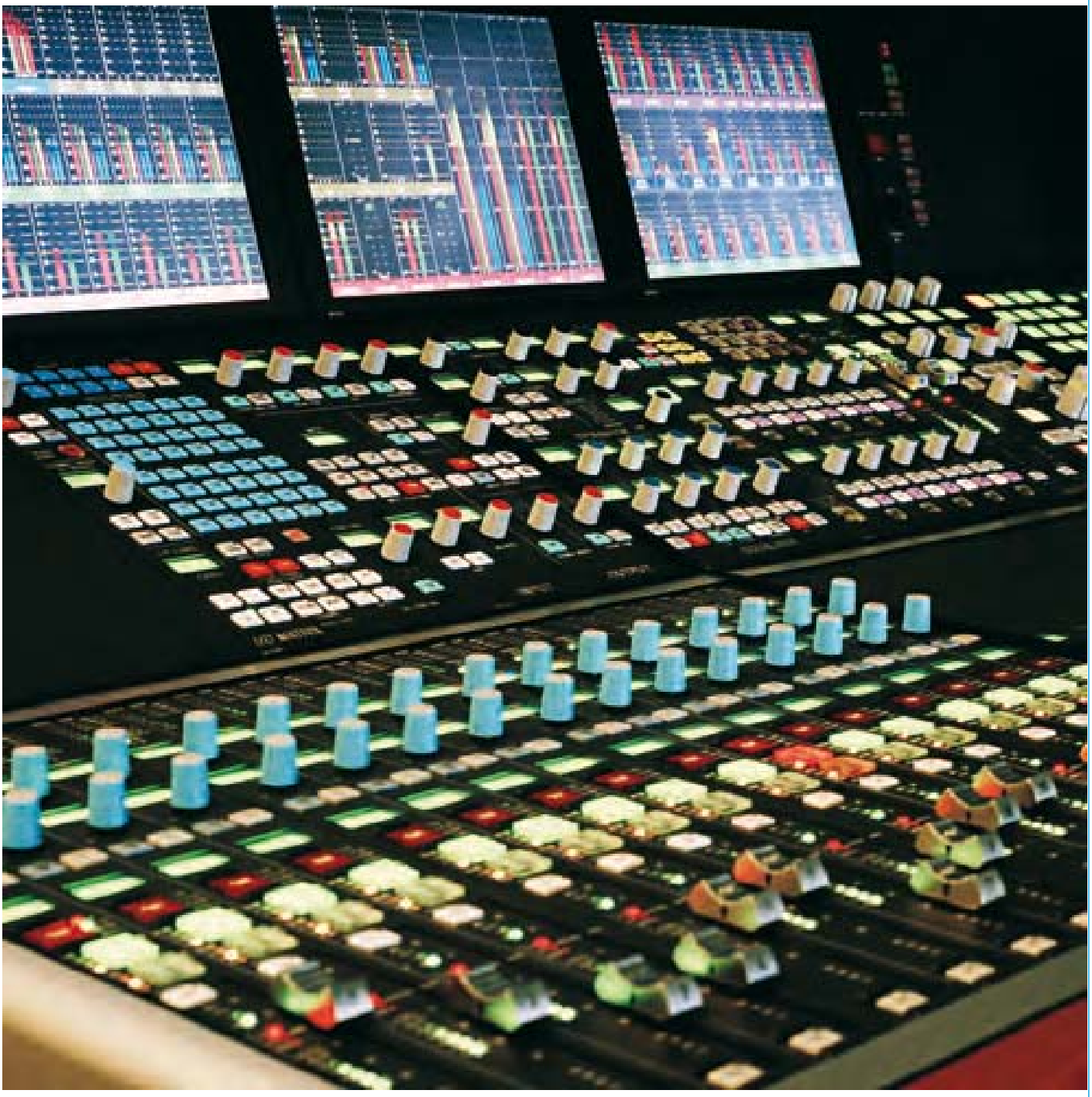
SIGMA TECHNICAL SPECIFICATIONS



Digital Broadcast Production Console with Bluefin HDSP

CALREC

Putting Sound in the Picture

CONTENTS

Continued...

SIGMA
OVERVIEW

CALREC

Putting Sound in the Picture

INTRODUCTION

Sigma is Calrec's second all digital production console designed for the most critical broadcast production and on-air applications. Based on the well established Alpha digital system architecture, Sigma 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 for existing consoles. Sigma continues to meet the changing requirements demanded by the on-set of surround sources in live production, providing sophisticated assignable monitoring solutions and encompassing flexible TFT style metering.

Bluefin
The Bluefin High Density Processing System provides 320 equivalent mono signal paths - and can provide this incredible power on just one card. The Bluefin technology project has been in development for a number of years and elements of the technology have been used in the Alpha console since its launch in 1999. It is a proprietary architecture which is has been conceived and developed entirely within Calrec.

Bluefin processing provides benefits beyond size and functionality. Calrec products have an unrivalled history of reliability and Bluefin further enhances this. The design generates less heat, uses less power and back-plane activity is reduced. System resilience is improved by 100% redundancy of all processing elements through the provision of a second card – it is like having another console as a hot spare.

The reality of HD programming is that it will continue to create more demand for 5.1 content. This technology meets production needs for HD production and live to air delivery far into the future.

Commitment
Calrec's continued commitment to customer value means Bluefin technology is fully retrofit-able to existing Sigma consoles. Having to increase console capacity to cope with HD television will not involve buying a new desk for existing Calrec users.

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, 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. Sigma is designed to ensure this level of confidence will continue in the digital era.

ISO 9001 and RAB Registered
Calrec Audio Ltd has been issued the ISO9001: 2000 standard by the Governing Board of ISOQAR.

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

PRINCIPAL FEATURES

Channel / Group Facilities

Up to 320 mono equivalent channels: 108 stereo channels plus 104 mono channels.
Up to 52 full 5.1 surround channels allocated from available channel resource.
8 x 5.1 surround, stereo or mono audio groups.
All channels and groups have 4-band EQ, 2-band Filters, Compressor/Limiter and Expander/Gate.
Separate 2-band EQ and 2-band Filters for Dynamics side-chain.
Up to 192 mono equivalent assignable inserts for outboard gear.
All channels and groups can have a direct output or a mix-minus feed.
Direct outputs can be pre EQ, pre fader, or post fader.
Automatic cross-fading facility, with user-definable fade out and in times.
Additional VCA style grouping system.
Every channel can route to every buss, at the same time, without restrictions.

Busses

2 main plus 2 sub-main stereo or 5.1 surround outputs with Compressors.
20 auxiliary outputs which can be 20 mono or 10 stereo.
48 outputs for multi-track or general purpose feeds.
Simultaneous LCRS, stereo and mono outputs available from each 5.1 main output.
Direct input available to group, mains, aux and mix-minus busses.

System

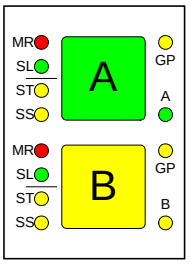
Up to 64 faders, with A and B layers of control, plus 2 main output faders with 2 sub-main outputs available on a second layer of control.
All faders are motorised and touch-sensitive.
A centrally assigned fader allows control of any fader from the optimum listening position.
Comprehensive surround panning and monitoring.
User-definable panels for monitor selection and control.
Flexible TFT screen-based meters with total user-configurability.
Delay available on inputs, outputs and groups.
Optional I/O expansion via a wide area interface such as MADI or Hydra, Calrec's sophisticated audio networking system.
On board Flash ROM memory system allows 99 full console snaphot or partial memories.
PC backup allows an unlimited number of memories.
Sophisticated GPIO facilities.

Resilience

Console operates independantly of PC.
Independent DSP operation ensures audio continuity even during PC or control reset.
Console and racks boot from power on in less than 20 seconds.
Full control system reset in less than 15 seconds with no loss of audio.
Last settings fully restored on power-up or reset.
Automatic change over to hot spares for power supplies, control cards and DSP card.
All cards and modules are designed to be hot plugged.
All cards and modules are designed to initialise upon insertion.

IMPORTANT CONCEPTS

Layering
Each fader can control two independent audio signal paths, named A and B. These signal paths can be either channels or groups, although for easy reference, the faders are simply known as channel faders. B signal paths are fully equipped with all the same facilities as an A path.



The faders are motorised, so when switching between A and B, the fader will move to the correct position.

Less important signals can be placed on the B layer. Even then, only one button press is required to access them again. Using the ALL A and ALL B buttons is like moving to a different section of a single layer design.

This arrangement allows more channels to be fitted into the space available in the frame. Channels towards the ends of the control surface 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, M2, S1 or S2 for the Main and Sub-Main output paths on the main faders. Pressing the Assign button causes the central control modules (the “Assign Panels”) to display and control the settings for that fader’s channel, group or main path.

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

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

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

PATHS AND PORTS

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

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

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

Each channel can select from two inputs (1 and 2), which can be any combination of mic/line and digitaI. 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.

SIGNAL PATHS

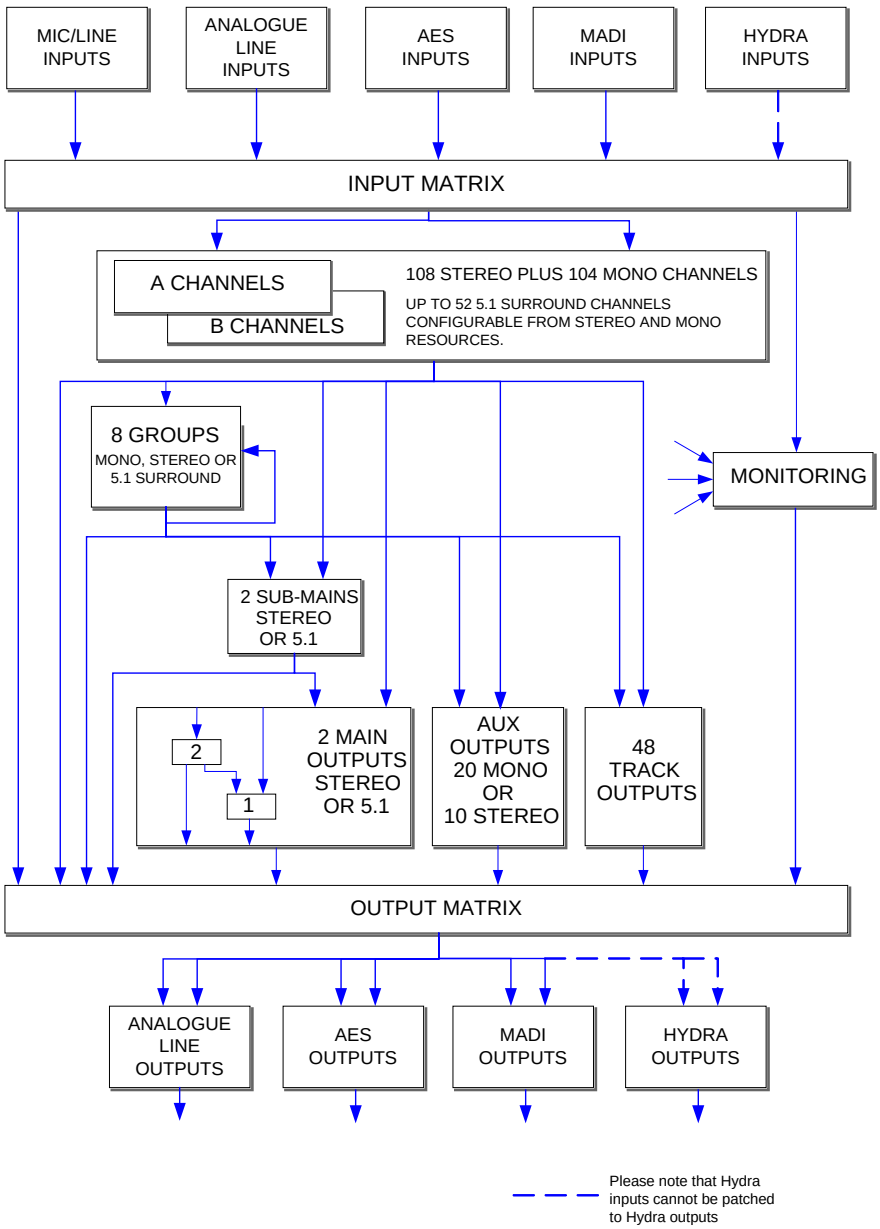
The system can have 320 equivalent channels: Up to 108 stereo plus 104 mono channels.Up to 52 5.1 surround channels can be created, each of these will use the resources of 2 stereo and 2 mono channels.

The 8 groups can each be designated as mono, stereo or full 5.1 surround. In addition, as many VCA style groups as required can be created.

If a main or sub-main output is designated as 5.1 surround, then a mono rear is derived at the 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 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 20 mono auxiliary outputs can be paired up to give up to 10 stereo auxiliary outputs.



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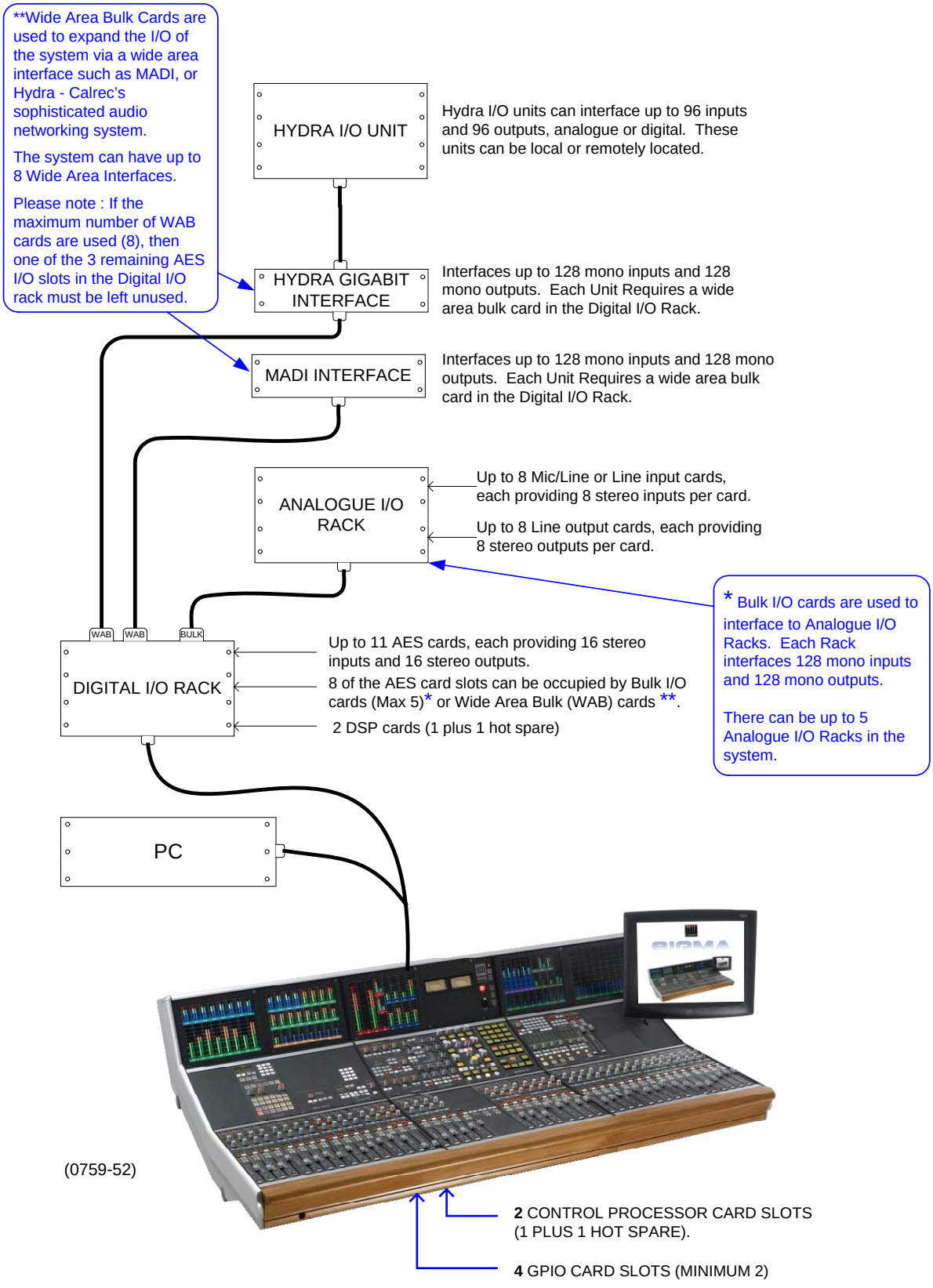
INPUTS AND OUTPUTS



The largest system (in terms of I/O) would have 8 WAB cards and 2 AES cards. If one WAB card is reserved as a redundant hot spare, this system would have 896 mono I/O on WAB interfaces, plus 32 stereo AES I/O. If all WAB I/O was AES through a Hydra network, the system could have up to 480 stereo AES on the system.

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 sub-sets of the screen's function.

Operational reproductions of the EQ, Dynamics, Routing, Aux Send, Aux Output and Delay controls; allowing changes to be made from the screen.

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.

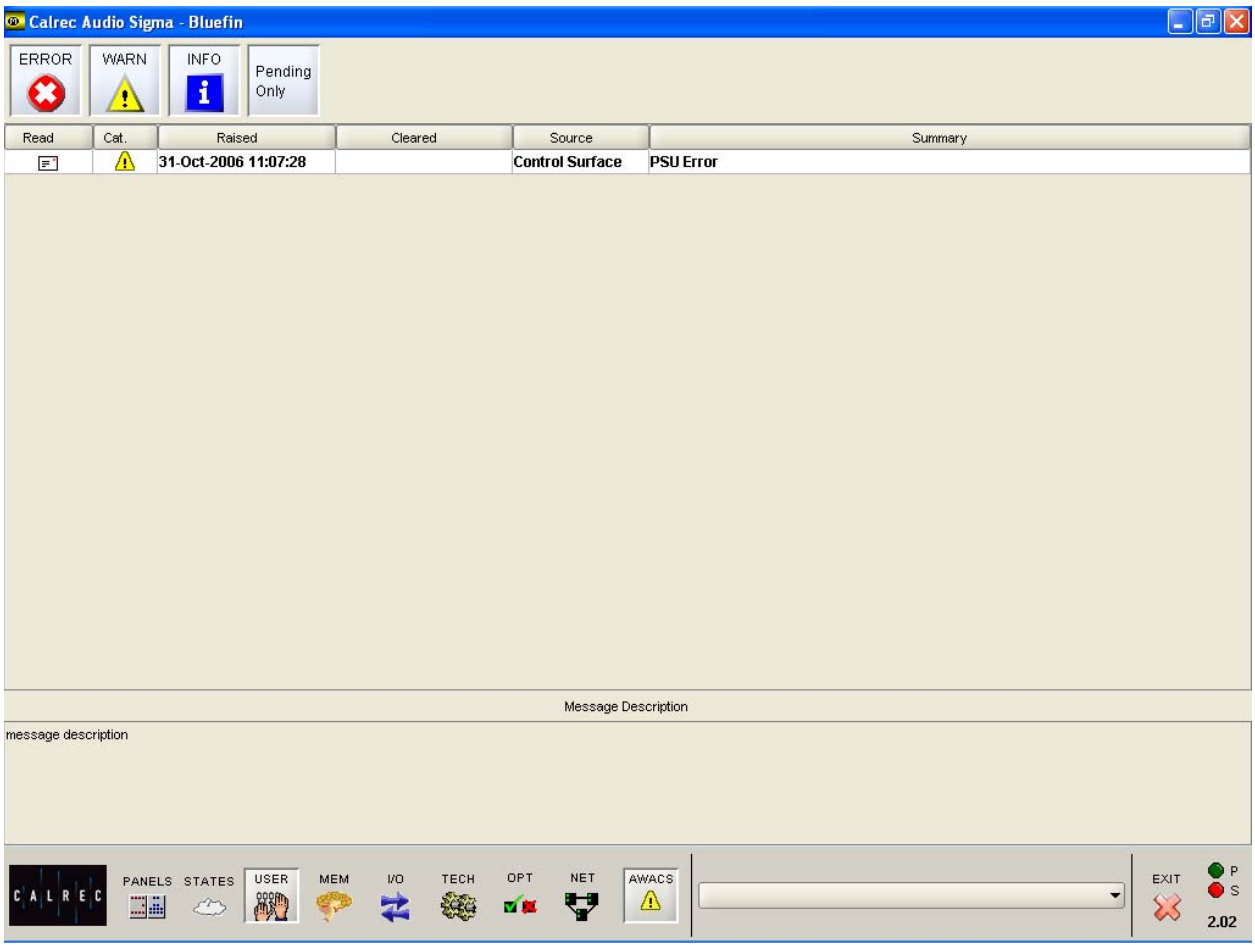
The Options screens are used to pre-set the system to the studio's required settings. Includes set up of meter configurations, monitor panel configurations, serial interface and label associations, GPIO and condition switching.

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 over-written unless they have been saved. This allows changes to be tried out without losing the original settings and these original settings can be restored without having to re-boot the system.

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

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

ERROR MESSAGES (AWACS)



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

Three types of messages are reported:

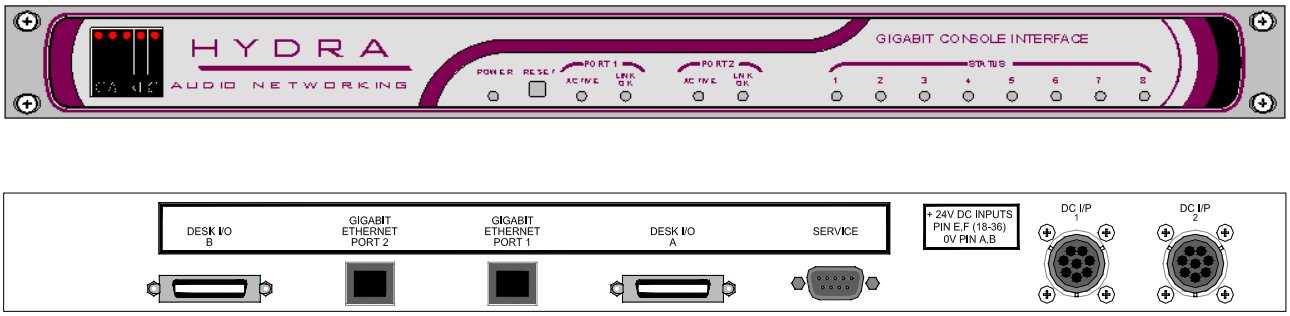
Information messages, eg "Control Surface UN4806 processor started successfully"

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

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

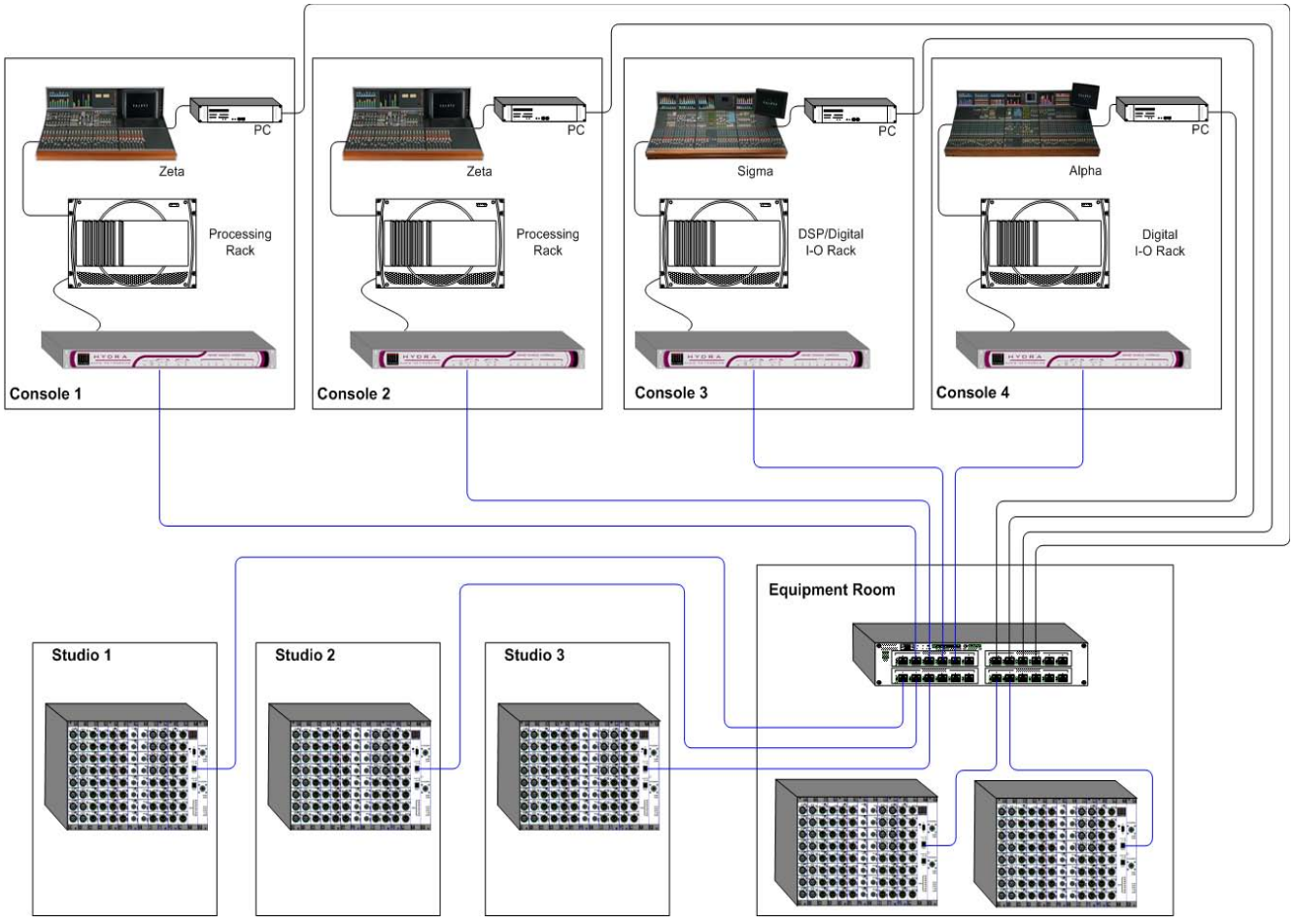
Because the system has many back-up features, it is possible to continue operating after errors are reported. If un-cleared errors are still present, an icon will flash in the AWACS button. Selecting this button at any time will switch back to the AWACS screen. Information messages can be cleared by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

HYDRA AUDIO NETWORKING



The Hydra audio networking system provides a powerful network for sharing of I/O resources and control data between Calrec digital consoles. Remote 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 shown above, via a Wide Area Bulk (WAB) card, which occupies one of the AES card slots in the Digital I/O rack. These units communicate information across the network via a commercially available Gigabit Switch.



The Hydra Audio Network configuration is set up and maintained using the console's front end screens.

SIGMA
FRAME OPTIONS AND DIMENSIONS

CALREC

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CONTROL SURFACE FRAME SIZES

Frames are made up of sections which can be 4, 5 or 6 modules wide. This allows many different sizes of console to be achieved using different combinations of different sized sections. Fader modules have 4 faders each, so console size can depend on the number of faders required.

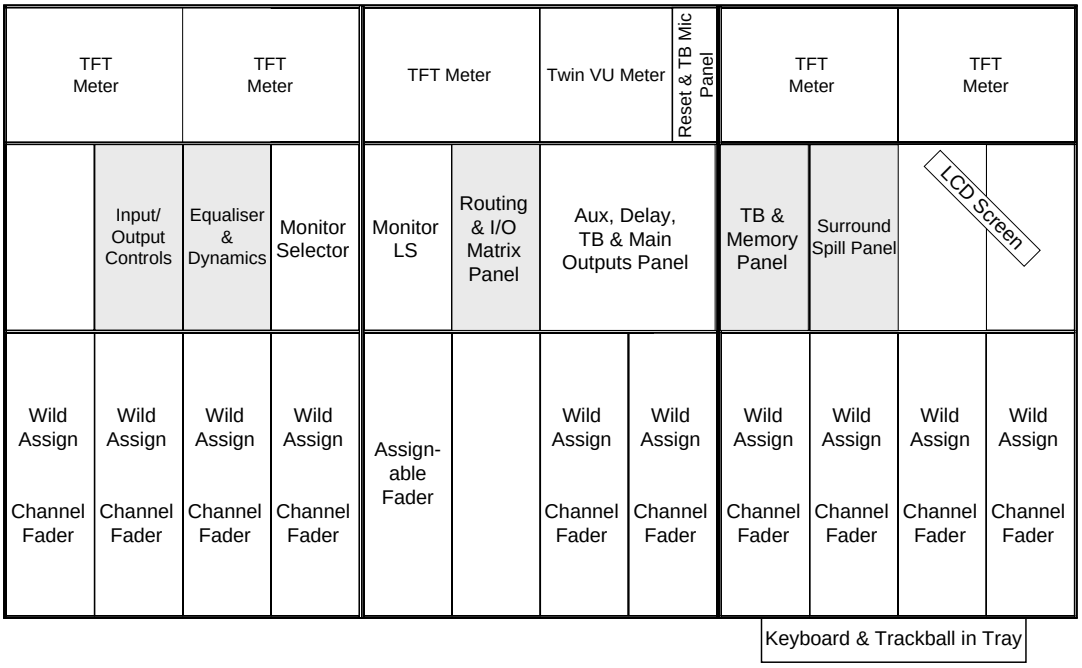
The table below shows the dimensions of the standard frame sizes available. Sections within the frame do not have to be in the order shown. For details of custom frames, with wedge sections etc, please contact Calrec.

No of Modules Wide	Frame	Length		Depth	
		inches	mm	inches	mm
12	4:4:4	60.9	1547	38	964
13	4:4:5	65.9	1672	38	964
14	4:6:4	70.8	1797	38	964
15	4:6:5	75.7	1922	38	964
16	6:4:6	80.7	2047	38	964
17	5:6:6	85.6	2172	38	964
18	6:6:6	90.5	2297	38	964
19	5:4:4:6	95.7	2428	38	964
20	6:4:4:6	100.6	2553	38	964
21	5:4:6:6	105.5	2678	38	964
22	4:6:6:6	110.4	2803	38	964
23	5:6:6:6	115.4	2928	38	964

CONTROL SURFACE FRAME SIZES

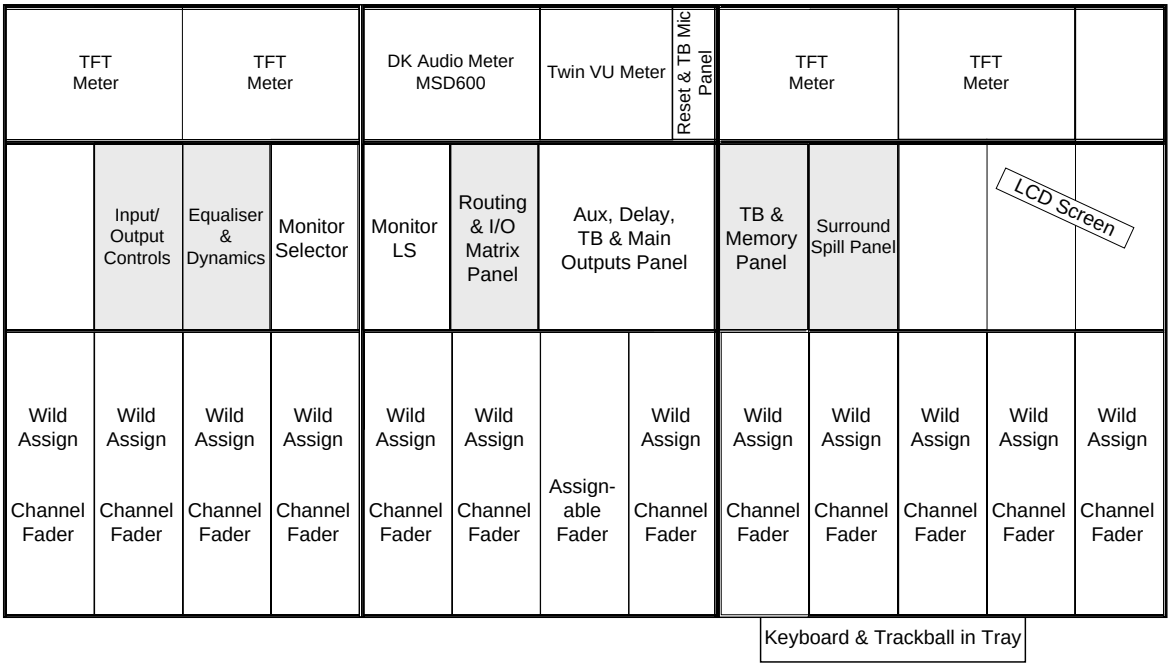
Example Frame Layout (4:4:4)

This example shows a 40 fader console, using a 4:4:4 frame. With 2 audio paths on each fader, this allows up to 64 channel faders within a frame only 1547mm (60.9 inches) wide. The Assign panels are shown shaded.



Example Frame Layout (4:4:5)

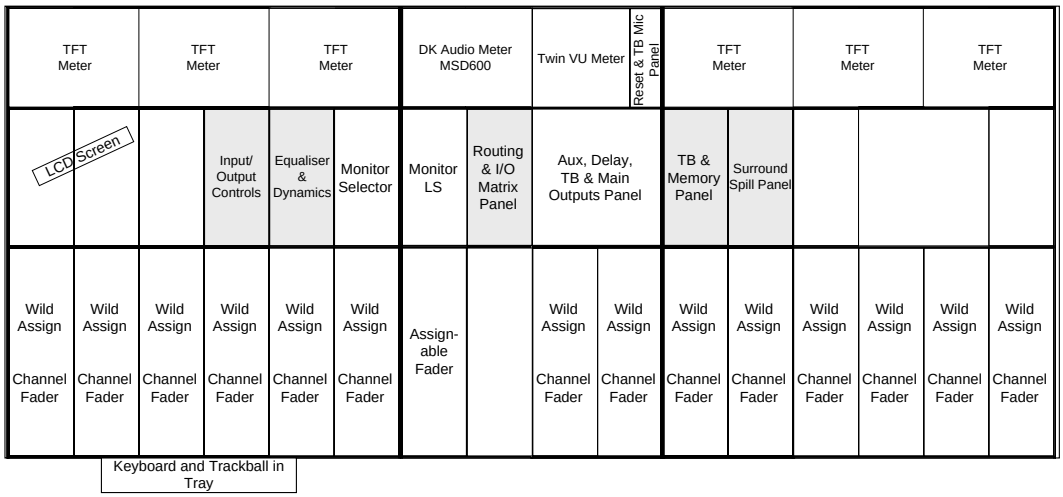
This example shows a 48 fader console using a 4:4:5 frame. With 2 audio paths on each fader, this allows up to 96 channel faders within a frame only 1672mm (65.9 inches) wide. The Assign panels are shown shaded.



CONTROL SURFACE FRAME SIZES

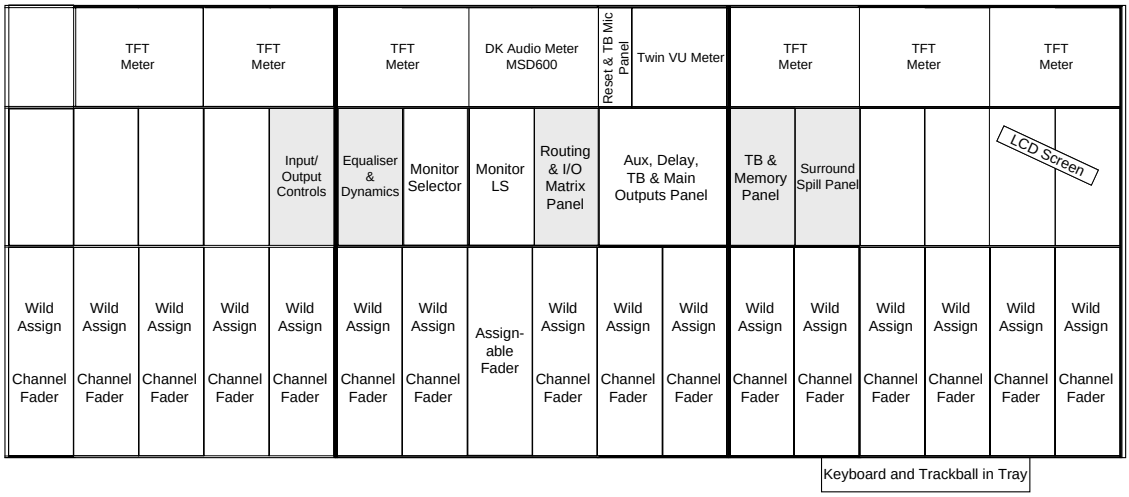
Example Frame Layout (6:4:6)

This example shows a 56 fader console using a 6:4:6 frame. With 2 audio paths on each fader, this allows up to 112 channel faders within a frame only 2047mm (80.7 inches) wide.



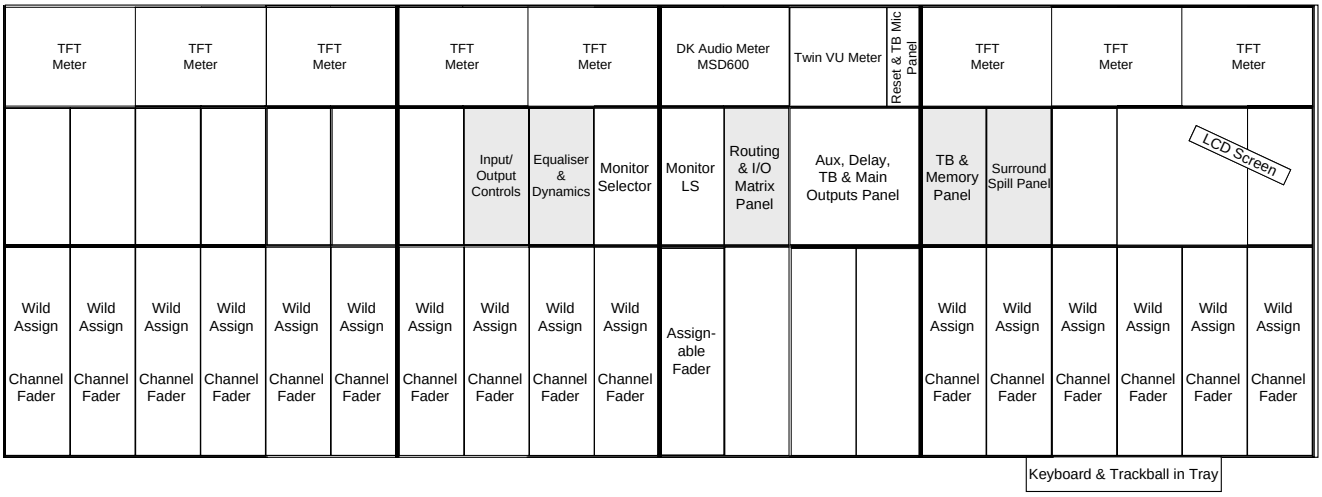
Example Frame Layout (5:6:6)

This example shows a 64 fader console, using a 5:6:6 frame. With 2 audio paths on each fader, this allows up to 128 channel faders within a frame only 2172mm (85.6 inches) wide.

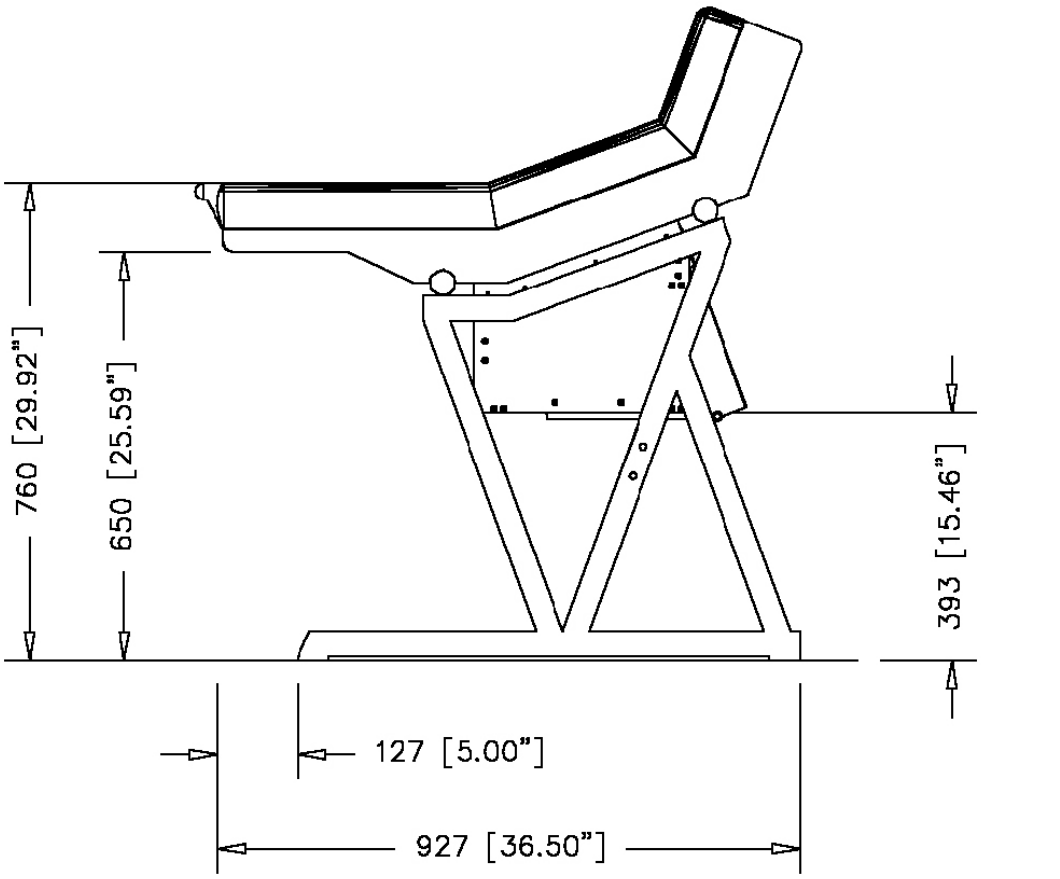


Example Frame Layout (6:4:4:6)

This example shows a 64 fader console, using a 6:4:4:6 frame. With 2 audio paths on each fader, this allows up to 128 channel faders within a frame only 2559mm wide.



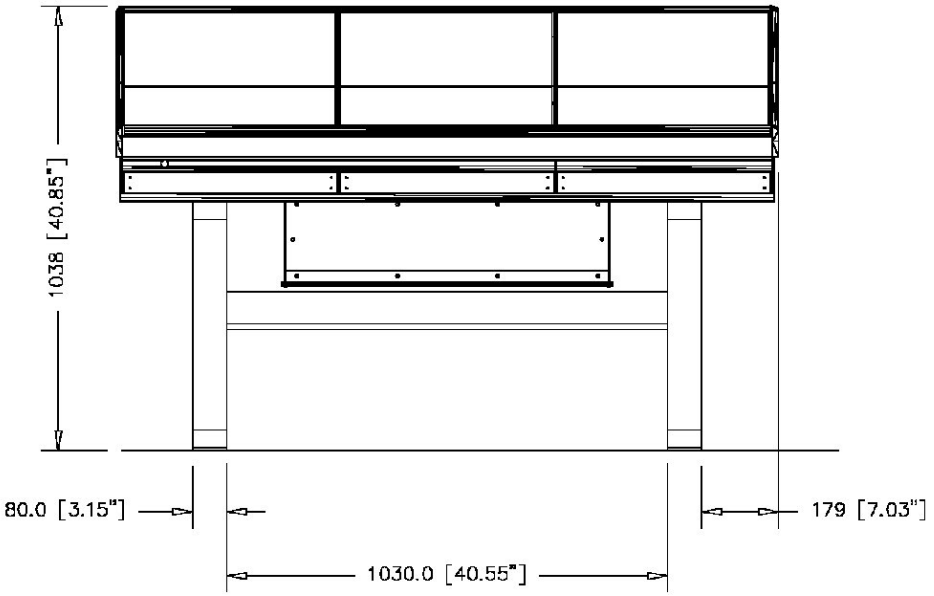
END ELEVATION



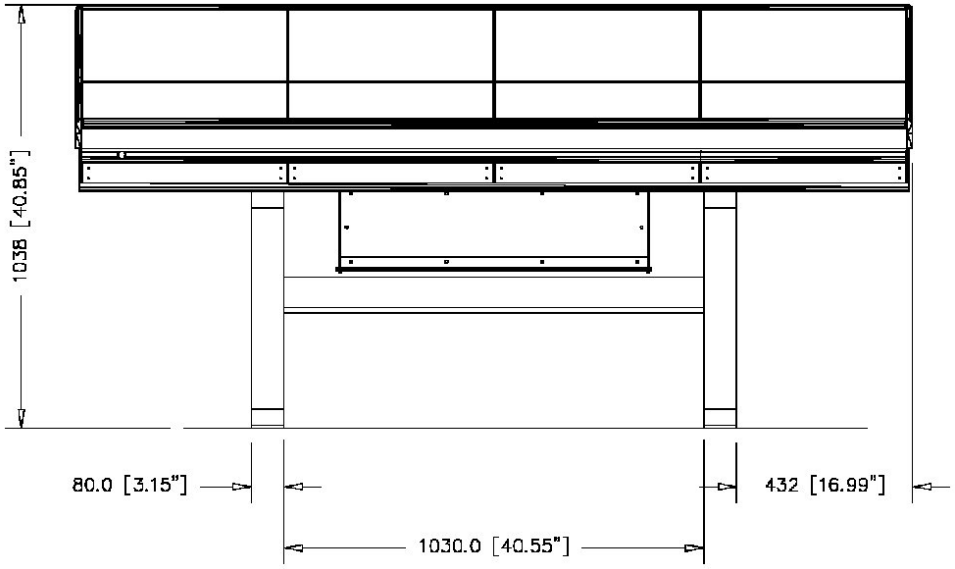
End Elevation

The end elevation dimensions are the same for all frame sizes. The control surface can be separated from the stand for access to the premises. The control surface sections can also be split apart if required.

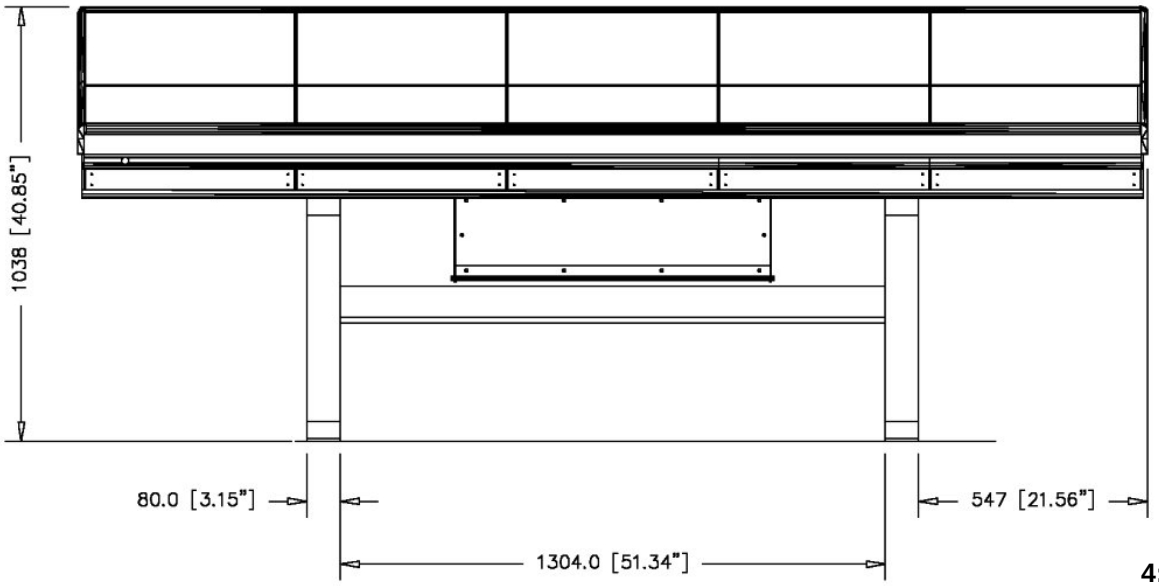
FRONT ELEVATION



4:4:4 Frame



4:4:4:4 Frame

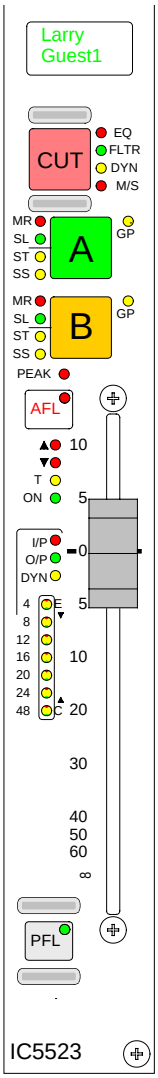


4:4:4:4:4 Frame

SIGMA
FADER AREA

CHANNEL AND GROUP FADERS

Channel and group paths are controlled by the channel faders. Each fader controls two independent audio signal paths, A and B. Any fader can control any channel or group path. Main output paths are controlled by their own dedicated faders.



The A and B buttons are known as the fader assign buttons, and are used to select either of the two channel paths A and B. Selecting a path will "call" the fader to the Assign panels, and the fader assign button will light red. Any changes made to the Assign panels affect the selected path. 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. If path A is active, the A fader assign button and the label will be lit in green. If path B is active, the B fader assign button and the label will be lit in amber.

The CUT button cuts the channel or group, its effect is the same as fading it out completely. The button will light up when in the active state. Alternatively, there can be ON buttons here instead, which switch the channel on.

The EQ, FLTR, DYN and M/S LEDs indicate that these functions are active.

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

Fader 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.
GP A group is assigned to the path.
ST The path is a stereo channel or group.
SS The path is a surround channel or group.

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

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

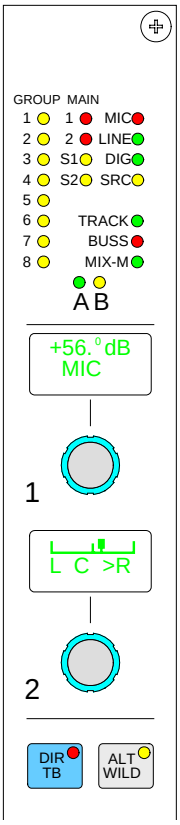
The PEAK LED will illuminate if the channel or group signal is within 3 dB of the clipping level.

The ON LED illuminates when the audio level is not at the ∞ position.

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

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

CHANNEL CONTROL



Above the channel fader section, there are a set of indicative LEDs and 2 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)
- Routing to any track
- Whether the direct output is feeding the mix minus buss.
- Whether the direct output is being fed with a mix minus feed
- The currently active fader path A or B

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

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

Wild controls are assigned using the USER-CHAN screen. Once assigned, the Wild controls “FLIP” with the fader providing the same function for each of the two paths. The A and B faders may also be assigned to a Wild control, in which case it will be the opposite fader which is being controlled.

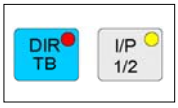
Wild Control Push-Switch Option

If a wild control has the Aux Send, Front Pan or 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 optional, so it can be enabled or disabled using the Options - MISC screen.

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

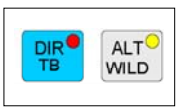
Button Options

Depending on the options purchased, the button next to DIR TB can perform different functions.



Option 1

Each channel path can select between two inputs 1 and 2. This is usually done using the Input/Output panel for the currently assigned fader. As an option, these buttons can be duplicated for each path on this panel. Input 1 is selected when the button LED is off, and input 2 is selected with the button LED on.



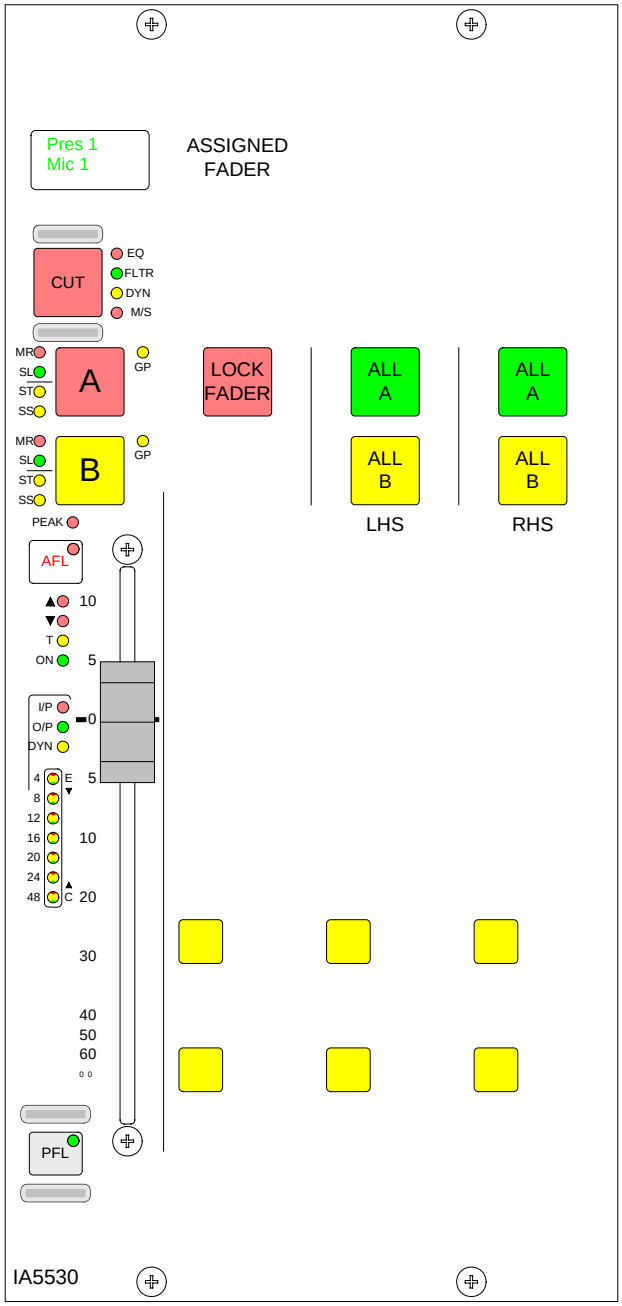
Option 2

The ALT WILD button allows switching between two complete sets of alternate wild settings. This would then allow up to 4 available wild controls per fader.

ASSIGNABLE FADER

The Assignable Fader is positioned towards the centre of the console, in the optimum listening position, and works in parallel with the currently assigned channel or group fader. Alternatively, LOCK FADER allows it to be fixed to a specific path.

The assignable fader can follow a spill fader, but cannot be locked to it. It can however be locked to a surround master.



All A/B Viewing

The ALL A and ALL B buttons switch all the channel faders to display either their A path or their B path. Buttons allow the left and right hand side to be switched seperately for each path. Using the ALL A and ALL B buttons is like moving to a different section of a single layer design.

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

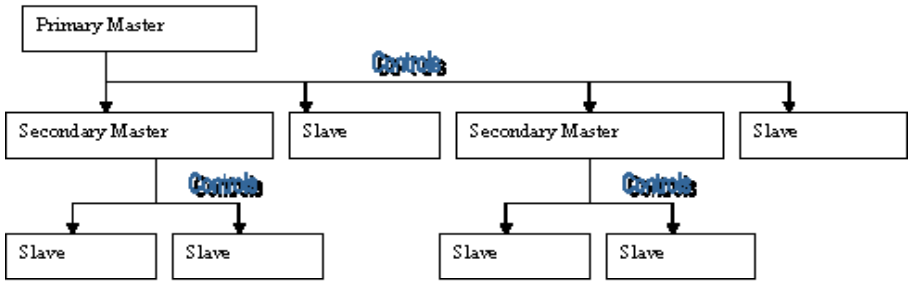
If set to change layer, a short press on the ALL A and ALL B buttons will switch all the channel faders to display either their A path or their B path permanently.

If set to “Latch View”, a short press of an All A or All B button will display the paths on the control surface until the button is pressed again. This is so that the console’s A/B display pattern is not lost. The console will revert back to the previously displayed layer on each fader.

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

VCA GROUPING

VCA groups allow the audio level, CUT, AFL and PFL functions of several slave faders to be controlled from one master fader. A VCA group is made or edited by holding down the fader assign button (A or B) of the fader to be master, and pressing the fader assign buttons of faders to be added or removed as slaves. It is possible to select a VCA master as a slave of another VCA group. When this happens, the slave master is known as the secondary master, and its master is known as the primary master.



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

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

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

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

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.

If a surround master is part of a VCA group then the VCA primary and secondary master levels, cut settings and APFL settings affect all of its spill legs. It is not possible for the spill faders themselves to be masters or slaves of a VCA group.

VCA Group Interrogation

Interrogation provides a clear way of identifying VCA group assignments. When the fader assign button of a VCA group member is held down, the fader assign buttons of all members of the same group will be lit, and the fader assign buttons of paths which are not part of the group will cease to be lit. When interrogating a Primary Master the fader assign buttons of its primary slaves and secondary masters will remain lit. When interrogating a secondary master the fader assign buttons of its secondary slaves will remain lit, and the primary master's fader 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.

5.1 SURROUND CHANNELS

5.1 surround channels provide the ability to control a discrete 5.1 source as a single channel. The system can have up to 52 surround channels. A surround channel consists of a surround master and the paths which are used to construct it.

Creating a Surround Channel
The surround button on the I/O Matrix is used to create a surround channel on the currently assigned fader. When this happens, the currently assigned fader becomes a surround master, and the assign panels show and allow adjustment of the surround master settings.

Each 5.1 surround channel uses the resources of 2 mono channels for Centre and LFE; and 2 stereo channels for L/R and Ls/Rs. These resources are allocated as the surround channel is assigned, from the available mono and stereo channels. One fader path is chosen by the user to be the surround master. This path holds the master control settings which affect the operation of the surround channel. Inputs are patched to each of the spill legs.

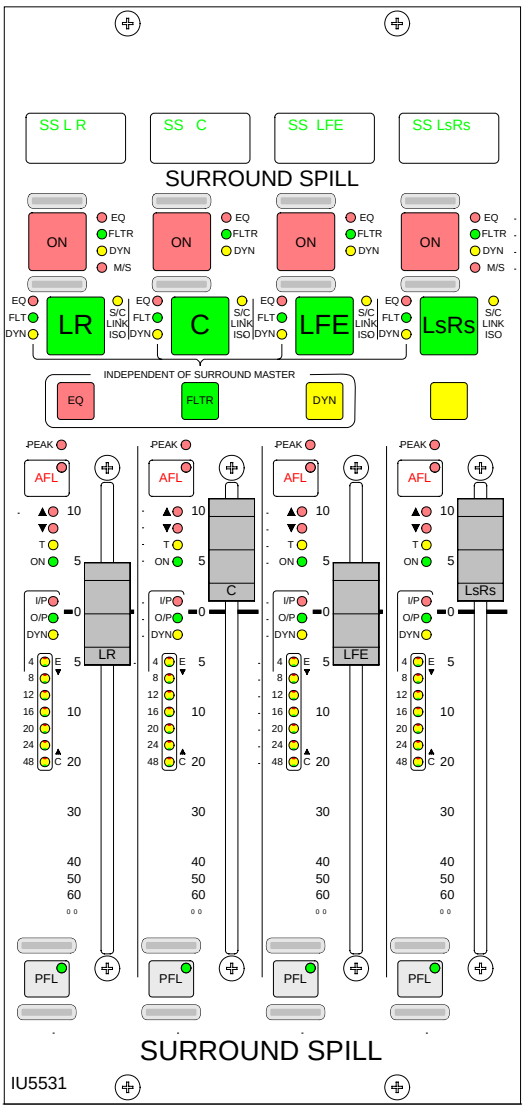
Surround Spill Panel
A set of screens are provided, to control the individual legs of the surround channels or groups. In addition, an optional surround spill panel is available so that adjustment can be made from the control surface.

When a surround master is selected as the currently assigned fader, the spill panel becomes active and displays the information for each of its spill legs.

Each spill fader has its own assign button, which is used to select the spill leg as the currently assigned path when the spill panel is active. The spill's assign button lights when selected, and its surround master's assign button will flash. When a spill leg is selected as the currently assigned path, the assignable panels show and allow adjustment of its settings.

The surround master level controls for input gain, fader position, direct output, aux send and track send, act like VCA masters of the spill leg controls. Each spill leg can select APFL, tone and CUT independently, but cannot select or deselect any of these when they are switched on via the surround master.With a surround master selected, the balance control on the Input/Output panel acts as an input gain trim control.

The spill panel should be situated near the centre of the console, but not in the fader bed, as the fader's movement may distract the user when switching between fader paths.



5.1 Surround Groups
Groups can be defined as mono, stereo or 5.1 surround on the User-Busses screen.

5.1 SURROUND CHANNELS

Independent Spill Path Control

Normally, settings for EQ, filters and dynamics applied to the surround master affect all the spill legs except LFE. The EQ, FLT and DYN CTRL buttons on the surround spill panel allow the currently assigned spill leg to control EQ, filters and dynamics independently of its surround master. LEDs next to the spill path's fader assign button indicate which functions are independent.

Independence can also be activated for the spill paths of each surround channel using the User-Spill-Independence screen, by selecting the relevant cells. The fader level can also be adjusted from here, by selecting the required cell in the FDR OFFSET column, and using the nudge buttons.

Surround Channel Routing

The User-Spill-Route screen allows whole surround channels or individual spill paths to be routed to mains, groups and tracks, using a selection table. This screen not only provides alternative controls to the routing buttons on the control surface, it also gives a comprehensive visual representation of the surround channel routes made in the system, and allows the user to evaluate and control the routing more effectively.

AUTOMATIC CROSS-FADING

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

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

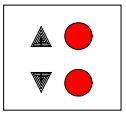
The fade in and out times of each auto-fader are individually adjustable. The range for both parameters are 10 ms to 5secs, as follows:

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

Operation

Once an autofader has been assigned to an opto input, and has a channel or group path assigned, it is possible to automatically fade in or out the 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.

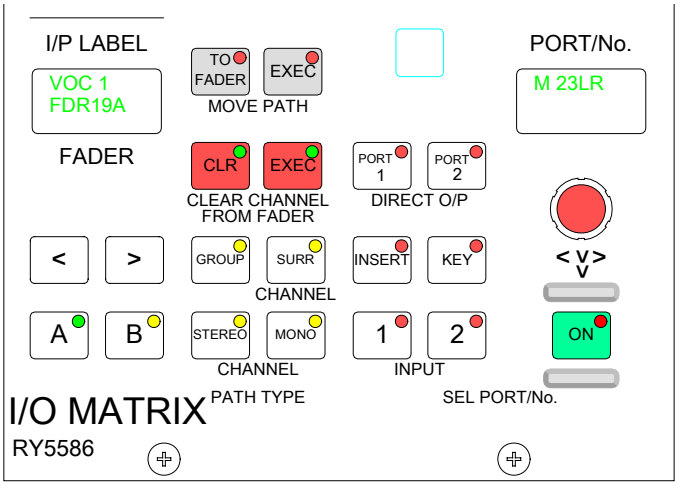
SIGMA
INPUT AND OUTPUT CONTROLS

CALREC

Putting Sound in the Picture

I/O MATRIX

The I/O Matrix provides a set of input and output patching controls on the control surface in addition to those on the I/O screens.



Input Port Assignment

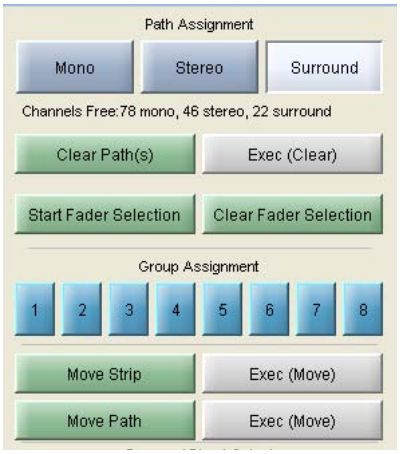
Ports are assigned to inputs 1 and 2 for the currently assigned fader using the I/O Matrix as follows:

- Press 1 or 2 to select an input.
- Use the rotary control to scroll through the lists of available input ports.
- Upon reaching the desired port, press the ON button to assign it to the input 1 or 2 for the currently assigned fader path.
- Pressing ON again will de-assign the port .

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

It is possible to determine which lists of ports appear for selection on the I/O Matrix using the Options - Ports Lists screen. Making only the relevant lists available for selection makes it easier to find the ports you require.

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



Path Type Selection

The GROUP, SURR, STEREO and MONO buttons select the path type for the currently assigned fader. If the path is to be a group, its number is selected using the rotary control and ON button. Groups are defined as surround, stereo or mono on the USER-BUSSES screen. The path type and group number can also be selected using the USER-CHAN screen.

Moving Paths

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

To move paths, select the assign button of the path you wish to move, and press TO FADER (the assign button will flash). Then select the assign button of the destination fader, and press EXEC to move the path. The two paths will swap over, and any Wild control assignments will move with them.

A surround master can be moved from path to path, but it is not possible to move a spill leg to another fader. It is not possible to move an isolated path.

The USER-CHAN screen can also be used to move paths. In addition, the whole fader strip can be moved to a different fader. This means that the A and B paths including any Wild Assignments will move to the selected destination fader strip. The Move Path function on the I/O matrix can be set to always perform Move Strip using the States screen.

Clearing Paths

Channels and groups can be cleared off thefader by pressing CLR and then EXEC. This will clear all settings and port assignments from the fader path (A or B). This function is also available using the USER-CHAN screen.

Fader Path Selection

In addition to the Assign buttons on the fader modules (A and B), fader paths can be called to the Assign Panels using the nudge buttons to scroll through the faders, and the A and B buttons choose the path. This is for use when pressing the fader assign button is not convenient, or should a fault develop on the fader strip.

Direct Outputs

Ports can be connected to channel and group direct outputs, first by selecting PORT1 or PORT2, and using the rotary control and ON button to choose and select ports. (Two ports can be connected to each direct output). When scrolling through the lists of direct outputs, those that are in use will display “IN USE” when the pot switch is relelased.

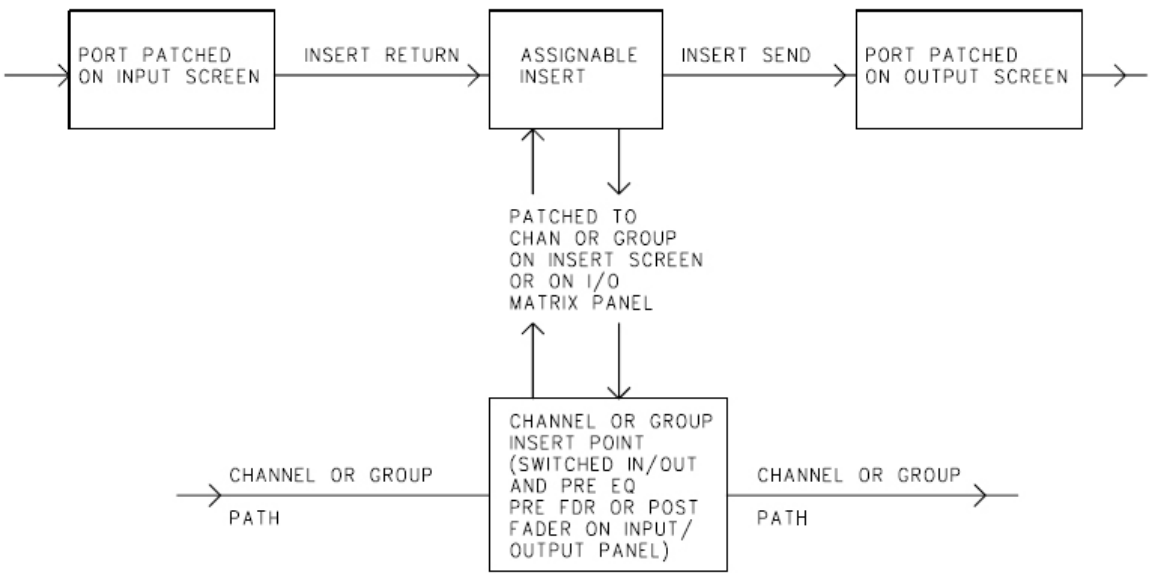
Channel and Group Inserts

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

Assignable inserts are designed to be pre-connected to send and return ports which are in turn pre-wired to insertable devices or to an insert patchbay (normally there would be some assignable inserts of each type). The Input and Output screens allow send and return ports to be set up for the assignable inserts.

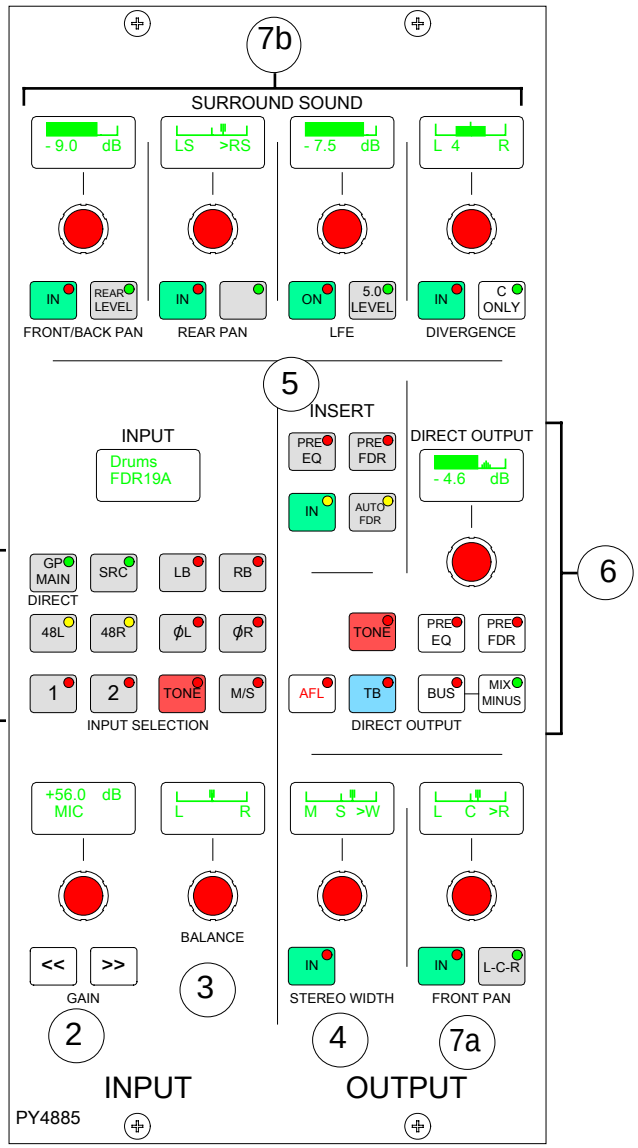
Pressing the INSERT button allows the rotary control and ON button to control assignment of inserts to channels and groups. This can also be done using the Insert screen. The insert is then patched in and out of the channel or group path using the buttons on the Input/Output panel.

The assignable inserts can be divided into up to 4 lists in a similar way to input and output ports. This separates them for selection on the pot-switch.



INPUT/OUTPUT CONTROLS

The INPUT controls on the Input/Output panel allow separate settings for the two channel inputs and gain, and ON/OFF for the group and main direct inputs.



(1) Input Settings

Each path can switch between two input ports using buttons 1 and 2. Optionally, each fader can have dedicated selection buttons for inputs 1 and 2 in its channel control section.

SRC switches the sample rate converter on AES inputs.

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

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

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

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

The TONE button switches tone to the input of the currently assigned channel or group. From here it can be routed as required.

(2) 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 digital 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. The gains are linked by pressing the input 1 and 2 buttons simultaneously. This behaviour is turned on using the States screen.

(3) Balance Control

Operates as a balance control on stereo channels only. With LB or RB selected, this control acts as an input pan control. With a surround master selected, this control acts as an input gain trim control.

(4) Width Control

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

(5) Inserts

Assignable inserts can be patched in and out of the channel path, using the IN button. The buttons allow the insert to be patched post fader, pre fader or pre EQ. Assignable inserts must first be set up using the I/O Matrix or I/O screens.

(6) Direct Output and Mix Minus

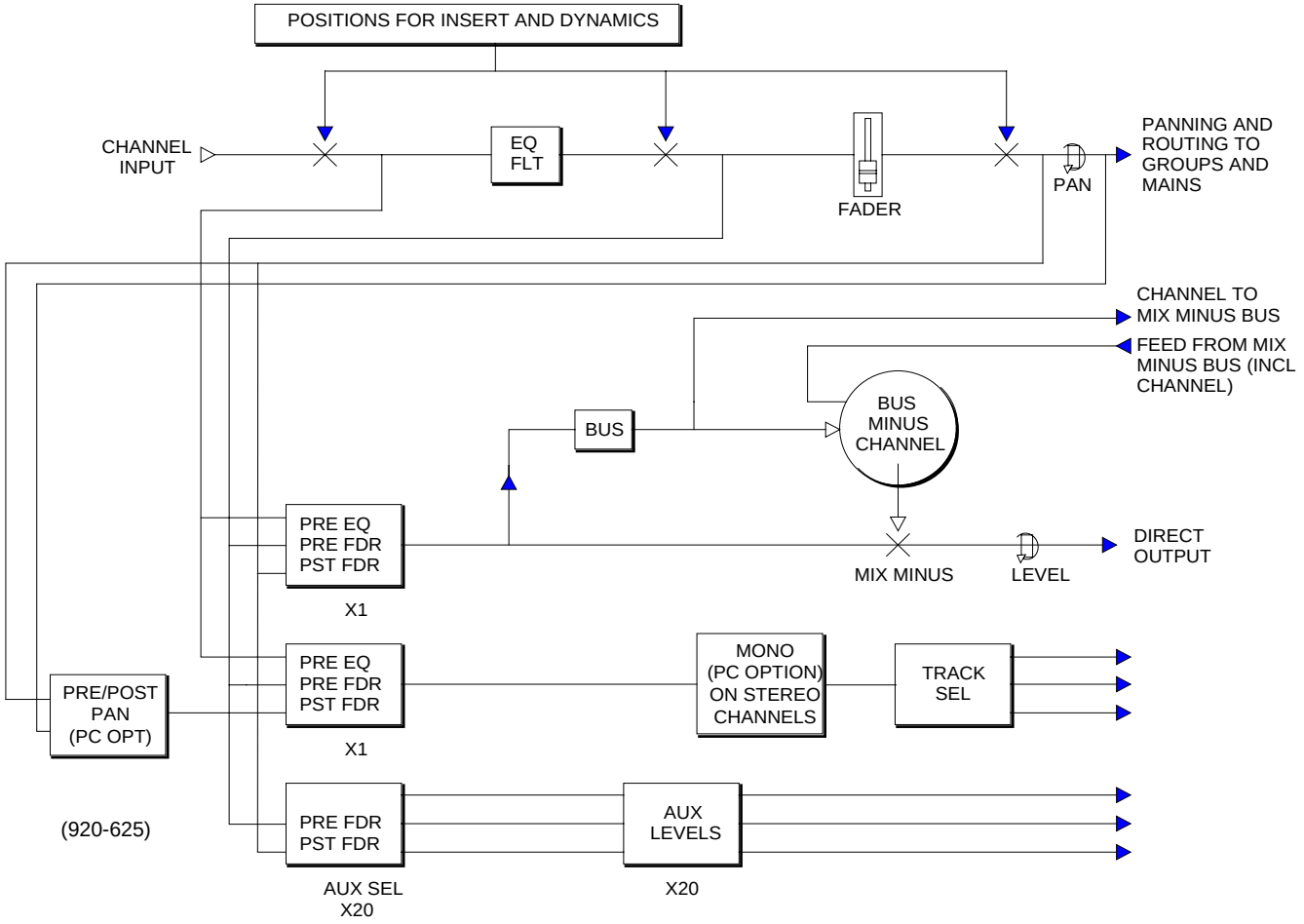
In the direct output section, the channel or group's direct output is post-fader, or can be set to Pre-EQ or Pre-fader using the selection buttons. Its level is adjusted using the rotary control.

The BUS button feeds the direct output signal to the mix minus buss. The output of the mix minus buss feeds back into the channel (or group) where the channel's signal is subtracted.

The MIX MINUS button then feeds the resulting signal to the direct output. Therefore, every channel can produce a mix minus output which is a mix of all the channels routed to the buss 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 buss, even if the channel is not feeding the buss.

All surround channels and groups have surround direct outputs with the option to downmix the output to stereo instead. The mix-minus of a surround direct output is a true mix-minus of the whole surround channel or group.

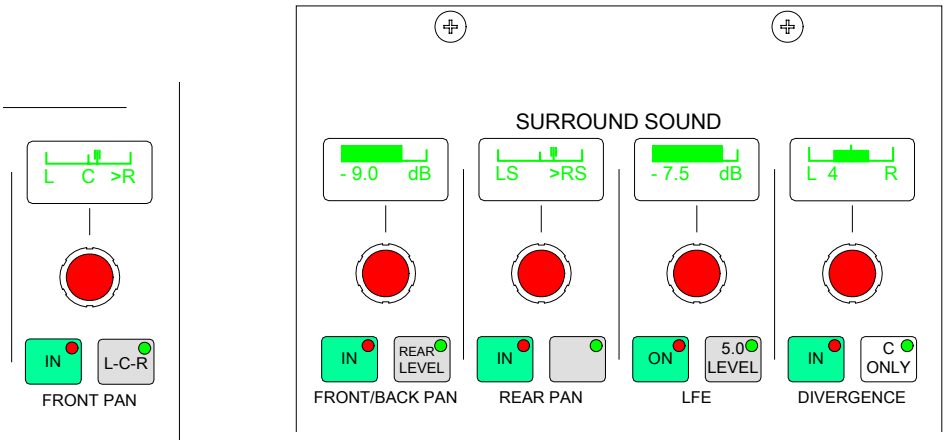


NOTE: SOME CHANNEL FEATURES ARE OMMITED HERE FOR CLARITY REASONS.

INPUT/OUTPUT CONTROLS

(7a & 7b) 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 surround outputs simultaneously.

AFL can be heard in surround, post the pan controls, provided that the monitoring is surround.



Front Pan
The Front Pan allows the front signal to be panned from left, through centre, to right. On stereo channels and groups, the L-R PAN acts as a balance control.

Front/Back Pan
The Front/Back pan control pans the signal between Front and Back. When Rear Level is switched IN, the levels to the rear and front are controlled seperately. This allows signal to be fed to the rear without affecting the balance of the mix in the front speakers. Also, the front signal can be turned off and a level set to the rear which is different to that being sent to any stereo groups or mains which the path is feeding.

Rear Pan
The Rear Pan allows the rear signal to be panned from Ls to Rs.

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

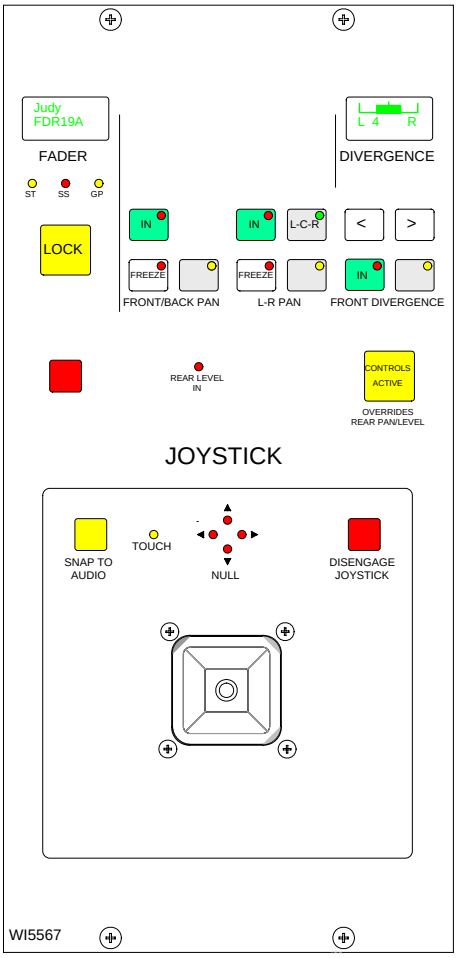
Divergence
The divergence controls set an amount of the centre signal to also feed to the left and right. Divergence does not operate on stereo channels and groups. The C ONLY button connects the channel output to the centre bus only. All other panning controls are disabled. The channel is fed to both left and right of stereo busses. On stereo channels and groups, C ONLY feeds a mono reduction of the stereo signal to the centre bus only.

Stereo and surround panning controls are strengthened with the inclusion of the optional motorised joystick panel.

MOTORISED JOYSTICK PANEL

The joystick panel is available as either a single joystick, or twin joysticks. The joysticks allow accurate stereo and surround panning of channels, groups or mains. Please note that the joystick is unavailable for use on 5.1 surround channels and groups; or their spill legs.

The joysticks are touch-sensitive, and the TOUCH LED lights when the joystick is touched. In normal operation, the joystick controls the currently selected fader path. LOCK allows the joystick to be fixed to a specific path. Pressing LOCK again will unlock the panel. The fader display shows the path currently assigned to the joystick panel and LEDs indicate the type of path being controlled.



- ST - Indicates a stereo source
- SS - Indicates a surround sound main
- GP - Indicates a group

Front/Back pan, L/R Pan and Front Divergence each have a set of dedicated controls. Each has an IN button to enable the function. The IN buttons and L-C-R button work in parallel with the buttons on the Input/Output panel.

Controls Active

CONTROLS ACTIVE must be selected for the joystick controls to take effect. When selected, the joystick moves to the position set by the Front Pan and F-B controls (including IN/OUT status). If the joystick is being touched when Controls Active is selected, then the audio will move to the position of the joystick. Any Rear Pan and Rear Level settings are disabled, and their displays on the Input/Output panel and any Wild Controls show “JOYSTK”. De-selecting Controls Active does not restore any previous Rear Level or Rear Pan controls, but leaves the Rear Level switched out, and the Rear Pan at the same setting and IN/OUT status as the Front Pan.

If a blank fader or a main path is assigned, Controls Active is disabled. The divergence display will be blank and the buttons will not take effect. If the joystick is engaged, it will default to the central position, unless it is being touched, in which case it will stay where it is. Similarly, if a path is assigned where Controls Active is off, the joystick (if engaged) will default to the central position, unless it is being touched, in which case it will stay where it is.

Freeze

When freeze is pressed on either axis, the joystick ceases to alter that axis. Freeze does not affect the Input/Output panel or Wild controls, they can still alter the frozen axis. The null LEDs show which direction the joystick must be moved to match the audio.

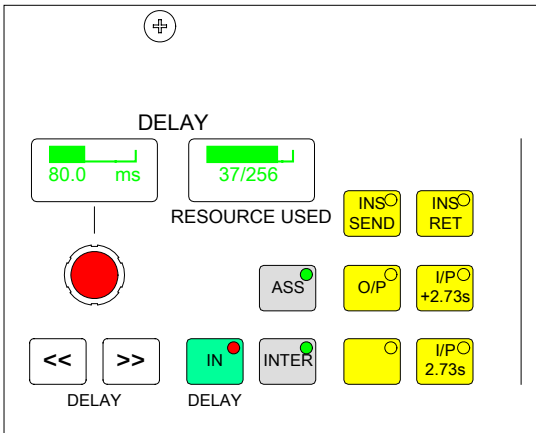
Disengage

When the joystick is disengaged, it does not control or move to follow the audio. The null LEDs will still indicate the direction in which the joystick must be moved to match the audio. When Disengage is de-selected, the joystick will move to the position of the audio, unless it is being touched, in which case, the audio will move to the position of the joystick.

Snap to Audio

Pressing this button will cause the joystick to snap to the position of the audio.

DELAY



These controls allow specific amounts of delay to be applied to the currently assigned channel path.

There are 256 mono legs of delay available for inputs and 128 mono legs available for outputs, each providing up to 2.73 seconds of delay. Stereo paths use two legs, and surround paths use 6 legs. Delay can be assigned in the following places:

Inputs:

- Either or both channel inputs (1 and 2)
- Channel, group and main insert returns
- A second leg of delay on either or both channel inputs (to allow up to 5.46 seconds)

Outputs:

- Channel and group insert sends
- Channel and group direct outputs

In addition, group inputs each have 2.73 seconds of delay permanently allocated.

The output of an insert send can be looped directly back into the insert return input providing the capability for an in-line delay either pre eq, pre fader or post fader. The user must first assign an insert to a channel or group and ensure no ports are patched to the send or return. With delay assigned to both send and return it is possible to have up to 5.46 seconds of extra delay in the channel or group. This is also available for the main inserts although a single leg of delay only can be applied to the insert return.

Assigning Delay

Select the path either by pressing its fader assign button or by selecting it from the screen. The yellow selection buttons allow the user to specify where the delay will be assigned. 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 ASS button is then used to assign the delay, and the IN button switches the set value of delay in and out of the selected path.

Interrogation

Holding down the interrogate button (INTER) will indicate the channels which have delay assigned by lighting their fader assign buttons (all other fader assign buttons will be extinguished). It is not possible to perform interrogation when controlling a “PC Fader”.

Delay on Surround Channels

Surround channel delay is assigned and adjusted only from the surround master. Each spill leg of a surround channel will always have the same delay properties. The delay setting of an individual spill leg are not independently assignable or adjustable. The delay settings of a spill leg cannot be cleared independently of its surround master.

When delay is assigned to a surround channel then six delay legs are used. If there are not enough free delay blocks then delay is not assigned to any part of the surround channel.

DELAY

Panels - Delay Screen

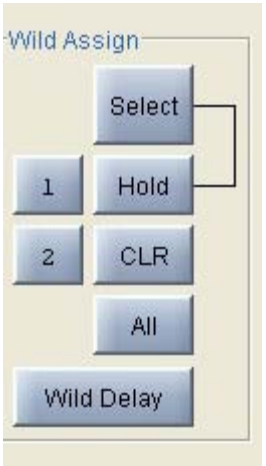
The Panels - Delay screen duplicates the delay controls on the control surface. Alternatively, the user can choose to control the delay assignment and values of a different fader, known as the “PC Fader” to which settings can be applied independently of the current assignment. Control is chosen using the selection buttons.

PAL Frames, NTSC Frames or ms

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.

Assigning delay controls to Wild controls

Delay controls can be assigned to Wild controls, such that the delay value can be adjusted using the channel control module. If the wild shaft push feature is enabled on the Options-Misc screen, then the wild delay control shaft can be used to switch the delay in and out of the channel’s path.



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

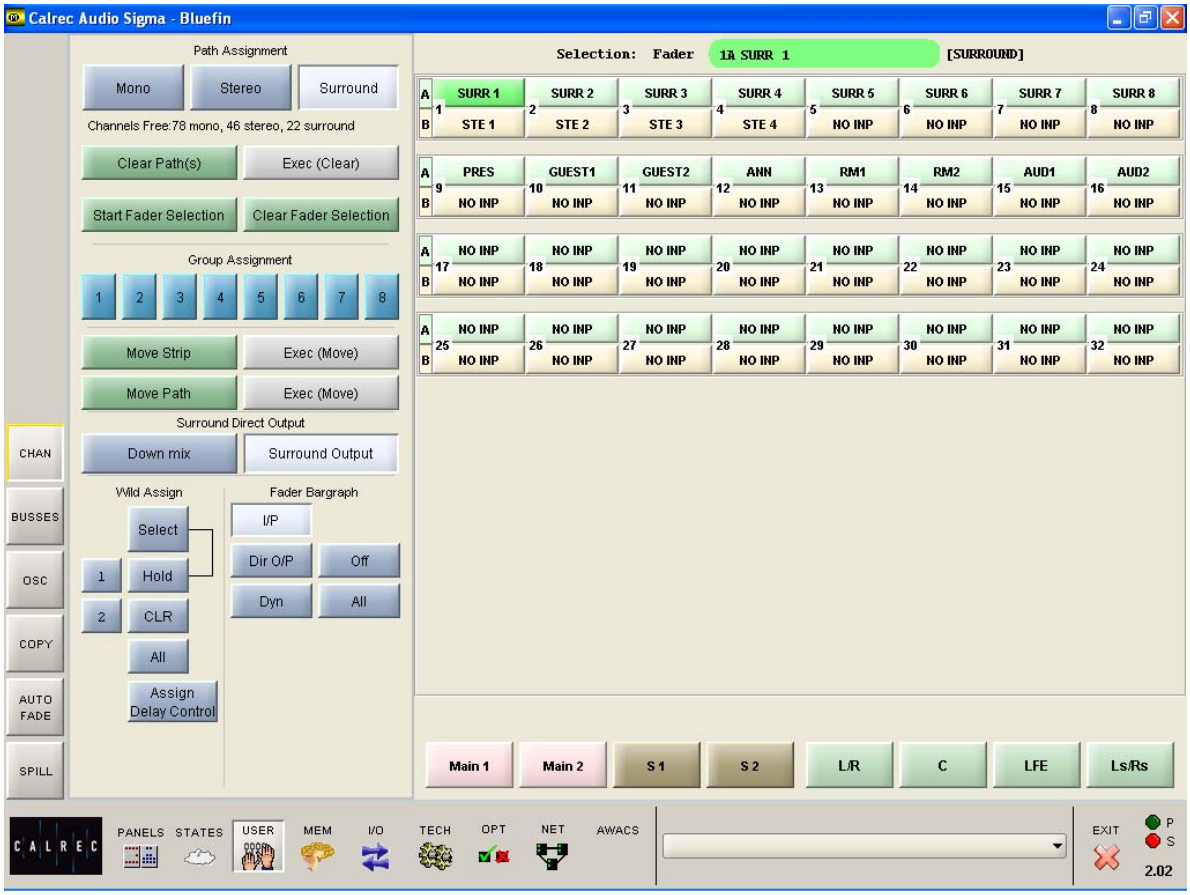
SIGMA
CHANNEL CONTROL

CALREC

Putting Sound in the Picture

USER-CHAN SCREEN

This screen provides controls for channel functions, some of which are available on the I/O Matrix.



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

In addition to the controls on the I/O Matrix, the MONO, STEREO and SURROUND buttons here select the path type for the currently assigned fader. If the path is to be a group, its number is selected using buttons 1-8. Groups are defined as surround, stereo or mono on the USER-BUSSES screen.

Paths can be moved and cleared using the Path Operations buttons. Each control requires its EXEC button to be selected before the action is carried out.

A or B paths can be moved or swapped from one fader to another, using the MOVE PATH buttons. To move paths, select the required path, and select MOVE PATH (the assign button will flash). Then select the destination fader path, and select EXEC (Move). The two paths will swap over, and any Wild control assignments will move with them. MOVE STRIP moves the whole fader strip to a different fader. This means that the A and B paths including any Wild Assignments will move to the selected destination fader strip.

All surround channels and groups have surround direct outputs. The buttons on this screen allow the user to choose the full surround direct output, or to downmix the output to stereo.

WILD ASSIGN

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

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

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

CLR will clear the selected Wild control from its assignment.

Multiple Wild Control Assignment
It is possible to assign controls to more than one fader path at a time, either by selecting individual fader assign buttons (A or B), or by defining a “block” or “Region” of faders. The button above HOLD toggles between SELECT mode and REGIONS mode.

In SELECT mode, select Wild 1 or 2 on the screen and HOLD (both will light), then a number of fader paths can be selected individually by pressing their fader assign buttons (A or B). Pushing an Assign panel rotary control will assign that control to all selected faders.

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

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.

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

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

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

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 channels and groups.

As console processing is not pooled, every channel and group can have EQ assigned without fear of running out.

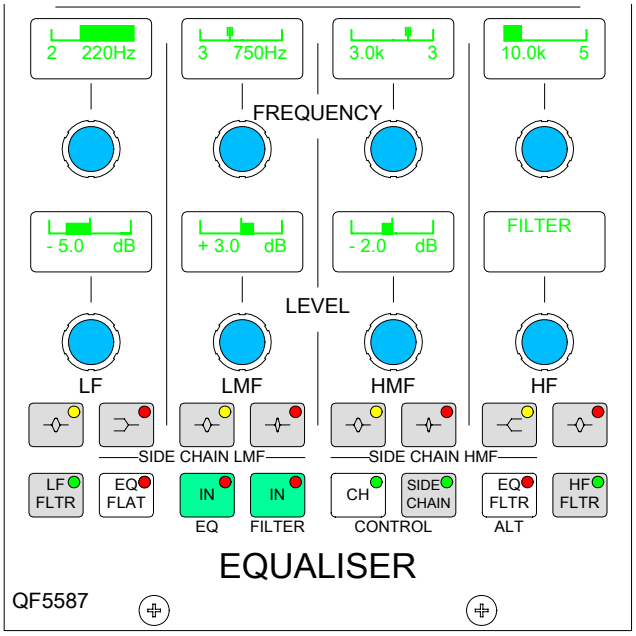
The currently assigned channel's frequencies can be adjusted using the following controls:

Filters
LF 12dB/octave, 20Hz to 330Hz
HF 12dB/octave, 3.3kHz to 20kHz

Equaliser:
LF 30Hz to 470Hz, shelf or bell (Q of 1.5)
LMF 160Hz to 2.4kHz, Q = 1 or High Q = 3
HMF 500Hz to 7.5kHz, Q = 1 or High Q = 3
HF 1kHz to 16kHz, shelf or bell (Q of 1.5)

EQ level controls are adjustable by ±15dB. Excessive control ranges are deliberately avoided to simplify operation.

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



Control Assignment
The CH button allows the panel to control the EQ and Filters in the assigned channel's path. The SIDE CHAIN button allows the panel to control the EQ and Filters in the dynamics of the assigned channel. There are 4 bands of EQ permanently available in the side chain in addition to the 6 bands available for channels and groups.

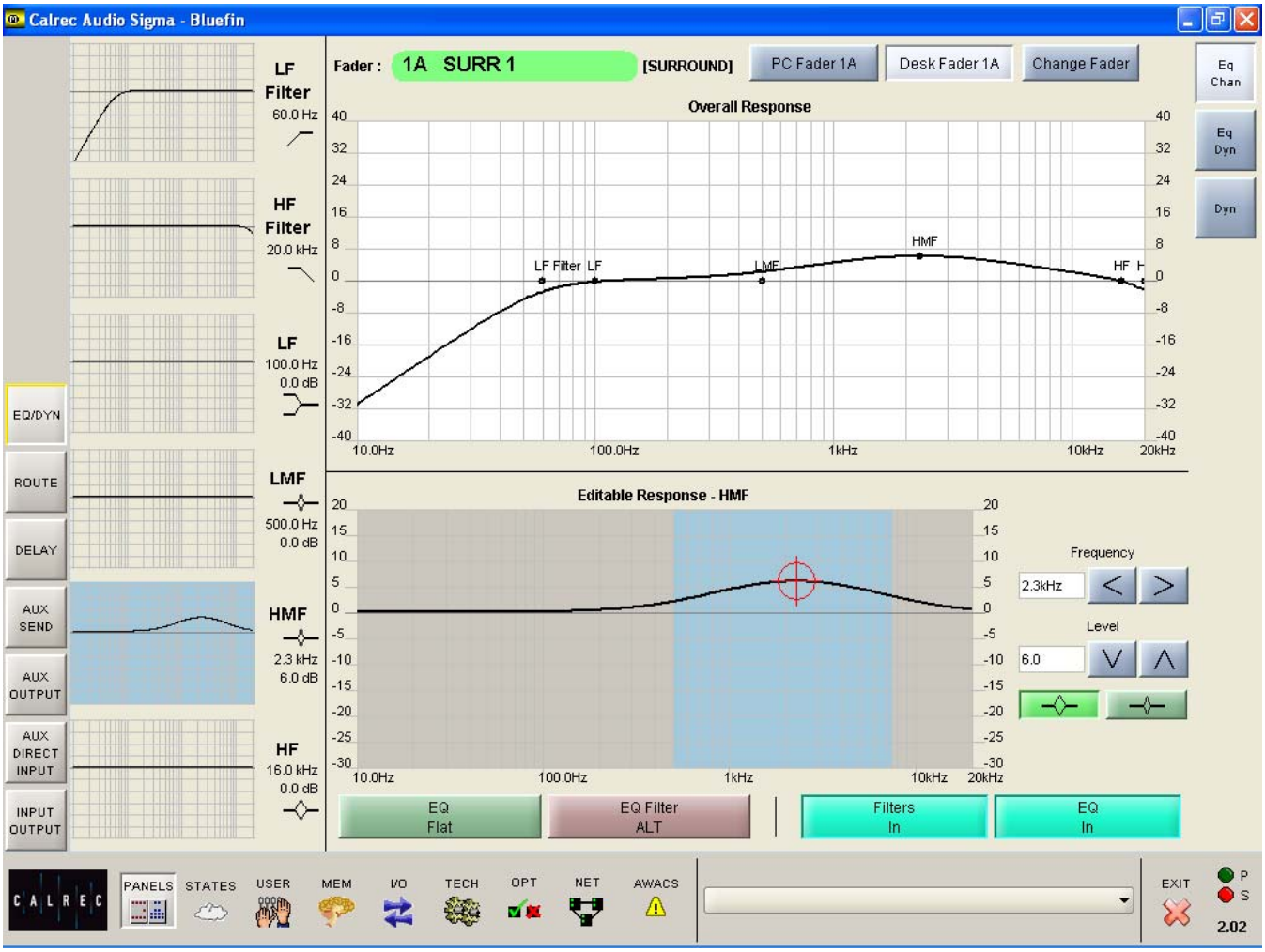
Alternate EQ
The ALT EQ FLTR button allows switching between two complete sets of EQ and Filter controls.

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

EQ AND FILTERS

Panels - EQ Screen

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



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

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

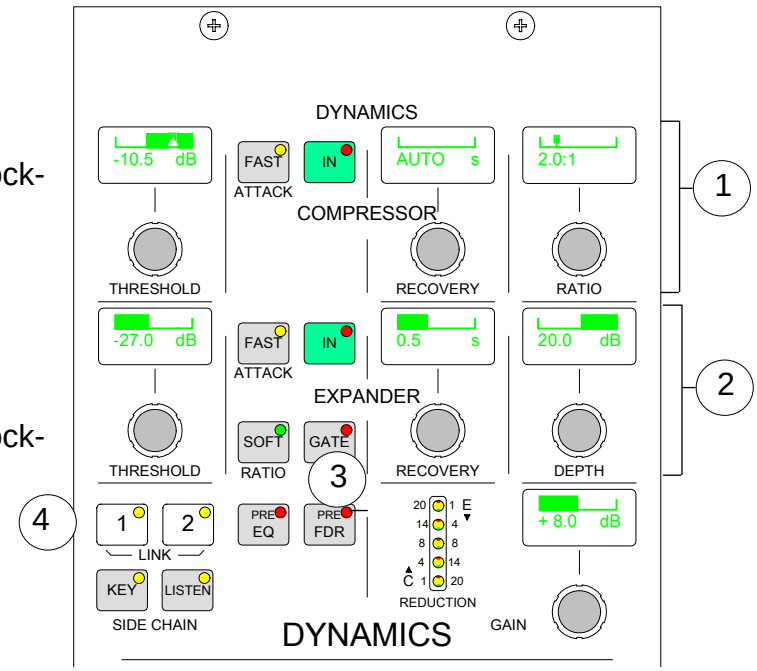
A similar screen exists to adjust the EQ if it is switched into the dynamics.

DYNAMICS

The Dynamics section of the module controls the compressor and expander or gate on channels and groups, and the compressor on main outputs.

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

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



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

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

(3) Gate
Threshold 0dB to -40dB
Recovery 75ms to 4 sec + AUTO
Depth 0dB to 40dB
Fast attack 300µs (normal 16ms)

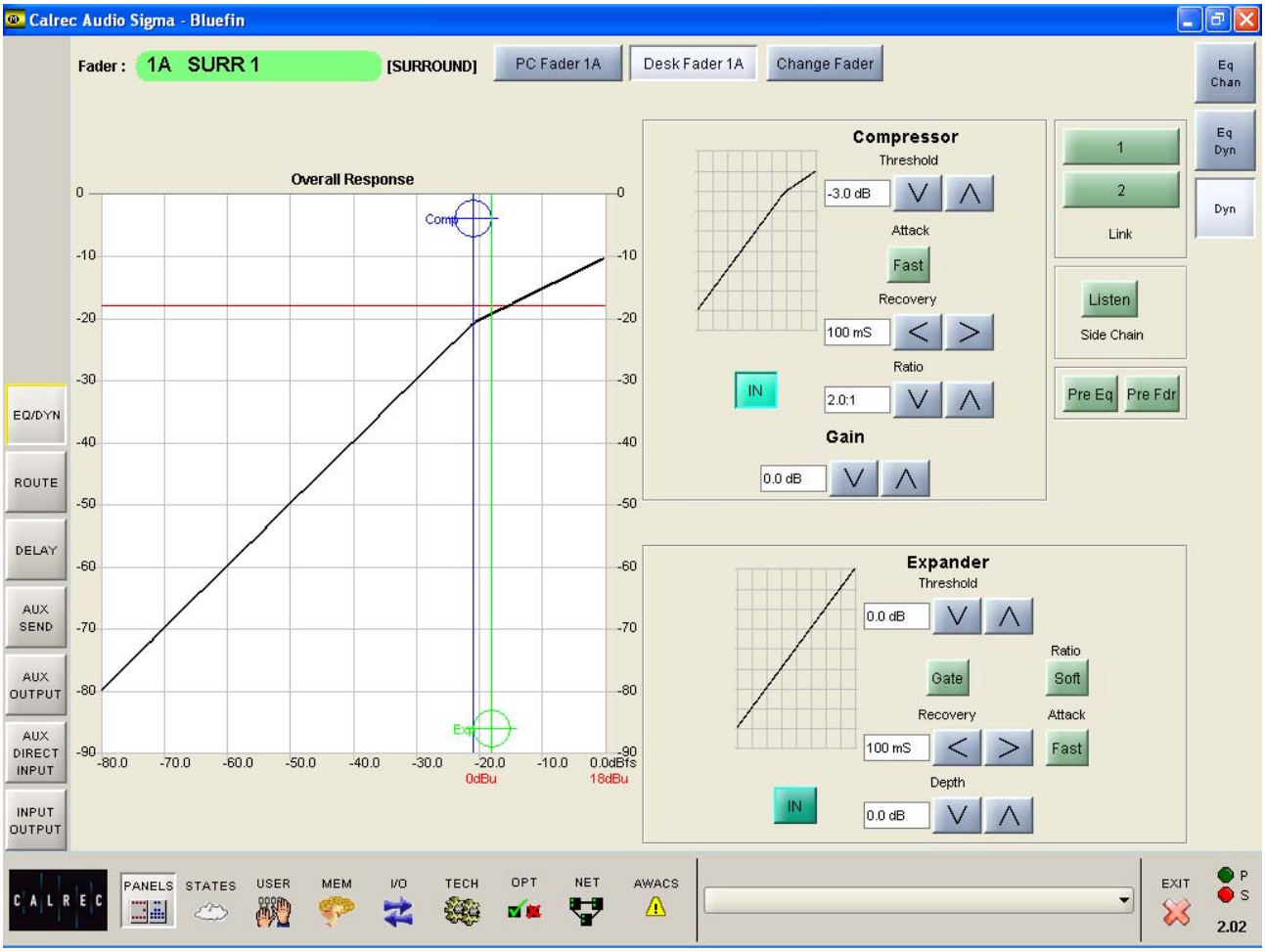
Make up gain is adjustable from 0dB to +20dB.

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

DYNAMICS

Panels - Dynamics Screen

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



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

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

CHANNEL COPY

Nine sections of the currently assigned channel or ALL together can be copied to another channel or channels using this screen.

Use the selection buttons to select the controls you want to copy. 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 and FLTR copy 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.

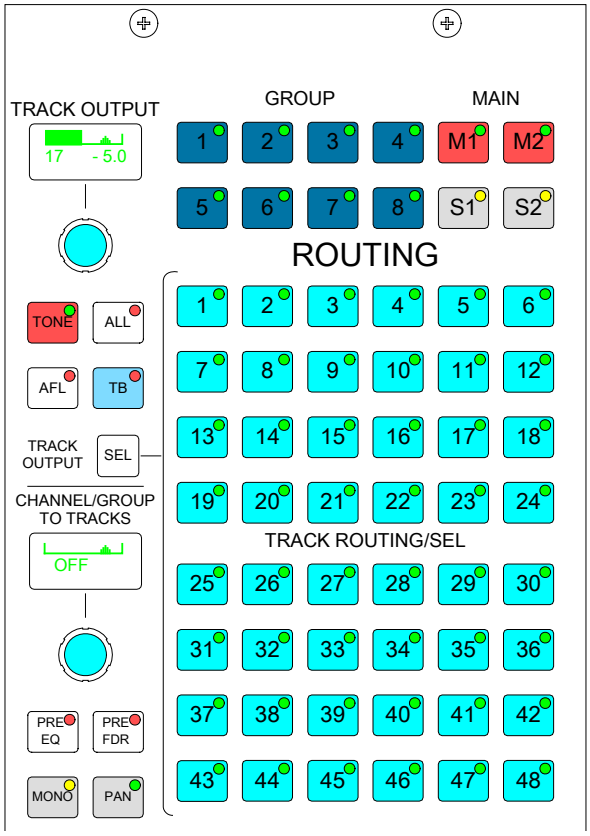
SIGMA
BUSSES

ROUTING AND TRACK OUTPUT CONTROLS

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

Track Output

The Track Output section controls the output to the multi-track, after the track mix. The 48 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 1-48. 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 direct output (post the mix minus and direct output level controls.

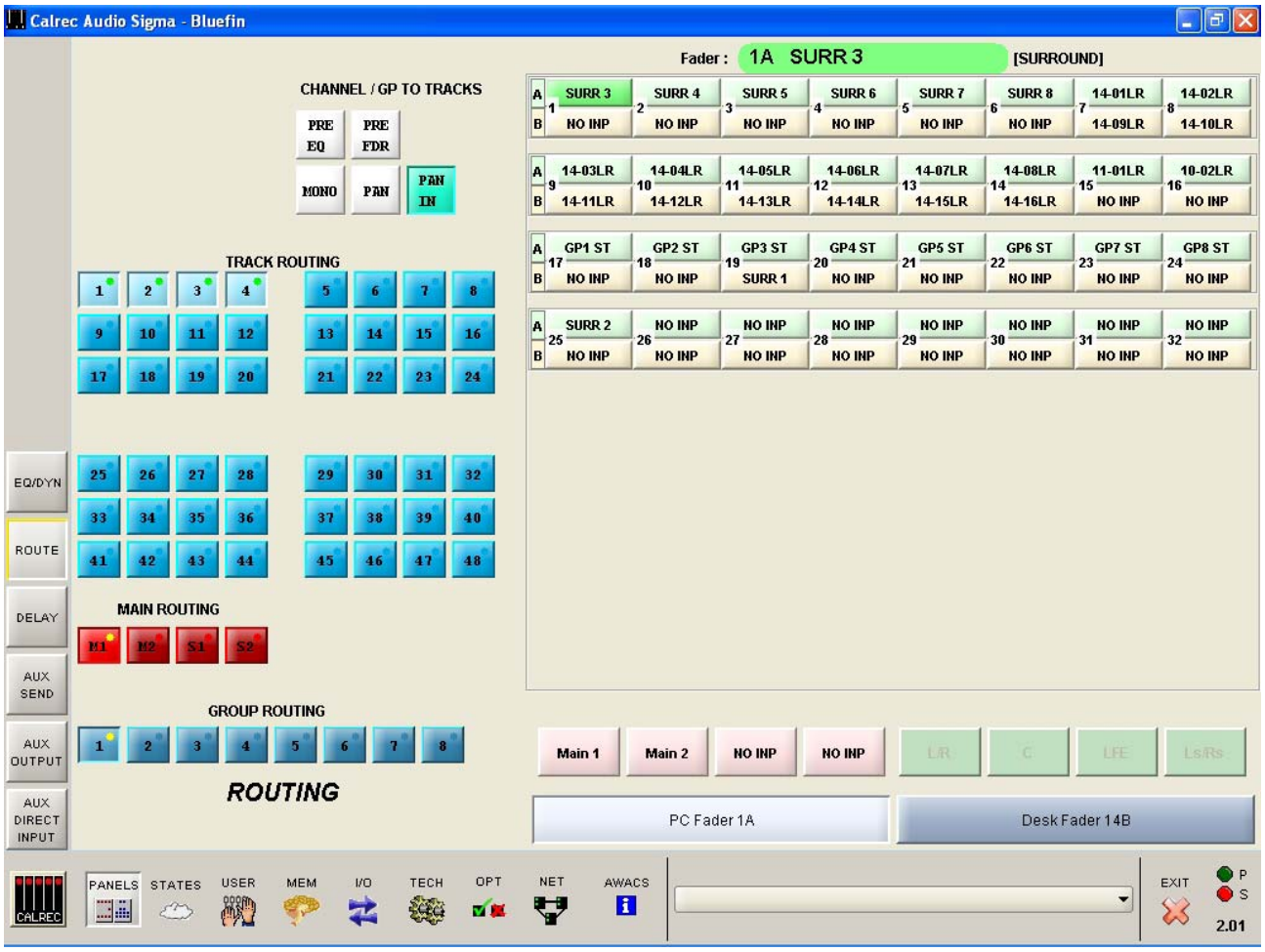
Global options can be set for how channels and groups feed the track routing selector. Using the selection buttons on the Options-Misc screen, the feed can be pre or post the channel or group pan, and stereo channels and groups can be sent as a mono signal.

Interrogate Mode

It is possible to discover which fader paths are feeding each of the routing busses by putting the panel into "Interrogate" mode. This is done by pressing the INTER button in the Auxiliaries section of the control surface. If any of the routing buttons (groups, mains, tracks) are held down, the fader assign buttons of all the paths feeding that buss will remain lit. The fader assign buttons of paths which are not feeding the buss will cease to be lit. This button can also be used to interrogate mix minus feeds using the BUS button on the Input/Output panel. Paths can be added or removed from the bus under interrogation, by selecting or de-selecting their fader assign buttons.

ROUTING AND TRACK OUTPUT CONTROLS

Panels-Route Screen



This screen provides alternative controls for the routing, in addition to those on the control surface. In addition, the user can choose whether to control the routing of the currently assigned fader path, or to select a different fader, known as the “PC Fader” to which settings can be applied independently of the current assignment. Control is chosen using the selection buttons “PC Fader” and “Desk Fader”

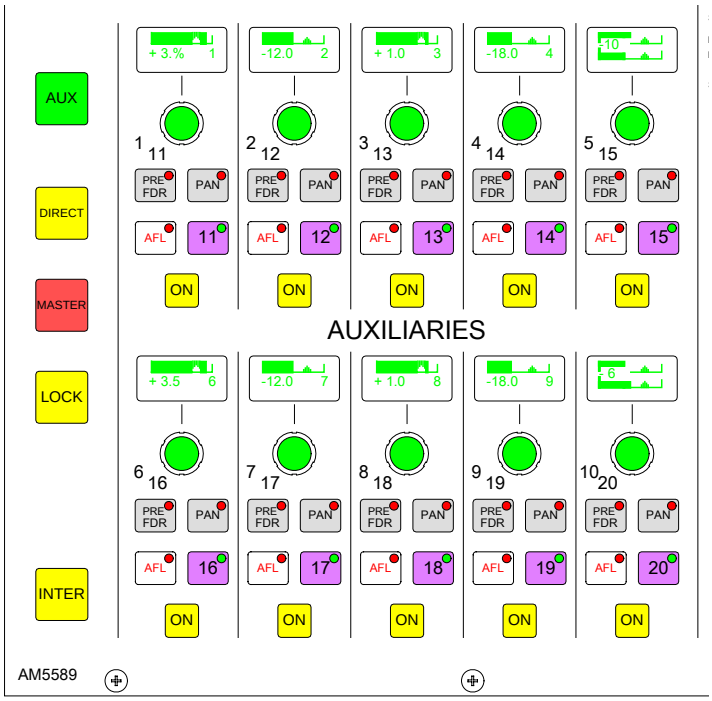
The right side of the screen has buttons for channel paths A and B, and Mains 1-4. To make changes, select the required path and use the buttons on the left side of the screen to choose the routing.

AUXILIARIES

There are 20 mono auxiliary output busses, which can be paired up to be used as stereo auxiliary output busses. The busses are pre-set to be mono or stereo on the USER-BUSSES screen.

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

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



AUX

Auxiliary Feeds

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

If, for example, aux 10 is stereo, then aux 20 will not be available (and aux 20 will not work on the monitor selector). On mono auxiliaries, buttons 11 to 20 switch the control to that numbered aux send. The Pan button will be inoperative.

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

DIRECT

Aux Direct Inputs

When DIRECT is selected, this section controls the auxiliary direct inputs. The Pre Fader and Pan controls will be in-operative.

MASTER

Auxiliary Outputs

When MASTER is selected this section controls the auxiliary outputs, the ON buttons switch the output on and off. On stereo auxiliaries a dual level display will be shown, For example, aux 5 and 10. Here, buttons 15 and 20 will be disabled. There cannot be a level offset on the output display.

LOCK

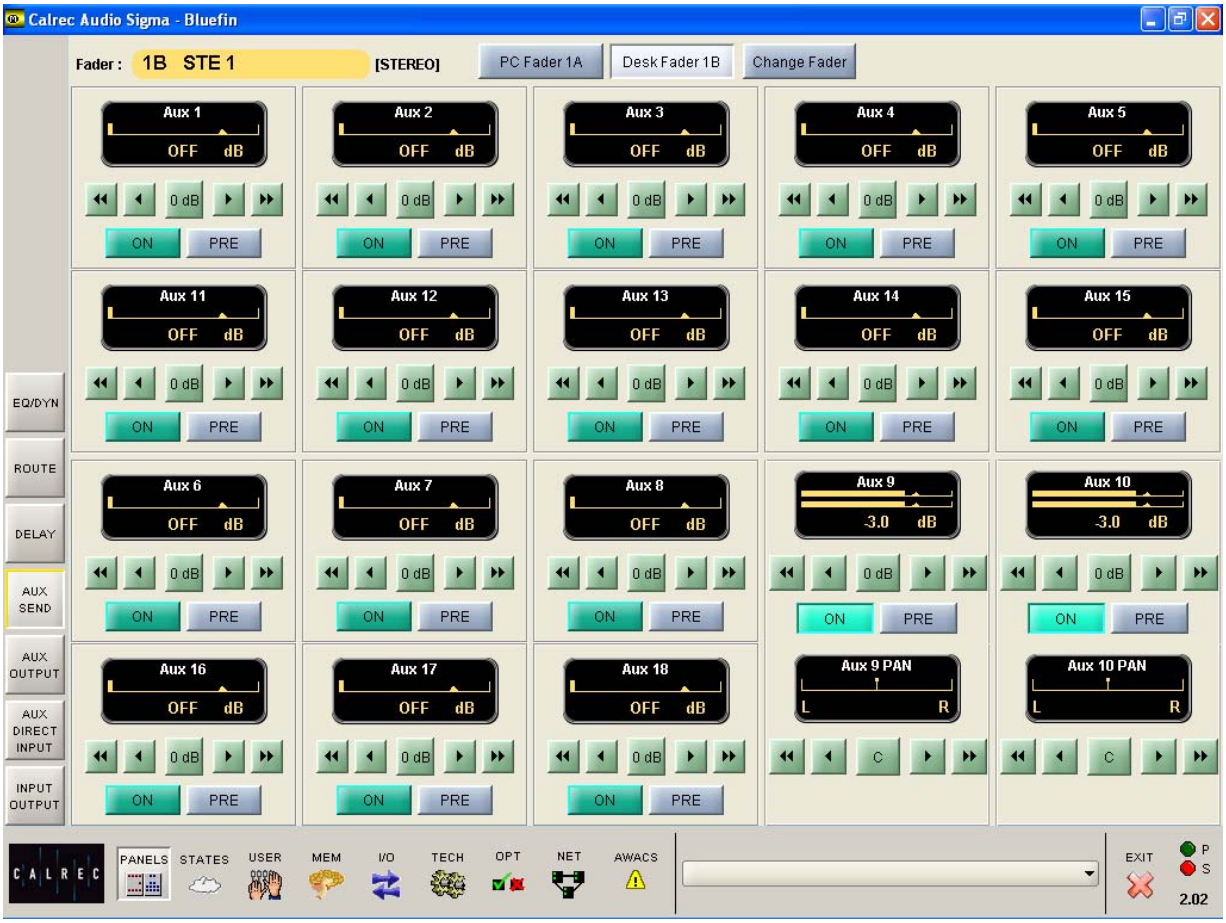
LOCK will lock the panel into output mode. If LOCK is not selected, the panel reverts to Aux if a fader assign button is pressed.

INTER

Interrogate Mode

INTER (latching) puts the panel into Interrogate mode. If the Aux ON buttons are held down, the fader assign buttons of all the paths feeding that buss will remain lit. The fader assign buttons of paths which are not feeding the buss will cease to be lit. Paths can be added or removed from the bus under interrogation, by selecting or de-selecting their fader assign buttons. This button can also be used to interrogate routing to group, main and track outputs by holding down their routing buttons, and mix minus feeds using the BUS button on the Input/Output panel.

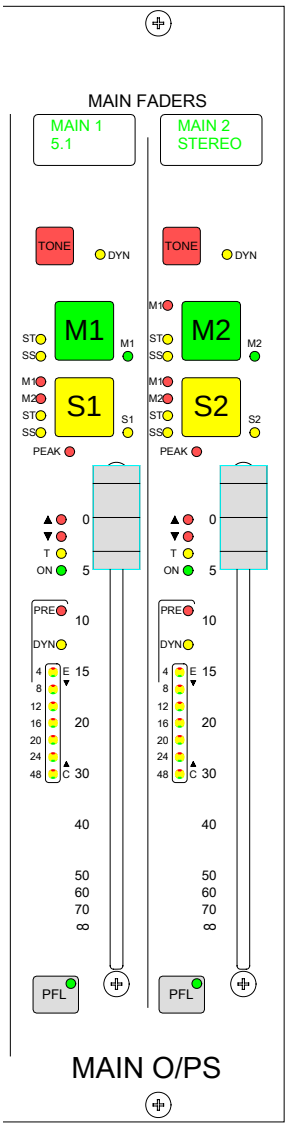
Panels - Auxiliary Control Screens



The user can view and adjust the auxiliary send, auxiliary output and auxiliary direct input controls using the Panels - Aux Send, Panels - Aux Output and Panels - Aux Direct Input screens. All of the auxiliary controls available on the control surface are available on the screens.

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

MAIN OUTPUTS



Like channel and group faders, the main fader design is dual path. Sub-mains 1 and 2 are incorporated under Mains 1 and 2 on a second layer of control.

The ASSIGN buttons (M1, M2, S1, S2) call the path to the Assign Panels to allow:

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

Surround and Stereo Main Outputs

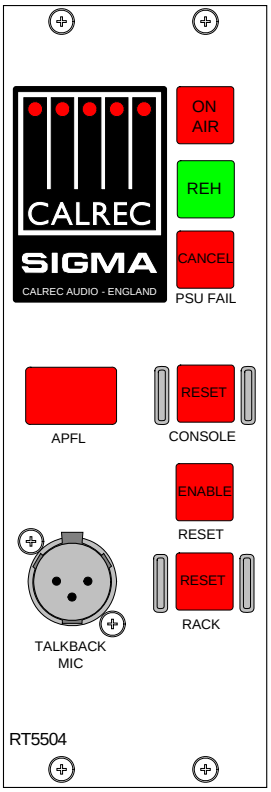
Each main output can be pre-set to be either surround or stereo. Surround mains are 5.1 plus a rear downmix to allow a simultaneous LCRS. There is also a stereo downmix and a mono downmix (potentially 10 outputs for each surround main). If a surround main is routed to a stereo main, the stereo downmix will be routed.

The insert and direct input are also surround.

BROADCAST FACILITIES PANEL

Console Reset

Pressing the ENABLE and CONSOLE RESET button resets the Control System only. Independent DSP operation ensures audio continuity during console reset. The most recent console settings are fully restored in under 15 seconds.



Rack Reset

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

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.

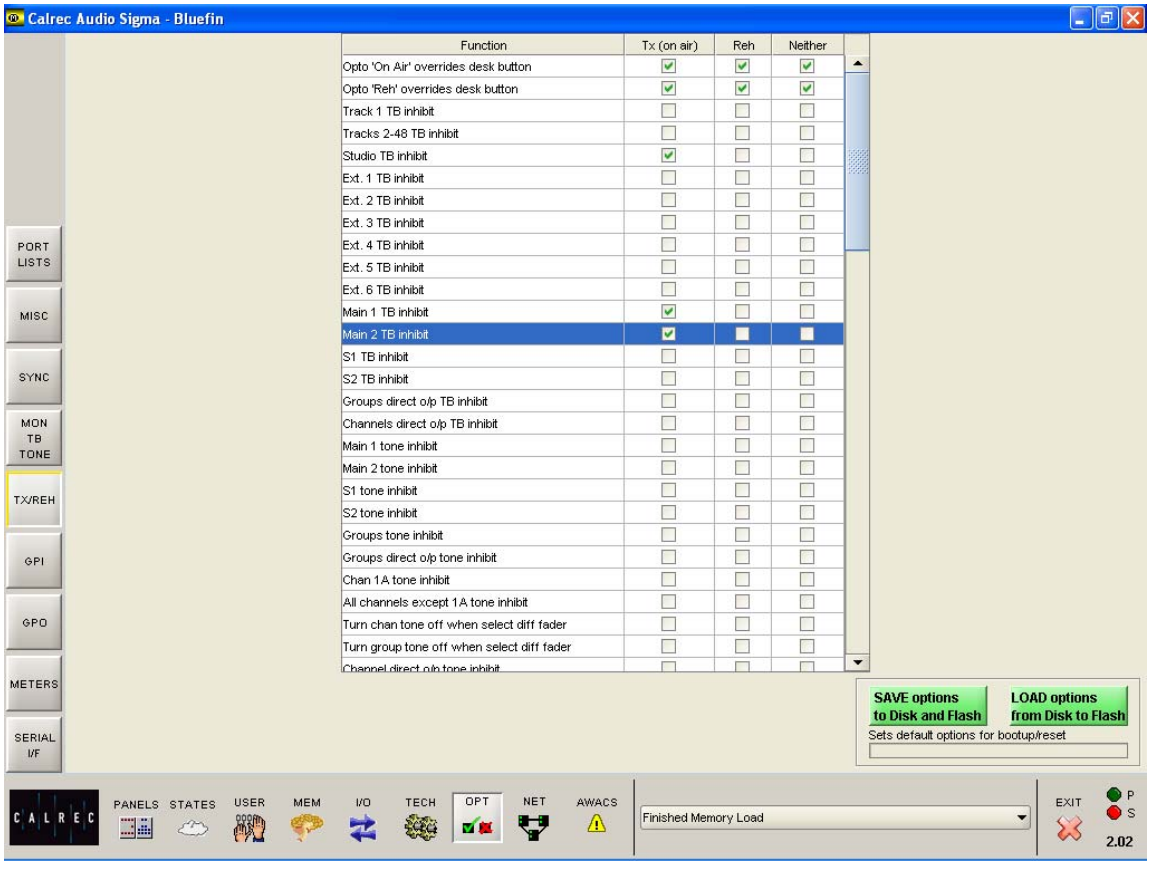
Power Supply Monitoring

The PSU FAIL Indicator/Cancel button on this panel flashes if any PSU fails, and a message is sent to the control surface via AWACS. The rack mounted power supply and distribution module monitors all power supplies for failures, and ensures hot changeover to spares if a fault occurs.

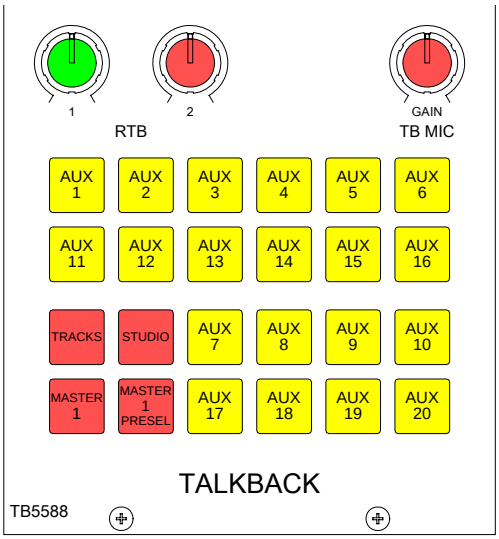
Condition Switching

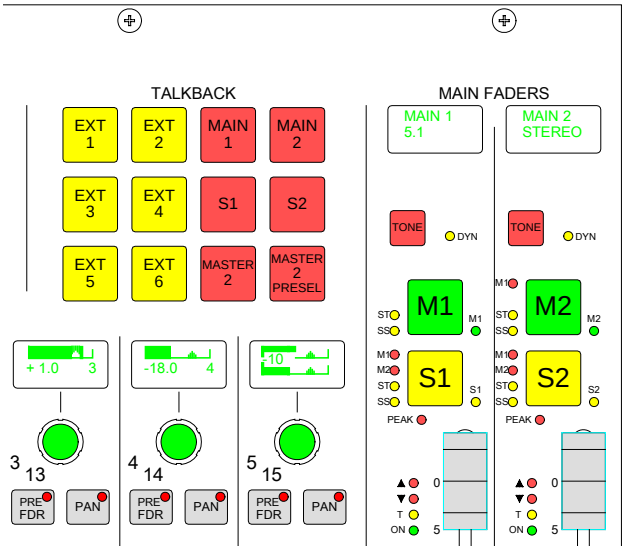
There are three modes which the system can be in: Transmit (TX or On Air), Rehearse, or neither. These are controlled from the ON AIR and REH buttons or from external inputs set up on the GPI screen.

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 in which to work.



TALKBACK





Talkback is available to all auxes, all Main and Sub-Main outputs, 6 external sources (via GPO switching), all tracks, and Studio.

In addition, the MASTER 1 button operates all the TB buttons pre-selected by the MASTER 1 PRESEL button.

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

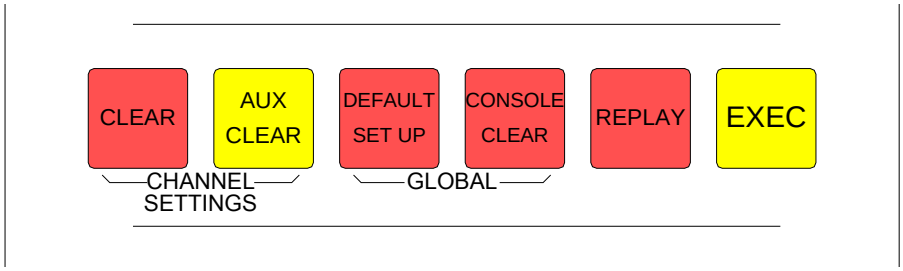
Talkback is available to direct outputs using the buttons on the fader modules and Input/Output panel.

Talkback is available to individual tracks using the button in the track routing section.

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

CONSOLE FUNCTIONS

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



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.

SIGMA
MEMORY SYSTEM

CALREC

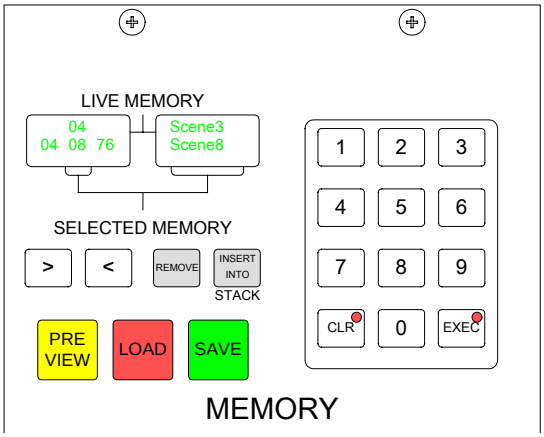
Putting Sound in the Picture

MEMORY SYSTEM

Once the console has been set up as required, its settings can be saved in the memory system. Up to 99 memories can be held in the Flash ROM for different console arrangements. In addition to this, an unlimited number of memories can be backed up to the PC's hard disk and recalled into the Flash ROM at a later date quickly and easily. Memories can be stored to removable media.

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 Selected Memory can be thought of as the "Ready" position, where the operator can place the next required memory until it is needed. Pressing LOAD+EXEC will launch the Selected Memory into the Live Memory position, overriding the previous console 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.

Clearing the Selected Memory

The contents of the Selected Memory can be cleared by pressing CLR + EXEC on the keypad or selecting CLR MEM on the MEM-SETUP screen.

Saving Memories

SAVE + EXEC saves console settings to the Selected Memory. Therefore, the memory to which you want to save must be in the Selected Memory position when Save is pressed. Alternatively, SAVE + Memory Number + EXEC will save into a specified memory number.

To create a new memory, choose an empty memory by typing its number on the keypad, or by selecting it from the list on the left of the MEM-SETUP screen. The memory being saved can be given a suitable title. If however, you wish to simply update changes you have made to the Live Memory, it must be occupying the Selected Memory position aswell.

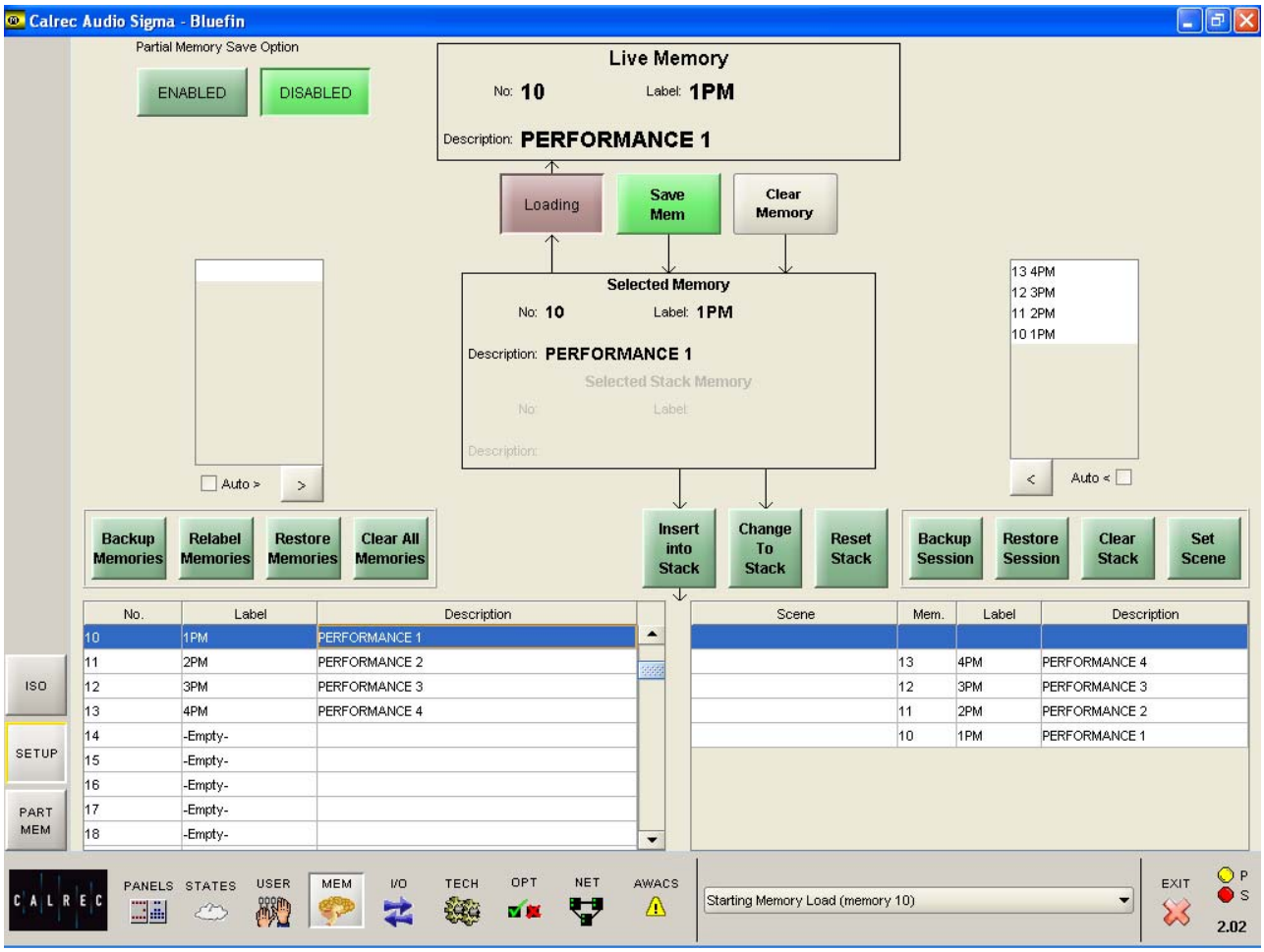
Preview Memory

When PREVIEW is held down, the Selected Memory settings will be displayed on the control surface without actually changing the current settings. The Assign panel displays are 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 using the MEM-SETUP screen. INSERT INTO STACK adds the Selected Memory to the stack. The > and < buttons scroll through the stack.

MEMORY SYSTEM



Memory Set Up Screen

This screen duplicates the memory functions available on the control surface, and allows management of stored memories and stacks. The two memories either side of the Selected Memory in the stack will appear in the windows either side of the Selected Memory window. 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.

All the available Flash ROM memories are listed on the memories screen, and when selected will occupy the Selected Memory position.

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 overwritten, cleared or loaded onto the console at an inappropriate time.

Managing Memories in the Flash ROM List

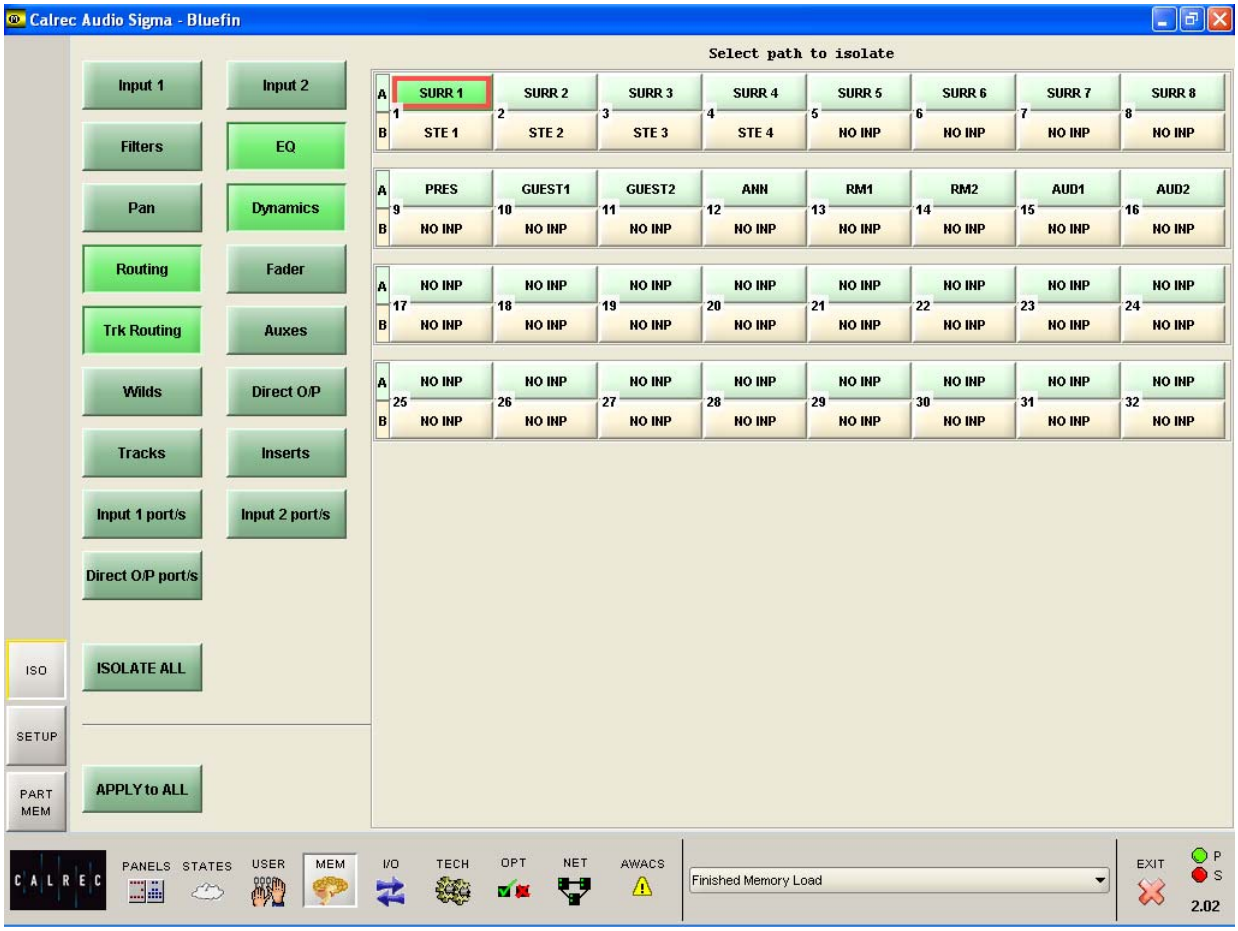
It is possible to back up all memories to the hard disk by selecting “Backup Memories”. Previously backed up memories can be restored from the hard disk or other media into Flash ROM by selecting “Restore Memories” . Memories can be re-named by selecting “Re-Label Memories”. Selecting “Clear All Memories” 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. A surround master can be part of a memory isolation selection, but its spill paths cannot be individually isolated from memory recall.

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.

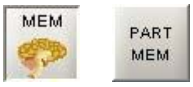
APPLY TO ALL applies the selected isolation settings to all channels and groups. To clear all isolation settings from all channels and groups, ensure all settings are de-selected, and select APPLY TO ALL.

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.

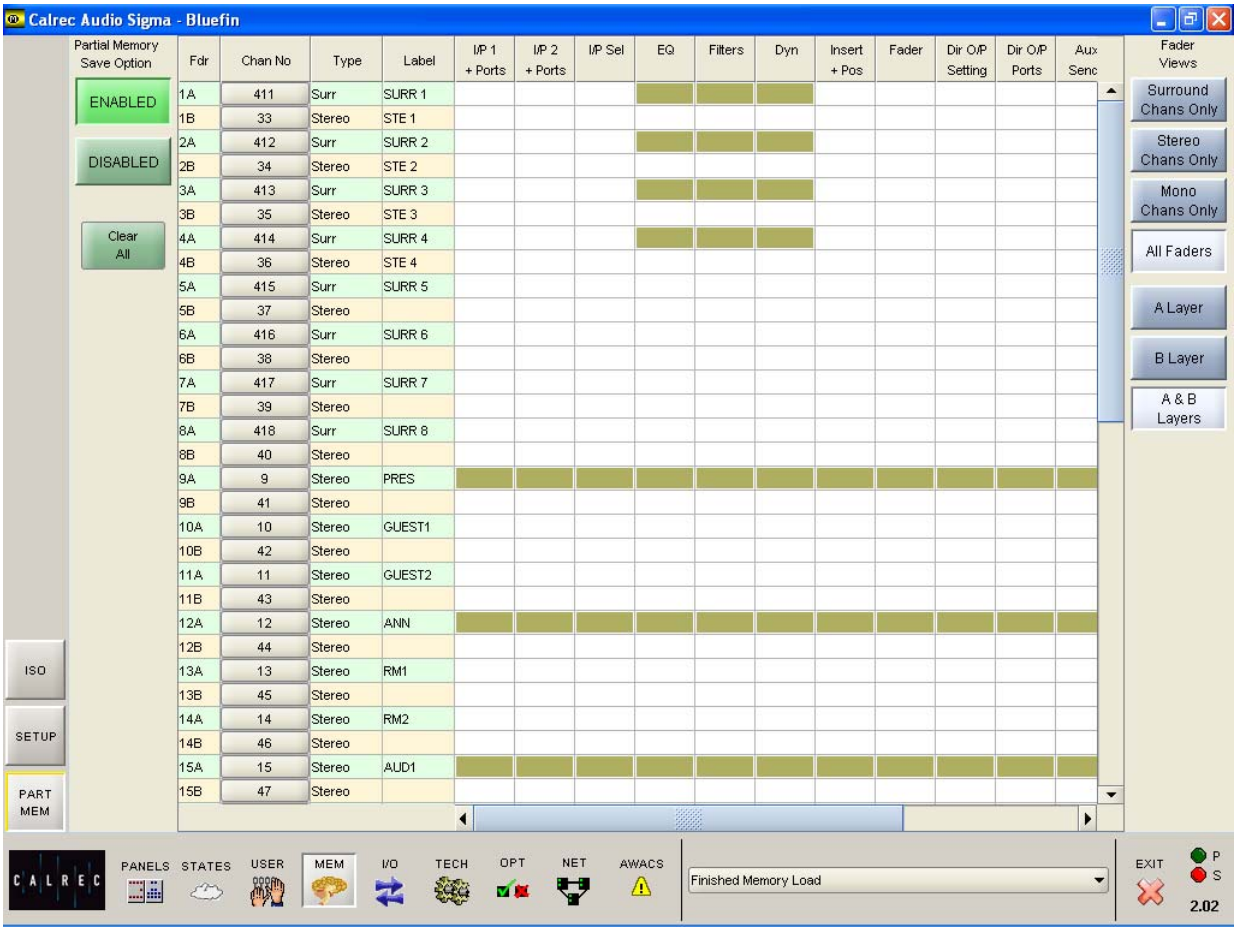
If an isolated port connection is changed, any isolation setting will be cleared, unless one of the console-wide isolation options is selected and contains that port.

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 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.

A partial memory only loads those channels or components on the control surface that were selected using the partial memory selections. A partial memory load does not affect the currently assigned fader and the A/B layer assignments. Partial memory selections are stored and recalled if a console reset occurs.

A surround master can be part of a partial memory, but its spill legs cannot be individually included in a partial memory.

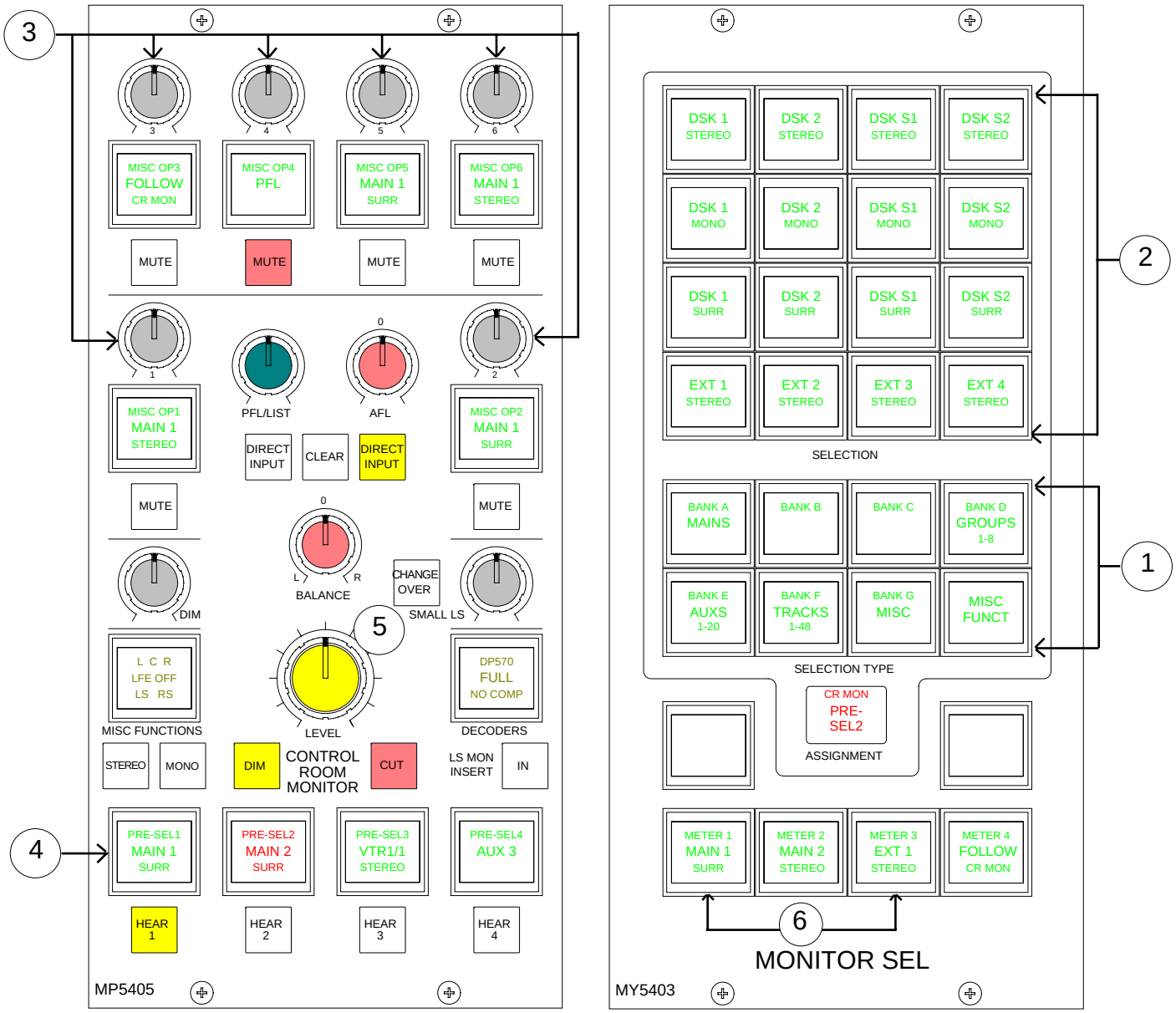
SIGMA
MONITORING, METER SELECT AND LOUDSPEAKER CONTROL

CALREC

Putting Sound in the Picture

ASSIGNABLE MONITORING, METER SELECT AND LS CONTROL

The assignable monitor panels offer a high degree of flexibility and user-definability. Each monitor output can select the source to monitor from all the available sources, independantly of the other monitor outputs. The sources are selected from a programmable set of selection buttons on the second panel. Each monitor output has a button incorporating a display, on which the currently assigned source label is shown.



(1) Selection Banks

All of the monitor sources can be grouped into 7 banks, with up to 16 sources in each bank. Banks A to G are user-definable using the Options-Mon I/P and TB screen. An eighth bank allows miscellaneous functions to be applied to the selected output, and is not editable. Pressing the bank selection button will change the 16 source selection buttons to display the sources allocated to that bank.

(2) Monitor Source Selections

There are 16 selection buttons. These can display the available monitor sources or functions allocated to the selected bank.

(3) Misc Outputs
There are 6 misc outputs to which monitor sources can be assigned. Each misc output can be given a suitable name during the set up of the console. This name will then appear on the button display, and on the front end screens. Misc outputs 1 and 2 can be stereo, 3 stereo, or 5.1 independently. Misc outputs 3, 4, 5 and 6 are stereo only. Pressing the button selects the misc output, and its display will be highlighted in amber. With the misc output selected, simply select a monitor source from the monitor selector panel to assign that source to the misc output. The currently assigned monitor source (and its bank) will also be highlighted in amber on the Monitor Selector Panel.

(4) Control Room Pre-Selects
There are 4 Control Room Pre-select buttons, where monitor sources can be assigned. This allows 4 sources to be preset ready for immediate listening on the main control room loudspeakers. Two of the buttons could be used for A/B comparison, whilst the main output is always available on one of the other buttons. With a Control Room Pre-select button selected, press the required monitor source from the 7 banks of 16 monitor sources on the Monitor Selector Panel to assign the source.The source label will be displayed on the button. The HEAR button below each Control Room Pre-select button allows the user to listen to the assigned source on the Control Room Monitor. The HEAR button will illuminate to show which Control Room Pre-select is currently being monitored.

(5) Control Room Main and Small LS
The SMALL LS level control is in series with the Main LS level control. This allows the Main LS level control to be used irrespective of which LS system is in use. The Small LS level control is used to adjust for the difference between the two sets of LS. The CHANGEOVER 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. DIM can be controlled from the TB if it is set to do so using the condition switching on the Options TX-REH screen.

(6) Meter Selectors 1-4
Any of the available sources can be assigned to 4 meter selectors 1, 2, 3 and 4.

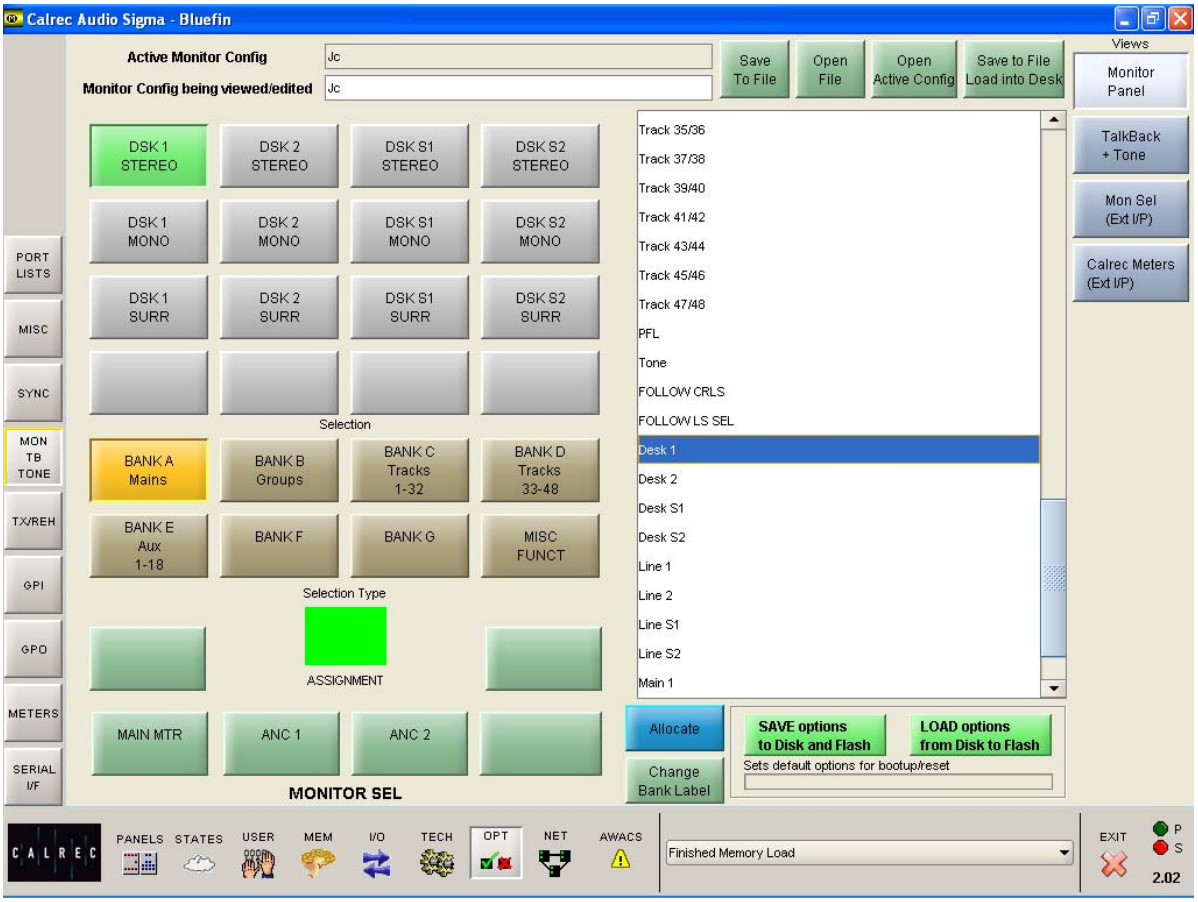
Meters 1 -4 can be surround, stereo, phase and can have an optional separate M/S (L-R sum/difference) meter.

With any of the meter buttons selected, pressing misc functions (bank 8) allows Tone and M/S to be selected for that meter.

ASSIGNABLE MONITORING, METER SELECT AND LS CONTROL

Assignable Monitor Panel Setup Screen

The screen allows all the available sources to be allocated to 7 banks of 16 selection buttons. This means that sources of the same type can be banked together for ease of access. Each external input's selection button can be given a user-definable label which will appear both on the screen and on the button's display.



The left side of the screen shows a representation of the monitor selection panel. The right side of the screen lists all the available monitor sources. Monitor sources are allocated to the 16 selection buttons on each bank as follows:

- Select the required bank (The selection buttons on the screen will change to the current button settings for that bank).
- Select the button to which you want to assign a source (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.

Each bank can be given a user friendly label using this screen. Select a bank, and then select the "Change Bank Label" button. Labels for the middle and bottom rows on the button can be entered. The top row will always display the bank number.

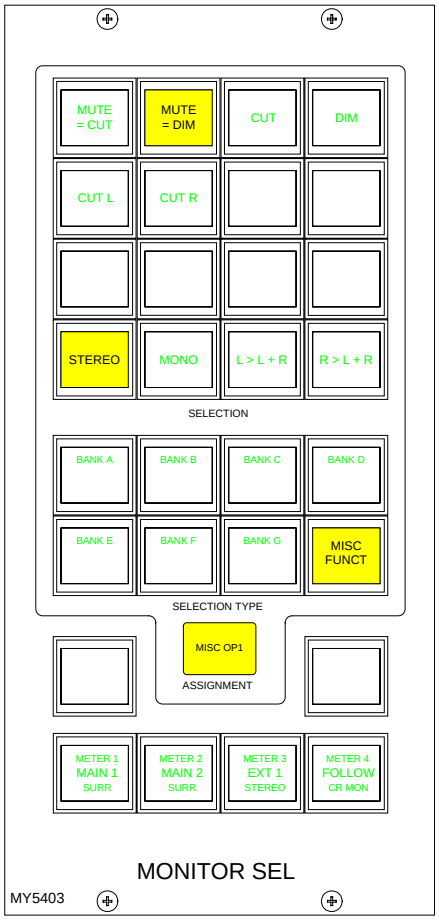
Once the user has the Assignable Monitor Panels set up as desired, the monitor configuration can be given a name and saved to the PC's hard disk, so that it can be recalled at a later date. Changes to the monitor configuration will not take effect until SAVE TO FILE LOAD INTO DESK is selected. Then the changes will be loaded onto the panels and saved.

ASSIGNABLE MONITORING, METER SELECT AND LS CONTROL

Misc Output Misc Functions

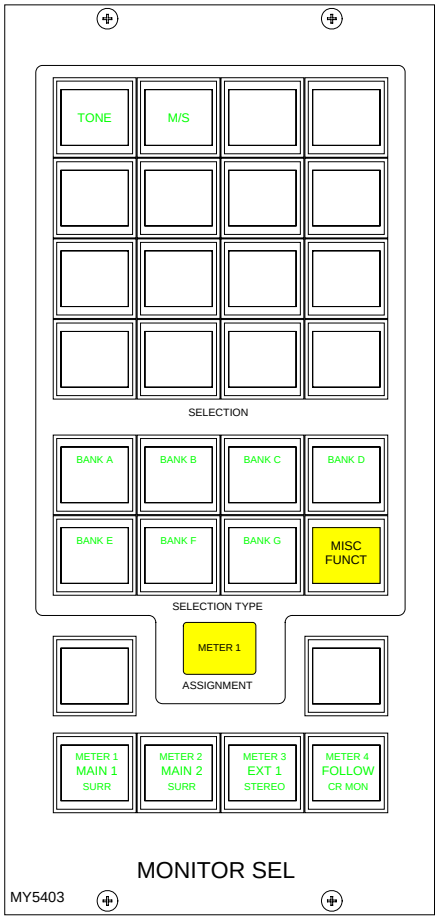
When a misc output is selected, the misc functions bank allows the following functions to be applied.

- The Mute button for each Misc output can be set to CUT or DIM the selected monitor source using the MUTE=CUT or MUTE=DIM buttons. The button will light red when set to cut, and yellow when set to dim.
- CUT and DIM can be applied using the buttons here.
- CUT L and CUT R allow the left or right leg of the selected monitor output to be cut.
- Stereo or mono buttons allow the misc output to monitor the source in stereo or mono.
- L > L + R and R > L + R allows either the left or the right leg to be sent to both the left and right of the stereo output.



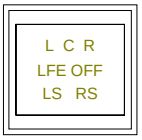
Meter 1-4 Misc Functions

When meters 1-4 are selected, the misc functions bank allows Tone and M/S (L-R sum/difference) to be selected for that meter.



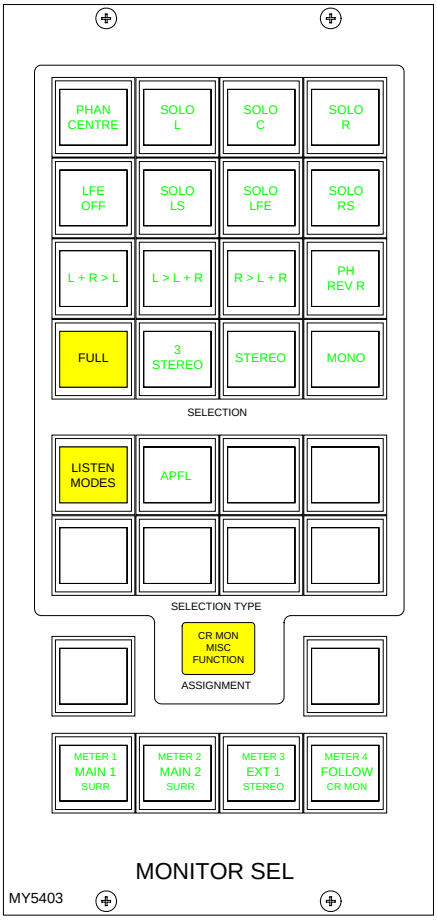
ASSIGNABLE MONITORING, METER SELECT AND LS CONTROL

Control Room Miscellaneous Functions



MISC FUNCTIONS

The Control Room Misc Functions selection button allows listening modes to be applied to the Control Room monitor, and APFL functions to be set up. Pressing this button gives access to functions displayed on the Monitor Selections panel. The Listen Modes and APFL functions are located in two seperate banks, and are chosen in the same way as monitor sources.



Listen Modes

The default listen mode is mono, stereo 3 stereo or full surround depending on the LS arrangement set in the Set up application. The selection buttons are as follows:

- Selection buttons to switch PHAN CENTRE on, and LFE off.
- 6 solo buttons allow solo monitoring of each component of a surround signal.
- 4 stereo option buttons: L+R to L, L to L+R, R to L+R and PH REV R. These will work in any mode, but are really designed for use in stereo mode or when monitoring stereo sources.
- 4 Listen mode selection buttons, allow the Control Room to monitor its selected source signal in Full surround, 3 STEREO, STEREO or MONO.

3 STEREO with Phan Centre ON is the same as STEREO except the LFE is optional.

If the source being monitored is surround, the STEREO button will create a stereo downmix of that source. If the source is stereo, the surround monitor buttons for that main output will have no effect.

MONO feeds L, C, R, LS and RS to L and R.

APFL

There are selection buttons for:

PFL to override each misc output 1-6

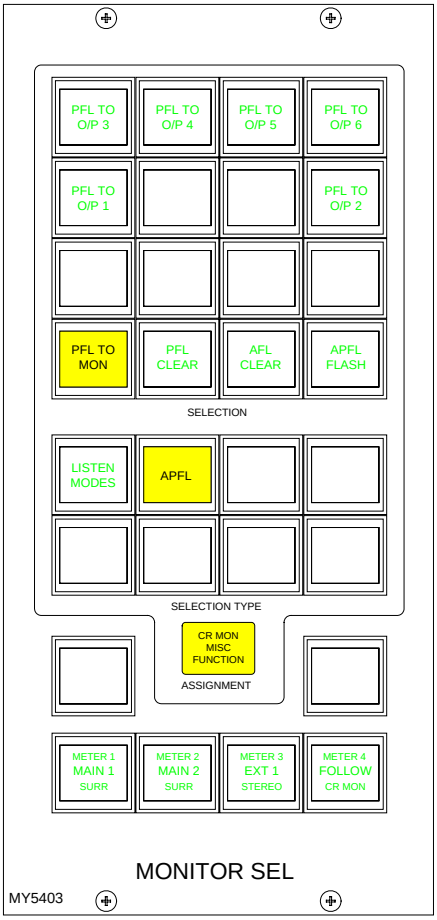
PFL to MON - Feeds the Control Room LS outputs overriding the current LS selection.

PFL clear and AFL clear, clear any latched buttons.

APFL Flash sets the APFL light to flash when any of the AFL or PFL buttons are latched.

PFL from surround mains is a stereo downmix of the surround signal.

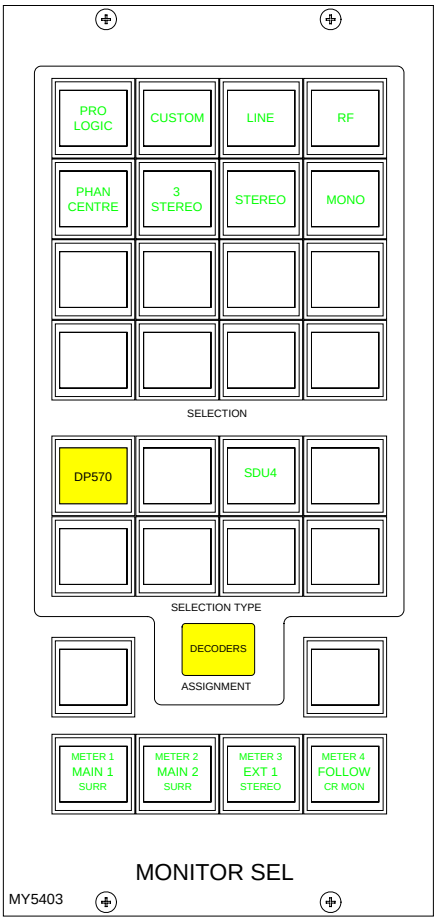
If PFL to MON is not selected, PFL can override the small LS (if it has been set to do this in the setup application). Alternatively, there can be a separate stereo PFL LS output. An external RTB input can mix with PFL to the PFL LS output.



ASSIGNABLE MONITORING, METER SELECT AND LS CONTROL

Decoder Remotes

The Decoders selection button allows any decoders which are installed to be controlled. Pressing this button allows the user to select a decoder, and gives access to decoder remote functions displayed on the Monitor Selections panel. The different types of decoder are located in seperate banks, and functions are chosen in the same way as monitor sources.



The decoder function buttons are as follows:

- 1 button for Pro Logic mode. When using a Dolby DP570, it is assumed that it will be set to Dolby Digital mode either in manual or auto detect mode.
- 3 buttons for Alternate Compression Modes: CUSTOM, LINE and RF. If none are selected, there will be no compression and no dialogue normalisation.
- 4 buttons for Alternate Output Modes: PHAN CENTRE, 3 STEREO, STEREO and MONO. If none are selected, the output will be full surround.

When controlling a Dolby SDU4, LT/RT decoder, only the stereo and mono output mode buttons will function.

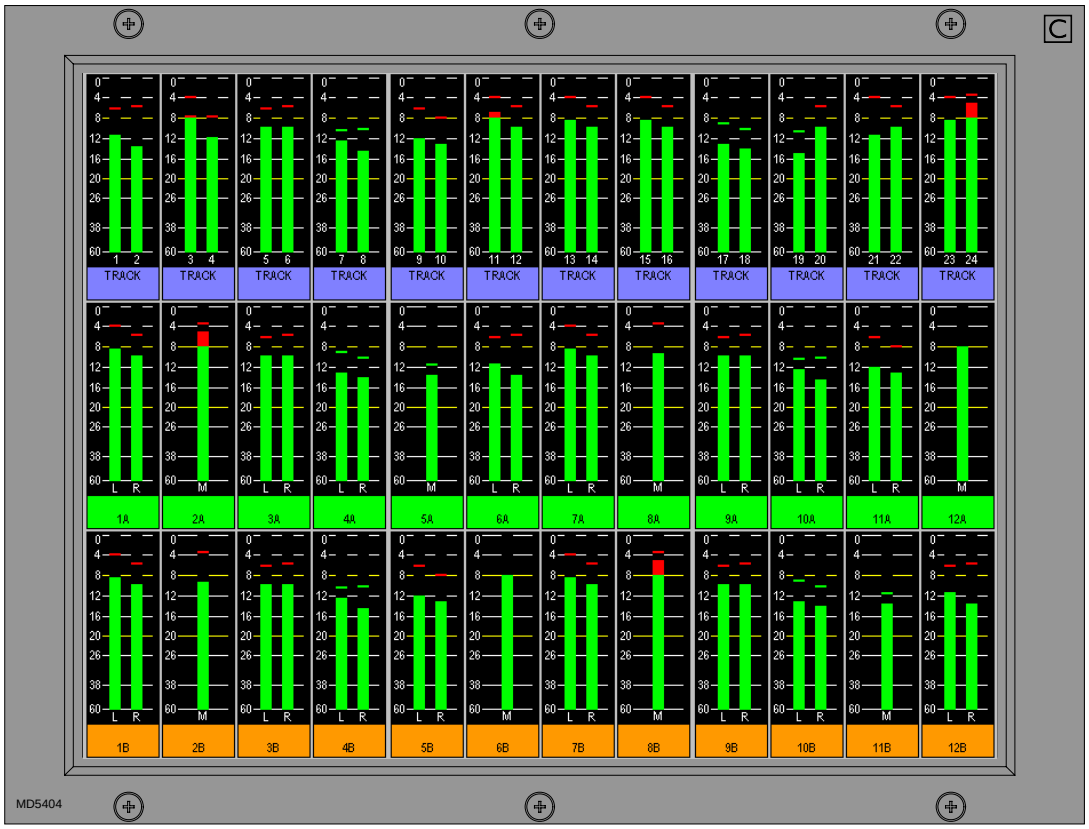
SIGMA
METERING SYSTEM

CALREC

Putting Sound in the Picture

calrec.com

TFT METERS



The console can have up to 16 high quality TFT screen based meters incorporated into its upstand, either instead of, or alongside the existing bargraph, moving coil VU and PPM meters. These TFT 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-Meters 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:

- Channel inputs, A and B paths (simultaneously, or set to follow A/B assign button).
- Main Outputs
- Group Outputs
- Track Outputs
- External Inputs
- Auxiliary Outputs
- Meter Selectors
- Miscellaneous functions

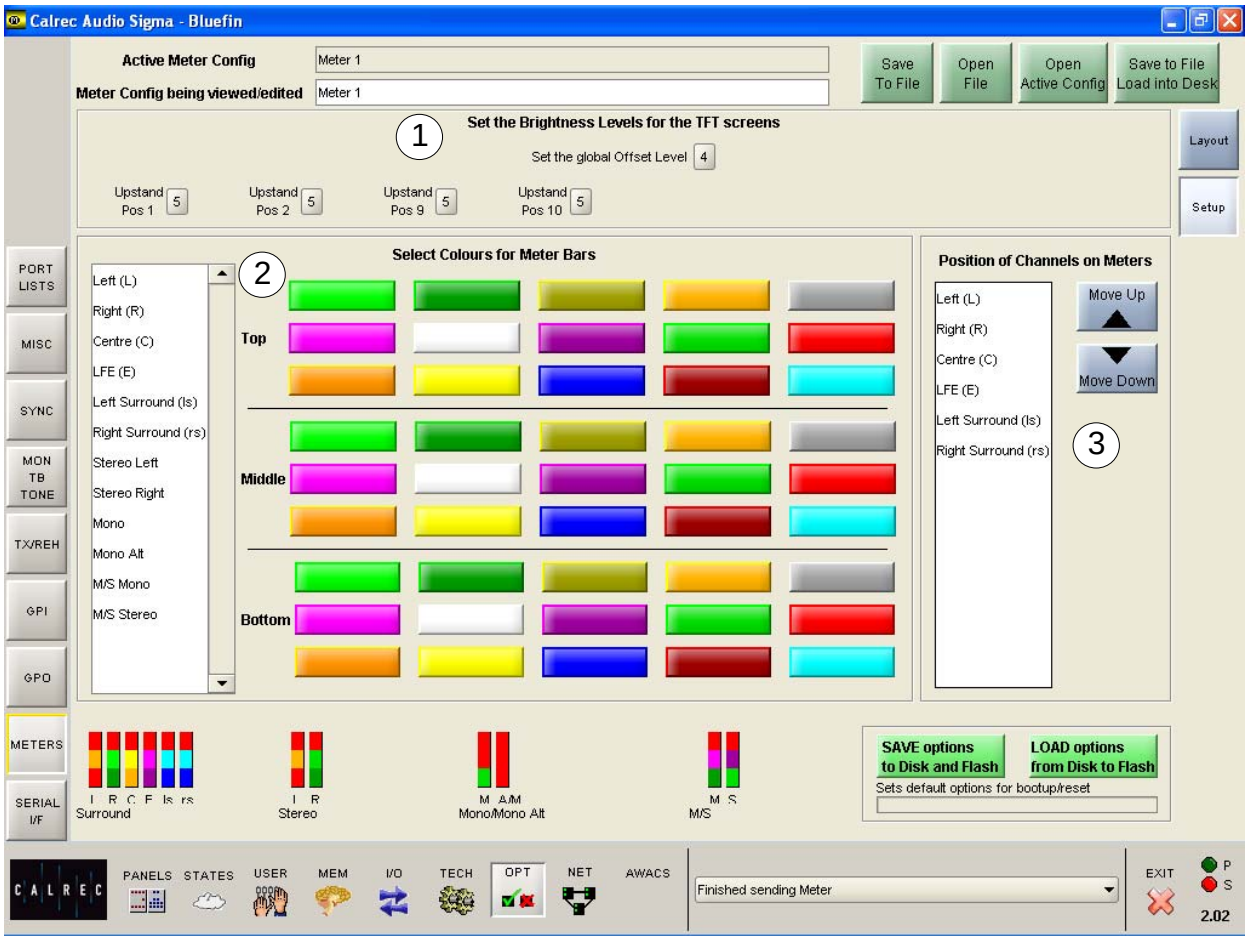
The screen layout is configured in halves, such that each half of the screen can have 4 or 6 columns, allowing 8 or 12 meter positions across the width of a TFT meter screen. Each column can then be split into up to three rows to contain meter positions which can be 1/3, 1/2, 2/3 or full height of the 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. When a screen is configured with 8 columns, these columns will line up with any channel or group faders positioned in that section of the console.

The number of meters configurable on the TFT screens is governed by the number of meter data signals available. There are 256 meter data signals available for output meters. In addition, for input meters, there is one meter data signal per audio signal. If an audio signal is metered on a TFT meter and a standard meter at the same time, it will use up two signals in the meter data stream. There can be up to 128 phase meters in the configuration.

TFT METERS

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

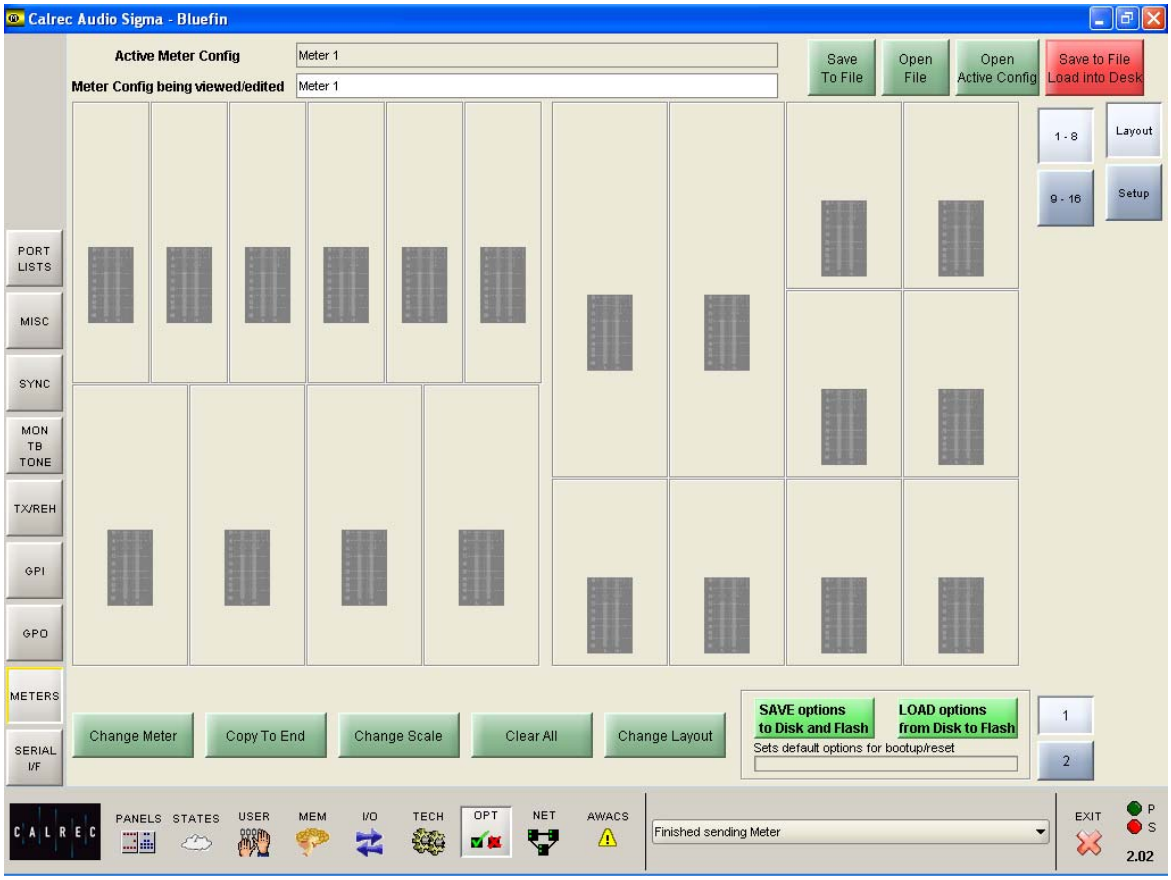
The user can select the colours to be used on the meters. The top,middle and bottom colours for each signal can be selected independently using the pallette. The selected colours for each signal are shown at the bottom of the screen.

(3) Signal Order

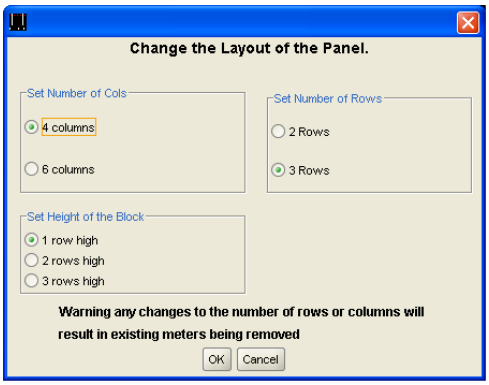
The user can select the order that the surround signals appear. The order can be shuffled by selecting a signal from the list and using the Up and Down buttons. The order chosen will be used for all surround meters.

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.

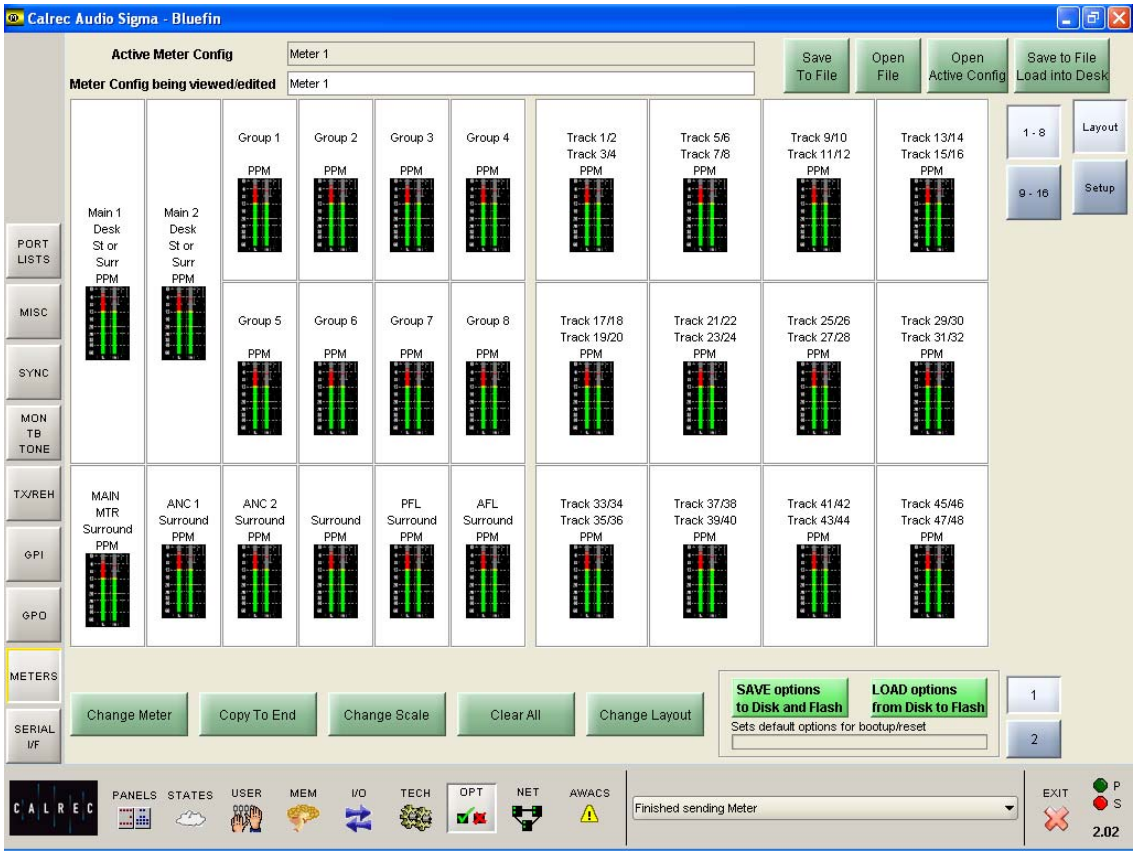
Columns

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

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.

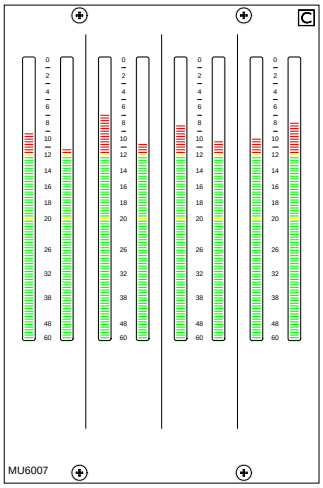
Change Scale
Each meter can be PPM, VU or Phase. There can be up to 3 phase meters assigned in the configuration. The scale type can be selected individually for each meter or globally for all meters.

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

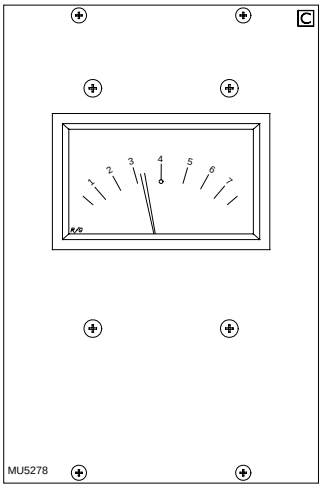
Change Layout
CHANGE LAYOUT is used to configure the layout of the TFT screen.

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.

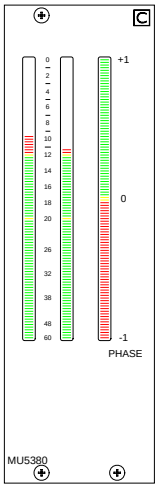
BARGRAPH AND MOVING COIL METERS



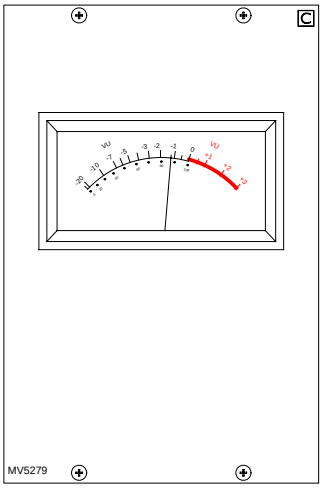
4 x Twin Bargraph



PPM Meter R/G (A/B)



Phase Meter Bargraph & Stereo Bargraph

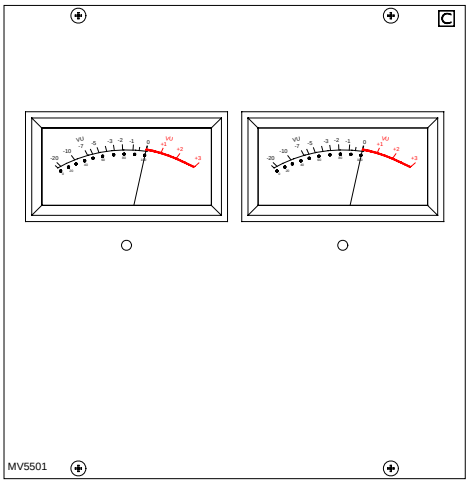


VU Meter

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

The MAIN and ANCILLARY 1 meters can 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 PPMs, VUs, bargraphs, phase display incorporating bargraphs, or a mixture.

The Main meters are fed from the Main meter selector which is on the Monitor Selector panel. It can select either Main 1 or 2 Desk (pre Tone and TB), Main 1 or 2 Line (which can be an external input), or Tone.



Twin VU Meter

In addition to the Main and Ancillary 1 meters, a comprehensive set of optional meters are available:

- Track Bargraphs displaying the track output levels, post Tone andTalkback
- ANCILLARY 2 Meter: This is stereo only. It can be PPMs, VUs or bargraphs
- Stereo APFL or surround AFL bargraph. AFL is monitored post the channel/group panning and is in surround. The APFL meter will display the stereo downmix of these signals
- MIX MINUS: Displays signal on the mix minus bus (mono)
- GROUPS: 8 stereo bargraphs for the groups. For mono groups, the left bar only will display

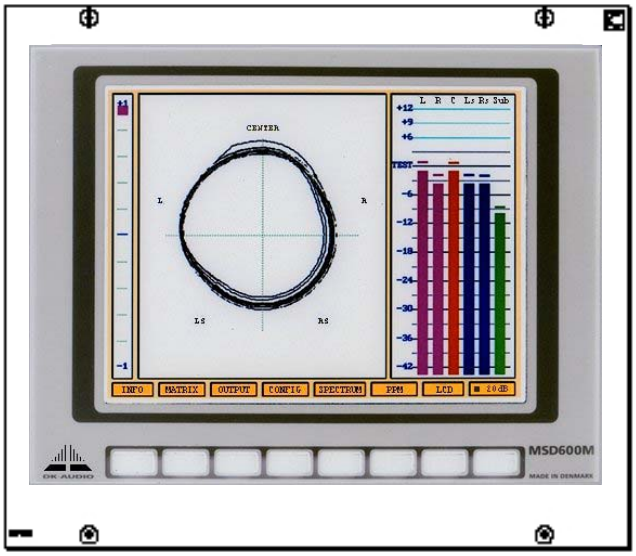
All Calrec meters including moving coil types, are fed directly from the meter processor. There are external meter outputs which allow other meters to be used.

Calrec bargraphs provide a bar which can be 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 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.

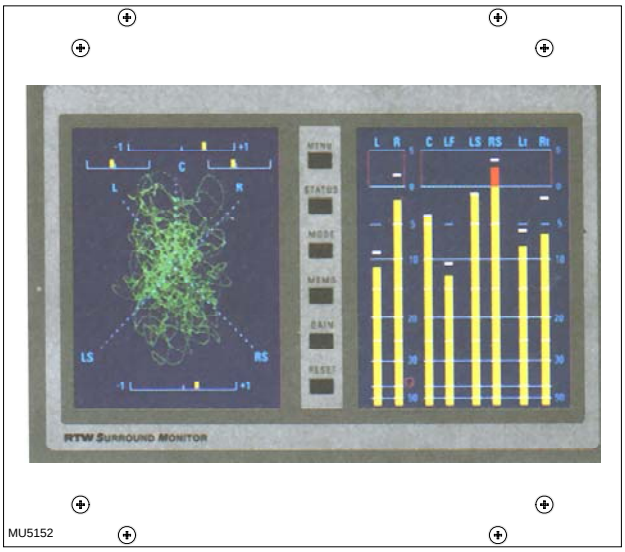
The meter bridge is continental height allowing alternative European bargraph meters to be fitted. These would require audio outputs from the I/O Rack.

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

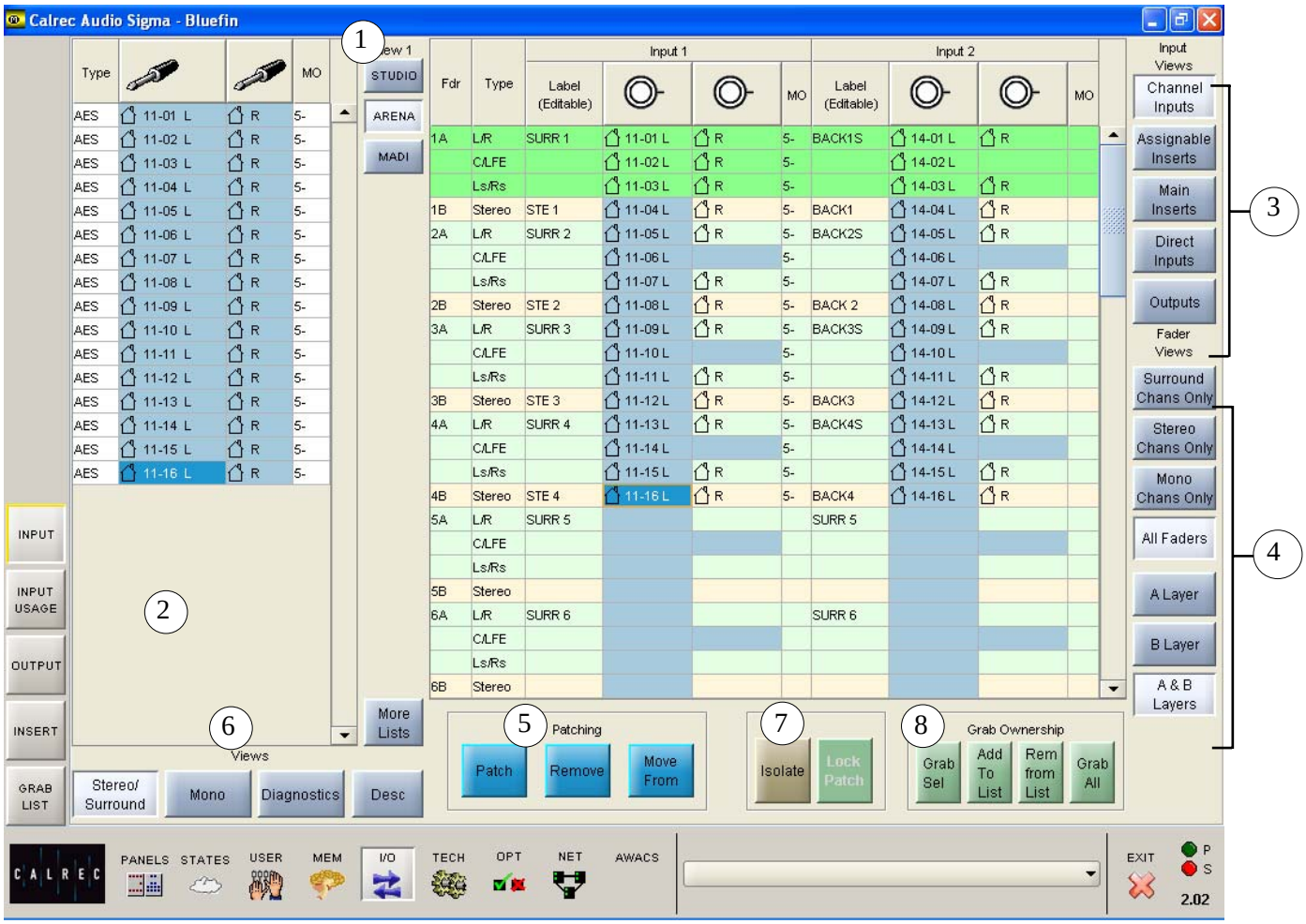
SIGMA
ON-SCREEN PATCHING

CALREC

Putting Sound in the Picture

INPUT PORTS SCREEN

The I/O - Input screen allows patching of input sources to channel inputs, insert returns, direct inputs or output ports.



(1) Source Lists
All of the available ports can be grouped into suitable lists. These lists can then be displayed on the left of this screen, ready to be patched to channels on the right. Different lists are accessed using the selection buttons.

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

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

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

INPUT PORTS SCREEN

(5) Patching

To make an assignment, select a source,  and an input port,  then select Patch. 

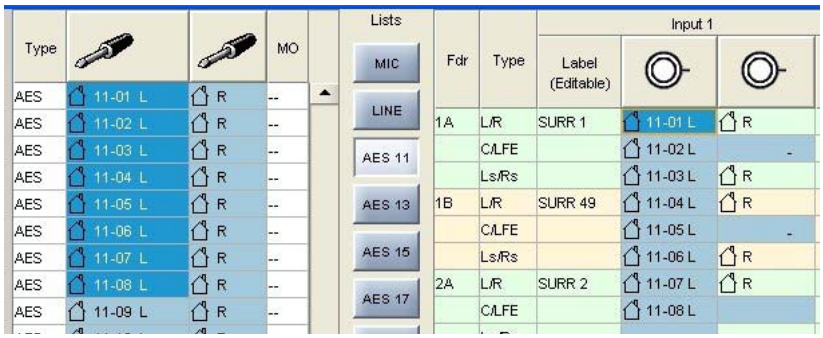
The input source label will appear in the channel input label field and on the fader on the console (if that input, 1 or 2 is currently selected on the Input/Output panel). By selecting the label cell on the screen, the input name can be edited using the keyboard. The new name is stored with the channel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

Once patches are made, they can be removed when selected by selecting REMOVE. 

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

Multiple Patching - It is possible to patch regions of sources to a region of inputs.

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



(6) Mic Open Busses

Each input port can be assigned to any of the 5 MIC OPEN busses by firstly selecting the port and then selecting the required buss. When the port is patched to a channel input, it will operate the mic open circuit when that channel is faded up and routed to the programme output.

If a pair of input ports are patched to a stereo channel, the channel will operate the buss to which the left of the pair is assigned. Each buss can be set to automatically cut the studio loudspeaker output (5 separately cut outputs are provided, one for each buss) and/or fire a relay. These are set on the Options screens: TX/REH and GPO.

(7) Port Isolation

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

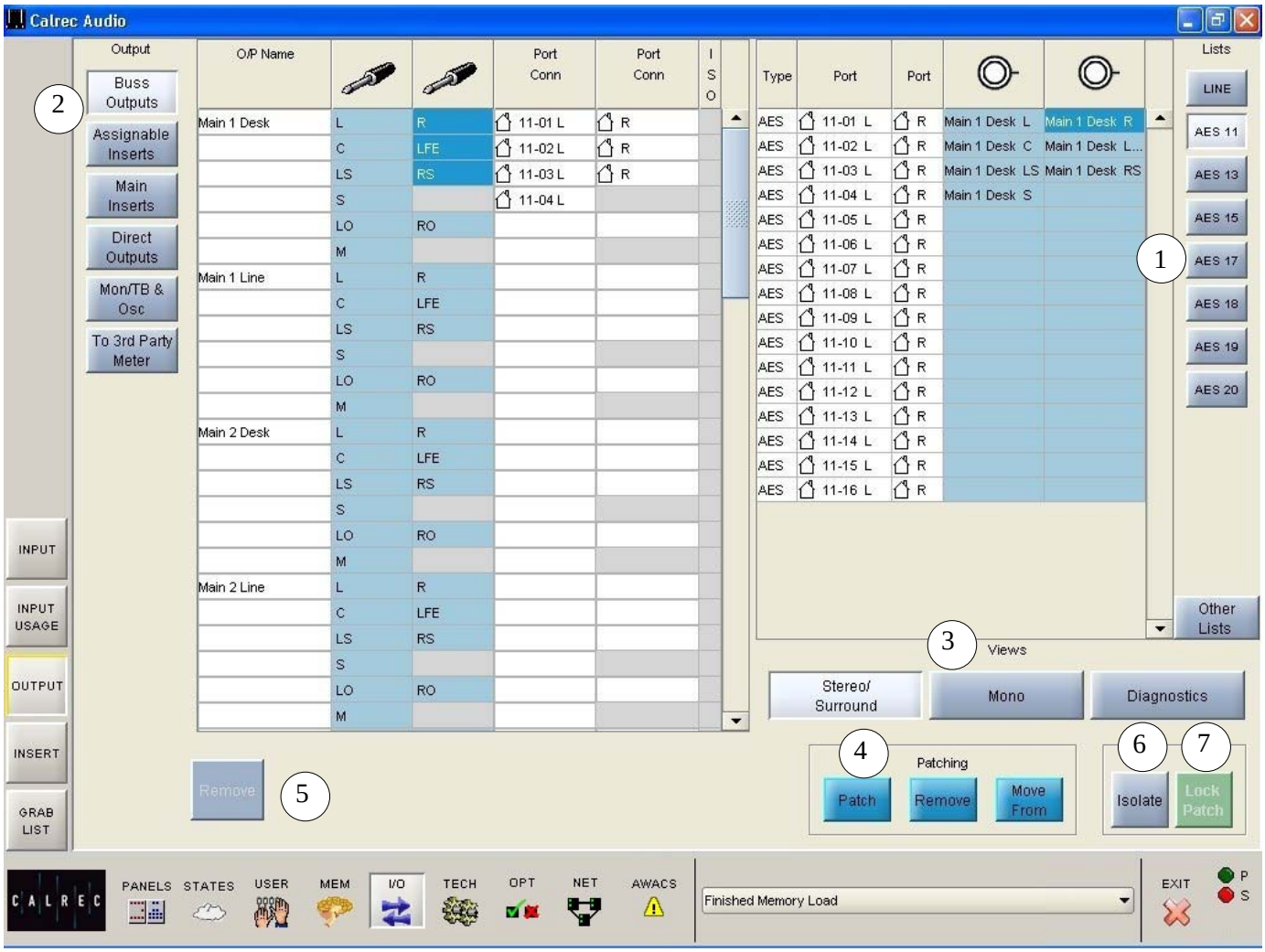
(8) Grab Ownership (Only visible if Hydra Audio Networking is installed)

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

In circumstances when the ownership needs to be overridden, the grab buttons allow the console to grab ownership of the network sources, either altogether, individually, or by adding them to a “Grab List”. When one or more Hydra sources are added to the grab list, the “Grab All” button changes to “Grab List”. The grab list can be viewed on the Grab List screen, accessed on the left side of the screen.

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 screen below shows the patching for buss outputs.



(1) Output Port Lists
All of the available ports can be grouped into suitable lists. These lists can then be displayed on the left of this screen, ready to be patched to channels on the right. Different lists are accessed using the selection buttons.

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

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

OUTPUT PORTS SCREEN

(4) Patching
To make an assignment, select an output signal,  and a port,  then select Patch. 

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

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

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

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

- Select first source point
- Select the output ports by dragging down the column
- Select Patch

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

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

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

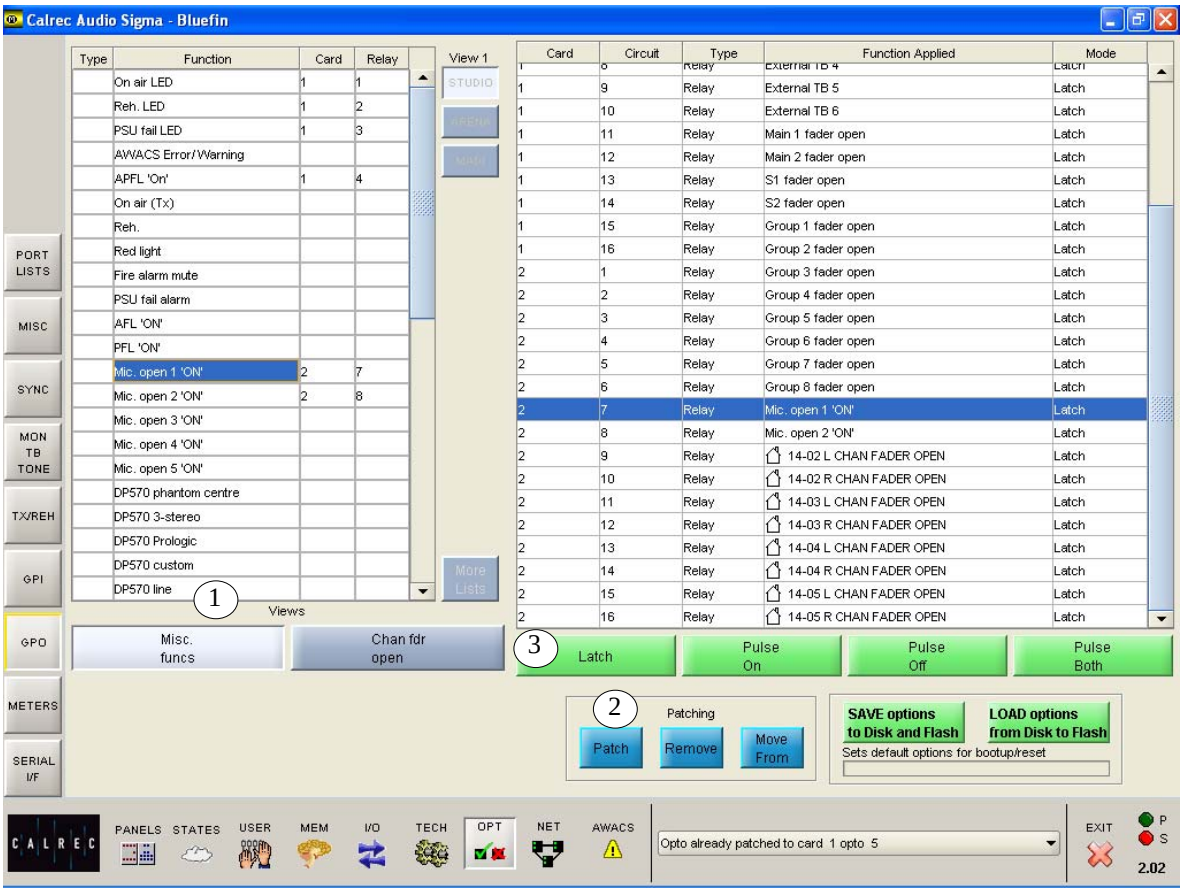
To lock an output port assignment, select an output port which has a source assigned to it, and select the LOCK PATCH button.

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

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

SIGMA
OTHER INTERFACES

GENERAL PURPOSE OUTPUTS



Up to 16 Relay isolated outputs are available on each GPI card in the system. Please note that on Relay/Opto card 1, relays 1 - 4 are not available, as they are used for TX, REH, PSU Fail and APFL facilities.

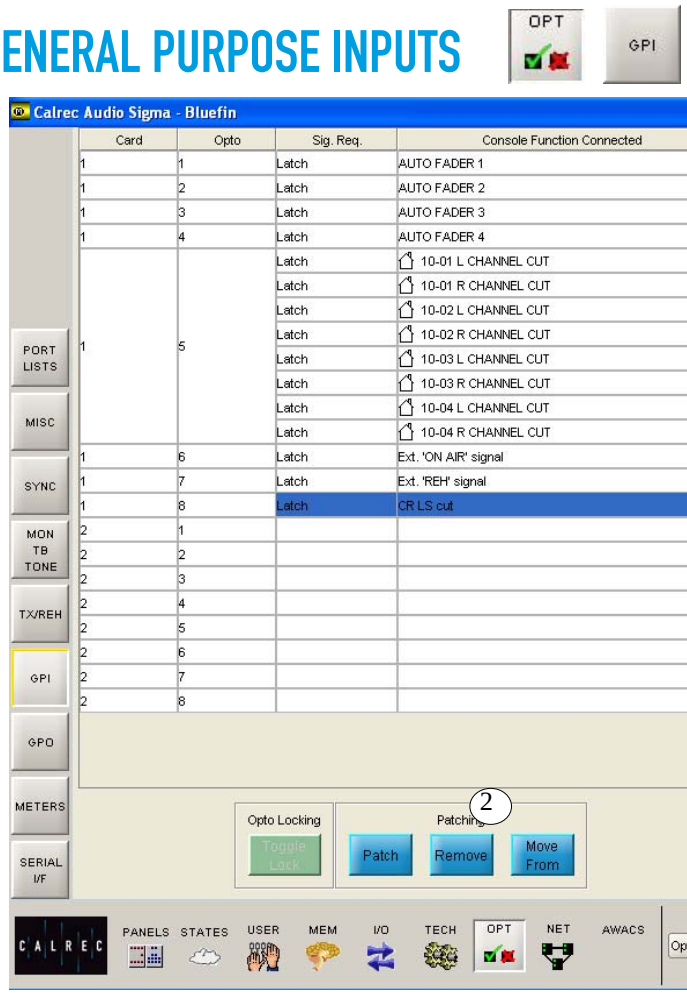
(1) “Misc Functions” or “Channel Fader Open”
The relay-isolated outputs can have various console functions assigned (with “Misc Functions” selected), or they can be set to operate when particular faders are opened (with “Channel Fader Open” selected). Console functions can be assigned to more than one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

(2) GPO Patching
To make an assignment, select a function (left side of screen), and a relay-isolated 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 8 Opto isolated inputs are available on each GPI card in the system.

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

With “Auto Fade” selected, the opto-isolated inputs can be assigned to auto-faders to allow automatic cross-fading.

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

If optos are patched to input ports, when fired externally, they will cut any channel to which that input port is connected. Once set up, opto assignments can be locked using the Opto Lock button, to prevent accidental removal.

SERIAL INTERFACE

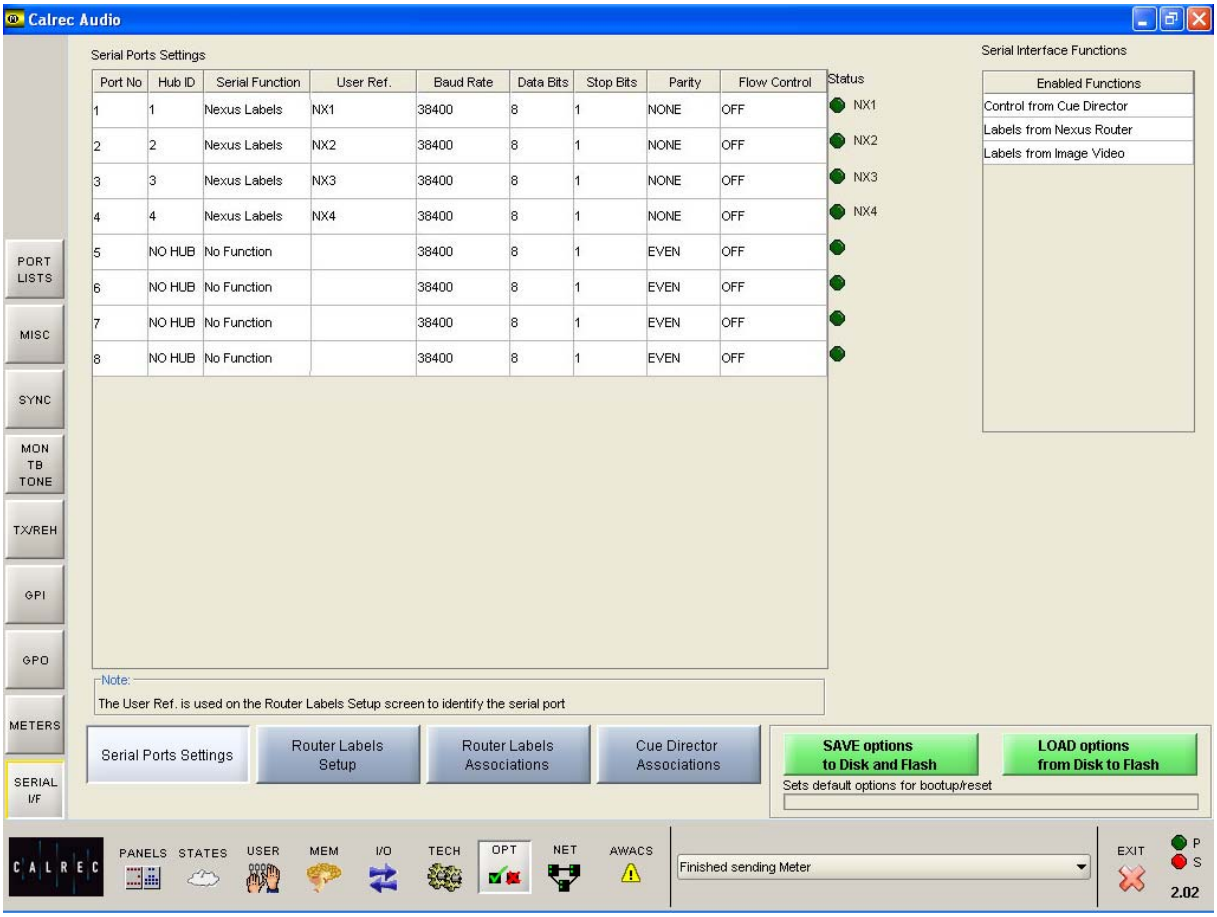
The system currently supports the following serial interfaces:

- Cue Director
- Nexus Router
- TSI1000 by Image Video

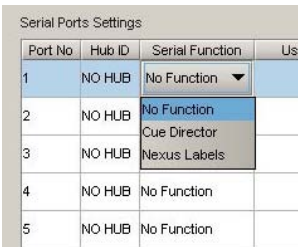
Serial port setup and label associations are made using the Options-Serial I/F screens.

Serial Port Settings Screen

The console can have up to 8 hub cards, each of which can have 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 each serial interface port, by allocating a function to each from the Serial Function column. Only the serial functions which are enabled for the console will be available for selection.



The Hub ID number is also selectable from a drop down list. The ability to change the Hub ID number is useful for the situation where two routers are connected to the console, sending the same information. If one router or serial port fails the serial function can be moved from one hub to another.

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

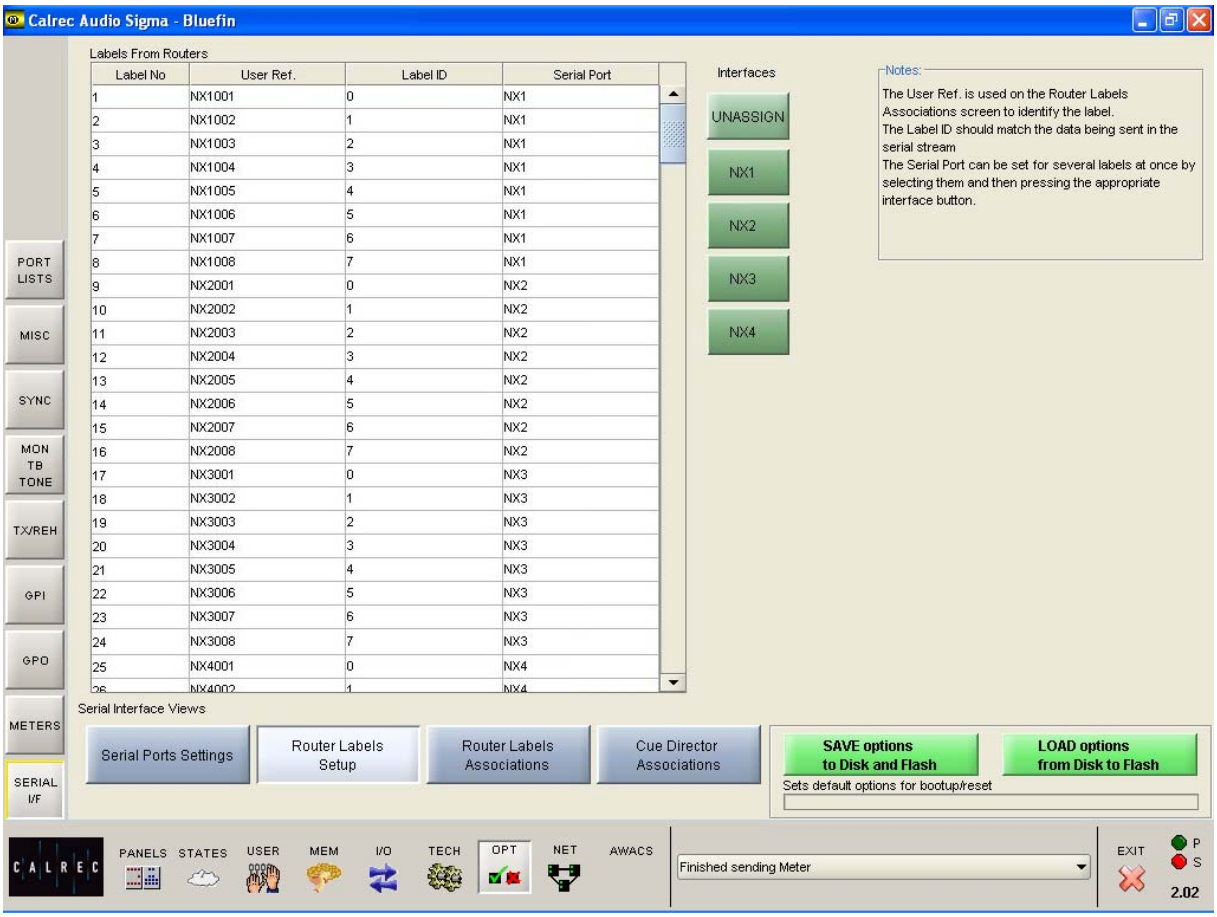
For each function there is an indicator which flashes when a valid message is received from the user serial port.

SERIAL INTERFACE

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.



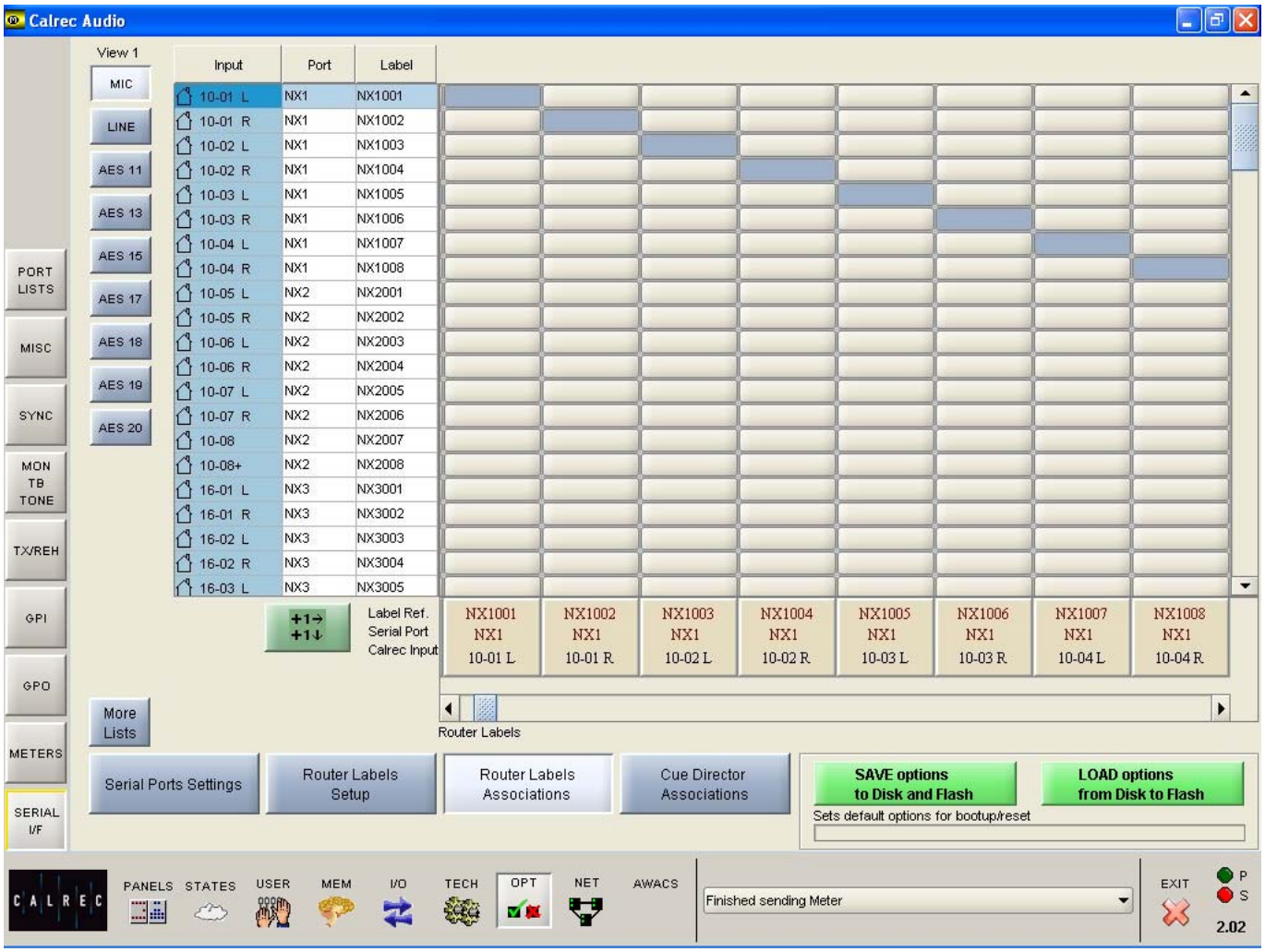
There are buttons next to the table, for each serial port function previously set up on the Serial Port Settings screen. To associate labels with a serial port interface, select the label, or region of labels, and select the required serial port function button. The serial port column tells the user 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.

SERIAL INTERFACE

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 Router labels are shown along the bottom of the screen. This forms a grid, and associations are made by selecting the intersecting cell between input port and router label. Each leg of the input ports is always presented as if it were a mono port.

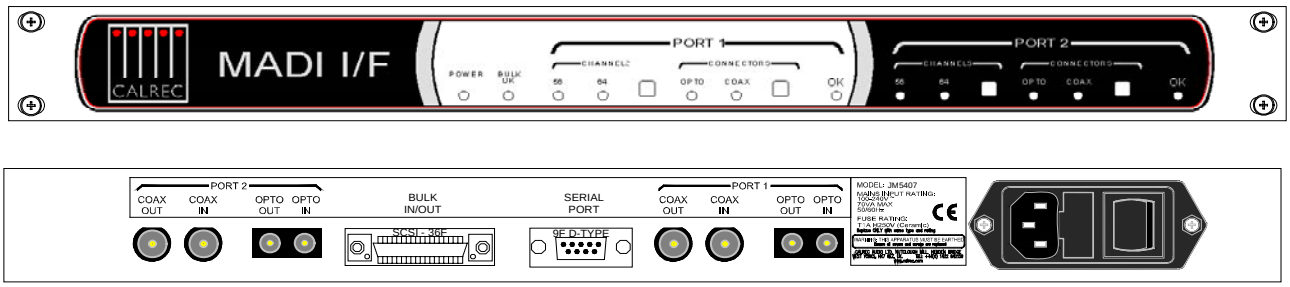
When an association is made, the cell will turn yellow. Associations can be unmade by selecting the cell again, whereby its colour will change back to grey. The +1 button is used to automatically move diagonally down the grid to the next association cell and toggle its condition. The action occurs out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

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

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

MADI

The rack mounted MADI Interface unit contains two independent, AES10 MADI compatible interfaces. The two ports are interfaced to the console via a Wide Area Bulk (WAB) card, which occupies one of the AES card slots in the Digital I/O 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.

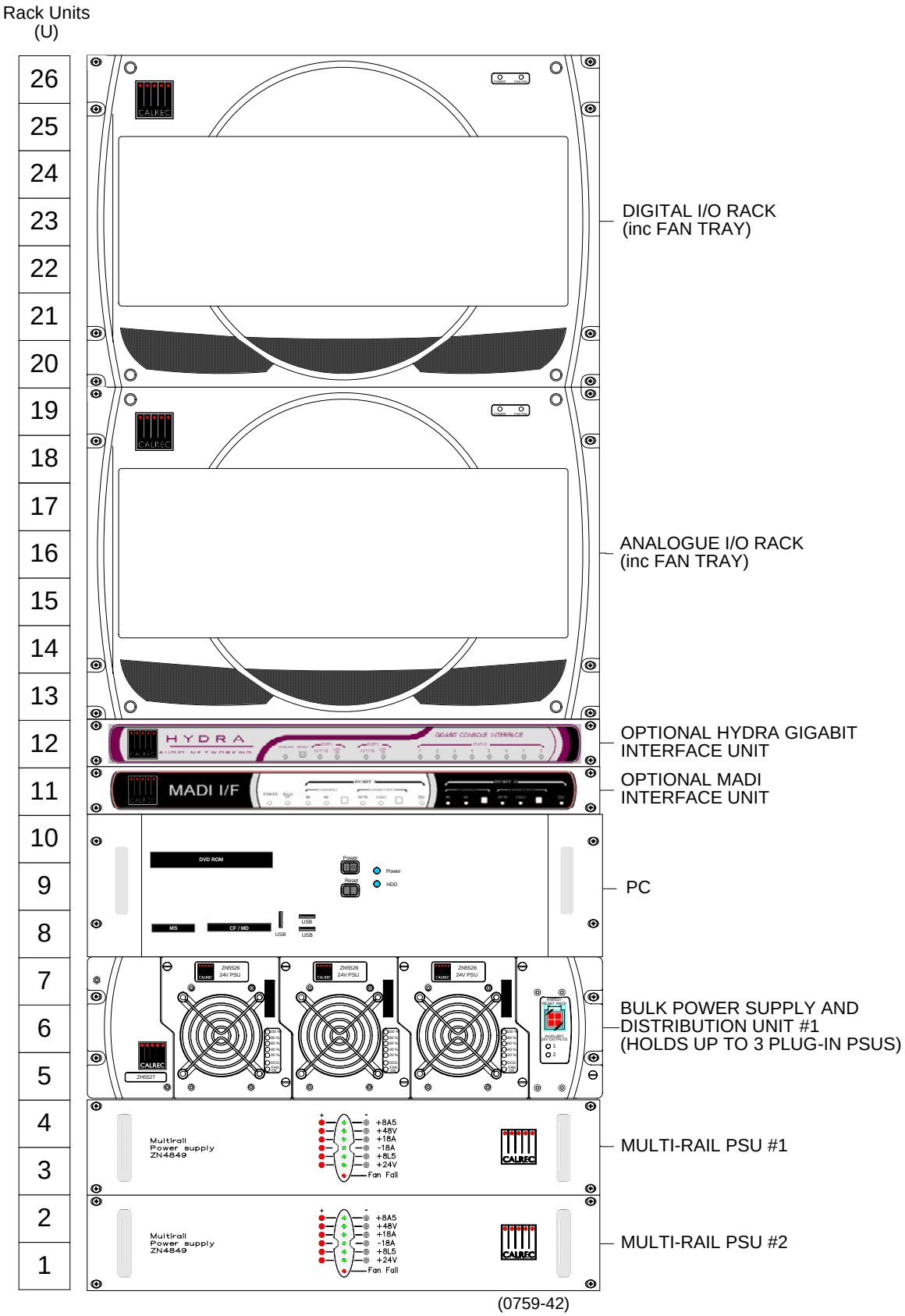
There is no Sample Rate Conversion available on MADI inputs or outputs therefore, all the equipment connected via MADI must be synchronised to the same source as the console.

The unit can be either mains powered or DC powered.

SIGMA
TECHNICAL INFORMATION

TYPICAL RACK LAYOUT

It is recommended that all equipment over 8Kg (17.5lbs) in weight, or over 150mm (6 inches) deep, is mounted into equipment bays which offer mechanical supports under each of the units. The diagram below shows how the equipment would typically be laid out within the bay.



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RACK SPECIFICATIONS

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

Items	Height	Approx depth (incl. mating cons)		Approx weight	
		inches	mm	lbs	kgs
Digital I/O Rack (fully populated)	7U	18.1	460	49.5	22.5
Analogue I/O Rack (fully populated)	7U	18.1	460	53.3	24.2
Bulk Power Supply and Distribution Rack with one PSU	3U	18.5	470	19.6	8.9
Additional PSU for Bulk PSU Rack	-	-	-	7.7	3.5
Multi-Rail PSU*	2U	18.1	460	22.1	10.0
Additional Multi-Rail PSU Hot spare	2U	18.1	460	22.1	10.0
PC*	3U	23.7	600	27	12.2
MADI Unit	1U	11.9	300	7	3.2
Hydra Gigabit Interface Unit	1U	10.4	265	6	2.7

* Units have handles protruding approx. 1.3” (32mm) from the surface of the front panel.

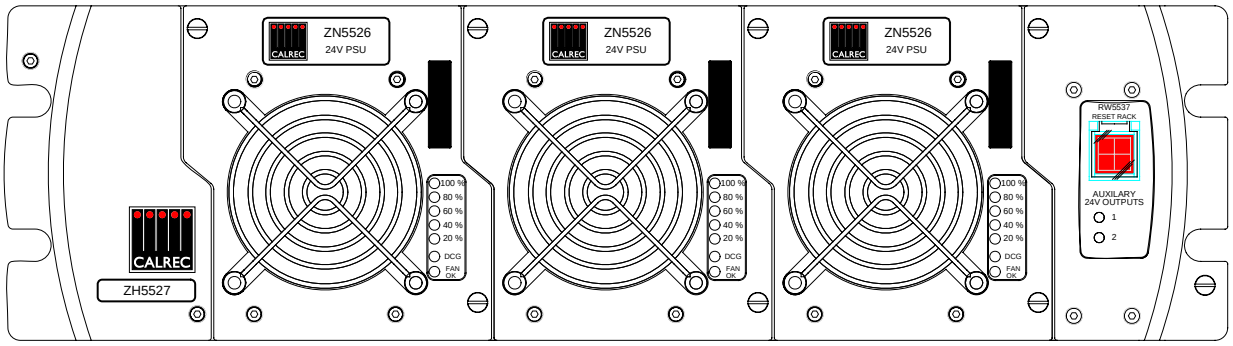
MAXIMUM CABLE LENGTHS

Cables		Maximum Length	
From	To	Feet	Metres
Control Surface	Bulk PSU & Distribution Unit	100.0	30.0
Control Surface	PC	500.0	150.0
Control Surface *	Digital I/O Rack *	100.0	30.0
PC	Digital I/O Rack	100.0	30.0
Digital I/O Rack	Bulk PSU & Distribution Unit	100.0	30.0
Digital I/O Rack	Analogue I/O Rack	33.0	10.0
Digital I/O Rack	BNC I/O Interface Panel	16.5	5
Digital I/O Rack	XLR I/O Interface Panel	6.5	2
Analogue I/O Rack	Analogue I/O Interface Panel (EDAC)	9.8	3
Analogue I/O Rack	Multi-Rail PSU	33.0	10.0
Multi-Rail PSU	Other Multi-Rail PSU	1.3	0.4
MADI Unit	Digital I/O Rack	16.5	5
Hydra Unit	Digital I/O Rack	16.5	5

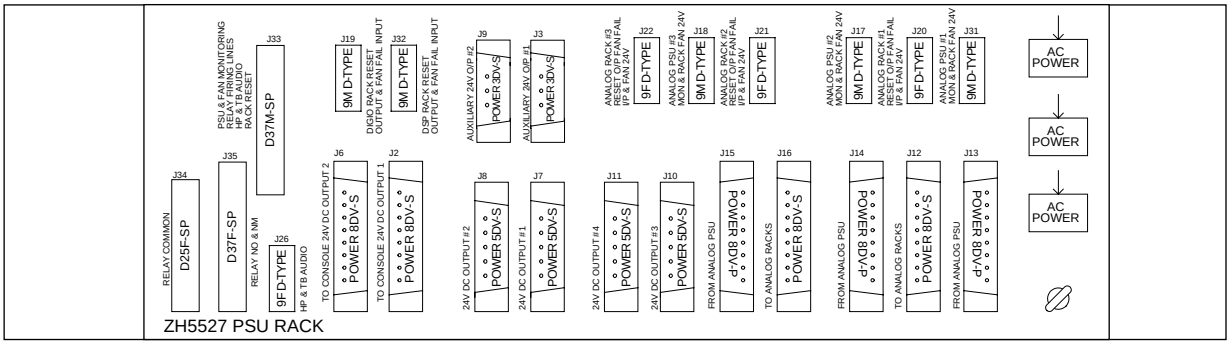
* Optional extenders can be supplied to provide console data connections up to 150 metres (500 feet) at an additional cost.

BULK POWER SUPPLY AND DISTRIBUTION UNIT

Front



Rear



This 3U rack can hold up to 3 identical plug-in power supply units. Each unit has separate AC power inputs via IEC 950 filtered inlets at the rear of the rack. The DC outputs are combined on the backplane. The maximum output power from each plug-in unit is 600W. The units can be “hot swapped” providing there is enough output power remaining to drive the load. Each unit has a bargraph to indicate the output power demand. Two 24V Auxiliary outputs are provided via resetable 10A current trips with LED status indication on the front panel. These could be used for a MADI interface unit or a Hydra networking interface unit for example. A typical system would have two of these racks, one to provide power to the console control surface and another to provide power to the Digital I/O Rack. The number of plug-in 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 sides of the rack. **To ensure proper cooling, there must be a minimum clearance of two inches (50mm) from the fans and side air outlets The maximum operating ambient temperature is 35ºC.**

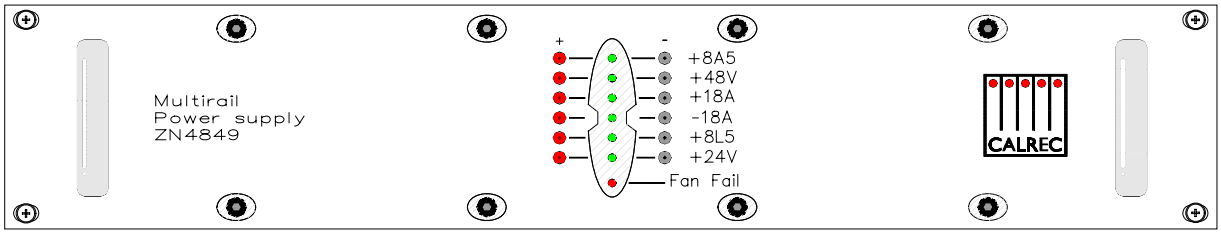
Bulk PSU Rack Fan Noise (dB SPL A-Weighted)	
These measurements were taken on axis at 1 metre from the dominant noise source:	
1 x 24V 600W PSU	42dBA
2 x 24V 600W PSU	45dBA
3 x 24V 600W PSU	47dBA
4 x 24V 600W PSU	48dBA
5 x 24V 600W PSU	49dBA
6 x 24V 600W PSU	50dBA

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

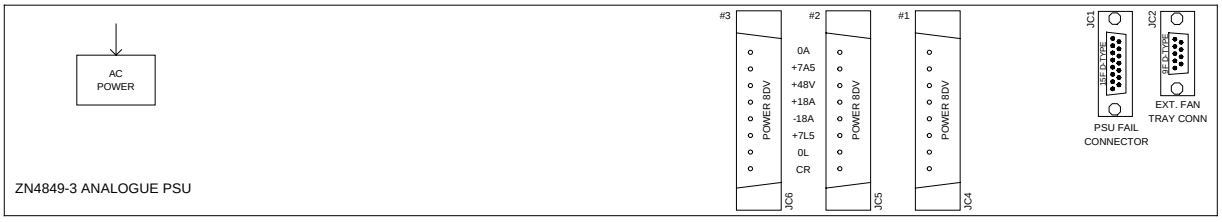
The unit also includes a front-mounted reset button for the Digital I/O rack.

MULTI-RAIL PSU

Front



Rear



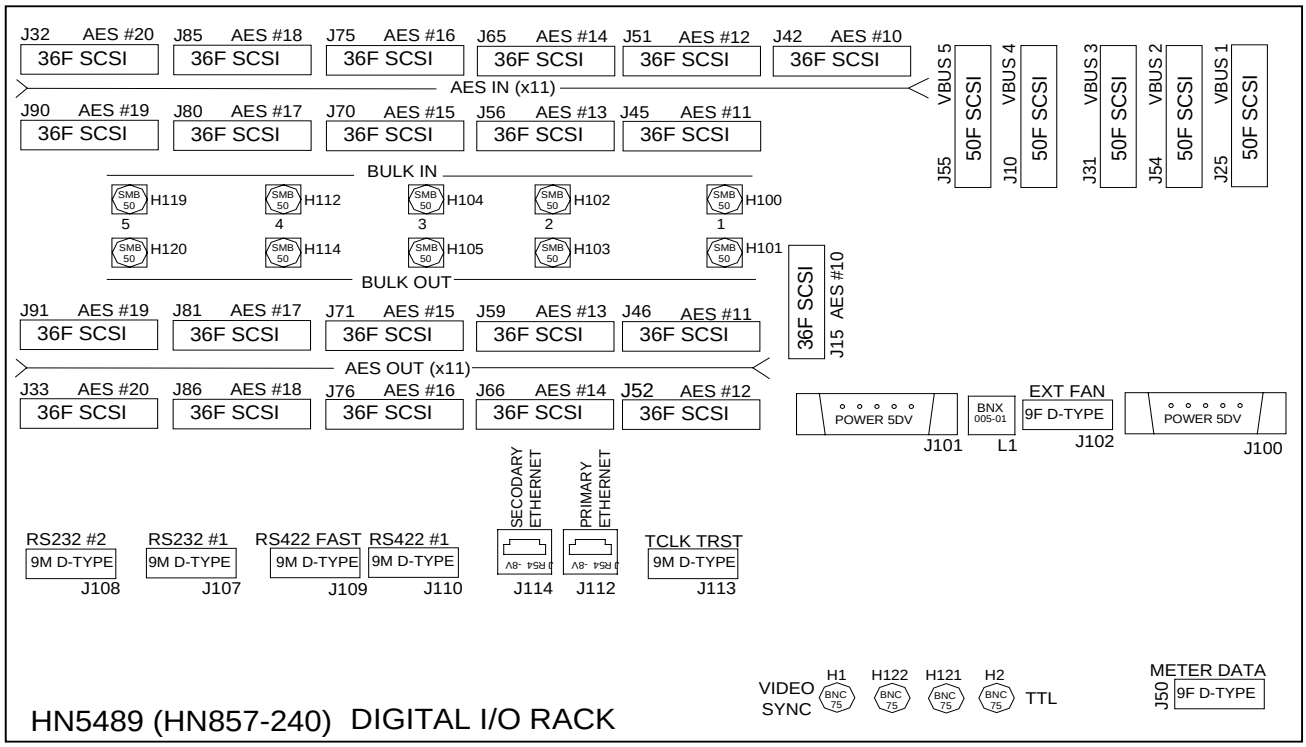
A 2U multi-rail PSU is used to power the Analogue I/O racks. A typical system with 2 Analogue I/O racks would have two of these multi-rail power supply units, plus a third unit acting as a “hot spare” providing redundancy, in case one of the other units fail. If racks are housed in different locations, each may require a hot spare. This is dependant upon the cable lengths involved. All hot spares are optional.

The Multi-Rail PSU is fan cooled but uses a very low noise fan (29dBA), 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. Should any of the fans slow down or stop, or any voltage rail fall outside specified limits, a PSU Fail signal will be sent to the console and PC to warn the operator of a problem.

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

AES INPUTS AND OUTPUTS

All AES inputs and outputs are provided on 36 way female SCSI-style connectors on the rear of the Digital I/O Rack (16 AES pairs of inputs or outputs per connector).



The Digital I/O Rack can house up to 11 AES I/O cards, each of which provides 16 AES inputs and 16 AES outputs. The cards are inserted into slots 10-20 within the rack.

Each slot has dedicated input and output connectors on the rear of the rack, to which the system's AES inputs and outputs are connected. These connectors are used only when an AES I/O card occupies the slot.

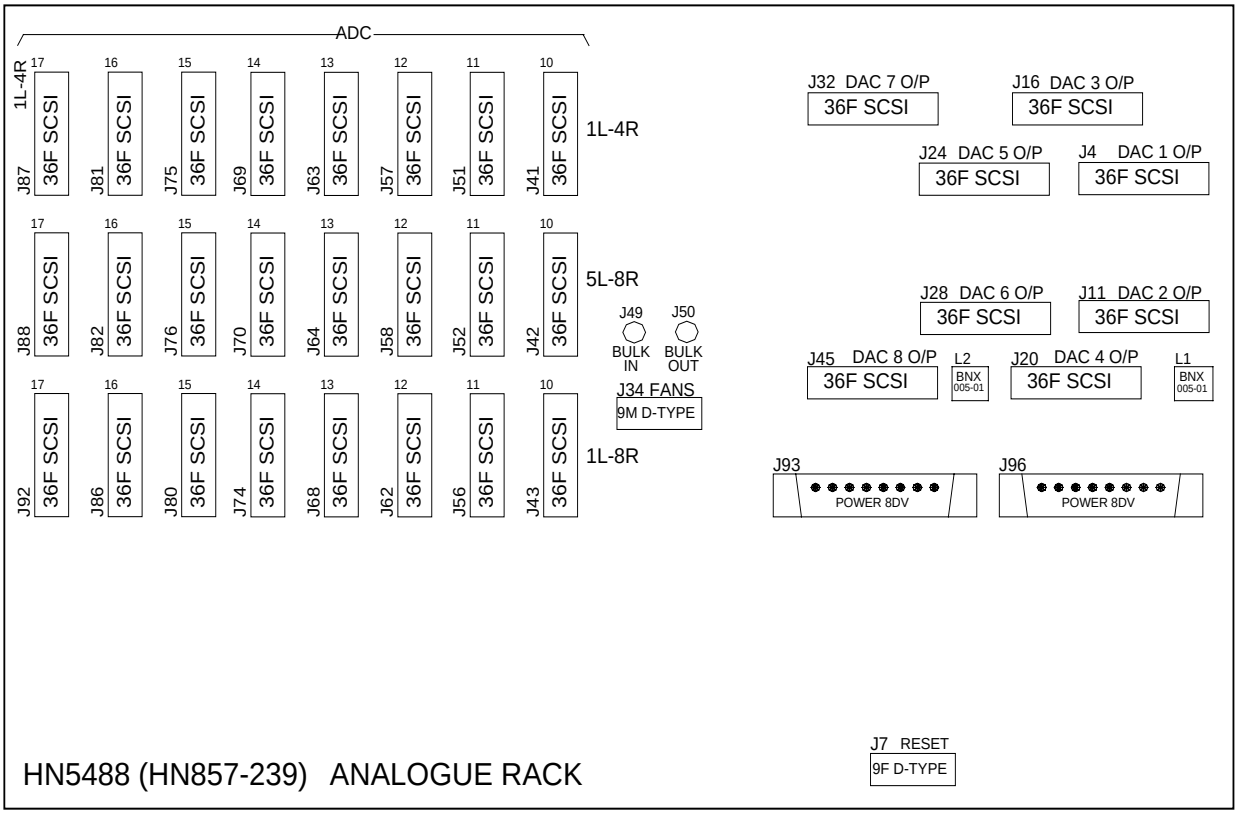
Of the 11 AES slots available, up to 5 can be occupied by bulk I/O cards which are used to interface to analogue I/O racks. If a slot is occupied by a bulk I/O card, then the AES I/O connectors belonging to that slot are left unused, and the SMB connectors for bulk I/O are used to connect to the analogue I/O racks.

Up to 8 of the 11 slots can be occupied by wide area bulk I/O (WAB) cards which are used for wide area interfaces such as MADI or Hydra. If a slot is occupied by a WAB I/O card, then the AES I/O connectors on the rear of the Digital I/O Rack belonging to that slot are used to connect to the wide area interface.

Digital I/O Rack Slot Arrangement					
Slot No	Compatible Card	AES Input Connector	AES Output Connector	Bulk Input Connector	Bulk Output Connector
1-7	DSP (ONLY 2 NEEDED - 1 PLUS HOT SPARE)	-	-	-	-
8-9	RACK PROCESSOR	-	-	-	-
10	AES, BULK OR WAB	J42	J15	H100	H101
11	AES OR WAB	J45	J46	-	-
12	AES, BULK OR WAB	J51	J52	H102	H103
13	AES OR WAB	J58	J59	-	-
14	AES, BULK OR WAB	J65	J66	H104	H105
15	AES OR WAB	J70	J71	-	-
16	AES, BULK OR WAB	J75	J76	H112	H114
17	AES	J80	J81	-	-
18	AES, BULK OR WAB	J85	J86	H119	H120
19	AES	J90	J91	-	-
20	AES	J32	J33	-	-

ANALOGUE INPUTS AND OUTPUTS

All analogue inputs and outputs are provided on 36 way female SCSI-style connectors on the rear of the Analogue I/O Racks.



ADC Card Slots and Connectors

Each analogue I/O Rack can house up to 8 mic/line or line input (ADC) cards, each of which provides 8 stereo inputs. The cards are inserted into the slots within the rack, these are numbered 1-8. Each slot has 2 dedicated input connectors on the rear of the rack, to which the system's analogue inputs are connected. Each of the input connectors provides connections for 4 stereo inputs.

ADC SLOT	MIC/LINE INPUTS 1-8 CONNECTOR	MIC/LINE INPUTS 9-16 CONNECTOR
1	J41	J42
2	J51	J52
3	J57	J58
4	J63	J64
5	J69	J70
6	J75	J76
7	J81	J82
8	J87	J88

DAC Card Slots and Connectors

Each analogue I/O Rack can house up to 8 line output (DAC) cards, each of which provides 8 stereo outputs. The cards are inserted into the slots within the rack, these are numbered 1-8. Each slot has a dedicated output connector on the rear of the rack, which provide connections for the system's analogue outputs. Each of the output connectors provides connections for 8 stereo outputs.

DAC SLOT	LINE OUTPUTS 1-16 CONNECTOR
1	J4
2	J11
3	J16
4	J20
5	J24
6	J28
7	J32
8	J45

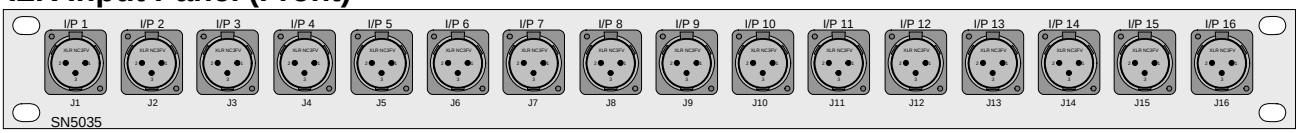
Each analogue I/O rack is connected to the digital I/O rack via the BULK IN and BULK OUT connectors J49 and J50.

BNC AND XLR INTERFACE CONNECTOR PANELS

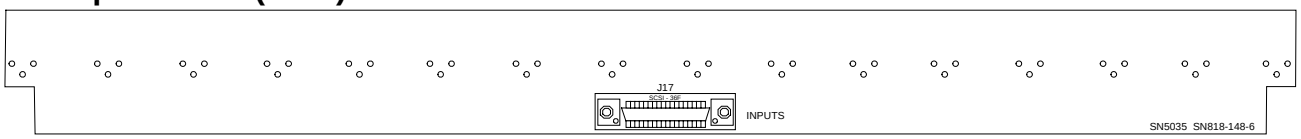
Audio inputs and outputs may be connected directly to the system's analogue and digital I/O racks using 36 way SCSI-style connectors. Optionally, break out connector panels and cabling can be provided.

For digital inputs and outputs, interface panels can be either XLR (16 male or female on a 1U panel) or BNC (32 on a 1U panel).

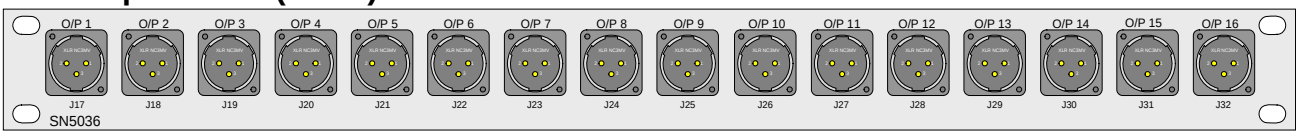
XLR Input Panel (Front)



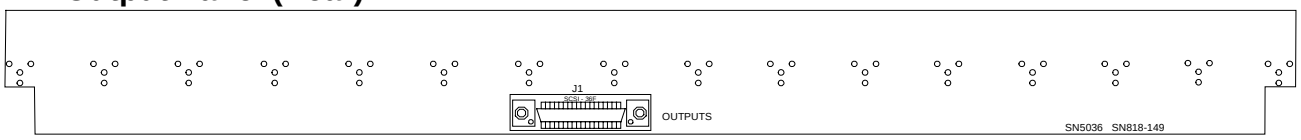
XLR Input Panel (Rear)



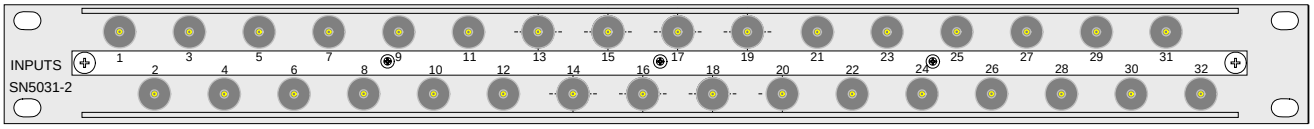
XLR Output Panel (Front)



XLR Output Panel (Rear)

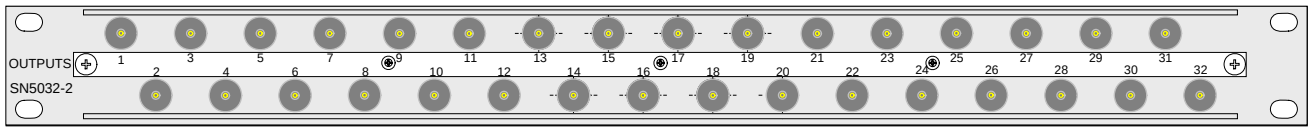


BNC Input Panel (Front)



BNC Input Panel (Rear)

BNC Output Panel (Front)



BNC Output Panel (Rear)

EDAC INTERFACE CONNECTOR PANELS

8 or 12 way EDAC connector 2U panels are available to interface analogue I/O in one of the following styles:

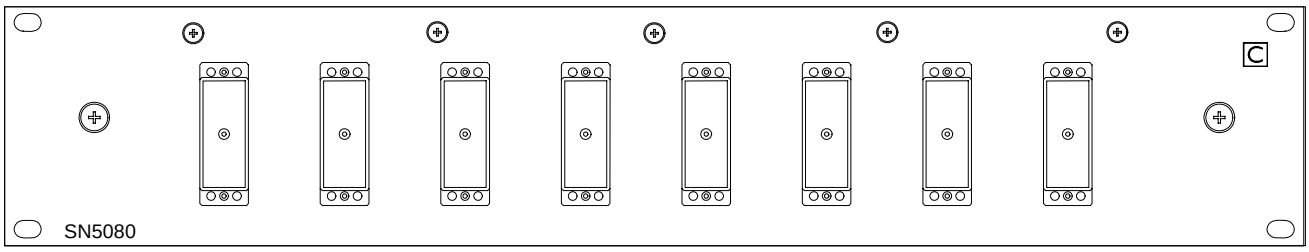
Interface	Style 1	Style 2
Mic/Line or Line Inputs	4 pairs per EDAC	6 pairs per EDAC
Line Only Inputs	8 pairs per EDAC	6 pairs per EDAC
Line Outputs	8 pairs per EDAC	6 pairs per EDAC

The choice of style will depend on the installation requirements. Limiting factors to be considered are:

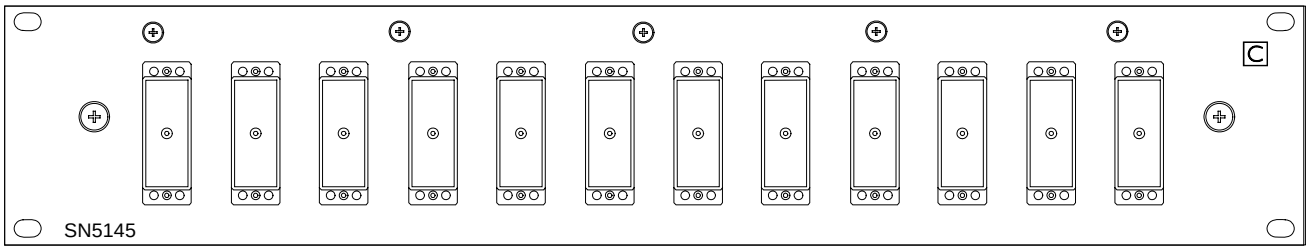
- The number of connections available in the external cabling
- Restricted amount of interface space available within 3m(9.8ft) of the backplane.

The different styles are achieved using interface cards which attach to the rear of the 2U panels to provide different combinations of SCSI-style connectors per EDAC (Except in the case of mic/line inputs where a custom cable is provided).

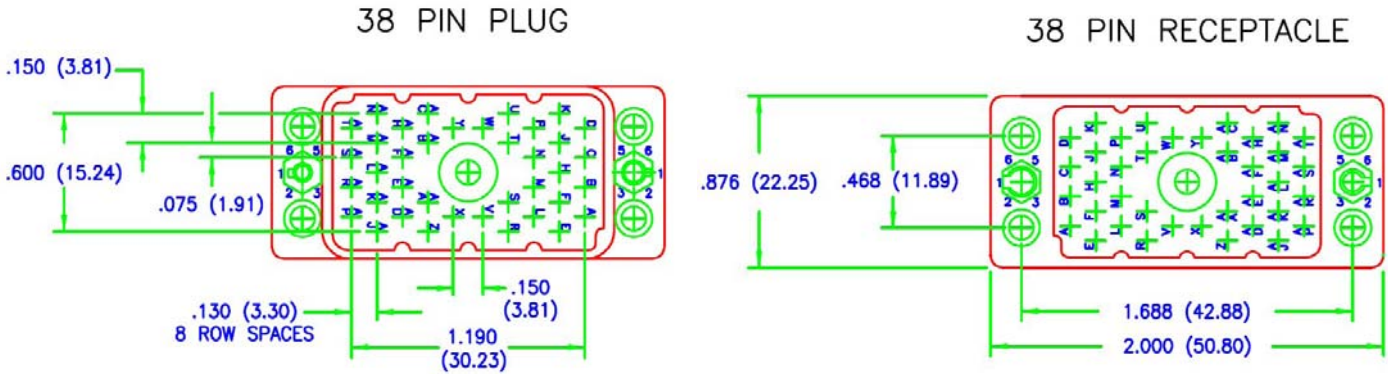
8X38W EDAC PANEL



12X38W EDAC PANEL



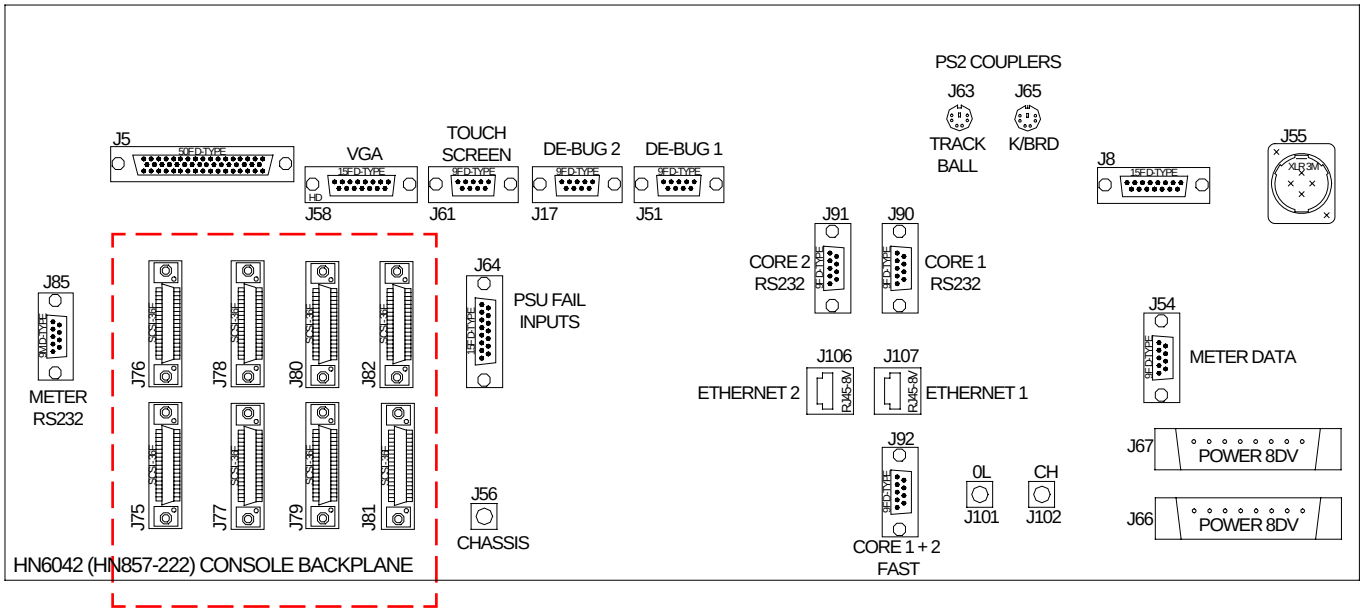
The connectors on these panels are 38 pin, male panel-mounted EDAC connectors (38MP-plug). Therefore, cables interfacing to these panels need 38 pin, female cabling connectors (38FC-receptacle).



GPIO CONNECTIONS

Connections to the relay and opto isolators are provided on 36 way female SCSI connectors on the rear of the console. Up to 4 cards can be fitted, each of which can provide up to 16 relay-isolated outputs and 8 opto-isolated inputs.

* Note that on Relay/Opto card 1, relays 1 - 4 are not available, as they are used for TX, RX, PSU Fail and APFL facilities.



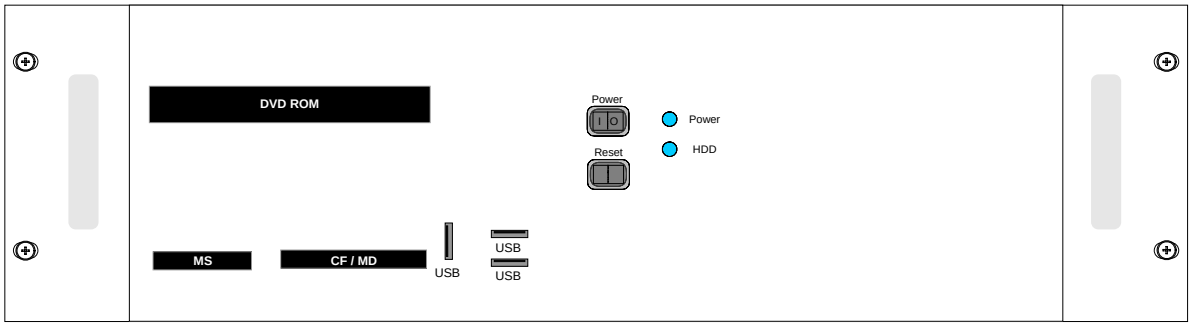
Relay Output Specification : 100mA maximum switch current, 30V maximum voltage.

Opto Input Specification : DC - 5 to 50 volts, positive or negative
AC - 5 to 50 volts peak, 50-60Hz.

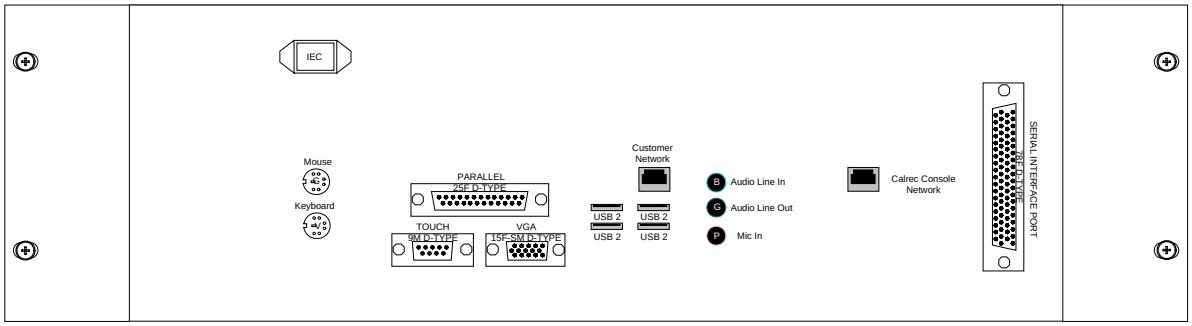
PC INFORMATION

Failure of the PC does not prevent continued operation of the control surface or the audio.

Front



Rear



There are USB connectors on both the front and the rear of the PC to allow 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.

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.

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.

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

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.

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

SYSTEM SPECIFICATION

Digital Inputs	
Formats Supported	AES/EBU (AES3) 24-bit 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	
Formats Supported	AES/EBU (AES3) 24-bit
Interface	110 Ohm transformer balanced 4V Pk-Pk (nominal) into 110 Ohm load 75 Ohm unbalanced 1V Pk-Pk (nominal) into 75 Ohm load (BNC)
Analogue Inputs	
Analogue - Digital Conversion	24-Bit
Input	Electronically Balanced
Input Impedance	>1k Ohms for Mic gains 10k Ohms for Line gains
Sensitivity	+18 / -78dB on Mic/Line Input Card +18/-24dB on Line Only Input Card.
Equivalent Input Noise	-126dB (150 Ohm source)
Distortion	-1dBFS @ 1kHz - Better than 0.003% -20dBFS @ 1kHz - Better than 0.006% -60dBFS @ 1kHz - Better than 0.3%
Frequency Response	20Hz to 20kHz +/- 0.5dB on Mic/Line Input Card 20Hz to 20kHz +/- 0.25dB on Line Only Input Card
Input CMR (Common Mode Rejection)	>70 dB (Typical 80dB) on Line Inputs >75 dB (Typical 85dB) on Mic Inputs
Analogue Outputs	
Digital - Analogue Conversion	24-Bit
Output Balance	Electronically Balanced, 20Hz to 20kHz, Better than -35dB, typically -45dB
Output Impedance	<40 Ohms
Distortion	-1dBFS @ 1kHz - Better than 0.006% -20dBFS @ 1kHz - Better than 0.003% -60dBFS @ 1kHz - Better than 0.3%
Frequency Response	20Hz to 20kHz +/- 0.25dB
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	NTSC/PAL Video Internal Crystal Reference TTL Wordclock (48kHz) AES/EBU Digital Input (48kHz)

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

- 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)

The system can be pre-set with up to five external sync sources, plus internal, such that if the 1st source fails, it will automatically switch to the 2nd, and so on.

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