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Overview




INTRODUCTION

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

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

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

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

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

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

ISO 9001 Registration

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

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

PRINCIPAL FEATURES

Format

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

Channel / Group Facilities

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

Routing

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

System

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

IMPORTANT CONCEPTS

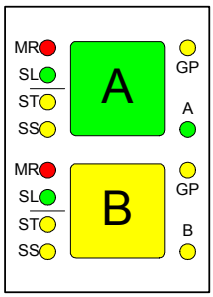
Layering

Each fader can control two independent audio signal paths, named A and B. These signal paths can be either channels or groups. 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. Channels can be accessed more quickly than on a conventional, single layer design.

Assignable Control



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

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 type of audio path on each fader is completely assignable. The operator can choose which faders to use for the mono channels, which for the stereo channels, and which for the groups.

PATHS AND PORTS

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

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

Instead, a "pool" of each type is provided, plus an internal matrix to allow any of them to be connected to any channel. This provides more flexibility than is possible with analogue designs. The matrix can be thought of as an electronic patch-bay with the added advantage that any connections made can be stored with the console's memories, and recalled at a later date. A similar matrix and "pool" is provided for the outputs. This 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. The system is available in a number of configurations known as Audio Packs, which are a suggested complement of ports. The Audio Pack which most closely matches the requirements of the installation can be chosen, and the port quantities can be fine tuned appropriately.

SIGNAL PATHS

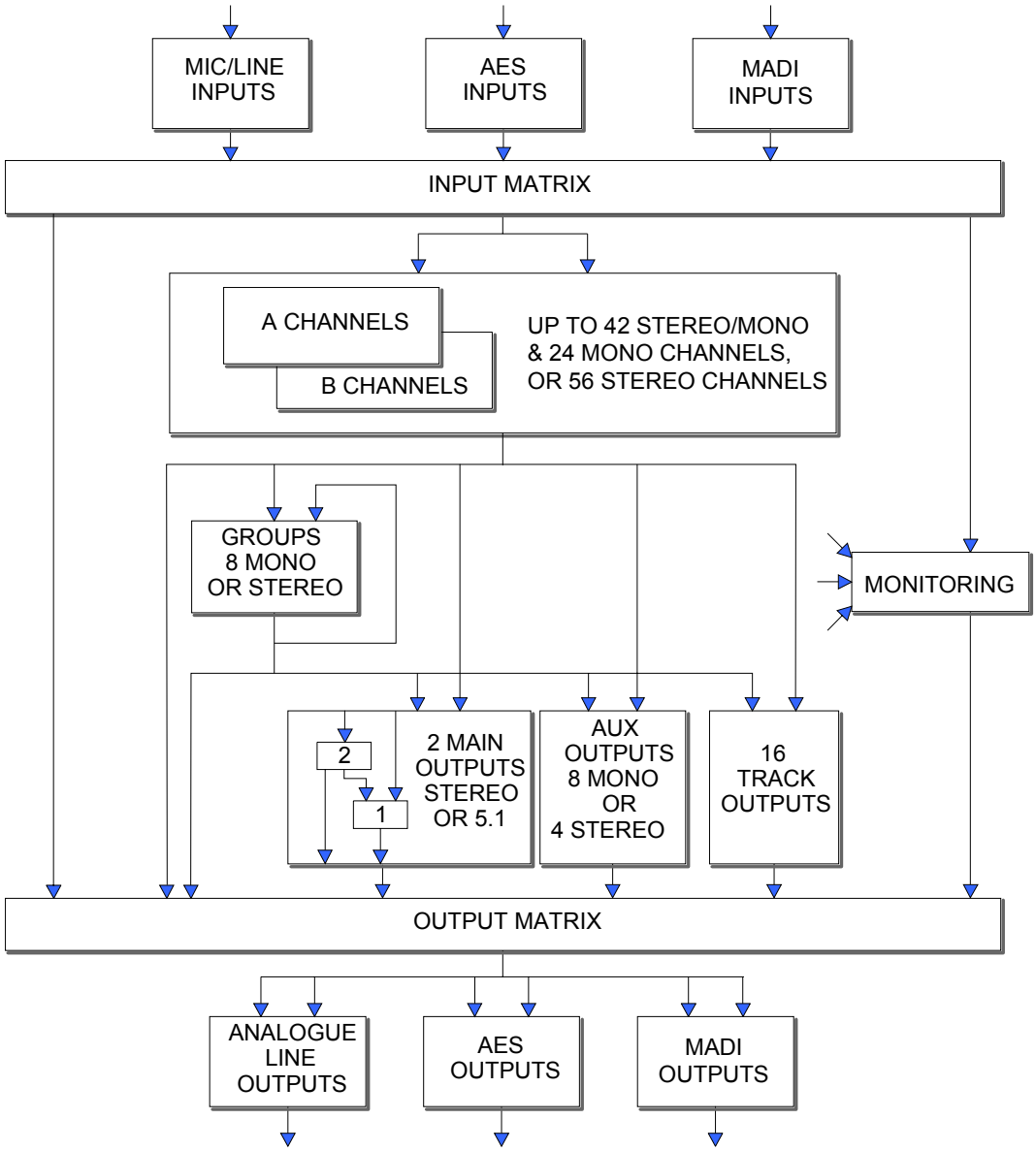
The console can have up to 42 stereo or mono plus 24 mono channels, or 56 stereo channels.

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.

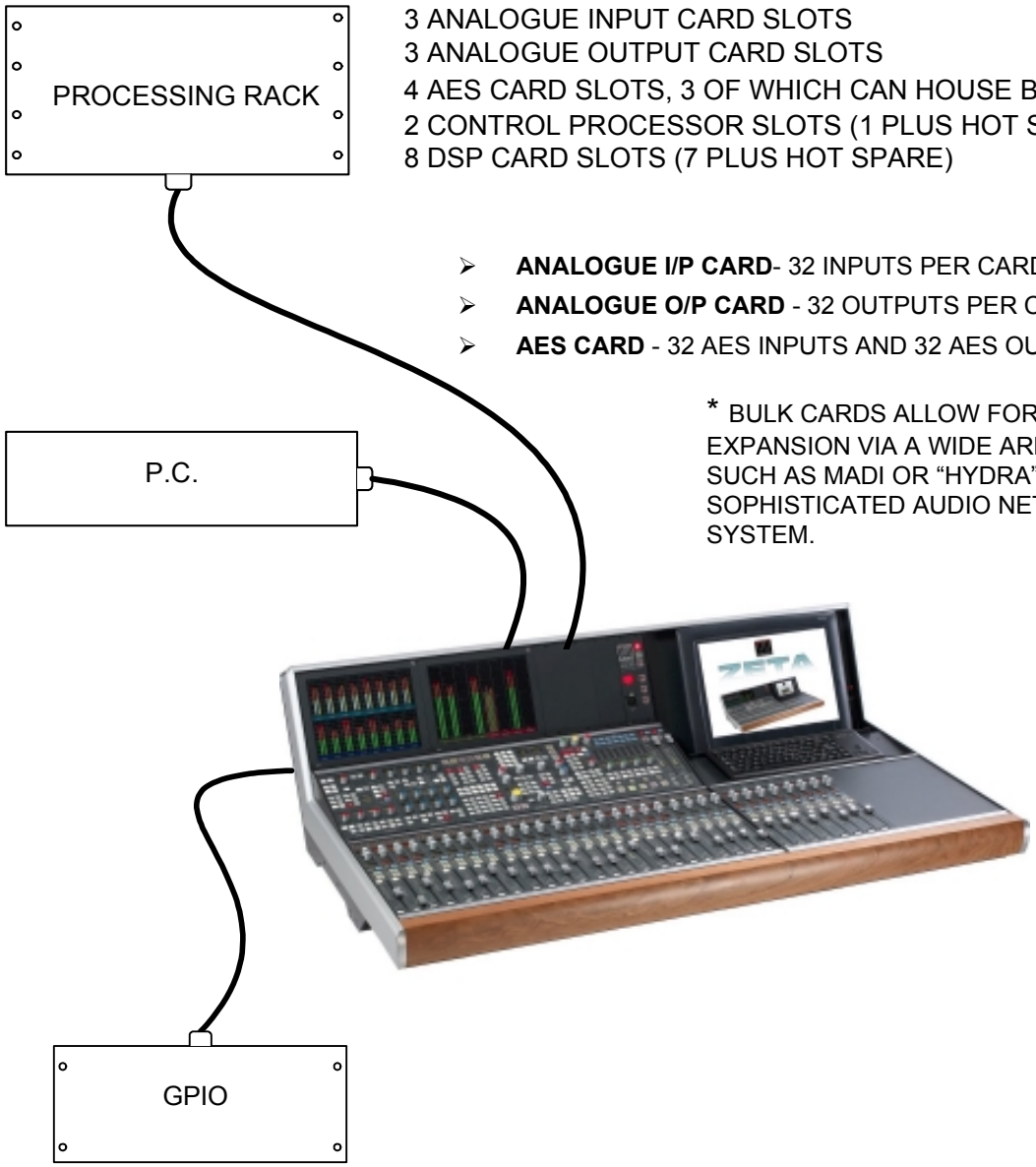
If a channel is panned to both a stereo group and 5.1 bus simultaneously, the pan law to each will be correct, as though the other bus did not exist, even though the same control is used to achieve the pan.

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



(3048-10)

INPUTS AND OUTPUTS



3 ANALOGUE INPUT CARD SLOTS
3 ANALOGUE OUTPUT CARD SLOTS
4 AES CARD SLOTS, 3 OF WHICH CAN HOUSE BULK CARDS *
2 CONTROL PROCESSOR SLOTS (1 PLUS HOT SPARE)
8 DSP CARD SLOTS (7 PLUS HOT SPARE)

- **ANALOGUE I/P CARD**- 32 INPUTS PER CARD.
- **ANALOGUE O/P CARD** - 32 OUTPUTS PER CARD.
- **AES CARD** - 32 AES INPUTS AND 32 AES OUTPUTS PER CARD.

* BULK CARDS ALLOW FOR OPTIONAL I/O EXPANSION VIA A WIDE AREA INTERFACE SUCH AS MADI OR "HYDRA" - CALREC'S SOPHISTICATED AUDIO NETWORKING SYSTEM.

(3048-11)

A standard Zeta system (without I/O expansion) has capability for:

- 96 Analogue inputs
- 96 Analogue outputs
- 128 AES inputs
- 128 AES outputs

AUDIO PACKS

The console is supplied in combinations of four basic processing cores (packs) providing pre-defined numbers of channels I/O and input delay legs (optional). Each of the four core provisions A, B, C and D are available with all stereo channels or a specific mono/stereo configuration as described below. In addition, Pack A is available with 4 or 8 audio groups.

Pack A

Available Configurations:		**A1** - 56 equivalent channels: 8 mono and 24 stereo (4 groups)
	OR	**A2** - 60 equivalent channels: 30 stereo (4 groups)
	OR	**A3** - 48 equivalent channels: 8 mono and 20 stereo (8 groups)
	OR	**A4** - 52 equivalent channels: 26 stereo (8 groups)
Inputs/Outputs		32 Mic/Line Input Ports 32 Line Outputs 32 AES Inputs 32 AES Outputs
Input Delay		8 mono legs

Pack B

Available Configurations:		**B1** - 70 equivalent channels: 10 mono and 30 stereo (8 groups)
	OR	**B2** - 72 equivalent channels: 36 stereo (8 groups)
Inputs/Outputs		64 Mic/Line Input Ports 64 Line Outputs 32 AES Inputs 32 AES Outputs
Input Delay		15 mono legs

Pack C

Available Configurations:		**C1** - 88 equivalent channels: 24 mono and 32 stereo (8 groups)
	OR	**C2** - 96 equivalent channels: 48 stereo (8 groups)
Inputs/Outputs		96 Mic/Line Input Ports 96 Line Outputs 64 AES Inputs 64 AES Outputs
Input Delay		24 mono legs

Pack D

Available Configurations:		**D1** - 108 equivalent channels: 24 mono and 42 stereo (8 groups)
	OR	**D2** - 112 equivalent channels: 56 stereo (8 groups)
Inputs/Outputs		96 Mic/Line Input Ports 96 Line Outputs 96 AES Inputs 96 AES Outputs
Input Delay		21 mono legs

All desk output allocations must be derived from the above standard port provisions. However, they may be expanded by purchasing additional interface cards.

TOUCH SCREEN LAYOUT

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

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

Virtual input delay controls.

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

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

Memory control screens to supplement the panel controls.

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

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

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

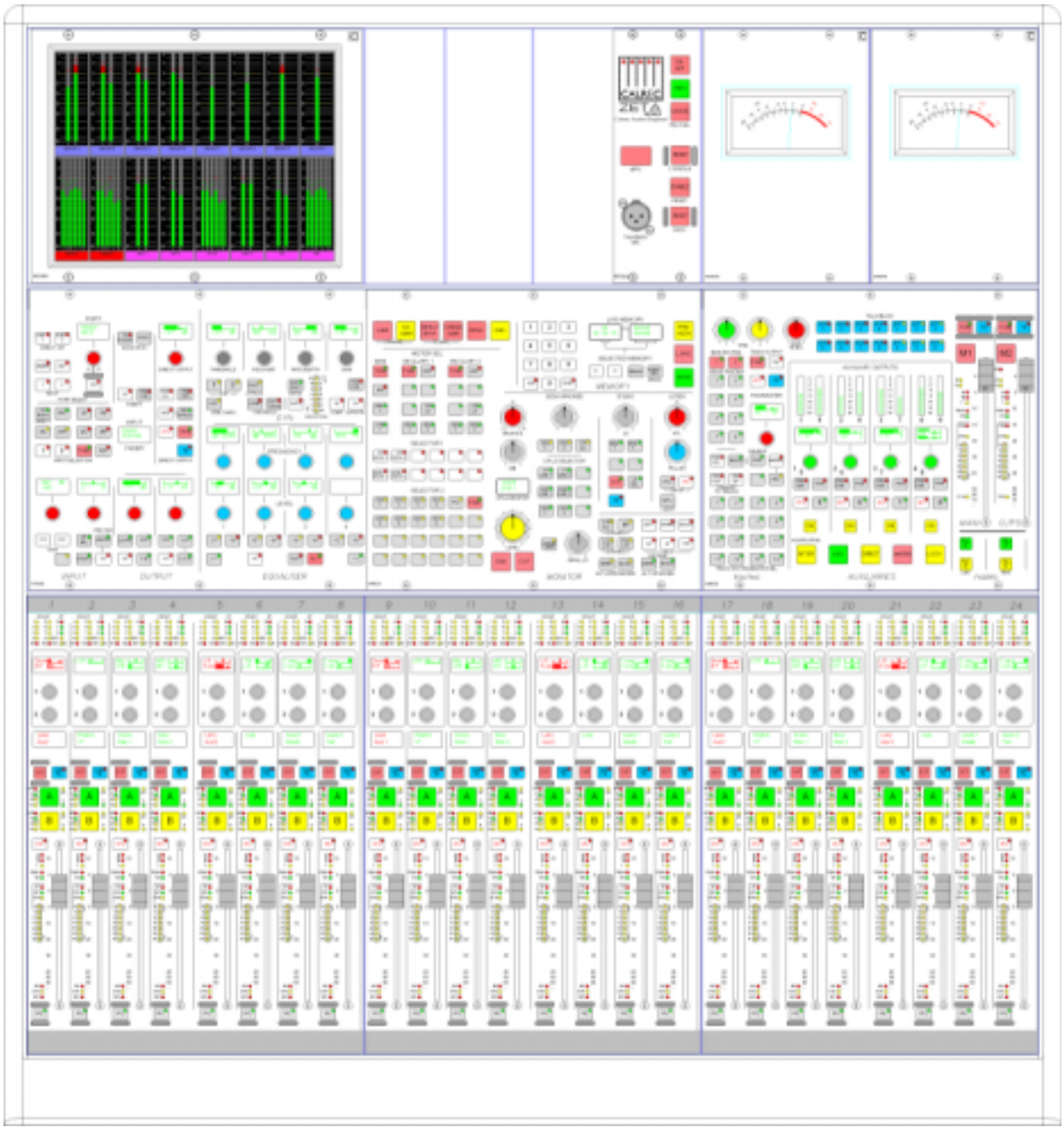
Options settings are not stored in the individual console memories but are saved and loaded separately using the buttons on each Options screen. This allows changes to be made without invalidating any saved memories. Changes to options take effect as soon as they are made, however if they are not saved,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

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

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

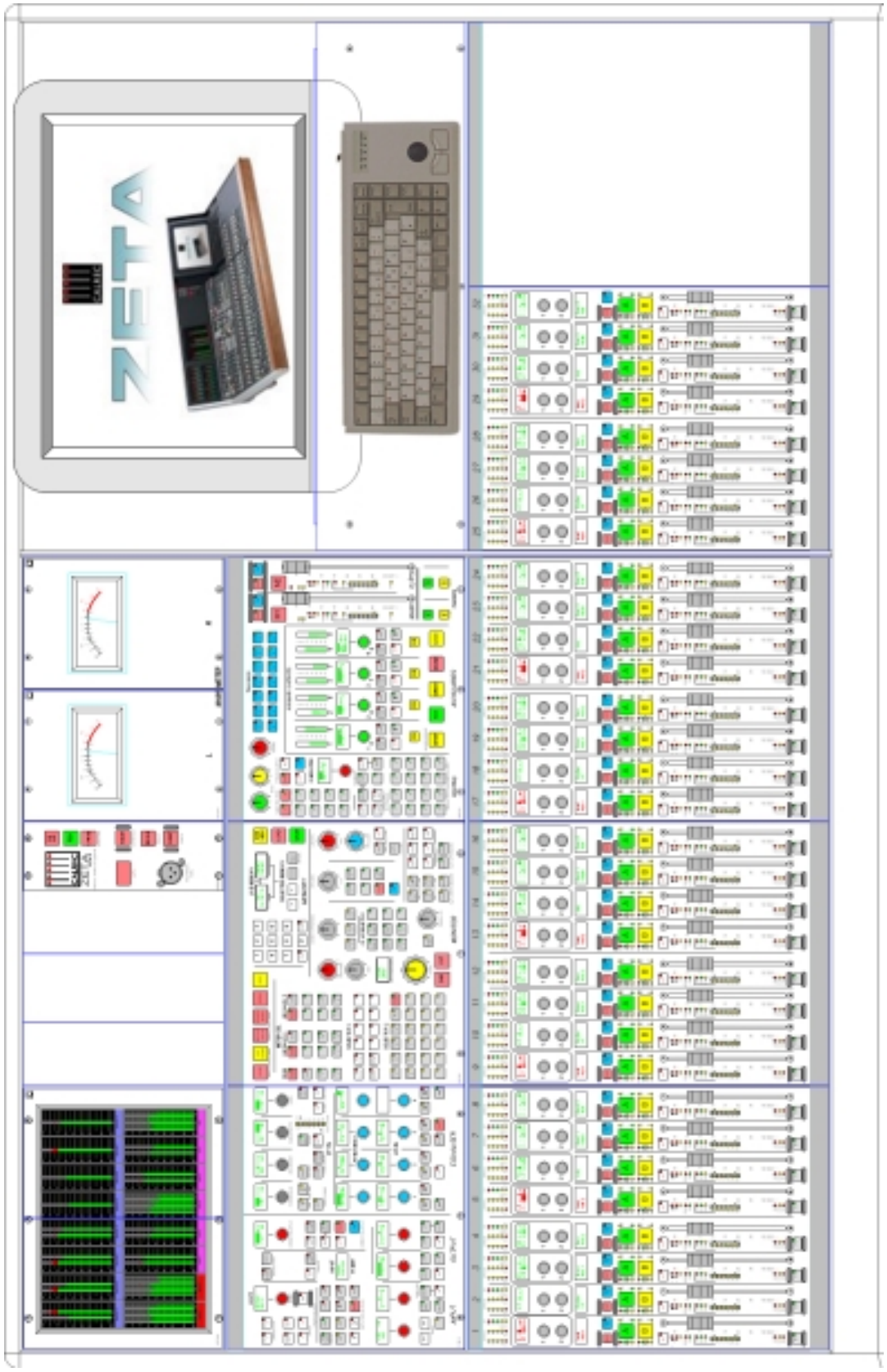
Frame Options and Dimensions

24 FADER FRAME TYPICAL LAYOUT



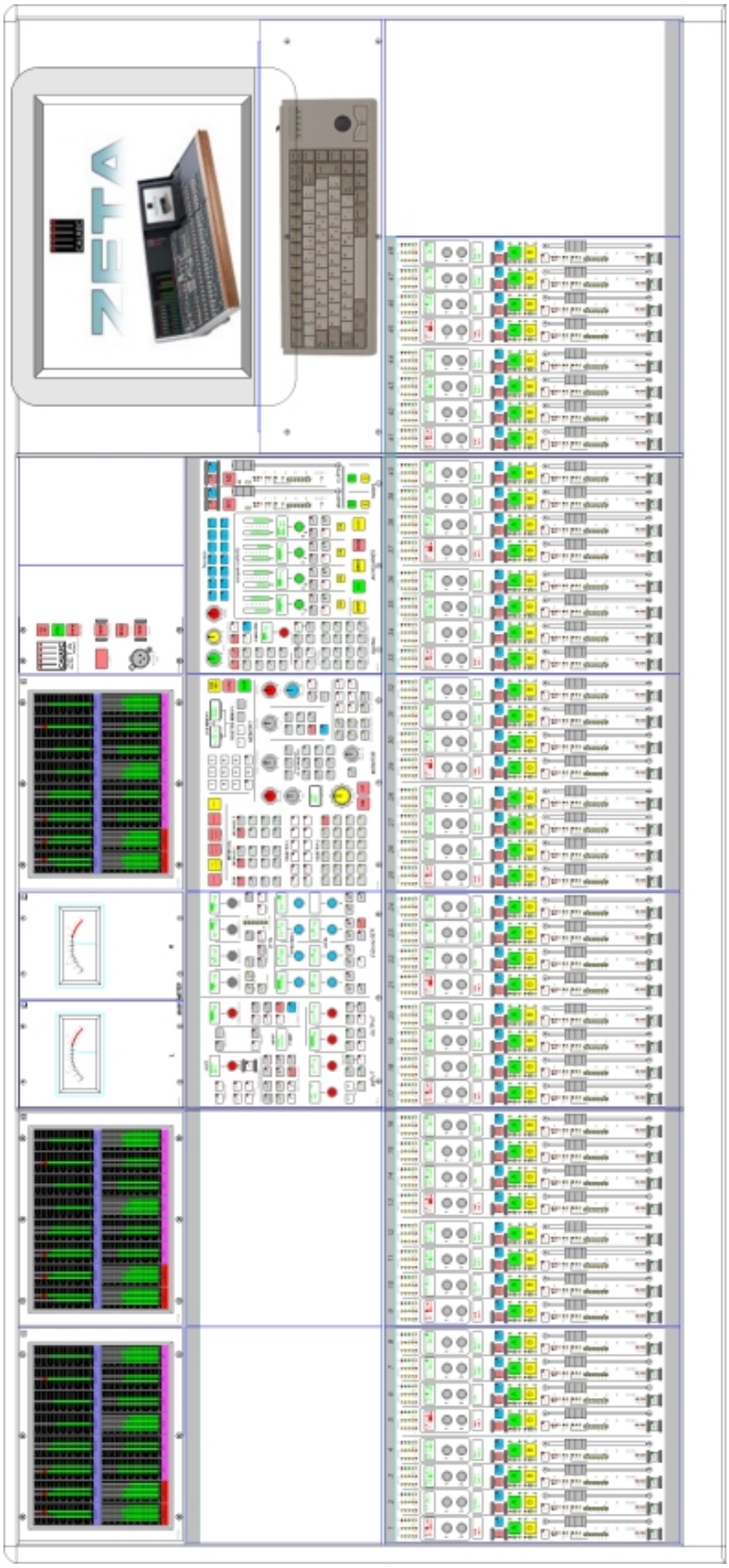
The smallest frame houses up to 24 faders, which allows up to 48 “Channel Faders” within a frame only 784mm (30.9 inches) wide. Due to it’s compact size, the colour touch screen, keyboard and trackerball need to be housed separately.

32 FADER FRAME TYPICAL LAYOUT



The medium sized frame houses up to 40 faders, which allows up to 64 “Channel Faders” within a frame only 1290mm (50.8 inches) wide.

48 FADER FRAME TYPICAL LAYOUT

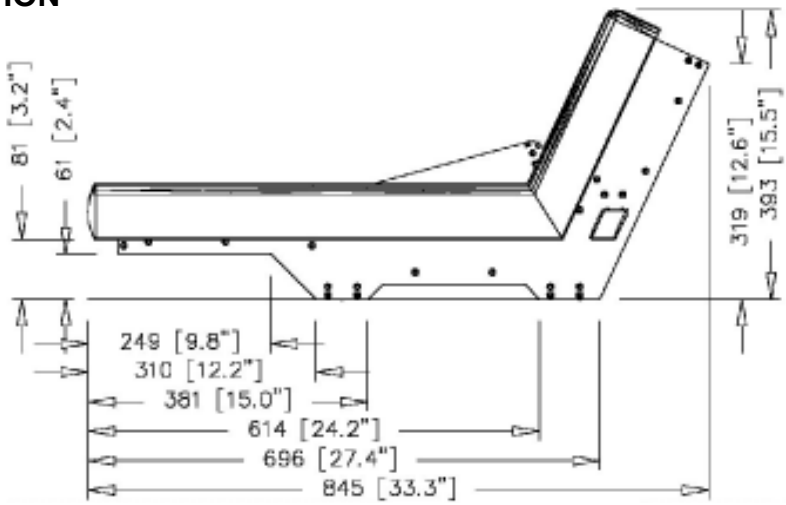


The largest frame houses up to 48 faders (the maximum number possible), which allows up to 96 “Channel Faders” within a frame only 1796mm (70.7 inches) wide.

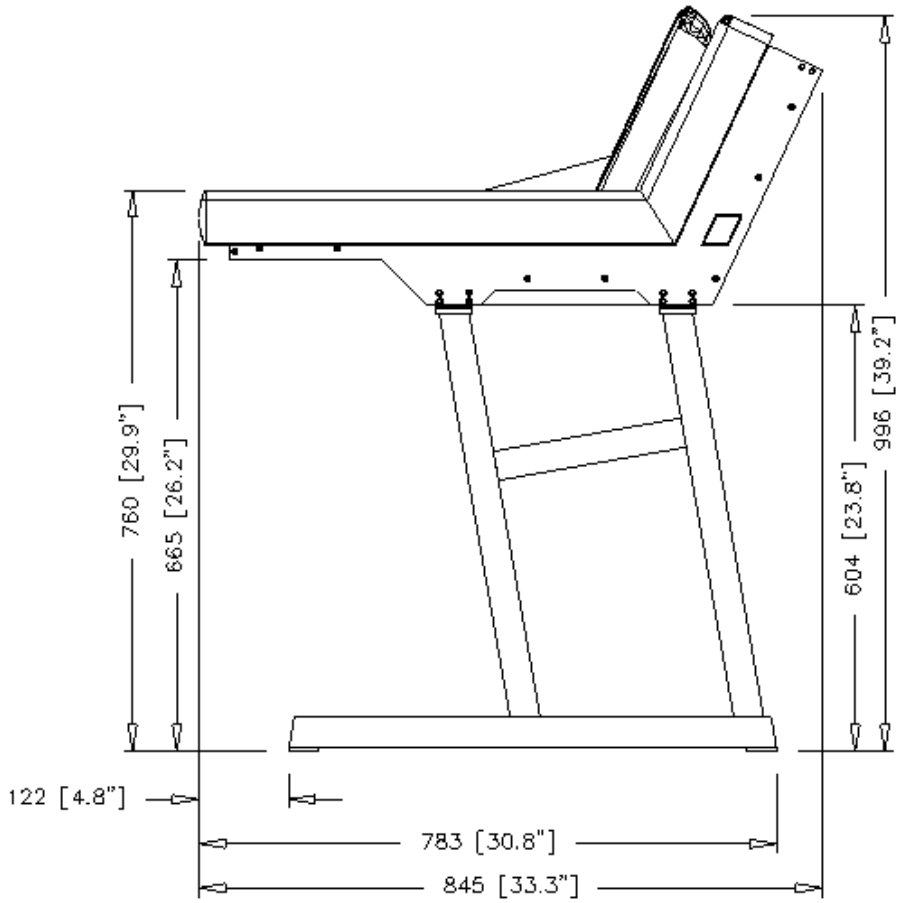
CONSOLE PLAN

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

END ELEVATION

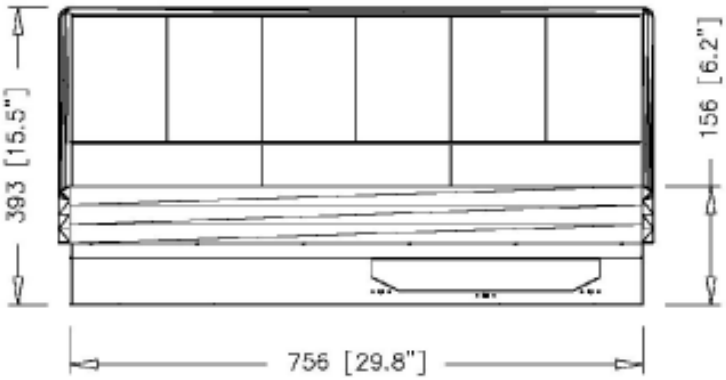


The end profile is the same for all three frame sizes. An optional floor stand is available.

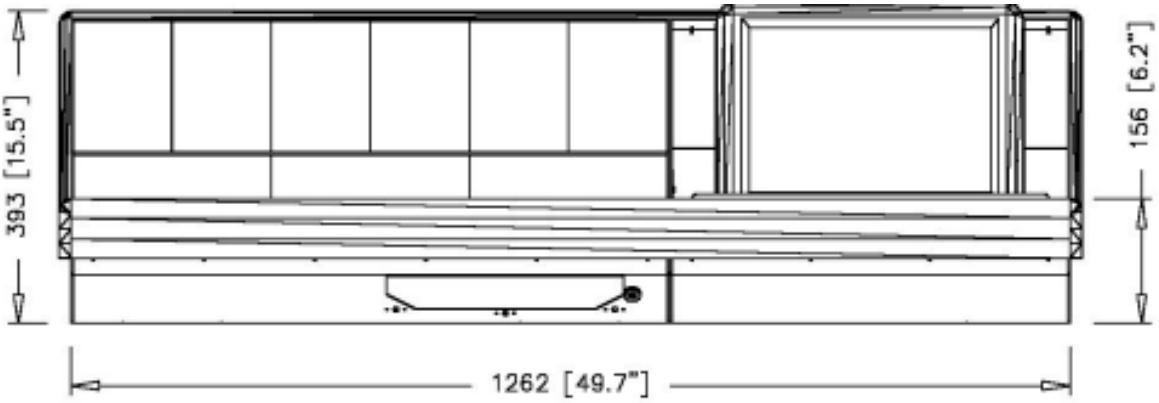


FRONT ELEVATION

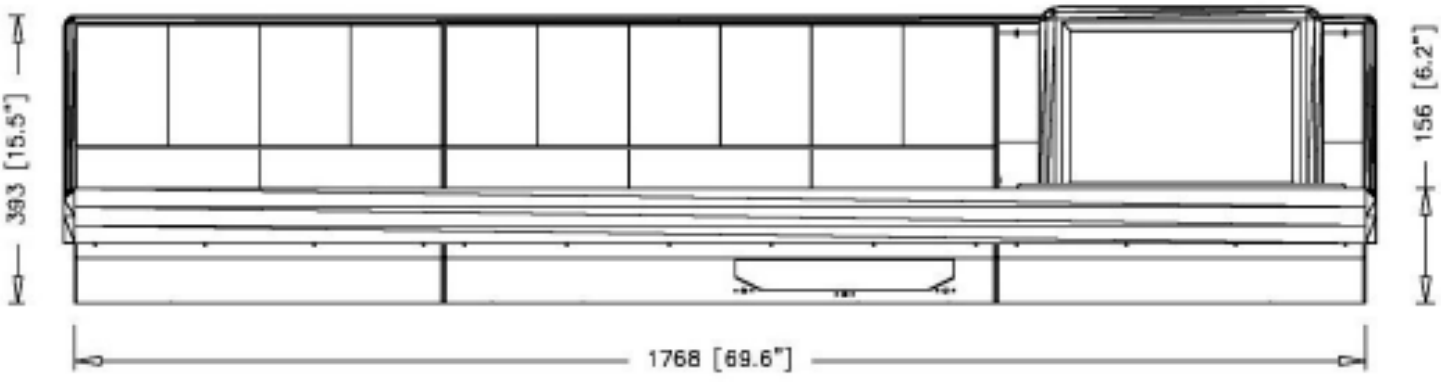
24 FADER



32 FADER



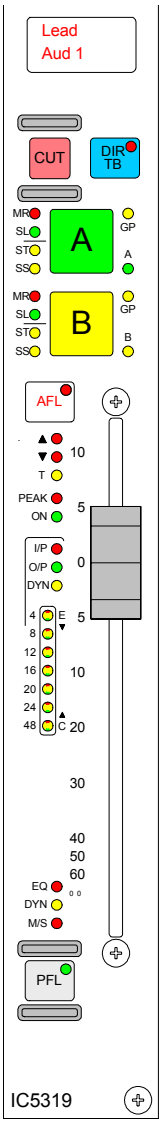
48 FADER



Fader Area




CHANNEL AND GROUP FADERS



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

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

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

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

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

Assign Button LEDs

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

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

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

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

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

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

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

CHANNEL CONTROL

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

A set of LEDs provide good visual feedback of :

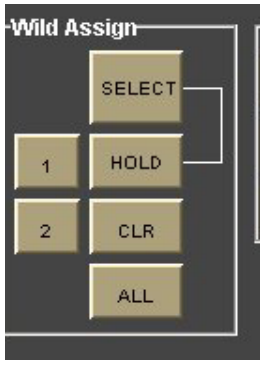
- Routing to groups and mains
- The currently selected input type (mic, analogue line, or digital)
- If the Sample Rate Convertor (SRC) is switched in (for AES inputs)
- Whether the direct output is feeding the mix minus bus (indicated in red), and whether the direct output is being fed with a mix minus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

Wild Controls

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

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

Functions are assigned to Wild controls from the USER-CHAN screen. The Assign Panel rotary controls incorporate a switch, operated by pushing the control. These switches are used to assign the control to a Wild control as follows:



- Select a fader path by pressing its Assign Button (A or B).
- Select WILD ASSIGN 1 or 2 on the USER-CHAN screen.
- Push one Assign Panel rotary control. For example, Aux 1 Send.

Wild controls provide the same function for paths A and B. The colour of the Wild control display indicates the path being currently controlled: 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.

If a Wild control has the Aux Send, Front Pan or Input Delay 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 enabled or disabled using the Options - Misc screen.

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.

The gains of inputs 1 and 2 can be assigned separately to Wild controls, by holding down their input button in the Input/Output section before pushing the gain adjustment rotary control.

The button above HOLD toggles between SELECT mode and REGIONS mode, which allow controls to be assigned to multiple fader path's Wild controls at a time. In SELECT mode, any number of fader paths can then be selected individually by pressing their fader assign buttons. In REGIONS mode, a block or region of faders can be defined by selecting HOLD and then 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 selected fader paths. It is possible to assign the same control to Wilds 1and 2 for all fader paths by selecting ALL before pushing the required Assign panel rotary control.

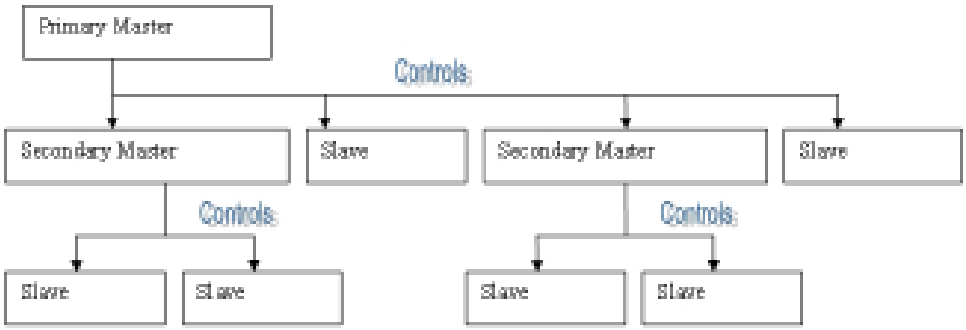
CLR will clear the selected Wild control from its assignment.

VCA GROUPING

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

VCA Masters as Slaves of another VCA Group

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



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

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

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

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

VCA Group Interrogation

Interrogation provides a clear way of indicating VCA group assignments. Interrogation is performed by holding down the assign button of a VCA group member. The assign buttons of all members of the same group will light. When a secondary master is interrogated, the assign buttons of all its slaves will light, and the primary master's assign button will flash.

Enabling VCA Group Editing

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

AUTOMATIC CROSS-FADING

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

Assigning Auto-Faders to Opto Inputs

Auto-faders are assigned to any one opto input using the OPTIONS - GPI screen. 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.

Assigning Channel or Group Faders to Auto-Faders

The User-Auto-Fade screen is used to allow assignment of channel or group faders to the 32 available auto-faders. Each auto-fader provides the ability for one path to be faded up to and down from the current fader level. Assignments are made by selecting an auto-fader from the list on the left, and a channel or group fader from the list on the right, and selecting “Patch”.

Fade IN and OUT Times

The fade in and out times of each auto-fader are individually adjustable. The range for both parameters are 10 ms to 5secs, as follows:

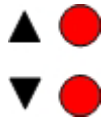
- 10ms to 100ms in 10ms steps
- 100ms to 1sec in 100ms steps
- 1sec to 5s in 500ms steps

Operation

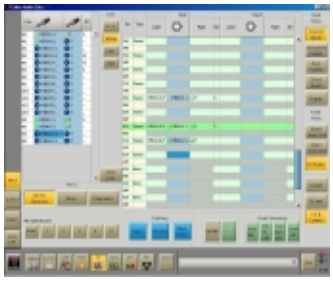
Once an auto-fader has been assigned to an opto input and has a channel or group path assigned, it is possible to automatically fade in or out the channel or group fader under the control of the opto input. When the opto input is fired, the path connected to the opto will be automatically faded in to 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.

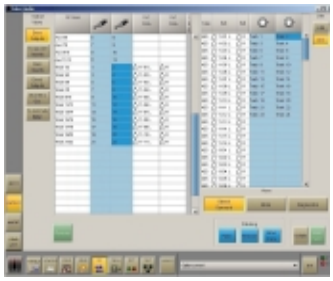
Indication of an Auto-Fade

Indication of an auto-fade is provided by illuminating the fader’s down NULL LED when the path 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.



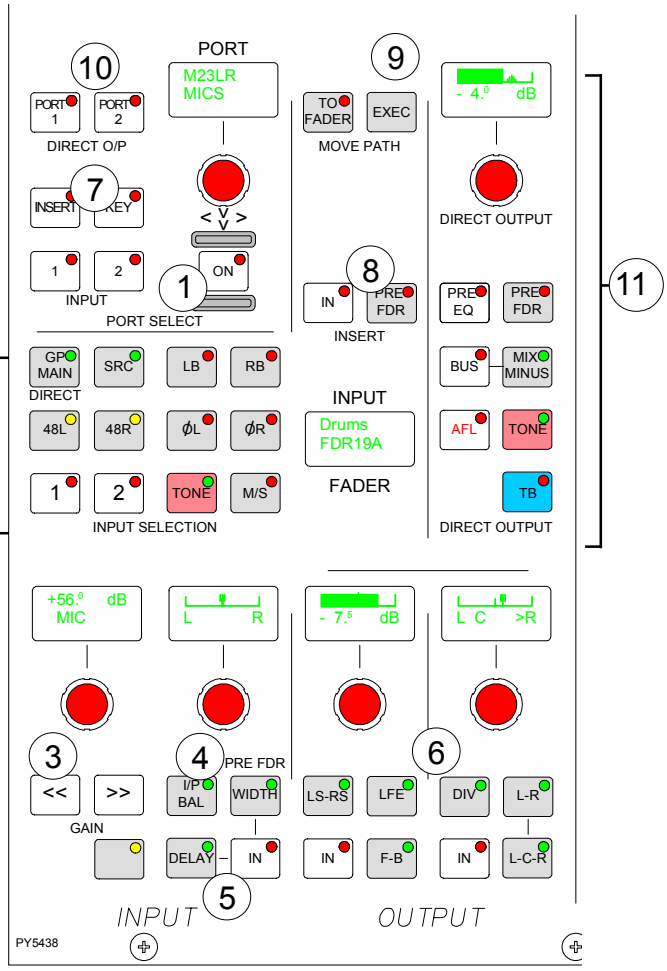
Input and Output Controls



INPUT/OUTPUT CONTROLS

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



(1) Input Port Assignment

Ports are assigned to inputs 1 and 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 .

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

Pressing and turning the rotary control gives access to lists of other types of input port which can be set up during installation of the console. Each port can be allocated to one of a number of lists to allow I/O which is wired for similar purposes to be grouped together for selection.

(2) Input Settings

Input Selection buttons 1 and 2 select between the two available inputs for the selected path.
SRC switches the sample rate converter on AES inputs.
48L and 48R switch phantom power on mic/line inputs. 48L is used for mono channels.
LB and RB provide Left to Both and Right to Both on stereo channels and groups.
ØL and ØR buttons reverse the phase of the channel inputs. ØL is used for mono channels.
TONE switches tone to the input of the channel or group.
M/S converts a sum and difference (mono/stereo) input to left and right on stereo channels.

(3) Gain Adjustment

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

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

(4) Input Balance and Width

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

(5) Input Delay
The delay button when pressed allows the rotary control, IN button and display to control adjustment of Input Delay values in addition to the controls on the Panels-Delay screen. Delay must first be assigned to an input using the Panels-Delay screen before the controls here can be used.

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

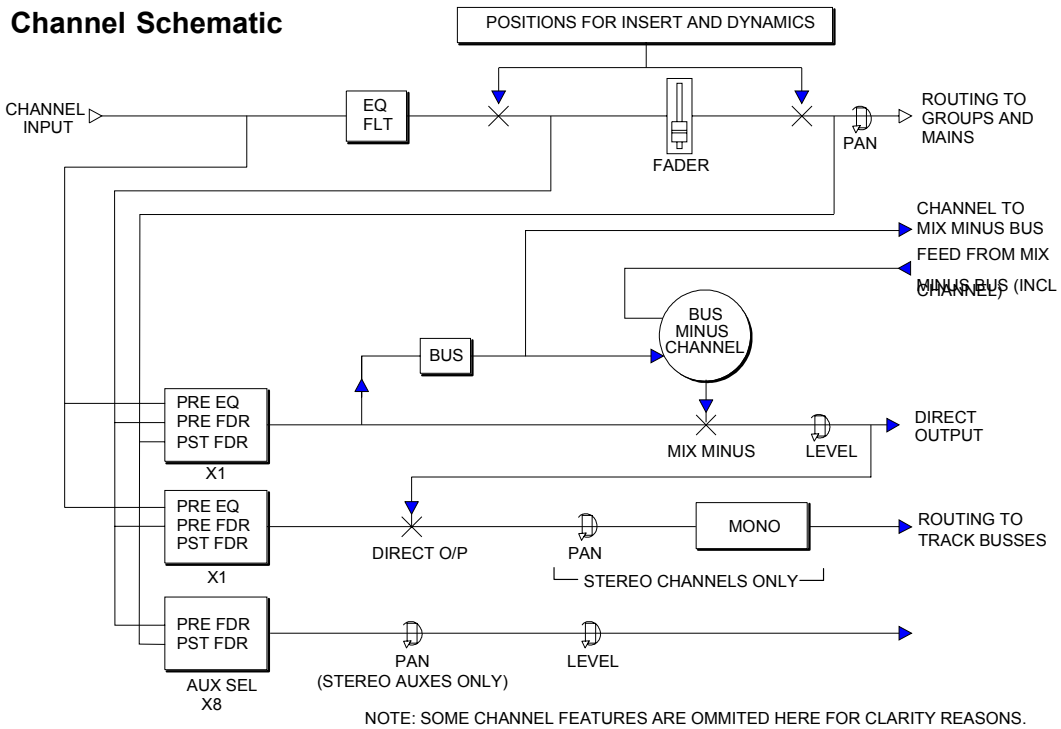
(7) & (8) Assignable Inserts
Pressing the INSERT button allows the rotary control and ON button to control assignment of assignable inserts to channel and group paths. Assignable inserts can then be patched in and out of the channel or group path, using the IN button. A button allows selection for the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

(9) Moving Paths
Paths can be moved from one fader to another, using the MOVE PATH buttons. Select the fader assign button of the path that you want to move, and press TO FADER. Then select the destination fader assign button, and press EXEC. Paths can also be moved on the USER-CHAN screen.

(10) Direct Output Port Assignment
Selecting PORT1 or PORT2 allows the rotary control and ON button to control assignment of 2 ports to channel and group direct outputs.

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

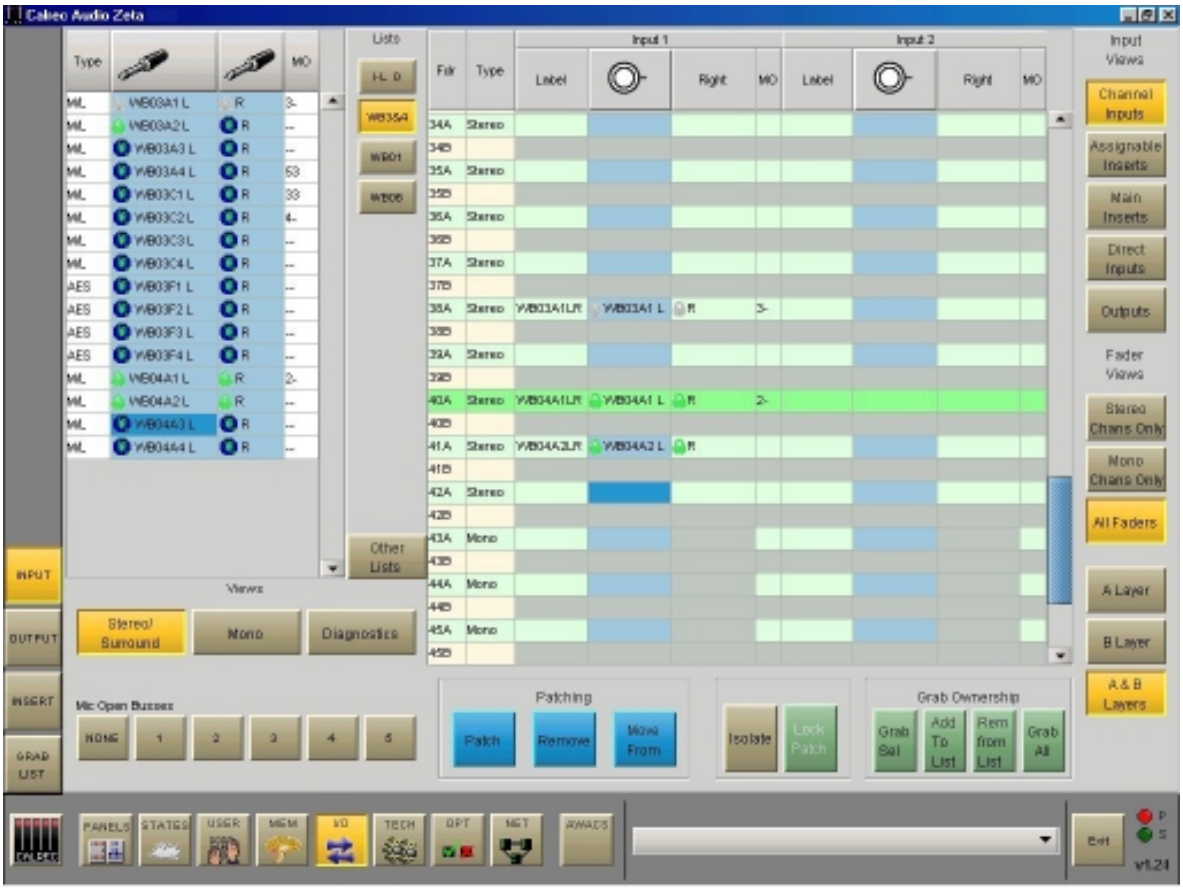
Simple Channel Schematic



NOTE: SOME CHANNEL FEATURES ARE OMMITED HERE FOR CLARITY REASONS. (3048-9)

INPUT PORTS SCREEN

In addition to the port and insert connection controls in the Input-Output section of the control surface, port connections for all I-O and the assignment of inserts can be set using the front end application. This screen allows patching of input sources to channel inputs, insert returns, direct inputs or to output ports.



The left side of the screen lists the available input sources, which may have been grouped into lists during installation. Different lists are accessed using the selection buttons. The Input View buttons on the right side of the screen select the different console path types which can have input ports attached. They will then be displayed in the main section of this screen.

Patching

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

By selecting the label cell on the screen, the input can be given a name. The name is stored with the channel input and replaces the source label on the fader display. It is possible to patch sources to many inputs in one operation using the trackball to select multiple cells in one column. Patches can be removed and moved between inputs when selected using the REMOVE and MOVE FROM buttons.

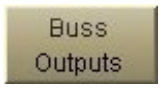
Mic Open Busses

Each input port can be assigned to any of the 5 MIC OPEN busses using the selection buttons. The mic open circuit will operate when the channel to which the port is patched is faded up and routed to the programme output. Each buss can be set to automatically cut the studio loudspeaker output and/or fire a relay, these are set on the Options screens: TX/REH and GPO.

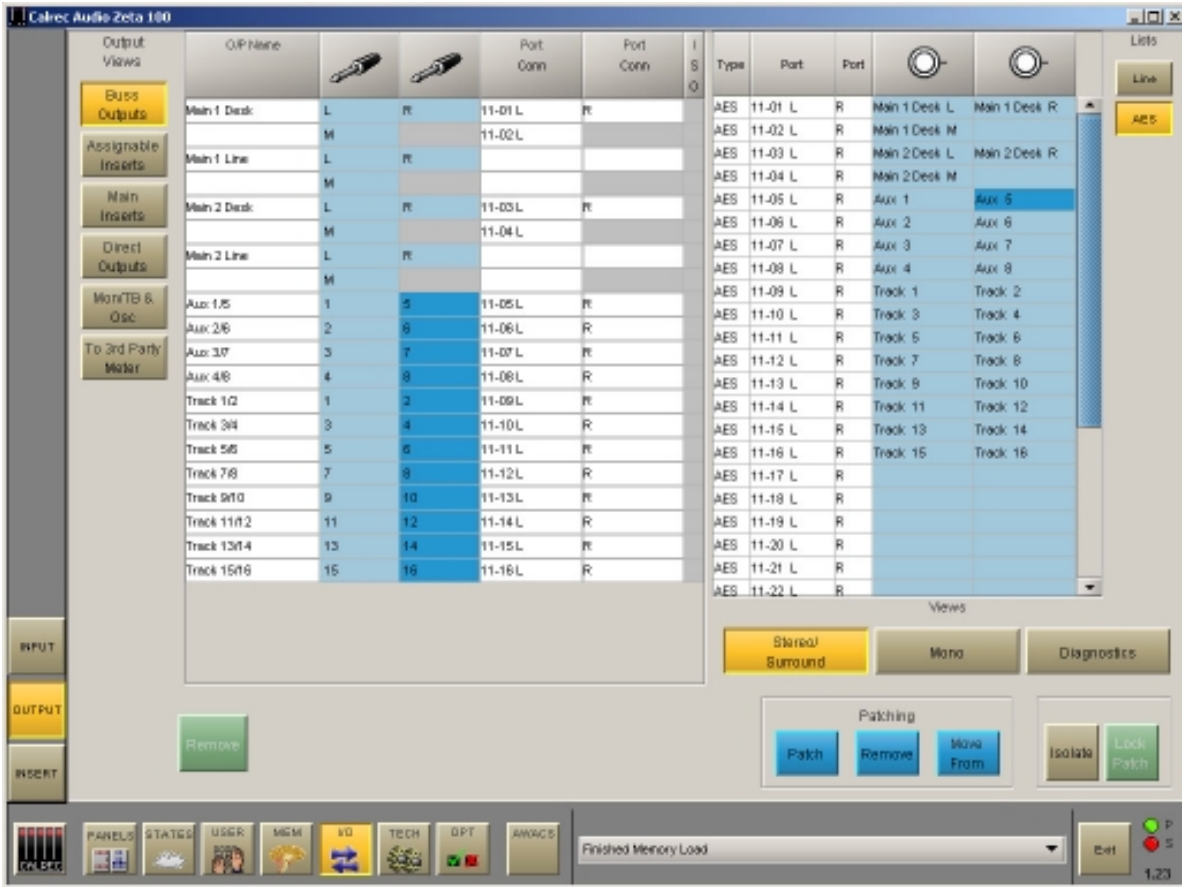
Port Isolation

The ISOLATE button allows the selected port connection to be isolated from memory recall.

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.



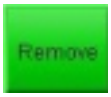
The right side of the screen shows the available output ports, which may have been grouped into lists during installation. Different lists are accessed using the selection buttons. The Output View buttons select the different categories of console output signals which can be patched to output ports. They will be displayed on the left section of this screen.

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. It is possible to patch signals to many outputs in one operation using the trackball to select multiple cells in one column. Patches can be moved and removed from selected output ports using the MOVE FROM and REMOVE patching buttons.

Removing Output Signal Port Connections

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

Port Isolation

Output ports can be isolated from memory recall using the Isolate button.

Output Port Locking

Some output ports may be ‘locked’ to avoid accidental removal, using the LOCK PATCH button. Operation of the locking system is only available in “Technician” or “Supervisor” password protected modes.

PANELS - DELAY SCREEN

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

Assigning Delay to a Path

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

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

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

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

Controlling Delay from the Control Surface

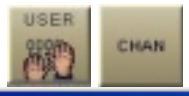
The Delay button in the Input/Output controls section allows delay values and IN/OUT status to be controlled from the control surface.

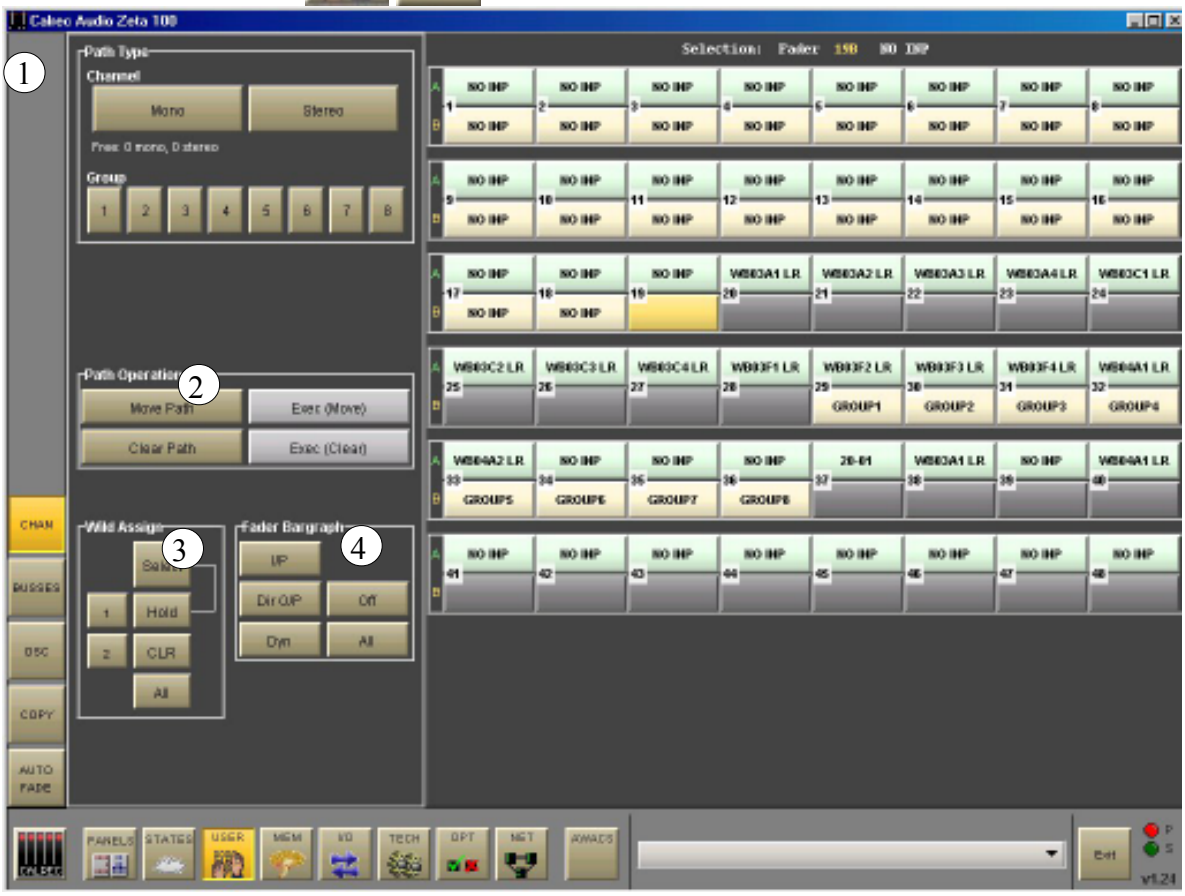
When input delay controls are assigned to Wild controls, the Wild's rotary push switch can be used to switch the delay in and out of the channel's path. This is enabled on the Options-Misc screen.

Channel Controls




USER-CHAN SCREEN





The right side of the screen shows the faders with buttons for paths A and B. To make changes, select the required fader either from the screen or by pushing its fader assign button. Then use the controls on the left side of the screen.

(1) Path Type Selection

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

(2) Moving or Clearing Paths

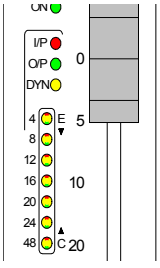
Paths can be moved from one fader to another, or cleared from their path type using the Path Operations controls. Each control requires its EXEC button to be selected before the action is carried out.

(3) Assigning Wild Controls

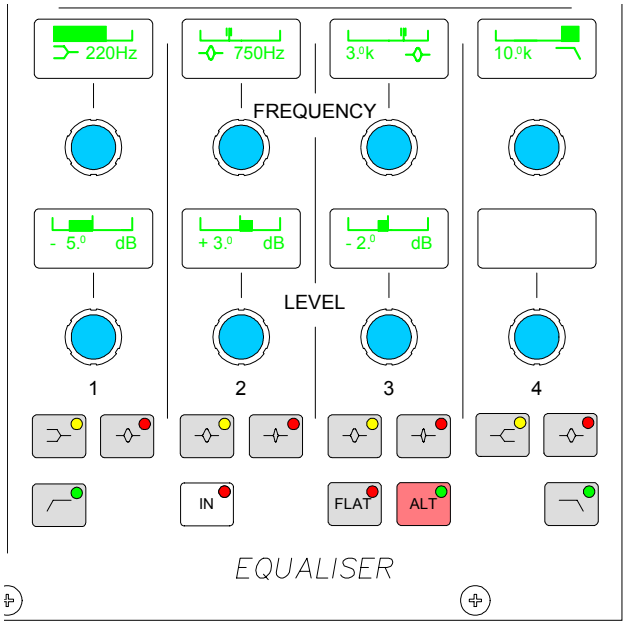
Functions are assigned to Wild controls from the USER-CHAN screen. All the Assign Panel rotary controls incorporate a switch which is operated by pushing the control. These switches are used to assign the control to a Wild control as explained in the Channel Control section, on page 23.

(4) Fader Bargraph Assignment

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



EQ AND FILTERS



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

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

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

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

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

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

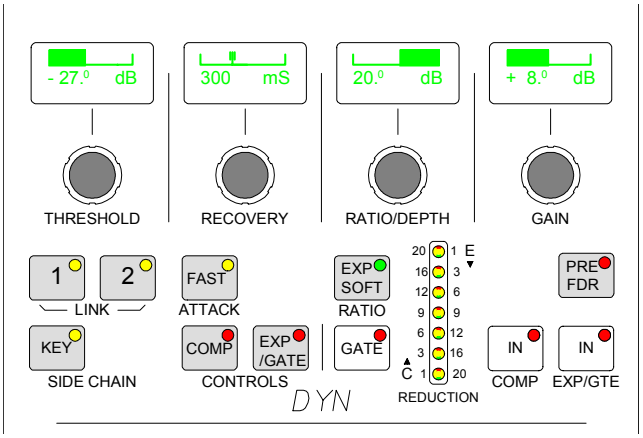
EQ FLAT will clear any EQ settings to flat. The button must be pressed and held down, this prevents against accidental flattening of settings.

DYNAMICS

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

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

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



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

Compressor/Limiter:

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

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

Expander:

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

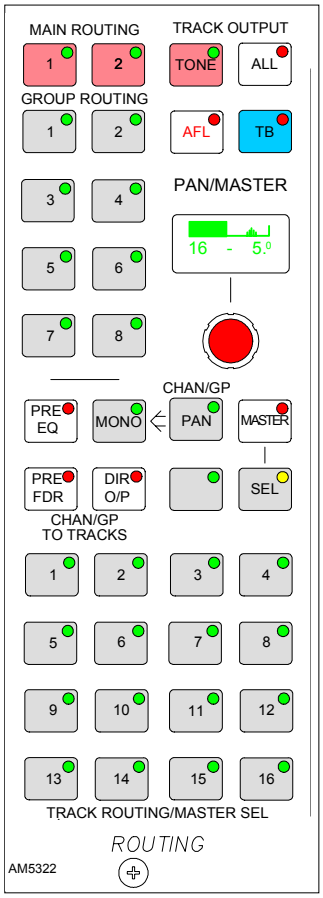
Gate:

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

Dynamics Linking

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

ROUTING AND TRACK OUTPUT CONTROLS



Routing Buttons

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

Track Output

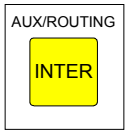
The Track Output section controls the output to the multi-track, after the track mix. The 16 track outputs can also be used as IFB or general purpose bus outputs.

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

The CHANNEL/GP TO TRACKS section selects the signal feeding the track routing selector to be post-fader (All OFF), pre-EQ, pre-fader or a copy of the direct output (post the mix minus and direct output level controls - see Channel Schematic on page 31).

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

Interrogate Mode



It is possible to discover which fader paths are feeding each of the routing busses by putting the panel into “Interrogate” mode. This is done by pressing the INTER button in the Auxiliaries section. If any of the routing buttons are held down, the fader assign buttons of all the paths feeding that bus will light. Paths can be added or removed from the bus under interrogation, by selecting or de-selecting their fader assign buttons.

AUXILIARIES

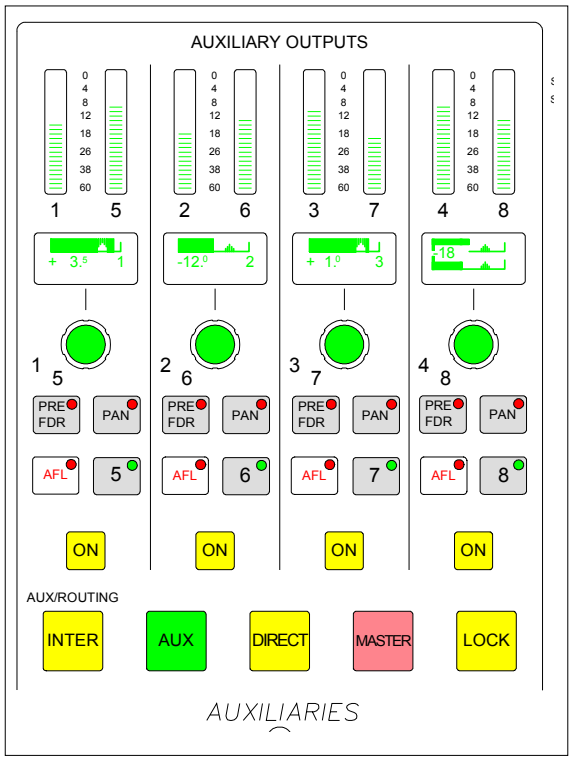
There can be 8 mono or 4 stereo Auxiliaries. The Auxilliary buses are pre-set to be mono or stereo using the User-Busses screen. If, for example, aux 4 is set to be stereo, then aux 8 will not be available (and Aux 8 will not work on the monitor selector).

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

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

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

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



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

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

AUX — When AUX is selected, this section of the module controls the feeds from the channels or groups to the auxiliary output busses.

DIRECT — When DIRECT is selected, this section controls the aux direct inputs. The pre fader and pan controls will be in-operative.

MASTER — When MASTER is selected this section controls the aux outputs. On stereo auxiliaries a dual level display will be shown. There cannot be a level offset on the output display. The ON buttons switch the output on and off.

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

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

CHANNEL COPY

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

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

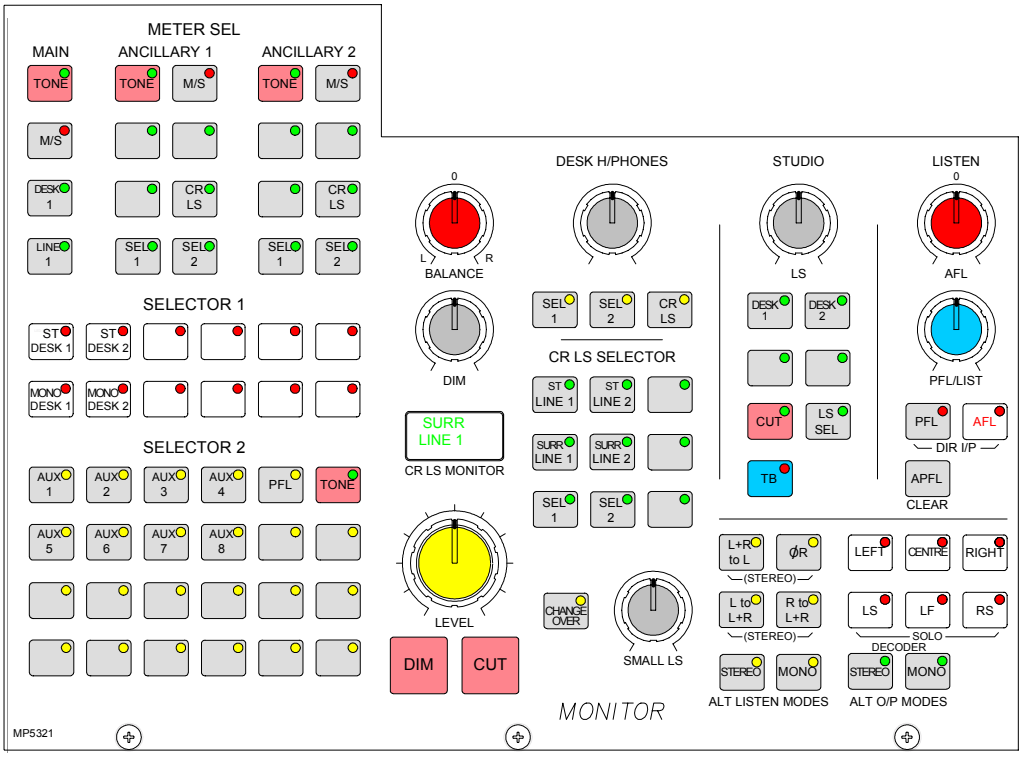
If a stereo channel's settings are copied to mono channels, only the relevant settings are copied. Other settings on the mono channels will be reset to the cleared down state. Any groups or main outputs included in the selected destinations will be ignored.

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

Monitoring, Main Outputs and Console Functions




MONITORING, METER SELECT AND LS CONTROL



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

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

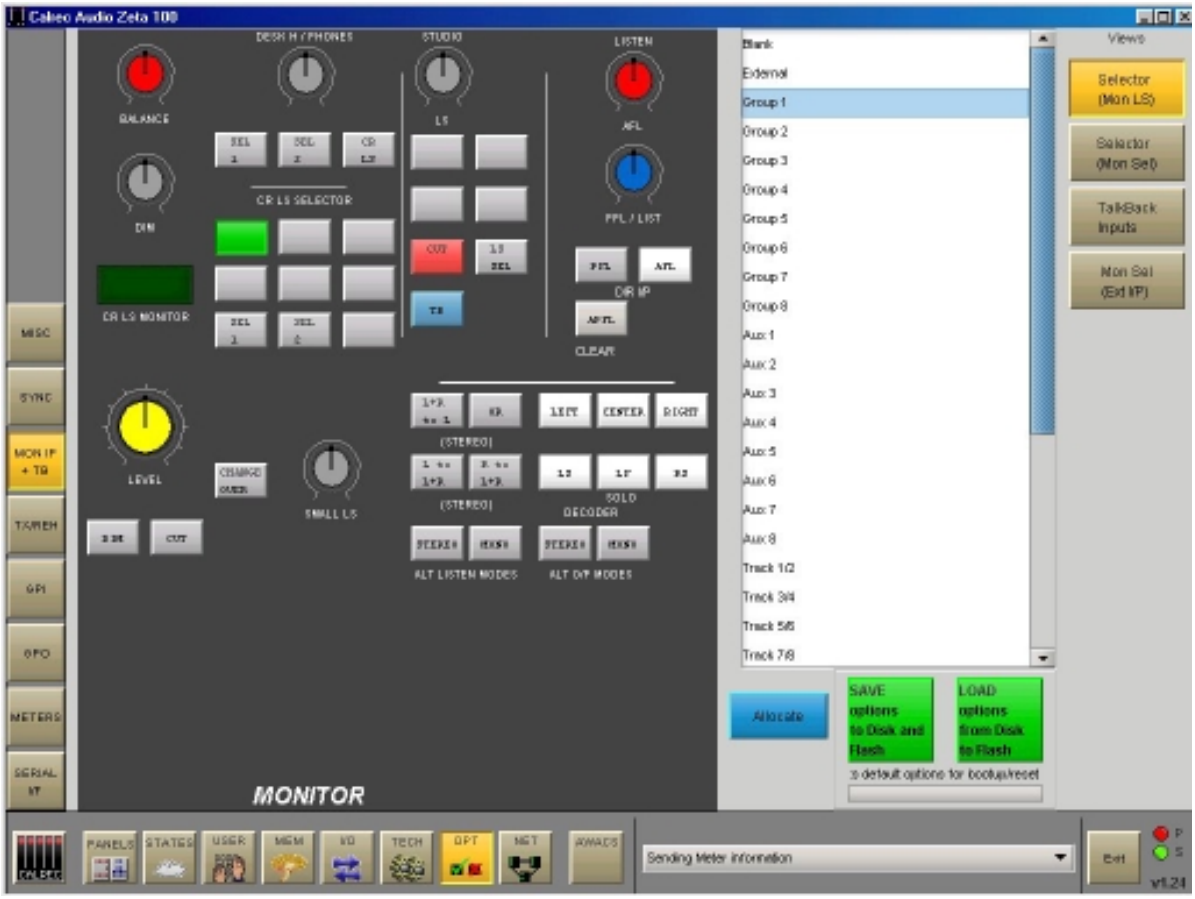
The Small LS level control is in series with the Main LS level control. The “change over” button diverts the monitor output to the Small LS for near field, or domestic check monitoring. Both Main and Small LS can be stereo, 3 stereo, or 5.1 independently.

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

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.

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.

Monitor Selection Panel Setup Screen



The screen allows the monitor LS user-definable buttons to be set up. The left side of the screen shows a representation of the monitor LS controls. The right side of the screen lists all the available monitor sources.
Monitor sources are allocated to the user-definable selection buttons as follows:

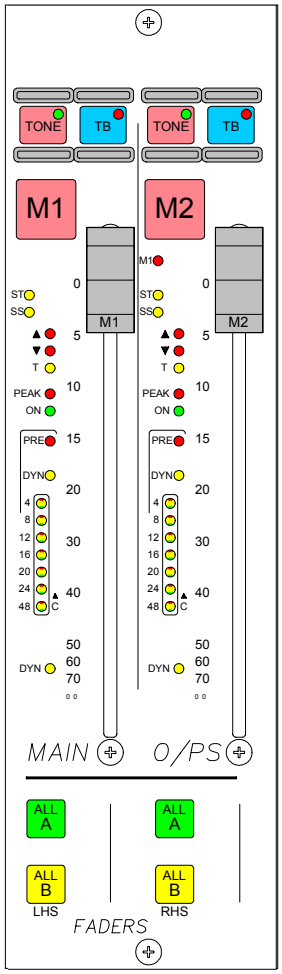
- Select the required selection button on the virtual monitor panel (screen button will flash)
- Select the required monitor soure from the list
- Select “Allocate” 

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

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

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

MAIN OUTPUTS



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

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

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

Surround and Stereo Main Outputs

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

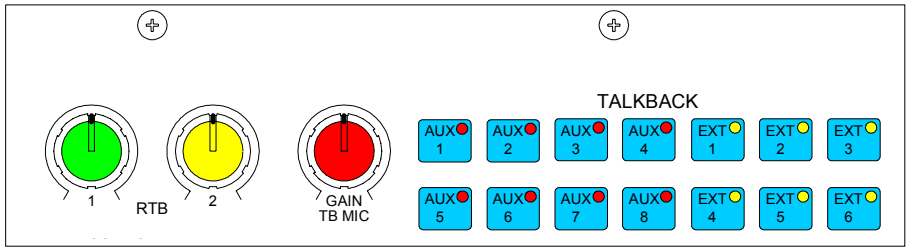
The function of the fader bargraph can be set to display either the pre fader level or the amount of gain reduction applied by the Dynamics setting.

Faders Section

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

TALKBACK

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

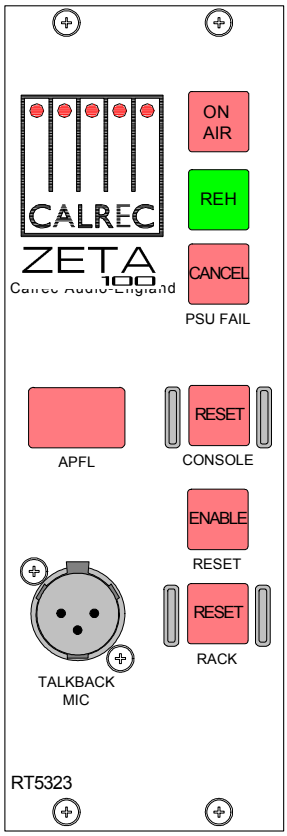


All Talkback buttons are subject to On-Air inhibits, set up on the TX-REH screen.

The GAIN control sets the level of the TB Mic.

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

BROADCAST FACILITIES



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

Condition Switching

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

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

Console and Rack Reset

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

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

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

Power Supply Monitoring

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

Automatic Warning and Correction (AWACS) Screen

If a problem does develop, it will be reported on the AWACS screen. The AWACS icon will flash to draw attention to the report. Selecting the icon switches to the AWACS screen where messages can be viewed. Message history is saved to the PC’s hard disk for future analysis.

Three types of messages are reported:

Information messages, eg “The primary core processor has started successfully”

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

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

Because the system has many back-up features, such as automatic change over to hot spares for PSU’s, control cards and DSP cards, it’s possible to continue operating after messages are reported.

CONSOLE FUNCTIONS

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

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

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

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

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

GLOBAL CONSOLE CLEAR - Clears the console of all settings

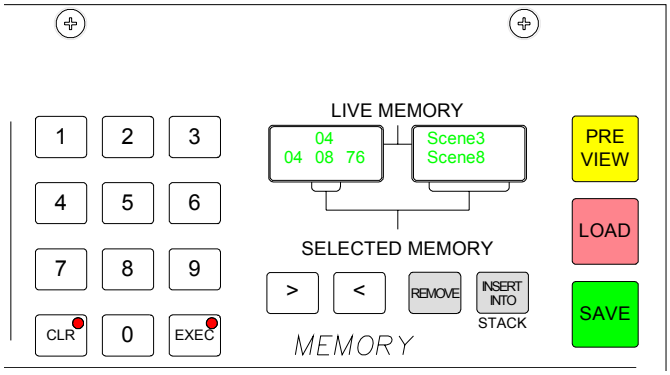
REPLAY - This button is not used.

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

Memory System




MEMORY CONTROLS



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

Live and Selected Memories

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

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

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

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

Choosing the Selected Memory

The keypad allows any memory number to be called into the Selected Memory position. 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 Memory screen will call it into the Selected Memory position.

Saving Memories

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

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

Preview Memory

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

Stacked Memories

The memories can be arranged into a pre-set list, known as a stack. This can be useful for setting up an easy-to-access shortlist of specific memories for use during a show. Stacks can be saved to the hard disk or removable media as sessions on the MEM-SETUP screen. INSERT INTO STACK adds the Selected Memory to the stack. The > and < buttons scroll through the stack.

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. To create a new memory, choose an empty memory from the list. When SAVE is selected to save the new memory, it can be given a label. The contents of the Selected Memory can be cleared by selecting Clear Memory.

When loading, saving or clearing memories from the screen, a confirmation box must be accepted before the action is carried out. This prevents memories from being accidentally overwrittten, cleared or loaded onto the console at an inappropriate time.

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

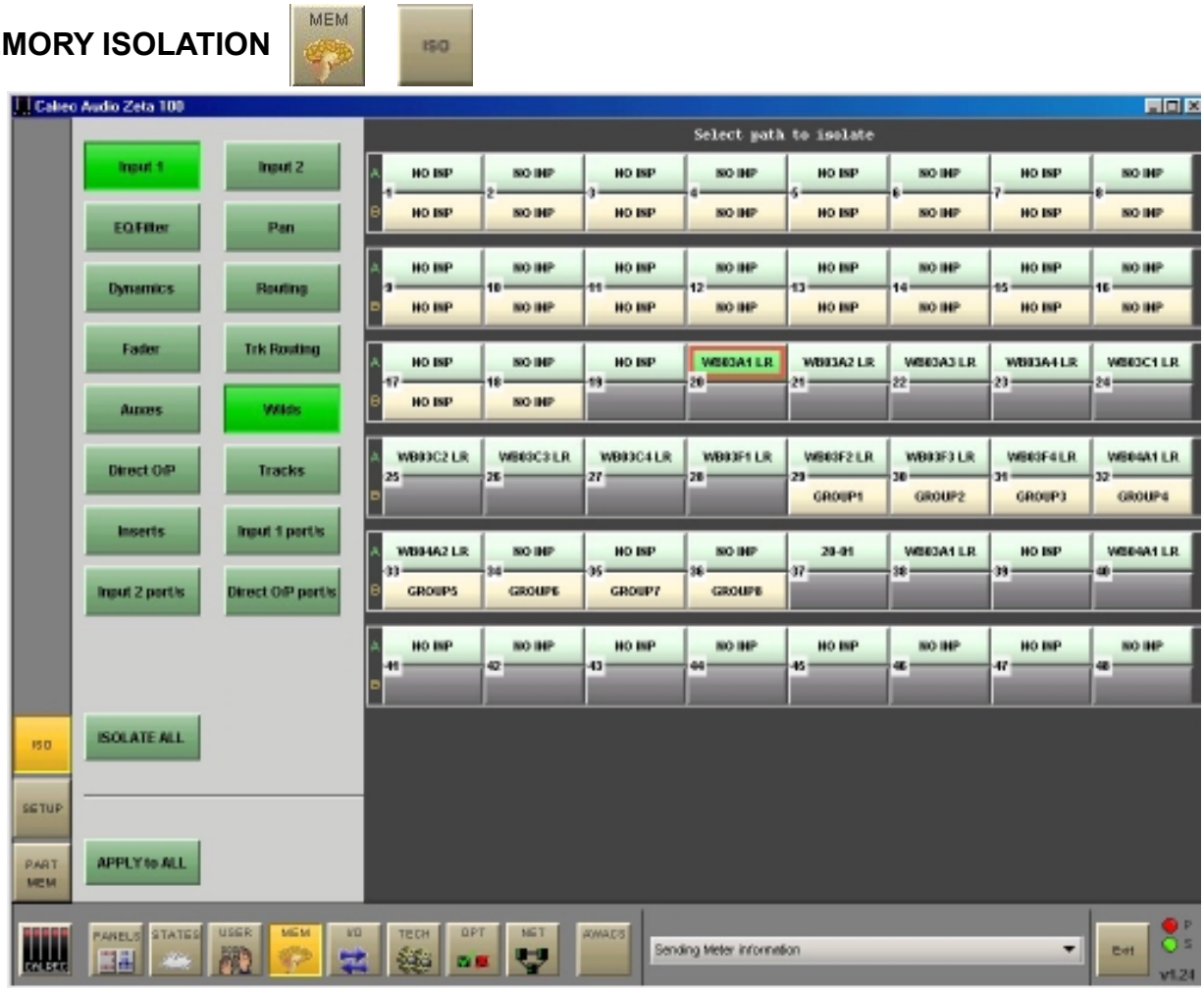
Managing Memories in the Flash ROM List

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

Sessions

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

MEMORY ISOLATION



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

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

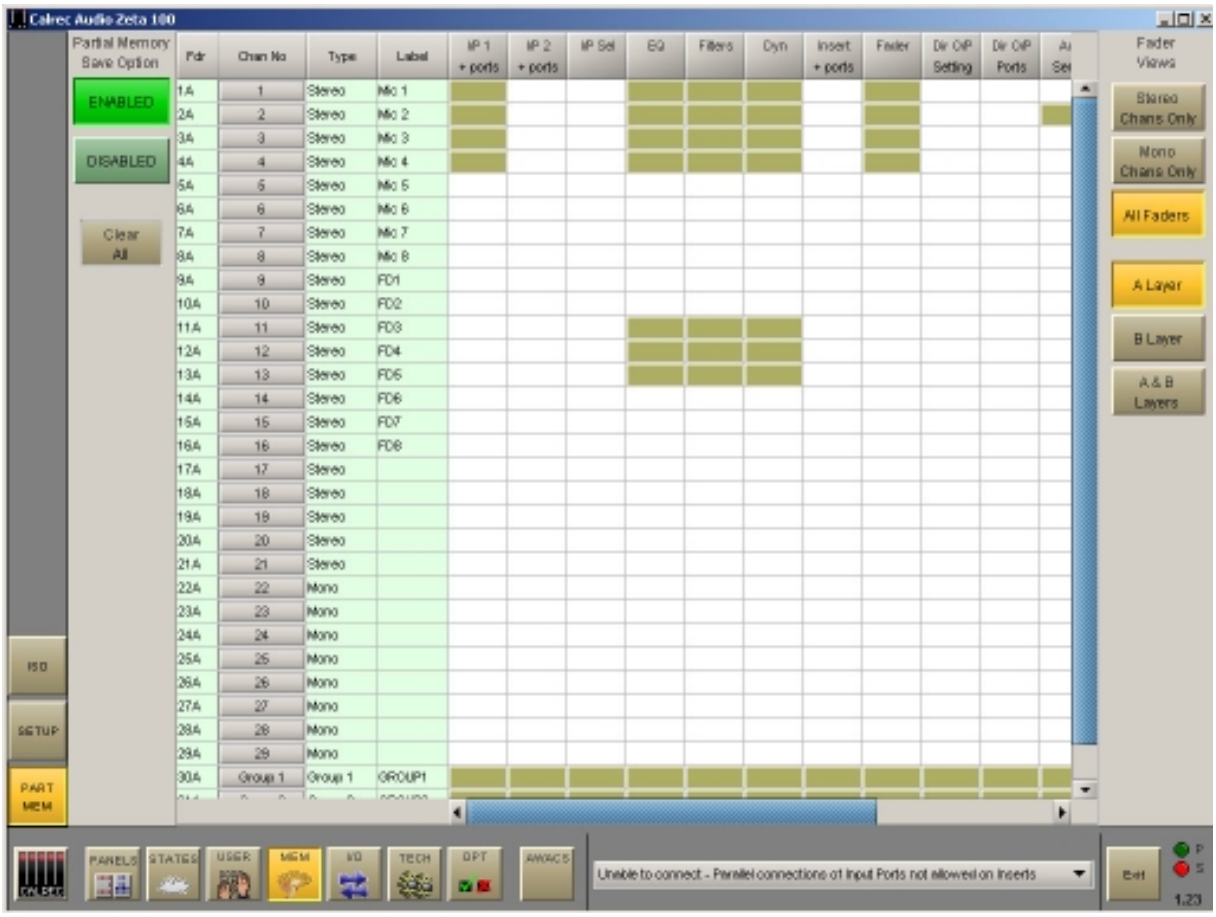
APPLY TO ALL applies the selected isolation settings to all channels and groups. To clear all isolation settings from all channels and groups, ensure all settings are de-selected, and select APPLY TO ALL.

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

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

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

PARTIAL MEMORIES



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

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

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

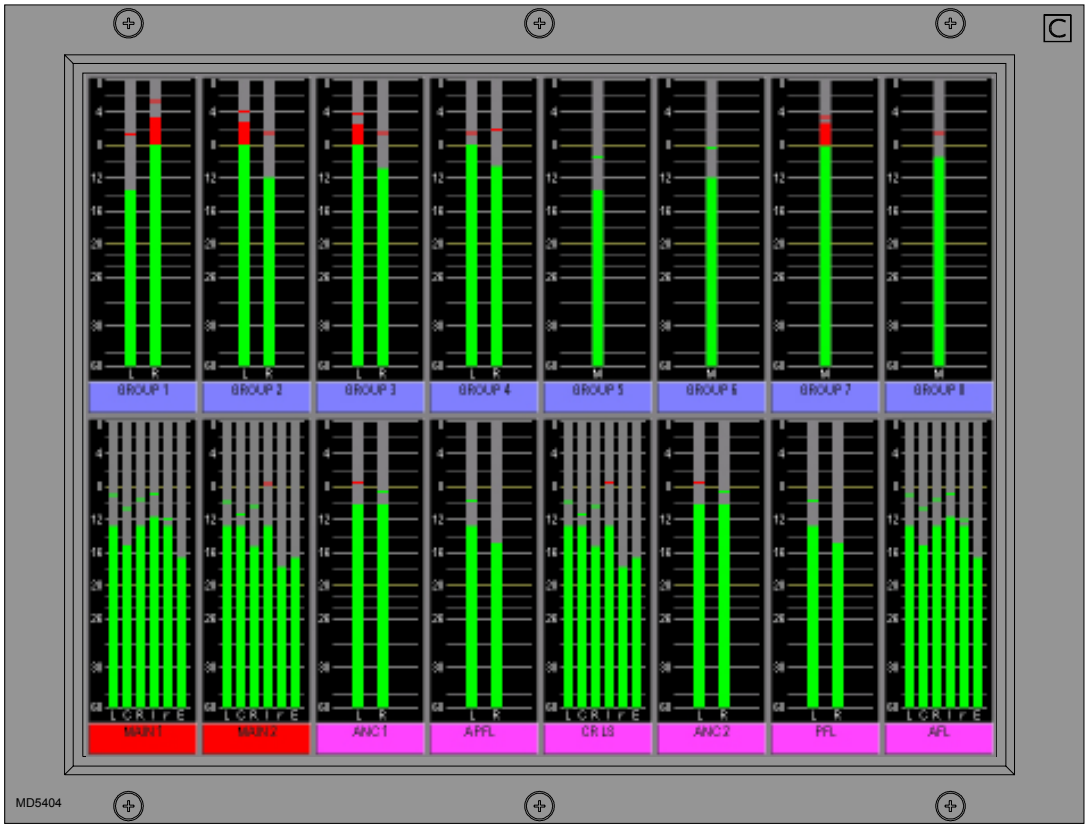
Partial memory selections are stored and recalled if a console reset occurs.

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

Metering System




TFT METERING SYSTEM



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

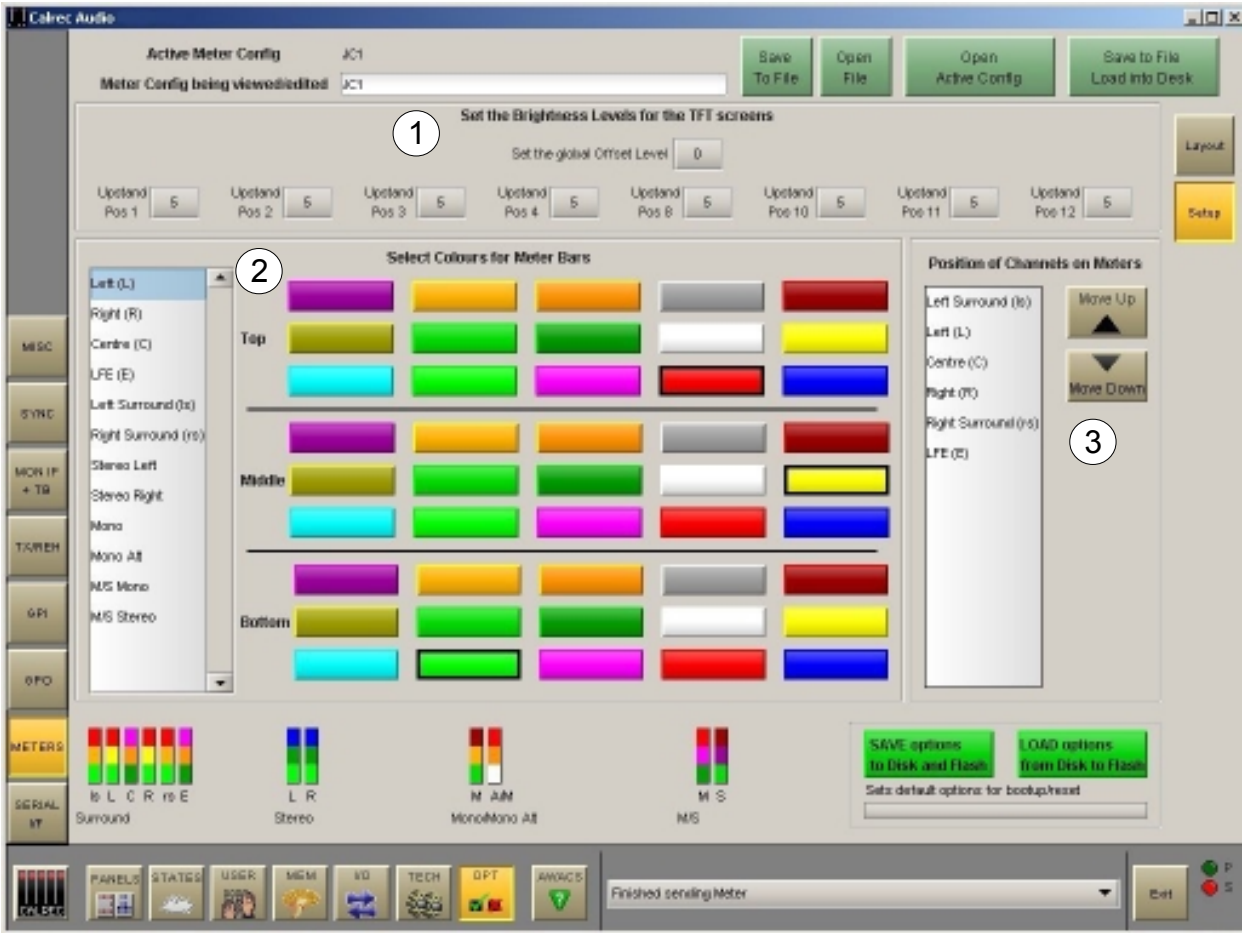
- Main Outputs
- Auxiliary Outputs
- Meter Selectors
- Miscellaneous functions
- Group Outputs
- Track Outputs
- External Inputs

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

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

TFT Meter Setup Screen

The Setup screen contains options to set global metering settings.



(1) Screen Brightness

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

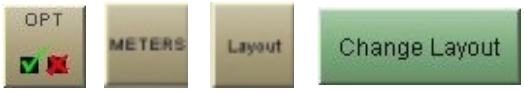
(2) Bar colours

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

(3) Signal Order

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

Changing TFT Screen Layout

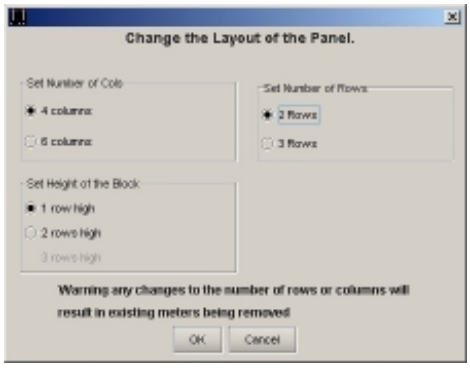


The user can control the layout of the rows and columns on the TFT screens. The numbered buttons allow the meter in that upstand position to be selected for set up.

Select a meter position (its background turns blue), and select CHANGE LAYOUT. A dialogue box then allows the number of columns and rows in the selected meter's half of the screen to be chosen. The meter's height can then be set to span the available rows.

Rows

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



Columns

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

Block Height

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

METER CONFIGURATION

Change Meter

Sources are allocated to TFT, bargraph or moving coil meters in the same way. Select a meter position (it's background will turn blue) and select CHANGE METER. A dialogue box will appear which allows the meter source to be chosen. Subsequent columns will list the available options for that source.

Copy to End

If a source has been allocated to a meter, and that meter is selected, COPY TO END can be used to allocate subsequent sources in the list to all the meter positions to the right of the selected meter position in the row, until the row is full, or you run out of sources in the list. The layout of the meter positions is also copied.

Change Scale

Each meter can be PPM, VU or Phase. There can be up to 3 phase meters assigned in the configuration. The scale type can be selected individually for each meter or globally for all meters.

Clear All

CLEAR ALL resets all the meter positions, clearing all settings on all meters in the upstand. A confirmation box must be accepted before this action is carried out, to prevent against accidental changes.

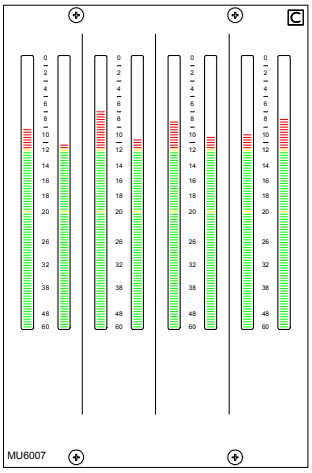
Change Layout

CHANGE LAYOUT will only be available if the selected upstand position is occupied by a TFT meter screen, as it is used to allow the user to configure their layout.

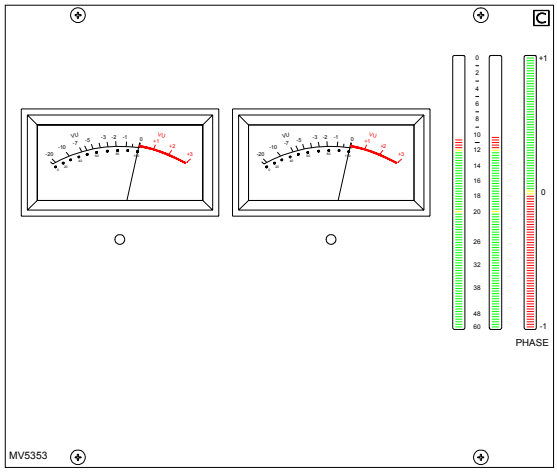
Saving and Restoring Meter Configurations

Once the user has the meters set up as desired, the configuration can be saved to the hard disk, so that it can be recalled at a later date. Changes to the configuration being viewed/edited will not take effect until SAVE TO FILE LOAD INTO DESK is selected. Then the changes will be loaded onto the console and saved.

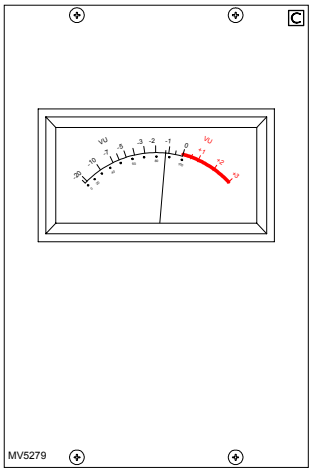
STANDARD METERING OPTIONS



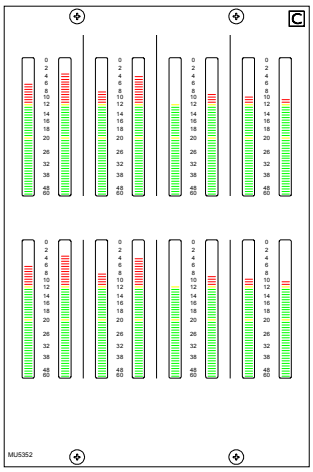
4 x Twin Bargraph



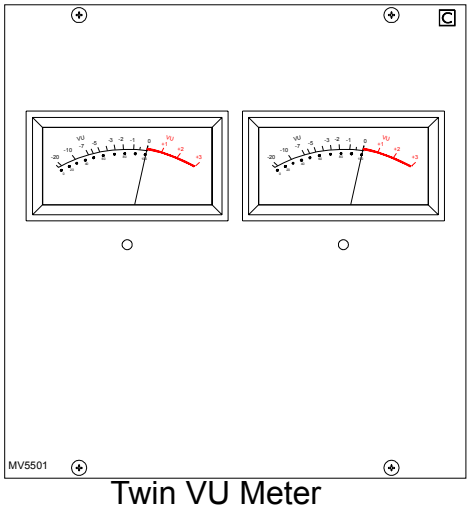
Twin VU, Bargraph & Phase Meter



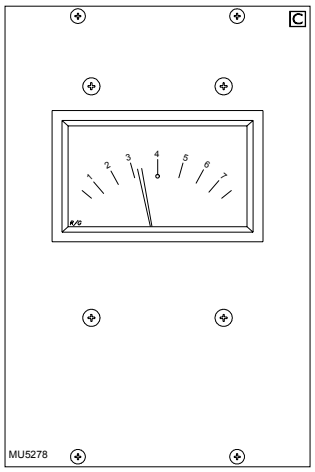
VU Meter



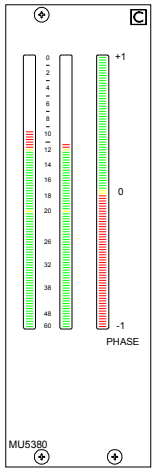
8 x Twin Bargraph



Twin VU Meter



PPM Meter R/G (A/B)



Phase Meter

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

Main and Ancillary 1 Meters

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

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

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

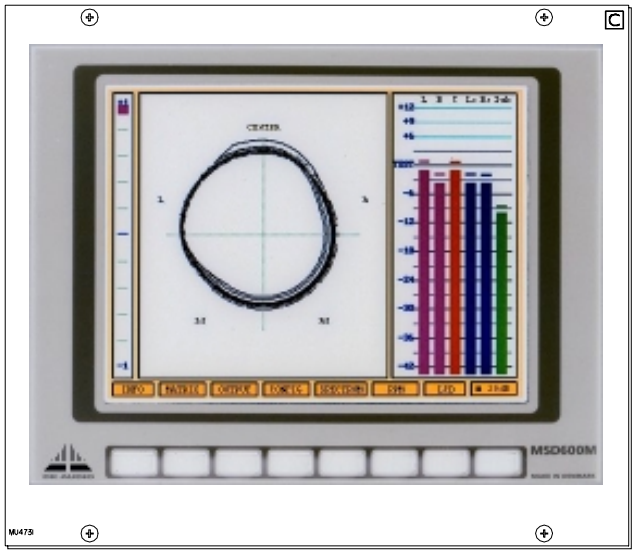
Other Meters
A comprehensive set of optional meters are available, for example:

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

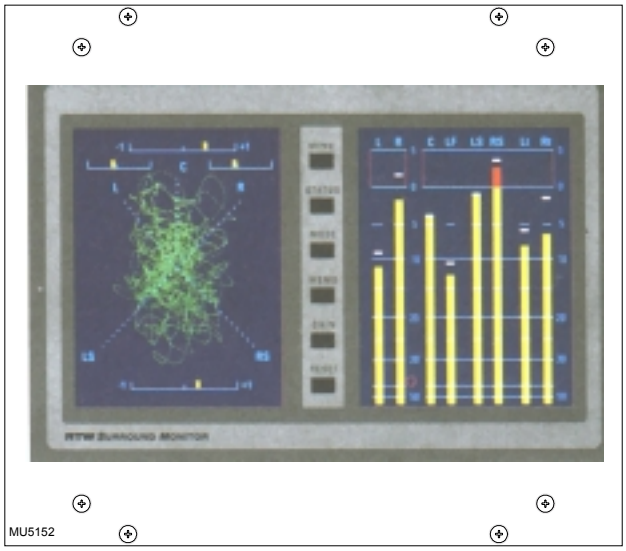
Calrec can supply either bargraphs, Moving Coil VU or PPM meters. All Calrec meters, including moving coil types, are fed directly from the internal meter system. There are external meter outputs which allow other meters to be used.

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

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

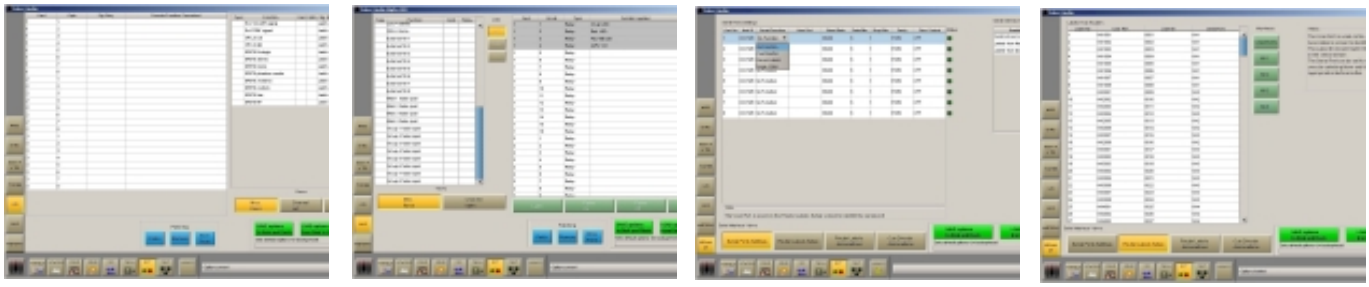


DK Audio MSD600M

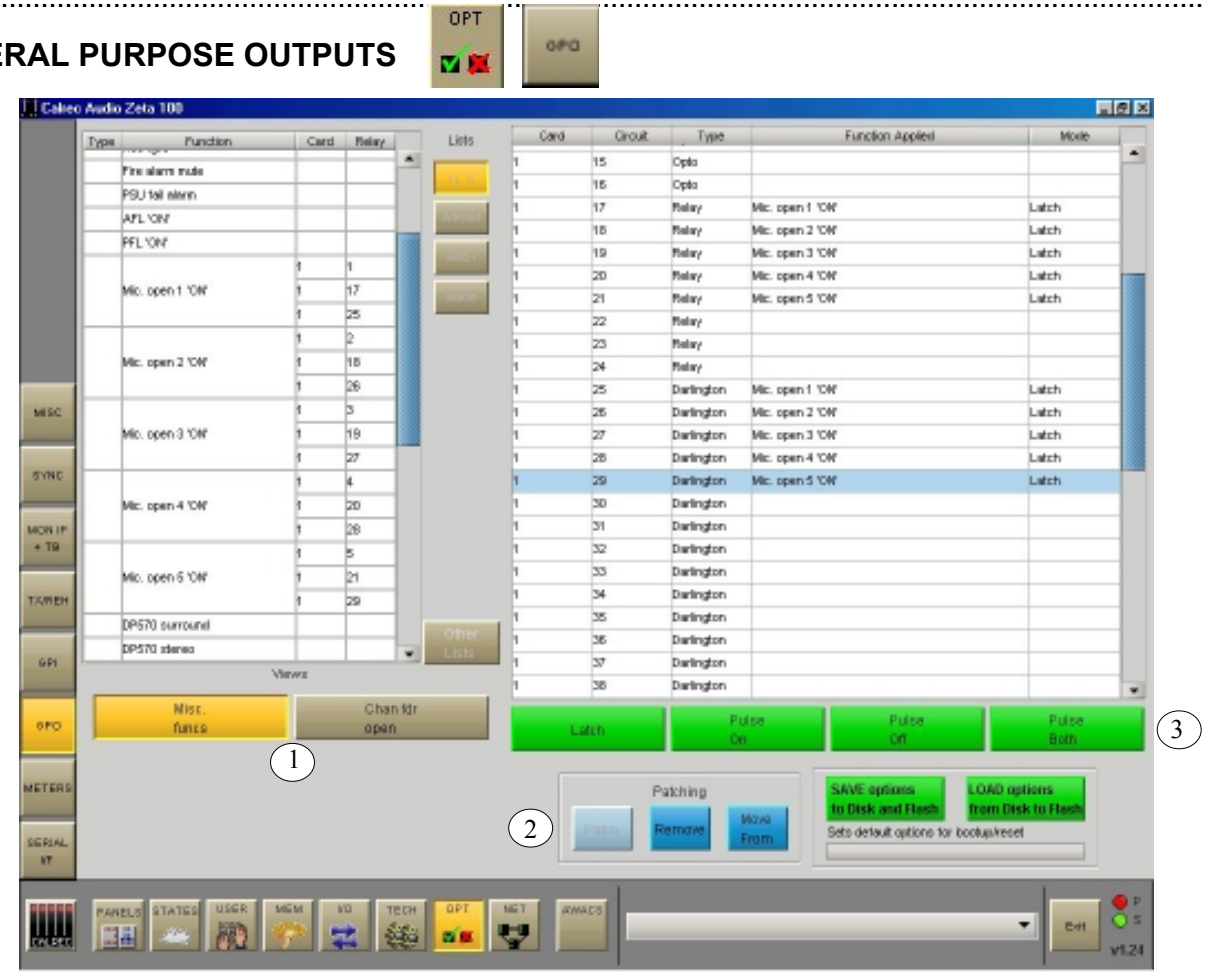


RTW 10810

Other Interfaces



GENERAL PURPOSE OUTPUTS



Up to 16 opto outputs, 40 Darlington outputs and 8 change-over relays are available.

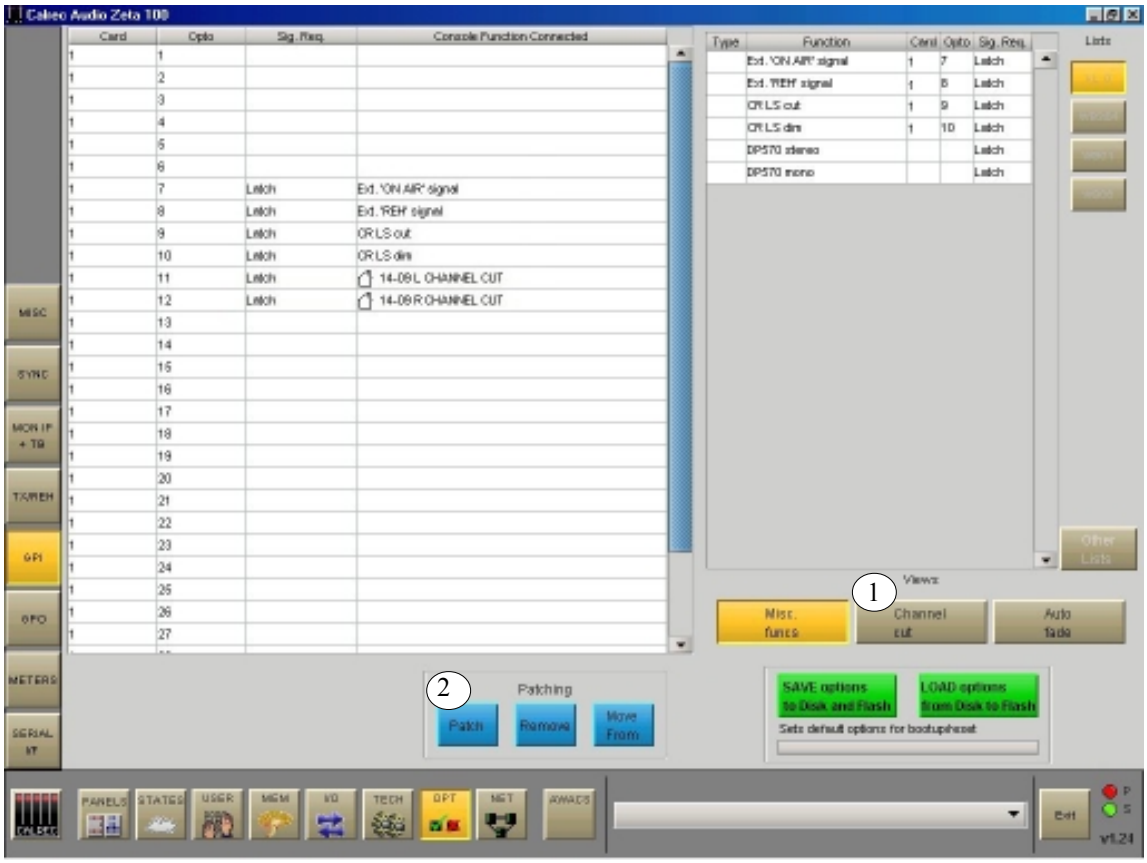
(1) “Misc Functions” or “Channel Fader Open”
The general purpose outputs can have various console functions assigned (with “Misc Functions” selected), or they can be set to operate when particular faders are opened (with “Channel Fader Open” selected). Console functions can be assigned to more than one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

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

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

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

GENERAL PURPOSE INPUTS



Up to 32 general purpose inputs are available.

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

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

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

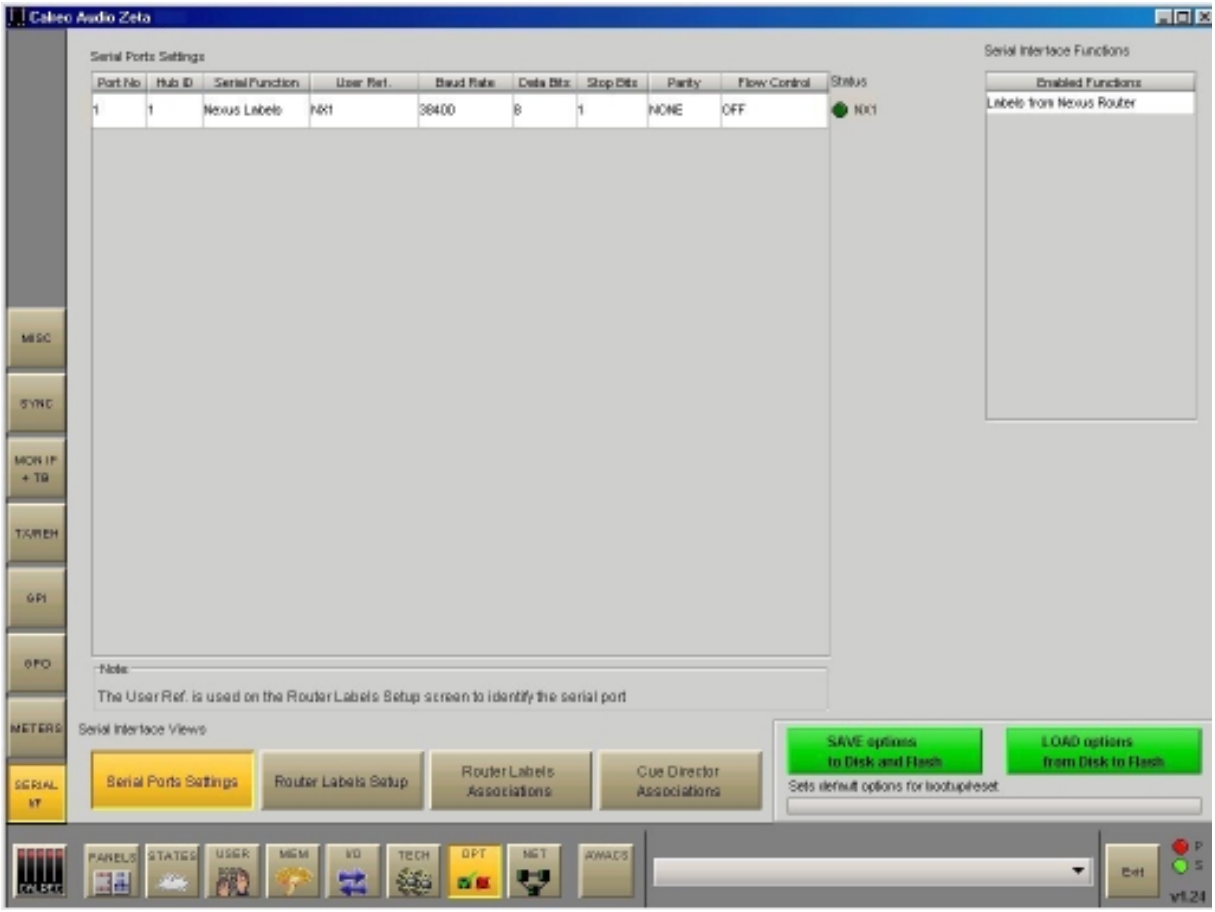
SERIAL INTERFACE

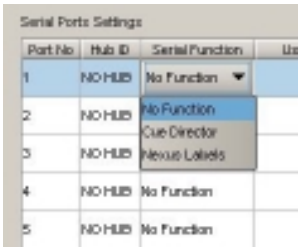
The system currently supports the following serial interfaces:

- Cue Director
- Nexus Router
- TSI Image Video 1000

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

Serial Port Settings Screen





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

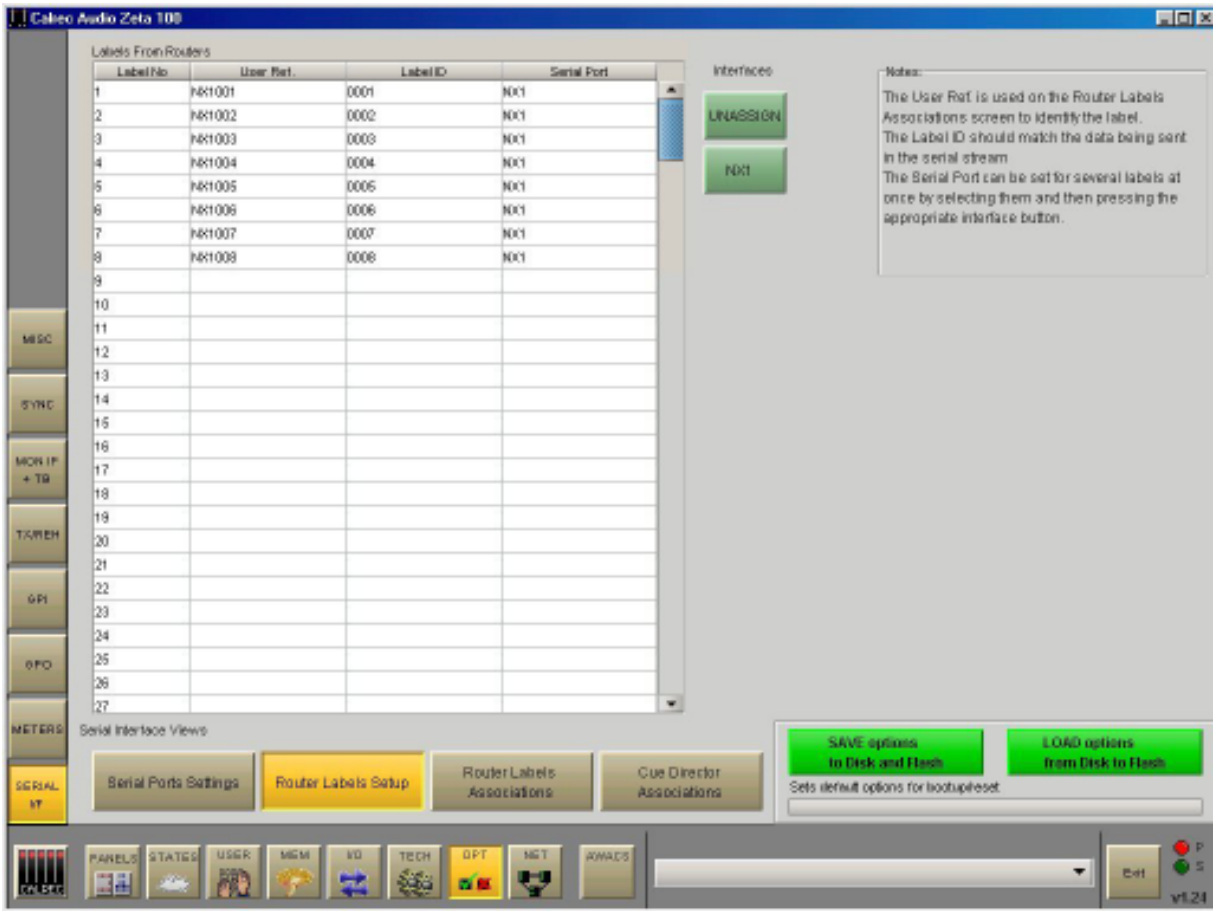
The function can be given a name by typing up to six characters in the USER REF column.

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

Router Label Setup Screen

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

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

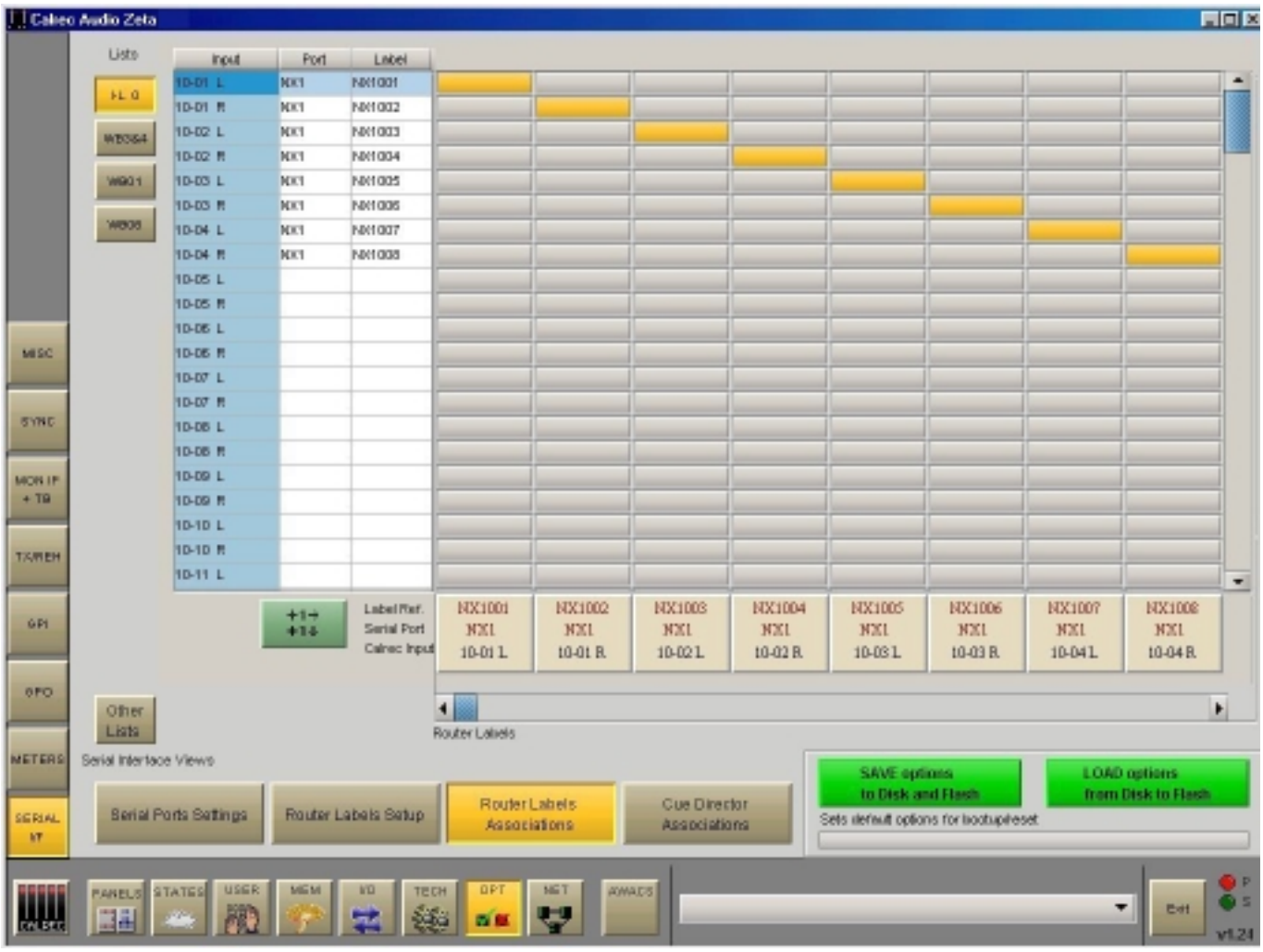


The serial port function previously set up on the Serial Port Settings screen will now have a selection button on this screen. To associate labels to the interface, select the label, or region of labels, and select the serial port function button. The serial port column tells the user which serial port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

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

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

Router Label Association Screen



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

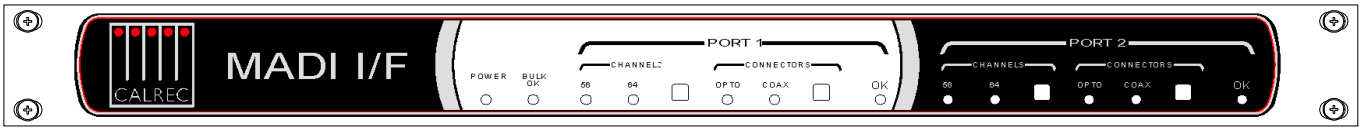
When an association is made, the cell will turn yellow. Associations can be unmade by selecting the cell again, whereby its colour will change back to grey. The +1 button is used to automatically move diagonally down the grid to the next association cell and toggle its condition. The action occurs out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

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

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

OPTIONAL WIDE AREA INTERFACES

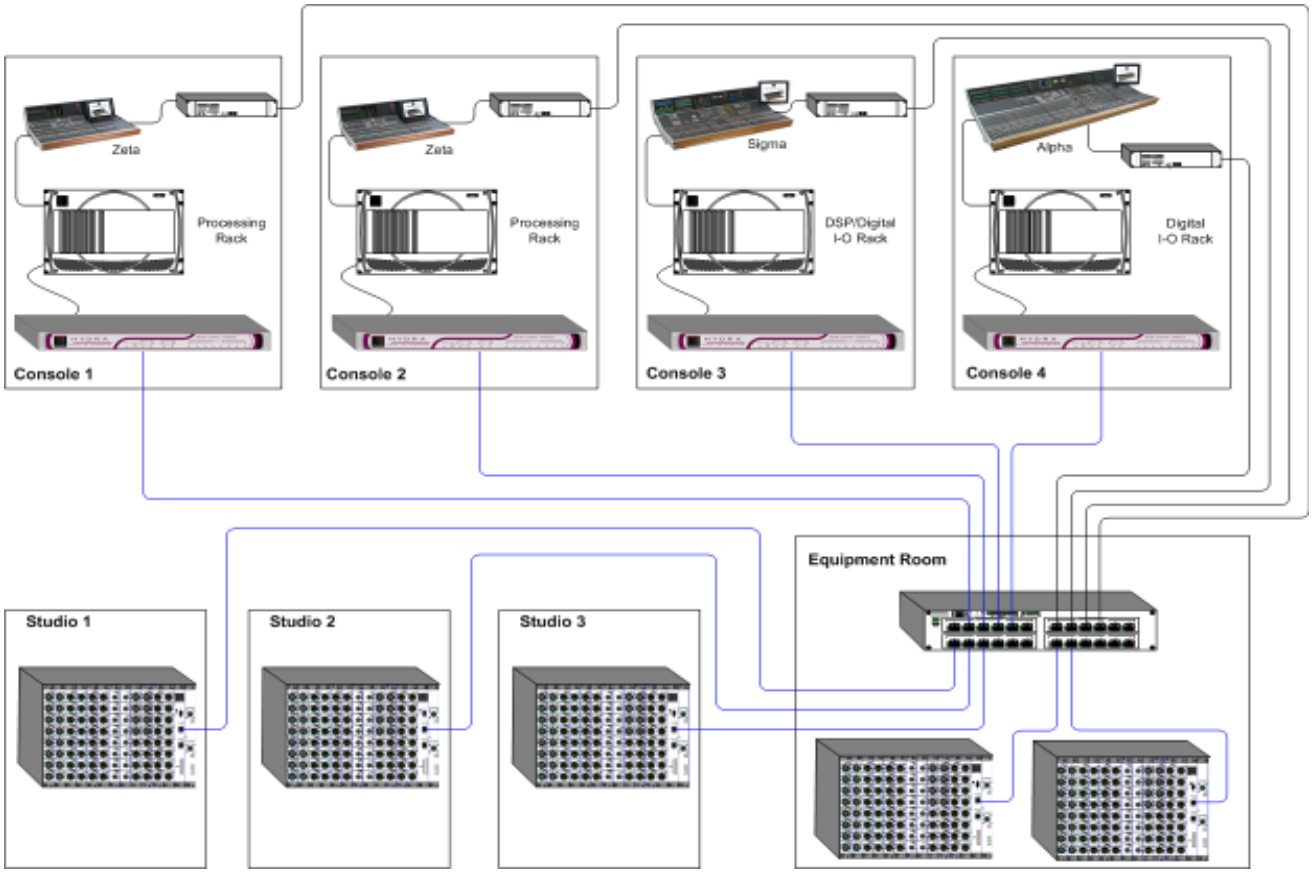
MADI



The rack mounted MADI Interface unit contains two independent, AES10 MADI compatible interfaces, and is available as an option. The two ports are interfaced to the Zeta system 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.

HYDRA

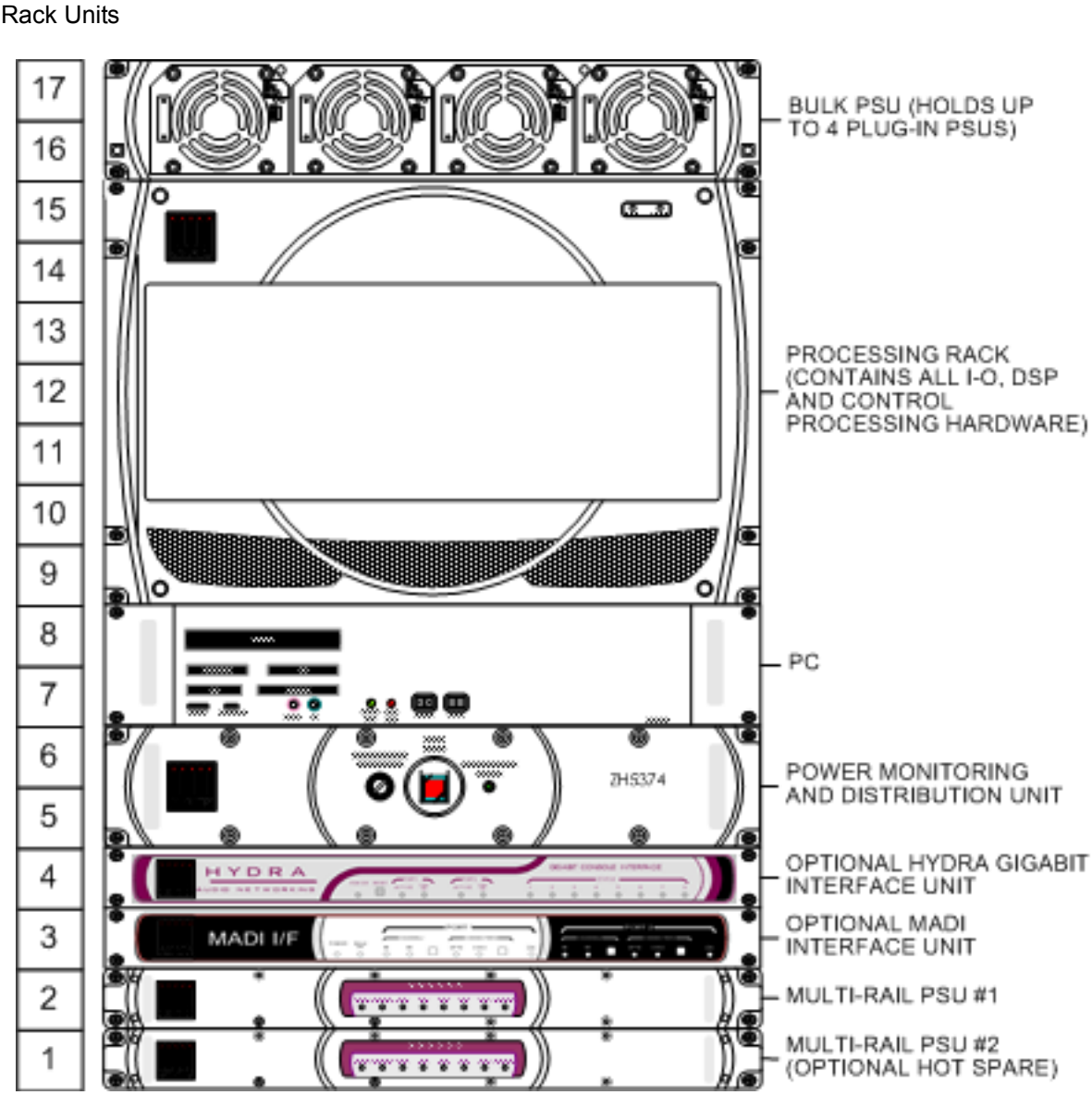
The Hydra Audio Networking System provides a powerful network for sharing of I/O resources and control data between Calrec digital consoles. Hydra I/O units, with up to 96 inputs/outputs, analogue or digital, may be connected onto the network, providing remotely located sources and destinations that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



Technical Information

TYPICAL RACK LAYOUT

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. The diagram below shows how the racks would typically be laid out within the bay.



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RACK SPECIFICATIONS

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 PSU rack with one PSU*	2U	18.5	470	17.5	8	1000	1250
Power for Bulk PSU Hot spare	-	-	-	-	-	No extra	Less than 5% extra
Processing Rack (Unpopulated)	7U	19.7	500	29.5	13.4	-	-
Processing Rack (Populated)	7U	19.7	500	53.2	24.2	-	-
PC*	2U	23.7	600	27	12.2	-	400
PSU Monitor & Distribution Unit *	2U	19.1	485	11.5	5.2	-	-
Hydra Gigabit Interface Unit	1U	10.4	265	6	2.7	-	-
MADI Unit	1U	11.9	300	7	3.2	-	-
Multi-Rail PSU *	1U	18.1	460	9.3	4.23	-	-
Power for Multi-Rail PSU Hot spare	-	-	-	-	-	No extra	Less than 5% extra

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

MAXIMUM CABLE LENGTHS

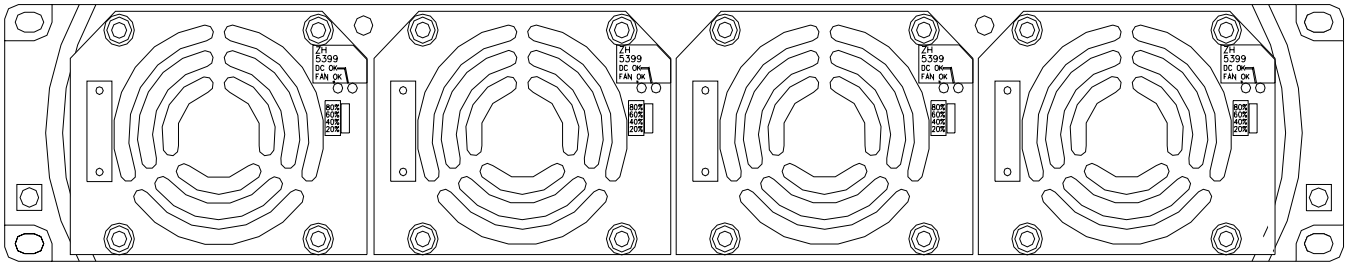
Cables from	To	Maximum Length	
		Feet	Metres
Control surface	PC	500	150
Control surface	Processing Rack	500	150
Control Surface *	Power Monitoring & Distribution Unit	100	30
Power Supplies	Power Monitoring & Distribution Unit	16.5	5
Processing Rack	Power Monitoring & Distribution Unit	16.5	5
Processing Rack	PC	100	30
Processing Rack	BNC/XLR I/O Interface Panels	9.8	3
Processing Rack	EDAC I/O Interface Panels	9.8	3
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.

POWER SYSTEM

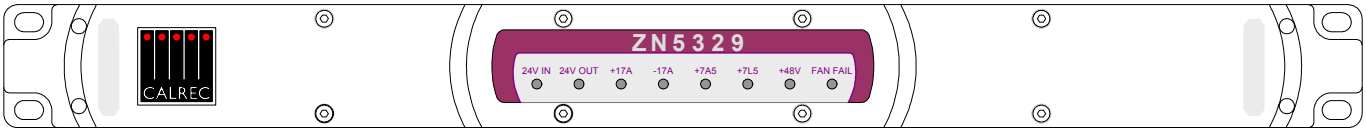
All PSU's are rack mounting and are separate from the units they power, except for the PC which has its PSU built in. Diode feeding allows supplies of the same type to be parallelled together.

Bulk PSU



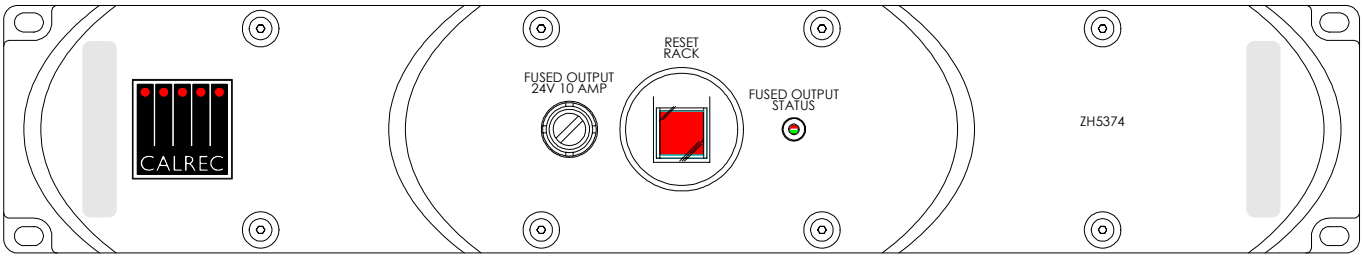
The Bulk PSU Rack is a 2U rack which can hold up to four identical plug-in PSU's. The rack has separate AC power inputs and DC outputs for each of the three PSU's. Any one PSU can be removed from the rack without disturbing the operation of the others in the rack. The console control surface and digital components in the processing rack are powered from one of these 2U racks. The number of PSU's required in the rack is dependant upon the size of the system, the distance between console and rack, and the "hot spare" requirement. The rack is fan cooled with fans mounted in the front of each PSU. The warm air is directed out of the rear of the rack. To ensure proper cooling, there must be a minimum clearance of two inches (50mm) from the fans and rear air outlets, and also any walls or other surfaces.

Multi-Rail PSU



The analogue components in the system are powered using 1U Multi-Rail PSUs. The number required is dependant upon system size, and "hot spare" requirement. The Multi-Rail PSU is also 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. The Multi-Rail PSU's are fitted with rear flanges to allow the rear of the PSU to be bolted to the studio equipment bay. All hot spare PSU's are optional. 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.

PSU Monitoring and Distribution Unit



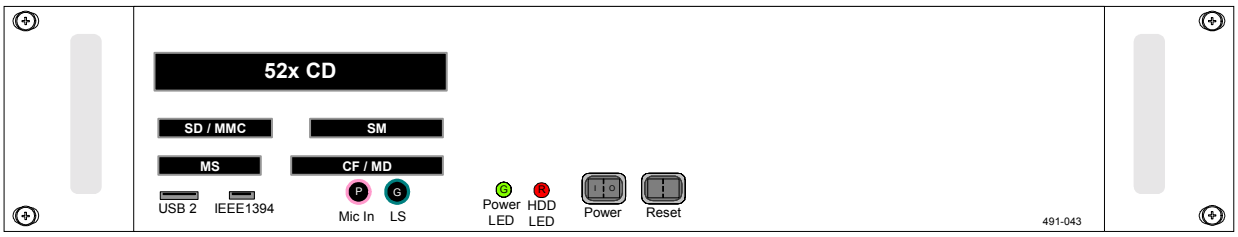
The Power Monitoring and Distribution rack performs many functions. It monitors the power supplies for failures, and ensures "hot" changeover to the spare should a fault develop. In addition to connections for power combining and distribution, the module includes:

- A front-mounted rack reset button. (Re-setting the racks does not affect control surface).
- 8 x changeover relays intended for switching balanced talkback audio.
- Opto-isolated fan fail and PSU fail inputs.

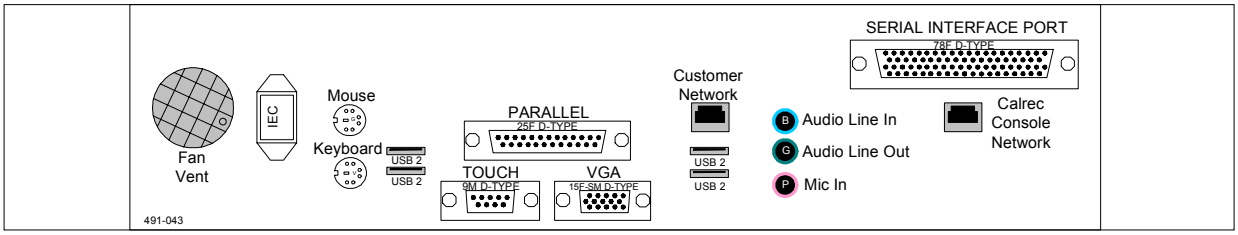
PC INFORMATION

Operating System	Windows 2000
CPU	Intel Celeron Processor (2GHz)
RAM	256 MB DDR RAM
HDD	40GB
CD ROM	52x
Network Ports	2 x 10/100
Card Slots	Compact Flash/Microdrive, SmartMedia, Memory Stick, Secure Digital/Multimedia Card
USB 2 Ports	4 (Rear of Unit), 1 (Front of Unit)
IEEE1394 Port	1 (Front of Unit)
Additional Hardware	8 Port Serial Card
Additional Software	PC Anywhere

Front



Rear



Remote Access

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

Network Ports

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

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.

Software Supplied

An OEM PC Operating System license is supplied with each console, and the operating system software is pre-installed. The console software will also be pre-installed, and will be 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.

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 Lenght	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)

ANALOGUE INPUTS	
Analogue - Digital Conversion	24-Bit
Input Balance	Electronically Balanced - Better than -80dB
Input Impedance	>1kOhms for Mic gains, 10k Ohms for line gains
Sensitivity	+18 / -78dB
Equivalent Input Noise	-125dB (150 Ohm source, 22Hz-22kHz bandwidth)
Distortion	-1dBFS @ 1kHz - Better than 0.006% -20dBFS @ 1kHz - Better than 0.004% -60dBFS @ 1kHz - Better than 0.3%
Frequency Response	20Hz to 20kHz +/- 0.5dB
ANALOGUE OUTPUTS	
Digital - Analogue 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

- Analogue input for 0dBFS can be pre-set globally to +28, +24, +22, +20, +18 or +15 dBu
- Pre-fader headroom on analogue inputs is adjustable globally from +24 to +36dB in 2dB steps
- Analogue output for 0dBFS Matches input setting into >1kOhms (+24dBu max into 600 Ohms)

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 0.005%
Frequency Response (Analogue Input to Output)	20Hz to 20kHz +/- 0.5dB
SYNCHRONISATION	
48kHz synchronisation 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

Calrec Audio Ltd reserve the right to change specifications without notice. E & O.E.

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