LB, RB, ØL, ØR, M/S and balance settings (only Ø 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 selections 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.

BROADCAST FACILITIES PANEL

The Broadcast Facilities panel allows the console condition (Transmit, Rehearse) to be set; console and rack resets to be performed; and PSU Fail indication. It also houses the connector for the talkback microphone.

Condition Switching

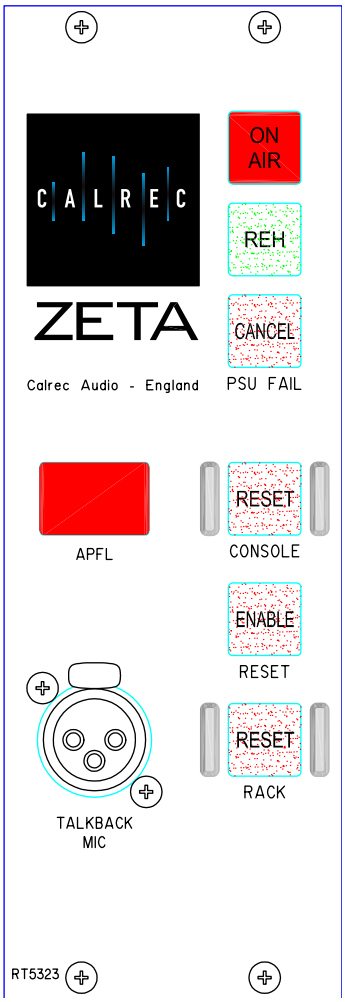
There are three modes which the system can be in: Transmit (TX or On Air), Rehearse, or neither. These are controlled from the ON AIR and REH buttons or from external inputs set up on the Options - GPI screen.

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 Reset

Pressing the ENABLE and 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.

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



Rack Reset

Pressing the ENABLE and RACK RESET button resets the racks only, the control surface is unaffected.

Please Note: Resetting the racks will result in a brief audio interruption.

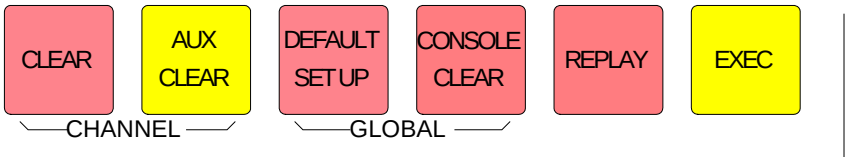
Power Supply Monitoring

The rack mounted PSU and distribution module monitors the power supplies for failures, and the hot spare will take over if a fault develops. 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 the unlikely event of a second PSU failing, the light will begin to flash again, to alert the user.

The PSU Fail Indicator can be set to flash whenever an AWACS error or warning message is reported. This is done using a general purpose output, set up on the Options - GPO screen.

CONSOLE FUNCTIONS

The console function buttons provide an easy way of clearing down console settings.



These buttons flash when selected 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.

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.

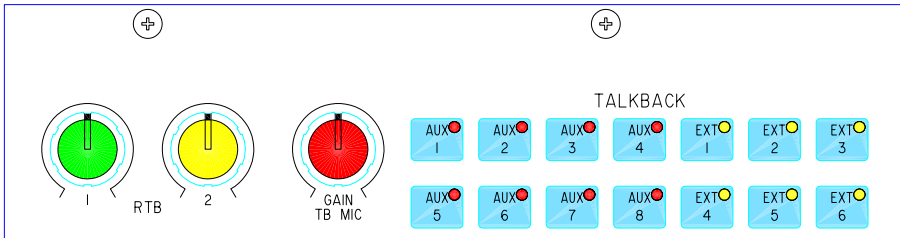
Default Setup
Recalls the default set up configuration for the console, replacing all settings.

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.

TALKBACK



Talkback is available to all 8 auxiliaries, both main outputs, 6 external sources (via GPO switching), all tracks, direct outputs and Studio LS.

Talkback is available to all 8 auxiliaries and 6 external sources (via GPO switching) using the buttons here.

Talkback is available to both main outputs using the TB buttons on the main output faders

Talkback is available to direct outputs using the TB buttons on each channel or group fader, or the TB button in the Input/Output section, or using the Panels-Input/Output screen.

Talkback is available to individual tracks using the TB button in the track output section of the control surface, or using the Panels-Track Output screen.

Talkback is available to Studio LS using the button in the monitor selector section.

Level Controls

The GAIN control sets the level of the TB Mic. 2 controls set the level of 2 RTB (Reverse Talkback) signals. Each RTB signal can feed a separate loudspeaker. There can also be a mix of both signals to feed a single loudspeaker. This can mix with the PFL feed.

Patching Talkback Inputs

Talkback inputs are patched using the OPTIONS - MON TB TONE - Talkback and Tone screen.

All Talkback buttons are subject to On-Air inhibits, set up using condition switching (TX-REH screen).

MONITORING, METER 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.

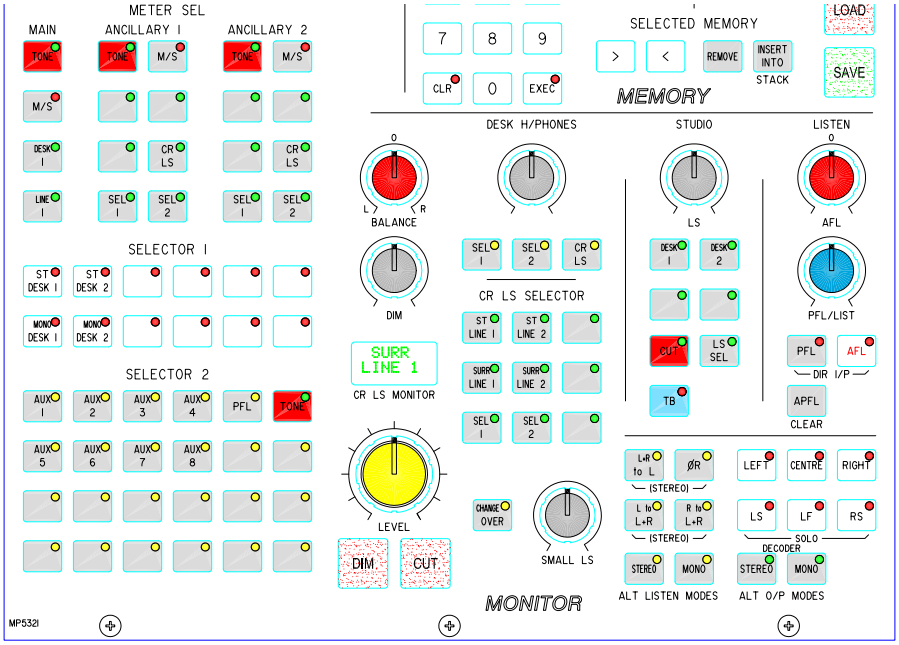
If the loudspeaker system is surround, stereo and mono sources will still be heard in stereo and mono, with no signals on the other speakers. Selector 1 and Selector 2 are sub-selectors which feed the other selectors. All selector external inputs can be mono, stereo or 5.1. Mono inputs are fed to L and 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 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 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.

Ancillary 2 is stereo only.

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.

ZETA
MEMORY SYSTEM

CALREC

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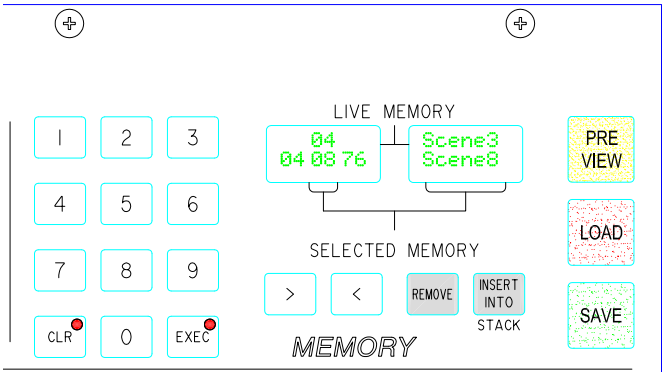
Putting Sound in the Picture

MEMORY CONTROLS

99 memories can be held in the Flash ROM for different console arrangements. In addition , the PC back-up can allow an unlimited number of memories, which are easily recalled into the Flash ROM . Memories can be stored to removable media, which can be useful when many different operators use the same console, or 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 operator can place the next required memory 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 in the Flash ROM 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 Selected Memory. 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 on the Mem-Setup screen.

Preview Memory
When the Preview button is held down, the Selected Memory settings will be displayed on the control surface without actually changing the current settings. The Assign panel displays will be blanked out. Upon release of the Preview button, the live settings will be displayed again.

Stacked Memories
Memories can be arranged into a pre-set list, known as a stack. This is useful for setting up an easy-to-access shortlist of specific memories for use during a show. Stacks can be saved to the hard disk or removable media on the Mem-Setup screen.

INSERT INTO STACK adds the Selected Memory to the stack.

The > and < buttons scroll through the stack. Pressing both > and < together, will reset the position so that the last number loaded is back in the central position.

To allow the stack to use the Selected Memory position, any memory which has been selected manually, and is not part of the stack (shown in inverse text), must first be removed from the Selected Memory position, by pressing REMOVE. If REMOVE is pressed while a stack memory occupies the Selected Memory position, it will be removed from the stack. A second press 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.

All the available Flash ROM memories are listed on the memories screen, and when selected will occupy the Selected Memory position. Memories will be shown as empty if they have not yet been used.

To create a new memory, choose an empty memory from the list either by selecting it, or by typing its number on the keypad in the memory section of the control surface. When SAVE is selected to save the new memory, it can be given a label.

Clear Memory

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.

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 (this is only available when the console is in Technician mode).

Stacked Memories

Memories either side of the Selected Memory in the stack will appear in the windows either side of the Selected Memory window.

Auto

These buttons will manually move the next memory in the stack into the Selected Memory position without being loaded.

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

If the Selected Memory is not part of the stack (shown in inverse text on the control surface), the Auto functions will not move memories to the selected memory position.

If the Selected Memory is not part of the stack, “Change to Stack” will add it to the stack. It will remain in the Selected Memory position.

If the Selected Memory is part of the stack, the “Change to Stack” button is replaced by “Remove From Stack”, with which the Selected Stack Memory can be removed from the Stack.

Sessions

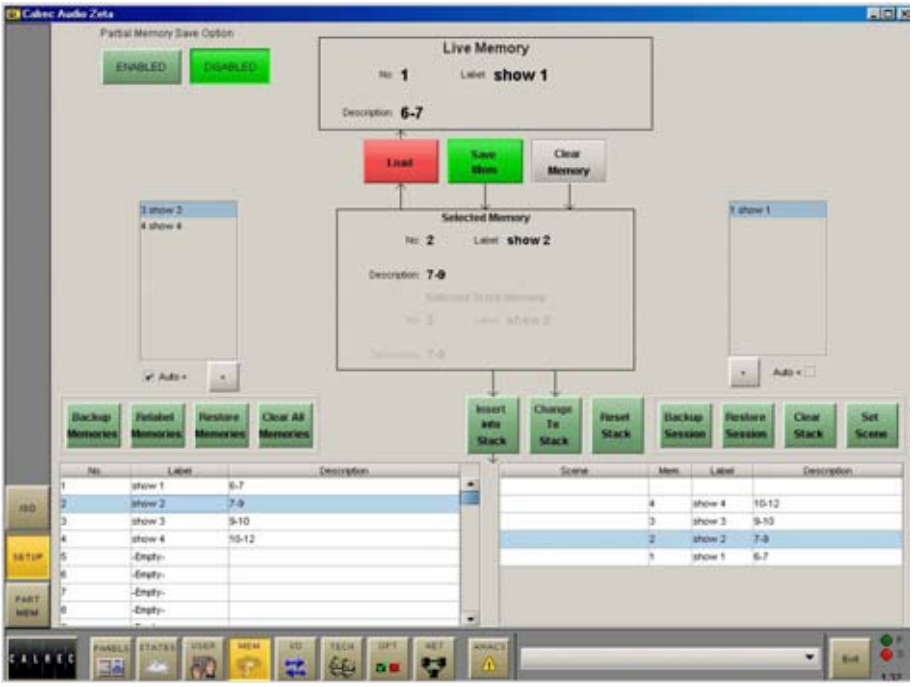
Stacks can be saved to the hard disk or removable media as sessions. Selecting “Back Up Session” backs up the stack and all the memories in it. “Restore Session” allows previously backed up sessions to be restored.

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

Partial Memories

In addition to the buttons on the partial memories screen, partial memories mode can be enabled and disabled using the buttons here. Partial memories mode allows components of console settings to be saved in the same way as full console memories. Components are chosen using the Mem-Part Mem screen.



MEMORY ISOLATION

The Isolate screen allows channel and group settings to be isolated from memory recall. This means their current settings will not be over-written when a 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 a path or settings for a path are isolated, the path will be highlighted with a red box on the right side of the screen.

Isolated Ports

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 independently. Isolated ports are highlighted in brown on the I/O screens.

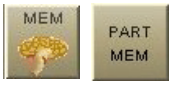
If an isolated port connection is changed, any isolation setting will be cleared, unless one of the console-wide isolation options is selected and contains that port.

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

Please note that Hydra output ports cannot be isolated from memory recall.

PARTIAL MEMORIES

The partial memory save option allows components of console settings to be saved in the same way as full console memories. Once partial memory save option 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.

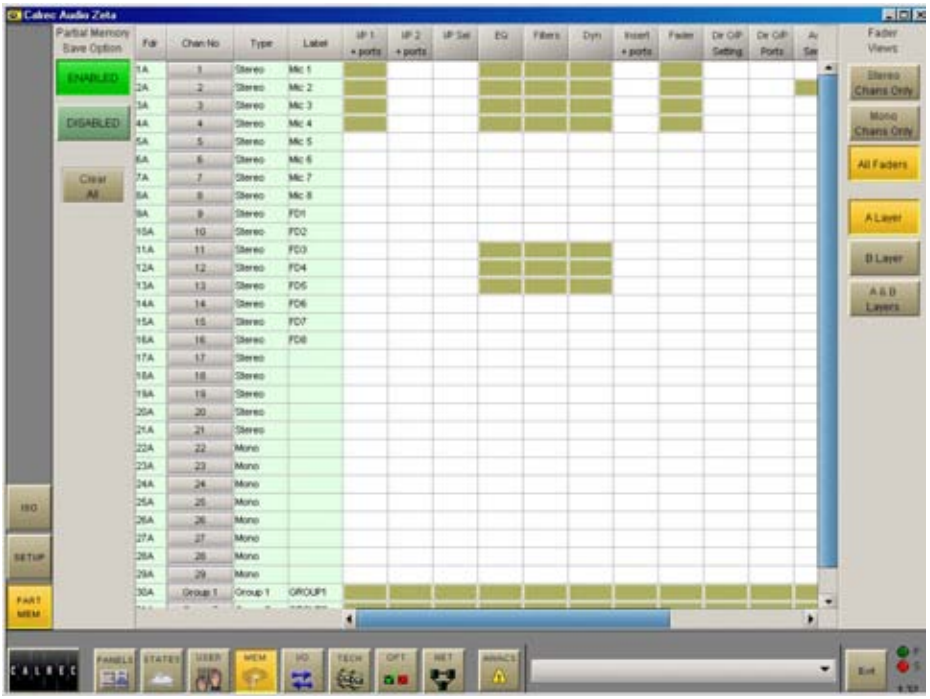


When a partial memory is recalled, only the settings saved will be updated. The partial memories screen provides a mechanism for specifying channels or sub-components of channels to be saved in a partial memory.

Partial memory save option is enabled and disabled using buttons at the top left corner of the screen. These buttons are also available on the Mem-Setup screen. When enabled, all memory saves are partial memory saves. When disabled, all saves are full console saves. Partial memory save option does not have to be enabled to allow previously saved partial memories to be loaded.

Including Channel Components in a Partial Memory

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.



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

ZETA
METERING SYSTEM

CALREC

calrec.com

Putting Sound in the Picture

TFT METERS

High quality TFT screen based meters can be incorporated into the console upstand either instead of or alongside moving coil or LED bargraph style meters. The user can dynamically change the layout of the TFT meters and their arrangement.

The screen layout is configured such that each half of the screen can have 4 or 6 columns, allowing 8 or 12 meter positions across its width. Each column can then be split into up to three rows which can be 1/3, 1/2, 2/3 or full height of the TFT meter panel.

This allows a greater density of meter functions to be displayed, as each TFT meter can display up to 36 meters within the space usually taken up by just two bargraph or moving coil meter panels.

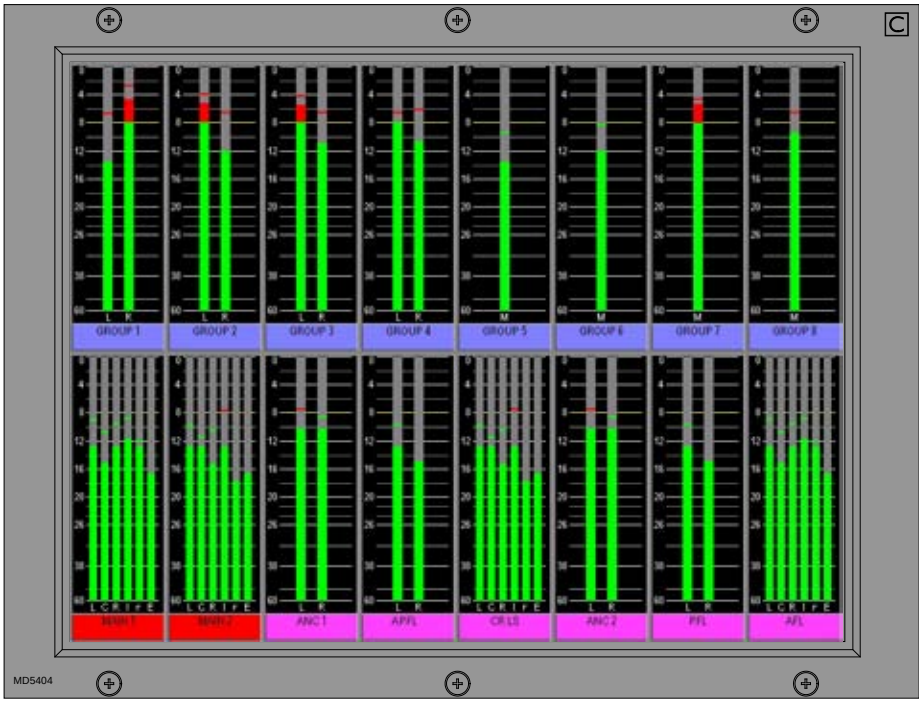
The following functions can be metered:

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

Each meter can be:

- Mono
- Stereo
- M/S (Sum and Difference of the stereo signal)
- Surround (L, R, C, LFE, LS, RS - sequence set as part of meter arrangement)
- Phase Display

When a screen is configured with 8 columns, these columns will line up with any faders positioned in that section of the console.



The number of meters configurable on the TFT screens is governed by the number of meter data signals available. There are 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.

There can be up to 3 phase meters in the configuration.

Bar colours

The user can select the colours to be used on the meters. The top/middle/bottom colours for each signal can be selected independently on the Options - Meter - Setup screen.

Signal Order

On the Options - Meter - Setup screen the user can select the order that the surround signals appear. The order chosen will be used for all surround meters.

Screen Brightness

Over time, the brightness of TFT screens can degrade. For this reason, a set of controls are provided on the Options - Meter - Setup screen to adjust the brightness of each screen individually and globally.

The brightness for each screen can be adjusted from 0-9 using the selection buttons. 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.

METER CONFIGURATION

Sources are allocated to TFT, bargraph or moving coil meters in the same way. 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 from mains, groups, tracks, auxes or other. Subsequent columns will list the available options for that source.

When selecting channel inputs to be metered, the fader number is selected, and the path A or B. Alternatively, the meter can be set to follow the fader's currently assigned path selection (A or B).

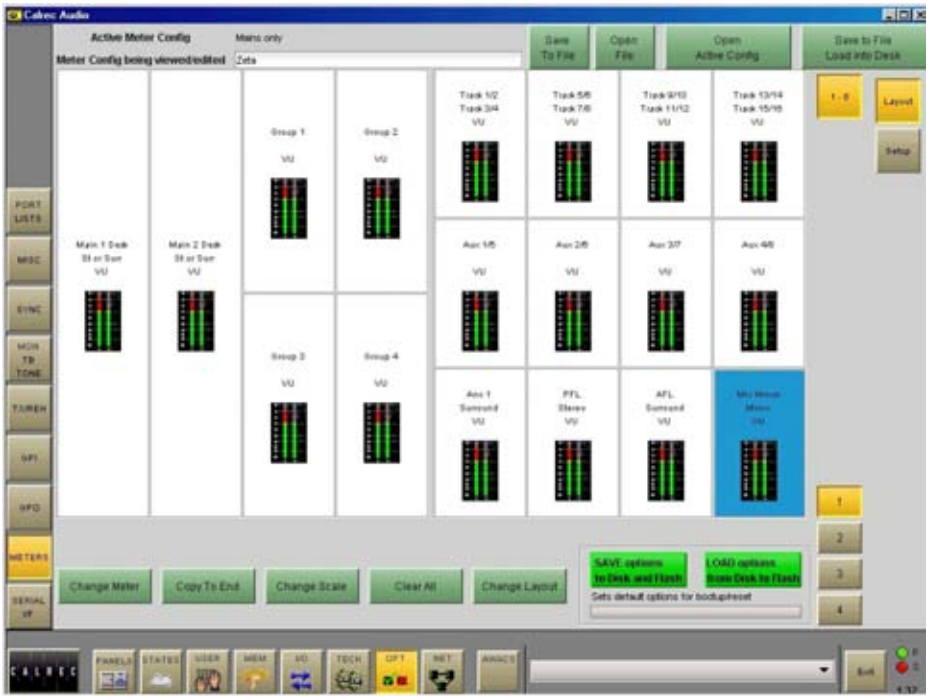
For surround CRLS, main meter and ancillary 1 meter, the width of the TFT meter will automatically change to match the source.

Each meter can be PPM, VU or Phase. There can be up to 128 phase meters assigned in the configuration, after all have been assigned the option will no longer be available.

The scale type can be selected individually for each meter or globally for all meters.

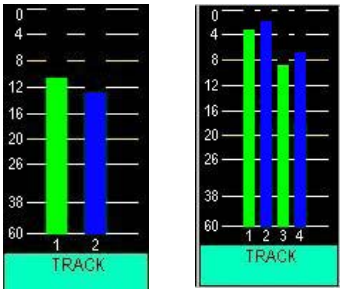
Adjusting TFT Meter Layout

The user can (with some rules) control the layout of the rows and columns on the TFT screens. The numbered buttons on the Options - Meters - Layout screen allow the meter panels to be selected for set-up. Upon selection of one of the numbered buttons, the meter occupying that upstand position will be shown in the main section of the screen.



Tracks on TFT Meters

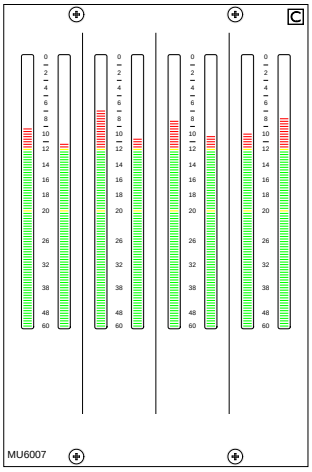
2 tracks can be displayed in any single meter position. However, if the meter position occupies a column which is 1/8 of the screen width (that half of the screen being set to 4 columns wide), then 4 tracks can be displayed allowing the track metering to occupy a smaller space.



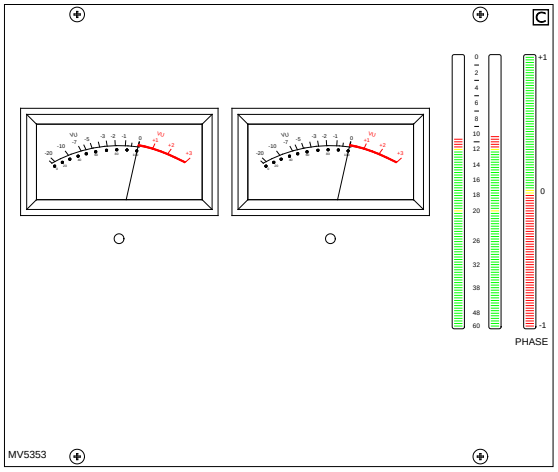
When selecting Tracks to meter, the first available options column allows two tracks to be selected for display in that meter position. The next available options column will then allow selection of the next two tracks. It is useful to change the colours for pairs of mono meters such as tracks, so that the left of the pair is a different colour to the right.

BARGRAPH AND MOVING COIL METERS

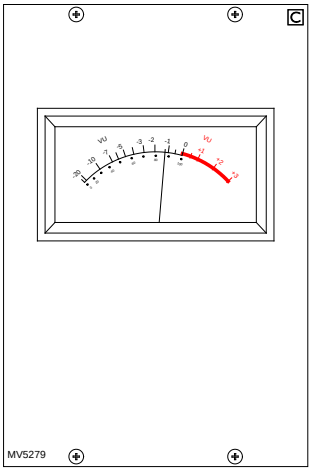
4 X TWIN BARGRAPH



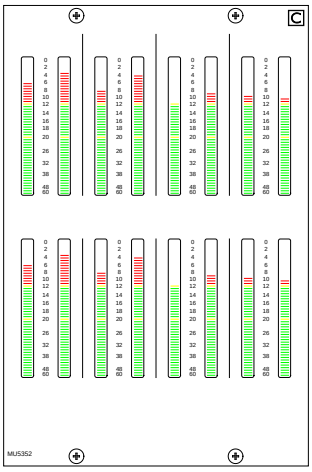
TWIN VU, BARGRAPH & PHASE METER



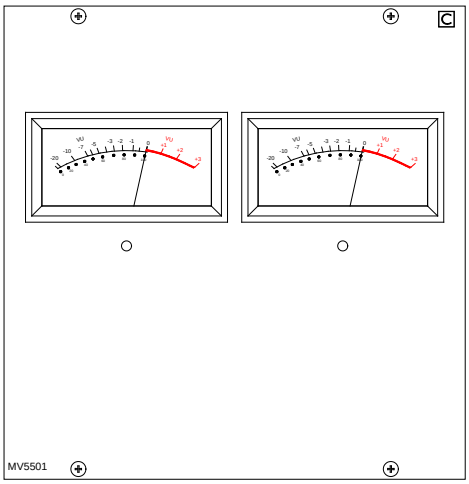
VU METER



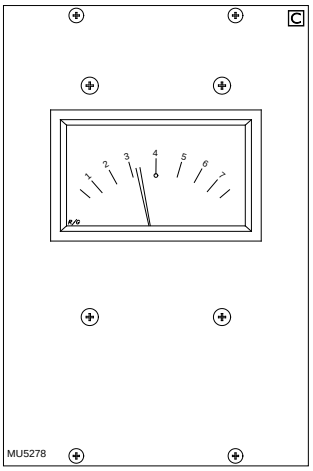
8 X TWIN BARGRAPH



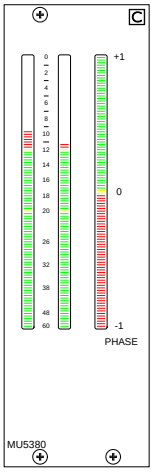
TWIN VU METER



PPM METER R/G (A/B)



PHASE METER



In addition to TFT meters, 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.

ZETA
OTHER INTERFACES

GENERAL PURPOSE OUTPUTS

Connections for 16 opto outputs and 40 Darlington outputs are provided on the rear of the console. In addition to this, there are 8 double pole change-over GPIO relays on the rear of the Bulk Power Supply and Distribution Unit. The GPO screen allows the general purpose outputs to be set up.

Please note that outputs 1 - 4 are not available, as they are used for TX, REH, PSU Fail and APFL facilities.

"Misc Functions" or "Channel Fader Open"

The relay-isolated 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 output.

GPO Patching

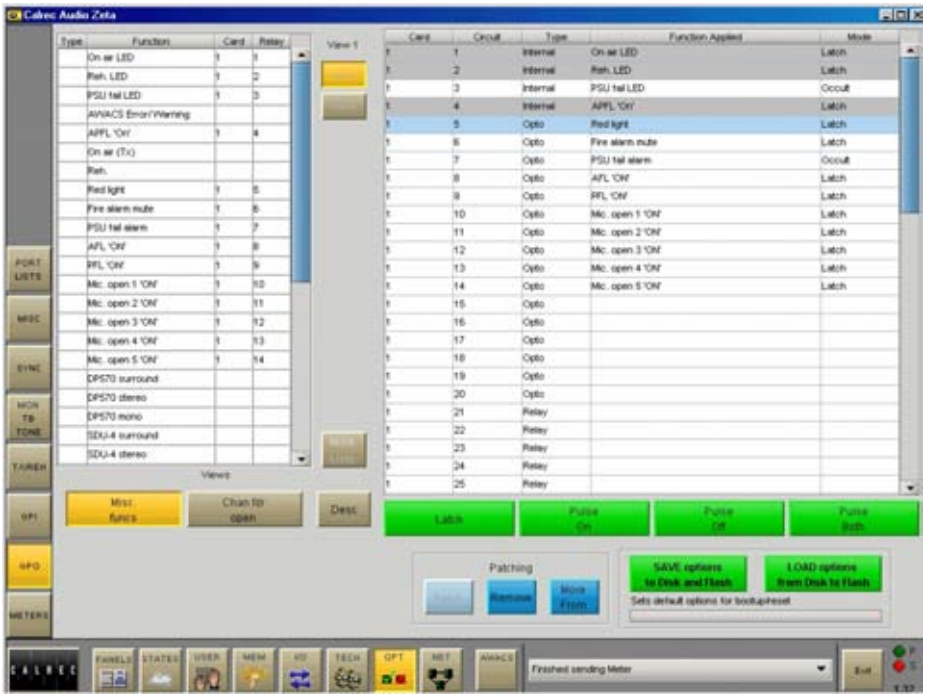
To make an assignment, select a function (left side of screen), and an output (right side of screen), and select Patch. Assignment can also be moved and removed, in a similar way to port connections.

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 - Relay is set to pulse when the function is activated.

Pulse Off -Relay is set to pulse when the function is de-activated.



Pulse Both - Relay is set to pulse once when the function is activated, and again when the function is de-activated.

GENERAL PURPOSE INPUTS

Connections for 32 opto-isolated inputs are provided on the rear of the console. In addition to this, there are 8 double pole change-over GPIO relays on the rear of the Bulk Power Supply and Distribution Unit. The GPI screen allows the general purpose inputs to be set up.

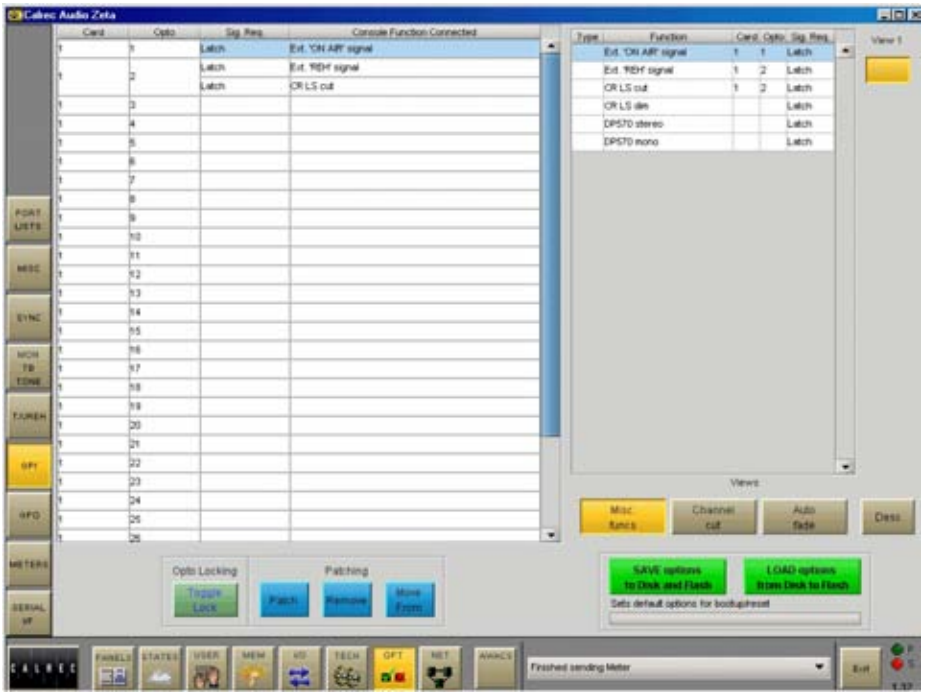
"Misc Functions", "Channel Cut" or "Auto Fade"
Each opto-isolated general purpose input can be assigned to up to 10 console functions (with "Misc Functions" selected), or cut up to 10 channels (with 'Channel Cut' selected).

With Auto Fade selected, this screen allows general purpose inputs to be assigned to auto-faders, to allow automatic cross-fading.

To make an assignment, select an 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 optos are patched to input ports, when fired externally, they will cut any channel to which that input port is connected.

Locking Optos
In Technician or supervisor mode, opto assignments can be locked and unlocked once set up, using the Opto Lock button, to prevent accidental removal.



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.

Router Labels

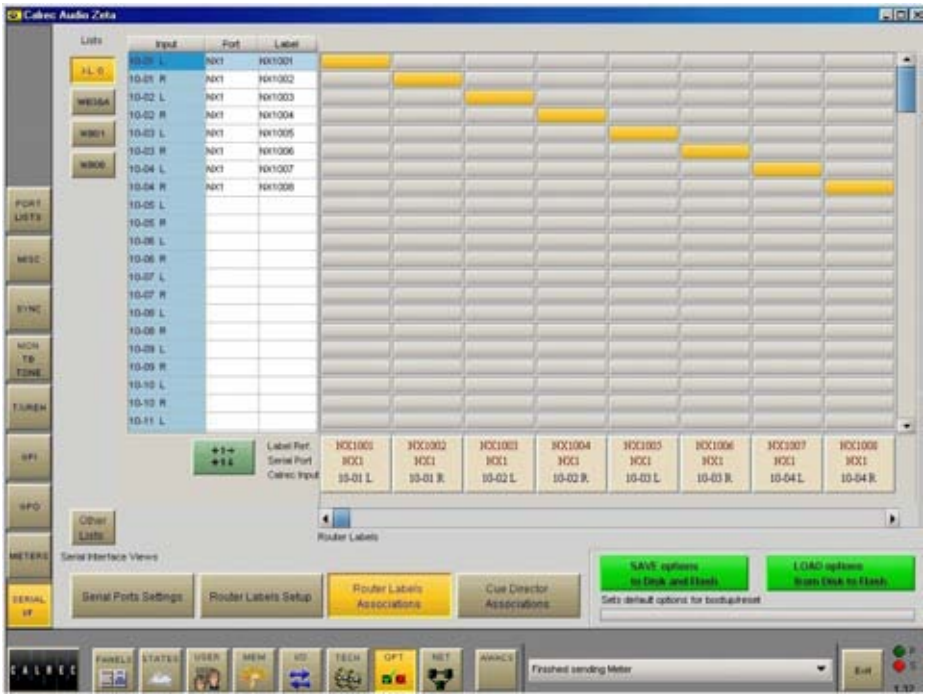
Some Routers incorporate a label interface which is used for the transmission of source (input) and destination (output) descriptions between itself and other equipment.

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. The Serial I/F - Router Labels Setup screen allows the link between messages from the router to be associated with one of the console's 256 labels.

A Router uses a reference code to define each of its output ports The console uses these reference codes to identify each port. The user can also give the label a friendly name of up to six characters.

The Serial I/F - Router Labels Associations 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 Router labels are shown along the bottom of the screen. This forms a grid, and associations are made by selecting the

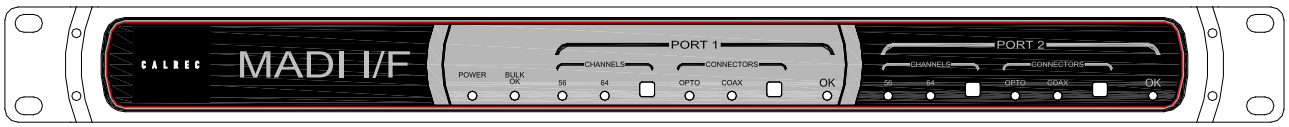


intersecting cell between input port and router label. Each leg of the input ports is always presented as if it were a mono port.

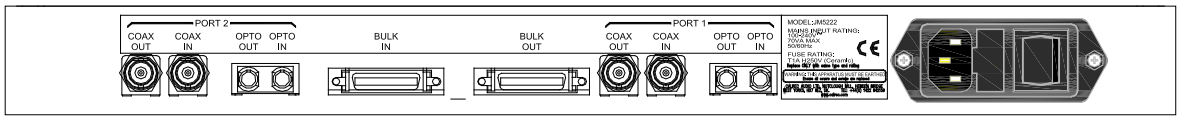
Once an input port is associated with a Router label, the labels will be visible on the fader label column on the I/O - Input screen on whichever channel the port is patched. If a new fader label is entered on the I/O - Input screen, it overrides the router label. The router label will also be displayed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

MADI

FRONT



REAR



The rack mounted MADI Interface unit contains two independent, AES 10 MADI compatible interfaces.

The two ports are interfaced to the console 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.

Once set up, MADI inputs are viewed and patched on the console in the same way as AES inputs.

MADI Unit	Power	Fiber		Copper	
		Connection	Max Cable Length	Connection	Typ. Cable Length
JM5407	DC (24V)	ST - Multi-mode	2 km	BNC (75 Ohm)	<50 m
JM5418	AC (100-240V)	ST - Multi-mode	2 km	BNC (75 Ohm)	<50 m
JM5450	DC (24V)	SC - Multi-mode	2 km	BNC (75 Ohm)	<50 m
JM5451	AC (100-240V)	SC - Multi-mode	2 km	BNC (75 Ohm)	<50 m
JM5754	DC (24V)	SC - Single-mode	10 km	BNC (75 Ohm)	<50 m
JM5755	AC (100-240V)	SC - Single-mode	10 km	BNC (75 Ohm)	<50 m

HYDRA AUDIO NETWORKING

Gigabit Ethernet is founded on key principles of preceding Ethernet technologies and provides a data rate of 1000 Mbps over copper or optical fiber.

Audio and control data is transferred using the Ethernet frame format over switched media in a network constructed from standardised structured cabling.

Hydra I/O boxes providing fixed or configurable I/O may be connected onto the network, providing remotely located sources and destinations that can be used by any or all mixing consoles.

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 Gigabit switch with connections to each mixing console and Hydra I/O box, in a star formation. Connections may be made with Category 5e UTP, up to 90 metres, or with optical fiber, up to 10 kilometres.

Hardware

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 boxes 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. 3 Hydra I/O boxes and 2 modular Hydra I/O boxes are also shown, each with up to 96 inputs/outputs available to any console on the network.

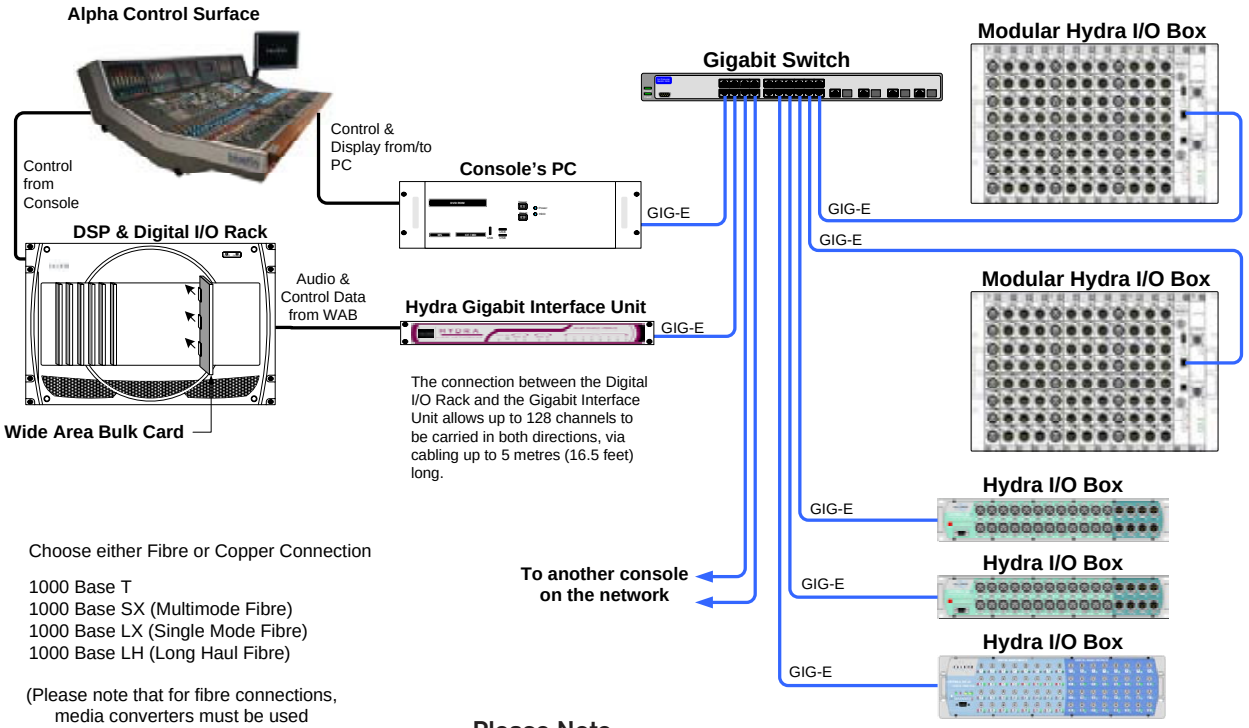
Network Editor

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 console's Network Editor consists of a set of screens for :

- Configuration of modular Hydra I/O boxes
- Offline editing of Hydra I/O and Audio Network
- Status representation of all 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 modular Hydra I/O boxes and audio network to be configured offline. During this time, any operations which require a console are disabled.



Choose either Fibre or Copper Connection

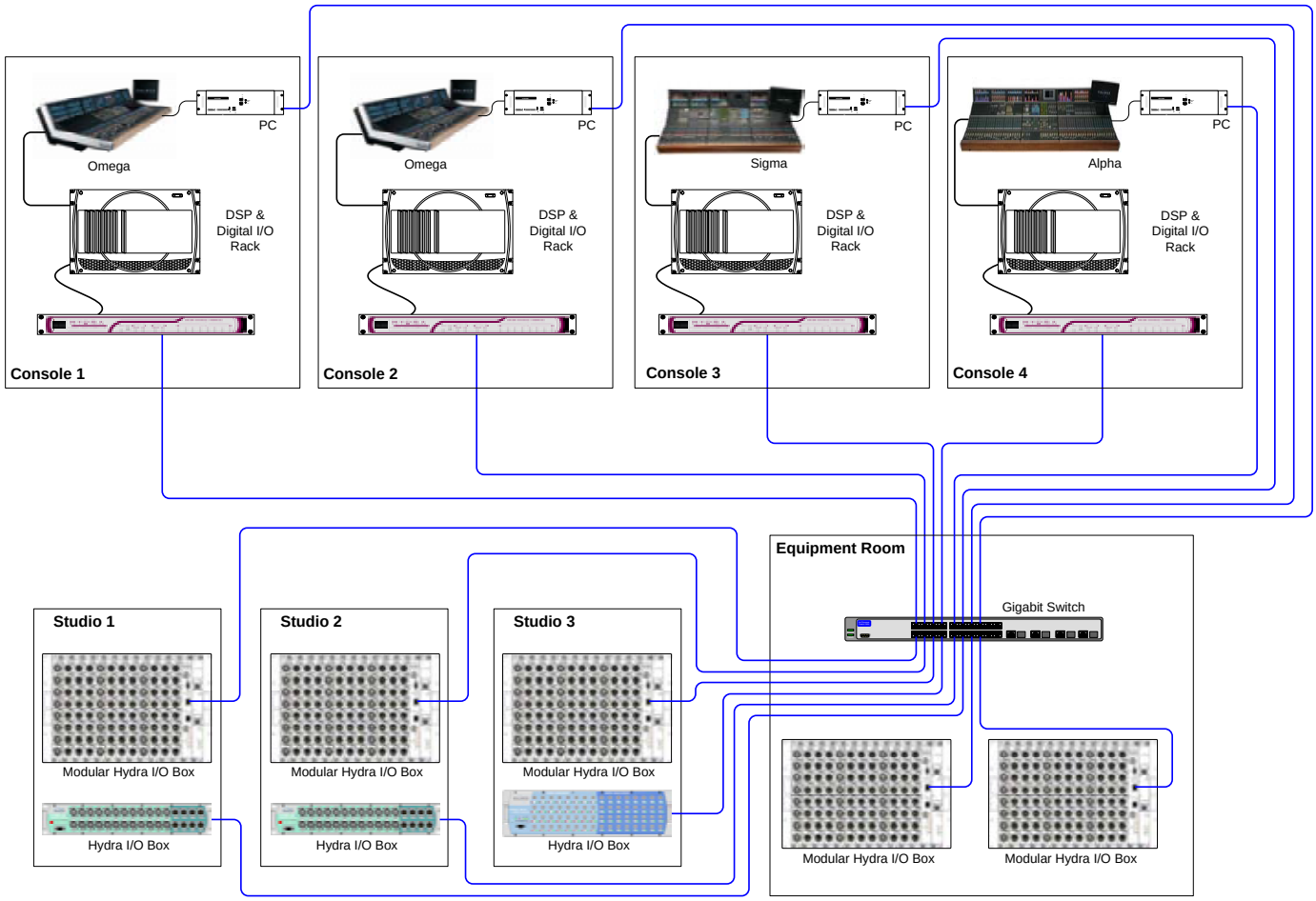
1000 Base T
1000 Base SX (Multimode Fibre)
1000 Base LX (Single Mode Fibre)
1000 Base LH (Long Haul Fibre)

(Please note that for fibre connections, media converters must be used between the Gigabit switch and the Modular Hydra I/O Boxes)

Please Note

Connections to the modular Hydra I/O box are via RJ45 connectors on the front of the unit's processor module. As this is a copper interface, when using fiber cabling, it is necessary for media converters to be used between the Gigabit switch and the modular Hydra I/O boxes.

TYPICAL HYDRA NETWORK EXAMPLE



The above diagram shows 4 control rooms, each with a Calrec digital console. The Gigabit interface unit for each console transmits and receives audio data to and from the Hydra I/O boxes, via a Gigabit switch located in the Equipment Room.

The console racks and Gigabit interface unit could also be in the Equipment Room if this was more suitable.

Synchronisation

Consoles sharing sources must be synchronised (e.g. to station sync or video). The Hydra I/O boxes synchronise to console with the highest IP address on the network.

Private 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

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.

ZETA
TECHNICAL INFORMATION

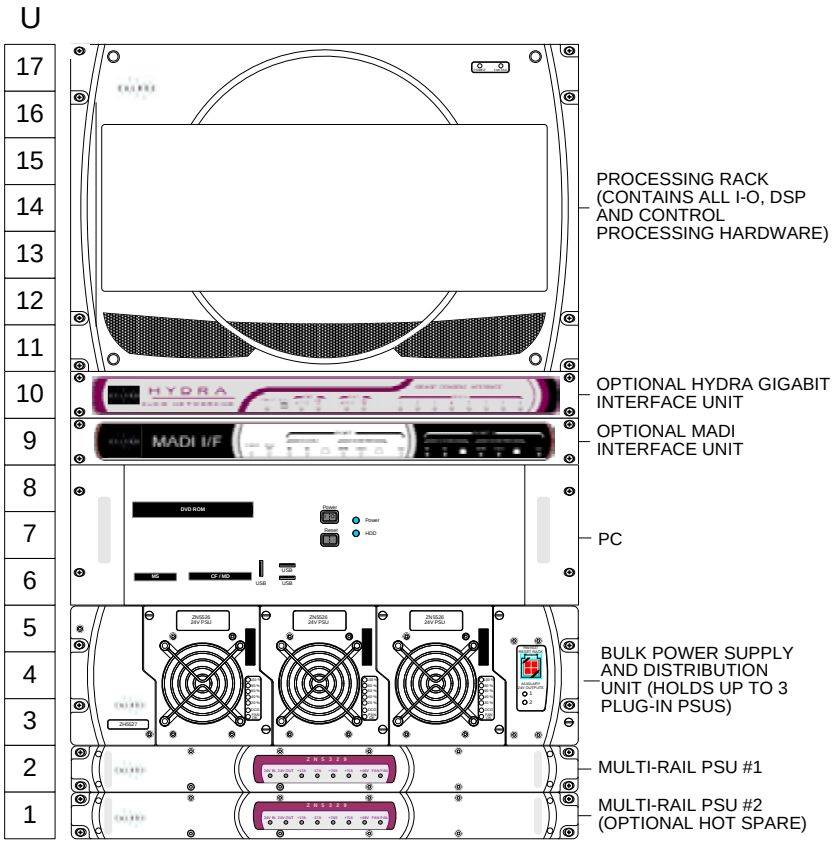
Putting Sound in the Picture

RACK SPECIFICATIONS

It is recommended that all equipment over 8Kg (17.5 lbs) in weight, or over 150mm (6 inches) deep is mounted into equipment bays which offer mechanical supports under each of the units. This will allow units to be supported as they slide forward during removal for maintenance purposes.

Equipment can be mounted in separate enclosures. Please refer to the cable lengths table when planning this.

The Processing rack has a fan tray built into it, which incorporates a baffle such that warm air is sucked up out of the rack and out through the rear of the fan tray. A vent in the front of the fan tray allows ambient air to enter. The baffle deflects this air up into the rack above. The bottom rack should not be positioned above any equipment producing significant heat.



Item	Height	Approx depth (incl. mating cons)		Approx weight		Approx Power Output (W) (full load)	Approx AC Power (VA) (full load)
		inches	mm	lbs	kgs		
Bulk Power Supply and Distribution rack with one PSU	3U	15	380	26	11.8	600	750
Additional Plug-in PSU (Hot Spare)	-	-	-	8.0	3.65	No extra	Less than 5% extra
Processing Rack (Unpopulated)	7U	19.7	500	29.5	13.4	-	-
Processing Rack (Populated)	7U	19.7	500	42.3	19.2	-	-
PC*	3U	23.7	600	27	12.2	-	400
Hydra Gigabit Interface Unit	1U	11.9	300	6	2.7	-	-
MADI Unit	1U	11.9	300	7	3.2	-	-
Multi-Rail PSU *	1U	18.1	460	9.3	4.23	-	-
Additional Multi-Rail PSU Hot spare	1U	18.1	460	9.3	4.23	No extra	Less than 5% extra

* Note: Unit has handles protruding approx 1.3" (32mm) from the surface of the front panel.

Cables From	To	Maximum Length	
		Feet	Metres
Control Surface	PC	492	150
Control Surface	Processing Rack	492	150
Control Surface *	Bulk Power Supply & Distribution Unit	24/32 Faders -492 40 Faders - 459 48 Faders - 394	24/32 Faders - 150 40 Faders - 140 48 Faders - 120
Processing Rack	Bulk Power Supply & Distribution Unit	16.5	5
Processing Rack	PC	98	30
Processing Rack	BNC I/O Interface Panels (Digital)	16.5	5
Processing Rack	XLR I/O Interface Panels (Digital)	9.8	3
Processing Rack**	EDAC I/O Interface Panels (Analogue)	16.5	5
Processing Rack	MADI Unit	16.5	5
Processing Rack	Hydra Gigabit Interface Unit	16.5	5

* For longer distances, the control surface requires a local power supply.

** For longer distances, custom made cables can be provided.

POWER SUPPLY AND DISTRIBUTION SYSTEM

Bulk Power Supply And Distribution
This 3U rack is used to provide power to the control surface and digital components in the system. The rack can hold up to 3 identical plug-in power supply units. The number of plug-in units required in the rack is dependant upon the distance between console and rack, and the "hot spare" requirement.

Each plug-in unit has separate AC power inputs via IEC 950 filtered inlets at the rear of the rack. The DC outputs are combined on the backplane. The maximum output power from each plug-in unit is 600W.

The plug-in units can be "hot swapped" providing there is enough output power remaining to drive the load. Each unit has a bargraph to indicate the output power demand.

Two 24V Auxiliary outputs are provided via resetable 10A current trips with LED status indication on the front panel. These could be used for a MADI interface unit or a Hydra networking interface unit for example.

The rack is fan cooled with fans mounted in the front of each PSU. The warm air is directed out of the sides of the rack. **To ensure proper cooling, there must be a minimum clearance of two inches (50mm) from the fans and side air outlets The maximum operating ambient temperature is 35°C.**

Bulk PSU Rack Fan Noise (dB SPL A-Weighted)	
These measurements were taken on axis at 1 metre from the dominant noise source:	
1 x 24V 600W PSU	42dBA
2 x 24V 600W PSU	45dBA
3 x 24V 600W PSU	47dBA
4 x 24V 600W PSU	48dBA
5 x 24V 600W PSU	49dBA
6 x 24V 600W PSU	50dBA

Power Monitoring & Distribution
In addition to supplying the console and digital rack components of the system with power, the Bulk power supply and distribution unit gathers and distributes the multiple rails (from external power units) required for any analog I/O cards. All the system power rails and fan speed monitoring is gathered here before being sent to the console. Should a fault occur, a warning light will flash on the console and a diagnostic message will appear on the front end AWACS (Automatic Warning And Correction System) screen.

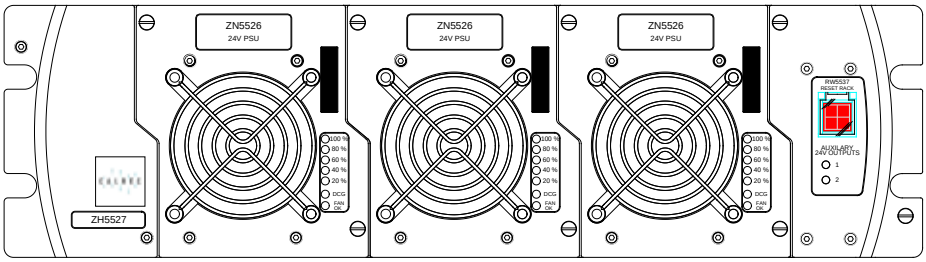
The unit also includes a front-mounted reset button for the processing rack.

Multi-Rail PSU
A 1U multi-rail power supply unit is used to power the analog components in the system. These supplies can be parallelled together. A typical system would have one of these multi-rail power supply units, plus a second unit acting as a "hot spare" providing redundancy, in case the other units fail.

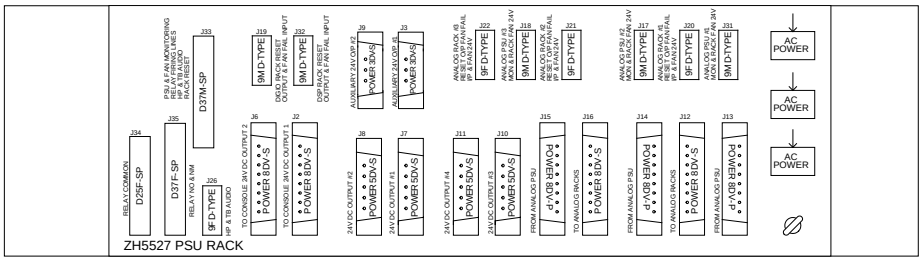
The multi-rail power supply unit is fan cooled but uses a very low noise fan, drawing air from side to side through the PSU instead of in from the front, to minimise noise. Should any of the fans slow down or stop, or any voltage rail fall outside specified limits, a PSU Fail signal will be sent to the console and PC to warn the operator of a problem.

These units are monitored via the bulk power supply and distribution unit. Should a fault occur, the hot spare would automatically take over from the primary unit, the PSU Fail Indicator on the Broadcast Facilities panel would begin to flash and a message would be sent to the control surface via AWACS.

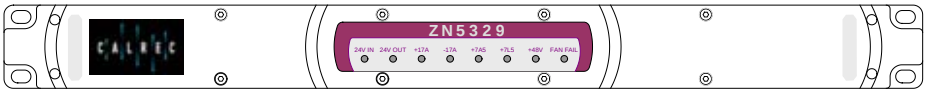
BULK POWER SUPPLY AND DISTRIBUTION UNIT (FRONT)



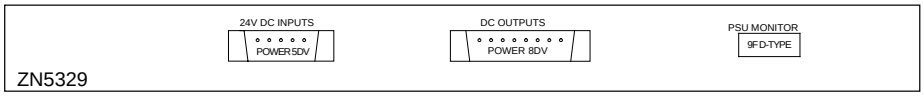
BULK POWER SUPPLY AND DISTRIBUTION UNIT (REAR)



MULTI-RAIL POWER SUPPLY FRONT



MULTI-RAIL POWER SUPPLY REAR



PC INFORMATION

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.

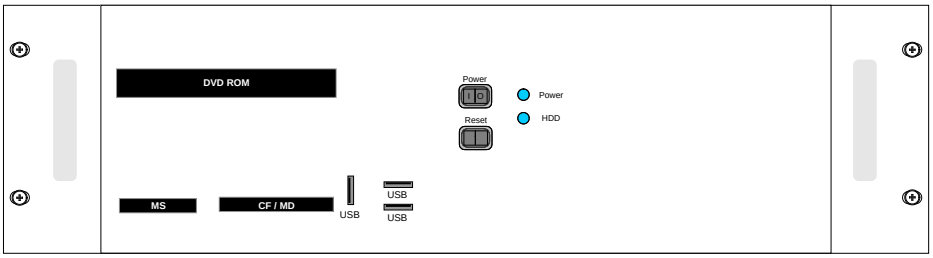
Local Network
A network port is provided to enable the user to connect to their own LAN. Calrec will not be responsible for the configuration of this port or for any performance issues arising from its use.

Hydra Network Connection
A Gigabit 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.

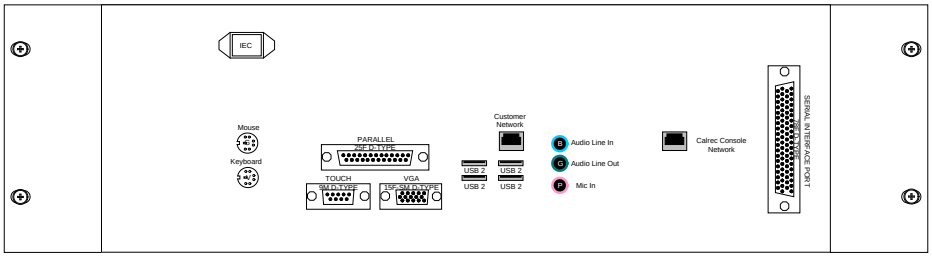
Software Supplied
An OEM PC Operating System license is supplied with each console, and the operating system software is pre-installed. The console software is also pre-installed, and supplied on a CD-ROM.

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.

FRONT



REAR



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

Username: CalrecAudio
Password: (none)

This user can install and run programs, but cannot change PC hardware settings (i.e. set up network, install drivers. It is recommended that this user is used during normal operation.

Username: CalrecAudioAdmin
Password: calrec

This user has full rights to the PC and can install and change PC hardware settings. It is recommended that this user is used during configuration of the PC and the setup of 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 LAN or to a USB device which can be plugged into the front or rear of the PC.

Some 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. The system can perform an automatic back up of these files to a user-specified drive.

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

SYSTEM SPECIFICATION

DIGITAL INPUTS		
Word Length	24-Bit	
Formats Supported	AES/EBU (AES3) Also suitable for use with SPDIF (IEC958 Type 2) signals	
Interface	110 Ohm transformer balanced, 5V Pk-Pk 75 Ohm unbalanced (BNC), 1V Pk-Pk	
Sample Rate Conversion	24-Bit switchable on all digital inputs	
SRC THD+N	-117dB @ 1kHz, 0.00014%	
DIGITAL OUTPUTS		
Word Length	24-Bit	
Formats Supported	AES/EBU (AES3)	
Interface	Transformer balanced 4V Pk-Pk (nominal) into 110 Ohm load Unbalanced 1V Pk-Pk (nominal) into 75 Ohm load (BNC)	
ANALOG INPUTS		
Analog - Digital Conversion	24-Bit	
Input Balance/CMR	Electronically Balanced - Better than -70dB (Typically -80dB)	
Input Impedance	>1k Ohms for Mic gains (1K2 Nominal) 10k Ohms for Line gains	
Sensitivity	+18 / -78dB	
Equivalent Input Noise	-125dB (150 Ohm source, 22Hz-22kHz bandwidth)	
Distortion	-1dBFS @ 1kHz - Better than 0.003% -20dBFS @ 1kHz - Better than 0.004% -60dBFS @ 1kHz - Better than 0.3%	
Frequency Response	20Hz to 20kHz +/- 0.25dB	
Crosstalk	20Hz to 20kHz >-86dB	
Delay	0.3ms	
ANALOG OUTPUTS		
Digital - Analog Conversion	24-Bit	
Output Balance	Electronically Balanced, 20Hz to 20kHz, Better than -45dB, typically -55dB	
Output Impedance	<40 Ohms	
Distortion	-1dBFS @ 1kHz - Better than 0.003% -20dBFS @ 1kHz - Better than 0.006% -60dBFS @ 1kHz - Better than 0.5%	
Frequency Response	20Hz to 20kHz +/- 0.25dB	
Crosstalk	20Hz to 20kHz >-90dB	
Delay	0.22ms	
PERFORMANCE		
Digital to Digital (AES/EBU) Distortion	-1dBFS, 20Hz to 10kHz - Better than 0.002%	
Digital to Digital (with SRC) Distortion	-1dBFS, 20Hz to 10kHz - Better than 0.002%	
Frequency Response (Analogue Input to Output)	20Hz to 20kHz +/- 0.5dB	
SYNCHRONIZATION		
48kHz synchronization from	NTSC/PAL Video Internal Crystal Reference TTL Wordclock AES/EBU Digital Input	
ENVIRONMENTAL CONSIDERATIONS		
	Operating	Non-Operating
Temperature Range	0°C to +30°C (32°F to +86°F)	-20°C to +60°C (-4°F to +140°F)
Relative Humidity	25% to 80% Non-condensing	0% to 90% Non-condensing
Maximum Altitude	2,000 Metres (6500ft)*	15,000 Metres (49,000ft)

*This is the limit to which the safety tests are valid

Analog input for 0dBFS can be pre-set globally to +28, +24, +22, +20, +18 or +15 dBu

Pre-fader headroom on analog inputs is adjustable globally from +24 to +36dB in 2dB steps

Analog output for 0dBFS Matches input setting into >1kOhms (+24dBu max into 600 Ohms)

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.

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