APOLLO OPERATOR MANUAL

V1.14.6

Digital Broadcast Production Console

CALREC

Putting Sound in the Picture

calrec.com

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IMPORTANT INFORMATION

After Sales Modifications
Please be aware that any modifications other than those made or approved by Calrec Audio Limited or their agents, may invalidate the console's warranty. This includes changes to cabling provided by Calrec and variations to the recommended installation as detailed in Calrec documentation.

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

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

Installation
In many installations the AC power connectors will not be readily accessible, effectively making the equipment permanently connected. The installation should be carried out in accordance with all applicable installation rules and regulations.

Service Personnel
The AC power disconnect devices are the 2 x IEC (IEC60320-1 C13/C14) couplers located at the rear of each unit. WARNING: The apparatus has a dual power system. It is essential that BOTH AC power IEC couplers are disconnected to prevent exposure to hazardous voltage within the unit.

Third Party Equipment
Integrating third party equipment into a Calrec system may compromise the product's ability to comply with the Class B radiated emission limits set in the EMC (Electro Magnetic Compatibility) standard EN55022.

Calrec Audio Limited can not be responsible for any non-conformities due to use of third party equipment. If in doubt, please contact Calrec Audio Limited for guidance prior to integrating any third party equipment.

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

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

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

FIGURE 1 - LEAD FREE

Pb Pb-Free **Lead Free**

RoHS Legislation
In order to comply with European RoHS (Reduction of Hazardous Substances) legislation, Calrec PCB and cable assemblies are produced with lead-free (tin/copper/silver) solder instead of tin/lead solder. See Figure 1.

In the unlikely event of a customer having to carry out any re-soldering on Apollo or Hydra2 hardware, it is imperative that lead-free solder is used; contaminating lead-free solder with leaded solder is likely to have an adverse effect on the long-term reliability of the product. Circuit boards assembled with lead-free solder can be identified (in accordance with IPC/JEDEC

FIGURE 2 - LEAD FREE STICKER

e1

standards) by a small oval logo (see Figure 2) on the top-side of the circuit board near the PCB reference number (8xx-xxx). The same logo is used on the connector hoods of soldered cable assemblies.

If in doubt, please check with a Calrec customer support engineer before carrying out any form of re-soldering.

ISO 9001 and RAB Registered
Calrec Audio Ltd has been issued the ISO9001: 2008 standard by the Governing Board of ISOQAR.

The award, for both UKAS (Figure 3) and RAB (Figure 4) 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.

FIGURE 3 - UKAS REGISTRATION

ISOQAR QUALITY ASSURED ISO 9001 — UKAS QUALITY MANAGEMENT 026
Certificate number 3205/02

FIGURE 4 - RAB REGISTRATION

ISOQAR QUALITY ASSURED ISO 9001 — ANAB ACCREDITED
Certificate number 3205/02

HEALTH AND SAFETY

Important Safety Instructions:

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Protect the power cord from being walked on or pinched particularly at the plugs, convenience receptacles, and the point where they exit from the apparatus.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/ apparatus combination to avoid injury from tip-over.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operator normally, or has been dropped.
- Warning: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
- Not intended for outdoor use.
- This equipment must be EARTHED.
- Before starting any servicing operation, equipment must be isolated from the AC power supply. The disconnect devices are the 2 x IEC connectors (IEC 60320-1 C13/C14 couplers).
- Do not allow ventilation slots to be blocked. Do not leave the equipment powered up with the dust cover fitted.

Cleaning

For cleaning the front panels of the equipment we recommend using a soft anti-static cloth, lightly dampened with water if required.

Explanation of Warning Symbols

Triangular warning symbols contain a black symbol on a yellow background, surrounded by a black border.

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

The exclamation mark within an equilateral triangle, as shown on this page, is intended to prompt the user to refer to important operating or maintenance instructions in the documentation supplied with the product.

Earthing

This is a Class I product. An Earth connection MUST be provided in each AC power cord.

The Earth Bolt connection at the rear of the console should be connected to Earth using Earth cable at least 6mm^2 in cross section (10 AWG).

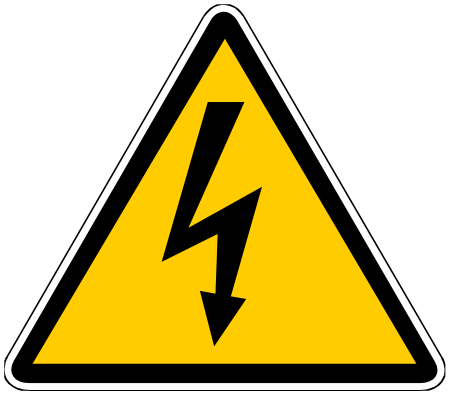
Lithium Battery Replacement

Caution: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type. Batteries must not be exposed to excessive heat such as sunshine, fire or the like

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

DANGEROUS VOLTAGES



IMPORTANT INSTRUCTIONS

TECHNICAL SUPPORT

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Email - Technical:	support@calrec.com
Email - General:	enquiries@calrec.com
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Fax:	+44 (0) 1422 842159
Website:	www.calrec.com

Should you require any technical assistance with your Calrec product then please contact your regional Calrec distributor. Customers within the UK or Ireland should contact Calrec directly.

For a complete list of worldwide distributors by region, go to www.calrec.com or contact us for more information.

For pre-delivery technical enquiries, UK and Ireland customers should contact the Calrec project manager assigned to their order. Post delivery, the Calrec Customer Support team will take care of your technical enquiries.

Our UK customer support team work closely with our global distributor network to provide the highest level of after sales support. Your distributor should be your first point of contact and will often be able to provide an instant solution, be it technical advice, spares or a site visit by an engineer.

Calrec UK customer support and our global technical team provide free of charge technical support and advice by phone or email to all customers.

Once your console is installed we can provide an engineer on site to carry out system commissioning. Commissioning ensures the equipment is correctly installed and fully functioning before it goes into use. During commissioning, our engineers can also help and advise with configuration and setup.

Calrec after sales support includes:

- Free of charge comprehensive technical advice and support by phone and email.
- Software and hardware upgrades.
- Repairs.
- Quick supply of replacement or loan hardware in the event of a failure.
- Providing export documentation for the return of faulty parts.
- On site commissioning visits.
- On site service and health check visits.
- Emergency engineer visits.
- On site on-air support, for complete peace of mind - providing operational guidance, and technical engineering support for new installations or high profile events.
- Operational training.
- Maintenance / technical training.
- Supply of replacement components
- Supply of documentation

Service contracts

We offer a range service contracts to our UK and Ireland customers, offering 24/7 telephone support, regular health checks and extended warranty amongst other benefits. Please contact our customer support team for more information on service contracts.

Product Warranty

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

Repairs

If you need to return goods to Calrec, for whatever reason, please contact your regional distributor or Calrec customer support beforehand for guidance, as well as to log the details of the problem and receive a reference number. For customers outside the UK and Ireland, shipping via the distributor saves customers from dealing with exportation paperwork. If there is a need to send direct to Calrec, contact us beforehand to log the incoming repair and for assistance with exportation documents.

Standard of Service

Ensuring the highest standards is a priority, if you have any comments on the level of service, product quality or documentation offered to you by Calrec, please contact the Calrec Customer Support team in the UK who will endeavour to address the issues. Calrec welcomes all customer feedback.

For feedback specific to this document, please contact enquiries@calrec.com.

APOLLO
OVERVIEW

INTRODUCTION

Apollo is a hugely flexible and scalable large format digital audio console designed to withstand the most critical broadcast production and live environments.

Apollo expands on the success of the Alpha / Sigma / Omega / Zeta product range, employing the same operational methodology and expanding upon it to encompass the powerful feature set required for modern broadcasting.

Control panels can switch mode on the fly, allowing for all controls to be quick and close to hand, irrespective of the operator's position and allowing each user their own preference of control layout. User splits and independent monitoring allow for multiple operators to work on the same surface without impacting upon each other. Comprehensive, flexible monitoring and metering ensure operator awareness and quick reaction over all aspects of the most complex productions.

Bluefin2

At the heart of the design is a powerful Bluefin2 digital signal processing engine. Calrec's award winning Bluefin DSP was first launched in 2006 allowing the design of consoles with very high channel counts contained on a single card, providing very efficient, reliable and powerful systems that can meet the ever increasing demands of modern broadcasting. The second generation of Bluefin is even more powerful and future proof. As well as high channel counts, amongst other benefits it provides comprehensive EQ, filters and dynamics on all paths, sample delay processing, multiple simultaneous track/IFB sends per path, LT/RT encoding as well as very comprehensive monitoring and metering.

Hydra2

Apollo consoles utilize I/O options from the comprehensive Hydra2 range. Fixed format units and modular I/O card-frames are offered in a wide selection of formats to suit all needs. The Hydra2 system can pass up to 512 channels of audio along with control data and error detection on each copper or fiber connection to the router within the console's processing rack. The physical location of I/O units can be selected to minimize external cable runs and setup time. Multiple Apollo/Artemis routers can be networked together, allowing all consoles on a network the ability to use all of the I/O connected. Standalone router racks - without control surfaces can also be connected either to expand the number of I/O ports available or to centralize I/O connectivity.

Commitment

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

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

PRINCIPAL FEATURES

Control Surface
- Up to 160 standard or dual physical motorized path faders.
- 12 dual layers of faders for flexibility in organizing path layout.
- Optional dual in-line fader panels providing simultaneous physical access to A and B sub-layers.
- Flexible control layout to suit each user's preference.
- Very comprehensive and configurable monitoring and metering.
- User splits allowing for multiple operators to work independently.

Signal Processing
- 1020 input channels available.
- Up to 16 Main outputs, 48 audio sub-groups, 96 track bus and 48 aux bus outputs.
- 6 full bands of parametric EQ / filters on each channel, group and main path.
- 2 x compressor / limiters, 1 x expander / gate, and sidechain EQ / filters on each channel, group and main path.
- 4 independent simultaneous post fader, pre fader or pre EQ track / IFB sends per channel / group path.
- Up to 4 direct output / mix-minus sends per path.
- up to 2.73 seconds of path delay per path.
- 512 legs of up to 2.73 seconds of assignable input and output delay.

I/O
- Integral 8192x8192 router with up to 512 audio channels per Hydra2 port. Fully integrable with any Hydra2 network.
- Extensive range of Hydra2 audio I/O & GPIO available.
- Copper or fiber connectivity.

Resilience
- Independent DSP, routing and control processing.
- Comprehensive hardware and data path redundancy.
- Fully hot-pluggable and self initializing components.
- Independent of system PC interface.

Power
- Distributed PSU system – no heavy duty power cables.
- Power Over Ethernet technologies for simple internal distribution.
- Low power consumption and heat generation.

APOLLO
OPERATION

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CONFIGURATION PC OVERVIEW

The configuration PC is mounted inside the surface. The only access available to the PC is through the keyboard, trackball, touchscreen display and USB port on the console upstand.

Apollo does not rely on the PC for audio processing. The console will continue to operate and process audio uninterrupted even if the PC is reset or suffers a loss of power.

Main application

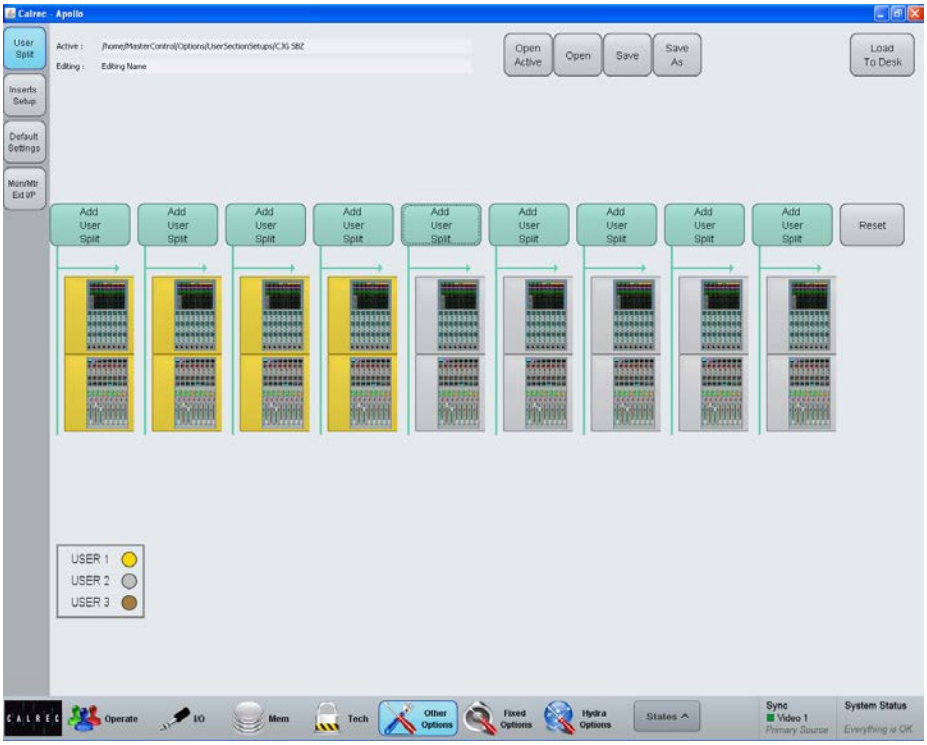
The main purpose of the configuration PC is to run the main application, which provides access to many important console options.

The main application is launched automatically when the configuration PC is booted. If the application has been closed, it can be re-loaded from the 'Main Application' icon on the desktop.

Figure 1 shows the layout of the main application. Along the bottom edge of the application is the main menu which contains buttons for each of the main sections of the application. When this document instructs you to go to the MEM section, for example, it is the equivalent of saying: 'touch the MEM button in the main application's main menu'.

Once a certain section has been selected, a list of available screens will appear vertically along the left hand edge of the application. Touching one of these buttons will update the main application to display the relevant screen. When this document instructs you to go to a certain screen, it is referring to touching the relevant button on this list, down the left hand side of the screen.

FIGURE 1 - MAIN APPLICATION



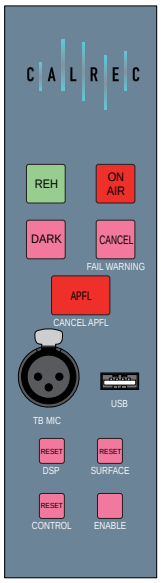
USB Port

A USB port linked to the configuration PC is available in the broadcast facilities panel located in the TFT meter upstand. This can be used for backing up and restoring memories or settings from the console. It is designed for portable flash based USB memory devices and as such may not provide power for larger USB hard drives.

Online Documentation

Electronic versions of all documentation may be accessed on the configuration PC by using the Online Documentation application. This can be loaded from the Online Documentation folder on the desktop.

FIGURE 2 - USB PORT



TOUCH OVERVIEW

Apollo makes great use of touch technologies to provide direct interaction with on screen controls.

The configuration PC display, surface displays and wild assign TFTs are all touch sensitive and should be used with a finger rather than any other pointing device (such as the top end of a pen) which may damage the surface of the displays. Certain aspects of the software have been designed to be accessed primarily through touch and so some terms should be defined to aid in reading this document.

Touch/Tap

The main interaction between operator and touch control is the touch (or tap). The operator should touch the desired control on the display then immediately release without changing position. See Figure 1.

Multiple touches (Hold and Touch)

In some cases it is necessary to combine touch controls to achieve the desired result. One control will normally be held which touching other controls. Figure 2 demonstrates this process. This is normally only required between control cell displays on the surface. Combinations between configuration PC and the surface will not be used.

Swipe

The swipe motion may be used to scroll through a list of items or page through a number of views. Touch the control and straight away swipe in the required direction. Remove the at the end of the swipe. This motion is shown in Figure 3.

FIGURE 1 - TOUCH/TAP

Touch the screen momentarily and then release in the same position

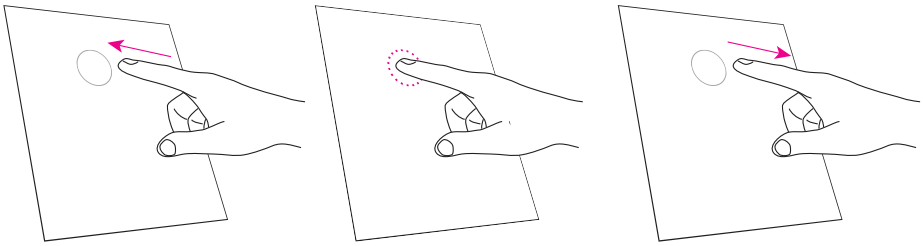


FIGURE 2 - HOLD AND TOUCH

Touch an area of a mini-TFT and hold while touching another area

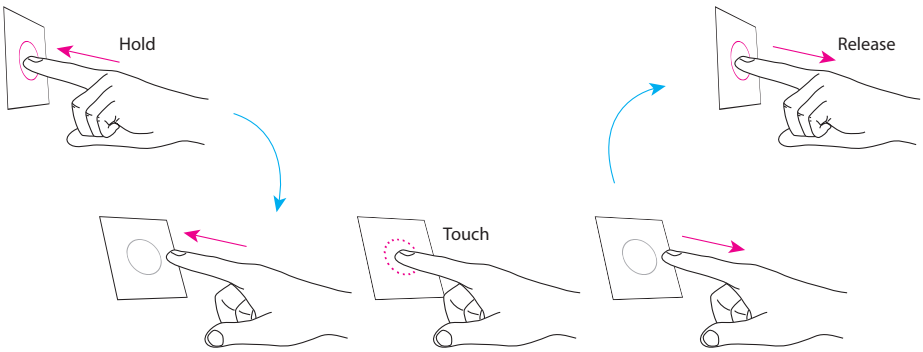
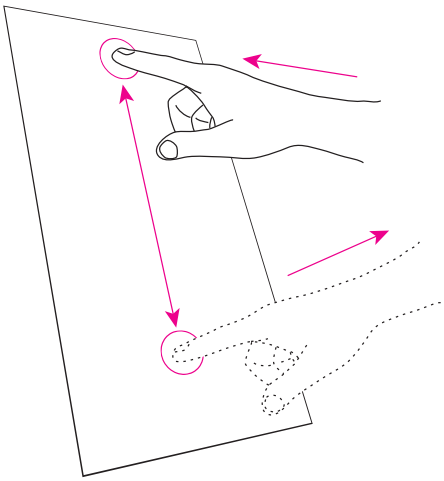


FIGURE 3 - SWIPE

Touch the display, swipe a finger to another position then release



SURFACE CONTROL OVERVIEW

Apollo works the way you want to. A variety of operating modes and different ways to display information ensure that every operator will feel at home behind the console.

There are a range of different panels available that make up the Apollo surface. These are detailed in the 'Surface Panel Overview' section of this document. It is first important to understand the different control types which make up these panels. The main control types on the surface are as follows:

Rotary controls

The rotary controls on the surface will change color to reflect the type of control they are currently assigned to. For example, when assigned to an Aux control they would be colored green.

Buttons

The small square and triangular buttons, like the rotary controls, change color when active to reflect the currently assigned control. Where there are buttons that relate to the same control as displayed on a control cell display, the buttons will be used for control. The control cell displays are not touch sensitive when a physical button is present.

Control cell

The two interface elements described above are combined with a display to make up control cells. One of these cells is shown in Figure 1.

The upper rotary control and button control the parameters shown in the upper half of the control cell display. The lower rotary control and button control the parameter shown in the lower area of the control cell display.

Controls that are not active (e.g. pan controls when assigned to a surround bus) are hidden; the rotary controls, buttons and control cell display sections will not be lit.

Button cell

In a button cell, as shown below, the buttons map directly to the nearest control cell display. Switchable controls are accessed by pressing the relevant button.

Strip

A Strip is a collection of controls that are specific to each fader on the surface. For example, each fader control cell always contains controls that affect the fader directly below it. The control cells and TFT on the wild assign panel may also be arranged in this way dependant on the wild assign panel mode.

Rows

Certain horizontal sets of controls are used together to group similar controls. These are known as **rows**. Each row on the surface has a name, such as 'Functions row' or 'Modes row'. The rows are identified on the next page.

The Layers row and Modes row always span the width of the panel and contain controls that do not relate directly to a specific fader.

FIGURE 1 - CONTROL CELL

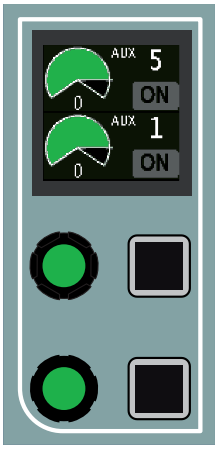


FIGURE 2 - BUTTON CELL

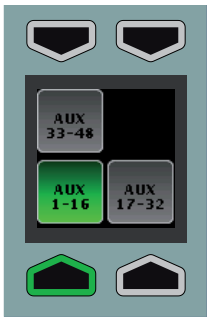
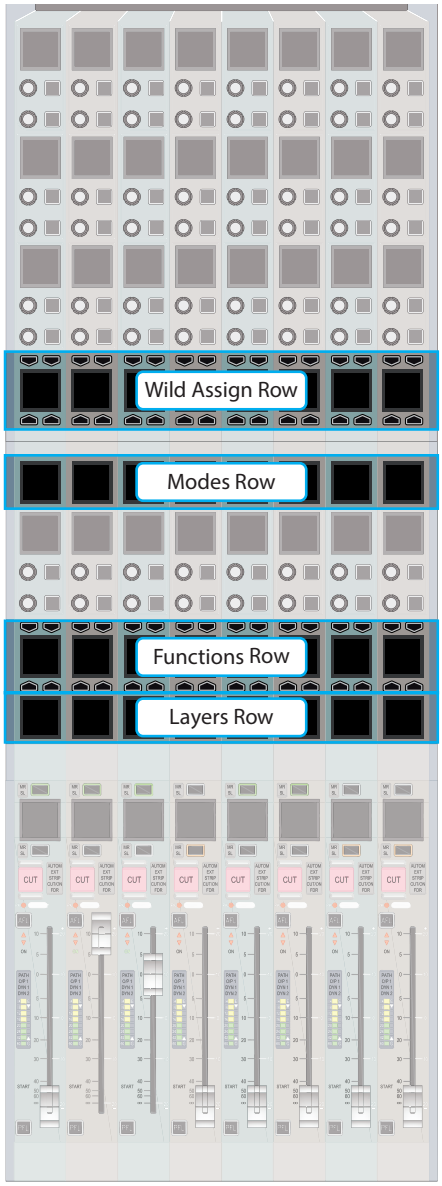


FIGURE 3 - ROWS

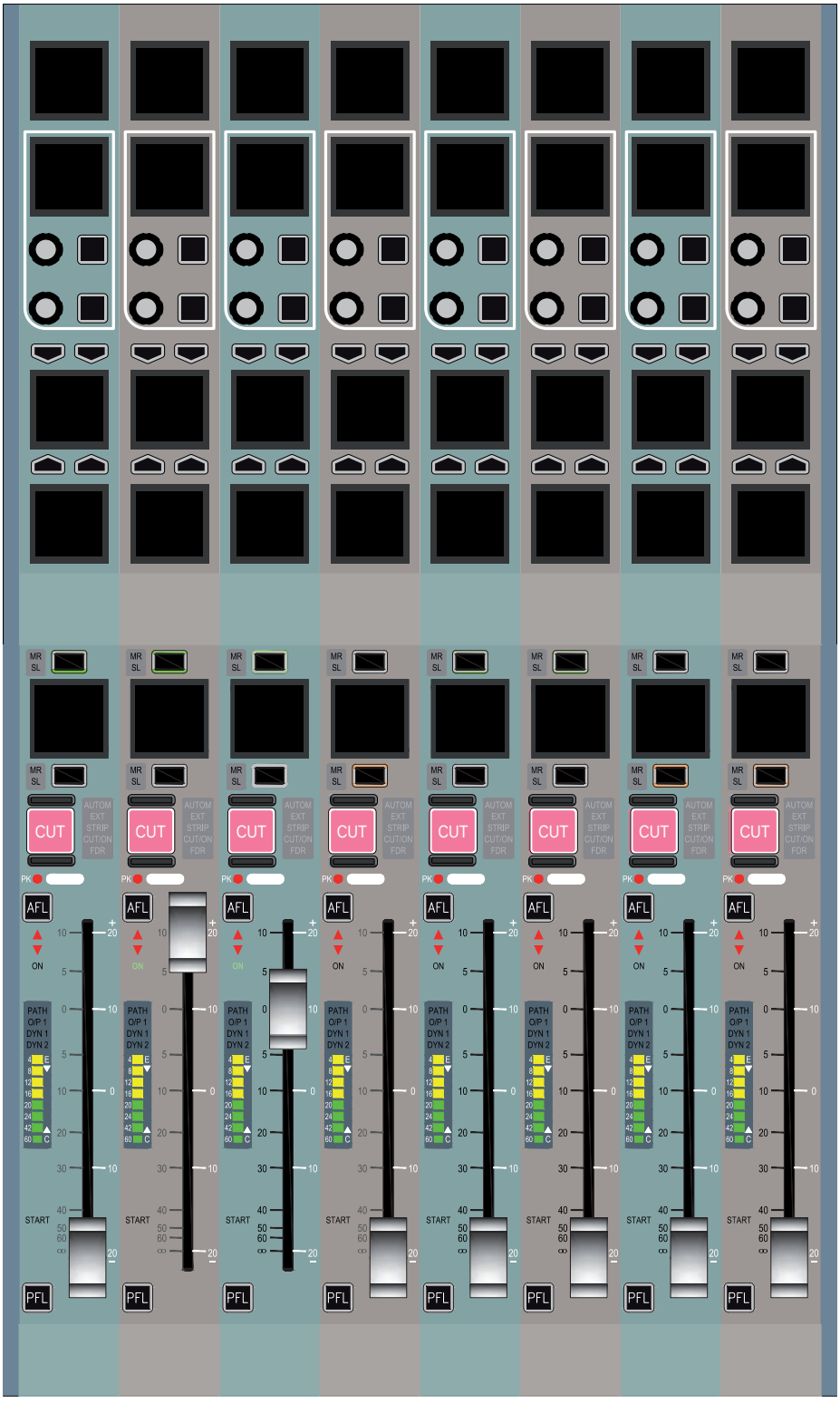


SURFACE PANEL OVERVIEW

Fader Panel

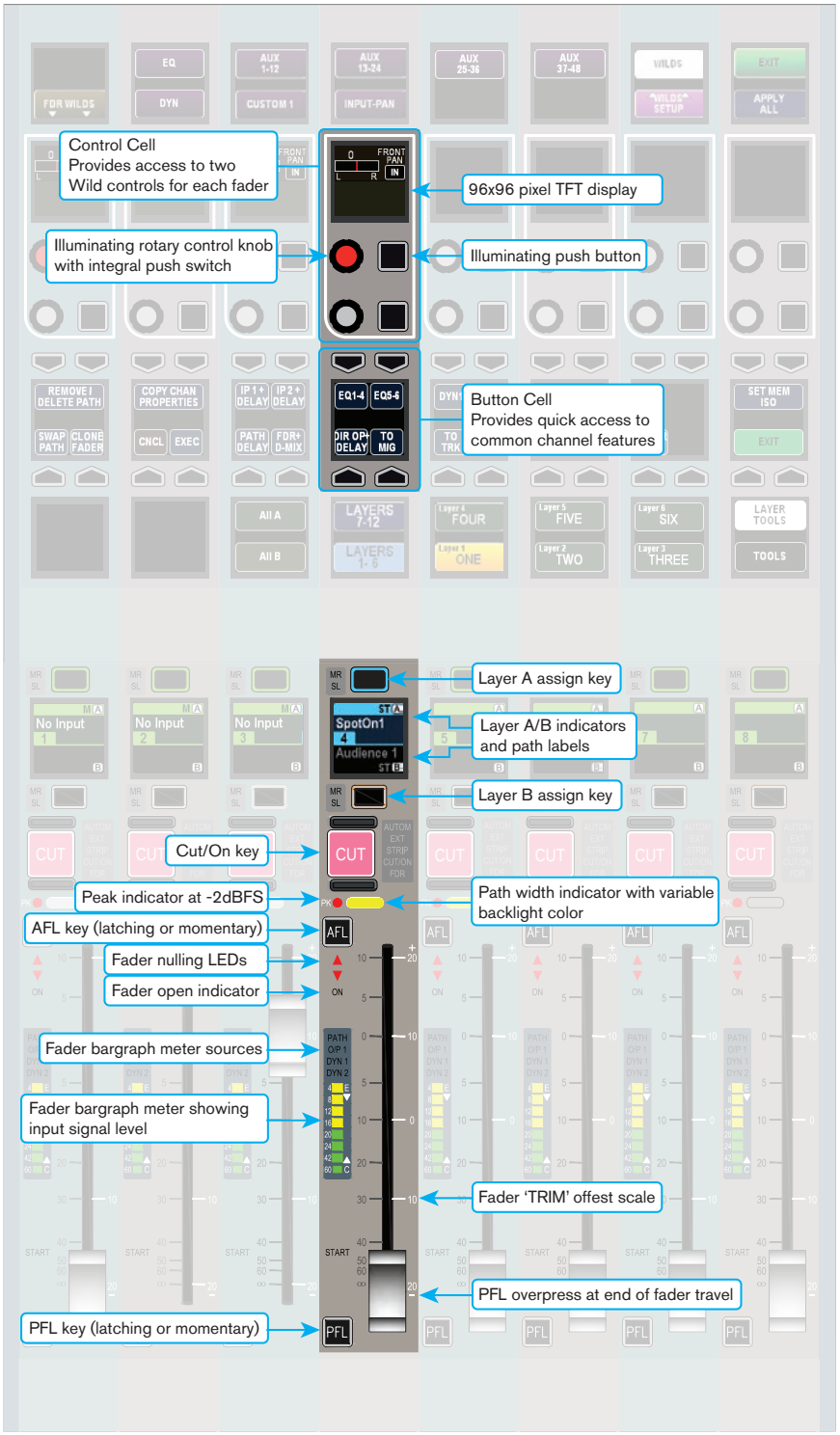
Each fader panel consists of 8 fader strips at a fader pitch of 30 mm. Each fader strip contains an A/B assign section, a button cell and a control cell. A blank fader panel is shown in Figure 1.

FIGURE 1 - FADER PANEL



The main control features are highlighted in Figure 2. All these controls are normally relevant to the highlighted fader and are repeated eight times across the panel.

FIGURE 2 - FADER PANEL CONTROLS



There are two, eight wide control cell rows that span the width of the panel which are highlighted in Figure 3.

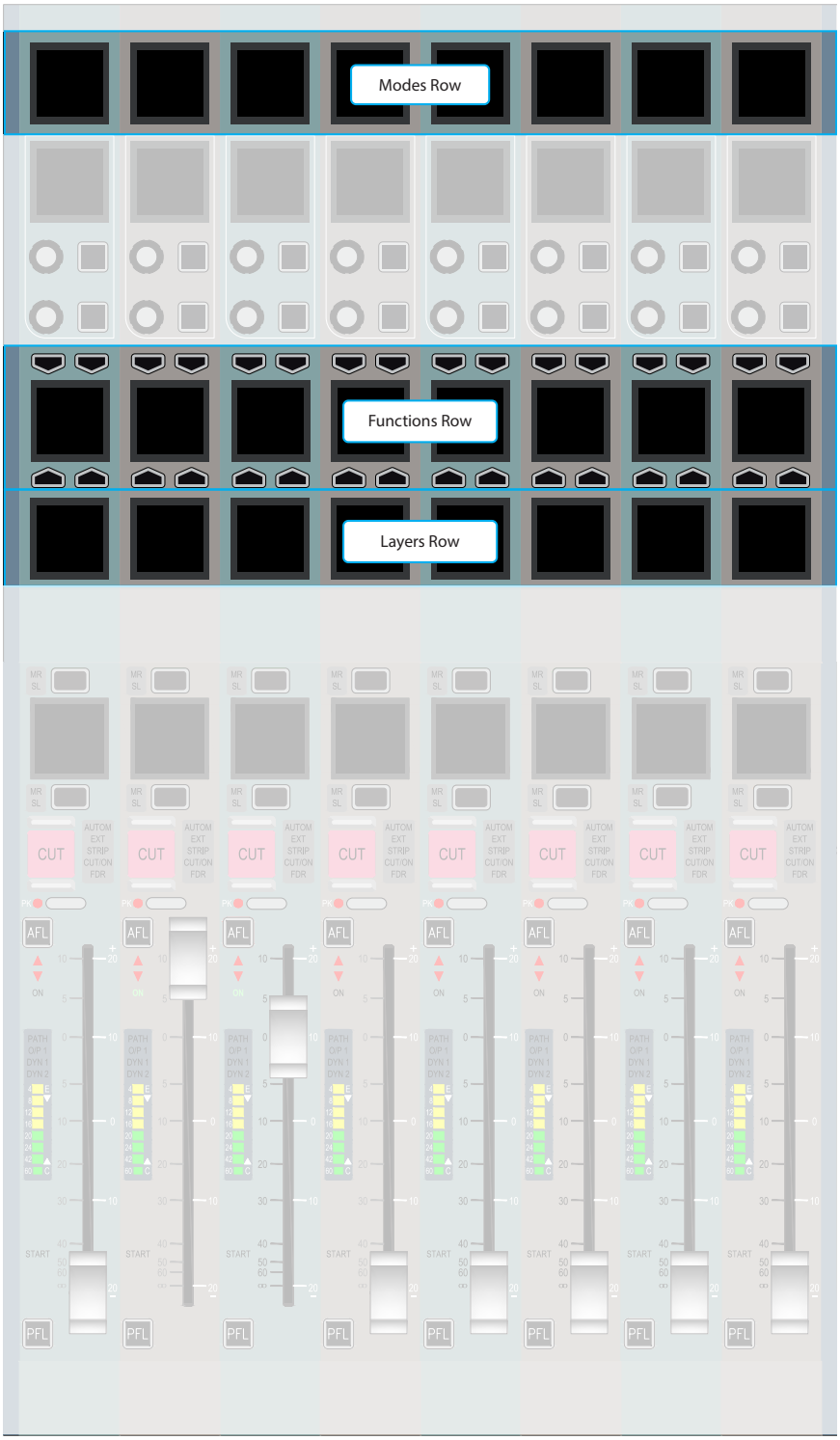
The Modes row is used to control the mode of the wild assign panel above it.

The Layers row is used for layer switching and accessing certain other panel functions.

The Functions row changes between displaying controls relevant to each fader (as shown in the previous figure), or a range of setup and configuration options which do not directly relate to any one fader.

It is an important to make the distinction that unlike other displays and controls on the panel, these rows are not linked to a single fader.

FIGURE 3 - FADER PANEL ROWS



Wild assign Panel
Each wild assign panel consists of 24 identical control cells and a row of button cells.

The bottom row, or wild assign row, is generally used to control the operation of the “fader wild” control cells above.

The control cells will display different controls and be arranged in different ways depending on the mode that the panel is operating in.

The panel could be in Assign, Outputs Monitor or Wilds mode.

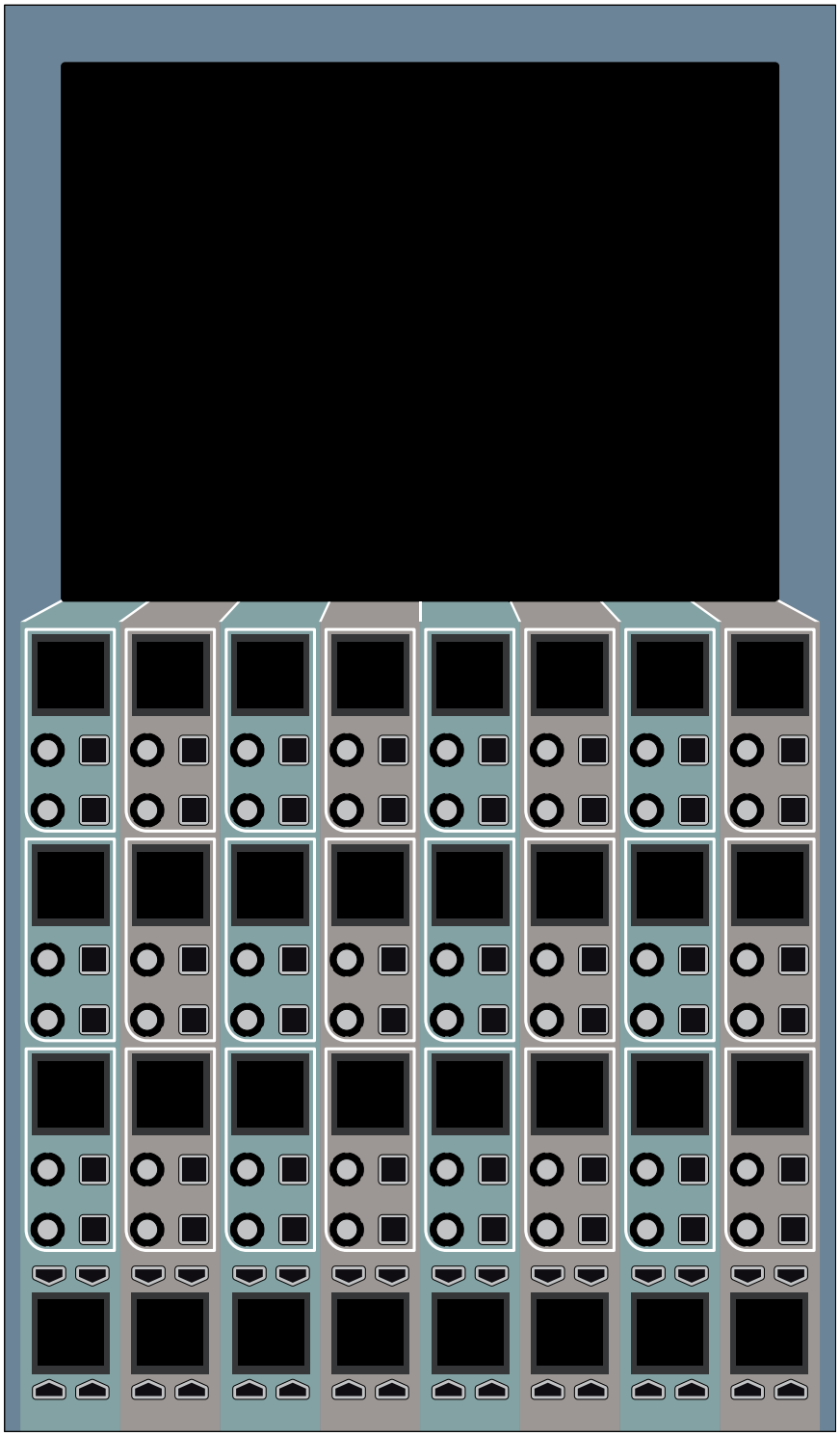
Assign mode makes the panel function as an assignable panel. In much the same way as previous Calrec assignable consoles, such as Alpha, a range of parameters are displayed that reflect the values of, and allow control over, the currently assigned path.

Wilds mode splits the panel up into eight vertical strips effectively providing six additional wild controls per fader.

Outputs and Monitor modes provide control over output and monitor functions.

A TFT touchscreen located at the top of the panel is used to display and interact with control settings.

FIGURE 4 - WILD ASSIGN PANEL



Each type of control on the wild assign panel is detailed in Figure 5.

FIGURE 5 - WILD ASSIGN PANEL CONTROLS

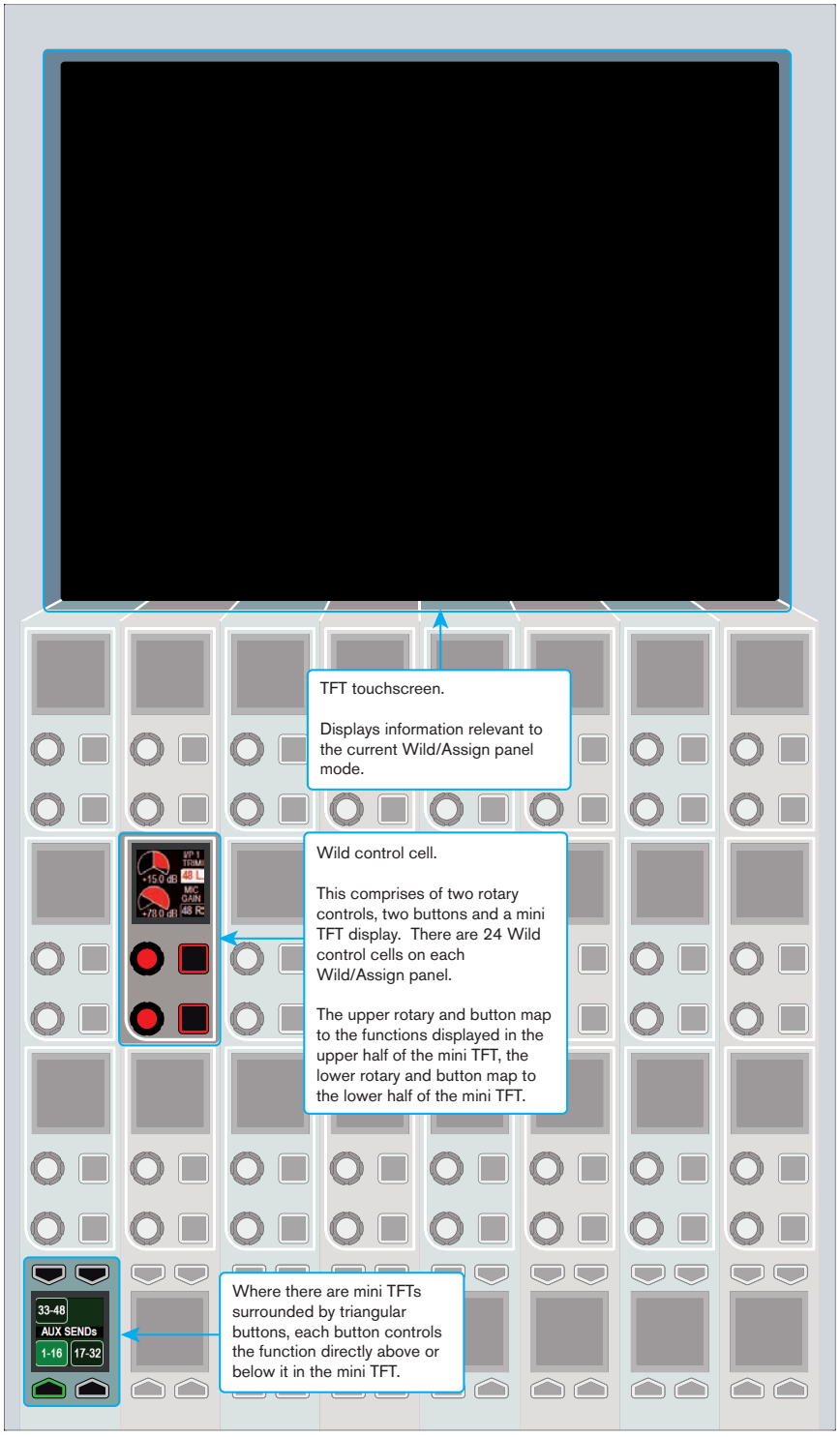
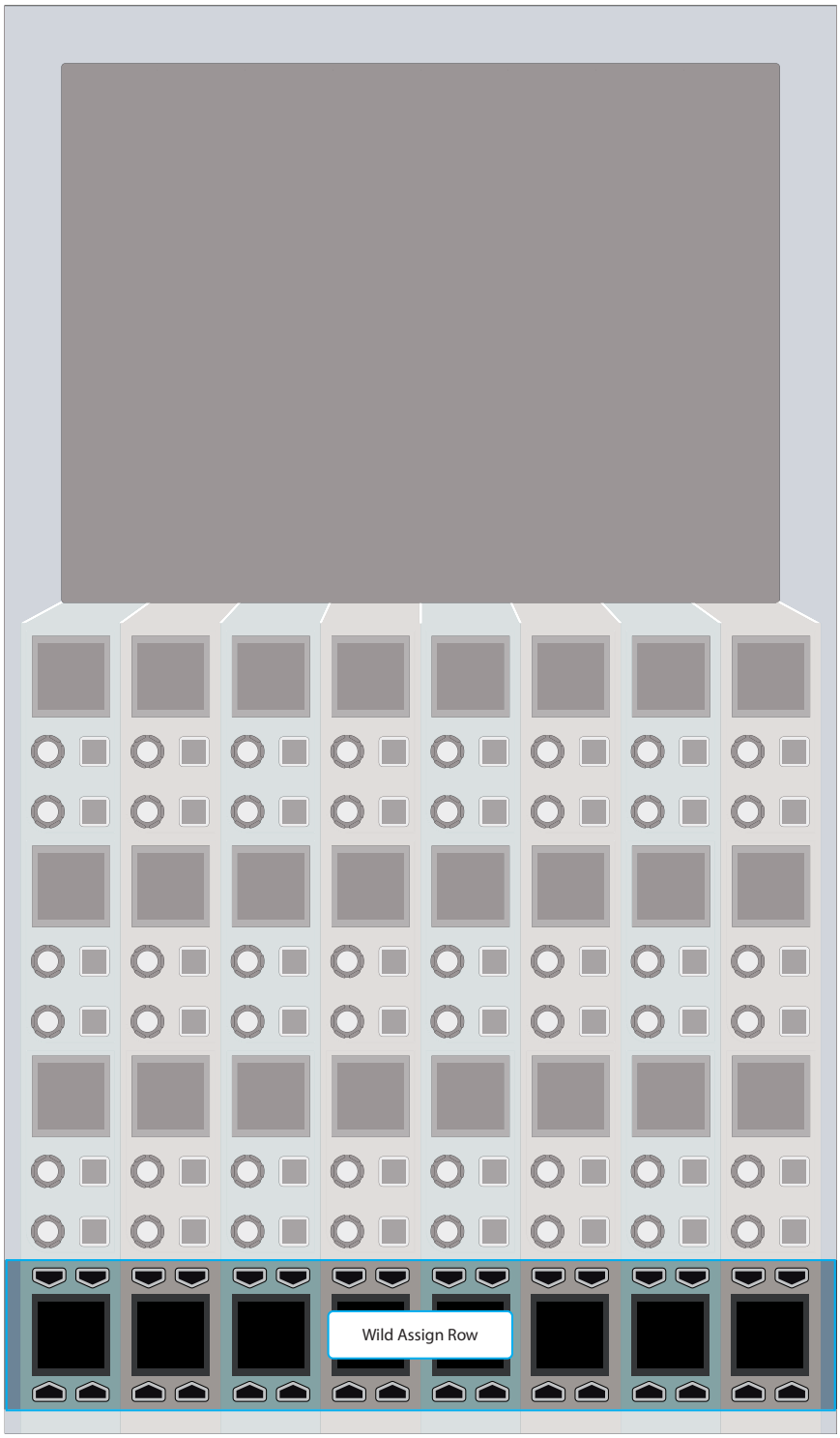


Figure 6 highlights the main row at the bottom of the wild assign panel. This row is known as the wild assign row. In Assign, Outputs or Monitor mode this functions as a panel wide row working with various controls in the control cells and mini TFTs above.

In Wilds mode, the panel is divided up into eight vertical strips. In this case the control cell displays in the Wild Assign row each relate to a separate strip of controls.

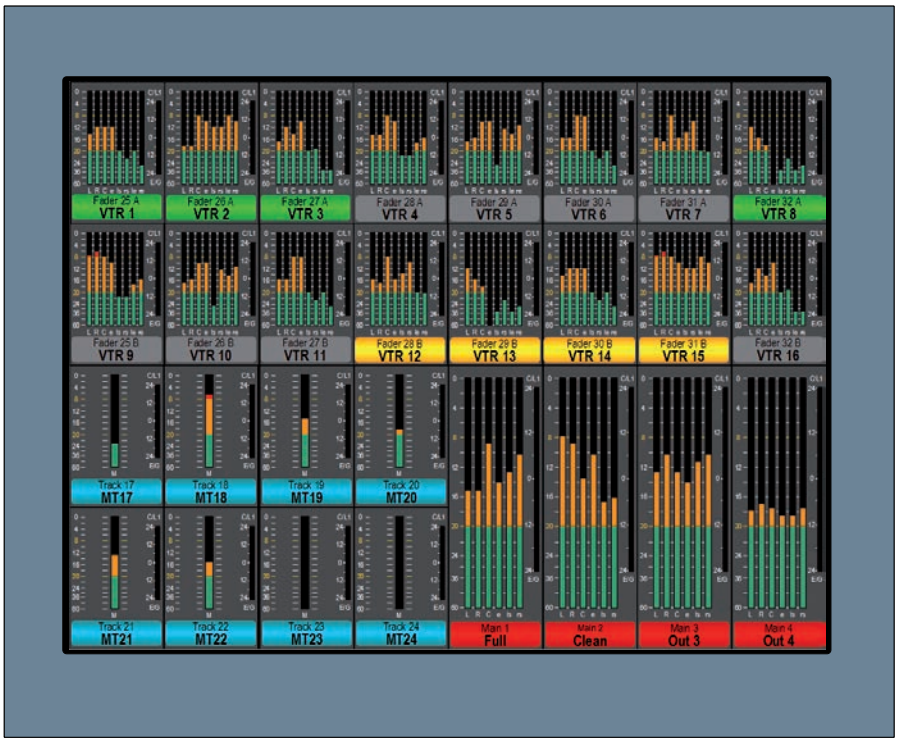
FIGURE 6 - WILD ASSIGN PANEL ROWS



TFT Panel

This is primarily used to display metering information and is not touch controlled. An example meter layout is shown in Figure 7.

FIGURE 7 - TFT METER PANEL



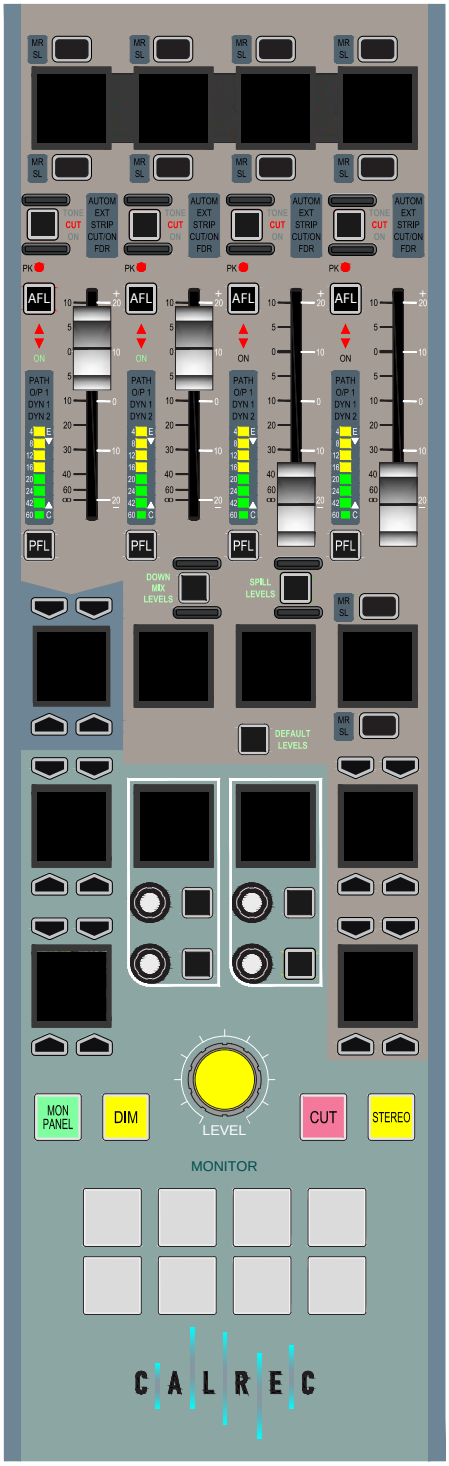
Monitor Panel

The monitor panel can act as either a spill controller, downmix controller or a main output controller. These functions are accessed with the four 60mm motorized faders. Each fader has its own PFL/AFL/CUT controls and a set of A/B assign keys either side of an control cell display.

The panel also contains a subset of the main monitoring controls including the large CR Monitor level knob, small LS trim and changeover, Dim level, AFL and PFL levels and the 4 preselected monitor Hear controls.

At the bottom of this panel are 8 illuminating buttons which can be configured to act as general purpose controls or indicators.

FIGURE 8 - MONITOR PANEL

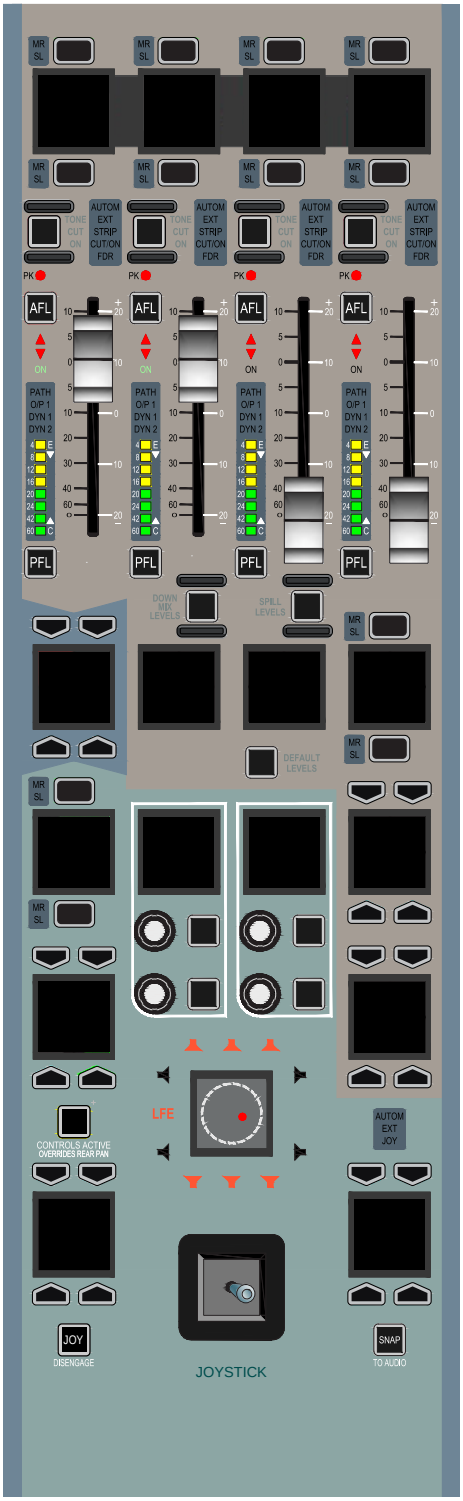


Joystick Panel

Like the monitor panel, this panel (Figure 9) can act as either a spill controller, downmix controller or a main output controller accessed via the four 60mm faders.

Instead of monitor controls, the lower green area of the panel is dedicated to controlling the surround panning facilities of the console with a motorized joystick.

FIGURE 9 - JOYSTICK PANEL



Broadcast Facilities Panel
The Broadcast Facilities panel is shown in Figure 10.

The top two buttons provide switching and indication for On Air and Rehearse states. The Fail Warning Cancel button acknowledges any failures in the system.

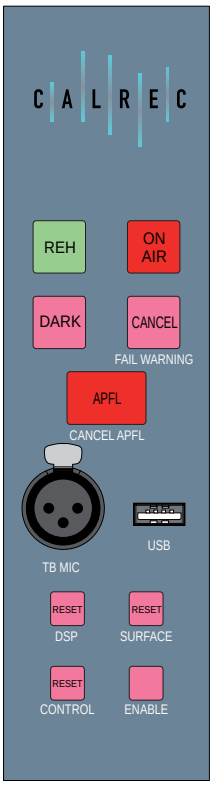
Under these is an APFL indicator which lights if the main monitoring is being overridden by AFL or PFL. This is also used to clear any latched AFL and PFL when pressed.

A Talkback Mic XLR connector is provided on this panel and also a USB connector which allows you to plug in a USB memory stick which can be used to load and store console configurations from the Configuration PC in the body of the console.

At the bottom of the panel are the reset switches. Each of these can be pressed together with the Enable button to reset the Surface, DSP module or Control Processor independently.

The Dark button switches on the surface screensaver. This turns off all control cell displays and LEDs and displays a screensaver graphic on the TFT displays. Simply touching any fader or control on the surface will disable the screensaver and switch on all displays. Dark mode does not affect audio.

FIGURE 10 - BROADCAST FACILITIES PANEL



Dual Fader Panel

The Apollo dual fader panel is shown in Figure 11. This panel is the same size as and can be used in place of the standard fader panel.

The panel contains eight 100mm and eight 60mm motorized faders with overpress. The functionality of these faders and controls around them are as described in the fader panel section.

The 60mm faders on the dual fader panel take the place of the control cells and button cells which are present on the standard fader panel.

Modes and Layers rows

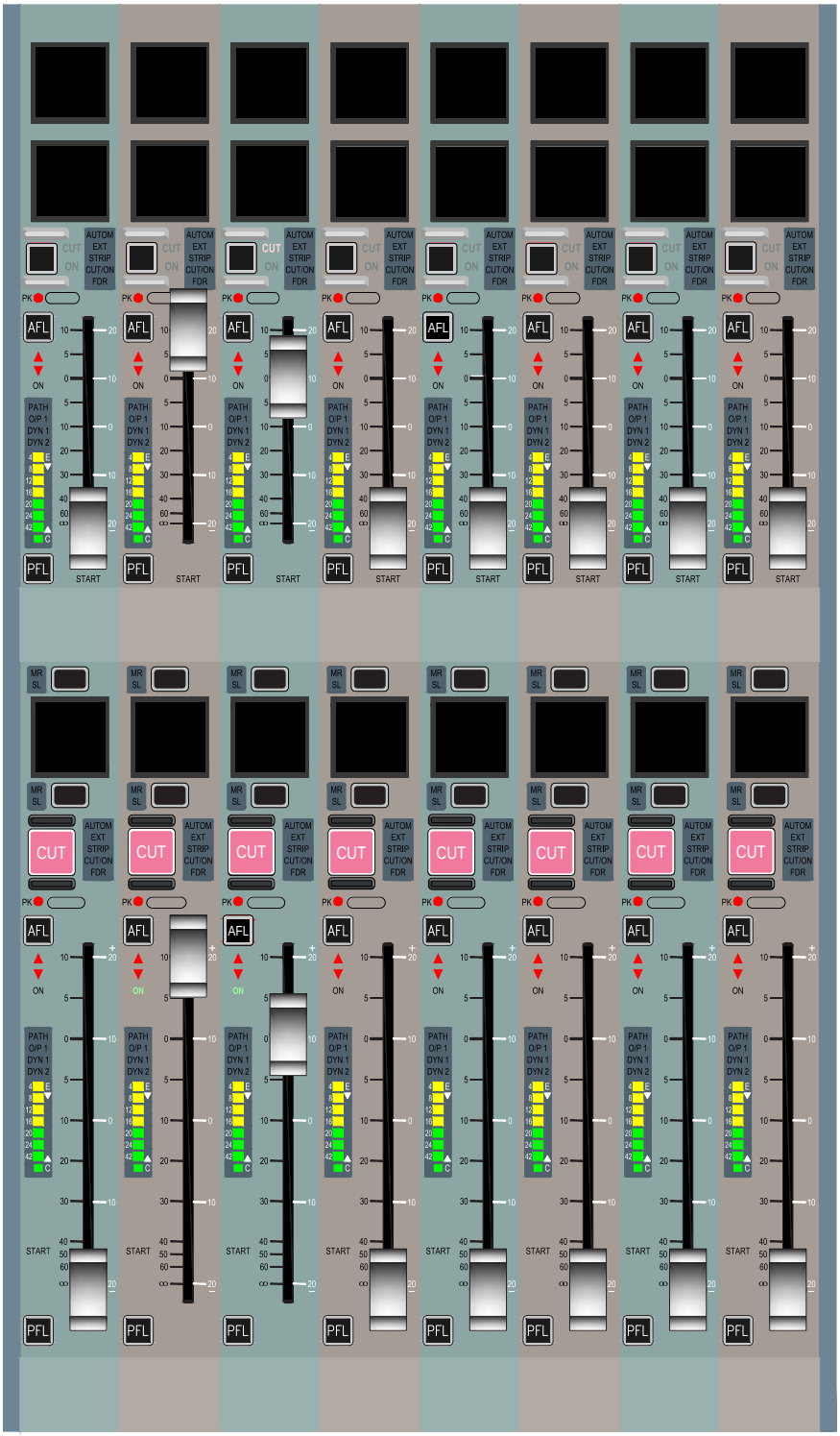
The Layers row and Modes row from the standard fader panel remain in place but are both situated at the top of the panel as shown in Figure 12. Both rows are touch sensitive as on the standard fader panel.

The controls in the Tools and Layer Tools functions of the standard fader panel are also accessible on the dual fader panel. They are accessed in the same way using controls on the Layers row, but instead of appearing on the button cells of the standard fader panel, the controls appear on the Modes row control cell displays. While accessing these functions, the standard controls of the modes row are inaccessible.

Path access

Where the standard fader panel has two paths available per fader (in each of the 12 layers) using the A and B assign buttons, the dual fader panel associates only one path per fader (in each of the 12 layers). The B paths are presented on the upper 60mm faders and the A paths are presented on the lower 100mm faders. This is the opposite way to the orientation on the standard fader panels. The A and B assign buttons assign the paths to any

FIGURE 11 - DUAL FADER PANEL



relevant assign modes on the surface, as on the standard fader panel, but the advantage is that both A and B paths are visible and accessible on faders at all times.

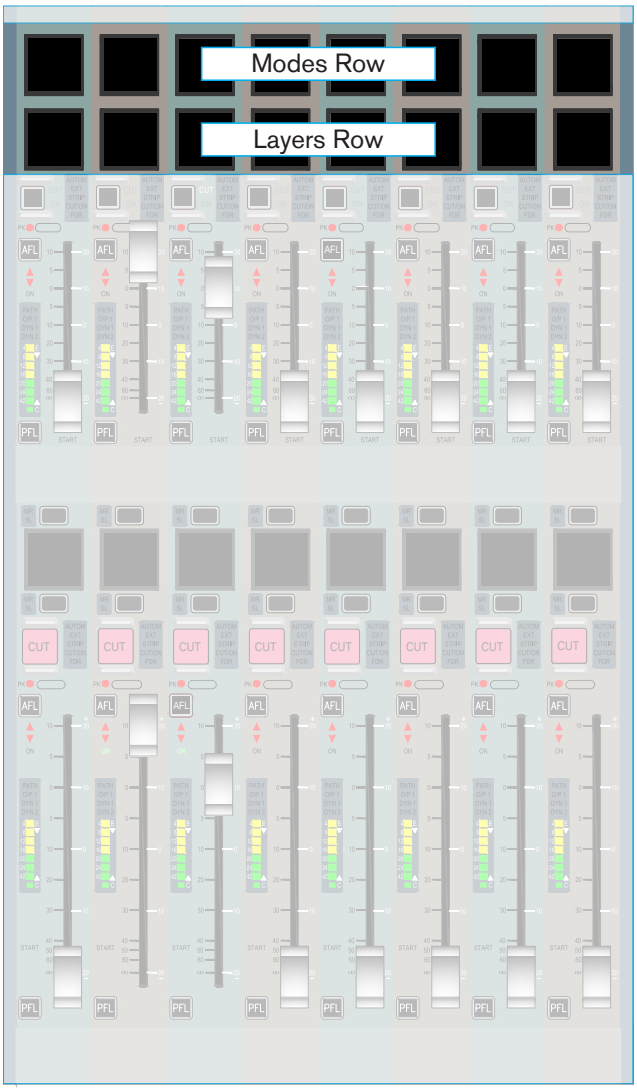
The assigned path will have it's assign button illuminated blue as on the standard fader panel.

Wilds mode
When a wild assign panel is located above a dual fader panel and is switched into Wilds mode, the path which the wild controls relate to (the active path) is determined by which assign button is selected for each fader. The active path for each fader can be changed by pressing the relevant assign button.

The path label for the active path will take up two thirds of the path label display and will have the relevant assign button illuminated.

Mixing dual and standard fader panels
A surface can be configured with both dual fader panels and standard fader panels. In this situation, the standard fader panels will only have the A layer enabled on the lower assign button so that operation is consistent with the dual fader panels. The B layer will not be accessible on these standard fader panels.

FIGURE 12 - ROWS



Custom Metering Panel

This panel provides the customer with an area to mount moving coil PPM/VU style meters and/or Vectorscope displays such as the DK MSD600M++ (Figure 13) or the RTW 10800 range (Figure 14).

FIGURE 13 - DK METERING PANEL

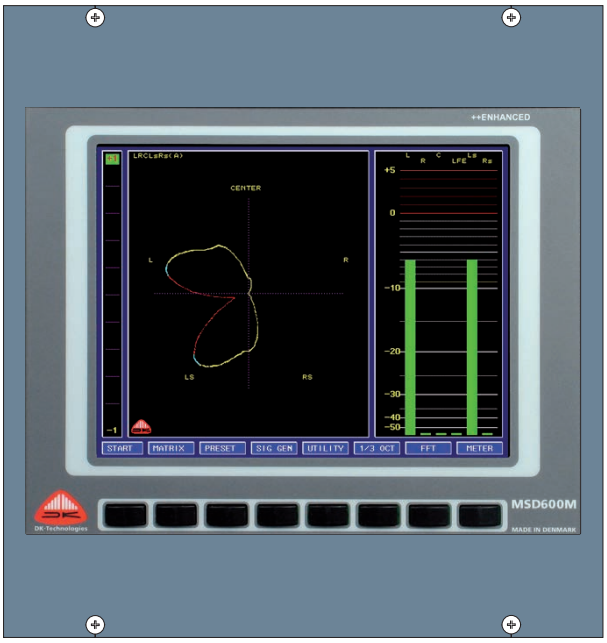
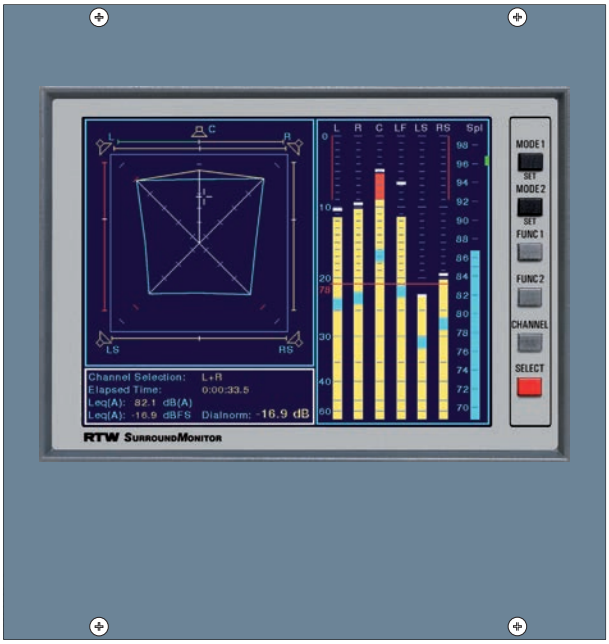


FIGURE 14 - RTW METERING PANEL



PANEL MODES

Wild assign panels can operate in five different modes, three of which are commonly required. Users often set three panels across the console into each of these modes to make the most commonly used controls all visible at the same time, in the layout of their preference.

The five panel modes available are:

- I/P-EQ-DYN (Input, EQ and Dynamics)
- SEND-ROUTE
- MON (Monitoring)
- O/P (Outputs)
- WILDS (in-line controls: see “Wilds mode” on page 31 for more detailed information)

Each panel-mode area can also be set to OFF if it is preferable not to have more than one instance of each mode on the surface.

To set a wild assign panel into one of these modes, touch the desired mode on the Modes row shown in Figure 1. This is located at the top of the fader panel, as highlighted in Figure 2. The modes row on a given fader panel sets the mode of the wild assign panel directly above it. If there is no wild assign panel above a fader panel, the mode controls relating to a wild assign panel will be disabled.

Apply all

A mode can be applied to all panels in the user section by holding the desired mode button, then pushing the APPLY ALL button.

Locking modes

A panel may be locked into a certain mode by pressing the MODE LOCK button. The mode buttons on the modes row will be removed and the panel mode will not change when APPLY ALL is used to change the rest of the surface. Press the MODE LOCK button again to unlock.

User Layouts

User layouts are stored arrangements of modes on the surface panels. The USER LAYOUT 1, 2 and 3 buttons in the lower half of the modes row allow switching between these layouts.

An example layout is shown at the top of Figure 3. This layout is set up to simulate the same operational concept as a centrally assignable console such as Calrec’s Alpha, Sigma, Omega or Zeta.

This feature is very useful if the arrangement of the surface layout has been altered and the user needs to quickly get back to a known and familiar state. It is also useful to be able to switch between two operational concepts easily. The user could switch between a console full of Wild controls and a centrally assignable surface at the touch of a button, and switch back with the same ease.

Example layouts are shown in Figure 3.

Setting up a User Layout

To set up a User Layout, simply select the modes for each panel on the console in the arrangement that you wish them to appear, then press and hold a USER LAYOUT button. The text will change briefly to USER LAYOUT SAVED to show that the process has been successful.

Recalling a User Layout

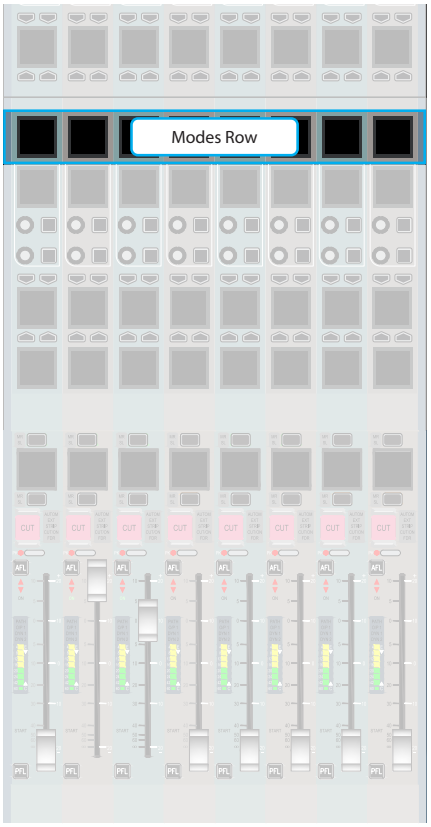
Press any USER LAYOUT 1, 2 or 3 button to recall the saved panel mode arrangements.

Assignable modes

The IP-EQ-DYN and SEND-ROUTE panel mode are two of the most commonly used modes. Both of these are assignable control modes, in that they display information for, and can adjust parameters of the currently assigned audio path. Unless user splits have been put into place for multiple operators, only one audio path is assigned at any given time.

FIGURE 2 - MODES ROW DETAIL

FIGURE 1 - LOCATION OF MODES ROW

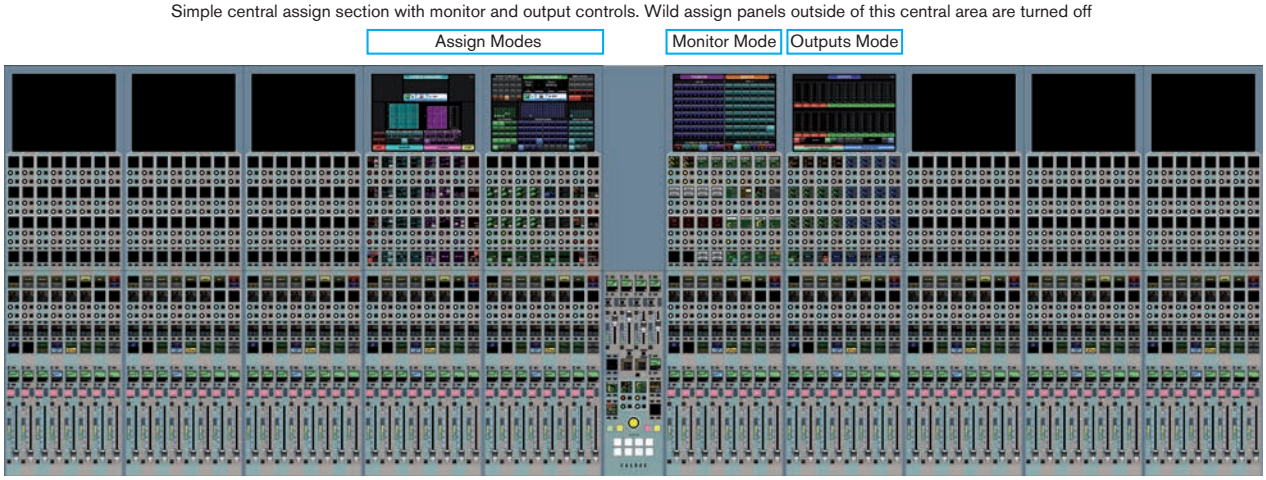


The currently assigned path is shown on the TFT screen in the upstand when displaying in one of the two assignable modes. If the currently assigned path is on an active fader layer, it is also highlighted by its’ fader label display and assign button being illuminated blue. The most common way to select an audio path to make it the currently assigned path and the focus of assignable panel modes is by pressing the fader assign button directly above (A layer) or below (B layer) a fader label display.

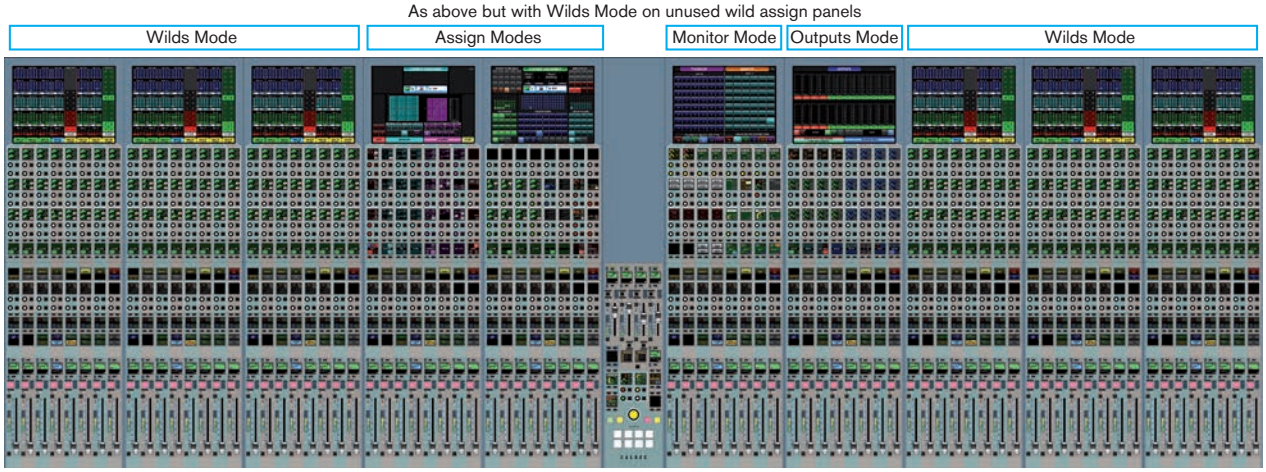
The actual controls available in an assignable panel mode may change depending upon the type of audio path which is currently assigned. For example, mono and stereo paths have different pan controls available to them. Paths with analog inputs patched to them have phantom power buttons, whilst paths with digital inputs have sample rate convertor buttons. If a Main output is the currently assigned path, fewer routing options are available than if a channel or group path is assigned.

FIGURE 3 - EXAMPLE LAYOUTS

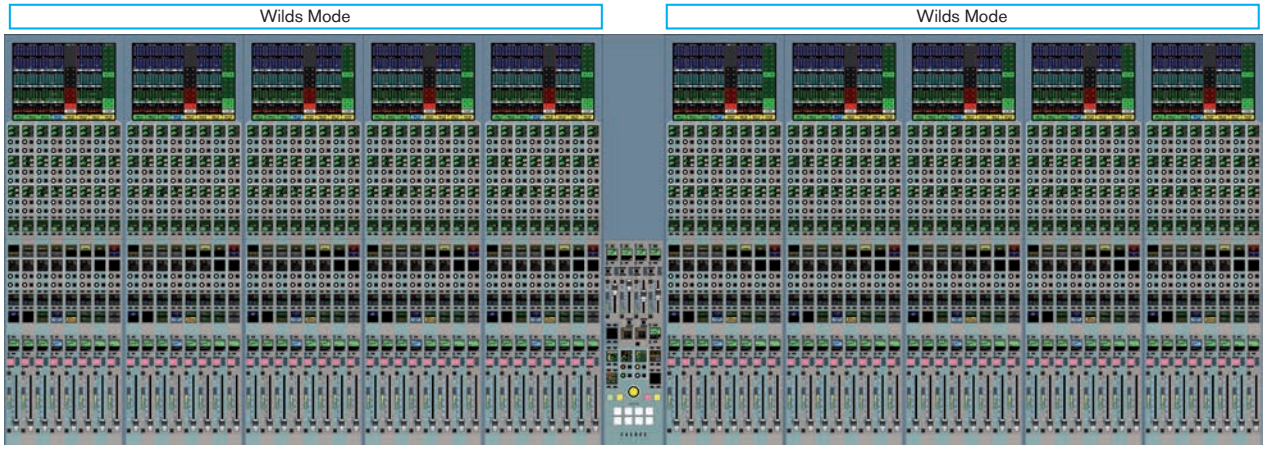
Simple central assign section with monitor and output controls. Wild assign panels outside of this central area are turned off



As above but with Wilds Mode on unused wild assign panels



Wilds Mode on all wild assign panels



WILDS MODE

Wilds mode arranges the wild assign panel controls and touchscreen into vertical strips, providing quick access to up to eight wild controls (including the two fader wild controls) and a section of the TFT touchscreen for each fader.

A wild assign panel set into Wilds mode is shown in Figure 1. Currently there are a range of pre-configured Wild strips available for use.

Accessing Wilds mode

To set a wild assign panel into Wilds mode, touch the WILDS button on the Modes row at the top of the Fader panel below. If the Wilds button is not visible on the Modes row, make sure that the panel is not locked by checking the status of the LOCK PANEL button also located on the Modes row.

Selecting Wilds mode will display the last used Wild strips on the panel and show the wilds mode setup buttons.

Changing Wild strips

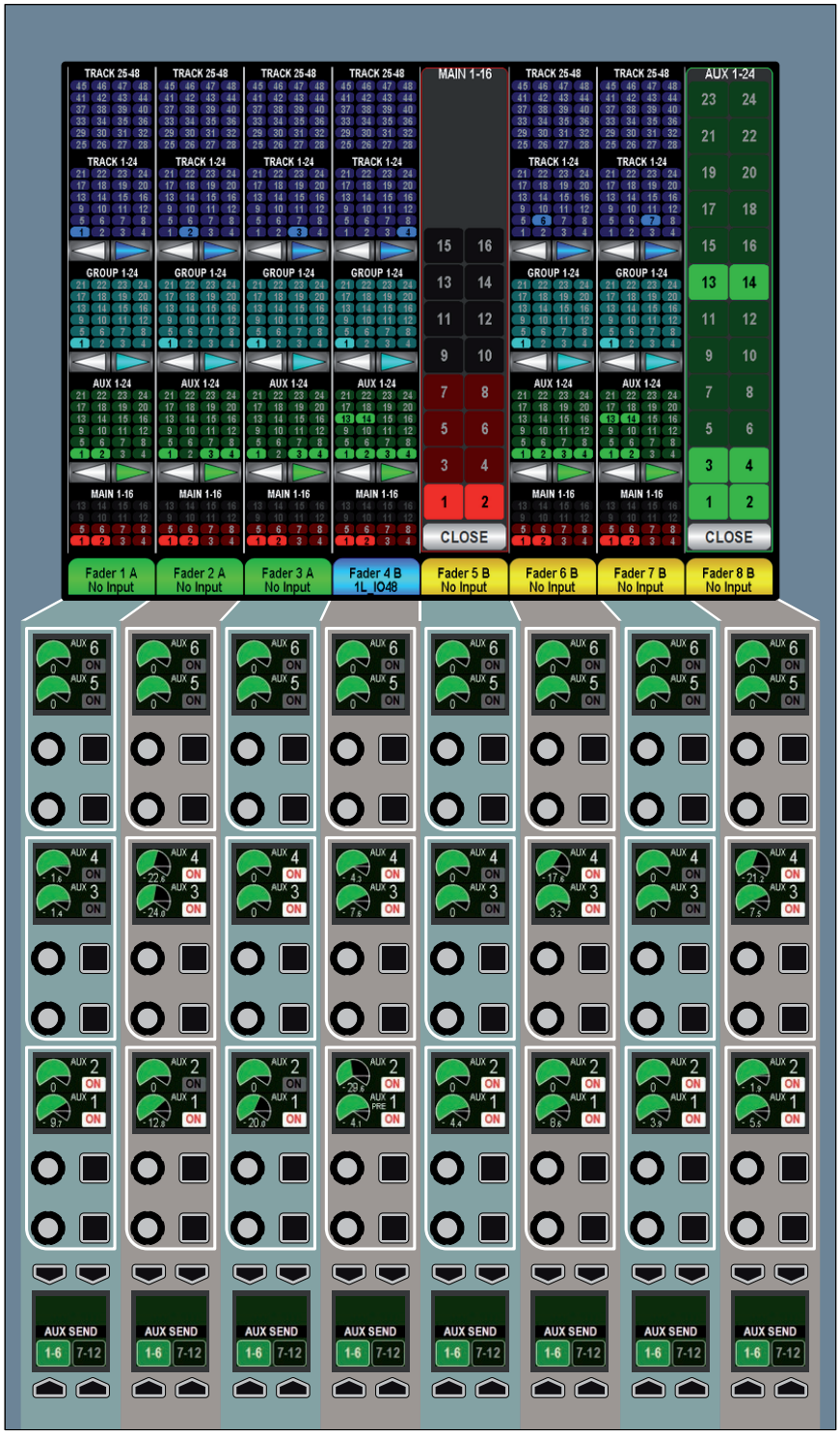
When Wilds mode is selected on the modes row, the available Wild control strips are shown on the Modes row. To select a different arrangement of Wild strips, touch the desired wild strip to assign it to the panel. Touch the EXIT button to return to the typical Modes row display. This process is illustrated in Figure 2.

If the available Wilds strips are not shown when in Wilds mode, touch the WILDS SETUP button.

Routing display

Each strip on the TFT contains a routing overview for the relevant fader. This overview also allows routes to be made and removed. The functionality of this feature is explained in the Routing section of this document.

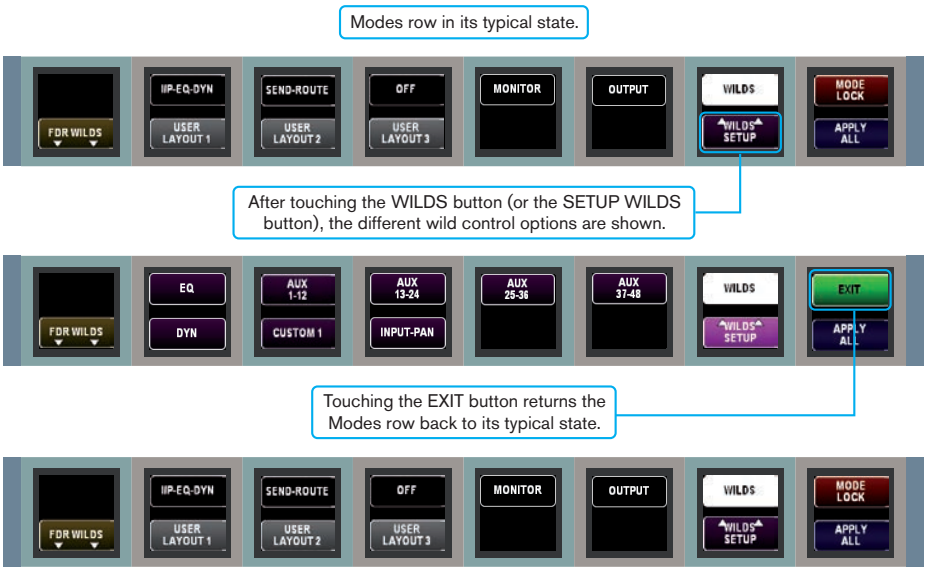
FIGURE 1 - WILDS MODE LAYOUT



A/B path indicator

There is an indicator below each routing stirp on the TFT which shows the fader number and path label. This changes color to indicate whether the A (green) or B (yellow) path is selected on the fader. The currently assigned path is colored blue.

FIGURE 2 - SETUP WILDS ON THE MODES ROW



ASSIGN MODE

Assign mode provides a way for the panels in an Apollo surface to function as a familiar Calrec assignable surface.

The concept of Assign mode is to provide a standard layout of controls on the surface which display and allow control over the parameters of the currently assigned path.

Assign Mode is made up of two layouts:

- I/P-EQ-DYN
- SEND-ROUTES

Both of these layouts appear as separate buttons on the Modes row.

I/P-EQ-DYN layout

This layout contains controls relevant to Input, EQ, Dynamics processing for the currently assigned path. The layout of controls is shown in Figure 1.

Sends-Routes layout

The Sends-Routes layout is shown in Figure 2. It contains controls for routing or sending the currently assigned path to Auxiliaries, Tracks, Groups, Mains, direct outputs and Mix Minus buses. Pan controls are provided for placing the path in any of these destinations. It also allows interrogation of buses.

Responding to path assignment

The exact controls displayed and the paths which they will affect depend on the currently assigned path. For example, different pan controls are visible depending on whether the currently assigned path has a mono or stereo width.

For details on assigning a path, please refer to the Assigning Paths section of this document.

FIGURE 1 - THE INP-EQ-DYN ASSIGN LAYOUT

FIGURE 2 - THE SENDS-ROUTES ASSIGN LAYOUT

Description of controls

The functionality of the controls on these panels will be detailed in the relevant sections of this document such as Input Processing, Equalization and Routing.

MONITOR MODE

Monitor mode compliments the dedicated monitor panel, providing control over monitor configuration and source selection as well as standard monitor controls that can be accessed from any location on the control surface along with provision for independent monitoring for multiple operators.

Monitor mode also incorporates talkback controls and user memory load / save facilities, the left hand side of the TFT display can switch between displaying these functions.

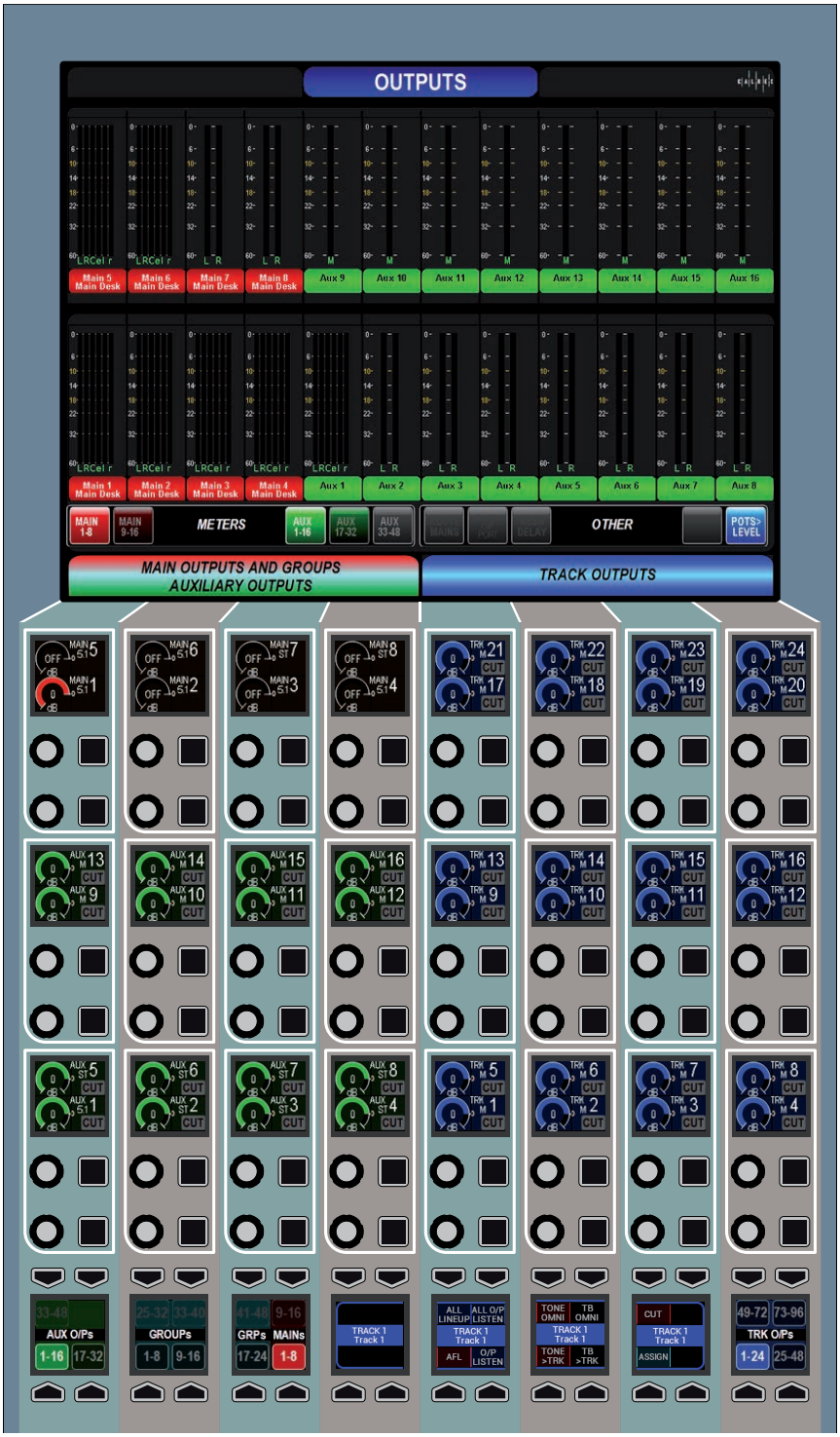
FIGURE 1 - MONITOR MODE CONTROL LAYOUT

OUTPUTS MODE

Outputs mode provides controls for manipulating output paths such as Main outputs, Track outputs, Aux outputs and Groups.

The TFT displays meters for Main and Aux outputs. The control cells provide level control and, where appropriate, cut functionality. A greater range of controls for the selected output such as tone, talkback, AFL and PFL can be accessed from the selected control area in the button cells at the bottom of the panel.

FIGURE 1 - OUTPUTS MODE CONTROL LAYOUT



ASSIGNING PATHS

An important concept of Calrec consoles is that of assignability. This allows controls to be shared amongst all paths, reducing physical space requirements and providing quick and familiar access to all controls.

When a path is assigned, certain areas of the surface will display and allow control of parameters of that assigned path. For example, any wild assign panels in Assign mode and the surround spill panel will update to reflect values of the currently assigned path. Assigning a different path will alter these displayed values.

Assigning a path

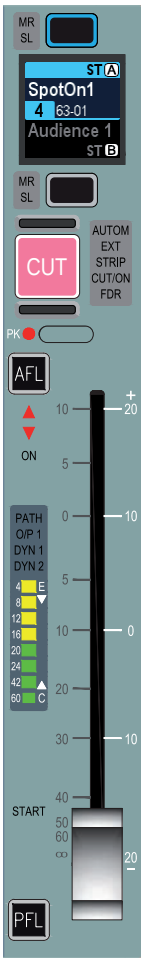
Above each fader is an display and two buttons as shown in Figure 1. The display shows the name of the A and B paths of each fader. The upper section (green) shows the A path and the lower section (yellow) shows the B path. The path that is currently being controlled by the fader takes up a greater percentage of the display area, is colored with the relevant color and has the relevant assign button lit.

To assign either of these paths, press the relevant button above or below the display (above for path A, below for path B). The section of the display showing the assigned path will turn blue to indicate the current assignment. The relevant button will also light up blue as confirmation. The fader will now control the assigned path as shown in Figure 2. Other areas of the surface that are set up to respond to Assignments will display and control parameters of this selected path.

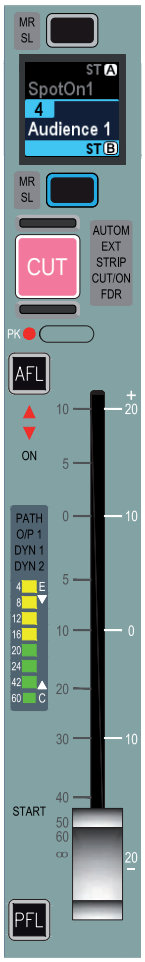
FIGURE 1 - ASSIGN BUTTONS

FIGURE 2 - PATH ASSIGNMENTS

Path A assigned



Path B assigned



FADER WILDS

Touching the FADER WILDS button on the modes row allows the user to assign different controls to the fader control cells.

The fader control cells are highlighted in Figure 1.

When FADER WILDS is touched, the modes row will update to show the available control arrangements that the fader control cells can display (Figure 2). Touching one of these options sets the eight fader control cells on the current panel to display the selected arrangement.

Each of the eight control cells on a fader panel act separately and affect the path assigned to the fader below it, much like an analog in-line console. They do not operate in a panel-wide assign mode.

FIGURE 1 -FADER CONTROL CELLS

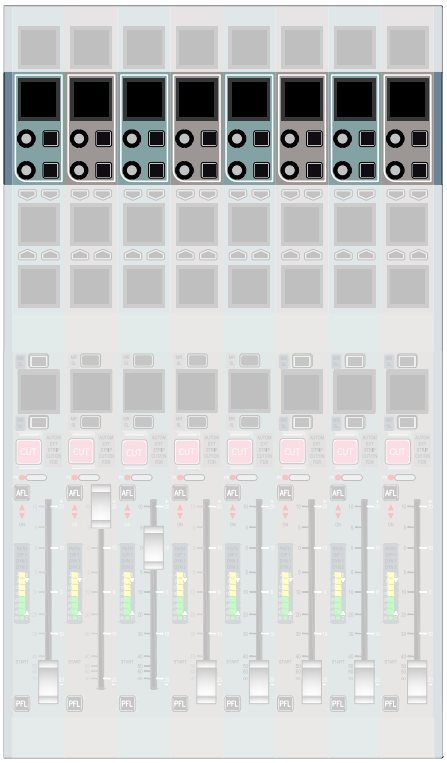
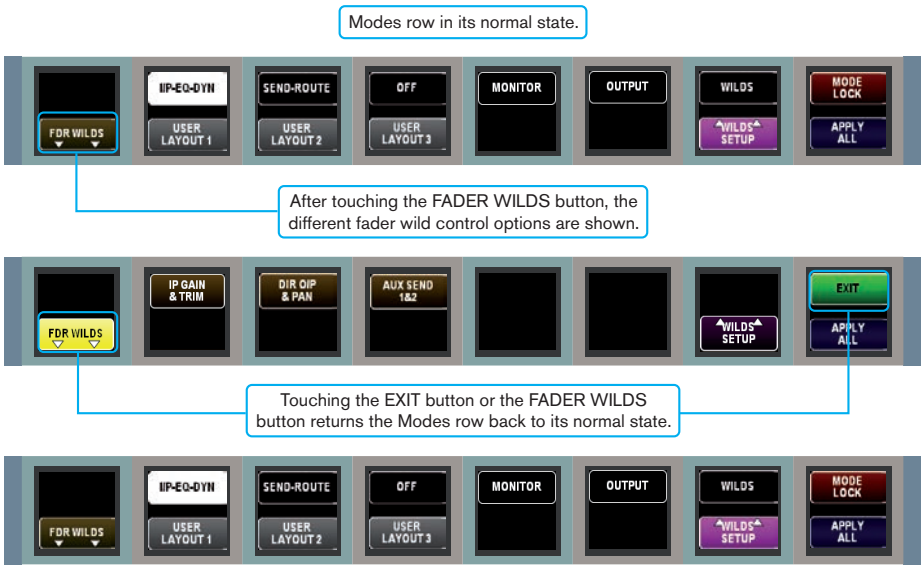


FIGURE 2 -FADER WILD CONTROL SELECTIONS



Apply all

Holding a fader wilds option and tapping the APPLY ALL button will set all fader wilds in the current user section to use the selected controls.

Exit

When the FADER WILDS button has been pressed and the modes row has been updated to show the fader wild arrangements, an EXIT button will appear at the lower right of the modes row. Touching this (or touching the FADER WILDS button again) will return the modes row to its normal state allowing access to all other mode buttons.

USER SPLITS

User splits allow the control surface to be sectioned, allowing multiple operators to work without impacting upon each other.

User splits are also often used to separate an extended control surface or sidecar from the main control surface. A maximum of three user splits can be set across the combination of main console and extension/sidecar.

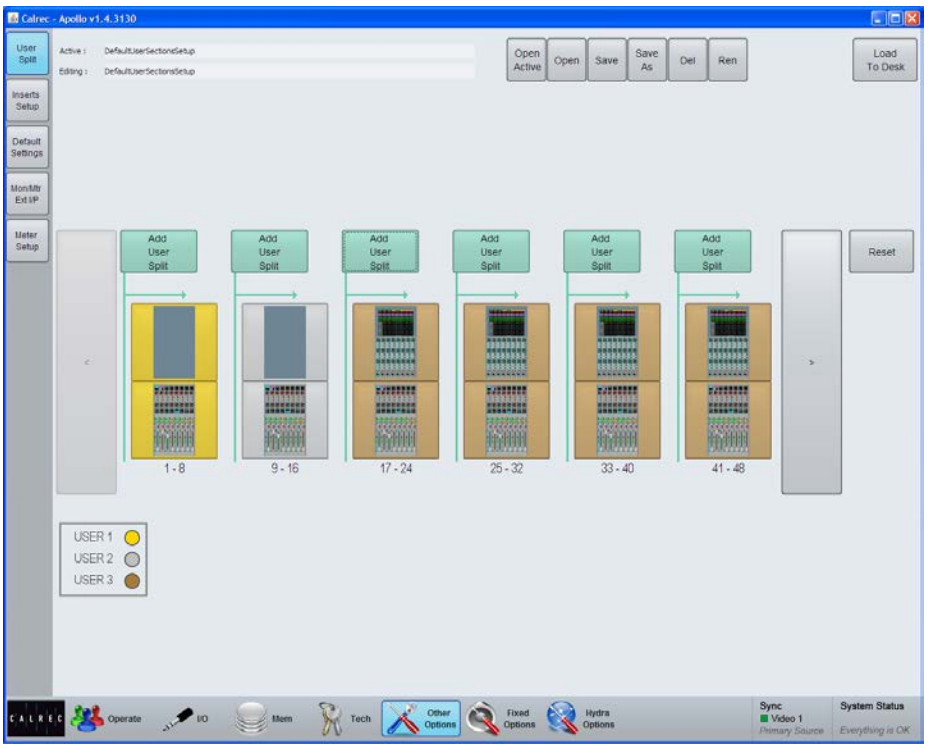
User splits can be placed between control panels to provide separate areas of control for up to three operators. User splits partition faders and the assignable panel modes IP-EQ-DYN & SEND-ROUTE. The assignable panel modes can only affect the currently assigned path within their user area. Each area can have its own currently assigned path. Changing the assigned path within an area does not change or cancel the assigned path or focus of assignable panels in other user areas. Also, changing layers only affects faders within the user area that the change was made from.

If multiple operators require their own monitoring, speakers / headphones can be fed from monitor output 1, monitor output 2 or miscellaneous monitor outputs, and each operator then use the controls relevant to their area. The PFL and AFL listen outputs of the faders within each user are can be selected to feed one of three different APFL bus sets, each of which can be patched to outputs for local monitoring, and the two main monitors can be configured to be interrupted by different APFL sets, allowing each user to be able to listen to their paths without affecting each others monitoring. Please refer to the Monitoring section for details on configuring monitoring for multiple users.

Identifying User Split Locations

The location of active user splits is shown on the control surface in the left hand button cell in the Layers Row. If this display shows “USER SPLIT”, the panels to the left are in a different user area to the panel with the indication and the panels to the right.

MAIN PC APPLICATION, OTHER OPTIONS>USER SPLIT SCREEN



ACTIVE USER SPLIT - LAYERS ROW

Creating / removing user splits

User splits are managed from the Main PC Application’s Other Options>User Split screen. Clicking on the Add User Split button above any of the panels allows the choice of users 1, 2 or 3 to be applied to that panel and to those to the right of it. Click the Load to Desk button in the top right corner to apply the user split settings on the screen to the control surface.

User split configurations can be saved using the Save / Save-As buttons, allowing them to be recalled at a later date using the Open button and then loaded to the desk without having to manually configure the splits each time common changes are required. Two filename fields are displayed at the top left of the screen; “Active” is the configuration currently on the control surface. “Editing” is the configuration being displayed on the PC screen. Clicking Open Active displays the user split file that is currently on the surface. Opening a file displays it on screen for editing. No changes are applied to the control surface until Load to Desk is clicked. Buttons are also present to allow user split files to be deleted or renamed. Clicking the < > buttons scrolls the panel view for surfaces too large to be displayed fully on the screen. Clicking the Reset button will remove all user splits.

LAYERS

Apollo provides an comprehensive layers feature to aid in organizing and accessing many paths extremely quickly.

Figure 1 shows the layout of controls on the Layers Row.

A/B Paths

Each fader provides instant access to two paths. These paths are known as the A and B paths and are described in the Assigning Paths section of this document.

To switch all faders to the A or B path use the ALL A or ALL B buttons on the Layers row.

Layers 1-12

There are also 12 layers available on the surface. Each layer contains it's own A and B paths.

Layers can be switched using the green buttons on the Layers row. The 12 layers are divided into two banks. The first bank contains layers 1-6 and the second contains layers 7-12.

The selected bank and selected layer are highlighted.

Using layers

Layers provide a flexible method of organizing paths on the surface. Layer 1, for example, may be configured to contain all main presenter microphones on path A and audience microphones on path B. Layer 2 may contain VT or server audio sources on path A. Switching between layers 1 and 2 provides fast access to both of these organized collections of sources. A path may appear on multiple layers simultaneously.

Layer Locking

A path can be locked to a fader and remain present on the surface regardless of the selected layer. To lock a path touch the LAYER TOOLS button on the Layers Row. On the updated Functions row above, touch and hold the LAYER LOCK button and then tap the assign buttons of any faders which contain paths that are to be locked to the surface. Holding LAYER LOCK and tapping an assign button toggles the lock on and off.

When a path is locked, a padlock icon will appear in the fader label display to indicate the lock is active.

When a path is unlocked the A/B display will show text to indicate the original layer location of the path as it may not be the currently selected layer. The locked path will still remain in view until a different layer or All A/B selection is made.

Layer Split

The Layers row contains a button entitled LAYER SPLIT. Touching this button on any panel inserts a layer split along the left hand side of that panel. The button will light up as an indication of the split. Any layer changes made to the left of the split will not affect any faders to the right of the split. This applies to All A and All B selections too.

Multiple layer splits can be put in place across the surface, each obeying the same rules described above.

Turning off the B layer

The global B layer, which allows each fader to access a B path can be turned off. This is currently a factory set option and Calrec should be contacted for activation.

With this option set, the faders on the surface will only have access to one path per layer and can be accessed using the A layer path assignment buttons.

FIGURE 1 - LAYERS ROW

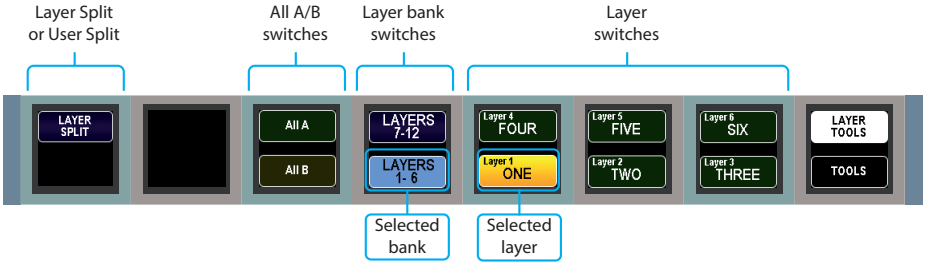


FIGURE 2 - LAYER TOOLS

APOLLO
GETTING SIGNALS INTO APOLLO

calrec.com

Putting Sound in the Picture

INPUT SOURCE ORGANIZATION

Input sources may take the form of physical audio input ports, DSP outputs from the same console, Hydra patchbay outputs from other consoles connected to the same Hydra2 network, or Hydra patchbay inputs the sources of which can be switched remotely by H2O or 3rd party controllers.

Filtering the Hydra2 network

Given the shared and hugely scalable nature of the Hydra2 system, your console may be able to access a large number of I/O boxes. Many of these will not be relevant to the show or project that is currently being worked on and their inclusion in any source lists would only reduce clarity and result in clutter. Apollo provides a method to filter out unwanted I/O boxes so that they do not appear in the patching lists, or anywhere else in the software. This feature is shown in Figure 1.

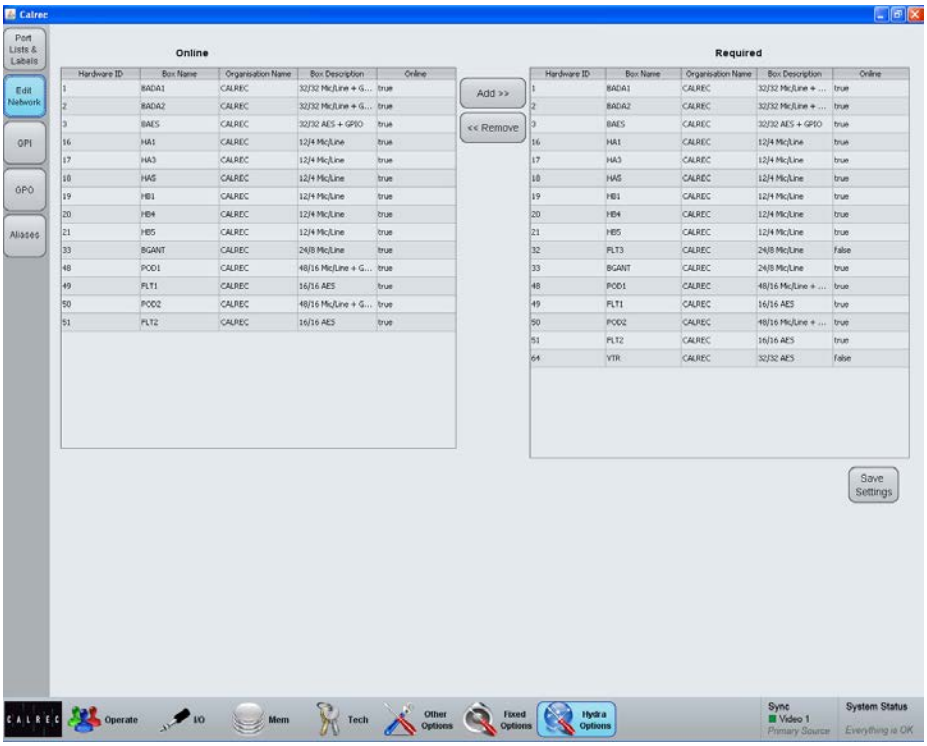
Open the EDIT NETWORK screen in the HYDRA OPTIONS section of the main application. There will be two lists shown. The left list shows all Hydra2 boxes connected to the network. Selecting a box in this list and pressing the ADD button will add that box to the list on the right. This means it will now be visible in the console patching screens.

Boxes can be removed in a similar way by selecting one in the right hand list and pressing the REMOVE button.

Input ports

A port is a physical input to, or output from the Apollo system. As all I/O is contained in a Hydra2 network, each input socket on a Hydra2 box can be termed an input port.

FIGURE 1 - EDIT NETWORK SCREEN



Hydra Patchbays

Hydra patchbays are virtual patchbays within the Hydra2 domain. Like hardware patchbays, Hydra Patchbays have a set of input ports which are 'hard wired' to output ports. For port patching purposes, Hydra Patchbay inputs are destinations and Hydra patchbay outputs are sources. When a source is patched to a Hydra patchbay input, it immediately becomes available at the corresponding Hydra Patchbay output. For example, if a console operator patches a direct output to a Hydra Patchbay input, the Direct Output feed becomes available to all Hydra2 users (who have been granted access,) as the corresponding Hydra Patchbay output. Hydra Patchbays are described in more detail at the end of this section "Hydra Patchbays" on page 71.

Port labels

I/O boxes have default native port labels based on the box ID and port number. These labels can be changed using the H2O application. H2O edited labels will appear on all consoles on the Hydra2 network. Labels can also be edited at a console level using the Main PC application. Console level edits overrule H2O and native labels but are only visible on the console they were edited on.

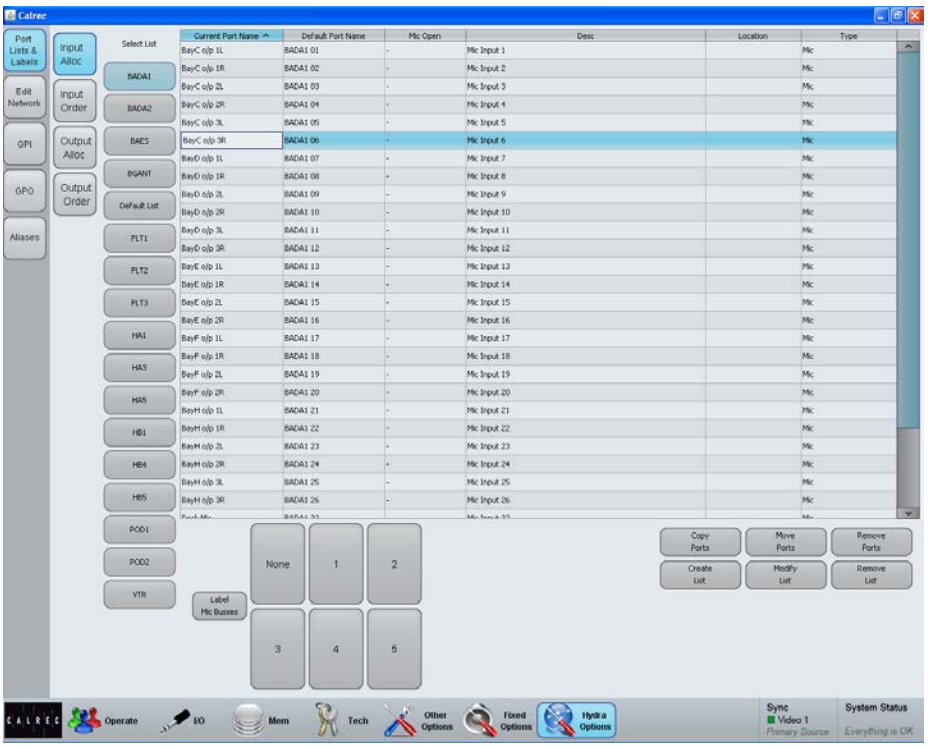
Console level port labelling is performed from the PORT LISTS & LABELS screen in the HYDRA OPTIONS section of the main application (Figure 2). In this screen, touch the INPUT ALLOC or OUTPUT ALLOC button to access the available input or output ports. Double click an port name to provide a new name. Each label is updated as soon as they are edited. If the port list is being viewed alphabetically in

label order, editing them will cause them to move position in the list and they can disappear from view. The list view can be filtered by any of the columns, to prevent ports moving as they are labelled, click on the “Diag” column header to view them in their physical order.

Note that up to 20 characters can be entered as port labels. All 20 characters are visible in the Main Application, and H2O, however the control surface has limited text fields. Fader displays only show the first 10 characters of a port label, TFT meter labels will show 14.

When viewing port lists in the patching screens, the ports are displayed alphabetically. This should be considered when labelling ports. Ports can be grouped together even if they are not in alphabetical order using sets which are described later in this section.

FIGURE 2 - PORTS LIST SETUP SCREEN



Port lists

Ports can be assigned to lists. Lists provide a way of filtering the information shown when patching ports.

To access ports lists, go to the PORT LISTS & LABELS screen in the HYDRA OPTIONS section of the main application (Figure 2). Select the INPUT ALLOC or OUTPUT ALLOC button at the left of the screen to work with input or output ports respectively. The screen will show all available port lists just to the right of the INPUT ALLOC button. The DEFAULT LIST is created automatically and contains all available input or output ports.

Creating lists

To create a new list, select the required ports from the default list (or any other list that already exists) and touch the CREATE LIST button. A popup will appear prompting for the name of the new list, which can be six characters or less. Enter the name and touch OK. The new list will appear below the default list and will contain the selected ports. Touch the new list to confirm this. It is possible to make a new list which is empty, by ensuring that no ports are selected when touching the CREATE LIST button.

Copying and moving ports to lists

Ports can be copied or moved between lists by selecting the required ports in the source list and touching COPY LISTS or MOVE LISTS. A popup dialog will appear allowing selection of the destination list. Select the destination list and touch OK.

Removing ports from lists

To remove ports from a list, select the required ports and touch the REMOVE PORTS button.

Renaming lists

Touch the MODIFY LISTS button to bring up a popup dialog. This dialog allows you to select a list and rename it.

Removing lists

To remove a list, select the required list and touch the REMOVE LIST button. A popup dialog will appear asking for confirmation of the removal.

Sets

Sets provide a way to group ports which together form part of a single source, for example a 5.1 surround source.

When viewing a port list, ports are sorted alphabetically according to their port

name. If ports are labelled with the box name and port number this will present a logical order in the list. If however, the ports are labelled according to their function, for example the name of the source feeding the ports with a suffix of each individual leg as shown in the left column of Figure 3, the ports may not appear in a sensible order in the list.

If all ports associated with a certain source are added to a set and arranged in the correct order within it, they will be presented in the port list in that order. The set will be sorted in the port list by the name of the first port in the set.

Adding ports to sets

To add ports to a set, navigate to the PORT LISTS & LABELS screen in the HYDRA OPTIONS section of the main application and select either INPUT ORDER or OUTPUT ORDER from the buttons at the left of the screen (Figure 4).

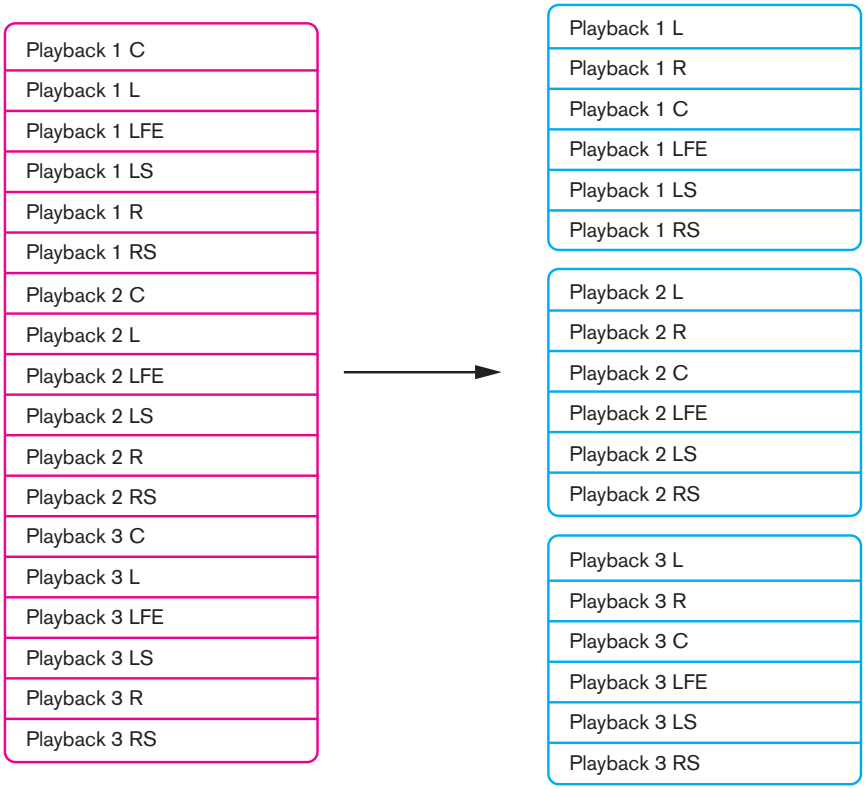
On the left of this screen, the lists in the current view are displayed. Press the MORE LISTS button to scroll through any available views. Select a list to work on by touching it. The main area will now update to show the ports stored in the selected list. Select the ports that re to be stored in a set and touch the CREATE SET button. The number of the set will appear next to the ports. The order of the ports within the set can be changed by selecting a port and touching the up or down arrow buttons.

Ports can be removed from a set by selecting them and touching the REMOVE FROM SET button.

Ports can be added to an existing set by selecting them and touching the ADD TO SET button. This will bring up a popup dialog which allows the user to select the destination set.

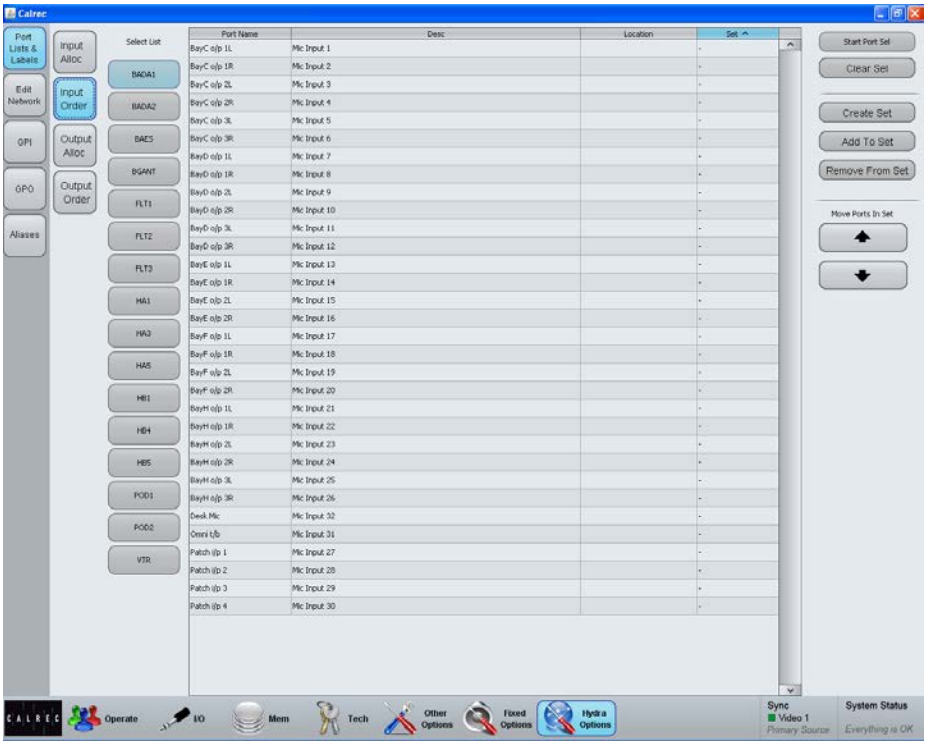
FIGURE 3 - SETS EXAMPLE

When ports are not assigned to sets, they appear in the port lists in alphabetical order. This may not list the ports in a sensible order, for example in the case of 5.1 surround sources.



By using sets to group ports for realted inputs, the lists will display the ports in the correct order. The ports will be sorted by the name of the first port in each set.

FIGURE 4 - SETS



PATHS AND FADERS

A path is a generic term that refers to a DSP process in the system. A signal present at an input port must be routed to a Channel path in order for it to be processed, routed, then sent back out of the system

Running at 48KHz, Apollo has 1020 mono channel paths available. The user is free to configure this pool of mono resources as required. Simply assigning any path type to a fader (mono, stereo or surround) automatically allocates the required number of DSP resources from the pool of 1020. A mono channel path uses a single DSP resource, a stereo channel path uses two mono resources, and a 5.1 channel path uses six mono resources.

Attaching paths to faders

For a path to be directly controlled, processed and routed, it must be attached to a fader on the surface.

(An input signal also needs to be patched to a path in order for audio to pass through the system. This is detailed in the Getting Signal into Apollo section of this document)

The Layers Row is highlighted in Figure 1. On this row touch the TOOLS button. This will update the Layers Row to display a range of options as shown in Figure 2. Now touch the FADER ASSIGNMENT button. The Functions Row above will update to show the paths types that are available to be attached to faders.

The main path types, including channels and groups, are listed on the lower half of the Functions Row. Touching one of these path types will list the available paths that can be attached to faders in the upper half.

Press and hold the button above the desired path and then press the A or B assign button of the fader to which you wish it to be attached.

Inserting paths

It is possible to blank out the A or B path of a fader and shuffle the existing paths on the surface to the left or the right. Figure 3 illustrates this feature.

To achieve this, hold the INS << BLANK or INS >> BLANK button and then press the A or B assign button on the fader where the blank is to be inserted.

FIGURE 1 - ROW LOCATIONS

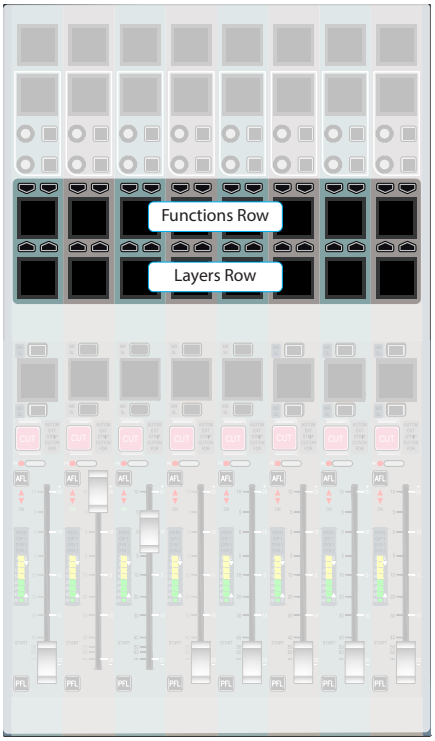


FIGURE 2 - ASSIGN FADERS VIEWS ON THE SETUP ROW

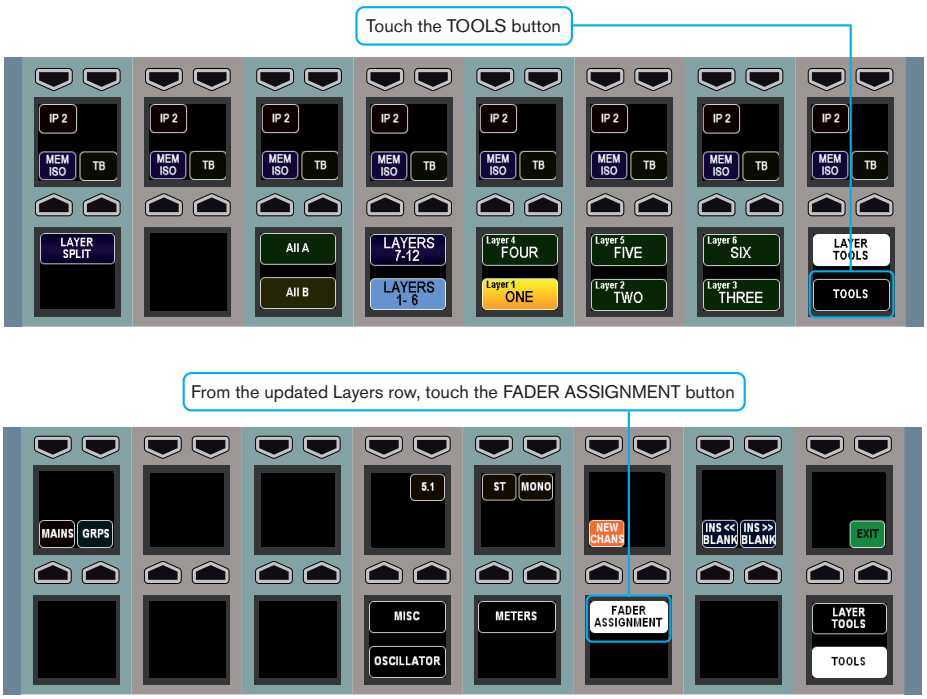


FIGURE 3 - INSERTING BLANKS

The arrangement of paths below serves as the starting point for the two following examples.

Paths may only be inserted if there are enough empty faders to the left or right of where the path is inserted. If there are locked paths between the empty faders and the path to be inserted they will not allow the insertion to continue. Similarly, paths cannot be moved past the faders at the left and right edges of the surface.

Removing a path from a fader

To completely remove a path from a fader on the surface, touch the LAYER TOOLS button on the Layers Row. In the updated Function row touch and hold the REMOVE PATHS button, then touch the assign buttons of the faders that contain the paths to be deleted. The assign buttons of the selected paths will strobe to indicate the selection. Release the REMOVE PATHS button and touch either the EXEC or CNC buttons to execute or cancel the selection respectively.

Locking layers

Each fader can be locked to a chosen layer. Layer locking ensures that chosen paths are always active and available on the control surface, irrespective of which is the active fader layer for the rest of the console.

To lock faders to the currently selected layer, select the LAYER TOOLS menu from the Layers Row, then on the updated Functions row above, press and hold the Layer Lock button whilst selecting the faders to be locked by pressing their assign buttons. Repeatedly pressing a faders Assign button whilst holding the Layer Lock button will toggle the lock on and off.

When a fader is locked to a layer, a padlock icon will appear in the fader label display to indicate the lock is active.

After unlocking, a fader will remain on the same layer until the next console wide layer change, or its A/B sub-layer is changed. (Unlocking does not cause it to automatically change to the current console layer.)

If only the A or B layer of a fader is locked it will no longer be possible to switch between the two. To retain A and B layer switching whilst locking a fader to a layer, both the A and B ASSIGN buttons must be pushed when locking the layer.

Cloning paths

An existing path may be cloned to an empty fader. This action does not duplicate the path, rather it allows multiple faders to control the same DSP path. Any changes made to the path on one fader will be reflected when the path is accessed by another fader.

The source path should be assigned by pressing the A or B assignment button. Now touch the LAYER TOOLS button on the Layers row to update the Functions row above. Touch and hold the CLONE PATHS button on the Functions row and then press the assignment button of the destination fader to which the path will be cloned. This must be an empty fader. The destination fader's A or B assign button will strobe to indicate the selection. The CLONE PATHS button can now be released and either EXEC or CNC can be pressed to confirm or cancel the cloning respectively.

Moving / Swapping paths

Two paths that are attached to faders on the surface can have their locations swapped. All settings on the paths remain intact, this function simply swaps the faders that control the two paths.

To swap the location of two paths:

1. In a similar way to cloning a path, push the ASSIGN button of one of the paths to be swapped.
2. Touch the LAYER TOOLS button on the Layers row to update the Functions row above.
3. Touch and hold the SWAP PATH button on the functions row then press the assign button of the other path which is to be swapped. The assign buttons of the two paths should now be flashing to indicate the selection.
4. Release the SWAP PATHS button and press the EXEC button to confirm the process or press the CNC button to cancel the process and leave the path positions unchanged.

The path on the first fader moves to the second selected fader, and at the same time the path on the second fader moves to the first rather than being removed. Faders with no path allocated can also be selected as part of the swap-path process, i.e. a path can be moved to a blank fader, leaving its original fader blank.

Swapping paths moves the whole DSP signal path from one physical fader to another. The input source and its settings along with DSP and routing settings are all moved from one fader to another.

Copying path settings

Settings for a given path may be copied over to another path. You can choose whether to copy all settings, or just a certain subset of the settings.

The elements which can be copied are:

- IP1 + DELAY (Input 1 settings - 48V, input trim, SRC and input delay)

FIGURE 4 - COPY PATH SETTINGS

- IP2 + DELAY (Input 2 settings - 48V, input trim, SRC and input delay)
- EQ 1-4 (EQ bands 1-4)
- EQ 5-6 (EQ bands 5-6)
- DYN1
- DYN2
- PATH DELAY (Path delay settings)
- FDR + D-MIX (Fader level and down mix levels if used)
- DIR O/P + DEL (Direct output and output delay settings)
- TO M/G (Routing to mains and groups)
- TO TRK (Routing to tracks)
- TO AUX (Routing to Auxiliaries)
- ALL (All of the above elements)

Note, when copying settings which include assignable (input and output) delay, the delay settings will only be copied if the destination already has the delay assigned. The copy function is just for the delay setting, not the delay itself.

To access the copy function, touch the LAYER TOOLS button on the Layers row. The updated Functions row above will display the controls shown in Figure 4.

To copy path settings:

1. Use the middle four button cells to select the path elements that you wish to copy by toggling on/off the buttons above each option.
2. Press the assign button of the path from which you wish to copy settings.
3. Now press and hold the COPY CHAN PROPERTIES button and whilst holding, press the assign button(s) of any paths you wish to copy the settings to. Release all buttons and then press the EXEC or CNCL buttons to confirm or cancel the copy respectively.

Some important points to note:

- If you are copying the properties of a surround spill leg the surround master will be used as the copy source.
- If any copied properties do not apply to the copy destination, those properties will not be copied, for example Balance settings will not be copied from a stereo to a mono path.
- If a path's properties are copied to a path of a different width, only the master settings for the path will be copied.
- Input 1/2 switching and TONE on/off switching will not be copied.

Warnings and Conflicts

When copying path properties it may be the case that now path settings create conflicts, for example, when altering the input settings of a shared input port. If a conflict does arise a pop-up will appear on the TFT to inform you along with the usual Input/Output sharing pop-up on the PC screen. See "Input Port Protection" on page 62 for more information.

FADER SETUP SCREEN

Fader / path management can also be carried out from the Main PC Application GUI.

The Operate>Fader Setup screen provides a visual representation of all faders and all layers, showing the current path to fader assignment of the control surface.

The on-screen display shows the type of path (if any) assigned to each fader, along with the input port / fader label, and supporting indicators such as VCA group status, layer locks, memory isolates, and cloned paths.

Clicking on a fader cell will bring up the options available:

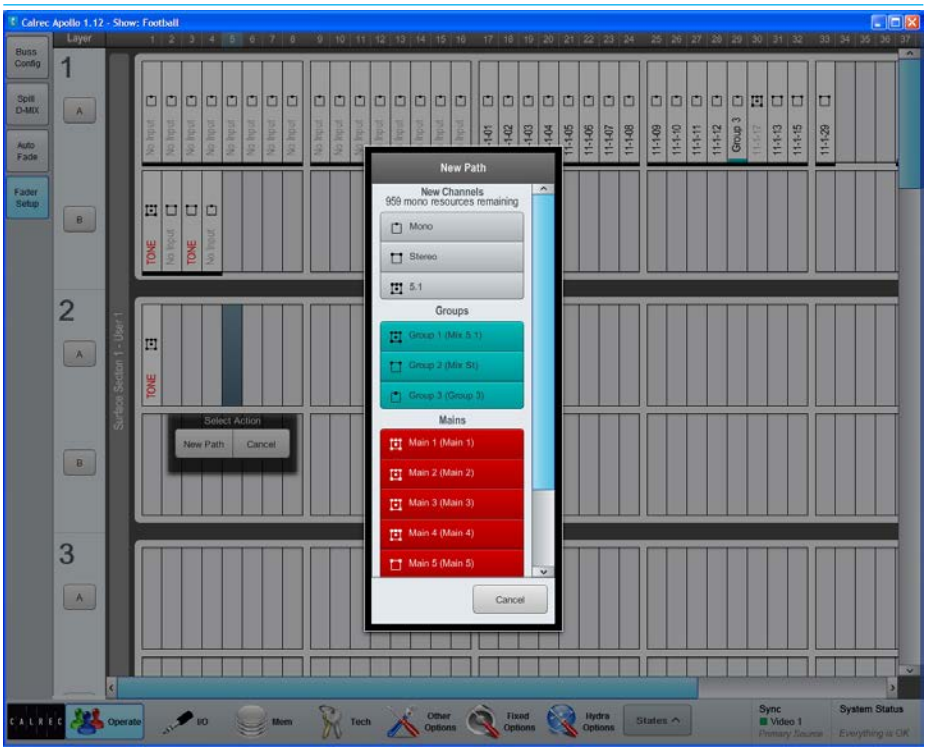
If the fader currently has no path assigned, a pop-up menu will allow path allocation (as shown in the adjacent screenshot).

If the selected fader already has a path assigned, options will be presented to create a clone, to move, or to delete the path. If “clone” or “move” is selected, the user should next select the destination fader - where the clone will be placed, or where the path is to be moved to.

When moving a path to a fader already occupied by another path, the user is presented with the option to swap the position of the two paths over (same as the Move Path function when performed from the control surface), or to discard the original path on the destination fader.

Operations can be performed on multiple consecutive faders at the same time by dragging, or shift-clicking to select a group. Whole rows can be selected by clicking the A / B layer markers down the left hand side of the screen.

MAIN PC APPLICATION, OPERATE>FADER SETUP SCREEN



Memories from larger consoles

User shows / memories can be transferred between mixing consoles of the same type, for example, an Apollo User Memory can be transferred to another Apollo surface. If a memory is loaded that was created on a larger control surface, with more faders, the additional paths are displayed as virtual faders. The fader setup screen can then be used to re-organize the paths needed onto available physical faders / layers.

PATH WIDTH ICONS

- Mono
- Stereo
- 5.1 Surround

USING INPUT SOURCES

The Main PC Application's I/O>I/O Patch screen is used to route Hydra2 audio input and output ports for general use.

This screen works on a source to destination basis, with the left hand side of the screen displaying a table of sources, and the right hand side displaying a table of destinations.

All patches made from the I/O screen are saved as part of the user memory.

Searching input sources

The source and destination lists are filtered by type. Click on the Select Source button at the top of the sources list to bring up the Available Sources menu. Source types are shown in a column on the left side of this menu, highlighting "Input Ports" displays a series of buttons for the Hydra2 input port lists, as defined by the Hydra Options>Port Lists & Labels screen (see the Input Source Organization section for more details on port lists). The Default List contains all Hydra2 input ports that have been made available. If port lists have not been customized, there will be a separate list for each Hydra2 I/O box, labelled with the box ID numbers. Custom lists may have been created and / or individual box by ID lists deleted. Custom lists are commonly used to group ports by location or type, for example "Studio 1 Mic's", "VT machines" etc. Selecting a port list closes the Available Sources Menu and displays the chosen list in the sources table.

Searching destinations

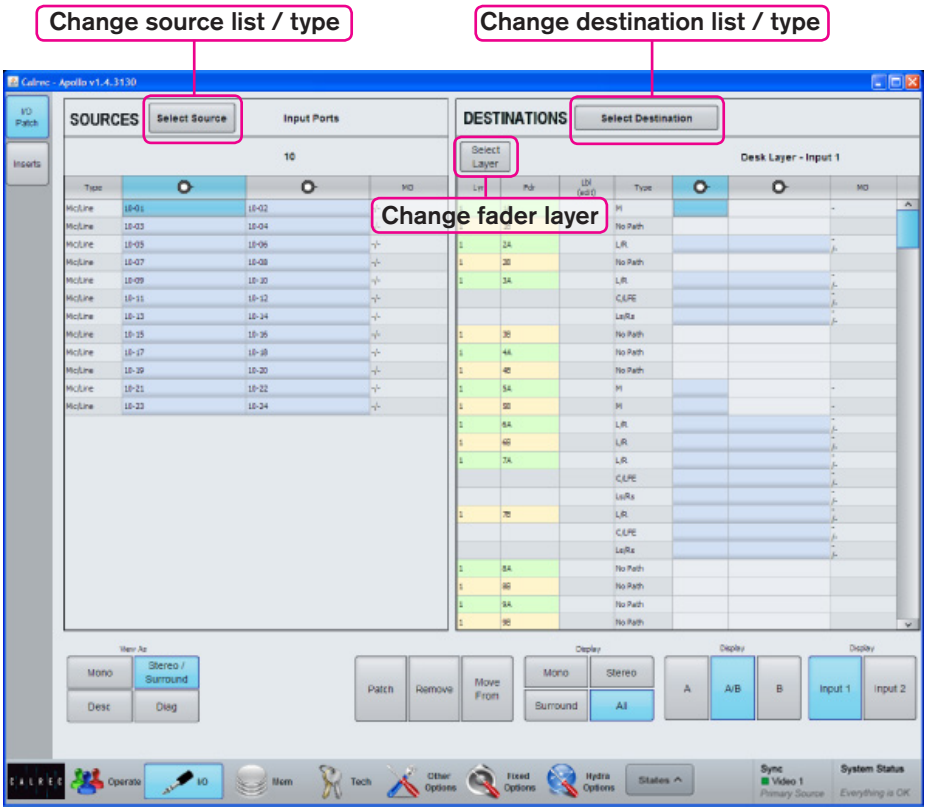
Click on the Select Destination button at the top of the destinations table to bring up the Available Destinations menu. Destination types are listed in a column down the right hand side of this menu. Highlighting "My Desk Inputs" displays the types of DSP inputs available to patch to, clicking "Channel I/Ps" closes the Available Destinations menu and displays a table of the control surface faders.

Channel input / fader views

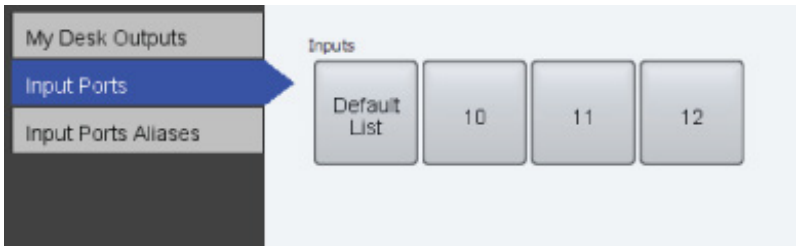
When displaying channel inputs, the left hand column of the destinations table, and the text field above the table show the fader layer being viewed. Different fader layers can be viewed by clicking Select Layer. Choosing "Desk Layer" makes the screen follow whichever is the active layer on the control surface.

Note that each channel path has two inputs which it can switch between, allowing the source on a channel fader to be quickly changed without re-patching.

MAIN PC APPLICATION, I/O>I/O PATCH SCREEN SHOWING DESK INPUTS



AVAILABLE SOURCES POP-UP MENU

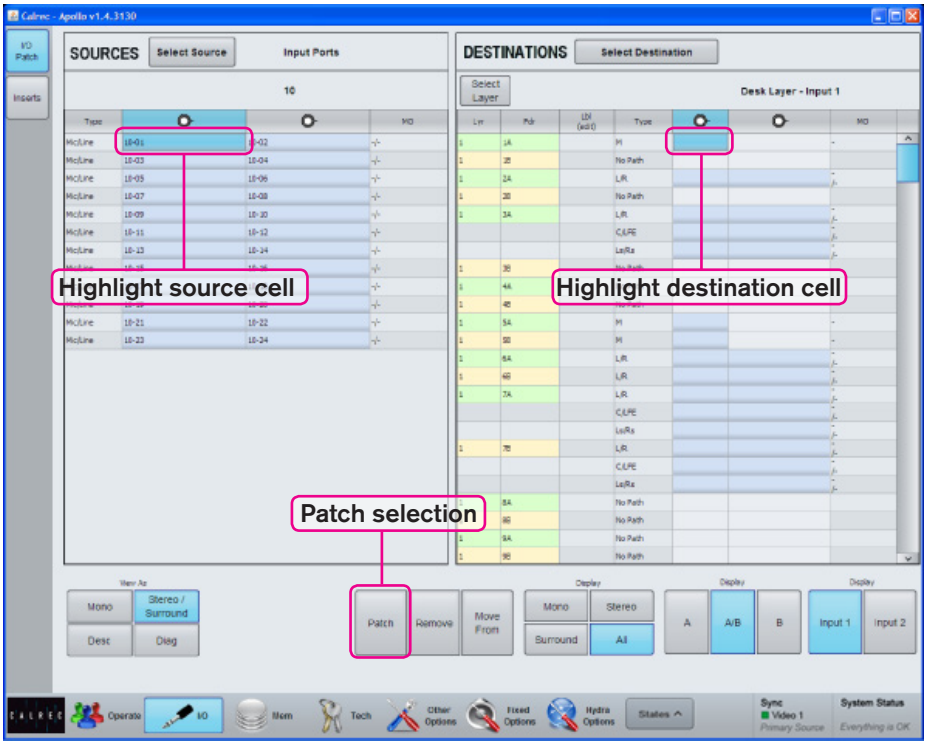


Input 2 is often used for backup sources such as secondary microphones. The input 1/2 switch takes place at the front of the DSP channel path - all processing, such as EQ, dynamics and routing of the channel is the same irrespective of whether input 1 or input 2 is active, meaning that changing to a backup source in this way not only utilizes the same fader but also ensures all processing and routing is the same as when using the original source. The two inputs do have independent controls for input specific functions, such as analog gain and phantom power, allowing for different types of sources to be used on the two inputs.

As well as fader layer, the text field above the destinations table also shows whether it is displaying input 1 or input 2. Buttons in the right hand corner beneath the table are used to switch between displaying Input 1 & Input 2. The labels are highlighted when viewing input 2 to draw attention to the fact that these are not the default inputs. This screen is used for the patching and viewing of patches only, the actual switching of a channel between using input 1 and input 2 is performed from the IP-EQ-DYN panel mode.

Faders in the table run in numerical order and are color coded green for A layer faders and yellow for B layer faders. Buttons under the table allow for the view to be filtered between showing both A & B layers or A layer only/B layer only. Display buttons are also present to show all faders, or for the view to be filtered to show only mono paths, stereo paths, or surround paths. The “Type” column shows the width of the path as M for mono, or L/R for stereo. Surround paths take up 3 rows in the table, one for front L/R, one for C/Lfe and one for rear Ls/Rs. Faders with no DSP path allocated are displayed as “No Path” in the type column.

PATCHING HYDRA2 INPUT PORTS TO INPUT CHANNEL PATHS ON FADERS



Patching input sources to faders

Patching is carried out by first highlighting the required source and destination patching cells - the blue colored cells in columns with jack socket icons at the top.

JACK SOCKET - PATCHING COLUMNS

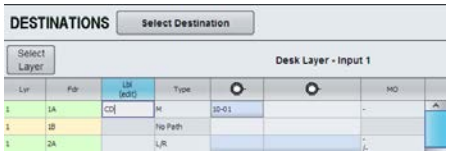
Stereo paths display patching cells in two columns, one for the left and one for the right. Surround path inputs are displayed in two columns across three lines. To patch an input port to a channel input, find the desired port in the sources list and highlight it by clicking on the blue cell. The example above shows input port 10-01 being highlighted. Find the desired channel / fader from the list on the right and highlight it by clicking on the blue cell, the example above shows a mono path on fader 1A being selected. Note that faders with no path allocated, or non-channel paths on faders such as Group and Main buses will not display a blue patching cell and cannot be highlighted. Once the relevant source and destination is highlighted, click the patch button to place the source onto the destination. Once patched, the source label is shown in the destination cell as well as the fader’s label display on the control surface and audio will be passing from the port into the channel input.

Custom fader labels

The “Lbl (edit)” column allows custom user labels to be shown in the fader’s label display. Double click on a cell in this column to enter a custom label. Note

that custom labels are associated with the fader, rather than the input port. The custom label is retained even if the input port is changed. If the port is removed, the fader's label will display "No Input". When a new port is patched, the custom label will be displayed again. To clear a custom label and revert to the port label, double click the label cell, delete it and press enter.

ENTERING CUSTOM FADER LABEL



Bulk patching and source views

Multiple patches can be made at a time by selecting multiple cells. For example, selecting one source, but multiple faders by click-dragging, or control / shift-clicking then patching will place the one source onto the multiple faders. Alternatively, selecting multiple sources and a single destination will patch all the selected sources to consecutive channel paths starting with the one selected. This can be useful for example to patch a group of 6 sources onto a surround fader in one process, or a group of consecutive ports to consecutive faders. When carrying out multiple patching, it can be useful to change the view of the sources - the buttons beneath the source table allow the view to be filtered as "mono" - showing all ports in a single column, or "Stereo / Surround" - showing all the same ports in two columns. The two views provide different ways of selecting and grouping multiple ports to be patched.

Additional port info - Desc & Diag

Additional source view filters are "Desc" which displays a description text field for each port alongside the label and "Diag" which shows diagnostic information as to the physical location of the port - this is particularly useful when port labels have been edited from their defaults. Clicking on the column headers orders the list by column, therefore clicking on the Diag column will order the ports by their physical order and box ID rather than by the alphabetic label order.

Over-patching, removing & moving

Patching a new source to a destination with a source already patched will replace the original patch with the new one.

Sources can be removed from destinations by highlighting the destination's blue cell and clicking Remove.

Clicking the "Move From" button with destination cells highlighted allows for different destination cells to then be selected, the button changes to display "Move To" and clicking it will remove the sources from the original destinations and place them on the new ones. Moving sources in this way moves the input port and input settings (analog gain, phantom power and SRC) from one input channel to another, it does not move the DSP channel path itself - path settings such as EQ, dynamics and routing do not move with the input. The Move Path function from the control surface's Layer Tools menu can instead be used to move the whole path, including all its' settings along with the input and input settings from one fader to another.

Offline patching

Sources that are currently offline, i.e. if the I/O box is not powered are displayed red with an "OFF" icon. Patches can still be made and saved using offline ports. When the I/O box comes online audio will automatically be routed as per any patching made.

Sources used in multiple locations

Hydra2 input ports can be patched to multiple console inputs as well as directly to Hydra2 outputs and to other console's on the same Hydra2 network. Audio is passed to all destinations simultaneously. Please note however that analog input gain, phantom power and sample rate conversion are set in the Hydra2 domain - in the I/O box rather than console DSP and therefore adjusting these parameters will affect all instances where that input port is used, including any other consoles on the same network.

Returning outputs to input channels

As well as patching Hydra2 input ports, input channel paths can also be fed from the console's DSP outputs. Highlighting "My Desk Outputs" in the Select Sources menu offers bus and direct output lists that can be patched to channel inputs in the same way as input ports. Patches made in this way actually loop the output/ bus audio back into a channel input. This is different to assigning a bus to a fader to provide fader level control over the bus.

Hydra Patchbays

Any Hydra Patchbays that the console has been granted access to from the H2O GUI will also appear in the Select Sources menu. Consoles can patch their DSP outputs to Hydra Patchbays which can in turn be patched as console sources, allowing consoles to share their outputs across the network without using physical I/O. In addition to accessing other consoles outputs, H2O network administrators and SW-P-08 router controllers can patch Hydra Patchbays to / from physical I/O ports, allowing them to remotely control which consoles are feeding which outputs, and to be able to change the audio on sources feeding console inputs. Please refer to the H2O user guide for details on configuring Hydra Patchbays.

Alias patching
The ports of any alias files that are active on the console will be available for patching from the “Input Port Aliases” group of the Select Sources menu. The audio on Alias ports is determined by the active Alias file. Changing the active alias file allows for the audio on aliased patches to be changed en-masse by the operator without changing the user memory and therefore retaining all other settings. This may be used for example to allow a show to be made from different studio locations, using different I/O boxes but using the same user memory so that any parameter changes only need to be managed in the one memory file . Please refer to the Alias Files section for detail on setting up aliases.

Patching inputs directly to outputs
As well as patching to console inputs, input sources can also be patched directly to output ports. This may be for simple routing of signals from point A to point B, to distribute a signal from one source to multiple destinations, or to convert the format of a signal between analog / AES / SDI / MADI etc. Sources can be patched to multiple outputs, channel inputs and other console’s inputs simultaneously. When patching an input directly to an output, it does not use up any console DSP resource. The signal is routed prior to any console DSP parameter settings, but post the Hydra2 domain input settings - analog input gain, phantom power and SRC settings are carried by input to output patches.

To patch to output ports, click the Select Destinations button, select Output Ports, then choose the relevant port list. Patching is performed the same way as for channel inputs - highlight the blue source cell, the blue destination cell then click patch.

If an output port already has a source patched, it will be displayed. Like channel inputs, patching a different source will replace the original one. Outputs with sources patched from other consoles on the network are prefixed R:

Please refer to the Passing Signals out of Apollo section for more details on output patching.

INPUT CONTROLS

Once a path has been assigned to a fader, certain options are available to control the input signal.

Depending on the operating mode, the controls may be accessible in various locations on the surface. As the controls available in Wilds mode are very flexible and may have been customized by the user, this section will detail the controls available on a panel in Assign Mode using the INP-EQ-DYN layout.

Figure 1 shows the layout of input controls in the INP-EQ-DYN Assign mode layout.

Inputs 1 and 2

Each input channel can be quickly switched between two inputs using the INPUT 1 and INPUT 2 selection buttons. A common use for input 2 is for backup microphones, allowing them to be easily available, using the same fader, processing and routing as when using the primary microphone on Input .

Mic/Line gain

The gain of any connected mic/line input can be adjusted with this control. The gain range varies from +78 to -18 dB. This gain control alters the gain at the input port in a Hydra2 I/O unit and will only be available to the owner of that port. Port ownership was discussed in the Input Sources section of this document.

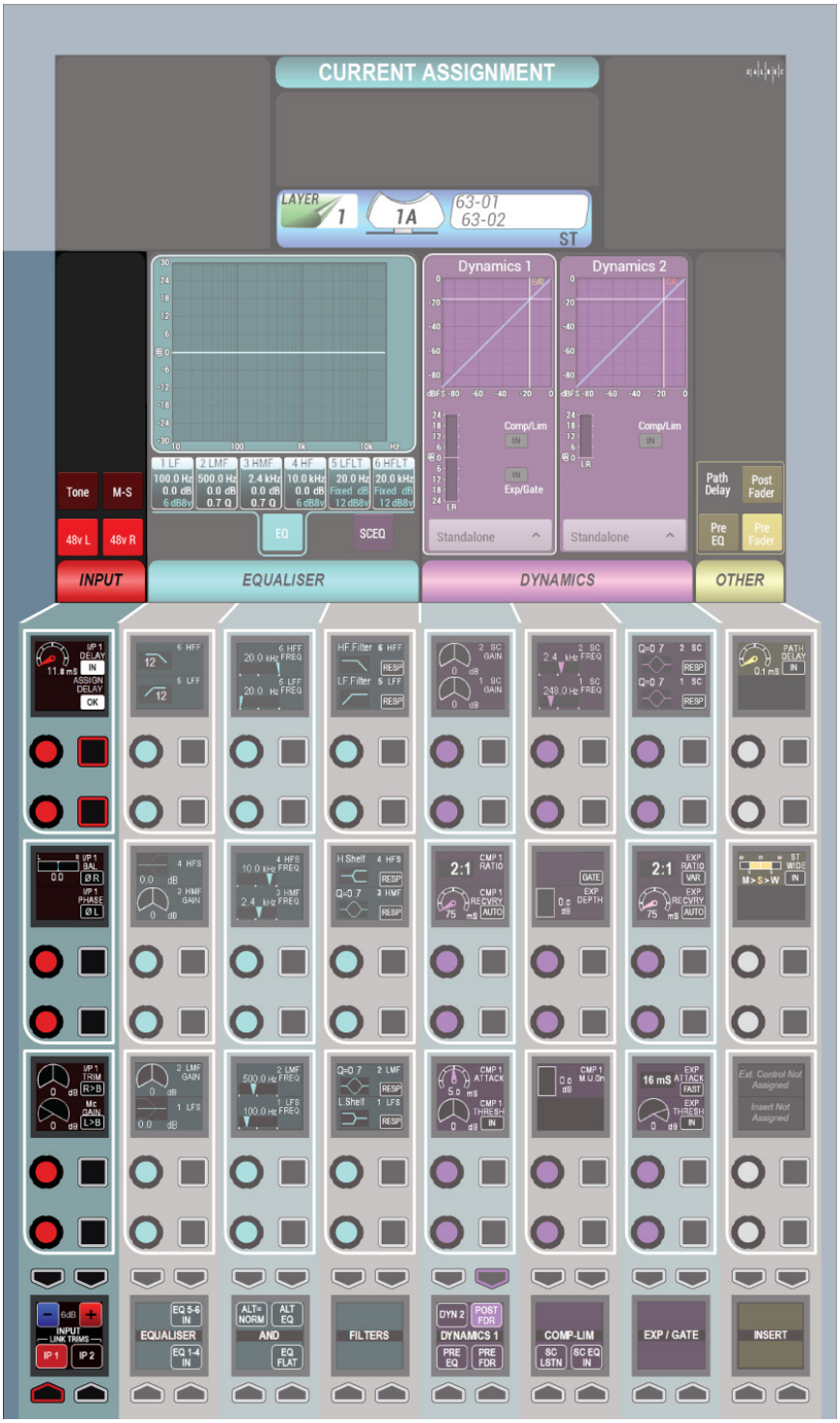
±6dB coarse gain

This control allows coarse gain adjustments to be made to the mic/line input gain. Pressing the + or - buttons will boost or attenuate the gain by 6dB respectively.

Input trim

Input trim boosts or attenuates an input signal by ±24dB inside the channel path. This is the only input gain control available for digital input signals. As the gain is

FIGURE 1 - INPUT CONTROLS



applied inside the channel path it has no effect on any other operators using the same port.

Linking Input Trims

Inputs 1 and 2 have separate input trim controls. These can be linked together by simultaneously pressing the INPUT 1 and INPUT 2 buttons in the wild assign row. The wording on the button cell changes to TRIMS LINKED to show that the process has been successful.

Adjustment of a linked input trim control will be applied to both Input 1 and Input 2, maintaining any offset between them.

Tone

A button on the TFT touchscreen overrides the input of the path with tone at the frequency and level currently set. When tone is applied to a channel an indicator will appear on the input controls, the fader and any meters relevant to the fader as a visual aid to the user.

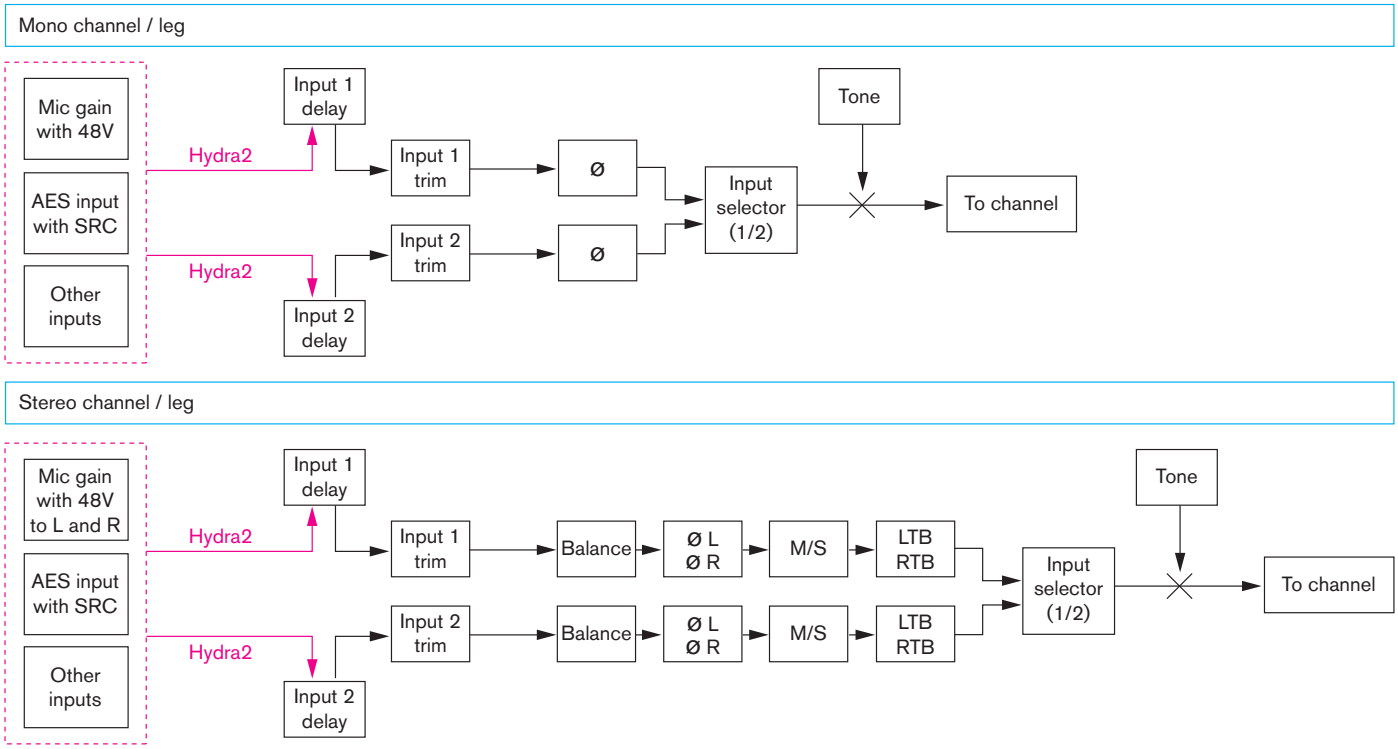
Input delay

A pool of 256 legs of assignable input delay is available to channel paths, allowing up to 2.73 seconds of delay to be applied to each path with delay assigned.

Input delay is assigned to channel paths from the IP-EQ-DYN panel mode. With the desired fader / channel selected as the currently assigned path on the surface, press the ASSIGN DELAY button in the Inputs area of the TFT screen to assign delay resource to the path. The amount of delay required can be adjusted using the upper rotary control in the top-left control cell, and can be switched in or out using the adjacent button. Pressing and holding down the delay rotary control resets the delay to the default value. A short press of the same rotary control brings up a delay control pop-up menu in the TFT screen above. The pop-up menu allows for the amount of delay to be displayed in either milliseconds or video frames (on a path-by-path basis), and also provides +/- buttons to step up or down the amount of delay by preset quantities as an alternative to using the rotary control. The Other Options>Default Settings page of the Main PC Application allows for ms or frames to be chosen as the default delay unit, the number of video frames per second to be selected to match the video format being used, and the +/- delay button step size to be chosen.

The following controls allow manipulation of mono or stereo input signals. Should a fader have a surround path assigned to it, each

FIGURE 2 - INPUT SIGNAL FLOW



mono or stereo leg of this surround signal may be manipulated by assigning the relevant leg on the spill panel...

48V
48V (phantom power) can be sent to each leg of the input signal using the 48V button (mono) or the 48L and 48R buttons (stereo). These are located on the TFT touchscreen.

Polarity inversion
The polarity of the each leg of the signal may be inverted individually.

Input balance
The balance of a stereo input pair can be varied from full left, through center stereo to full right. If the balance control is switched out, then the balance is set to center stereo.

M-S
If the input signal on a stereo input is presented as an M-S pair it may be presented incorrectly unless the M-S decoder is switched in. A button on the touchscreen toggles the decoder in or out.

SRC
Sample rate conversion may be turned on if an AES input is selected.

Signal flow
Figure 2 shows the signal flow of Apollo's input section for a stereo input with input 1/2 selection.

Note that it is possible to change input controls for an I/O box port which is offline. In this case it is important that console operators regularly save the User Memory to avoid losing settings when the I/O box comes back online.

REPLAY

The Replay feature allows easy switching between inputs 1 and 2 for a pre-determined set of paths.

The primary use of Replay is to provide a quick way to play back multitrack content over the same fader paths used for recording. This is achieved by patching each live audio source to a path's input 1 and the corresponding recording device output to the path's input 2. All paths being used with the multitrack recorder should then be added to the Replay Set, allowing their inputs to be switched between 1 and 2 with a single button press.

Replay control buttons can be accessed by selecting TOOLS and then MISC from the Layers row. On the far left of the functions row above there are two buttons associated with Replay: ON and SETUP.

Adding Paths to the Replay Set

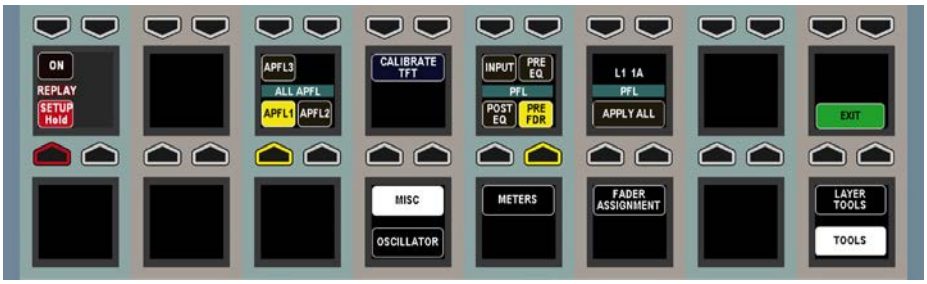
Paths can be added or removed from the Replay Set by pressing their ASSIGN button whilst holding the Replay SETUP button down, as indicated in the figure above.

Whilst holding down Replay SETUP, notice that all paths currently in the Replay Set are indicated by strobing ASSIGN buttons.

Activating Replay

Pressing ON in the Replay button cell activates Replay, switching all paths within the Replay set to input 2, regardless of which input they were previously assigned to. Pressing ON again will deactivate Replay and switch all paths in the Replay set to input 1.

REPLAY CONTROLS



INPUT PORT PROTECTION

Input Port Protection is a simple process designed to protect input sources when they are being used by multiple operators across a network.

Audio input sources can be shared by all consoles connected on the same Hydra2 network. All operators can control a shared input using their own console's input controls, but no operator has direct control of the shared input's Mic Gain, phantom power (48v) or SRC. To help avoid unwanted or accidental changes, these critical input controls are 'protected' using a simple manual process.

If the currently assigned path is using a protected input, a pop-up will appear in the upper left of the I/P-EQ-DYN TFT screen showing the names of all sharing consoles. If 'Protected' appears in this list, as shown above, this indicates that the input has been protected by the network administrator via the H2O GUI (see the H2O user guide for more information).

When the fader ASSIGN button is pressed on a path using a protected input, it's Mic Gain, 48v and SRC controls will appear disabled (grayed out) on the lower left of the I/P-EQ-DYN TFT screen.

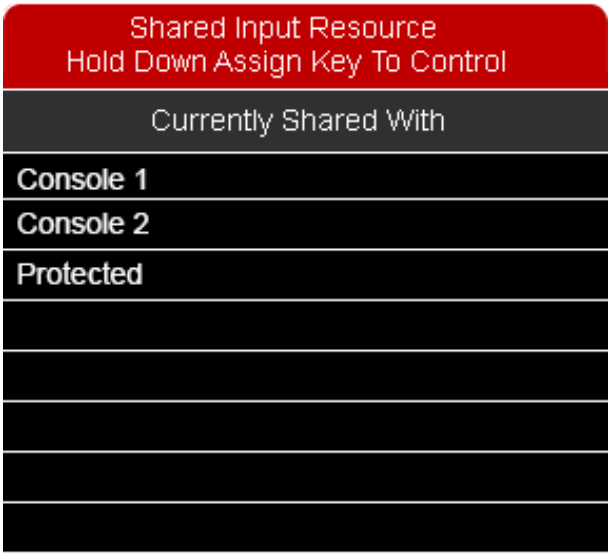
Controlling a Protected Input Port

To alter a protected input's Mic Gain, 48v or SRC, simply hold down the corresponding fader's ASSIGN button whilst making the desired change using the usual surface controls.

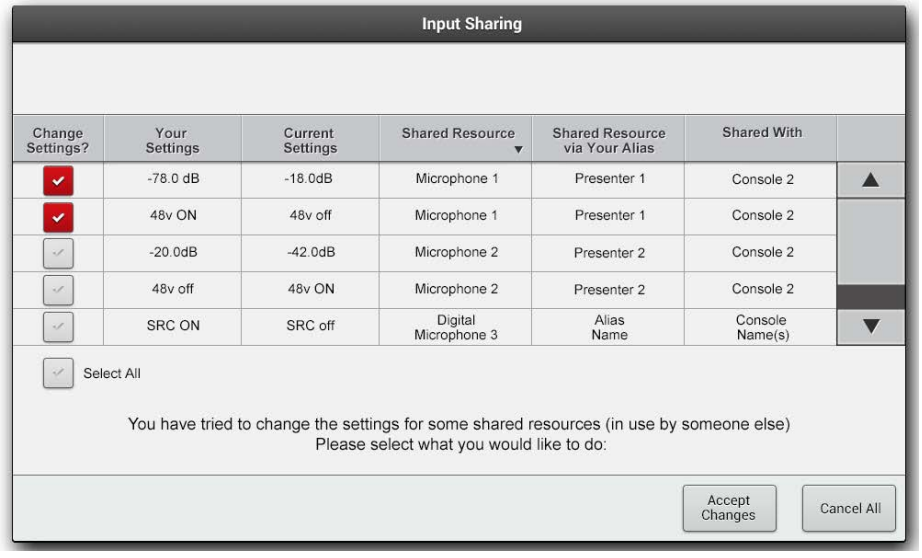
Loading Shows/Memory/Alias Files

There are implications for protected inputs' Mic Gain, 48v and SRC settings during the process of loading shows, user memory and aliases (for more information on memories, see "Using Shows and Memories" on page 152).

SHARED INPUT NOTIFICATION POP-UP - CONSOLE



INPUT SHARING POP-UP - PC



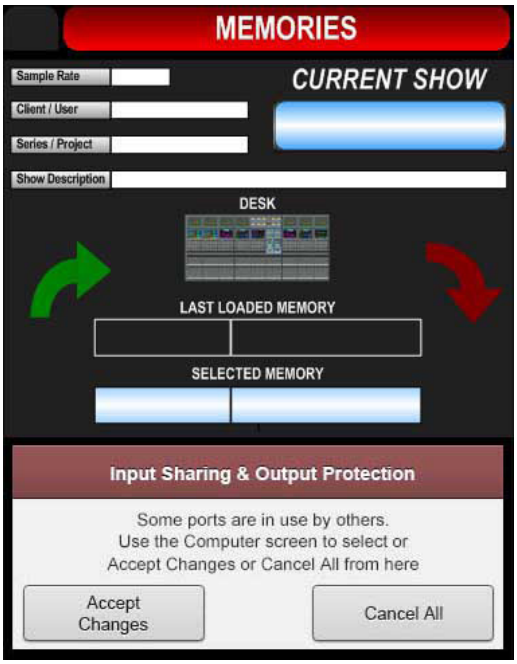
If memories are loaded which affect protected inputs, a pop-up appears on the PC screen. This pop-up contains a table of information to help in deciding which protected input settings, if any, need to be overwritten. All protected inputs are listed, along with the consoles they are shared with, current settings and the potential overwrite settings. There is also a column indicating Alias names, if in use. The left hand check box column is used to choose which settings to overwrite. Initially all changes are de-selected. Once selections have been made, the ACCEPT CHANGES button can be pressed to accept the selected changes and prevent changes that are deselected. CANCEL ALL will prevent any settings changes. In both cases the protected input sources will still be patched to the desired console paths, it is changes to Mic Gain, 48v and SRC that are being protected.

A simple "Ports in use by others" pop-up will also appear on the surface's Memories screen. This Pop-Up gives the option to ACCEPT CHANGES or CANCEL ALL, allowing full functionality through the surface, but with reduced options and information. When using this pop-up, there is a second layer of protection which will ask the operator is they are really sure about the changes before being prompted to ACCEPT CHANGES again.

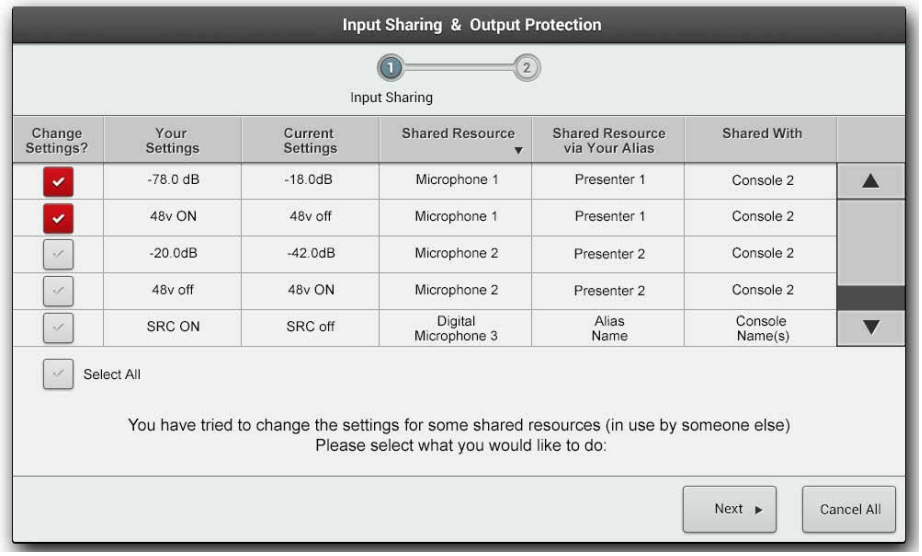
Remember to ensure you know what the effect of the memory load will be before selecting ACCEPT CHANGES, as this will alter the protected input sources for all operators.

The main PC's pop-up may have 2 stages - Input Sharing and Output Protection. This indicates that the memory to be loaded also contains changes to outputs which are in use by other operators. (See "Output Port Protection" on page 113 for more information)

SHARED INPUT NOTIFICATION POP-UP - MEMORIES SCREEN



INPUT SHARING AND OUTPUT PROTECTION 2 STAGE POP-UP - PC



DOLBY E DECODING

Dolby E decoders are an option for fitting in Hydra2 modular I/O boxes. If fitted, the decoders are patchable and can be used to decode any Dolby E signal being input to any Hydra2 I/O box on the network.

The VO5873 modular I/O card has 2 SDI inputs and 4 slots for Dolby E decoder modules. Multiple VO5873 cards can be fitted within the same or different modular I/O boxes across the network to provide the total quantity of decoders required.

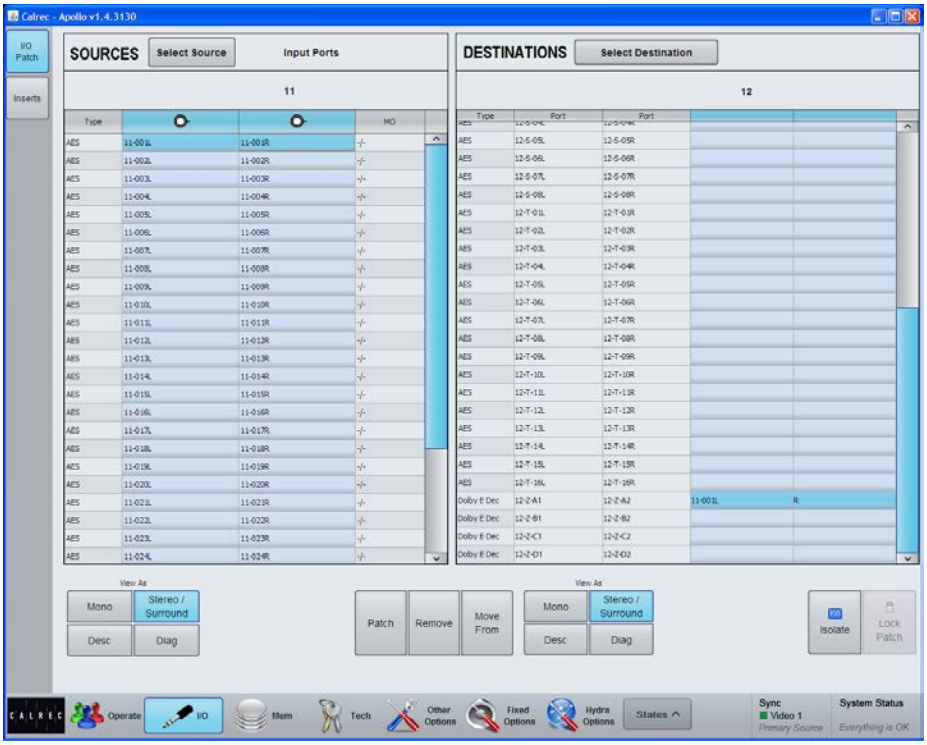
Although physically located on the same card as SDI inputs, the Dolby E decoders are in fact fully patchable in their own right and can be used to decode any Dolby E signal fed into any Hydra2 input on the network, whether it is coming in as an AES pair or is embedded into an SDI or MADI stream.

LED's A, B, C & D on the front of the module itself illuminate green to show if decoder cards have been fitted in the four available slots on the module.

Passing signals through decoders
Consoles with access to VO5873s will display the Dolby E decoders as I/O ports available for patching in a similar way to regular I/O patching. Unless the I/O lists have been customized, the decoders will appear in the port lists labelled with the ID number for the modular I/O boxes they are fitted in, and like other I/O are ordered by the slot the module is fitted in.

Dolby E encoded signals that are fed to a Hydra2 input port and require decoding should be patched to a decoder. Using the Main PC Application, I/O>I/O Patch screen, find and highlight the input port pair being fed with encoded signal in the sources lists on the left side of the screen (see the previous section on Using Input Sources for more details on I/O patching).

AES INPUT PAIR PATCHED TO OUTPUT PORTS FEEDING A DOLBY E DECODER



OUTPUT FROM A DOLBY E DECODER PATCHED TO AN INPUT CHANNEL

Click on the **Select Destinations** button above the destinations table, choose **Output Ports** from the pop-up menu and then select the port list containing the decoders. Two ports are available for each decoder card for the L & R of an encoded pair. Highlight one of the encoders in the list and patch the L& R input port pair to the L & R of the chosen encoder. The audio from the chosen input ports is now feeding the chosen encoder card.

Then, from the **Select Sources** menu find the list containing the decoder's output. 8 ports provide inputs to the system from the output of each decoder card. These ports can be patched in the same way as regular I/O ports. To put them on input channel paths, choose My Desk Inputs from the Select Destinations menu, or to pass the decoded audio straight out they can also be patched directly to output ports of any format. Like other input ports, the feed from the decoders can be patched to multiple destinations simultaneously.

Important - sample rate conversion
In order for a DolbyE signal to be decoded, it must NOT be sample rate converted before reaching the decoder. Patching an AES input source, either from a regular AES port or from within an SDI stream to a decoder will automatically turn the sample rate convertor (SRC) off for that specific AES pair at the Hydra2 input stage. Calrec MADI inputs do not have SRC and therefore are unaffected by patching to decoders. For successful decoding, ensure that the signal is not being sample rate converted before it reaches the Hydra2 input, for example by external routers or de-embedders.

The switching of SRC on an input port will affect all instances where that port is being used, including other consoles on the network that may be accessing it. To turn a Calrec SRC back on, or to manually switch on / off, the input itself (as oppose to the decoder) should be patched to an input channel. With the input channel selected as the currently assigned path, SRC switching buttons are available from the TFT screen of the IP-EQ-DYN panel mode. The on / off status of a port's SRC is retained after removing it from an input channel.

Once the signal has passed through the decoder it is then automatically sample rate converted to ensure the integrity of the signal through the console. SRC of the decoded signal cannot be turned off.

Important - synchronization
If an SDI stream is connected to the VO5873, its' decoder cards will operate using the SDI stream's frame sync. This is to allow extracted metadata to be aligned relative to the video frame sync. If the card is being fed SDI whilst decoding a signal that is not part of that SDI stream, it is important that the encoded signal has the same sync reference as the SDI stream feeding the card. Failure to ensure this will result in loss of audio and metadata.

Metadata
A connector on the VO5873 front panel outputs metadata extracted by the Dolby E decoder cards, Please refer to the Hydra2 Installation Manual for the connector pin-out information.

Passing encoded Dolby E
If required, Dolby E encoded signals can be routed through the Hydra2 domain without decoding. When patching input ports containing Dolby E encoded signals directly to output ports, it is important to ensure that any sample rate convertors on the incoming signal are switched OFF. An Encoded signal may be input as an AES pair or embedded into SDI or MADI streams and can be patched directly to AES, MADI or SDI outputs irrespective of the format the input is in. Calrec MADI inputs do not have sample rate convertors, but AES and AES within SDI do and will be switched in as a default. To maintain the integrity of the encoded signal, ensure the SRC of the port it is being fed into is switched off. Patching the input ports to a decoder (as well as directly to the required output ports) will automatically switch the SRC off. If required, the patch to the decoder can then be removed, the SRC will stay off. Alternatively, or if no decoders are fitted, the SRC can be switched manually by patching the input port to a channel input (as well as directly to the required output ports). SRC can be switched on and off from the TFT screen of the IP-EQ-DYN panel mode when the channel is the currently assigned path. The ports can then be removed from the input channel and the port's SRC on/off status is retained.

ALIAS FILES

Alias files enable easier setup of input and output configurations when productions move to different studios.

In systems with several studios and control rooms, moving a production causes a change to some of the resources used, but retaining a similar I/O patching scheme. For example changing a show from Studio 1 to Studio 2 is likely to require a similar set of inputs patched to the console channels but coming from a different studio wall box. An alias file provides easy re-patching. Similar alias files also exist for output routing.

Editing alias files

To create or modify an input alias file, go to HYDRA OPTIONS and ALIASES and choose INPUT FILES. With either a new or existing file open for editing, all the available input ports are shown in the right hand window and can be placed as part of the alias by touching the ADD PORTS button. Once added, the ports can be given a function related name as shown in figure 1. The commonly used CTRL X, CTRL C and CTRL V for cut, paste and copy can be used to speed the entry of text names. Names must all be unique and any temporary duplicate is shown with a red warning.

Once the alias file for use with one set of ports has been saved, another can be created using an alternative set of ports, assigning matching names for the audio signal to those used in the first alias file. It will often be convenient also to organise the output ports into suitably named Output Alias files.

Alias groups

The display order is alphabetical so to ensure related are adjacent in source lists, ALIAS GROUPS can be created. These can be thought of as performing

FIGURE 1 - INPUT ALIAS FILE EDITING

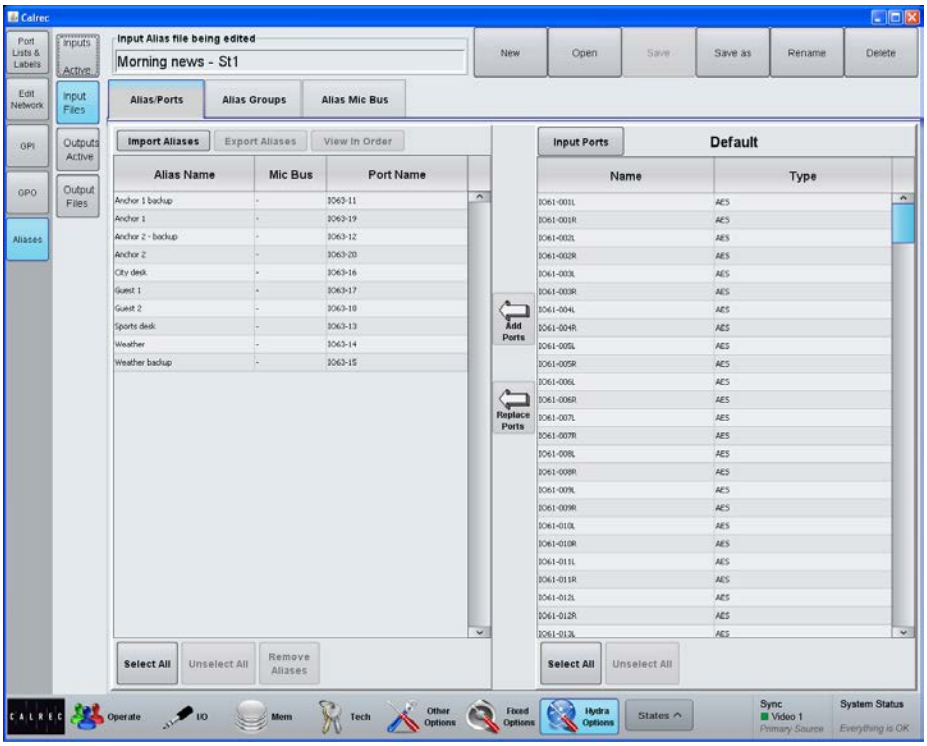
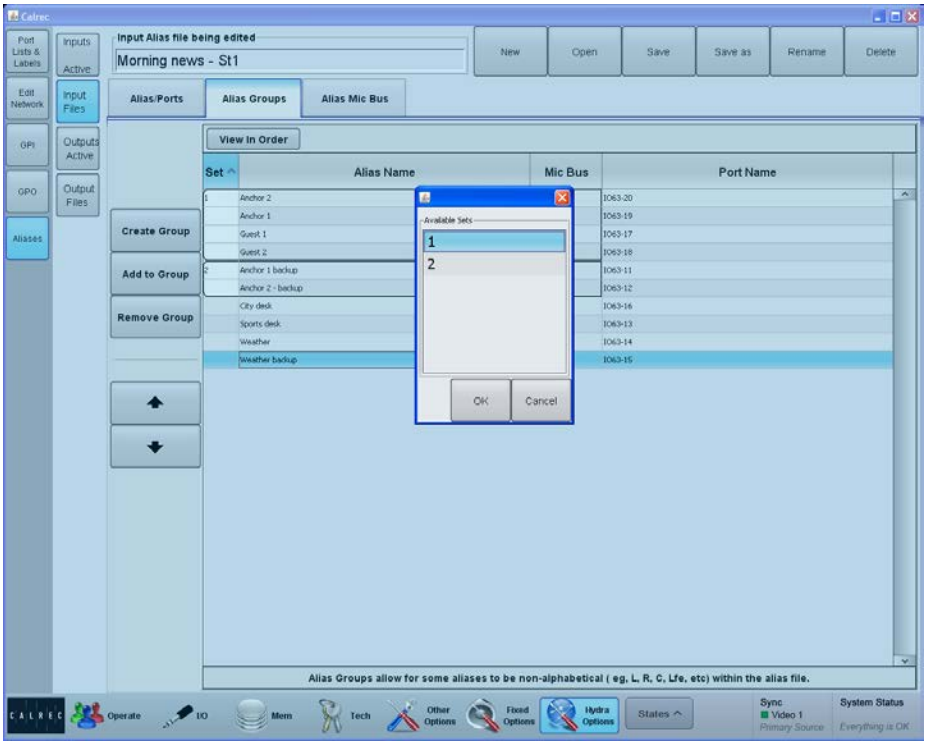


FIGURE 2 - ALIAS GROUPS



a function similar to input sets and within the group, the term SET is again used.

First select the alias file for which groups are going to be assigned and then select the first port that is to belong to that group. Touch CREATE GROUP and 1 appears in the SET column. Other ports can then be chosen as in figure 2, either to be added to an existing group, or for a newly created group. This grouping is only of the ports within the alias file and should not be confused with any other form of grouping that may be in use on a console.

Alias mic bus

ALIAS MIC BUS allows the ports to be assigned to one or more of the console's five mic open buses so that studio speaker muting is correctly assigned when the production changes studios.

Enabling an alias file

To make an input alias file active and ready for use, go to INPUTS ACTIVE and using the arrows, placed the required file(s) into the left window of active alias files as in figure 3. Only files that contain valid input patching can be made active.

When output alias files have been created, they should also be enabled to make them available for use.

Alias patching

To use the routes defined in the input alias file, go to the I/O patching screen. When filtering the Sources, as shown in Figure 4, all the currently active Input Alias files will be shown, as well as available inputs ports and desk outputs. Output aliases are used in a similar way.

FIGURE 3 - ALIAS ENABLING

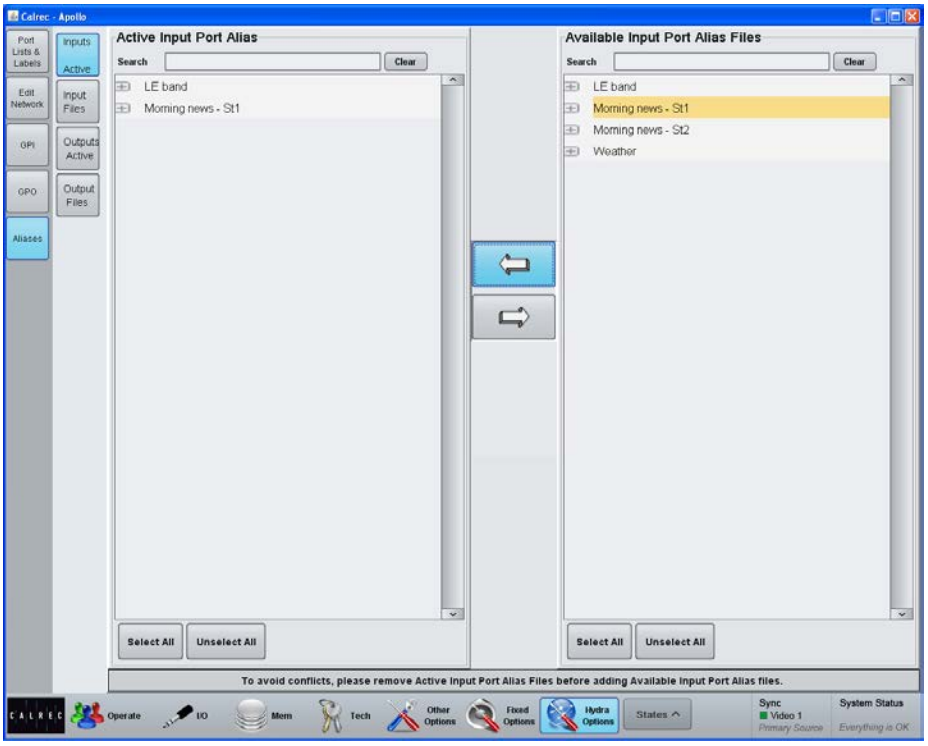
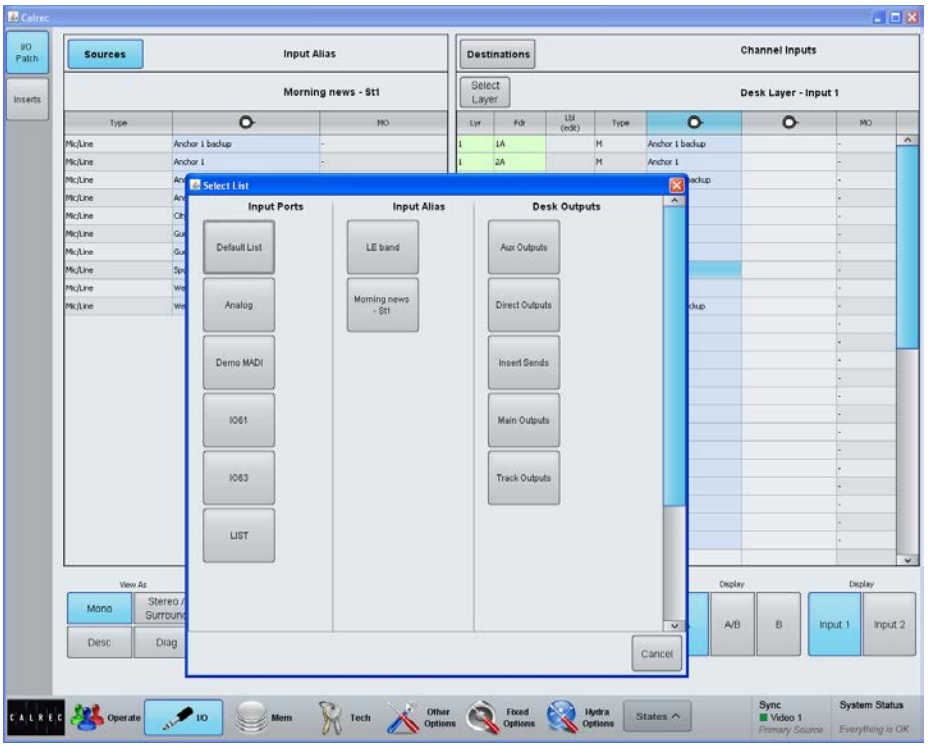


FIGURE 4 - USING AN INPUT ALIAS



TONE / OSCILLATOR CONTROLS

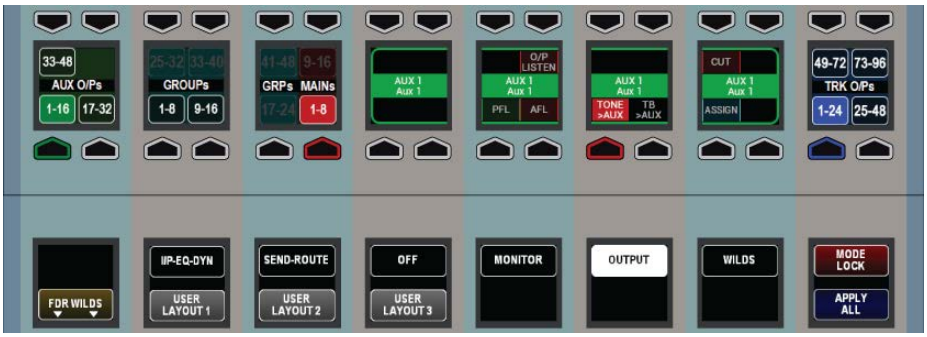
There are many tone injection points within the Apollo DSP to aid with path checking and line-up.

Tone can be routed in the following ways:

- To a channel or group fader's input - press the fader's ASSIGN button and select TONE in the lower left hand corner of the I/P-EQ-DYN TFT screen.
- To Track outputs - press the rotary controller for the required track output when in the OUTPUTS panel mode to bring up extra controls including tone switching, then select TONE>TRACK
- To Aux outputs - press the rotary controller for the required Aux output when in the OUTPUTS panel mode to bring up extra controls including tone switching, then select TONE>AUX
- To Group Outputs - press the rotary controller for the required Group output when in the OUTPUTS panel mode to bring up extra controls including tone switching, then select TONE>Group
- To Main outputs - press the rotary controller for the required Main output when in the OUTPUTS panel mode to bring up extra controls including tone switching, then select TONE>Main
- To Main outputs from the 4 faders on the monitor panel - If Main outputs are assigned to these faders, and the panel is not in downmix or spill levels mode, the button just above each fader becomes a Tone selector.

Changing the mode of panels or the assigned focus by selecting a different fader or output bus does not clear the tone. Tone will remain until deselected or globally cleared.

ASSIGNING TONE TO A BUS OUTPUT



- Panel in Outputs mode shown after Aux 1 rotary control press

The Oscillator functions provide control over internal tone parameters and allow the option to override the internal tone generator with external or "house" tone.

These controls can be accessed from any fader panel by pressing TOOLS and then OSCILLATOR on any fader panel's Modes row. The oscillator controls will then be displayed in the Functions row above, as shown in the image below.

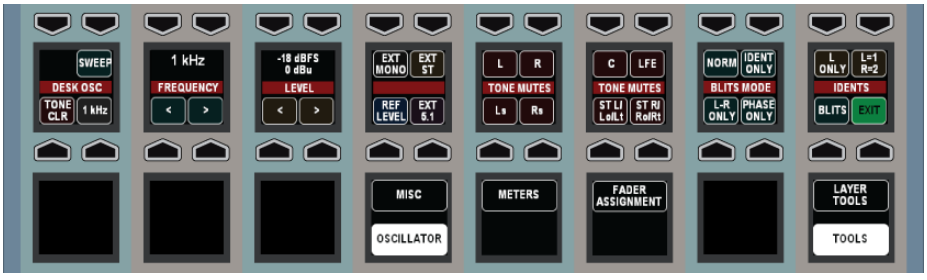
Oscillator Parameters

The Functions row provides controls to adjust the internal oscillator's level and frequency, including a repeating tone sweep function and mute options for each leg of the accessed path:

- Frequency ranges cover the band from 20Hz to 20kHz.
- Level is displayed in both dBFS and dBU.
- The oscillator sweep is stepped and runs from 20Hz to 20kHz.
- The < and > buttons allow you to change the direction of the sweep.
- Pressing and holding "1KHz" or "Ref Level" will reset to the default values.

Note, the default level value is intended to match your regional or chosen running levels and line-ups, e.g. for the US, the default lineup setting is -20dBFS/+4dBU whereas for the UK it is -18dBFS/0dBU. If your line-up levels are not as expected please contact your engineering support or Calrec support at support@calrec.com.

OSCILLATOR CONTROLS



Tone Idents
Ident patterns are used to identify which channel is which to help verify routing and patching. Apollo consoles support three ident formats which can be selected from the "Idents" control cell within the oscillator control row.

"L ONLY" is similar to the EBU ident specification. The tone on the left audio channel is repeatedly interrupted whilst the right channel remains constant.

"L=1, R=2" is similar to the GLITS ident specification. Tone is repeatedly interrupted on both left and right channels. Each interruption on the left channel is followed by two interruptions on the right channel.

These are stereo idents and will only be applied to tone being injected onto stereo paths / outputs. If tone is selected directly onto a surround output (rather than on a fader routed to an output) the stereo ident will only affect the stereo downmix / encoded output channels.

Only one of the two stereo idents can be selected at any given time.

BLITS ident is for use on 5.1 surround paths and will not affect tone on mono or stereo paths. BLITS ident can be selected / used at the same time as one of the stereo idents.

Four different modes can be selected for the BLITS format, selectable from the control cell to the right.

"NORM" is the full BLITS cycle mode - First, a short burst of tone is applied to each of the 6 channels, one at a time, in order. Four different frequencies of tone are used at this stage to help ID the channels - L/R outputs at 880Hz, Center at 1320Hz, Lfe at 82.5Hz, Ls/Rs at 660Hz. This is followed by 1KHz tone the on L & R legs only. The right channel is continuous, whilst the left channel is repeatedly interrupted. The last stage of the cycle applies 2KHz tone on all 6 channels simultaneously before beginning the cycle again. Each cycle lasts approximately 13 seconds. The different frequencies used also help to identify each part of the cycle, for example if 1KHz can be heard anywhere other than front L/R there must be a problem with routing or patching.

All Idents apart from BLITZ can be used in conjunction with the Oscillator sweep function. Selection BLITZ automatically disables the sweep.

External Tone
The "EXT TONE" buttons override the console oscillator, allowing for externally generated tone to be applied for users who have a "house" tone / ident system.

Mono, stereo and 5.1 tone paths are separated to support their idents. External tone can be applied and selected individually to each "width" of tone bus, meaning a mixture of internal and external tone could be used if required.

External tone sources can be fed into any Hydra2 input. The inputs used need to be patched accordingly -

From the PC Main Application, FIXED OPTIONS>Mon-TB-MTR-PATCH page, Select DESTINATIONS in the upper right area of the screen and choose TONE + TB. From the upper left, select SOURCES and choose the relevant Desk Inputs list for the I/O ports the external tone is connected to. Highlight the blue cell for the correct "Ext Tone" destination, highlight the blue cell for the correct input port and click Patch to apply. Repeat for any other sources required.

The destinations side of this page also provides the option to switch in/out sample rate convertors if digital sources are patched or to select phantom power and adjust input gain on analogue inputs, though the analogue settings are normally only changed from their defaults for the Talkback destinations displayed in the same list. For Tone destinations using analogue inputs the default setting is 0dB gain and NO power.

Patches made on this page are automatically saved and remain the same for all memories and shows

Tone Clear
The upper half of the control cell on the far right provides a TONE CLEAR function. This will clear all tone selections made on the control surface - i.e. it will deselect tone switched to channel inputs, bus outputs etc (it does not affect external tone patches and does not turn off the oscillator). This is a convenient way to ensure all paths are passing normal signal and no tone is injected over the path prior to going on air. It is also a convenient method to kill tone in a hurry when the source is not so obvious.

Tone Troubleshooting & FAQs

No tone present when selected
Selecting external tone will replace the console oscillator whether external tone is present or not. If internal tone is not present when expected, check it is not set to external.
If using external tone, check the correct input ports are patched to the external input (and that the tone generator is connected, on and set correctly)
Also check that the oscillator level and frequency are set to suitable values.

Tone on stereo downmixed / encoded outputs lower than expected
When selecting tone to a surround output bus, it is also applied to that buses' LoRo/LtRt outputs at the same level. This is because tone is being applied at the final output stage. With tone to line selected the signal on LoRo/LtRt is NOT derived from a downmix or encoding of the surround channels. The same level of tone is applied to both the 5.1 and the downmixed output.

Tone on stereo downmixed / encoded outputs higher than expected
If tone is fed from a surround channel / path which is in turn routed to a surround output, the LoRo/LtRt of that output will generally be of a higher level than that on the surround legs as the LoRo/LtRt output is derived from a downmix of the content on the surround legs as per the downmix settings.

Tone not present or low on Lfe channel of outputs
If tone is routed from a channel to surround main output and signal is not present on the Lfe leg of the output, this is likely to be due to the default state of surround Main outputs having a high frequency filter switched in on their Lfe leg. Reduce the frequency of the oscillator to around 50Hz to see (and hear) the Lfe channel. If desired, the filter can be switched out or adjusted by selecting the Main output as assigned, then selecting the Lfe channel from the surround spill panel and adjusting the filters from an EQ panel.

HYDRA PATCHBAYS

Hydra patchbays (HPBs) allow console operators to make selected DSP audio outputs available on the Hydra2 network, allowing other Hydra2 users to access them as well as allowing console input sources and output feeds to be changed remotely.

HPBs are virtual patchbays within the Hydra2 domain. Like physical patchbays, HPBs have a number of input ports which are 'hard wired' to output ports. For port patching purposes, Hydra Patchbay inputs are destinations and Hydra Patchbay outputs are sources.

When a source is patched to a Hydra Patchbay input, it immediately becomes available at the corresponding Hydra Patchbay output. For example, if a console operator patches a direct output to a Hydra Patchbay input, the Direct Output feed becomes available to all Hydra2 users (who have been granted access,) as the corresponding Hydra Patchbay's output.

There are two types of HPB: 'console specific' and 'shared'. Console specific Hydra Patchbays are available to the console that they have been created for, plus H2O and 3rd party controllers via SW-P-08. Shared Hydra Patchbays are available to all Hydra2 users who have been granted access, plus H2O and 3rd party controllers via SW-P-08. Consoles can patch signals to their own or shared Hydra Patchbay inputs in the same way they patch to physical output ports.

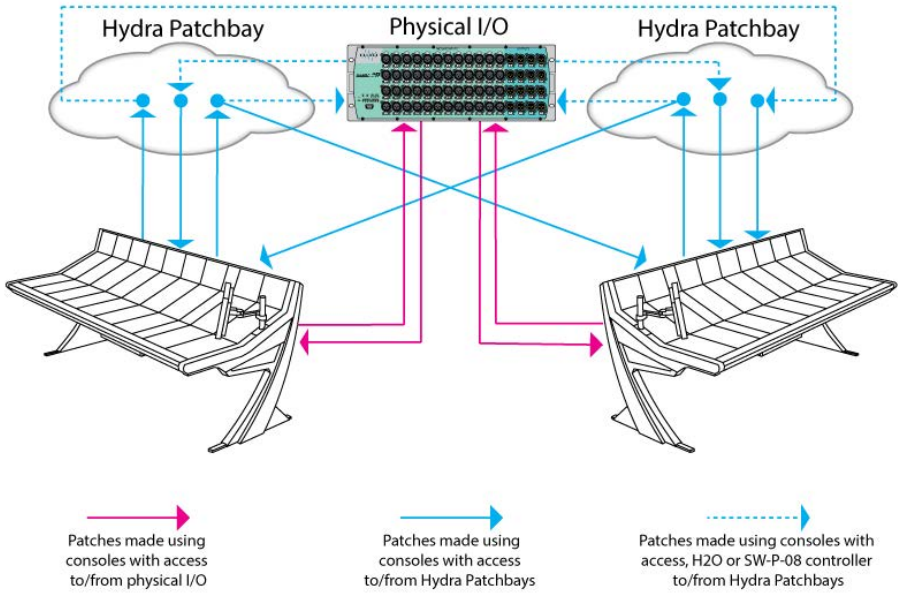
Hydra Patchbays allow network administrators (via H2O) to patch console inputs and outputs (which have been patched to Hydra Patchbay ports) to physical I/O ports. H2O users can choose physical input ports to connect to console's Hydra Patchbay inputs, and physical output ports to connect to console's Hydra Patchbay outputs allowing them to choose and change console feeds and output destinations.

External routers supporting the SW-P-08 protocol can also have access to Hydra patchbays enabling 3rd party control over console patching.

Hydra patchbays are created from the H2O user interface. See the H2O user guide for more information.

Once created, Hydra patchbays are available for patching, they appear 'online' within the Hydra Options>Edit Network screen of Main Application from where they can be added to the console's Required List for use in port patching.

HYDRA PATCHBAYS



Port Sharing

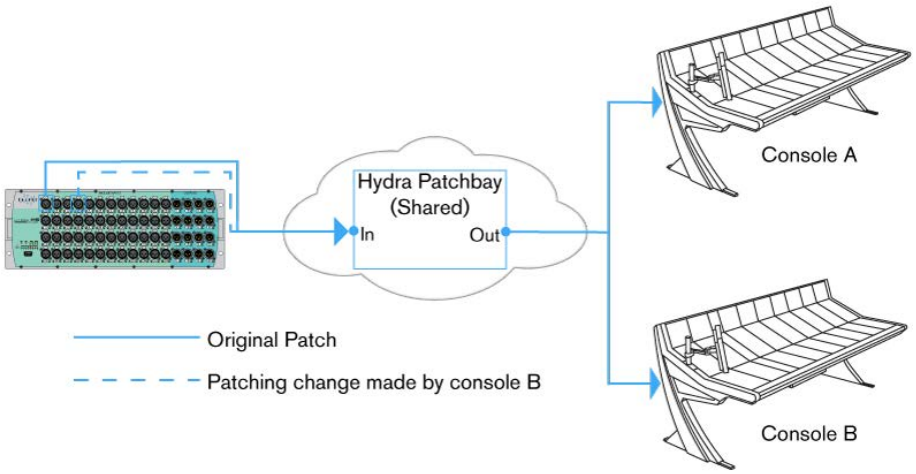
Input and output port protection works as normal when dealing with Hydra Patchbays for both console and H2O users. In situations when two or more consoles are using the same feed from a Hydra Patchbay (as in the picture on the next page) it is possible for one console to change the patching of the other by changing the I/O box port which is feeding the shared Hydra Patchbay input, either through a Memory load, or through changing the individual patch. In these circumstances it is important that the console operator understands the contents of the Input/Output protection dialogue before accepting any changes, as these changes directly affect other network users.

Console operators are given the ability to change the source feeding a HPB that is feeding other consoles to add increased flexibility. However we advise that all I/O box port to Hydra Patchbay input patching is controlled from H2O or a third party controller to avoid unwanted changes to other console's source feeds.

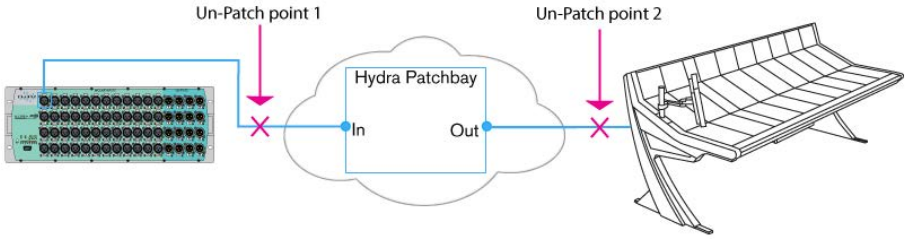
Unpatching

Under normal circumstances when I/O box ports are un-patched, their input settings (Mix Gain, SRC. 48V) are reset to their default values. However, when using Hydra Patchbays it is possible to un-patch a port at two points in the signal chain, as shown in the figure on the right. If the port is first un-patched at point 2, the I/O box port's input settings will be retained, even when the port is also un-patched at point 1.

HYDRA PATCHBAY - CONSOLE PATCHING CHANGE



HYDRA PATCHBAY - UN-PATCH



APOLLO
PROCESSING AUDIO

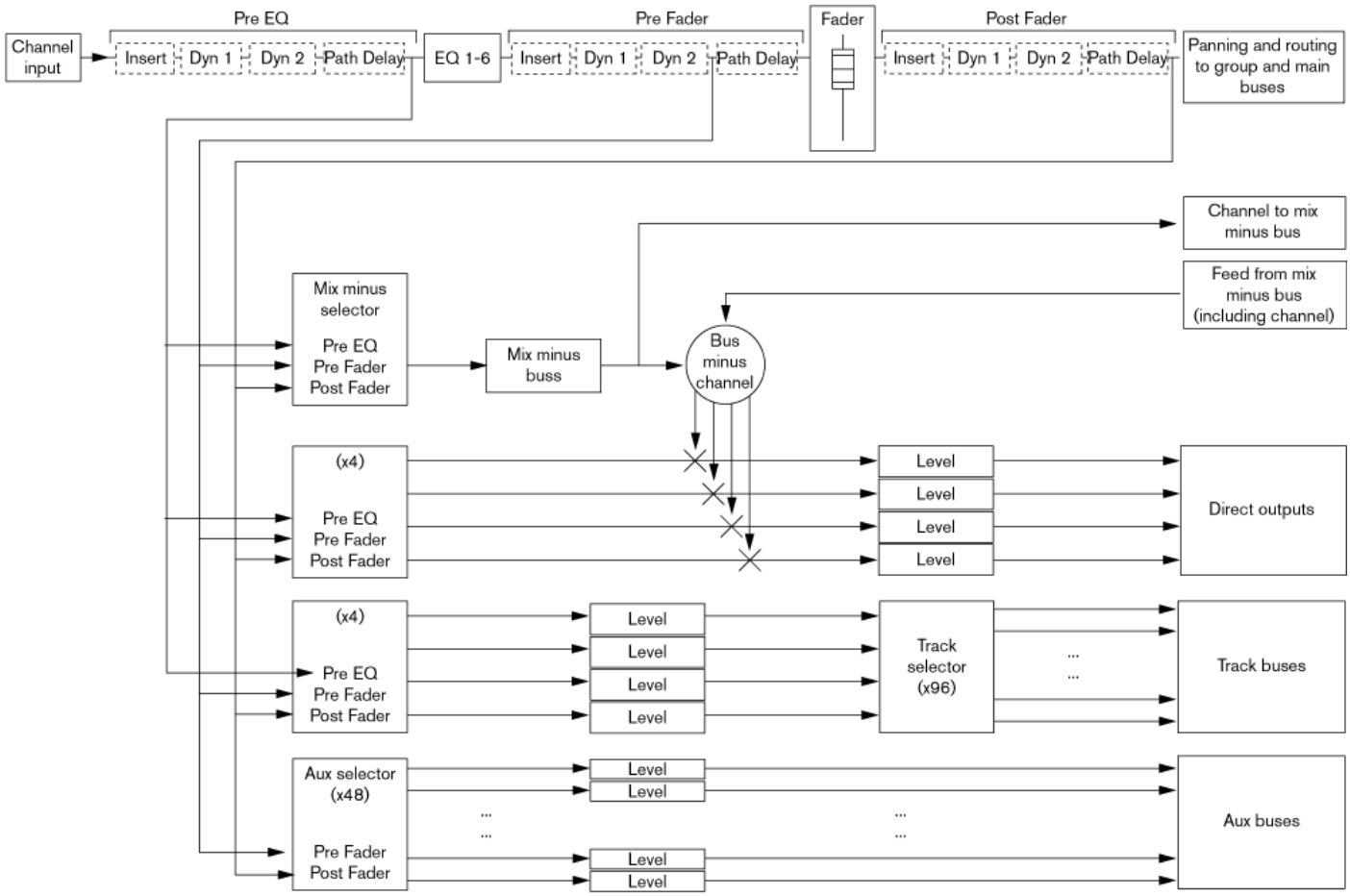
CALREC

Putting Sound in the Picture

CHANNEL SIGNAL FLOW

The figure below illustrates the signal flow in an Apollo channel path, showing how Inserts, EQ, Dynamics, Path Delay and the relevant send and output points can be positioned within the signal path.

CHANNEL SIGNAL FLOW



EQ AND FILTERS

EQ is available on all paths without restriction. Each path has access to six full range, fully parametric, switchable response EQ bands.

Each EQ band has a frequency range from 20Hz to 20kHz and can have either a high-pass filter, low shelf, notch, bell, high shelf or low-pass filter response.

Given the flexible and configurable nature of the surface, the EQ control layouts used here are available on the INP-EQ-DYN Assign mode layout. These controls would only affect the currently assigned path.

On/Off

Buttons in the left button cell switch all bands 1-4 on or off together and bands 5 and 6 on or off together.

Alternate EQ

Two EQ curves can be created per channel using the ALT EQ button. Touching this button flips between the two EQ curves for quick EQ changes or comparisons. The ALT = NORM button copies the main EQ settings over to the alternate EQ.

EQ flat

Holding the EQ FLAT button for a second will reset the gain, frequency and response (and Q where applicable) for all EQ bands.

Gain

The left column of Control cells contains gain controls (where relevant) for all six bands.

Frequency

Each band has a full frequency range from 20Hz to 20kHz. This is controlled by the middle rotary control on each row.

EQ CONTROLS ON THE INP-EQ-DYN ASSIGN MODE LAYOUT

Response
Pressing the RESP button for any band in the right column of Control cells allows the rotary control to scroll through the available response types. The button will be lit during this process. Once the response has been chosen it can be selected by pressing the button a second time. When the RESP button is not pressed, the rotary doubles as the Q control.

EQ curve display
The touchscreen shows a graphical representation of the current EQ curve for the assigned channel. It also shows an overview of the settings of each EQ band below it.

EQ PARAMETERS

	Range	Q
High Pass Filter	N/A	12 dB/octave
Low Shelf	+18dB to -18dB Variable	6dB/octave
Notch	-30dB Fixed	22.2
Higher Mid Frequency Bell	+18dB to -18dB Variable	0.3 to 10
Lower Mid Frequency Bell	+18dB to -18dB Variable	0.3 to 10
High Shelf	+18dB to -18dB Variable	6dB/octave
Low Pass Filter	N/A	12 dB/octave

DYNAMICS

Every channel / group / main path has to two dedicated dynamics processing units that are always available to them. Dynamics 1 provides a compressor / limiter and expander / gate. Dynamics 2 provides a second compressor limiter.

Dynamics controls

The dynamics controls and related displays are all located in the I/P-EQ-DYN panel mode, as shown in the adjacent illustration. Dynamics controls and displays are all color-coded purple.

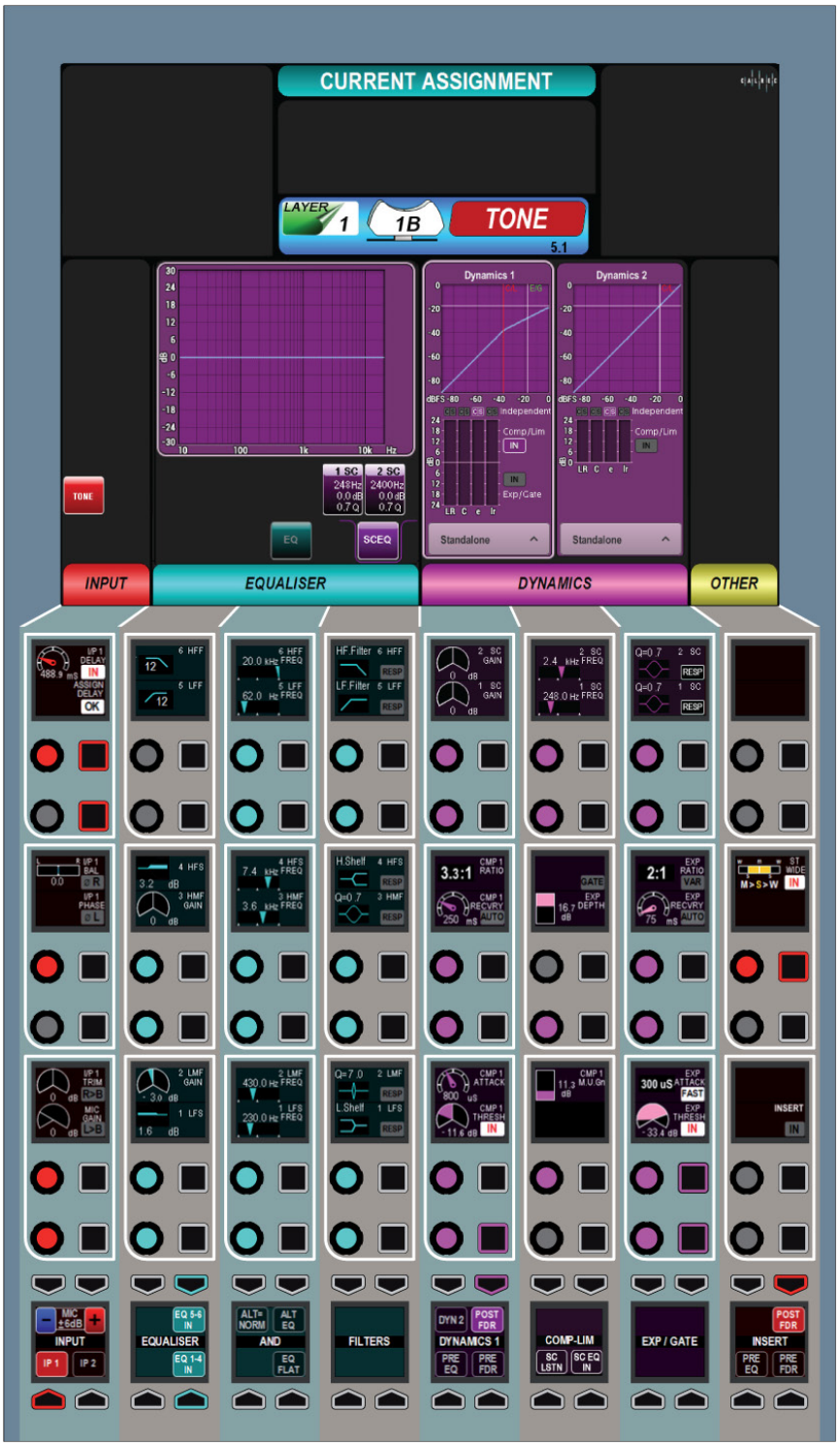
The TFT screen displays a graph of input level versus output level along with gain reduction meters for both dynamics processors. With SCEQ selected on the TFT screen, it also displays the EQ curve for the dynamics 1 side-chain.

This panel mode can switch between controlling dynamics 1 and dynamics 2 - touch the dynamics 1 or 2 display area of the TFT screen to switch control between the two processors. Alternatively, press the “DYN 2” button (in 5th button cell of the bottom row shown on this page) to switch controls between the two processing units. Note, the processor currently under control is labelled across the center of this display, and is highlighted by a white border on the TFT screen.

Both dynamics 1 & 2 can be used as limiters simply by switching the compressor in and setting the ratio to the maximum of 50:1. At this setting, the input has to increase by 50dB above the threshold in order for the output to increase by a negligible 1dB - the signal is effectively being limited.

The expander in dynamics 1 can be switched to perform as a gate by pressing

FIGURE 1 - DYNAMICS CONTROL LAYOUT



the Gate button in the 6th control cell in the middle row.

Processing order
Buttons in the bottom control row shown on the previous page allow each dynamics unit to be selected to operate post fader, pre fader (post EQ) or pre EQ (pre fader).

Dynamics metering
In addition to the gain reduction meters shown in the panel mode TFT area which show the status of the currently assigned path, dynamics gain reduction meters are also displayed for each path in the upstand metering area above. These upstand meters can be switched between displaying dynamics 1 and dynamics 2 using the panel Tools>Meters menu found in the layers row, to bring up the options in the functions row above.

Dynamics gain reduction meters light upwards, away from the zero point, in a red color to indicate the amount of gain reduction being applied due to compression. Where expander / gates are available (Dynamics processor 1), the same meter bar will light downwards, away from the central zero point, in a green color to indicate gain reduction due to gating or expansion.

If a surround master is the currently assigned path on the control surface, the panel mode area of the TFT will display gain reduction bargraphs for each of the surround elements. In addition, "C" & "S" indicators above each meter show whether each surround element has dynamics control and / or sidechain independence from the surround master.

Sidechain EQ
The "SC EQ IN" button in the wild assign (bottom) row of the dynamics control section is used to switch sidechain EQ in and out.

The sidechain EQ parameter controls can be found in the top row of the dynamics control area. As with regular EQ bands, you can select various response types by pressing RESP and turning the related shaft encoder. The remaining controls change according to the response chosen

The EQ response curve for the sidechain can be viewed by selecting SCEQ from the TFT screen beneath the EQ curve.

About Dynamics Sidechain & EQ
All dynamics 1 processors have optional sidechain EQ. Channels have 2 band EQ, whilst Groups and Mains have a 1 band EQ.

The sidechain is an offshoot from the audio path through the Channel / Group / Main. Dynamics processors use the sidechain to determine the audio level and then apply gain reduction to the "through" audio path. Sidechain audio is not passed on, it is used purely as a reference for dynamics processors.

Applying EQ to the sidechain does NOT change the relative frequency response of the audio path though the console, only the audio that "triggers" the dynamics.

By applying EQ to the sidechain you can tune the dynamics to act on or ignore peaks depending on the frequency. For example, a basic "De-Esser" used to reduce sibilance is a compressor with a high pass filter on the sidechain. The compressor only receives the high frequency content and will therefore only apply gain reduction if high frequency content exceeds the threshold setting.

Dynamics Links
The compression gain reduction level of multiple paths can be bused together using dynamics links. Paths that share a common dynamics link, will all get the same amount of gain reduction applied - If the signal level on a path, combined with the path's compression settings causes it to apply gain reduction, the same amount of gain reduction will be applied to all other paths using the same dynamics link, irrespective of their own audio content and compression settings.

If multiple paths are triggering compression, the gain reduction across the linked group will be the same as whichever path is compressing the most. For example, if the settings and audio level of one path causes its compressor to apply 5dB of gain reduction, and another path is causing 10dB of reduction, all the paths in the group will have their signals reduced by 10dB.

When Expander/Gate units are part of a dynamics link and one feed within the link reaches the threshold level to open the expander/gate, all expander/gates within the link open regardless of the levels of their feeds.

DYNAMICS PARAMETERS

	Compressor
Threshold	+20dB to -20dB
Recovery	75ms to 4s + Auto
Ratio	1:1 up to 4:1 in 0.1 steps, 4:1 up to 10:1 in 0.2 steps, 10:1 up to 20:1 in 1.0 steps, 20:1, 25:1, 30:1, 35:1, 40:1, 50:1 (Limiter)
Attack	50µs to 200ms (5ms default)
Make Up Gain	0dB to 20dB

	Expander
Threshold	+10dB to -40dB
Recovery	75ms to 4s + Auto
Depth	0dB to 40dB
Ratio	2:1 and Var (variable according to level)
Attack	300µs (fast) 16ms (normal)

	Gate
Threshold	0dB to -40dB with 6dB hysteresis
Recovery	75ms to 4s + Auto
Depth	0dB to 40dB
Attack	300µs (fast) 16ms (normal)
Gate Delay	0s to 1s

DELAY SETTINGS

Delay can be inserted into the signal path in the following ways:

- Input delay - up to 2.73s available per path from a pool of 256 mono legs (e.g. when assigning to a 5.1 signal, 6 of the 256 mono legs will be used) can be assigned from the I/P-EQ-DYN panel - see “Input Controls” on page 58 for more information.
- Path delay - up to 2.73s available for all paths from the I/P-EQ-DYN panel, pre-EQ, pre-fader or post fader - see “Path Delay” on page 81 for more information.
- Output delay - up to 2.73s available per path from a pool of 256 mono legs from the Output and Send-Route panels - “Output Control” on page 114 and “Direct Outputs” on page 117for more information.

Note that Input, Path and Output delay can be used individually or in combination.

Individual Delay Control

Individual delay values can be displayed in either milliseconds or video frames. Push any delay rotary controller to display its delay control pop-up on the main surface TFT screen (as shown on the right). Within the delay pop-up there is a two-state button to switch between milliseconds and video frame resolution and up/down stepper buttons for use as an alternative to the rotary controller for setting the delay time.

Global Delay Settings

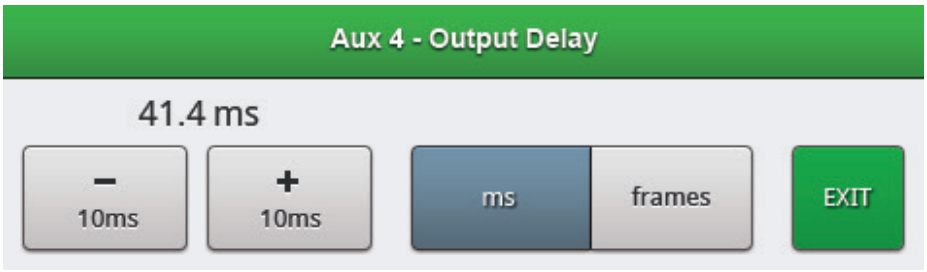
Global delay controls can be accessed from the Main application on the console PC by first selecting OTHER OPTIONS and then MISC SETTINGS.

There are three global delay settings as shown in the image on the right. **Default Delay Unit** sets the resolution type for all new delay assignments, the interface is a two state button to switch between ‘ms’ and ‘frames’. This ‘ms’/’frames’ selection can be applied to all existing delay assignments by clicking APPLY TO ALL EXISTING DELAYS.

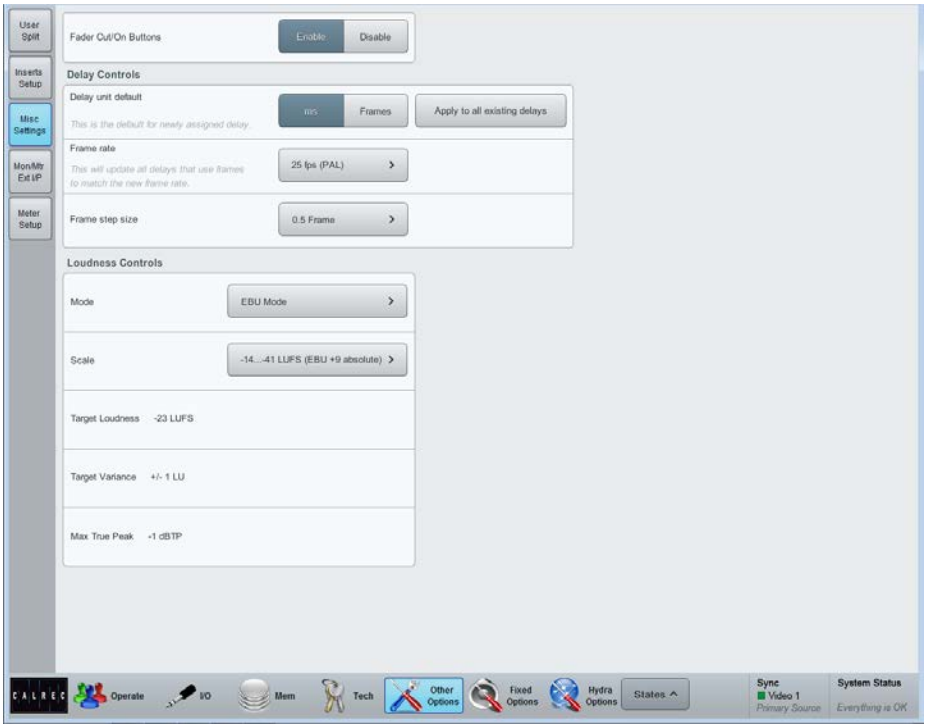
The **Frame rate** selection button is used to set the video frame rate for all frame-based delay assignments. The frame rate should be set to match the frame rate of the video signal that the audio feed is related to.

Finally there is the **Frame Step Size** selection button which sets the resolution of the stepper button within the surface pop-up shown above. There are two options: 1 frame and 0.5 frames.

DELAY CONTROL SURFACE POP-UP



GLOBAL DELAY CONTROLS - CONSOLE PC



PATH DELAY

Up to 2.73s of Path delay can be inserted into all Channel, Group, Main, Aux or Track paths.

There are three options when placing Path Delay into the signal chain - pre EQ, pre fader or post fader.

Assigning Path Delay

To access Path Delay controls for the currently assigned fader, put any panel into I/P-EQ-DYN mode and look to the OTHER section down the right hand side of the panel.

Working from the top, the TFT shows a three-state button cell which allows the signal chain positioning to be changed between PRE EQ, PRE FADER and POST FADER. As shown in “Channel signal flow” on page 74, Path Delay is inserted at the end of the processing block, after insert, dynamics 1 and dynamics 2. The pre EQ and post fader sends are situated after the respective Path Delay, but it is worth noting that the pre fader send is situated prior to the pre fader Path Delay.

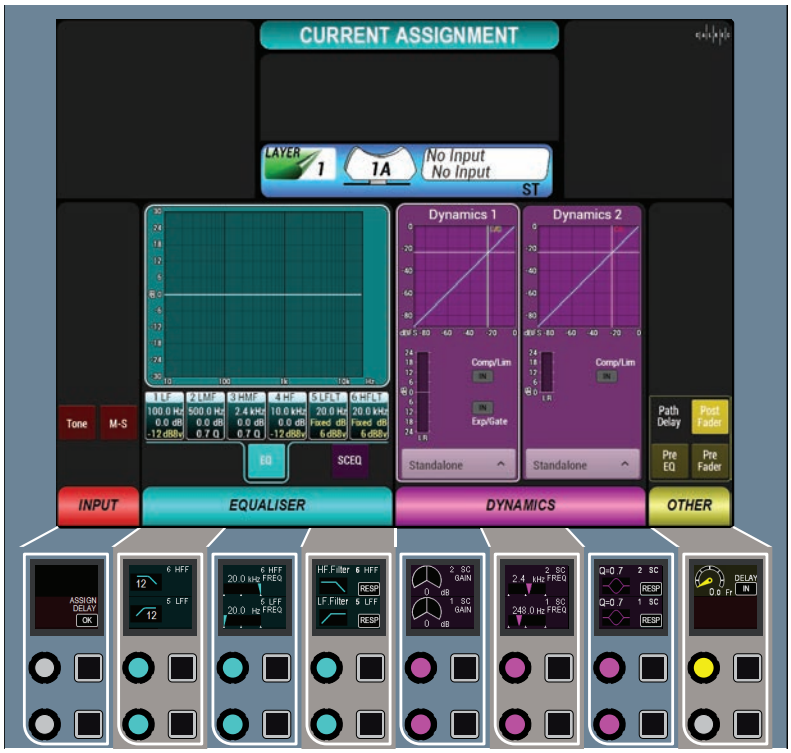
The top half of the first control cell within the wild assign panel allows control of the Path Delay, the button switches the delay on or off and the rotary controller alters the delay length.

If the Path Delay rotary controller is pushed, a pop-up appears on the TFT screen with a two state button to switch between showing Path Delay in time (ms) and video frames. There is also the option to nudge the delay amount up or down.

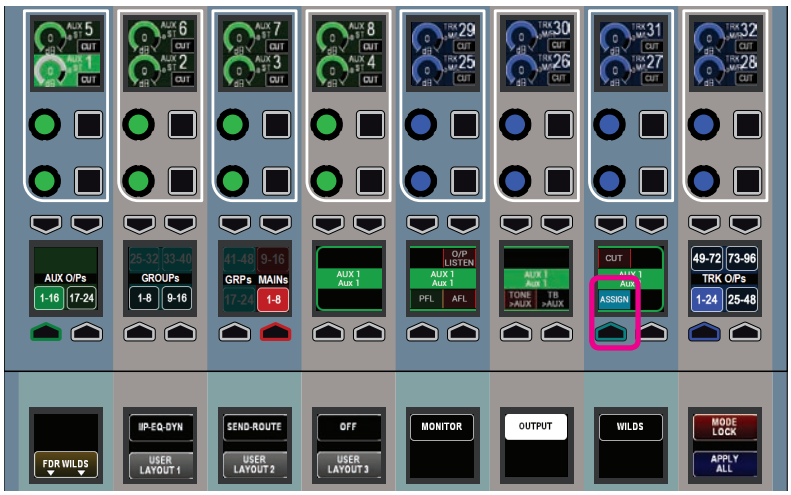
Assigning to a Path which is not Attached to a Fader

To assign Path Delay to a path which is not assigned to a fader, put a panel into OUTPUTS mode and press on the rotary controller associated with that output. This brings up the selected bus controls within the Wild Assign row, on which there is an ASSIGN button. Press this ASSIGN button and then assign path delay in the usual way from any surface panel that is in I/P-DYN-EQ mode.

PATH DELAY CONTROLS - I/P-EQ-DYN PANEL MODE



ASSIGNING WHEN PATH IS NOT ASSIGNED TO A FADER



AUTOMIXER

Automixers are designed to control audio levels for shows where there are multiple guests or presenters talking together. Automixers adjust the individual microphone levels automatically and dynamically in order to pick out the people speaking, and to reduce the level of people that are not speaking, whilst maintaining consistent overall mix and ambient levels. In reality, Automixers only ever apply attenuation, signals are never actually boosted.

Automixers are available on Calrec Apollo consoles running software V1.12 and higher.

Each mixing console has 8 separate automixers, each of which can control any number of mono input channels and mono audio group buses on the control surface. Stereo and surround paths, and outputs or buses other than groups cannot be assigned to automixer control.

Automixers are embedded within the "Dynamics 2" processing unit and are assigned using the same menu as the dynamics side-chain links. Paths assigned to automixer control cannot use the dynamics 2 processor for normal compression / limiting at the same time, however the dynamics 1 processor is still available for full use as compressor / limiter and expander / gate.

Assigning control

To assign a path to automixer control, select the IP-DYN-EQ panel mode. In this mode, the TFT screen displays the settings for both the dynamics 1 and 2 processors. Call attention to the chosen path by pressing its fader assign button (the currently assigned path is displayed in the TFT screen). Select the Dynamics Links / Automixer menu for the dynamics 2 processor by pressing the button at the bottom of the settings display box - if the path is not currently assigned to an automixer or dynamics 2 side-chain link, this button will display "Standalone". From the pop-up menu, select one of the 8 automixers. Select the other faders that need to be in the same automix group and assign them to the same automixer number.

To clear a path from automixer control (and side-chain links), select "Standalone Dynamics" from the same pop-up menu. To place the path under the control of a different automixer, simply select a different numbered automixer.

To close the pop-up menu, press anywhere on the TFT screen away from the menu.

Gain reduction metering

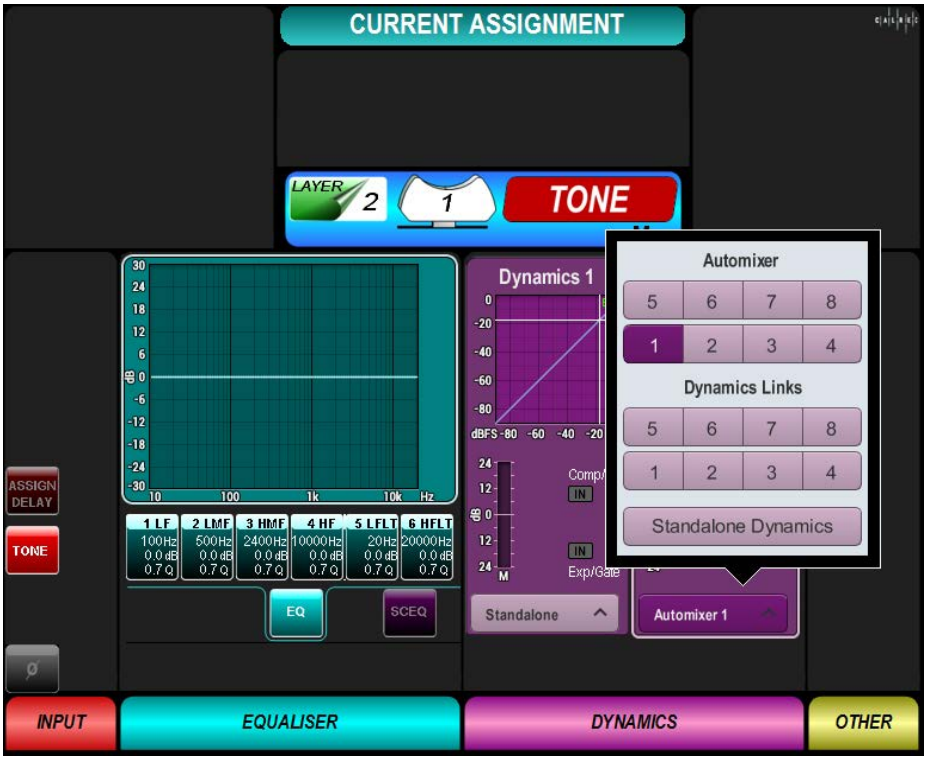
The Dynamics 2 display area shows a gain reduction bargraph meter and the In / Out status of the control for the currently assigned path. Upstand bargraph meters for fader inputs will automatically also show an automixer gain reduction meter for each path assigned to an automixer. A number at the bottom of this meter indicates which of the 8 automixers is controlling a path. Automix gain reduction meters are distinct in color and display from standard dynamics gain reduction meters. If the automixer is not applying gain reduction to a path, its meter will display full scale to the 0 point. When gain reduction is applied, the meter drops to indicate the amount it is being reduced by.

Adjustment controls

To access automixer controls, select the dynamics area of the IP-DYN-EQ panel to view the Dynamics 2 controls by using the Dyn2 button. Buttons in the same control cell allow for the processing to occur post fader, pre fader (post EQ) or pre EQ (pre fader).

When viewing dynamics 2 controls with the currently assigned path assigned to an automixer, control cells on the panel provide two sets of controls, some for the

IP-EQ-DYN PANEL MODE TFT SCREEN - ASSIGNING AUTOMIX



Automixer as a whole and some for the individual assigned path.

ATTACK and RELEASE affect how the Automixer module reacts to all assigned paths, These controls are used for 'smoothing' out incoming signals, faster attack and release times lead to a faster reacting but therefore more erratic automixer, whereas, slower attack and release times lead to a slower reacting but smoother effect.

Individual paths can be placed in and taken out of the assigned Automixer by enabling and disabling the corresponding IN button.

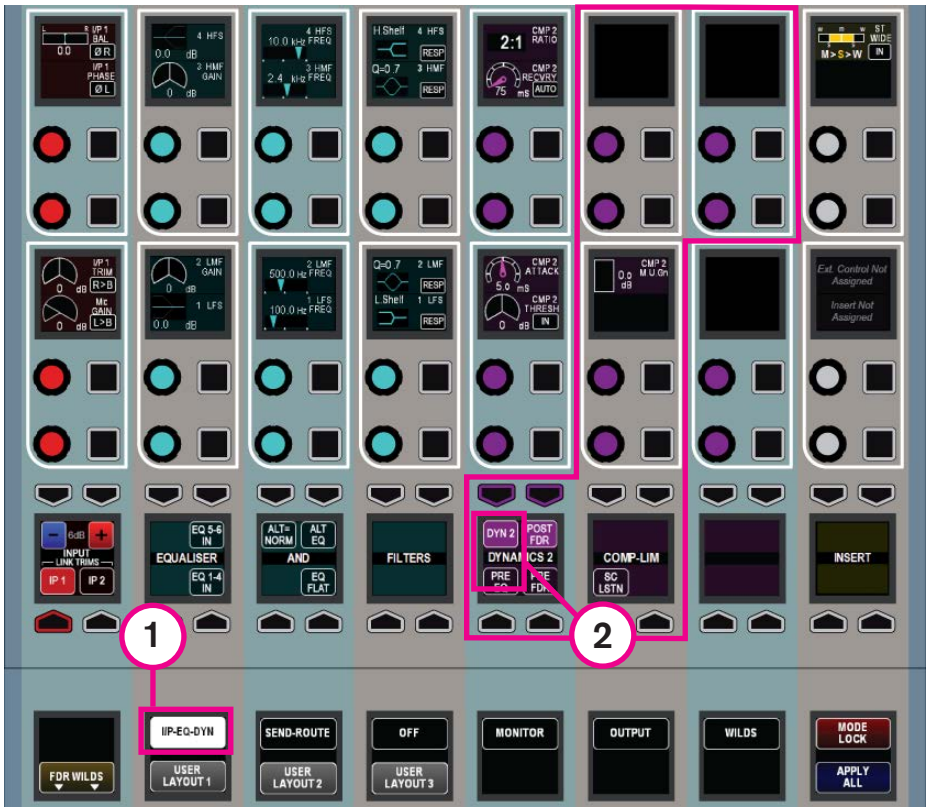
Each Automixer can be disabled and enabled using the DISABLE button in the control cell to the right of the Automixer Attack and Release settings.

Weight and levels

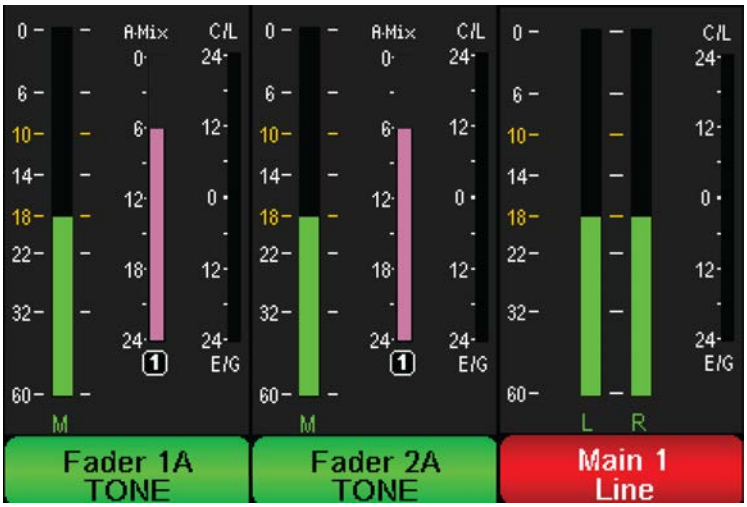
The Automix weight control allows the emphasis to be set for each input, the higher the weight of an input relative to the others, the higher the signal that passes from that input, e.g. to give more emphasis to a presenter over guests when they are talking at the same time.

As an example, if only one fader within an automixer group has audio content, no gain reduction is applied to that input and its automix meter will display full (0dB). If only two faders have audio, and the audio is at the same level (e.g. tone for test purposes), 6dB of gain reduction is applied to each, maintaining the same overall mix level when the signals are routed to the same bus. If one of the two paths is set to have a 10dB higher weight than the other, the same overall level is still passed when they are mixed, however the higher weighted path will only be reduced by 2dB, whilst the lower weighted one will be reduced by 12dB. Note, these values are given only as an example that can be clearly demonstrated on a console using tone.

IP-EQ-DYN PANEL MODE - DYN2 ASSIGNED TO AUTOMIX



UPSTAND METERS



- The meters above show an example of 2 mono channels under automix control. Both channels are fed with identical input audio and are routed to Main 1.

STEREO WIDTH

Stereo paths and stereo legs of surround paths have access to the stereo width control.

This control varies the width of the paths stereo image from mono through stereo, through to wide. Wide creates an apparent extension of the image past the usual left and right limits.

Stereo width appears pre fader, post EQ and dynamics in the processing chain and must be switched in using the IN button.

FIGURE 1 - STEREO WIDTH CONTROL

SURROUND SPILL

Apollo makes very efficient use of surface controls for accessing and controlling surround signals.

Whether controlling mono, stereo or surround signals, only one fader is required on the surface for global manipulation and application of signal processing to the complete collection of paths that make up that signal. For a stereo signal, two mono paths are required and controlled simultaneously by a single fader. For surround signals, six or more mono paths are required and controlled simultaneously by a single fader.

Under normal circumstances this provides an extremely quick way to alter the level of, or assign processing to all component paths of a given signal. However for times when more flexibility or greater control of individual component signals is required, the signal can be expanded onto the spill faders.

Accessing the spill faders

On the dedicated monitor panel, shown in Figure 1 (or the Joystick panel which has the exact same upper section as highlighted in Figure 1) press the SPILL LEVELS button. This upper section will now allow access and control of the individual legs of a surround path via the spill faders.

Spill faders

The spill controls follows the currently assigned path. When a fader which controls a surround signal is selected as the currently assigned fader, the spill panel updates to reflect the status of the component signals. If the assigned fader controls a mono or stereo path, the spill panel will become unavailable until a fader controlling a surround path is assigned.

The faders on the spill panel behave in the same way as every other fader on the surface. They have the same assign buttons above and below the fader label display, the same AFL, PFL and cut buttons and the same bar graph meters. They can be assigned in the same way as any other fader and by doing so, individual control of the processing of a specific component path is possible.

FIGURE 1 - SPILL CONTROLS

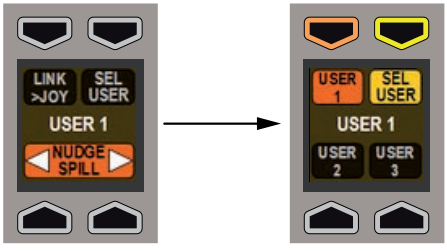
Depending on the width of the surround signal present on the assigned fader, the component signals will be arranged differently on the spill faders. Stereo components of the surround signal such as L-R and Ls-Rs are normally grouped together and controlled by a single spill fader, whereas mono components such as LFE are present on their own fader. The fader label displays above each fader list the available component paths which may be split between the A and B paths. These are accessed and behave in the same way as all other A and B paths on the surface.

Current spill panel assignment

The fader label display above the currently assigned fader is mirrored below the right most spill fader. This can be used to change the path assignment between the A and B paths on that same fader without leaving the spill controls.

The spill controls can be set to follow the current path assignment, or they can be locked to a specific path. This function can be changed by pressing either the FOLL A/B or LOCK buttons respectively.

FIGURE 2 - SEL USER



If the path controlled by the spill faders is locked, the fader label display on the spill panel will not follow the path assignment on the surface. It will display the locked path as an indicator of which path is being controlled by the spill panel.

Nudge
The spill controls contain a function that will nudge the current path assignment along the surface in either direction. Pressing the right nudge button changes the fader assignment to the fader on the right of the currently assigned fader. The left button moves the assignment to the left along the surface.

Changing the user section
When multiple operators are using the surface, it is possible for any of them to access the spill controls for paths assigned in their own user sections.

Press the SEL USER button in the lower button cell of the spill control area as shown in Figure 2. This will update the rest of the control cell display to display the three user sections. Press the button corresponding to the required user section that the spill controls should respond to and then press the SEL USER button again. The chosen user section should now be shown in the middle of the display and the spill faders should respond to that users path assignments.

Assigning paths on the spill panel
When a surround path is accessed on the spill panel, each leg of the surround signal may have processing applied to it individually. Individual legs may be assigned using the assign buttons above each spill fader in the same way that paths on the normal faders are assigned.

When a path on a spill fader is assigned, the assign button of the parent surround path will still appear blue but will also strobe. This indicates that any assign modes will affect a single component of the surround signal, rather than the whole signal.

Main paths on Monitor/Joystick panel
When the faders on the Monitor or Joystick panels are switched into 'Mains' mode (rather than Spill or Downmix mode) and a Main path on one of these faders is assigned, it is not possible to switch the mode of the faders on the same panel and use them to alter the spill legs of the assigned main. The function of the faders cannot be switched unless a path from a normal fader or another Monitor or Joystick panel is assigned. This is intended to avoid the confusion of having a single fader indicate the assigned path and the relevant spill leg at the same time.

PROCESSING INDEPENDENCE

Processing independence
By default on a surround path, any processing is applied to all legs in the path (with some exceptions discussed later). One set of master controls set the processing applied to all legs. However, processing can be made independent for an individual leg of a surround signal, for example the C leg of a 5.1 path. The surround path which is being processed will be referred to as the surround master in this explanation.

EQ independence
By default, the EQ set on the surround master is applied to all legs of the path. To apply independent EQ to an individual leg of the path, first assign the required leg on the spill faders (see the Surround Spill section of this document for information on this process). Now in INP-EQ-DYN mode press the INDEP button next to the EQ band you wish to make independent for the assigned leg. This band can now be adjusted to process the assigned leg independently from the assigned surround master. EQ bands still following the surround master settings will display the text S.MSTR below their frequency value.

Adjustments to EQ bands still following the surround master will also affect all other legs in the path.

Dynamics independence
Dynamics of individual legs can be made independent from the surround master in two ways.

Firstly, the dynamics sidechain linking can be made independent. Under normal circumstances, any leg of the surround signal which crosses the threshold first determines the amount of processing to be applied to all legs equally. For example, if the C leg has the highest level and is the only leg to cross the compressor threshold, it will have a certain amount of gain reduction applied to it. This same amount of gain reduction is also applied to all other legs even if they didn't cross the threshold. This keeps the relative balance of the sound field intact.

By making the dynamics sidechain linking independent for a given leg, that leg will only have gain reduction applied when it crosses the threshold itself. The control values remain common with the surround master, but the leg will be processed independently.

To make the dynamics sidechain linking independent, assign the required leg of the surround master and press the DYN1 SURR SC LINK INDEP (or the DYN2 equivalent to make the second dynamics unit linking independent).

The second way to make dynamics processing independent is to make the control values independent for a given leg. This would mean that any leg in the surround master can have different dynamics controls. If the dynamics linking is not made independent, the paths would be processed according to the first path to cross the threshold, but their thresholds and other parameters may be set independently.

It is possible to have both dynamics linking independence and control independence set for individual legs. For example, a surround group or main path may contain a 5.1 sports mix with a commentator in the C leg, and crowd, music and effects signals in other legs. Using Apollo's flexible processing section it is possible to compress the commentator independently from the signal in the surround legs. This provides Apollo with a very flexible processing section, able to handle almost all situations with ease.

FIGURE 1 - INDEPENDENCE CONTROLS IN INP-EQ-DYN MODE

By default the LFE leg of a surround path has independent EQ and dynamics from the surround master. The independence can be removed by reversing the previous processes.

Independence status indicators

The status of EQ and dynamics independence in indicated on the monitor and/or joystick panel. When a surround path is assigned and the faders on the monitor or joystick panel are se to show spill or downmix levels, the two displays highlighted in Figure 2 show a blob next to any processing which has been made independent.

FIGURE 2 - INDEPENDENCE INDICATORS

INSERTS

Apollo has a pool of 256 mono insert resources available. These may be used to create inserts for any width of path in the system.

Configuring inserts is a two step process. First any insert send and return resources should be patched to output ports and input ports respectively. The insert resources should then be connected to the required paths on the surface. This process is shown in Figure 1.

Patching insert resources to ports
Insert sends and returns can be patched to ports in the I/O PATCH screen of the I/O section of the main application. This screen is shown in Figure 2.

In this screen select INSERT SENDS from the sources list and OUTPUT PORTS in the destinations list. Select the required insert sends and outputs ports then touch the PATCH button.

Now select INPUT PORTS from the sources list and INSERT RETURNS from the destinations list and patch the required ports to insert returns.

FIGURE 1 - INSERT ABSTRACTION

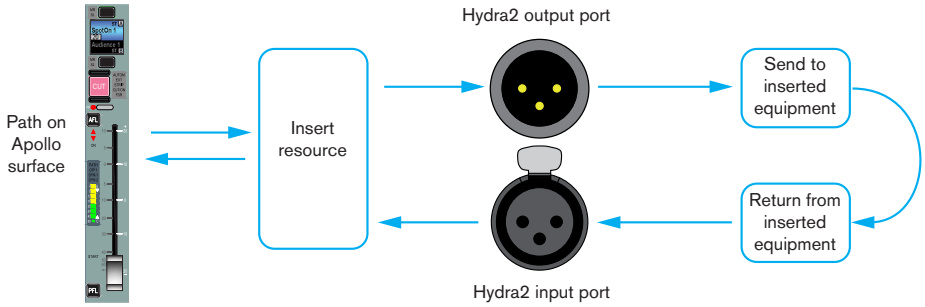
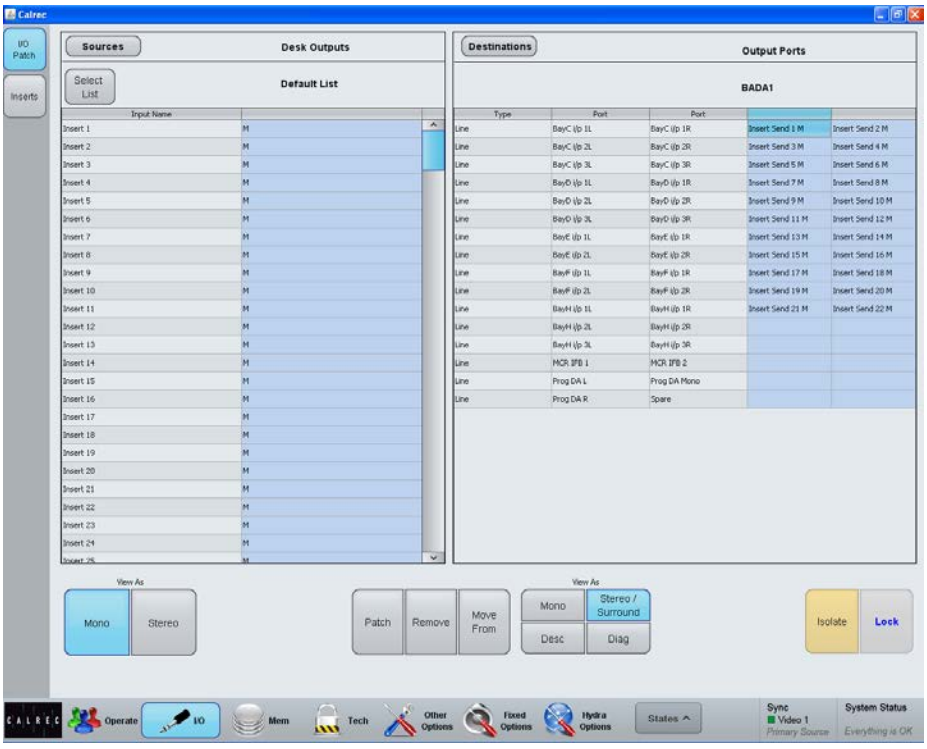


FIGURE 2 - PATCHING INSERTS



Connecting insert resources to paths

Navigate to the INSERTS screen in the I/O section as shown in Figure 3. The available insert resources are shown in the list on the left. Paths on the surface are shown in the list on the right. Select the required insert resources, then the paths to which the insert should be connected and touch the PATCH button.

Naming insert resources

Insert resources may be labelled in the INSERTS SETUP screen in the OTHER OPTIONS section of the main application, as shown in Figure 4. In this screen, touch the INSERT ALLOC button. Double click an insert resource name to provide a new name, which must be 12 characters or less.

Insert resource lists

Insert resources can be assigned to lists. Lists provide a way of filtering the insert resources and can be selected when patching insert resource sends and returns to ports, or connecting insert resources to paths.

To access insert resources lists, go to the INSERTS SETUP screen in the OTHER OPTIONS section of the main application. Select the INSERT ALLOC button at the left of the screen. The screen will show all available insert resource lists just to the right of the INSERT ALLOC button. The DEFAULT LIST is created automatically and contains all available resources.

Creating lists

To create a new list, select the required insert resources from the default list (or any other list that already exists) and touch the CREATE LIST button. A popup will appear prompting for the name of the new list, which can be six characters or less. Enter the name and touch OK. The new list will appear below the default

FIGURE 3 - CONNECTING INSERTS TO FADERS

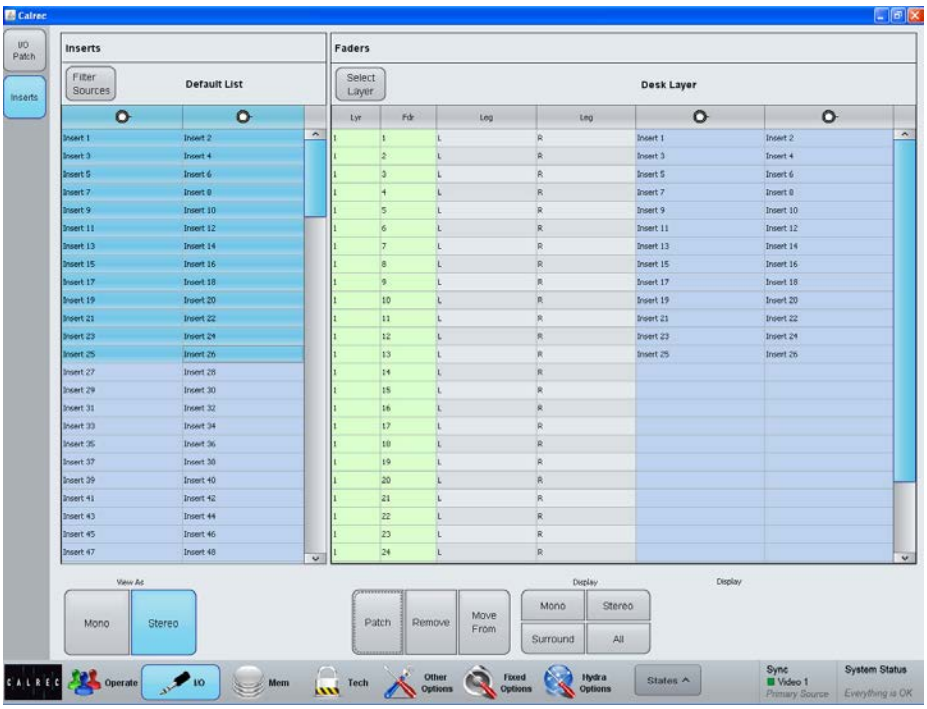
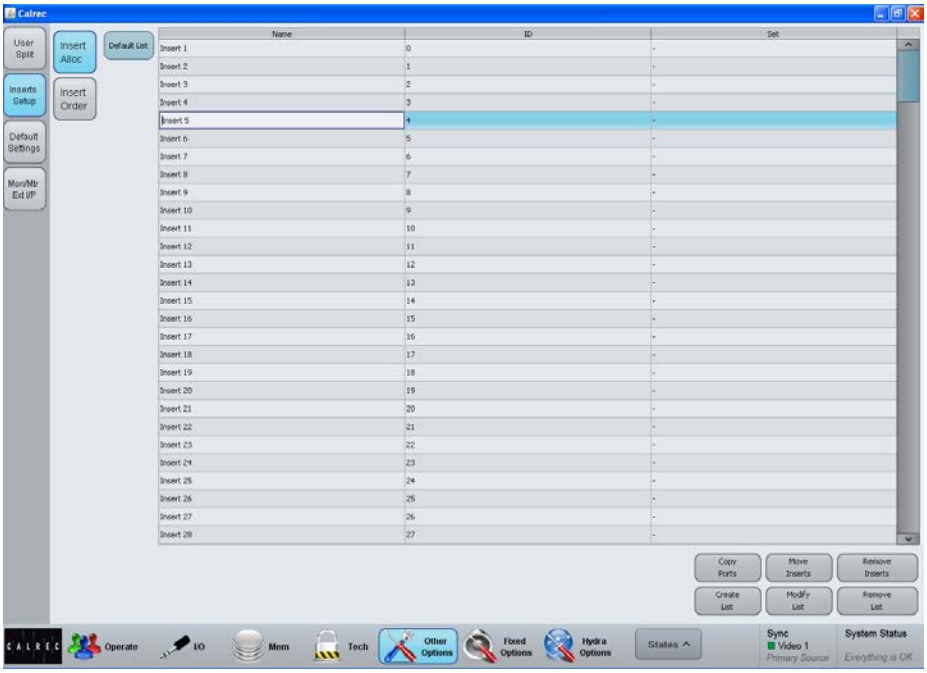


FIGURE 4 - INSERTS SETUP SCREEN



list and will contain the selected insert resources. Touch the new list to confirm this. It is possible to make a new list which is empty, by ensuring that no resources are selected when touching the CREATE LIST button.

Copying/moving insert resources to lists

Resources can be copied or moved between lists by selecting the required resources in the source list and touching COPY LISTS or MOVE LISTS. A popup dialog will appear allowing selection of the destination list. Select the destination list and touch OK.

Removing insert resources from lists

To remove resources from a list, select the required resources and touch the REMOVE INSERTS button.

Renaming lists

Touch the MODIFY LISTS button to bring up a popup dialog. This dialog allows you to select a list and rename it.

Removing lists

To remove a list, select the required list and touch the REMOVE LIST button. A popup dialog will appear asking for confirmation of the removal.

Insert Order and Sets

Insert resources can be ordered into sets. For a description of sets and the order of items within a set, please refer to the Input Sources section of this document.

VCA GROUPS

Apollo's moving fader VCA groups provide control over fader level, cut status and APFL status.

Creating and dissolving VCA groups

To set up a VCA group, first choose a fader to be master and then assign a number of other faders for it to control as slaves. To do this push and hold the master fader's assign button, then press the assign buttons of any paths which are to become slaves, or press again to remove. Slaves can only have one master.

Group hierarchy

Apollo provides up to three levels of group hierarchy. A master can have slaves but can also be made a slave of another master. Figure 1 illustrates the hierarchy. When the full hierarchy is in place, 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.

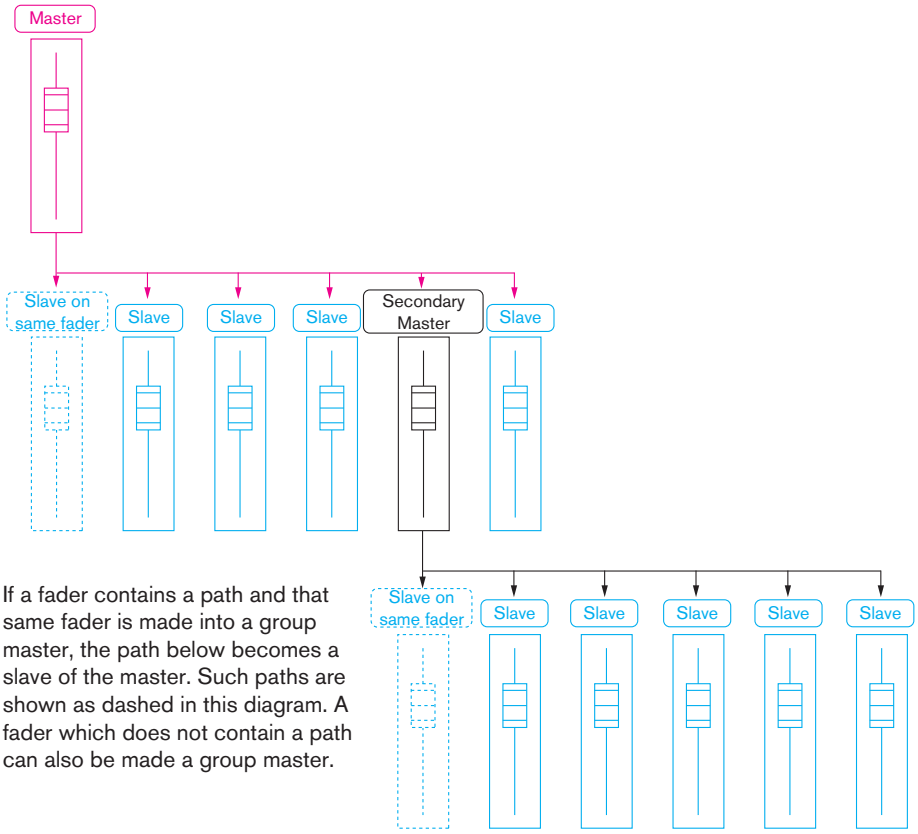
When the level of a secondary master is adjusted, the audio level of all its slaves changes by the same amount. Its adjustment will not affect the level of the primary master or its slaves. Changing the CUT, AFL or PFL of a secondary master applies the settings to the secondary master's slaves only.

Fader status indicators

Each fader contains two indicators next to each assign button as shown.

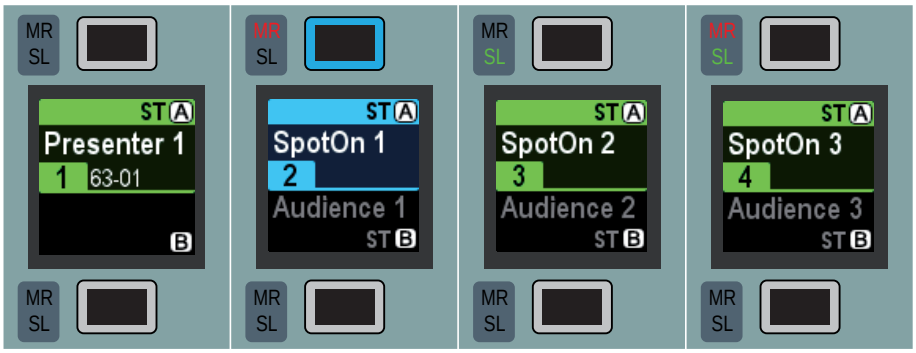
- Neither indicator will be illuminated if the fader is not part of any VCA group.
- The MR indicator illuminates red if the fader is a master

FIGURE 1 - GROUP HIERARCHY



If a fader contains a path and that same fader is made into a group master, the path below becomes a slave of the master. Such paths are shown as dashed in this diagram. A fader which does not contain a path can also be made a group master.

FIGURE 2 - FADER STATUS



Fader is neither a primary or secondary master or slave

Fader is a master. As it has a path attached to it, the path 'SpotOn 1' is a slave of the master

Fader is a slave of a primary or secondary master

Fader is a secondary master. As it has a path attached, the path 'SpotOn 3' is a slave of the secondary master

- The SL indicator illuminates green if the fader is a slave
- Both MR and SL indicators illuminate if the fader is a secondary master.

VCA group interrogation

Interrogation works in a similar way to the routing interrogation feature. It provides a clear way of indicating group assignment using the path assign buttons. As with creating a group, interrogation is performed by holding the assign button of the path to be interrogated. A number of different situations exist:

- The interrogation of a master will illuminate all the assign buttons of its slaves. If any intermediates exist which are controlled by the selected master, their assign buttons will strobe slowly. The slaves of the intermediate will not be lit.
- The interrogation of an intermediate will illuminate all the assign buttons of its slaves. The assign button of its master will strobe quickly.
- Interrogating a slave of a master will cause the master's assign button to strobe quickly.
- The interrogation of a slave of an intermediate will strobe the intermediate's assign button slowly and the intermediate's master's assign button quickly.

While holding an assign button, only the assign buttons relevant to the VCA group will illuminate or strobe. The rest will be unlit for clarity.

Masters and slaves on the same fader

Masters can be created on a faders which do not contain a path. They can also be created on faders which already have a path attached to them. In this case, the path on the fader becomes a slave of the master. The master and the new slave beneath it can be accessed and controlled in different ways.

Normally any changes to the fader level, cut or APFL status will apply to the master and subsequently all slaves in the group. If the fader assign button is held down, then the changes will apply to the slave beneath the master.

If the fader is assigned but the button not held down, any alterations to EQ, dynamics and routing for example will apply to the slave only as normal. Processing outside of fader level, cut and APFL status does not apply to VCA groups.

Fader level indicator

Touching a fader will display its level in the screen above. This indicator will disappear after a short period of time.

Nulling indicators

If the combined level of a master and slave is greater than +10dB or less than -100dB, the slave fader will remain at the appropriate end of its travel and the relevant up or down nulling indicator will be illuminated. The nulling indicators are shown above.

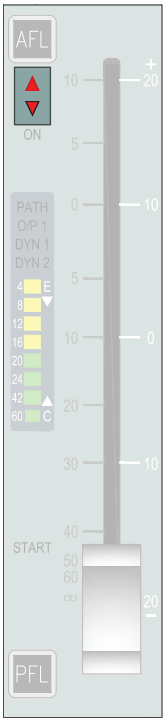
Preserving balance of slaves at low levels

When a master is set to a level below -50dB, its slaves cannot be altered. Altering the levels of slaves when the master is turned down to this degree would most likely produce inaudible results. To preserve the balance of the group and to prevent any signals being turned up excessively when the master is raised, this restriction has been put in place. In this case, both nulling LEDs on the slaves will illuminate.

5.1 Surround channels

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.

FIGURE 3 - NULLING INDICATORS



VCA group protection

Within the TOOLS menu under MISC there is a VCA GROUP EDIT DISABLE option. The default status of this option is off but it can be switched on to stop any changes being made to VCA groups. VCA groups created before this option is turned on will still be operational but if changes to VCA group organization are attempted a VCA EDIT DISABLE warning will be displayed in the corresponding fader label display.

VCA Slaves move with VCA Masters

By default slave and secondary master faders move along with their masters to show their individual, relative levels. This feature can be disabled if preferred: Within the PC application, navigate to OTHER OPTIONS and then MISC SETTINGS. The first option is to enable or disable "VCA Slaves move with VCA Masters". If the feature is disabled, slaves and secondary master faders will no longer move inline with their masters but their nulling indicators will light appropriately to show whether the actual level is above or below that being shown by the fader position.

AUTOFADERS

Autofaders allow Apollo's faders to be opened and closed under the control of another system through the use of GPIs.

There are 256 autofaders in the Apollo system. GPIs are assigned to control one or more of these autofaders when they receive the required trigger signal. The autofaders can then be assigned to control one or more faders on the surface.

Assigning GPIs to autofaders

GPIs are assigned to autofaders in the GPI screen in the HYDRA OPTIONS section of the main application as shown in Figure 1.

The FILTER INPUTS button will bring up a popup which lists all available Hydra2 I/O boxes that have the GPIO module fitted. Selecting one will populate the left hand side of the screen with the opto-inputs available in that box.

The FILTER FUNCTIONS button brings up a popup with groups of available functions that can be controlled by the GPIs. Select AUTOFADERS to populate the right hand side of the screen with the available autofaders.

A single GPI may control any number of autofaders, so assignments can be made one to one or one to many. Select the required GPI from the list on the left and any number of autofaders from the right. Now touch the PATCH button.

To remove a connection, select the connected autofader from the GPI list on the left and touch remove.

Assigning autofaders to faders

Once the relevant GPIs have been assigned to autofaders, the autofaders can be assigned to control faders on the surface. This is done on the AUTO FADE

FIGURE 1 - PATCHING GPIS TO AUTOFADERS

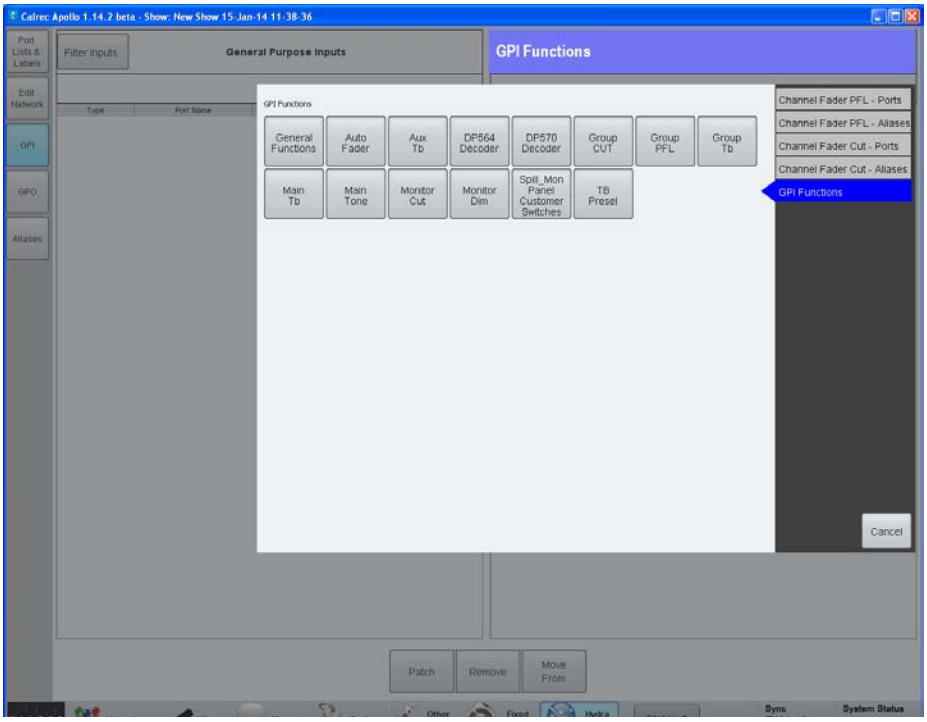
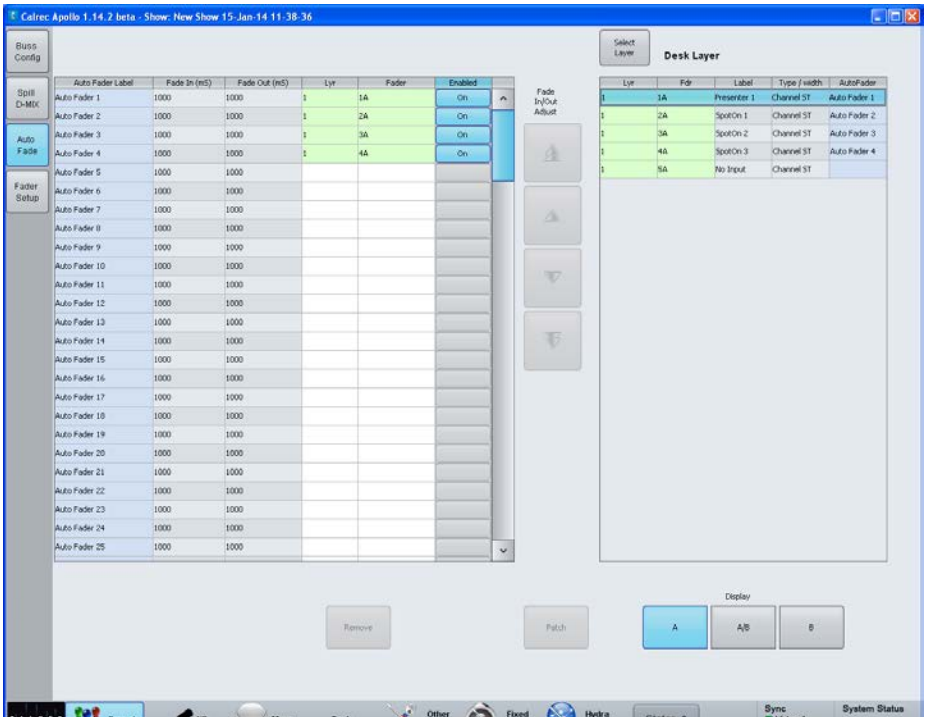


FIGURE 2 - ASSIGNING AUTOFADERS TO FADERS



screen in the OPERATE section of the main application, as shown in Figure 2.

The Autofaders are listed at the left side of the screen, and the surface faders are listed at the right. To change the layer of faders shown, touch the SELECT LAYER button and select the required layer from the popup. The A, B and A/B buttons below the list allow only the A faders only, B faders only or A and B faders to be shown.

To connect an autofader to one or more faders, select the required autofader in the left list, and the target faders in the right list and touch the PATCH button. To remove a connection, select the relevant autofader and touch the REMOVE button.

Autofader levels

When an Autofader is attached to a fader and is enabled, providing the trigger signal is not present, the fader will jump to -infinity dB. When the trigger signal is present, the fader will fade up to the level set before the autofader was made active. When the fader has been faded up, any changes to level will be remembered and the fader will return to this value on any subsequent fade ins.

Autofader settings

The AUTO FADE screen allows the settings of the autofaders to be configured. The available settings are:

- FADE IN (ms). This setting varies the fade in time between 10ms and 5s. This is how long the fader will take to reach it's maximum level after the trigger signal begins.
- FADE OUT (ms). This varies the fade out time between 10ms and 5s. This is the time the fader takes to fade out when the trigger signal ceases.

Autofader Enable/Disable

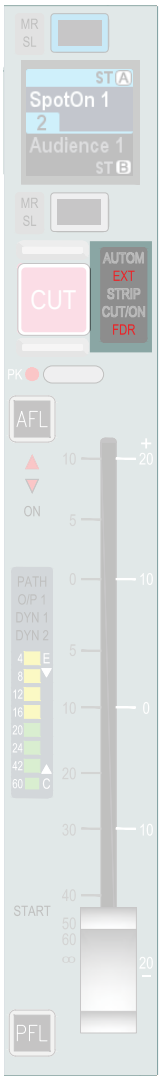
Each autofader can be enabled and disabled individually using the ENABLED button to the right of the autofader on the AUTO FADE screen within the Main application.

Autofaders can also be enabled and disabled per path from the surface. When in IP-EQ-DYN mode, the control cell screen on the right hand side will either display EXT CONTROL ENABLE on/off if CSCP is globally enabled from the Main application, or AUTOFADER ENABLE on/off if CSCP is globally disabled. In both conditions the button will have the same effect of disabling/enabling autofader control of the currently assigned fader, but if CSCP is globally enabled, switching the EXT CONTROL ENABLE button off will also disable CSCP control of the currently assigned fader (see “Remote Control” on page 170 for more information).

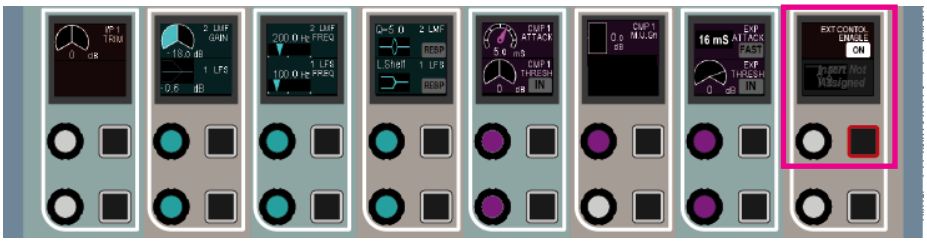
Autofader indicators

When an autofader is assigned to a fader, the fader will show the EXT and FDR indicators as shown in Figure 3. FDR indicates that the fader is automated and EXT indicates that the control is an external source.

FIGURE 3 - AUTOFADER INDICATORS



EXTERNAL CONTROL ENABLE/AUTOFADER ENABLE



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BUSES OVERVIEW

There are a pool of mono DSP resources available for each bus type. The user may configure the number and width of the buses they require from these pools of resources.

The number of resources available to each bus type and the maximum number of each bus type supported by the Apollo system are detailed in Figure 1. From a pool of mono resources, the user can define the number and widths of the buses they require.

For example, there are 48 mono DSP resources available for Aux buses. The maximum number of Aux buses that can be configured in the system is 48 and these would all be mono. The maximum number of stereo Aux buses that can be created is 24 as it takes two mono DSP resources to create a stereo bus.

Buses which can be configured up to 5.1 width (mains and groups for example) each use 6 mono DSP resources. The buses do not all have to be the same width, and any combination of mono, stereo and surround formats can be created from the pool of mono resources.

Setting bus widths

The number and width of buses chosen for use are defined in the BUS SETUP screen in the OPERATE section of the main application (Figure 2). Select a bus type using the buttons on the left of the screen. The total number of buses will now be listed, which in the case of Auxiliaries is 1-48. For each of these the width can be defined by selecting the relevant row or rows and choosing the desired width from the buttons on the right of the screen.

At the top of the screen a number shows the remaining mono DSP resources for that bus type. When this number reads zero, no more buses may be created unless more resource is made available. This can be achieved by setting previously configured buses to NO BUS in the WIDTH column.

LtRt / LoRo downmixes

For each 5.1 main bus, the stereo down mix can be chosen to be LoRo or LtRt.

LoRo maximizes mono compatibility at the expense of losing the front rear separation that a Dolby ProLogic decoder could recover when using an LtRt downmix.

Buss routing

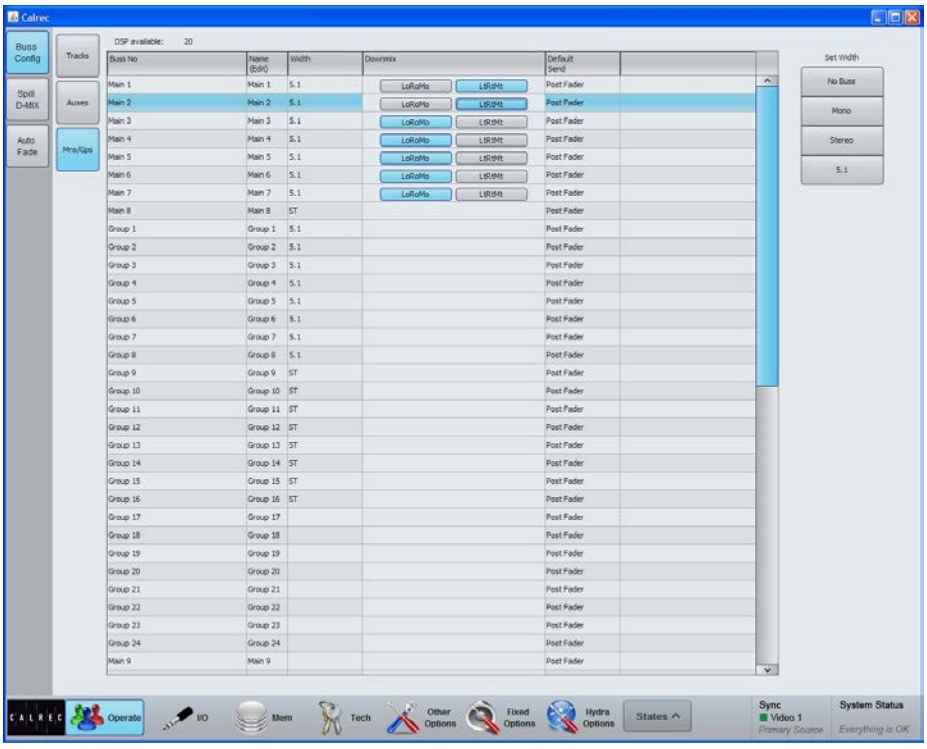
Apollo has a very flexible bus structure allowing many routing possibilities:

- Channels can route to Groups, Auxes, Tracks and Mains.
- Groups can route to other Groups, Tracks, Auxes and Mains.
- Mains can route to other Mains.
- Tracks cannot route to any other bus.
- Auxes cannot route to any other bus.

FIGURE 1 - BUSS RESOURCES

Buss Type	Mono Resources Available	Max Number Configurable Busses
Mains & Groups	128	16 Mains, 48 Groups
Auxes	48	48
Track	96	96

FIGURE 2 - BUSS SETUP SCREEN



Pre-fader Aux send cut options

Path sends to Aux output buses can be configured to cut under certain conditions, such as the send path's fader being open / closed and / or the path being cut.

These options are set from the Operate>Buss Config>Auxes page of the Main PC Application, as shown on the right.

The options are set on an output basis, but it is the send from each path feeding the outputs that are independently cut depending on the status of each path routed to the aux output.

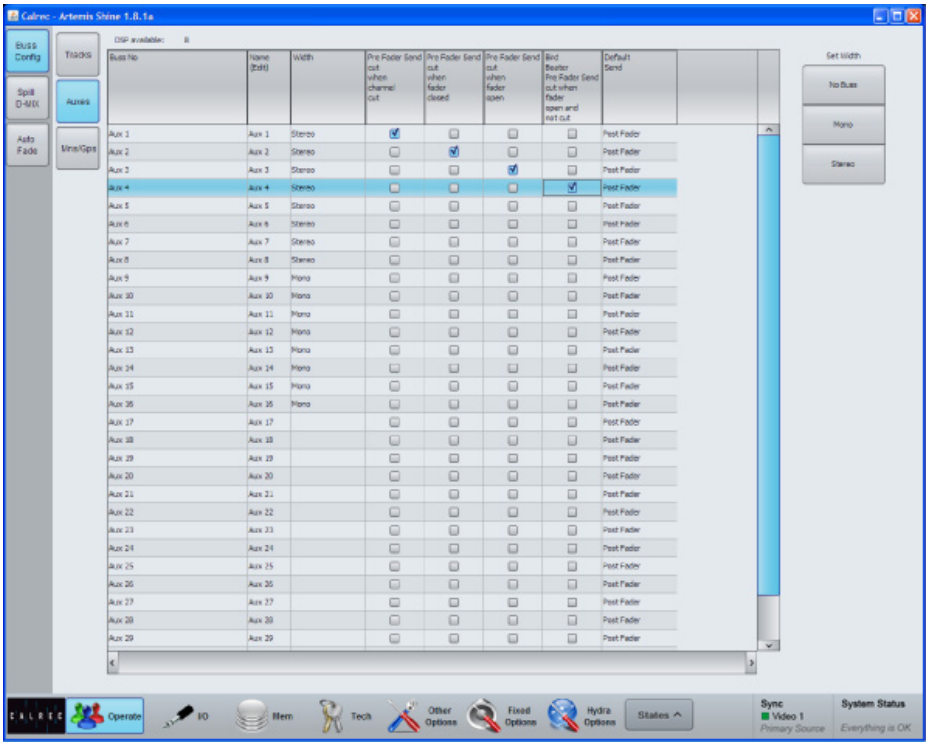
For example, if "Pre Fader Send cut when fader closed" is selected for Aux output 1, the pre-fader sends from each path routed to Aux1 will be muted whilst their fader is closed. As soon as the fader is opened, the path will send audio to the aux at pre-fader level. Pre fader sends whose faders are open, as well as any paths feeding post fader will still be passing audio to the Aux1 output.

The options available for muting sends to each aux output are:

- Pre-fader send cut when channel cut (or not "on" if fader have path On buttons rather than cuts).
- Pre-fader send cut when fader closed.
- Pre-fader send cut when fader open.
- "Bird-Beater" - Pre-fader send cut when fader open and not cut. The send is active only if fader closed, or path cut (or not "on" if on buttons fitted rather than cuts).

The pre-fader cut when channel cut option can be selected in combination with either the cut when fader open or fader closed options, however other combinations would conflict with each other and as such, selecting one will cancel others.

MAIN PC APPLICATION, OPERATE>BUS CONFIG>AUXES SETUP SCREEN



MAKING A ROUTE

Using Assign Mode

Routes can be made using the SENDS-ROUTES assign panel as shown in Figure 1. When a path is assigned, the wild assign touchscreen displays and allows the user to change which buses the assigned path is routed or sent to. Touching a bus on the touchscreen will toggle the route on or off.

The control cells allow the levels of individual Aux sends to be set and their routing to be toggled on or off. They also allow the track send levels to be altered.

Accessing Detailed Send Controls

To select a send, **push its rotary control** - this makes it the focus of the central five button cells at the bottom of the panel - Aux Send 1 is the focus in this image. These 5 button cells provide access to positional controls such as pre/post fader and on/off switching, along with talkback and tone controls in the case of Track sends.

Paging Through Buses

Given the finite size of the touchscreen and number of available control cells, it may not be possible to view all required buses at once. In this case, paging buttons will be made available at the bottom of each bus section on the touchscreen and also on the left and right button cells at the bottom of the panel.

Routing Overview

An overview of each bus type is located on the touchscreen above the routing buttons and provides a complete overview of where the assigned path is routed without having to page through the different screens.

FIGURE 1 - ROUTING IN THE SENDS-ROUTES LAYOUT OF ASSIGN MODE

Using Strips Mode

Routes to buses can also be made when using Wilds mode. Each vertical strip on the touchscreen displays an overview of the routing of the relevant path. A strip of the touchscreen is shown in Figure 2. There may not be room to show every destination of each bus type and so paging buttons are provided.

Routes can be made or broken by touching the required destination bus type on the touch screen strip. The strip will be populated with larger routing buttons of the selected type, which can be touched to create or remove routes. As with the overview, it may not be possible to fit all possible routing destinations on a single page. The destinations can be paged through either by using paging buttons similar to the overview screen, or by swiping the screen up or down.

To exit the routing screen for the selected bus type and return back to the routing overview, touch the CLOSE button.

FIGURE 2 - WILDS MODE ROUTING STRIP ON TOUCHSCREEN

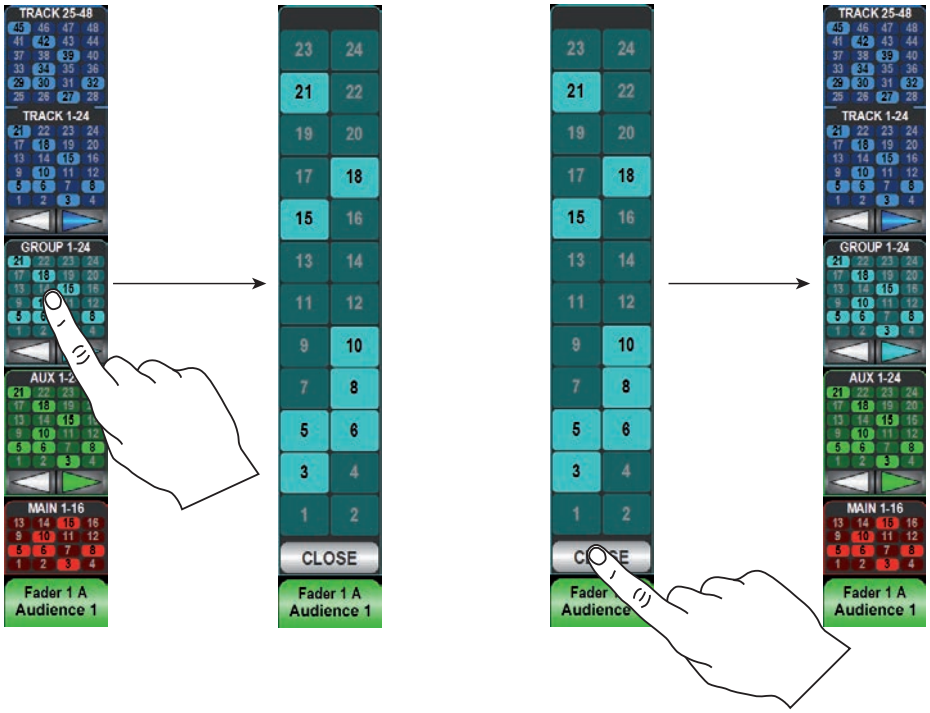
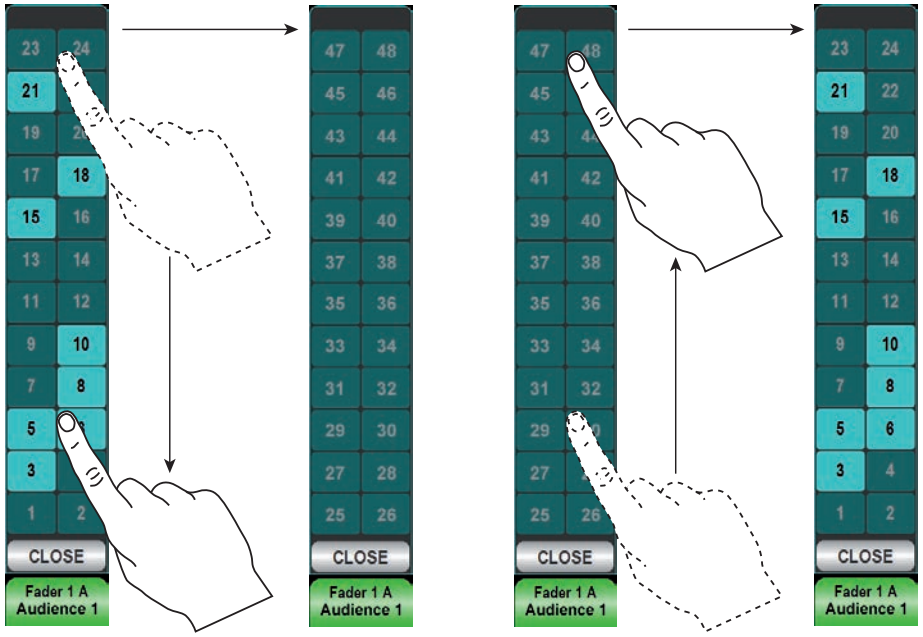


FIGURE 3 - SWIPING THROUGH BUSSES



PANNING

Apollo provides flexible and adaptive panning controls which change to reflect the width of both the source and destination paths.

It is important to note that the pan controls for a given path do not actually alter the panning of the path itself. They do in fact alter the pan position of that paths contribution to it's destination bus. It is therefore possible to have different pan positions set when sending to multiple buses, for example to an Aux, Track and Main simultaneously.

There is a shared pan position for the channel when it is routed to Main and group buses. There is another pan position for the channel when it is routed to Tracks. Finally, the channel has an individual pan position for each Aux bus it is sent to.

Which pan position is being controlled?

When in the SENDS-ROUTES layout of Assign mode, the right hand button cells contain three buttons labelled:

- PAN > MN/GRP
- PAN > TRK
- PAN > AUX

These buttons determine which pan position the pan controls are affecting for the assigned path.

As there is one pan position that applies to all mains and groups, and another position applying to all tracks, these can be controlled by selecting either PAN > MN/GP or PAN > TRK respectively.

Pushing the PAN > AUX button allows control over the pan position for each individual Aux send. The send currently being controlled is indicated by a number in the graphic above the button. To change the pan controls to alter a different Aux send, push down on the required Aux rotary control. The number in the graphic should now update to show the affected Aux send.

Controls

Depending on the width of the current path, and the width of the destination bus, different pan controls will be made available on the surface. For example when sending a mono path to a mono bus, there will be no controls available. When sending a mono path to a surround bus, a great deal more controls will be presented that allow control over mono placement in a surround field.

The complete range of controls is described here:

Front Pan

Front pan allows positioning of the signal in the L and R speakers. The button next to the Front Pan rotary control switches the pan position in or out.

C only

C ONLY sets the signal to appear only in the center speaker. It effectively overrides all left and right pan positions.

Front L-C-R

Pushing the FRONT L-C-R button switches the FRONT PAN control between L-R panning and L-C-R panning.

Front Divergence

With FRONT L-C-R switched in, the spread of the signal can range from fully converged in the C speaker, through equal level in L, C and R, right the way to full divergence with no level in the C speaker and full level in the L and R speakers. The button next to the divergence rotary control switches the divergence position in or out.

Front-Rear pan

FRONT-REAR PAN varies the position of the signal between the front and rear speakers. The L and R position in the front and rear speakers is independent and can be controller separately with the FRONT PAN and REAR PAN controls. The signal is moved from the front pan position through to the rear pan position.

Rear Pan

Rear pan allows the left to right position of the signal to be set in the rear speakers. This is independent from the front pan position and can be switched in or out using the button next to the rotary control.

LFE

LFE varies the level sent to the LFE speaker. When this control is switched out, no signal is sent to the LFE.

Non LFE

The level sent to all channels other than the LFE channel can be varied with the NON LFE control. When this control is switched out and the signal is panned to one or more channels other than the LFE, the signal is sent at full level.

PANNING USING THE JOYSTICK

In addition to using the pan controls in Wilds mode, panning can be achieved using the joystick panel, if fitted.

The panel is shown in Figure 1 with the joystick controls highlighted. The upper half of the panel containing the faders functions in exactly the same way as those on the monitor panel. The relevant sections of this document (Surround Spill, Downmixes, Main Paths on the Spill Faders) should be referred to if these functions are required.

Accessing the joystick controls

The information displayed on the joystick controls relates to the path shown in the upper left button cell display. This display and its assign buttons function in the same way as the fader label displays above each fader. This path can be selected in a number of ways.

Firstly, if the FOLL A/B button in the JOY CTRL button cell is selected, the joystick controls will follow the currently assigned path. If FOLL A/B is deselected, the controls will not follow the currently assigned path. If selected, the controls will follow the assigned path in the user section displayed in the lower left button cell. To change this user section, press the SEL USER button and select a different section.

The NUDGE JOY buttons in the lower left button cell allow the joystick controls to step up or down faders on the surface. The upper assign display will reflect this change to indicate which path is now selected. If the FOLL A/B button is selected, the NUDGE JOY buttons will move the path assignment up and down the faders too. If it is not selected, the currently assigned path will remain the same, but the joystick controls will control a different path.

FIGURE 1 - JOYSTICK CONTROLS

If the LOCK button in the JOY CTRL button cell is pressed, the controls will not affect any other path until they are unlocked. Press the button again to unlock.

Making the joystick controls active

When the required path has been assigned, the joystick controls must be made active. To do this, press the CONTROLS ACTIVE button. The controls can now be used to alter the pan position.

Disengaging the joystick

At any time, the joystick can be disengaged to prevent accidental changes to pan position. To do this, press the DISENGAGE button. The rest of the joystick controls remain active, and can be interacted with.

Pan display

The pan display in the center of the joystick controls displays a range of information. The hidden-till-lit loudspeaker indicators provide a indication of the widest path that is being panned to. Take an example when panning to mains and groups. If two main paths were of a 5.1 width and two were stereo width, the loudspeaker indicators would appear as they do in Figure 1, as 5.1 is the widest path in this instance. The stereo buses would receive a downmix of the 5.1 signal.

The red blob shows the position of the audio in the sound field.

The white cross-hair indicates the physical position of the joystick, which may not necessarily be the same as the audio. For example freezing an axis, panning only to LR or disengaging the joystick can all cause this situation to occur.

Snap to audio

Should the joystick be in a physically different position to the audio position

it can be snapped to the audio position by pressing the TO AUDIO button to the lower right of the controls.

Pan control menu

The PAN CTRL MENU display allows certain pan settings to be configured. It allows front-rear pan to be switched in and the axis to be frozen. It also allows left-right pan to be switched in, optionally set to LCR pan and to freeze the left-right axis. The operation of the menu is shown in Figure 2.

Freezing axes

The freeze controls, for example FREEZE LR and FREEZE FB, stop the joystick from affecting the pan position in the frozen axes. If the left-right axis is frozen by selecting FREEZE LR, then the audio will remain in a constant position along that axis, regardless of the physical joystick position.

FIGURE 2 - PAN CONTROL MENU

The menu is in its default state

Press the upper left FRONT button

The menu is now editing settings for front pan. Three options exist; IN, FREEZE and LCR. They switch front pan in, freeze the front axis and set it to LCR instead of LR respectively. Press EXIT to return to the default state.

Press the EXIT button

The menu is in its default state

Press the lower right FRT-REAR button

The menu is now editing settings for front-rear pan. Two options exist; IN, and FREEZE. They switch front-rear pan in and freeze the front-rear axis respectively. Press EXIT to return to the default state.

Press the EXIT button

The menu is in its default state

INTERROGATION AND REVERSE ROUTING

Interrogation allows the user to see all contributing paths that have been routed to a selected buss.

Set a wild assign panel on the surface to the SENDS-ROUTES Assign mode layout. The wild assign touchscreen then shows controls for routing the assigned path to the many destinations available, as shown here. Notice in the central title area at the top of the screen containing the text 'Press to interrogate'. Touching this area will switch the screen into interrogation mode as shown below.

When the screen is switched to interrogation mode, tap to select any destination that you wish to interrogate. If a path on the current layer is routed to the selected buss, it's path ASSIGN button will strobe. The path assignment buttons of any paths that are not routed to the selected buss will be unlit.

Whilst interrogating a buss, layers may be switched using the layer selection buttons to reveal contributing paths on other layers. The ALL A and ALL B buttons can also be used to reveal any paths on either fader level which are routed to the selected bus.

Reverse routing

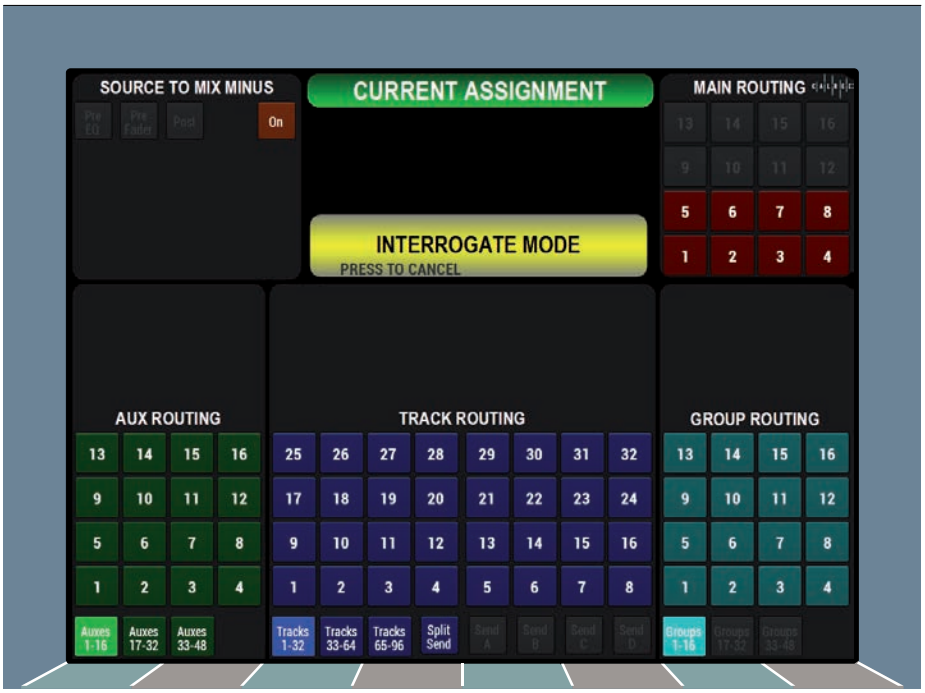
While in interrogation mode, routes from multiple paths to the selected buss may be made or removed by pressing the relevant path ASSIGN buttons. The path ASSIGN buttons will strobe if the route is made. Again, layers and ALL A/B may be switched while performing reverse routing.

Leaving interrogation mode

When interrogation or reverse routing is complete, touch the 'Interrogate Mode' area to return the surface to the normal operational state.

ROUTING SCREEN

INTERROGATION SCREEN



SPLITTING TRACK SENDS

Each channel has up to four track sends although by default only one is enabled.

The enable the four sends, touch the SPLIT SEND button below the track routing buttons. This will enable four more buttons for selecting the required send (A, B, C or D) as shown in Figure 1. Select one of these sends and then create or remove routing to tracks as required. A letter will appear below the track number when a route is made to indicate which send it is associated with.

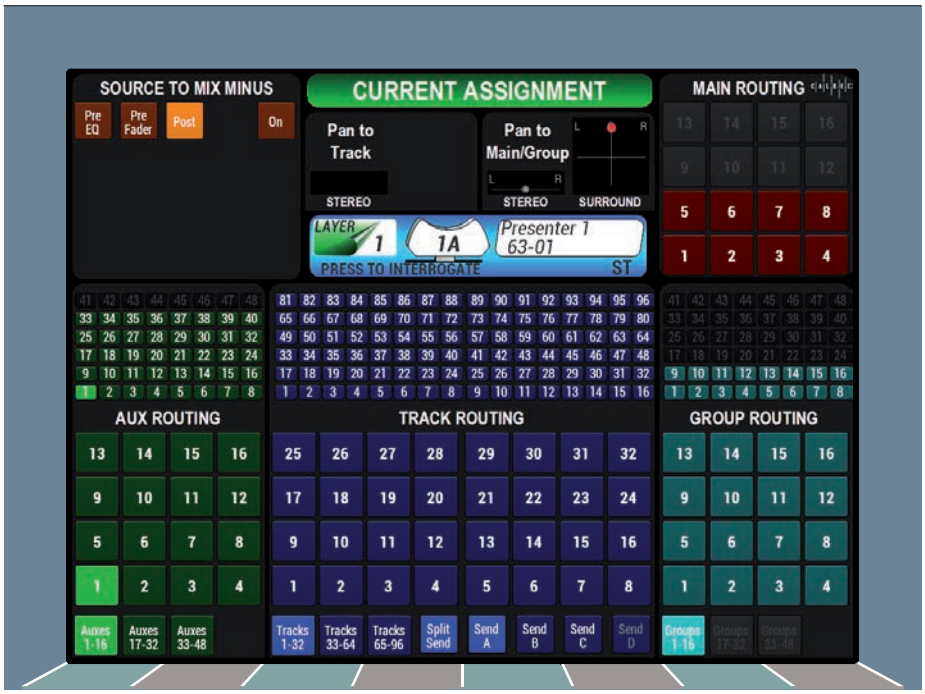
Each of the four sends has an individual level control and can be selected by pushing the relevant rotary control to appear in the 'Selected' button cells at the bottom of the panel. This enables access to a wider range of controls for that specific send such as pre or post fade.

Removing sends

If a channel has been routed to a track using send C then send C must be selected when removing the route. Only routes made with the currently selected send may be removed.

In order for the track routing to be collapsed back to just one send, all routes from sends B, C and D must be removed. The SPLIT SEND button can now be touched again to remove the three unused send controls.

FIGURE 1 - ROUTING SCREEN



DOWNMIXES

Apollo has comprehensive downmix facilities to make downmixing as simple as possible while retaining complex control where necessary.

Downmixes are applied to the metering and monitoring systems, including APFL, and all relevant paths in the system.

When a surround path, metering or monitoring signal is routed to a stereo or mono destination, a downmix must be applied to take care of the increase in level that will occur due to the summing of surround components, and also to shape the sound in the desired way.

Apollo allows a number of default downmix configurations to be set up. One of these downmix configurations can be selected for use in a show. All downmixes performed within that show will follow the default settings selected, unless changes are made to individual paths or buses by the user. Apollo uses the monitor panel, shown in Figure 1, to make these adjustments.

Pressing the DOWNMIX button on the monitor panel changes the faders from controlling main or spill levels, to allowing them to alter the downmix levels for the assigned path. The downmix configuration selected for the show is applied to downmix faders automatically for all surround paths. Changes to the downmix faders for an individual path can be made and apply only to that path.

The downmix faders available for a 5.1 path are:

- L/R
- C
- LFE
- Ls/Rs
- Lo/Ro

FIGURE 1 - DOWNMIX FADERS

Note that there may be a different number of faders for paths of different widths. The LoRo fader defaults to being on the B layer of the left-most downmix fader.

Bypassing the downmix faders

When routing a surround path or bus to a stereo or mono bus, the downmix levels set by the downmix faders are applied automatically. To bypass the downmix faders for a given bus, select the bus in SENDS-ROUTES mode and press the BYPASS DOWNMIX FADERS button.

For information on selecting a bus in SENDS-ROUTES mode, please refer to the 'Making a Route' section of this document.

Pre-fader downmixes

Should a surround path or bus be sent to a bus pre-fader, it may be necessary to have the spill fader levels applied to make the downmix the same as the post-fader downmix. This is because the post-fader downmix is processed after the spill faders, and so adjustments to individual legs on the spill faders will have an effect on the resultant downmix.

To make the pre-fader send follow the spill faders (but not the overall path fader) to produce the correct downmix, select the destination bus in SENDS-ROUTES mode and press the FOLLOW SPILL FADER LEVELS button. This button will only be visible if the send or route is pre-fader.

Setting downmix defaults

Users with technician access can set up five different downmix defaults (with an additional default set up by Calrec). One of these defaults can be selected by operators to act as the default for their show. To enable Technician mode, please refer to the Technician Mode section of this document.

Navigate to the DOWNMIX screen in the FIXED OPTIONS area of the main application. This screen is shown in Figure 2. The six downmix defaults are presented in a table. The first set of downmix values is set by Calrec and cannot be changed. User sets 1-5 may be altered freely by the technician.

Default values can be provided for most parameters including L, C, R, Surround L&R, and LFE contributions to LoRo downmixes, with separate adjustments available for the levels sent to any LtRt downmixes that are being created.

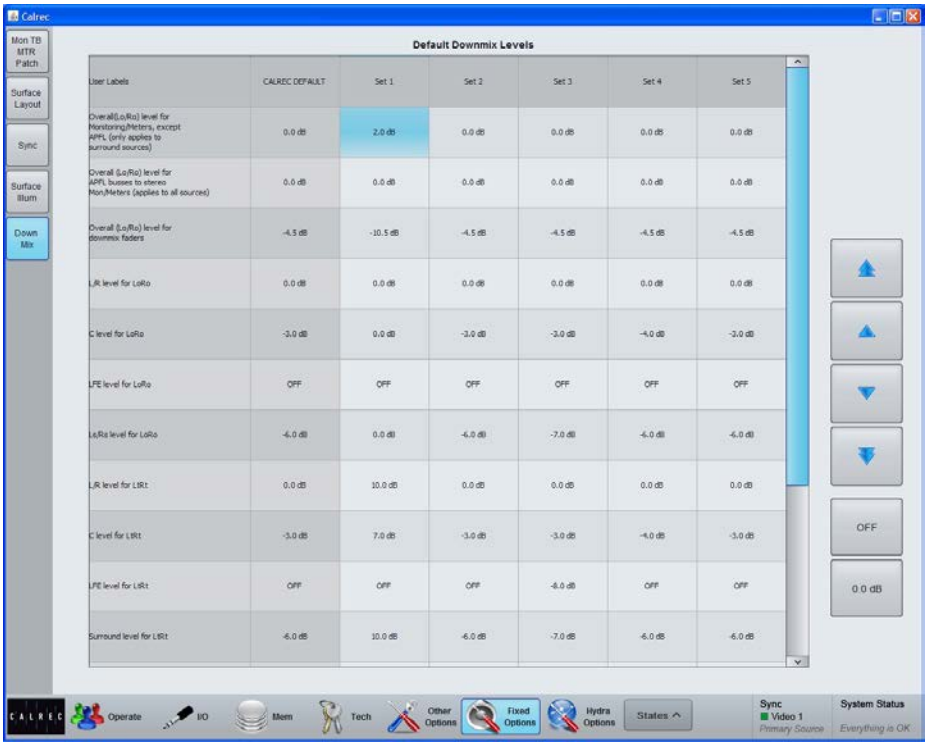
Levels may be set by selecting the relevant cell, then using the buttons at the right to increase of decrease the value. Buttons are provided to quickly set a given cell to 0dB or to turn the level off entirely.

Once the levels have been set, resultant levels are shown in the cells below. These resultant levels include:

- Resulting L/R level for downmix faders
- Resulting C level for downmix faders
- Resulting LFE level for downmix faders
- Resulting Ls/Rs level for downmix faders

These resulting levels are the levels which will be applied to the downmix faders and to the metering, monitoring and APFL downmixes due to the overall LoRo offsets.

FIGURE 2 - DOWNMIX DEFAULTS



Selecting the required downmix default

When any relevant downmix defaults have been set up, users can select the required configuration for use in their show by navigating to the SPILL D-MIX screen in the OPERATE section of the main application as shown in Figure 3.

The downmix configuration currently in use is indicated in the CURRENT D-MIX column of the table. To select another configuration, touch the button below the relevant column. This will make the following buttons at the bottom of the screen active:

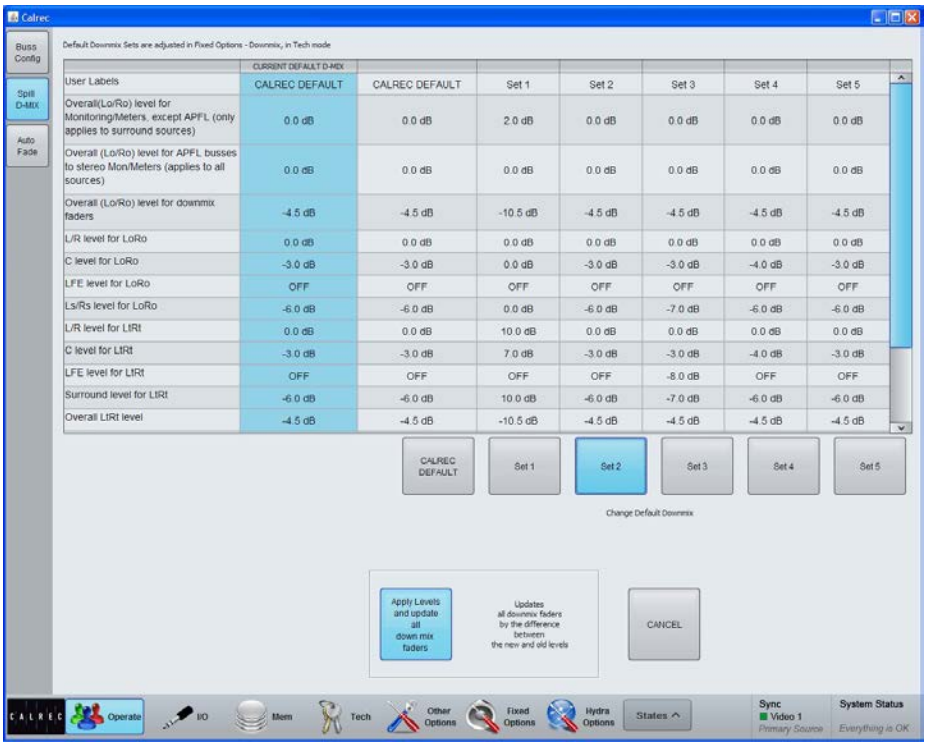
- APPLY LEVELS AND UPDATE ALL DOWNMIX FADERS. This applies the downmix to the system (monitoring, metering and paths) including existing paths. If the downmix faders on any paths have been offset from the downmix default levels, the offset will also be applied to the new downmix levels for those paths.
- CANCEL. This cancels any changes to this selection.

Applying default levels to downmix faders

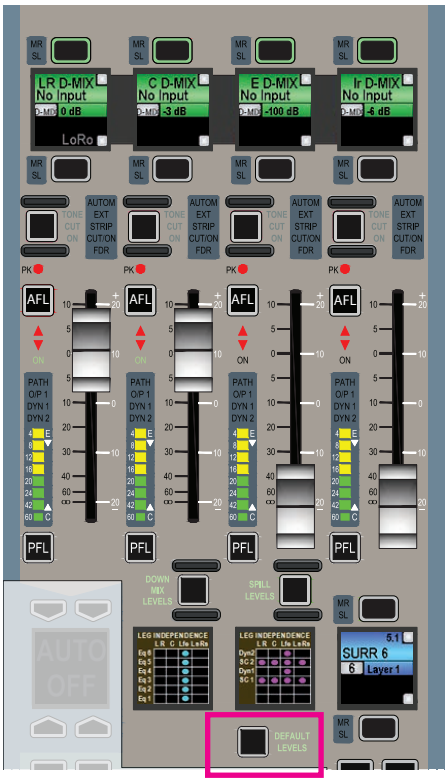
If any downmix faders have been changed, it is possible to set individual downmix faders to their default.

To do this, make sure that the faders on the monitor panel are set to display the downmix levels by pressing the DOWNMIX button. Now press and hold the DEFAULT LEVELS button along with the assign buttons for any downmix faders that are to be set to the default.

FIGURE 3 - SELECTING A DOWNMIX DEFAULT FOR USE IN A SHOW



DOWNMIX DEFAULT



LT/RT DOWNMIX ENCODING

The patchable downmix output of each surround Main output bus can be set to be either an Lo/Ro or an Lt/Rt format.

Lo is a mix of Left front, Left rear, Center and Lfe content. Ro is a mix of Right front, Right rear, Center and Lfe content. (By default, Lfe does not contribute to the downmix, but it can be added.) The contribution of each part is determined by the default downmix setting applied and can be adjusted using spill faders in downmix mode.

LT/RT is often referred to as an encoded output. The surround legs are summed together in a similar way to Lo/Ro, however phase changes are made to some of the content before summing which allow surround decoders to "unfold" the stereo signal back to discrete surround that matches the original 5.1 output of the console.

Lo/Ro, like any stereo signal can be "decoded" to produce a 5.1 path, however without the phase encoding of Lt/Rt the result will not match that of the original 5.1.

Note, when a Main output is set for Lt/Rt, only the downmix audio patched to output ports is phase encoded. Any internal routing of the surround main output to stereo destinations remains as LoRo. For example, if a surround Main1 bus is routed on to stereo only Main2 bus, or if a full surround bus is being monitored in stereo - IE the chosen source is full 5.1 but the monitor is in stereo mode.

Lt/Rt outputs conform to the downmix settings applied on the PC Main Application OPERATE>SPILL D-MIX page, however they are NOT affected if the downmix settings are adjusted from a Spill panel in downmix mode. When in Lt/Rt mode, changes made to the downmix from the Spill panel in downmix mode are still affecting the LoRo and can therefore affect Main to Main routing or stereo only monitoring as described above.

Selecting Lt/Rt or Lo/Ro

The downmix format for surround main output patching is selected from the Operate>Bus Config>Mns/Gps page of the PC's Main Application.

APOLLO
PASSING SIGNALS OUT OF APOLLO

OUTPUT TYPES AND PATCHING

DSP outputs including Mains, Tracks, Auxes, Direct Outputs etc. can be patched to physical Hydra2 output ports, virtual Hydra Patchbays, or back into channel inputs of the same console.

Patching

Output patching is performed in exactly the same way as input patching, using the I/O screens in the Main PC Application. From the I/O>I/O patch screen (shown on the right), Click the Sources button at the top left of the screen and select the appropriate output list from the "My Desk Outputs" group in the pop-up menu, the contents of which will then be displayed in the left hand table of the screen. Select the required destination list on the right hand side in the same way by clicking the Destinations button. Highlight the desired blue source cell on the left, and the desired blue destination cell on the right and then click patch. The blue cell on the right should now display the source that has been patched.

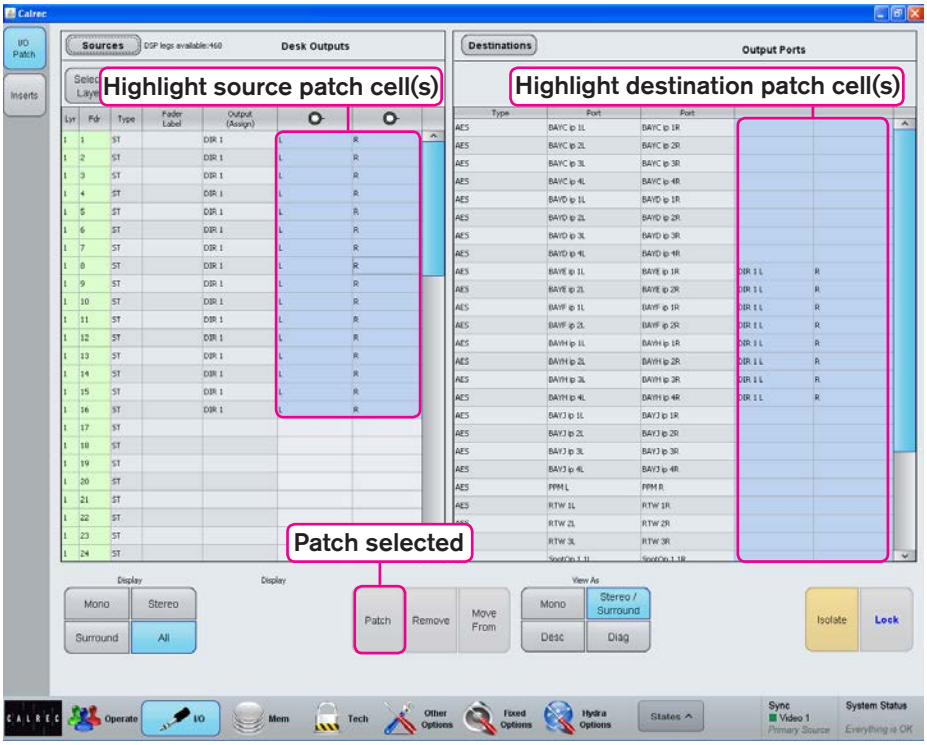
Hydra Patchbays

Virtual patch-points can be created within the Hydra2 domain using the H2O network administrator application.

Once configured, patch-points are available from the I/O patching screens on each console given access. Console DSP outputs patched to Hydra Patchbays are available for other users on the Hydra2 network as sources without using up physical I/O ports.

In addition to console DSP inputs and outputs, Hydra Patchbays can be patched to / from physical I/O and other Hydra Patchbays. This allows other users, such as a H2O network administrator, or SW-P-08 controller to be able to select which consoles are feeding which output ports (e.g. to select which control room is on-air), and to be able to change sources feeding into consoles.

MAIN PC APPLICATION I/O>I/O PATCH SCREEN - I/O PATCHING



Locking output port patching

Output ports may be locked to protect their patching from unintended changes. To do this, select one or more output ports in the DESTINATIONS list and then touch the LOCK button below. Repeat the process to unlock the ports again.

Locked ports are indicated by bold blue text.

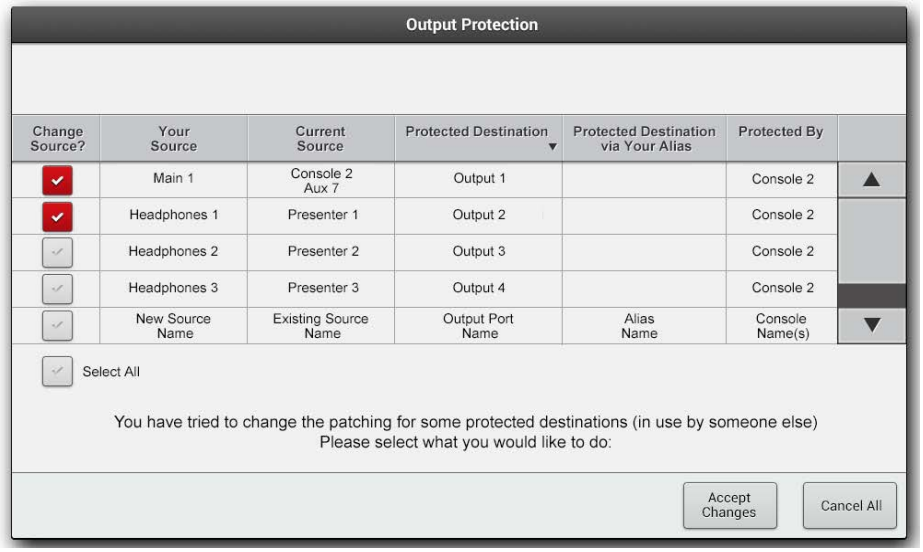
If a port is locked by a technician using Technician Mode, the ports can only be unlocked by another technician. This may be used to lock down any essential patching and prevent user error.

For more information on Technician Mode, please refer to the Technician Mode section of this document.

OUTPUT PORT PROTECTION

Output port protection is a system that notifies operators when they are attempting to patch to outputs that are already in use elsewhere on the network, and provides information to assist in deciding whether to go ahead with each patching decision.

All output destinations can be available to all consoles on a Hydra2 network if they have been granted access within H2O, but only one audio feed can be routed to each individual output at any one time. When an output is in use, it is "protected" from over-patching by other users on the network.



Patching to Protected Outputs

When an operator patches to a protected output, either by console patching or by loading shows, user memory or alias files, a pop-up appears on the console's PC screen containing a table of information to assist in choosing whether to go through with the new patching or to keep the current settings.

The check boxes down the left hand side of the table are used to select each patch change individually. The SELECT ALL check box selects and deselects all patching changes as a whole.

On clicking ACCEPT CHANGES, changes which are checked in the pop-up, plus any changes which are not displayed due to them having no effect on protected outputs are all made and the pop-up closes. On clicking CANCEL ALL, all changes that affect protected outputs are rejected but all changes which do not affect protected outputs are made and the pop-up closes.

If a user memory is loaded from the surface's memories panel area when in monitor mode, a simplified version of the pop-up is also displayed on the surface allowing the operator to accept or cancel all changes, providing output protection notification on the surface, without reliance on the system PC.

Always ensure patching changes are correct before accepting them as you may affect other users on the network.

Output protection differs form Locking output ports. Locking is a manual process which locks an output for all operators, whereas Output Protection is an automatic process designed to prevent accidental over-patching during operation, whilst retaining a smooth workflow.

As detailed in the Input Port Protection section of this manual, when loading shows, user memory or Alias files it is likely that both protected outputs and shared inputs will be affected by the memory load. In this case the pop-up will have two stages - Input Sharing and Output Protection.

OUTPUT CONTROL

Outputs mode provides control over output buses and displays relevant output meters.

The layout of controls on a panel set into Outputs mode is shown in Figure 1.

The rotary controls provide level control for Main, Group, Aux and Track outputs. The buttons cut or uncut the output (there is no cut functionality on a Main output).

Depending on the configuration of the system, there may be more outputs than can be viewed at one time on the control cells. In this case, the outputs can be paged through using the buttons in the button cells at the left and right of the panel.

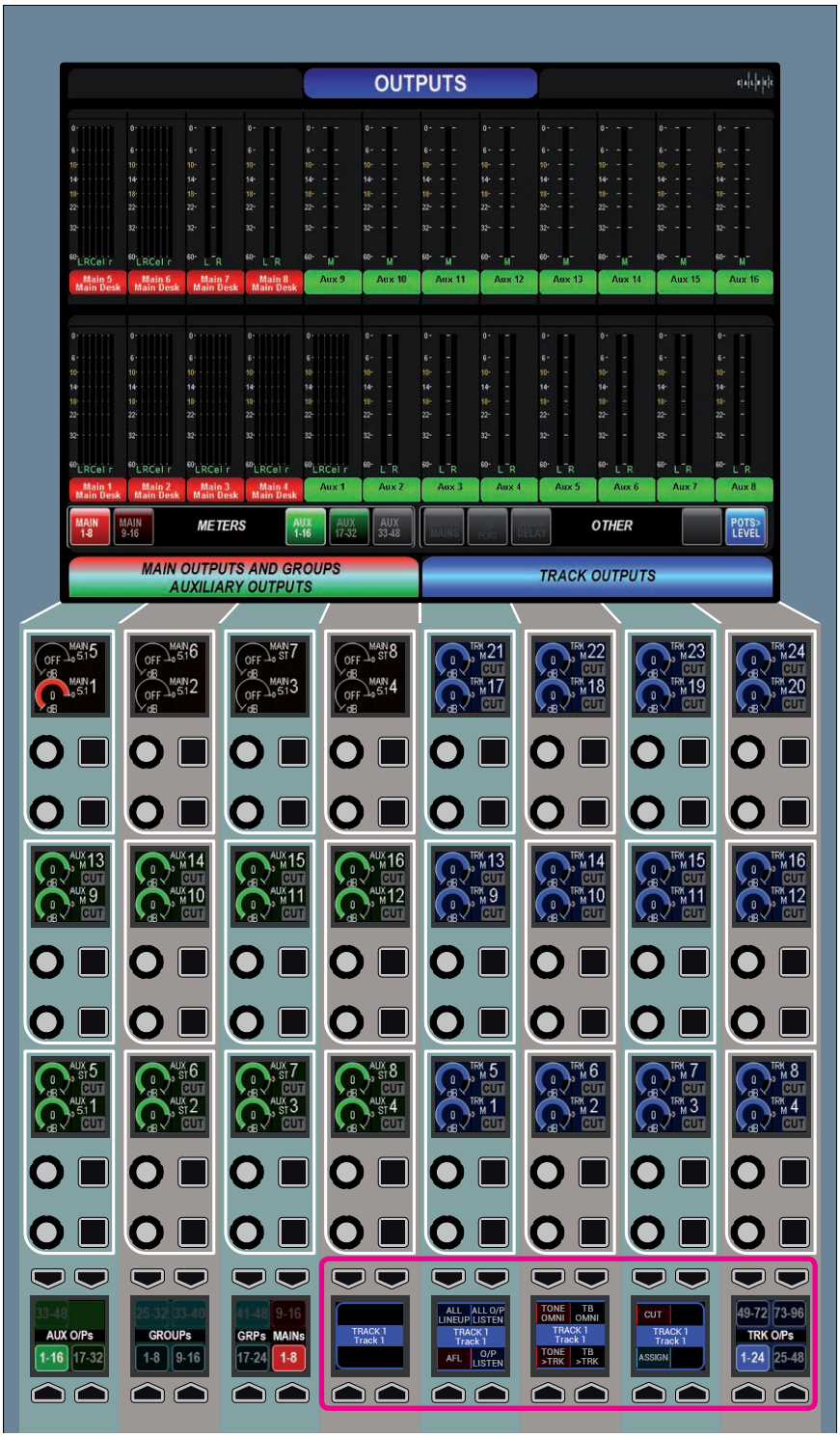
Accessing further controls

Four of the button cells at the bottom of the panel are used for more detailed control over the currently selected output. **To select an output, push down on its rotary control**. The current selection is indicated by the color of the four control cell displays and also by a text label which spans across the center of them. Controls that can be accessed in this way include direct talkback to the output, tone to the output and PFL. This section also contains an "ASSIGN" button. Selecting this makes the current output the assigned path on the desk. The same as selecting a fader's assign button to make that Channel/ Group/Main path the current focus of all the assign panels, this button provides an alternative for outputs that may not be allocated to faders, or for when the fader is not close to hand.

Outputs on Faders

As well as rotary level controls on the OUTPUTS screen, Main outputs and group buses can be assigned to faders for level control, adjusting either the rotary or the fader has the same affect and will

FIGURE 1 - OUTPUTS MODE CONTROL LAYOUT



update each others display / position. Main outputs can also be assigned to the faders on the dedicated monitor and joystick panels. When the fader area of one of these panels is not displaying surround in spill or downmix mode, Mains can be assigned to them in the same way as to regular faders. Using these faders for mains provides a fader control that is close to hand but separated from the regular faders .Please refer to the Paths and Faders section of this document for more information on this process.

Bus Output Delay

Available output delay resource, and delay controls for Main, Aux and Track bus outputs appear on the SEND-ROUTE panel mode - select a bus output's assign button, either from the fader or from the OUTPUTS panel (see previous page) to display the delay controls for that bus on the SEND-ROUTE PANEL.

A pool of 256 legs of output delay resource is available across the console. Being a pooled resource like input delay, the resource needs to be assigned to the path before it can be switched in. The resource used and available are also displayed on the SEND-ROUTE panel.

For Main outputs, delay can be assigned, switched in and adjusted independently for 5.1, stereo and mono, Desk and Line outputs. When delay is assigned to more than one of a buses' outputs, Link buttons appear to allow the controls to track together. Select each output to the same link bus in order for the delay control to track on all when any of them are adjusted. Linked delay can be offset - if delay is adjusted before linking, the difference in delay values is retained after the link is made, the controls will track together whilst maintaining their offset.

Pressing and holding down a rotary delay control sets the delay value to 0.

A short press of a delay rotary control brings up a pop-up menu in the TFT screen above which allows for the amount of delay to be displayed in either milliseconds or video frames. The same menu also provides +/- buttons to step up or down the delay amount by a preset quantity as an alternative to using the rotary control.

The Other Options>Default Settings page of the Main PC Application allows the delay display default to be selected as either milliseconds or video frames, the number of video frames per second to be selected to match the format of video being used, and the +/- delay button step size to be selected.

MAIN PATHS – MONITOR/JOYSTICK PANELS

The faders on the Monitor and Joystick panels can be switched to allow control over the Main paths in the system.

This is achieved by ensuring the SPILL LEVELS and DOWNMIX LEVELS buttons are deselected on the panel.

Main paths can then be patched to the faders in the same way as other faders on the surface. Please refer to the Paths and Faders section of this document for more information on this process.

These faders can be assigned and have processing and routing applied in the same way as any other fader on the surface.

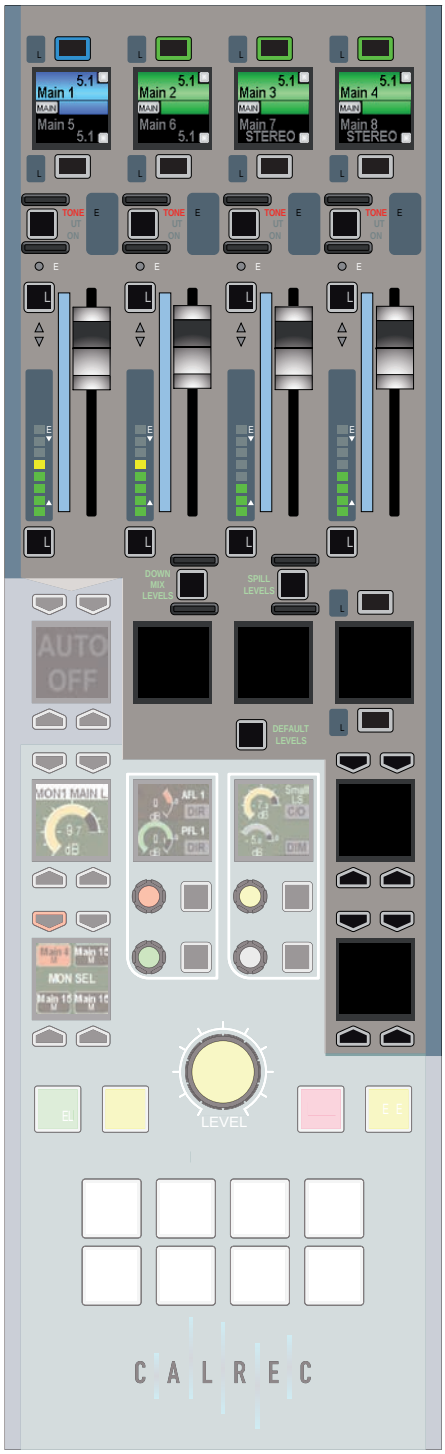
Tone to mains

When controlling Main paths, the buttons above each fader that performed the CUT or ON functions for spill levels now inject tone into the relevant Main output. The hidden-till-lit indicators will confirm this function.

Accessing Spill controls for Main faders

When controlling Main paths and a Main path on one of these faders is assigned, it is not possible to switch the mode of the faders on the same panel and use them to alter the spill legs of the assigned main. The function of the faders cannot be switched unless a path from a normal fader or another Monitor or Joystick panel is assigned. This is intended to avoid the confusion of having a single fader indicate the assigned path and the relevant spill leg at the same time.

FIGURE 1 - MAIN PATHS ON MONITOR PANEL



DIRECT OUTPUTS

A pooled resource of 512 legs of direct outputs can be assigned for use with channel and group paths.

Up to four direct outputs can be created per path, each can be set to be fed pre-EQ, pre-Fader, post-fader or from the Mix Minus bus. Output delay can be assigned to any direct output—this is taken from the same pool of delay resources as bus output delay.

Assigning Direct Outputs from the Surface

To assign a direct output to a path using the surface controls:

1. Push the ASSIGN button for the path to which you want to assign the direct output.
2. Place any panel into SEND-ROUTE mode from the Modes row. The four center-right control cells will read: PUSH TO ADD DIRECT OUTPUT. Push one of these cell's rotary controls and the Direct Output pop-up appears on the TFT above, as shown in the image on the right.
3. Select Mono or Stereo to enable a Direct Output and select either a feed position (pre-EQ, pre-fader or post fader) or choose to have the Mix Minus bus feed the Direct Output.

Assigning Direct Outputs from the PC

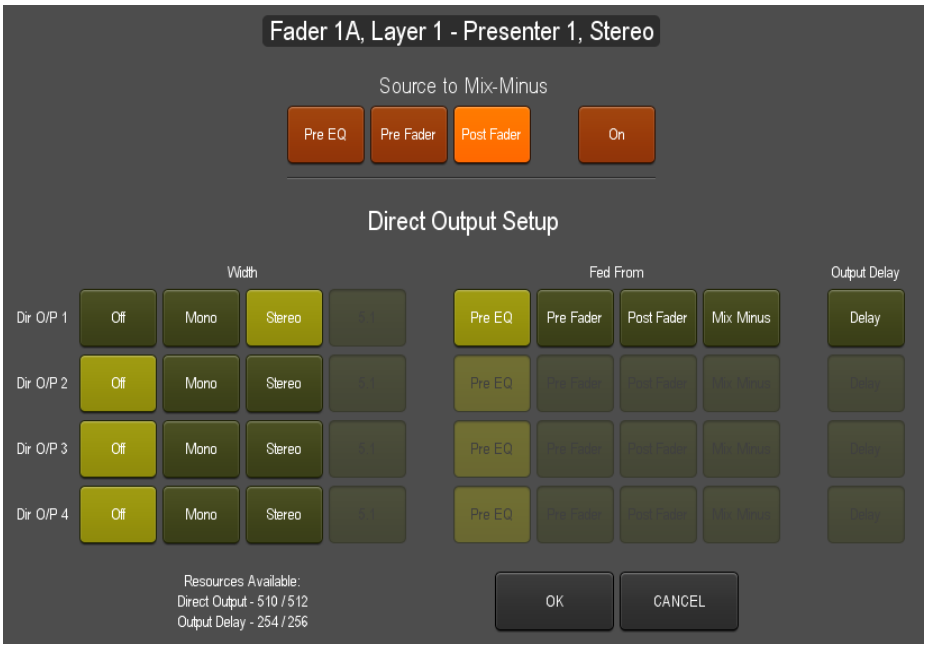
To assign direct output resources to paths using the console PC:

1. Select I/O patching from the menu bar in the Main application.
2. Select SOURCES > DIRECT OUTPUTS from the Sources menu.
3. Click on the Output (Assign) cell in the table for the required path and the direct output setup pop-up appears. (see step three above for more detail)

Like other console DSP outputs, each direct output can be simultaneously patched to multiple destinations—physical output ports, Hydra patchbays, or channel inputs.

DIRECT OUTPUT ASSIGN FROM POP-UP

DIRECT OUTPUT SETUP POP-UP



- Note, the Direct Output pop-up also allows you to route the Direct's Output's source path to the Mix Minus bus using the buttons along the top of the pop-up

Direct Output Controls

If a path has direct outputs assigned to it, level controls, color-coded yellow, will be available in the SEND-ROUTE panel mode when viewing that path.

Additional controls for each send can be viewed by pressing down on a rotary controller to display functions related to that send across displays in the bottom of the panel (as shown in the adjacent panel image). The send that is the current focus of this area is displayed across the center of the displays.

When a direct output is selected, buttons in this area allow for the send to be set pre EQ, pre fader or post fader, and for the send to be routed via a mix-minus bus. The same menu area also has an AFL button to solo the direct send over the monitor output, as well as buttons to route talkback and tone to the direct output. A button labelled “Setup” in this area brings up a direct output assign/width menu in the TFT screen above. This menu is the same as the one accessed from the PC Main Application. This pop-up TFT screen menu can be accessed from the control surface even if no direct outputs have been assigned to the current path by pressing on the greyed out direct output level control, and then selecting Setup from the lower send menu.

Direct output delay

Delay on direct outputs comes from the same pool of DSP resource as bus output delay. The Direct Output setup screen shows the amount of available delay resource and allows delay to be assigned. Open the Direct Output setup screen by pressing a direct output rotary controller to open the Direct Output control functions menu below and then press SETUP to view the screen on the panel’s TFT screen, as shown on the right. Alternatively, find the same screen on the PC Main Application from the I/O page, Sources>Direct Outs and clicking on the output cell for the required fader.

ADDITIONAL CONTROLS FOR EACH DIRECT OUTPUT

- Additional controls for each send on the SEND-ROUTE panel mode can be shown in the area highlighted above by pressing on the rotary level control for the required send. Note the particular send currently being displayed is labelled across the center of these displays

To switch in and adjust delay, press on the Direct Output rotary controller and then select POT=DELAY from the Wild Assign row below. The Direct Output control cell now shows delay rather than level and the associated button is used to switch in the delay.

As with input delay and bus output delay, the value can be displayed in either milliseconds, or video frames. Press on the delay rotary control to bring up a pop-up menu on the TFT screen above. The pop-up menu allows for the display of this specific output to be changed between ms and frames. The same pop-up menu also has +/- buttons to allow the delay value to be stepped up or down by a pre-determined amount as an alternative to using the rotary control.

The Other Options>Default Settings page of the Main PC Application allows the delay display default for the whole console to be selected as either milliseconds or video frames, the number of video frames per second to be selected to match the format of video being used, and the +/- delay button step size to be selected.

Direct output talkback

Pressing and holding the Talkback button in the lower control area when a direct output is selected will momentarily replace audio on that direct send with talkback. From V1.11, a “TB” button is located in the functions row above each fader (as long as the panel is not displaying a Tools or Layer Tools menu. If so, exit the Tools / Layer Tools menu using the exit button at the right hand side of the row). This easy access TB button will route talkback to direct output 1 only. Note, dual fader panels do not currently support this button location.

APOLLO
MONITORING

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MONITOR MODE

A wild assign panel can be set into Monitor mode providing controls for monitoring, metering and talkback features.

Figure 1 shows the layout of controls in Monitor mode. To set a wild assign panel into Monitor mode, touch the MONITOR button on the Modes row.

FIGURE 1 - CONTROL LAYOUT IN MONITOR MODE

CONTROL ROOM MONITORING

Apollo features powerful pre-selectors for fast and clear access to multiple control room monitor sources.

Pre-selectors

The idea behind pre-selectors is to enable multiple sources to be set up, each ready to be fed to the main loudspeakers instantly at the touch of a button.

Control Room speaker pre-selectors

There are four pre-selectors available for choosing which source is fed to the control room speakers for monitoring. These are shown in Figure 1. The labels on each display show which path has been set to that pre-selector. Pressing the button below the triangular HEAR indicator in the lower right hand corner of each pre-selector, makes that the chosen source to be fed to the control room speakers.

Changing pre-selector source

The right hand side of the wild assign touch screen displays the available sources which the user can set to a pre-selector. This is also shown in Figure 1. Tabs at the bottom of the screen allow different types of paths to be shown in the main area above.

To change the source set to a given pre-selector, press the SEL button above it. The control cell display will be highlighted to indicate the selection. Now touch the required path on the wild assign touch screen area described previously. The pre-selector display will update to display this newly set path. Pressing the HEAR button will select that path to be sent to the control room loudspeakers.

Control room monitor controls

The control room monitor level can be altered using the rotary control labelled MAIN LS LEVEL. A CUT button is

FIGURE 1 - CONTROL ROOM MONITORING

located to the left to this control to cut the main loudspeakers.

A dim level control is provided to set the level of attenuation applied by the dim control. The dim on/off button is located to the right of the MAIN LS LEVEL control.

To the left of the CUT button is a button labelled SMALL LS C/O which switches the monitoring from the main loudspeakers to a secondary monitoring setup. The rotary control next to this button provides control over the level of the secondary loudspeakers.

Buttons are provided above the to monitor the stereo or mono downmix of the monitor source where appropriate.

Loudspeaker cut buttons

Cut buttons are provided at the left of the panel. These cut buttons control the output of the currently selected monitor output which could be the main control room output or any of the miscellaneous monitor outputs. The required output is selected using the SEL button for each miscellaneous output or any of the SEL buttons in the main LS pre-selectors.

Monitoring for multiple users

Two Main Monitor outputs are available to patch to output ports, Mon1 and Mon2. Assignable panels selected to Monitor mode can switch between controlling monitor 1 and monitor 2 from the control cell in the bottom left. Changing between monitor 1 and 2 on an assignable panel to the left of a dedicated monitor panel will also switch that dedicator monitor panel between Mon1 and Mon2. The source selection display on the dedicated monitor panel displays which of the two monitor outputs it is controlling across the center of the display. This allows for 2 operators using the same processing rack - either on the same surface (one of the monitor outputs could be patched to a headphone feed) or using extended surfaces or sidecars, to have their own set of monitoring controls, either from dedicated monitor panels or from assignable mode panels.

If user splits are also in place to demarcate sections of faders for use by each operator, each user area can be set so that the AFL and PFL output of their paths are routed to separate AFL & PFL buses which in turn can be selected to feed the two main monitors.

From an assignable panel in monitor mode, with one of the pre-selectors selected to ensure the TFT display is controlling monitor selection (rather than a miscellaneous monitor or meter selector), select Misc from the source selection type menu at the bottom of the TFT screen to view additional monitor settings. This screen allows the selection of APFL 1 or 2 to be routed to each of the two main monitors.

The APFL buses used by the faders in each user area can be selected from the Tools>Misc menu of the panel. There are in fact 3 APFL buses that can be selected, however only APFL 1 & 2 can be routed to the main monitors. AFL3, PFL3 and APFL3 can be patched to output ports from the meter outputs list - these are full level with no gain control and therefore if to be used for listening should be sent to a monitor with built in level control.

In addition to the main monitor outputs, miscellaneous monitor outputs can also be used. The level control and source selection for the miscellaneous outputs is on the full monitor mode panel when selected to control Monitor 1. Miscellaneous monitor outputs do not have APFL injection.

DEDICATED MONITOR CONTROLS

A subset of monitoring controls can be accessed on the dedicated monitor panel.

The panel features hard controls for main loudspeaker level, cut, dim and stereo. The display in the upper left button cell shows the control room monitor level.

The MON SEL button cell allows the user to listen to any of the four control room monitor pre-selectors. The pre-selectors cannot be defined on the dedicated monitor panel, this must be done in Monitor mode.

In the two control cells are master AFL and PFL level controls, small loudspeaker level control and changeover switch, and a control to vary the amount of attenuation applied by the dim function.

FIGURE 1 - MONITOR PANEL

Eight GPIO buttons and indicators are located on the monitor panel.

The configuration and operation of these is described in the section External Interfacing.

AFL, PFL AND OUTPUT LISTEN

Apollo consoles have a comprehensive multi-user AFL, PFL and Output Listen system.

AFL

Selecting an AFL - 'After Fader Listen', replaces the output of the control room monitor with the post fader audio of the path being AFL'd. AFL provides a 'non-destructive solo'- Only the control room monitor output is affected, no paths are cut, and mixes to all other buses and outputs are unaffected, allowing users to quality-check selected paths whilst maintaining all mixes.

Whilst in AFL mode, the control room monitor selection display will indicate as AFL. When all AFLs are switched off, or globally cancelled, the monitoring will revert to outputting its previously selected source.

PFL

Selecting a PFL - 'Pre Fader Listen' sends the associated feed, by default, to a dedicated PFL/RTB LS output (RTB is 'Reverse Talkback' which allows for signals to be mixed with PFL for listening on the PFL/RTB output e.g. for use with producer / director hot-mics).

Multiple paths can be PFL'd or AF'Ld at the same time, creating a summed mix of pre or post fader path solos.

Output Listen

Mains, Tracks, Auxes and Direct Outputs all have an OUTPUT LISTEN option. Like AFL, this provides a non-destructive solo, but Output Listen takes the feed after the addition of output delay, directly before the feed leaves the console.

Accessing from faders

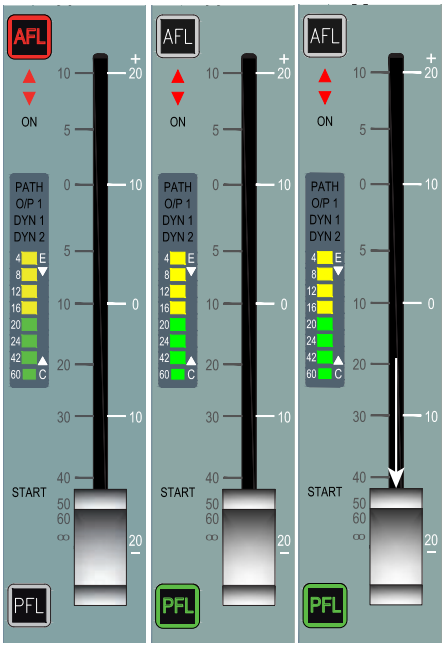
When a path is attached to a fader, AFL and PFL can be accessed using the AFL and PFL buttons. Both are either latching if tapped briefly, or momentary if held.

FADER AFL & PFL CONTROLS

Latching or momentary AFL using the AFL button.

Latching or momentary PFL using the PFL button.

Overpress (push the fader lower than the normal backstop) to activate PFL.



APFL INDICATOR / CANCEL BUTTON

ACCESSING AFL AND OUTPUT LISTEN FOR OUTPUT BUSSES

By default, PFL is automatically canceled when a fader is opened e.g. if a fader reaches ∞ whilst PFL is activated, PFL will be deactivated when the fader reaches -90dB. This feature can be disabled by turning off the OPEN FADER CANCELS PFL button within the TOOLS>MISC menu.

PFL can also be activated using the fader overpress feature: Move the fader down to its lowest position, then push it down past the normal backstop position and PFL activates for that fader. This is a momentary setting so as soon as you release the fader, PFL is deactivated. (It is possible to disable this feature, contact Calrec customer support for more information.)

Accessing bus AFL, Output Listen and PFL

When in Outputs mode, any bus can be brought into focus in the wild assign row button cells by pushing down on the output's rotary control. Once an output is

in focus options appear in the wild assign row button cells for activating PFL and AFL or Output Listen for the currently assigned path.

Cancelling AFL and PFL

When any AFL or PFL is active, the APFL indicator on the Broadcast Facilities panel illuminates. Press this button to cancel all AFLs and PFLs that are currently active. There is also an APFL cancel button on the TFT screen when in Monitor mode.

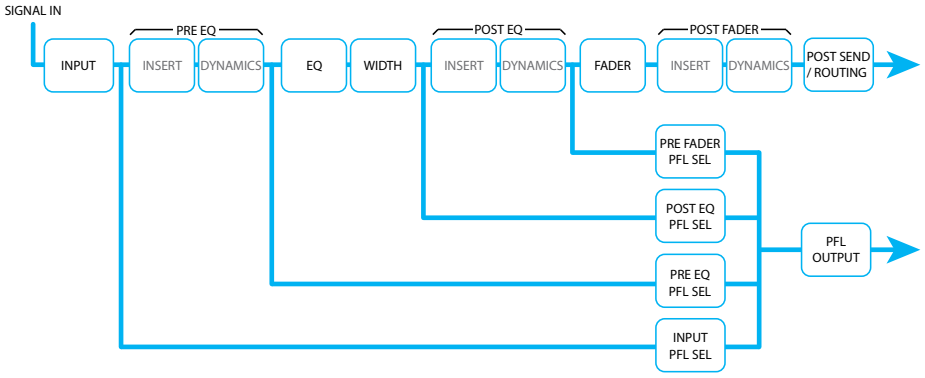
Moving PFL within signal chain

PFL can be selected to output from various points within a path's signal flow (see diagram above right). Select TOOLS>MISC from any fader panel's Layers row to bring up APFL options in the row above (see diagram to the right). A short press of one of the selection buttons changes the PFL point for the currently assigned path. To change multiple paths, press and hold the desired selection button whilst selecting paths by pressing their fader assign buttons. To change all paths on the surface, or within the user split, press and hold APPLY TO ALL, then press the required PFL selection point. When a path fader PFL is activated, the fader label display momentarily displays the PFL's selected location.

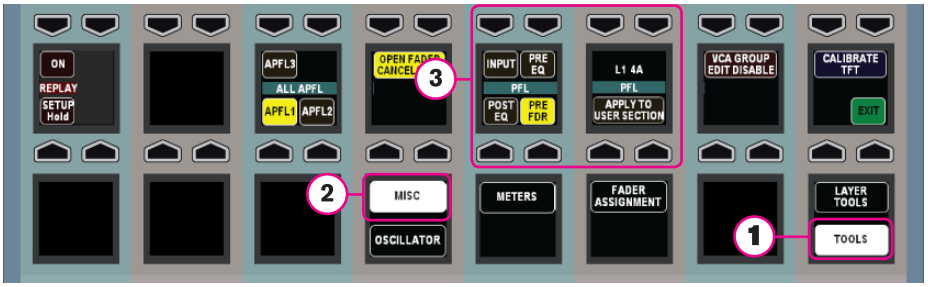
Patching AFL/PFL to external monitors

Navigate to the MON TB MTR PATCH screen in the FIXED OPTIONS section of the main PC application. Touch the sources button and select MONITOR OUTPUTS from the popup that appears. The source list will now make all monitor outputs of the system available for patching, including the three independent AFL and PFL systems for each user section. Simply select the required source and destination ports and touch the PATCH button.

PFL OPTIONS WITHIN PATH SIGNAL FLOW



TOOLS>MISC, CONTROL SURFACE PFL OPTIONS



Sending PFL to the main monitors

To send the PFL signal to the main monitors rather than the dedicated PFL/ RTB output, press the PFL TO MON button found in the Monitor panel mode.

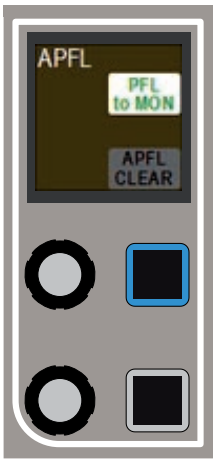
Sending PFL to the small LS

The system can be configured to route PFL signals to the small loudspeakers, overriding any other signal presently going to it. This is a factory defined configuration and should be specified when ordering the console.

Using AFL and PFL with multiple users

When working with multiple user splits across the surface, each split can use an individual APFL system. The choice of which is set using controls in the functions row. Touch TOOLS then MISC on the layers row and the available options for APFL system selection appear on the updated Functions row above. Press one

MONITOR PANEL MODE PFL TO MON



of these buttons to set the active APFL system for that area, as shown above. Repeat this process in each user split.

APFL systems can be selected to be routed to outputs 'Monitor 1' and 'Monitor 2': Set an assignable panel into Monitor Mode and select any of the four monitor pre-selectors to ensure that the source selection screen on the TFT is referring to the main monitor (rather than a miscellaneous monitor or meter selector.) Select MISC from the monitor selector type menu at the bottom of the TFT screen to bring up monitor options and choose APFL 1, 2 or 3. Use the control cell at the bottom left of the monitor mode panel to switch between Main Mon 1 and 2 and set their APFL systems as required.

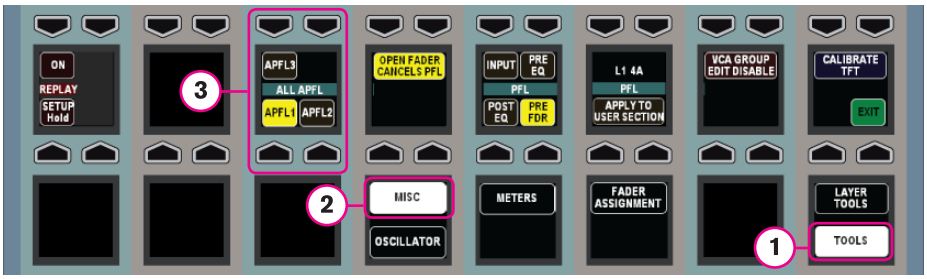
The FLASH APFL option for each APFL system instructs the APFL indicator in the broadcast facilities panel to flash or to illuminate steadily when any AFL or PFL is active in the relevant user section. If the option is selected, the indicator will flash. If it is deselected, the indicator will illuminate steadily. This allows two APFL systems on the same surface to have separate indicators.

The CLEAR AFL and CLEAR PFL buttons clear AFL and PFL respectively for each APFL system, unless the PFL has been triggered by a GPI (see below for more information)

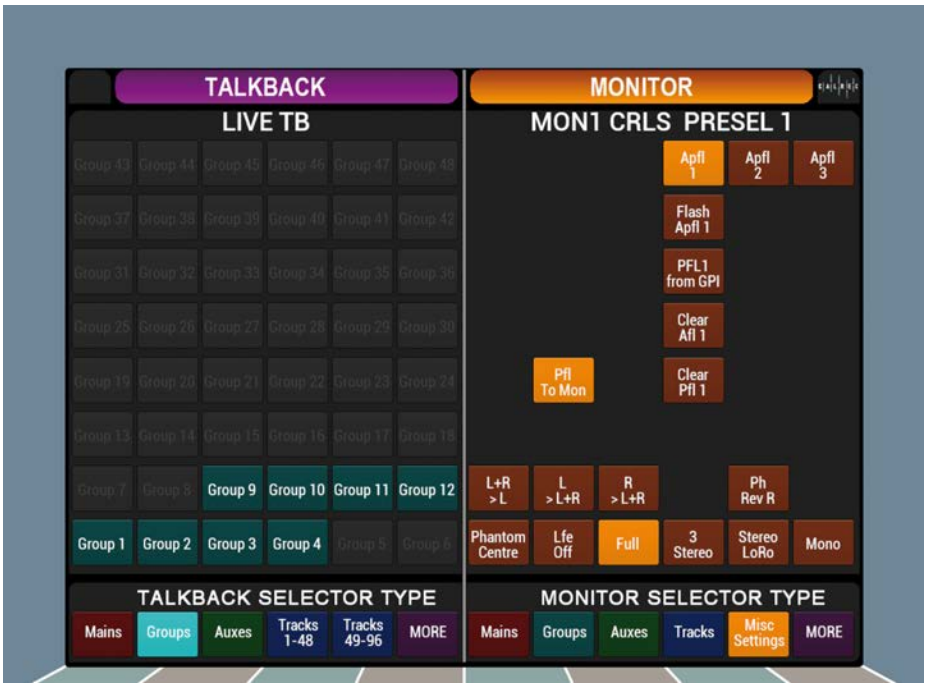
Note that if a path is moved to another fader on the surface or to another user split, the path's AFL or PFL status will move along with the path, feeding the APFL system that has been set for that user split.

Patching AFL, PFL and APFL buses
As well as injecting into the main monitors, AFL, PFL and APFL systems are also available to patch to output ports. APFL systems are available in monitor source lists, post their level controls and in meter lists, pre their level controls.

APFL SELECTION FOR MULTIPLE USERS



APFL INDICATOR OPTIONS



PFL via GPI
PFLs can be remotely activated via GPI. GPI-PFL selections are input port or input Alias based, firing the PFL of whichever path the input is patched to. See "GPIO" on page 168 for details on patching GPIs to surface functions.

If a channel's PFL has been activated via a GPI, the EXT light next to the fader lights up green to indicate that control is being applied externally.

It is not possible to deactivate a GPI PFL from the desk, this can only be achieved by deactivating the GPI Opto itself. **Therefore, if the PFL is only activated via GPI, the APFL clear button in the Broadcast Facilities panel will not light up.**

In Monitor Mode, with MISC selected, as shown above, there are 'PFL from GPI' enable buttons for each APFL bus. These can be used to quickly regain control of any channels which are set to have their PFL activated via GPI. For example for APFL 1, if a GPI has activated a channel PFL and you wish to deactivate the PFL from the control room, simply touch 'PFL 1 from GPI'. Note that until this is reactivated the GPI PFL for all channels using APFL system 1 will not work.

HEADPHONES

A headphone jack is located in the control surface chassis, the default location shown in figure 1.

The quantity and location of headphone jacks can vary depending on the chassis build ordered. Please note that in order to use the headphone jacks, balanced analog audio needs to be fed to the control surface via the rear interface panel. This would normally be fed from Hydra2 output ports allowing the headphone feed to be selected from the control surface. Please consult with your installation engineer if unsure of connectivity.

Patching the headphone output
Navigate to the FIXED OPTIONS section then the MON TB MTR PATCH screen of the Main Application, as shown in Figure 2.

In the sources list on the left, press the filter button and select MONITOR OUTPUTS. From the list select any monitor output you wish to drive the headphones.

In the right hand list select the output ports that the headphone jack has been wired to and click PATCH.

FIGURE 1 - DEFAULT LOCATION OF HEADPHONE JACK SOCKET

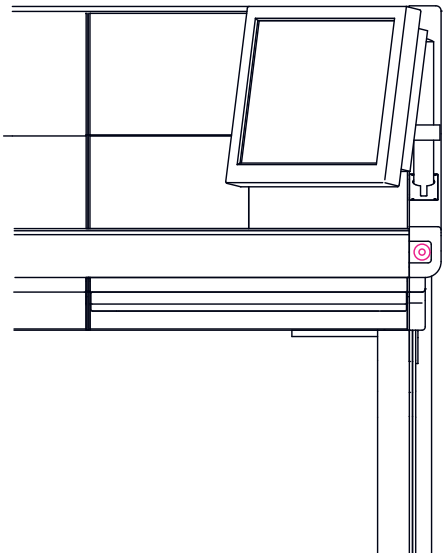
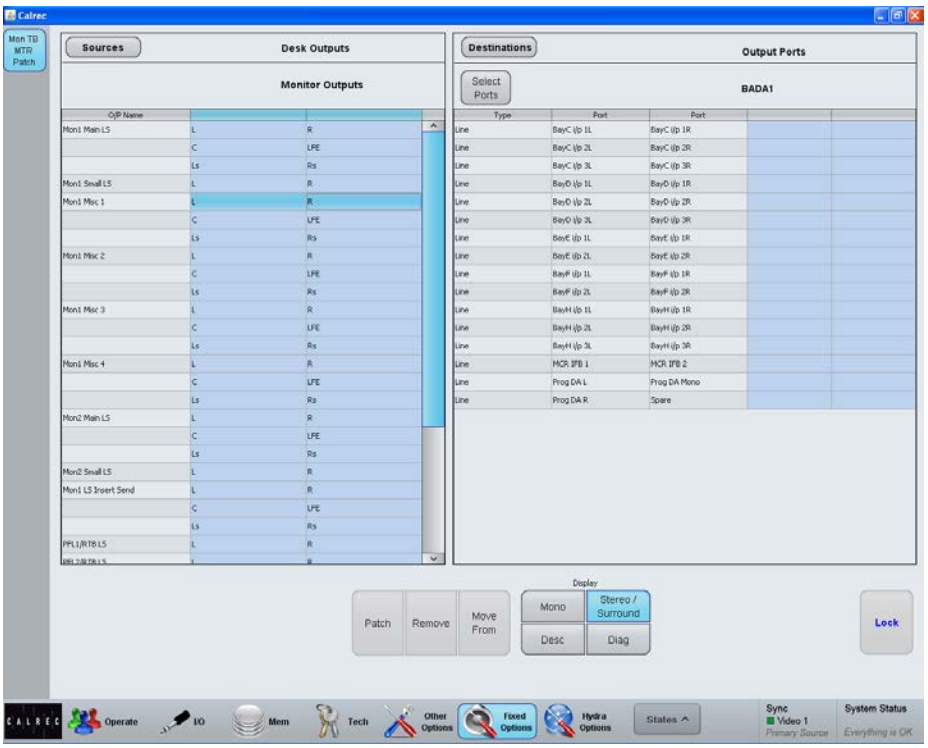


FIGURE 2 - PATCHING HEADPHONE CONNECTIONS



MISCELLANEOUS MONITOR SOURCES

There are four miscellaneous monitor pre selectors available in Monitor mode. These are set up and used in a similar way to the control room pre selectors and are shown in Figure 1.

Each output control has a rotary control for altering the level of the output and a dim button. The control cell display shows the name, and if the bus has a defined configured, the width (M, ST, 5.1) and name of the elected source and indications of the output level and dim status.

Altering the output source

The output source can be altered by pressing the SEL button which brings attention to the required miscellaneous output. Now press on the new source in the right hand side of the touchscreen above. The control cell display will update to show the newly selected output.

Patching miscellaneous monitor outputs

The miscellaneous monitor outputs are patched in the MON TB MTR PATCH screen in the FIXED OPTIONS section of the main application (Figure 2).

In the sources list on the left, press the filter button and select MONITOR OUTPUTS. From the list select one of the MISC LS outputs.

In the right hand list select the output port to which the miscellaneous output should be connected and press PATCH.

FIGURE 1 - MISCELLANEOUS MONITOR OUTPUT CONTROLS

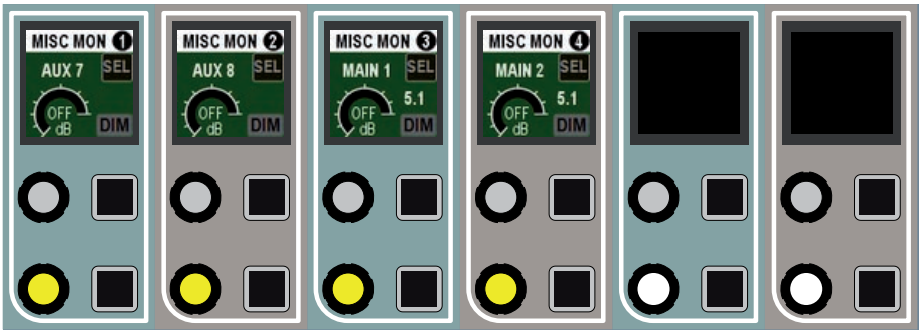
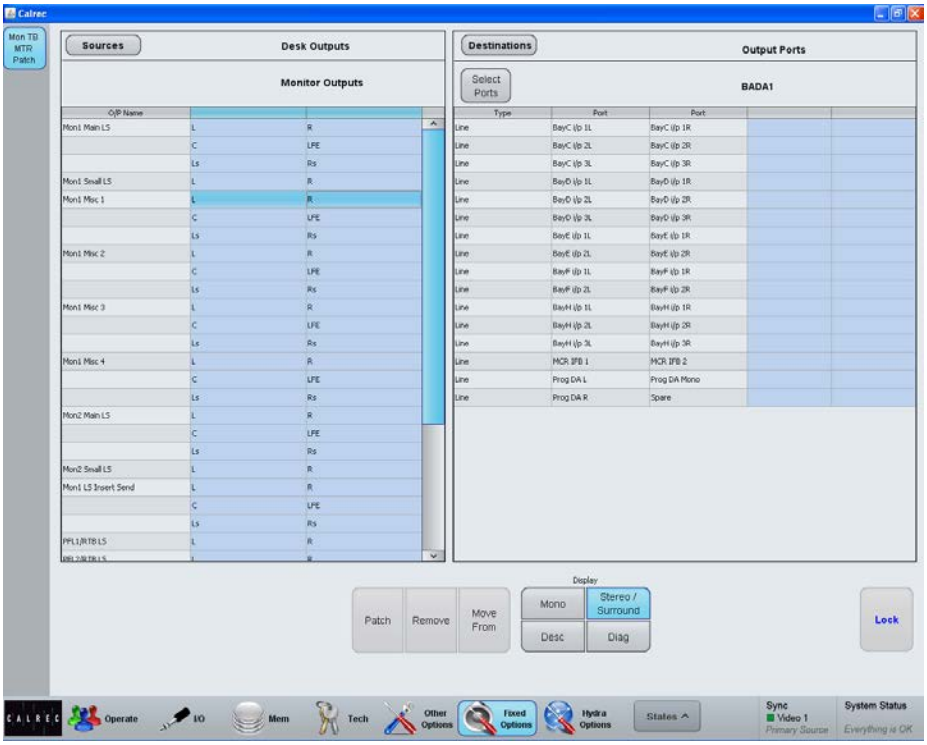


FIGURE 2 - PATCHING MISCELLANEOUS MONITOR CONNECTIONS



MONITOR FUNCTIONS

The touchscreen in Monitor mode provides a range of controls to access various functions for each monitor output.

Select a Main LS pre-selector using the relevant SEL button. On the right hand side of the touchscreen, touch the MISC button to reveal the controls. Different control arrangements appear for surround and stereo outputs as shown in Figures 1 and 2.

Misc LS functions are accessed in the same manner, but by selecting a Misc Monitor output using the relevant SEL button. The available functions are shown in Figures 3 and 4.

The lower area of the touchscreen is common to both Main LS and Misc LS selections. It contains controls over individual legs and downmixes of the signals sent to the monitoring outputs

The upper section of the Main LS screen containing APFL controls is explained in the AFL and PFL section of this document.

The upper area of the Misc LS screen contains options for changing a button on the relevant Misc LS control cell between CUT or DIM.

FIGURE 1 - MAIN LS SURROUND OPTIONS

FIGURE 2 - MAIN LS STEREO OPTIONS

FIGURE 3 - MISC LS SURROUND OPTIONS

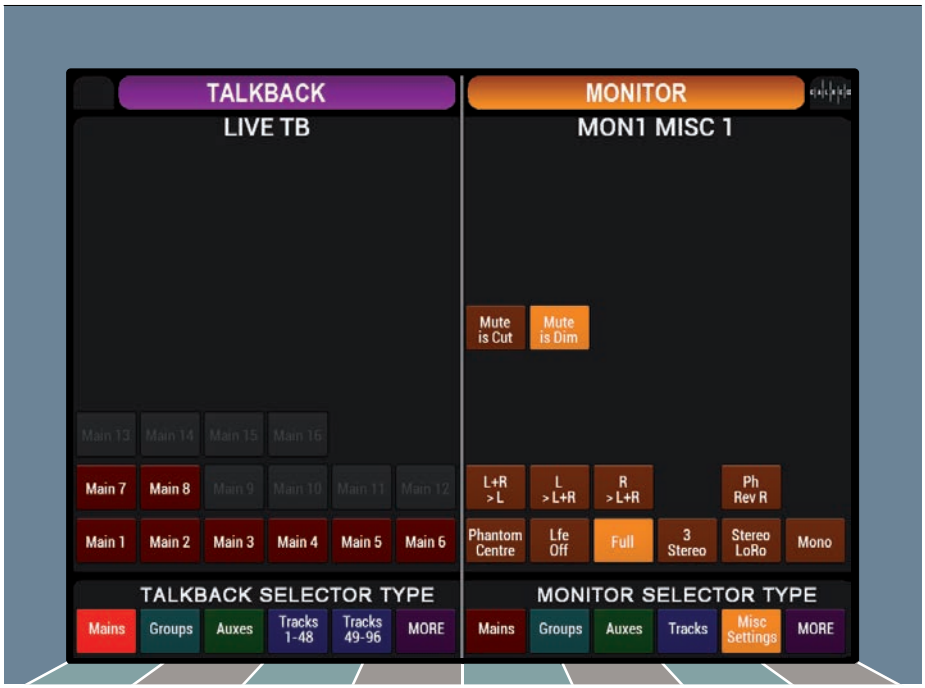
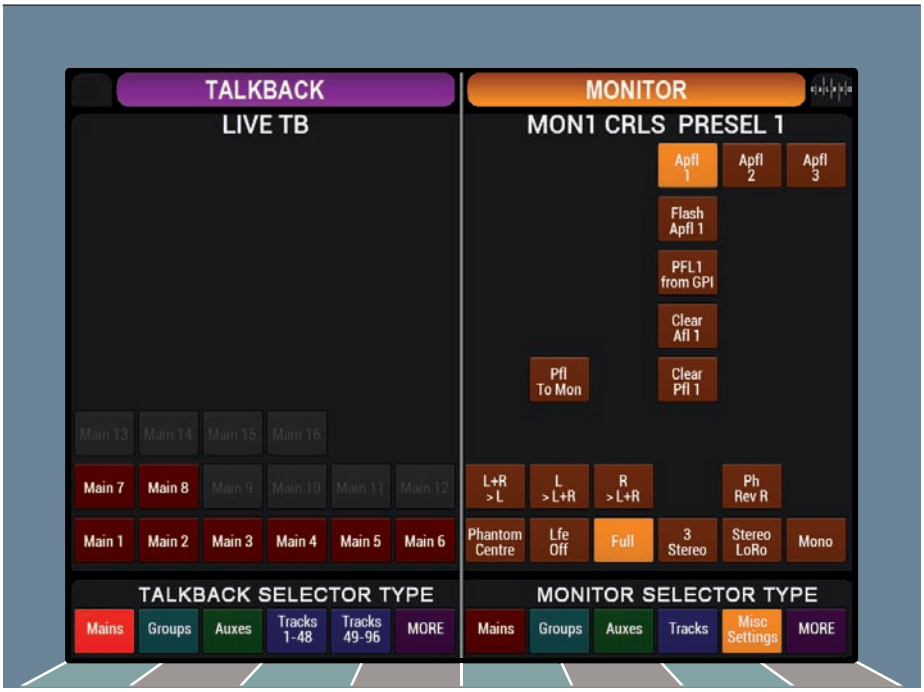


FIGURE 4 - MISC LS STEREO OPTIONS



SURROUND MONITORING

The Apollo has both audio signal path and remote control facilities for use with encoded surround signals such as those handled by the Dolby DP570 (Dolby Digital and E encoder/ decoder), DP564 (Dolby Digital and Pro Logic decoder) and SDU4 (Pro Logic decoder).

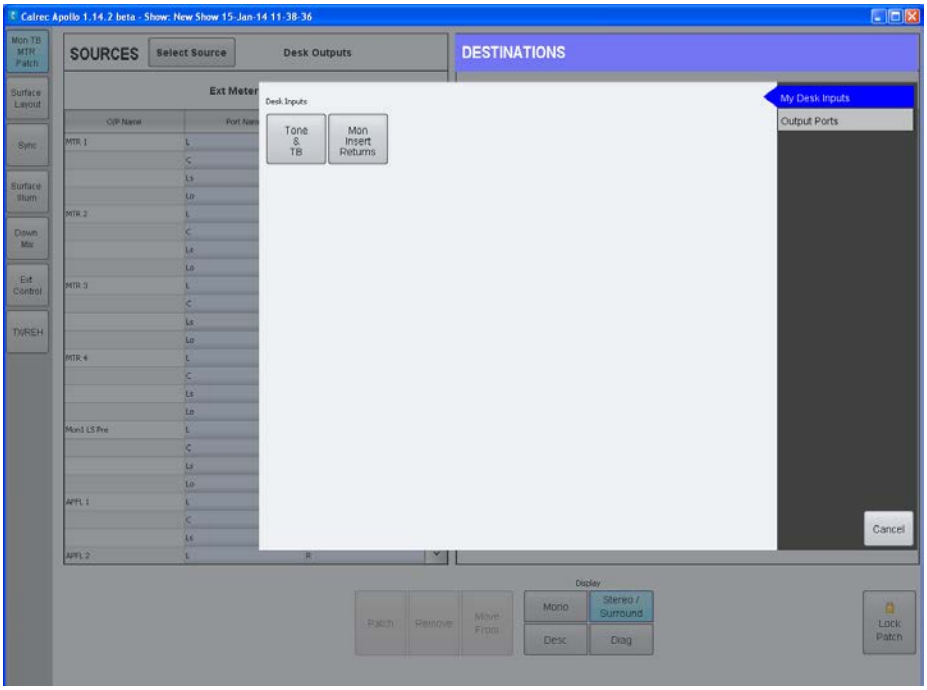
The console monitor system has insert points to allow the console selectors to route audio to the external unit and to bring it back into the signal path. The console can also provide GPO control outputs via relays and display the status of the external unit via GPI tallies and indicators on a wild assign panel.

To enable a monitor insert use the configuration PC and go to FIXED OPTIONS and choose MON TB MTR PATCH, touch the SOURCES button then choose Monitor Outputs (in the Desk Outputs column).

Then touch the DESTINATIONS button and filter that to confirm the port to be used as the insert send, typically an AES port on a BNC connector, if making a simple direct connection to a Dolby unit input. Touch PATCH to confirm the route.

Then go back to the Sources list and choose the port to be used as the insert return and filter the Destinations list to show MON INSERT RETURNS, and patch the required port (Figure 1).

FIGURE 1 - MONITOR RETURN PATCHING



The monitor insert can be placed in the signal path, or bypassed using controls on a wild assign panel in monitor mode (Figure 2). To manage the mode of the surround encoder/decoder use the SEL button to bring up a remote encoder screen in the right half of the TFT touchscreen. The software has specific touch screen controls and indicators for three different models of Dolby unit and the required one is chosen at the bottom of the panel. The upper part of the screen provides mode selection for the chosen unit. The modes can be chosen by touching on the buttons which illuminate to show the current status. It should be noted that whilst the SDU4 uses latched outputs from the console, the DP570 and DP564 only show status information as returned by signals from the encoder/ decoder units.

The control outputs and tally inputs are via the console's GPIO system so can also be used to control other models and brands.

The detailed hardware connections for remote controlling Dolby units is described in the Installation Manual. To assign the GPIO ports use the HYDRA OPTION page, filtering the GPO functions to the chosen relay in a convenient I/O box and the opto return input to the relevant GPI function.

FIGURE 2 - MONITOR INSERT

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TALKBACK

Talkback facilities can be set up and activated through the monitor panel, shown in Figure 1.

The left hand side of the TFT panel, when in monitor mode can switch between viewing talkback selection and user memories from the button cell in the bottom left corner of the mode area, as shown in the adjacent illustration.

Live talkback routing

To toggle talkback, touch a destination in the left hand side of the touchscreen, below the words 'Live Talkback'. The talkback latches, allowing multiple destinations to be selected simultaneously.

Talkback groups

There are four talkback groups available which can be set up to allow multiple talkback destinations to be fed simultaneously with a single button press. These group controls are located in the middle row of control cells at the left hand side of the panel.

To set a talkback group's destinations, touch and hold the upper SEL button in the relevant control cell, then tap the required destinations on the touchscreen.

To toggle talkback to a group, press the lower TALK button in the relevant control cell.

Talkback level

The level of the talkback may be adjusted using the TB control.

Reverse Talkback

There are three reverse talkback inputs into the system. The level of these feeds may be adjusted using the RTB 1, 2 or 3 controls.

FIGURE 1 - TALKBACK CONTROLS IN MONITOR MODE

Patching talkback/reverse talkback inputs

Navigate to the MON TB MTR PATCH screen in the FIXED OPTIONS section of the main application as shown in Figure 2. Locate the physical input ports which will feed the talkback (this will be the port to which the talkback microphone is patched) and the reverse talkback inputs (these could be microphones in other areas of the facility).

With an input port selected, also select the desired input from the list on the right then touch the PATCH button.

The method for physically connecting the surface talkback microphone is covered in the Installation manual. The studio technician should be consulted if it is not clear where talkback sources are patched.

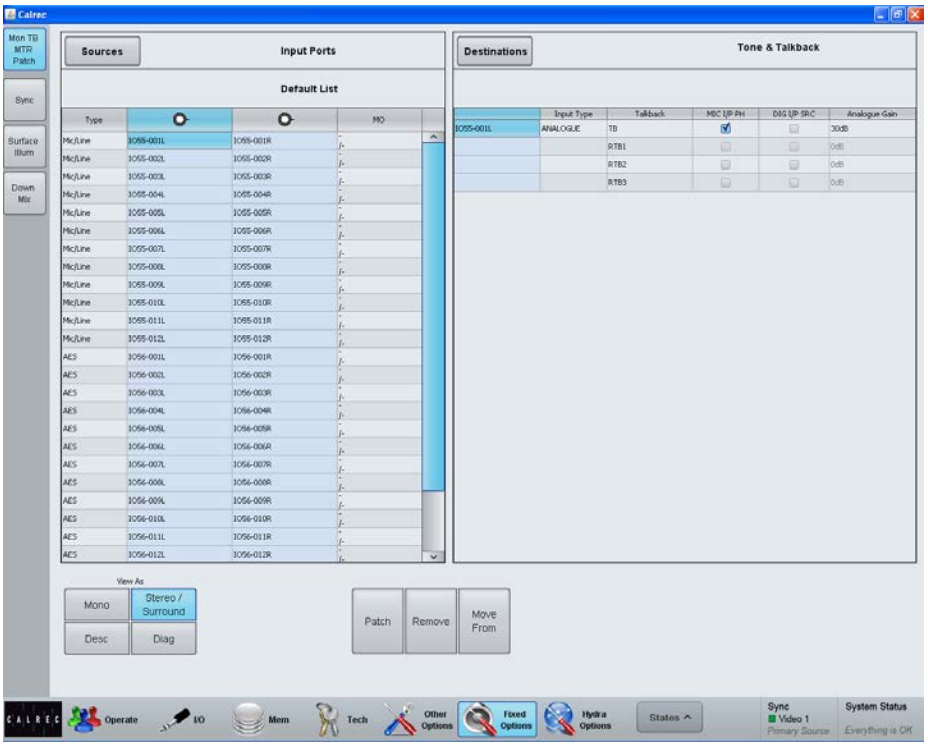
Microphone settings

When a microphone is patched to a talkback input, the mic may be provided with phantom power (analog inputs) or SRC applied (AES3 inputs) by checking the relevant box as shown in Figure 2. To adjust the gain of a microphone, the relevant 'Analog Gain' cell should be touched to bring up a dialog allowing selection of the desired gain.

Monitoring reverse talkback signals

In order to monitor reverse talkback inputs, the RTB bus must be patched to an output port where relevant loudspeakers are connected.

FIGURE 2 - TALKBACK INPUT PATCHING



MIX MINUS

Mix Minus is a system that allows a comprehensive mix to be sent to multiple listeners each receiving the complete mix, minus their own input.

Figure 1 shows an abstraction example of a mix minus system. Assume that the sources surrounded by a blue box represent people, either presenters or field reporters. The other sources may represent VT or server audio feeds.

These sources are fed to the input of eight channels on a console. Each channel has the option for it's signal to be sent to the console wide mix minus bus.

This mix minus bus can be routed back out to any sources that may require foldback, for example the presenters or field reporters. Each source would be fed the entire mix-minus bus signal, with their own contribution to that mix removed, creating an unique feed.

In Figure 1 the mix sent back to source 1 would consist of sources 2-8, source 2 would receive a mix of sources 1 and 3-8 and so on...

Why remove a source's input from its foldback mix?

Two reasons are presented here. The first relates to field reporters, or presenters in studios communicating via long distance systems such as satellite links.

The reporter would need to hear a mix of the show's audio in order to hear cues and communicate with the presenters. The inherent delay in these systems means that it may be a number of seconds before the audio reaches the reporter.

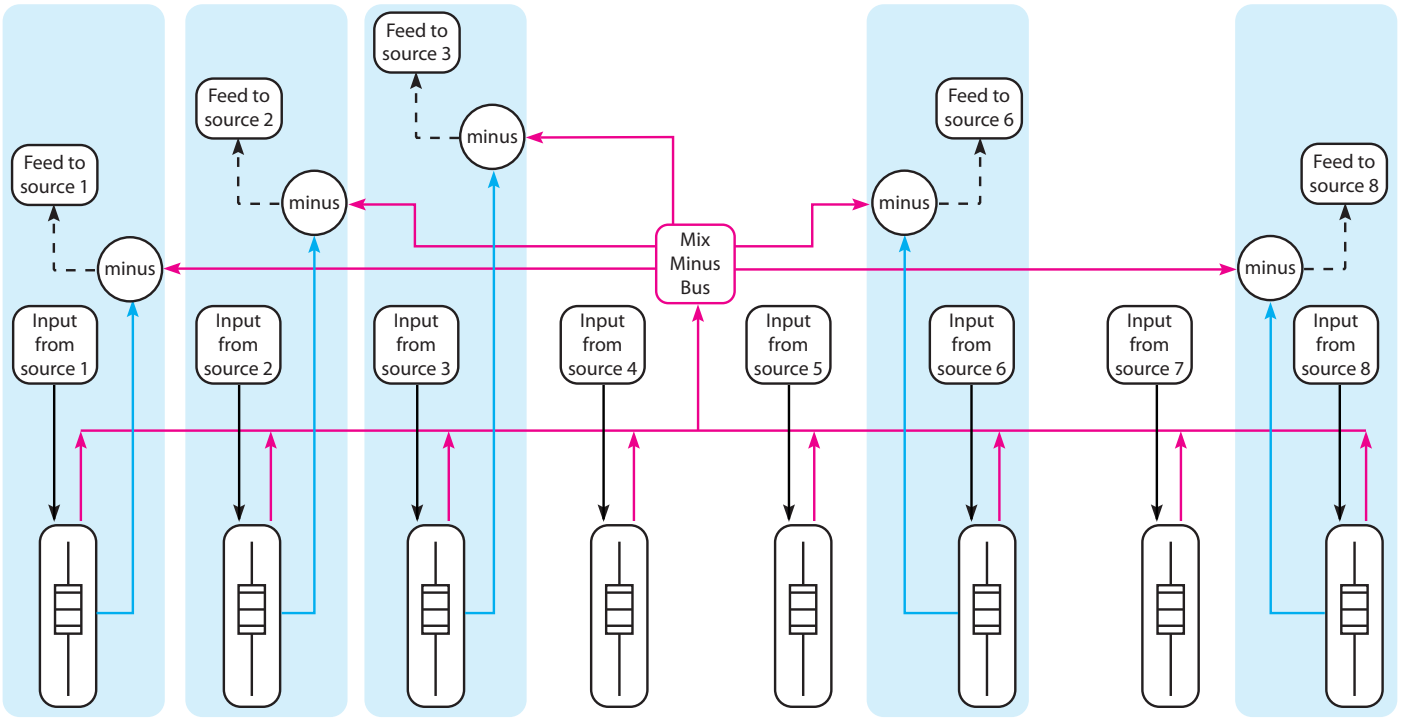
It can be very difficult to speak while hearing your own voice returned to you with even a slight delay. By using a mix minus feed to the reporter, their own contribution to the audio is removed before it is fed back to them eliminating this problem.

The second reason is to eliminate feedback. If a presenter's foldback was monitored on loudspeakers without subtracting their own contribution, some of their original signal may be picked up by the microphone again, thus creating a feedback loop. By using a mix minus system to remove the presenter's own contribution, this feedback loop is broken.

Sending signals to the mix minus bus

There is one mono mix minus bus, which is a global bus that any path can contribute

FIGURE 1 - MIX MINUS ABSTRACTION



to. To send a signal to this bus, first assign the chosen path and press the BUSS 1 button in SENDS-ROUTES mode as highlighted in Figure 2. Signals can be sent pre/post fade using the buttons to the left.

Assigning a direct output

Each path on the surface has a number of direct outputs associated with it. These direct outputs can be assigned to any output port which can then be used to feed the foldback back to that path's source.

To assign a direct output, use the I/O PATCH page in the I/O section of the main application. Touch the SOURCES button and select DIRECT OUTPUTS from the popup that appears. Select the fader where the source that is to be fed the mix minus signal appears. Press the DESTINATION button and select from the lists of output ports. Select an output port and then press PATCH.

For more details, including how to allocate direct out resources, please see the Direct Outputs section of this document.

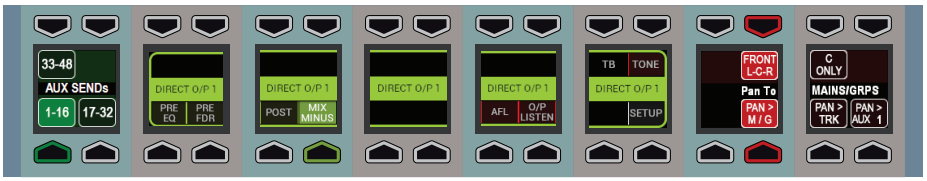
Monitoring a mix minus signal

Assign a path on the surface that is being fed by the source you wish to send a mix minus signal to. Select a Direct Output bus in SENDS-ROUTES mode by pressing the relevant rotary control. The bus selection area in the button cells will update to show the selected bus as shown in Figure 3. Press the MIX - button to route the mix minus signal to the selected Direct Output.

The mix minus signal sent to the required source will be the contents of the mix minus bus, with the source's contribution (if any) removed.

FIGURE 2 - SENDING SIGNALS TO THE MIX MINUS BUS

FIGURE 3 - MONITORING A MIX MINUS SIGNAL



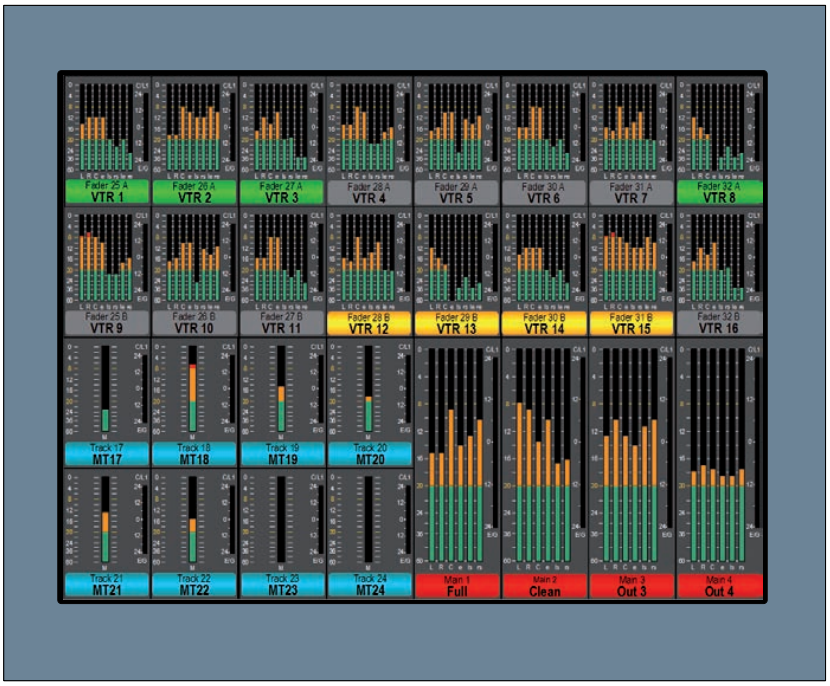
APOLLO
METERING

TFT METERS

The Apollo TFT meter layouts can be customized in several ways.

The figure on the right shows an example layout of a configured TFT meter. The TFT is divided up into a number of 'cells', each of which can be one of a number of sizes, and can display mono, stereo or surround meters. Paths that support dynamics also display gain reduction meters

EXAMPLE TFT METER LAYOUT



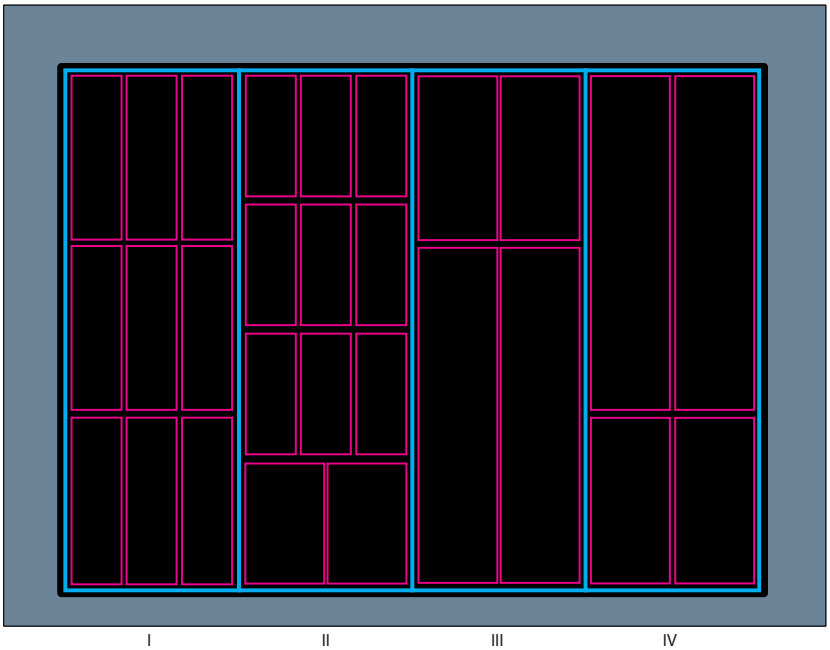
Meter cells
Each TFT meter is divided into four vertical sections as shown here.

Each of these sections can display two or three cells in the horizontal space, and three or four cells in the vertical space, providing a maximum of four rows of twelve grid sections on each TFT, 48 cells in total.

Cells can be combined vertically to create taller meters of half to two thirds of the screen height.

A vast range of meter cell designs can be created, but some arrangements have specific advantages. For example, to allow meters to line up with the faders on the panel below, use 2 meter cells across the width of each vertical section. In this layout there will be 8 meters across the width of the TFT screen.

VERTICAL AND HORIZONTAL METER SECTIONS



Meter layout

Meter configurations can be laid out and saved using the Main PC application. First select OTHER OPTIONS, then choose METER SETUP from the buttons on the left hand side. Meter configurations are saved as individual files. Shows remember the active meter configuration file but you can load an alternative meter configuration file at any time.

In most instances, there will be an existing meter configuration active on the console so before creating a new meter configuration go to SAVE AS or NEW and enter a file name for the new meter configuration that you are going to create to ensure that the original file is preserved.

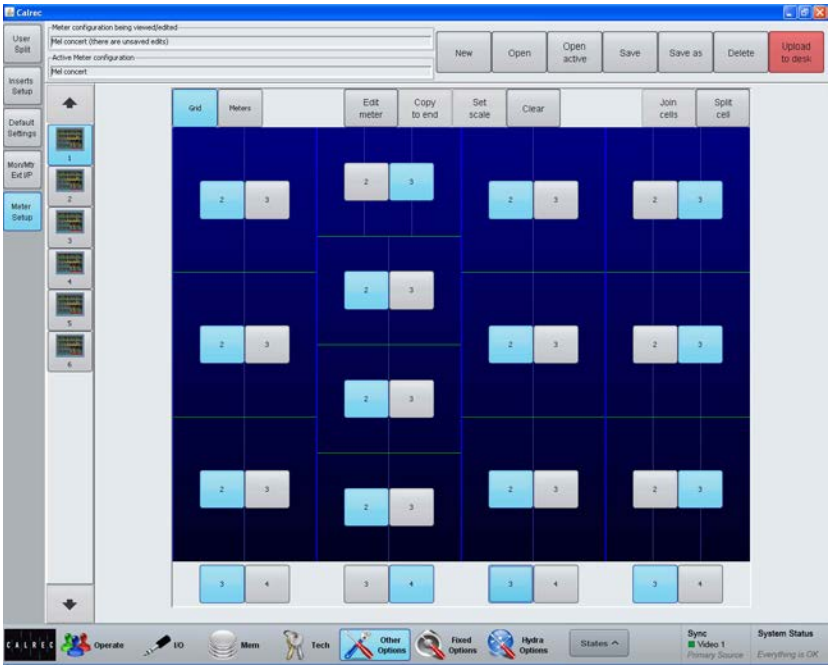
The Meter Setup screen shows thumbnail images of all available TFT panels in a column down the left hand side of the screen. Touch to select the TFT panel that you wish to edit and the main screen grid is populated with the settings for this panel.

The buttons along the top of the main meter setup window allow control of the configuration. Selecting GRID subdivides the window to show the current layout. The buttons at the base of each vertical section set the vertical cell division accordingly, e.g. selecting 3 splits the TFT so that there are 3 cells within the vertical space. Individual cells can be selected to have 2 or 3 cells horizontally using the number selection buttons within each cell.

Larger vertical heights can then be created by joining cells. To create meters higher than a third or quarter of the screen first select the METERS tab. Adjacent vertical areas of the same width can then be joined by touching the upper of the two cells to be linked, then touching JOIN CELLS. Combining ⅓ and ¼ height meters with 2 and 3 wide cells allows a vast range of alternative grids.

As soon as changes are entered, the file name within the text field at the top of the window carries a warning that there are unsaved edits associated with the file, and the SAVE button become active.

GRID CONFIGURATION



Meter assignment

Once the grid of meter cells has been defined, meters can be inserted into each cell. Select METERS at the top of the window, then either click on a meter cell and then click METER SOURCE at the top of the window, or press and hold/double click on the meter cell. These two methods both bring up the meter source selection pop-up window. Within the pop-up, selecting a source type from the buttons down the left hand side populates the main window with all available meter source options of that type. Some meter sources have sub options, such as choosing a loudness meter, or an A/B fader path meter. Once you have selected a meter source touch APPLY TO SELECTED to add that meter source and function to the selected meter cell.

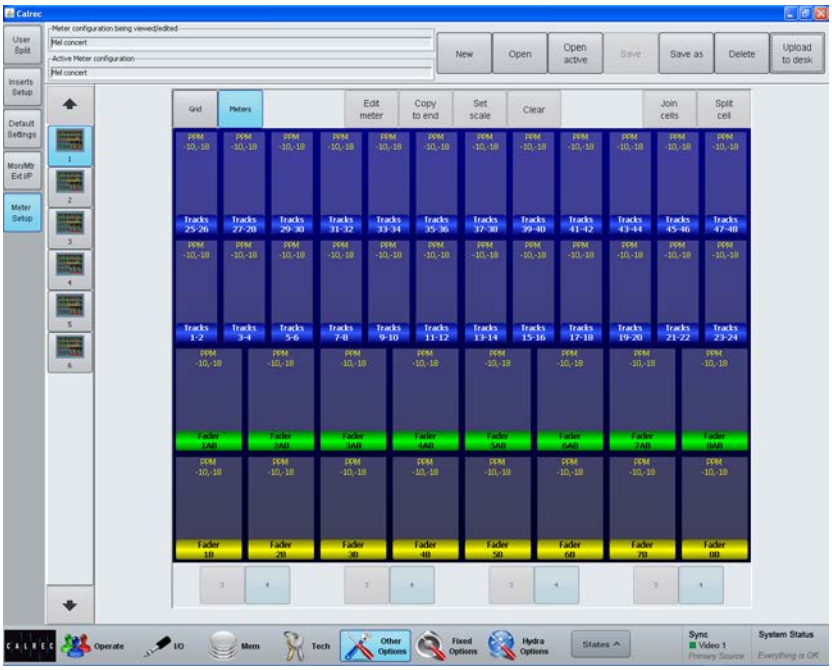
Alternatively, APPLY TO END OF ROW sets the selected cell to the assigned meter function and each cell to the right to the same type with an increment of one. For example, if the first meter was assigned to meter Track 1, the next would meter Track 2 etc. This is only the case when there are similarly sized unassigned meter cells to the right of the selected cell, and the meter function is part of a sequence of similar sources. If there are already some meters assigned in the row and you wish to incrementally overwrite these meters, click OVERWRITE TO END OF ROW.

All changes to TFT meter configurations are initially held in a buffer memory and are only applied to the console when UPLOAD TO DESK is touched. When available, this button will turn red.

Meter Scales

Each meter can be set either PPM or VU mode. PPM characteristics are fast attack and slow decay to show audible peaks. VU characteristics are slow attack and fast decay to show average level. There are three PPM scales, -8...-20, -10...-18 and -12...-20. The VU scale is -8...-20. Scale settings can be copied to adjacent similarly sized meter cells by choosing APPLY TO END.

METER ASSIGNMENT



Dynamics meters

Any meter for a path with dynamics processing will have a gain reduction meter displayed at the right hand side of the meter cell. The function of these meters is described in “Dynamics metering” on page 78. Dynamics meters can show either DYN1 or DYN2. This option is set from the surface by selecting TOOLS, and then METERS.

A/B path meters

Path meters can be selected to display only the A layer or only the B layer, or alternatively A/B layer meters can be chosen, which follow the currently active layer on the surface.

Meter labels and colors

The color bar beneath each meter relates to the coloring of paths used throughout the surface. Red corresponds to main paths, dark blue to tracks, green to auxes, light blue to groups and so on. A and B path colors correspond to the A and B path selector buttons above the faders which are green and yellow respectively.

The labels under each meter display the fader label, port description and port name in priority depending on which have been set.

Meter Selectors

There are four meter selectors available which can be accessed from the wild assign row of any panel in MONITOR mode, labelled MTR1 - 4. Meter selectors allow quick access to four meters which can be either internal or external to the console. The output of these meter selectors can be displayed on up-stand TFT meter panels or can be patched to any Hydra2 audio port to feed:

- A non-TFT meter within the console, such as the DK/RTW surround meters.
- External meters outside of the console
- Anywhere you want to feed a selectable audio source.

Selecting a meter selector to display on the up-stand TFT is done as normal from OTHER OPTIONS>METER SETUP. MTR1-4 are located within the OTHER meter source menu. Patching the meter selector output to an audio output is done from FIXED OPTIONS>MON TB MTR PATCH, select Ext Meter Outputs from the sources list.

Meter selectors are available in the lower button cells when in the Monitor panel mode. They function in the same way as the Monitor pre-selectors - press SEL to make the chosen selector the focus of the TFT panel above from where a bus can be chosen as the source for the selected meter.

As well as for selecting sources, the TFT screen in this panel mode also has a MISC page from where it is possible to send tone to the external meter or put the meter in M/S mode.

METER SELECTORS

FADER & DYNAMICS METER SETTINGS

Some additional up-stand TFT meter settings can be selected from any panel's Layers row, TOOLS>METERS menu, as shown on the right.

Fader meters

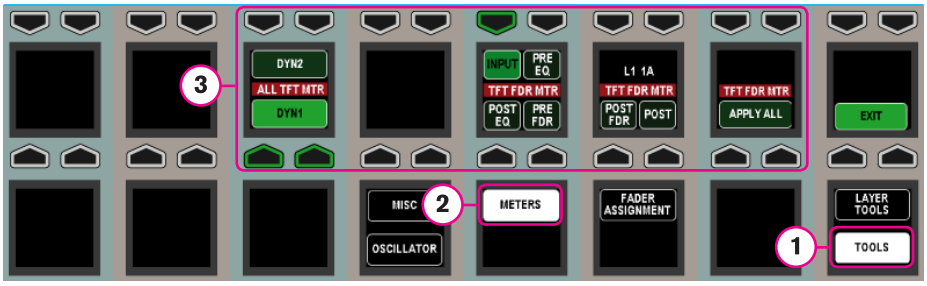
Up-stand metering displaying audio on fader paths can be selected to display audio from various points within the path's signal flow. Change the currently assigned fader's meter simply by pressing a selection button from the TOOLS>METERS menu. Change multiple fader meters by holding the selection down and then selecting the desired faders by pressing their fader assign buttons. Press and hold APPLY ALL, and then choose a signal path point selection to change all fader meters across the surface, or within the user split. The meter's label will display the point from which the audio is being accessed.

Dynamics meters

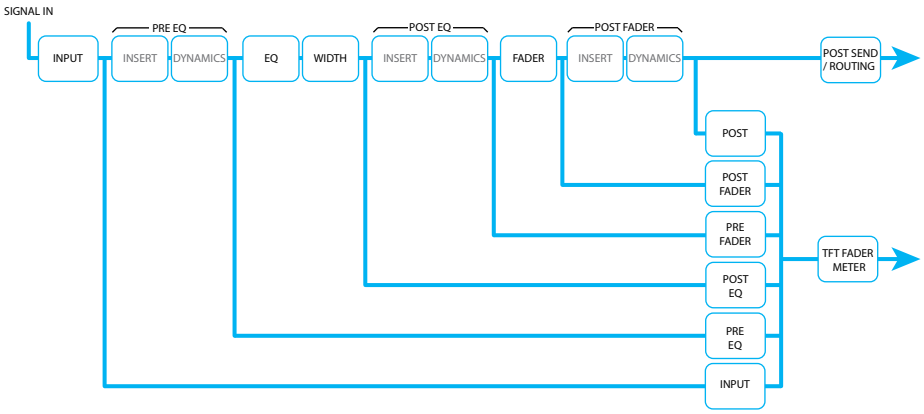
The dynamics meters located to the right of channel, group and main meters can be configured to show the first or second dynamics units.

To do this, touch the TOOLS button on the layers row. The Layers row will update to display various meter setup options. Pressing the buttons above UPSTAND DYNAMICS 1 or UPSTAND DYNAMICS 2 will change all relevant TFT meters to display the selected information.

TOOLS>METERS - CONTROL SURFACE METER OPTIONS



PATH SIGNAL FLOW & TFT FADER METER SELECTION POINTS



EXTERNAL METER OUTPUTS

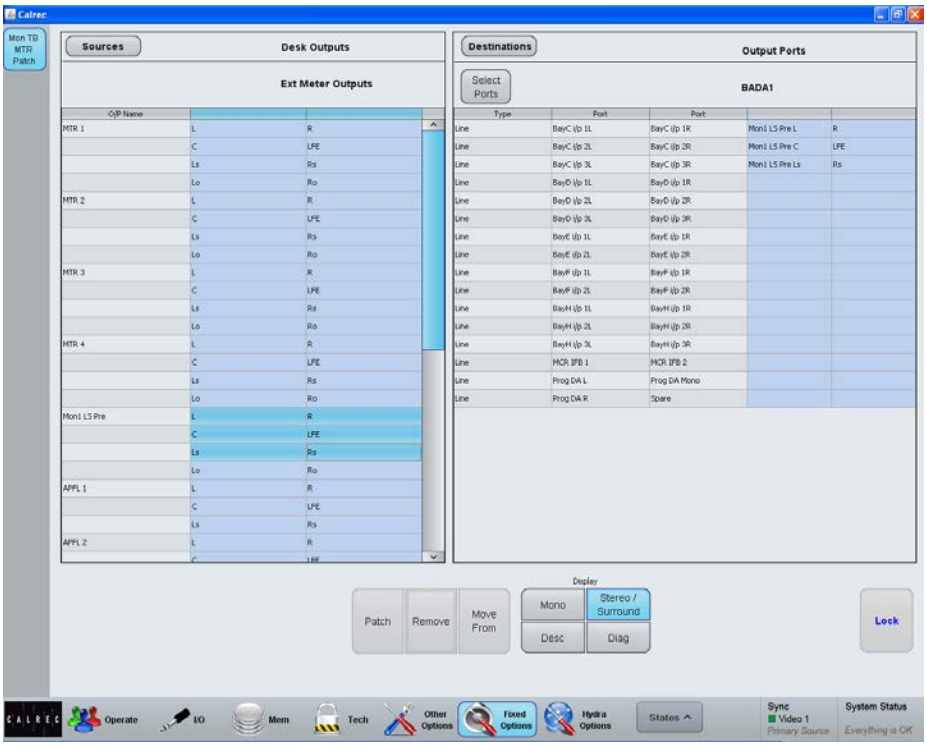
External meters can be fed by the Apollo metering system in a similar way to loudspeakers.

Navigate to the MON TB MTR PATCH screen in the FIXED OPTIONS section of the main application as shown in Figure 1. Touch the sources button at the top of the screen and choose EXT METER OUTPUTS from the popup window that appears.

Find the port to which the external meters are connected in the list of ports on the left of the screen. If you are unsure where any meter are physically connected, contact your installation technician.

With the destination port selected, choose a source to feed the meter and then touch the PATCH button.

FIGURE 1 - EXTERNAL METER PATCHING



LOUDNESS METERS

Loudness meters provide a way to monitor and regulate average loudness levels over the duration of a program.

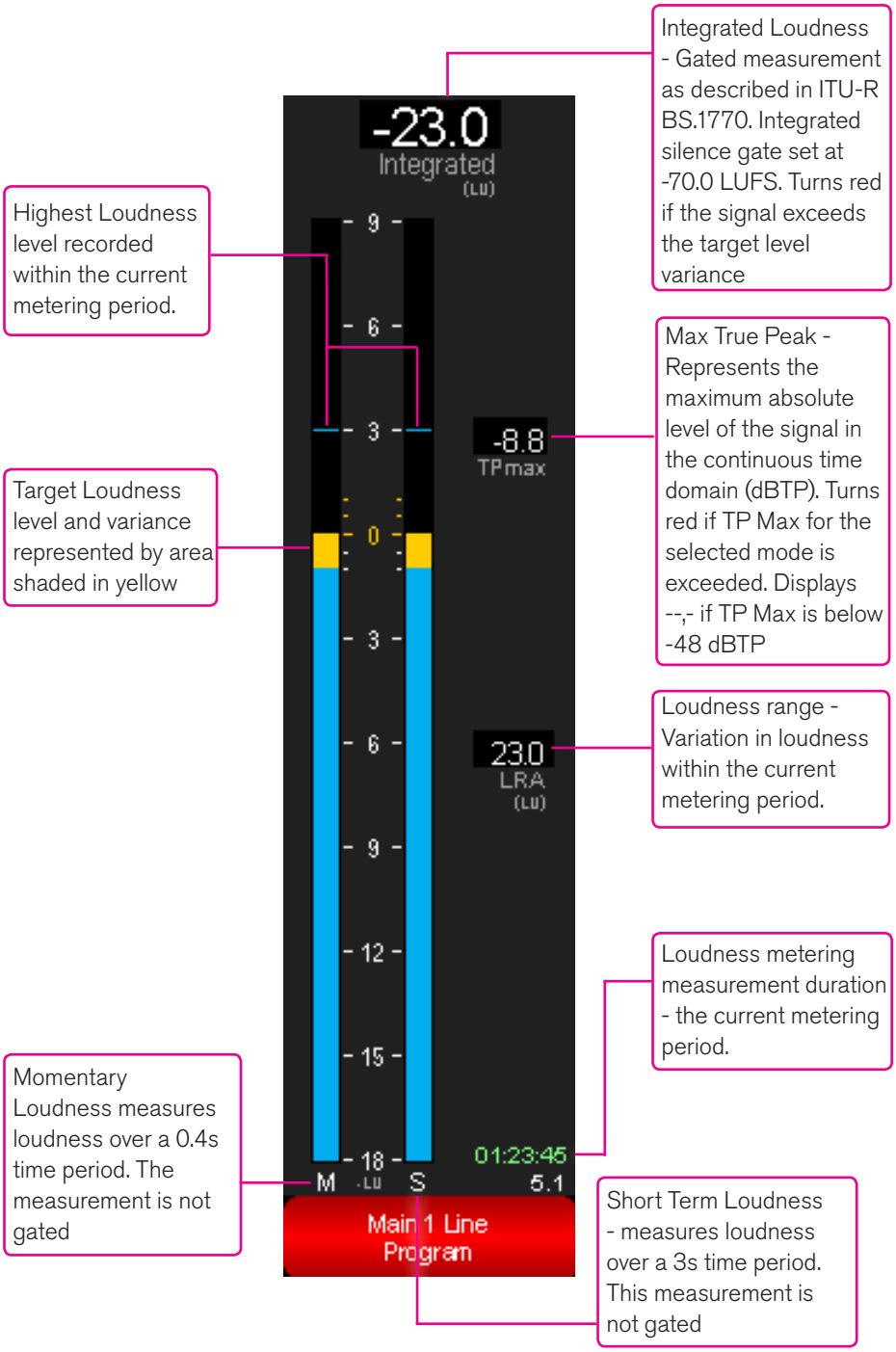
16 loudness meters are available to freely assign to any source or output. Loudness meters can be assigned to TFT meter panels using the method described within "TFT Meters" on page 140. The Meter Setup screen in the Main application displays how many loudness meters are available at any time.

Loudness Metering Modes

There are four loudness metering modes available on the console, the details of which are displayed in a table on the following page. The loudness meter mode is set globally for the console; select OTHER OPTIONS, then MISC SETTINGS within the main PC application and select a metering mode from the button selector. An appropriate loudness metering scale can also be set from this screen, which alters the scale of all loudness meter bar graphs - the example shown on the right is displaying EBU mode with +9...-18 LU scale.

Loudness meter modes relate to standards set by organizations in different geographical regions. EBU (European Broadcasting Union) relates to Europe, ATSC (Advanced Television Systems Committee) to North America and ARIB (Association of Radio Industries and Businesses) to Japan. These are currently the main standards and are being widely adopted in other geographical regions.

LOUDNESS METER - DESCRIPTION OF COMPONENTS



Integrated Loudness - Gated measurement as described in ITU-R BS.1770. Integrated silence gate set at -70.0 LUFS. Turns red if the signal exceeds the target level variance

Highest Loudness level recorded within the current metering period.

Max True Peak - Represents the maximum absolute level of the signal in the continuous time domain (dBTP). Turns red if TP Max for the selected mode is exceeded. Displays --,- if TP Max is below -48 dBTP

Target Loudness level and variance represented by area shaded in yellow

Loudness range - Variation in loudness within the current metering period.

Loudness metering measurement duration - the current metering period.

Momentary Loudness measures loudness over a 0.4s time period. The measurement is not gated

Short Term Loudness - measures loudness over a 3s time period. This measurement is not gated

- The current metering period refers to the period since the meter(s) were last reset.
- A gated measurement is calculated ignoring signals below the gate threshold.

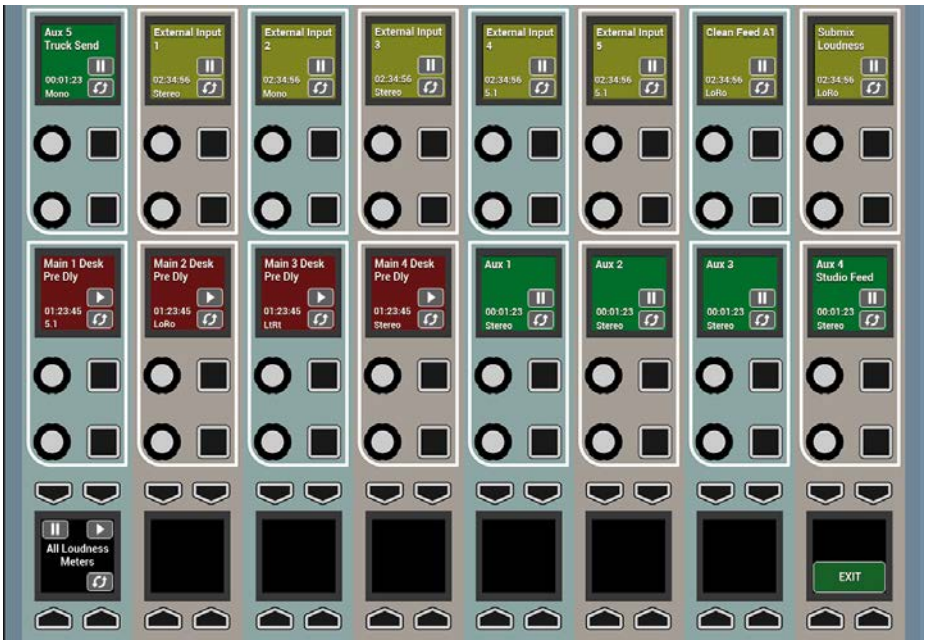
Controlling Loudness Meters

Once Loudness meters have been set up in the Main application, controls for each Loudness meter can be accessed from the surface.

In the Layers row of any panel, select TOOLS, then METERS. The top section of the top right hand button cell on the functions row shows the LOUDNESS option. Pressing this puts that panel into Loudness Meters mode and populates the Wild Assign panel control cells with individual controls to start, pause and reset each individual loudness meter. The path width, path label and time since last reset are also displayed.

As well as individual control cells for each meter, there is a global control cell within the wild assign row which starts, pauses and resets all loudness meters together. This global control cell is duplicated on the Monitor/Spill panel.

LOUDNESS METER CONTROLS



- Loudness meter controls shown within the wild assign row and the bottom row of the wild assign panel

Start Loudness Meter

Pause Loudness Meter

Reset Loudness Meter

LOUDNESS METERING MODES

	Scale	Target Loudness	Target Variance	Max True Peak	Relative Gate
EBU Mode	+9...-18 LU (EBU +9 relative) +18...-36 LU (EBU +18 relative) -14...-41 LUFS (EBU +9 absolute) -5...-59 LUFS (EBU +18 absolute)	0LU (-23 LUFS)	+/- 1LU	-1 dBTP	-10.0 LU
ATSC A/85: 2011 (BS1770-1)	+9...-18 LU (+9 relative) +18...-36 LU (+18 relative) -15...-42 LKFS (+9 absolute) -6...-60 LKFS (+18 absolute)	0LU (-24 LKFS)	+/-2 LU	-2 dBTP	N/A
ATSC A/85: 2013 (BS1770-3)	+9...-18 LU (+9 relative) +18...-36 LU (+18 relative) -15...-42 LKFS (+9 absolute) -6...-60 LKFS (+18 absolute)	0LU (-24 LKFS)	+/- 2LU	-2 dBTP	-10.0 LU
ARIB TR-B32	+9...-18 LU (+9 relative) +18...-36 LU (+18 relative) -15...-42 LKFS (+9 absolute) -6...-60 LKFS (+18 absolute)	0LU (-24 LKFS)	+/- 1LU	-2 dBTP	-10.0 LU

APOLLO
SHOWS AND MEMORIES

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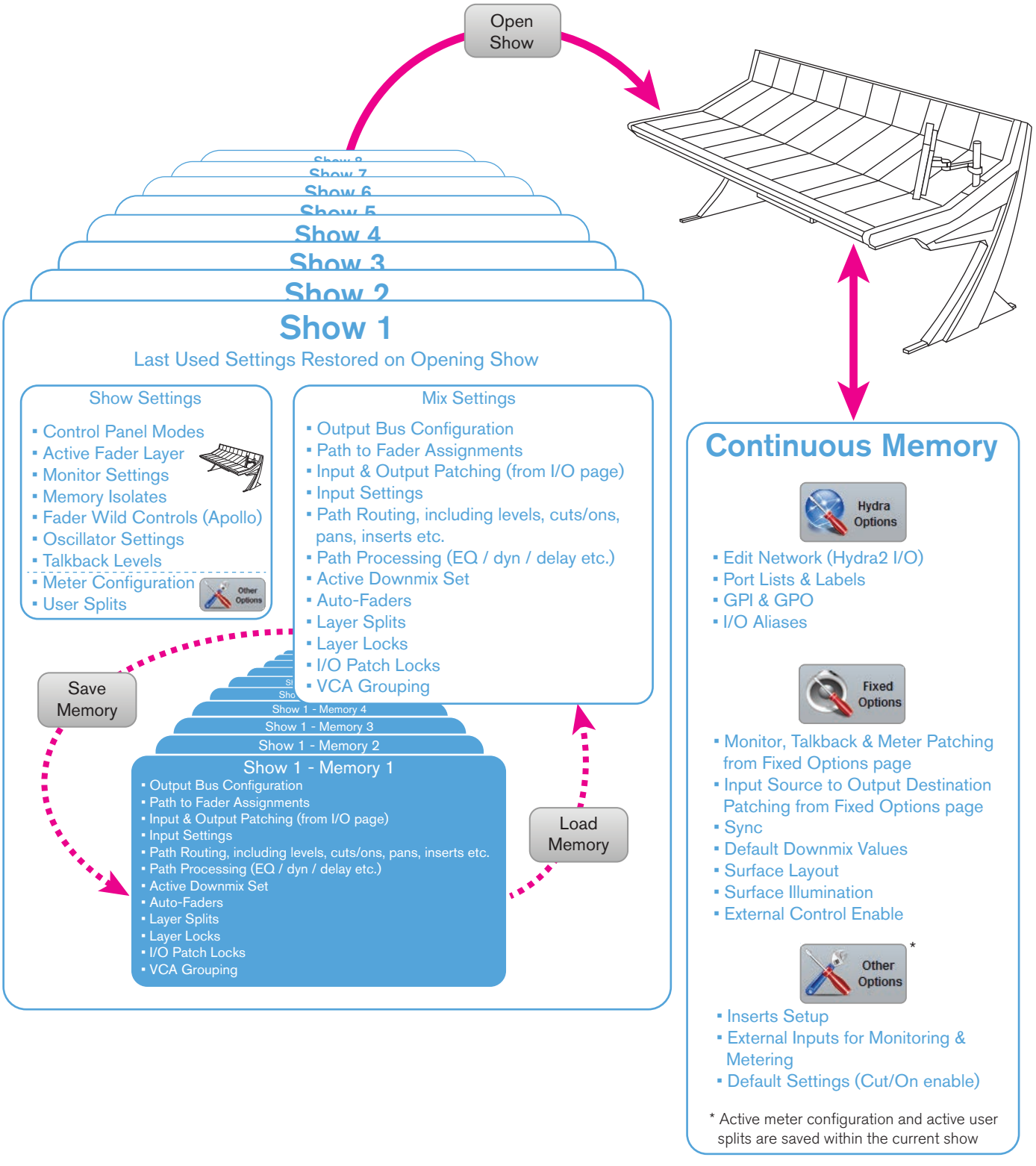
Putting Sound in the Picture

SHOWS, USER MEMORIES, ACTIVE OPTIONS FILES AND CONTINUOUSLY SAVED CURRENT SETTINGS



User memories can be thought of as snapshots - a way of recording the current settings at any given time for later recall. Apollo user memories are organized within "Shows". Multiple Show files can be created, each containing their own set of user memories.

All current settings are continuously saved, allowing the console to boot up in its' previous state after power loss or reset.

Shows do not need to be manually saved; when a show is opened, console settings automatically revert to how they were when the show was last in use.

User memories can be saved within each show to retain mix settings and configuration, such as path to fader assignments, input & output patching, path routing & levels, and signal processing (see diagram opposite for more comprehensive list). The current settings of all the parameters that can be saved to a user memory are continuously saved to a "hidden" user memory within the show.

When a show is opened, (either manually or on boot up), it is the hidden user memory that is loaded, presenting the last used settings, NOT the last saved settings.

Although the console can be used without ever saving a user memory, it is good practise to save known good setups in order that they can be reverted to in the event that parameters get changed by accident, by other users, or to clear any ad-hoc temporary changes that have been made during operation.

Shows provide organization of user memories. Rather than having to search through a long list of varied memories, consolidating similar memories into shows makes them easier to search and to manage. It may help to create a show for each type of production, e.g. "Morning News", "Football", "Chat Show" "Music" etc. Before saving multiple memories within a show, it is good practise for a single setup to be built, tested, and saved as the default memory for the show. During setup, there are likely to be changes and additions required - working with a single default memory is more manageable than having to make changes to multiple memories. Once the core setup is proven, and requirements for changes are less frequent, the default memory can be used as a template for customization, and variations can be saved with different names.

New shows that are similar to existing ones can be created by choosing to Save Show As. This effectively makes a copy of the show, including the user memories within, so that it does not have to be built from scratch. Any unwanted user memories within the new show can then be deleted.

In addition to the settings that are saved within user memories, (and the hidden, continuous user memory), some other settings are maintained within each show. The most obvious and visible of these is often the active meter layout on the console up-stand which can be different for each show. Other settings that can change on the opening of a show file (and are not part of user memories) are: The mode of control panels on the surface, the currently active fader layer, monitoring settings, the parameters assigned to fader wild controls (Apollo only), memory isolates (settings that have been blocked from changing on user memory load), oscillator settings (level, frequency, idents), talkback levels and any active user splits.

These show based settings are not manually saved. On the opening of a show file, the settings are restored as they last were the previous time the show was open.

Meter layouts and User split configurations are actually saved as separate, independent files. Each show saves a reference to which file it is using. This allows multiple shows to use the same settings without having to build them for each, and allows for configuration changes to automatically apply to all shows using them.

Other settings are not saved as part of shows or their user memories and as such will not change when opening shows or loading memories. Like all other settings, however, they are saved as part of a continuous memory, ensuring they are restored from power on or reset. These include all of the settings that are applied from the Hydra Options and Fixed Options pages of the Main PC Application, as well as some of the settings applied from the Other Options page (See diagram opposite).

Shows, memories, and other options files are saved on the primary and secondary controller cards fitted in the console's processing rack. The number of show and memory files that can be saved is dependant upon the amount of available storage space on the controller cards, which is displayed on the Memory Load / Save page of the Main PC Application. The size of each show / memory file depends upon the amount of console resources being used. Shows and Memories can be backed up from the controller cards to the console PC HDD, or an external storage device connected to the up-stand USB port.

USING SHOWS AND MEMORIES

Shows and memories are managed from the console's Main PC Application, MEM screens.

The upper section of the MEM>LOAD/SAVE screen (as shown in the screenshot to the right) displays the name and details of the currently active show that is on the control surface. The lower section of the screen displays a list of the user memories available within the current show. The central area of the screen displays two text fields in between the user memory Load and Save buttons - the upper, white, text field displays "Last Loaded Memory" or "Last Saved Memory" depending on the most recent memory operation, I.E. this text field always displays the current working user memory on the control surface. The lower, blue, text field displays the memory selected, if any, from the available memory list - This is the memory that will be loaded if the Load button is pressed, and the default save (overwrite) location if the save button is pressed. Shows and memories are saved on the controller card in the console's processing rack.

Note, the "Capacity Used" bar-meter, below the memory list, shows the amount of space available on the controller card for storing Shows and Memories, however, the controller card memory is also used for other files and folders and so the capacity may vary.

Creating a new show

Press the NEW SHOW button in the top left corner of the MEM>LOAD/SAVE screen to open the new show dialog. You are required to select a default show template from the list, upon which the new show will be based, and to enter a name, along with some other labelling by which the new show will be identified. With valid labels entered and a template selected, press OK to create the new show and to make it active on the control surface.

Opening an existing show

Press the OPEN SHOW button to bring up a list of all the shows currently present on the console's controller card. Select a show from the list to highlight it and then press LOAD to make the chosen show active on the console, bringing it up in its' last used state, and making its' user memories available for loading.

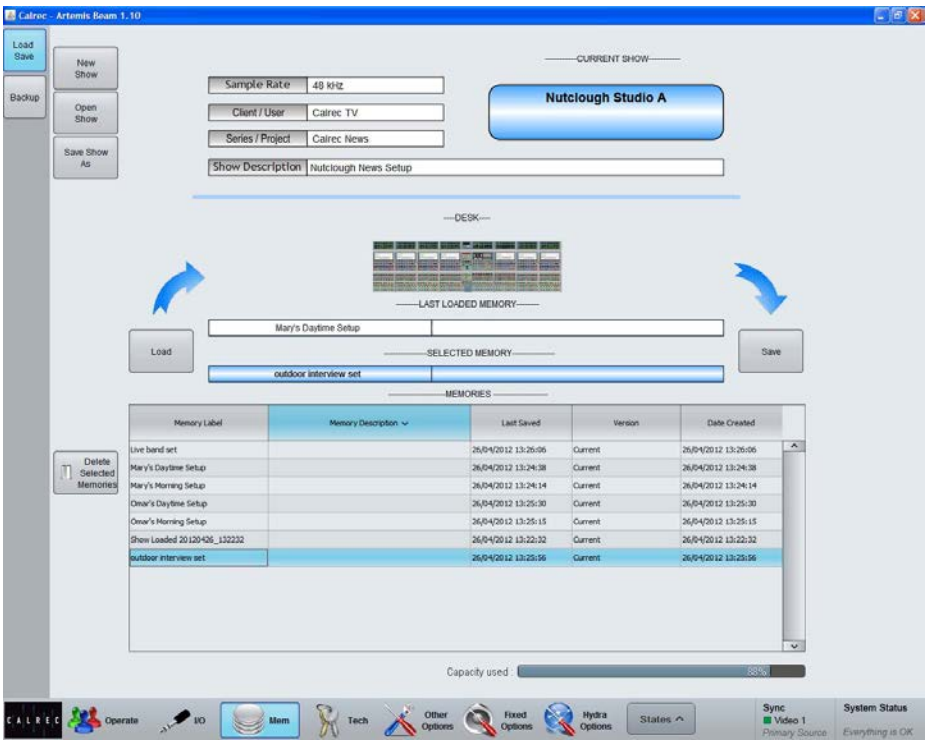
Saving / duplicating shows

Shows do not need to be manually saved; they are continuously saved automatically and always open in their last used state. Pressing the SAVE SHOW AS button allows the show to be duplicated, under a new name, allowing a new show to be created based upon settings saved under an existing show. The new show will contain copies of all the user memories contained in the original which can then be edited or deleted as required.

Creating and editing default shows

Users logged in to the Main PC Application as technicians (From the Tech screen) have the ability to convert or save existing shows as defaults, making them available as templates for new show creation. Selecting CONVERT TO DEFAULT removes the show from the Open Show list, and places it in the New Show templates list. The SAVE SHOW AS dialog, when logged in as technician, provides the option to save the show as a default, making a copy available in the New Show template list whilst leaving the original available to open from the Open Show list. Default show templates contain copies of all the user memories from the original. Default shows cannot be edited without logging in as a technician, therefore saving a show as a default is a method for making a backup that is protected against unauthorized or accidental changes. Users logged in as technicians also have the ability to open default shows from the OPEN SHOW dialog. Any changes made to the default show whilst it is open will be maintained within the default when it is used as a template for new show creation, allowing technicians to change settings and add or remove user memories from default templates. The factory standard Calrec default show template cannot be opened

CONSOLE MAIN PC APPLICATION>MEM>LOAD/SAVE SCREEN



or edited. If a default show is open and the user logs out of technician status, the default show will be closed, and the console will revert to the previously used show file. Technicians should not leave the system logged in to prevent unauthorized changes to default templates.

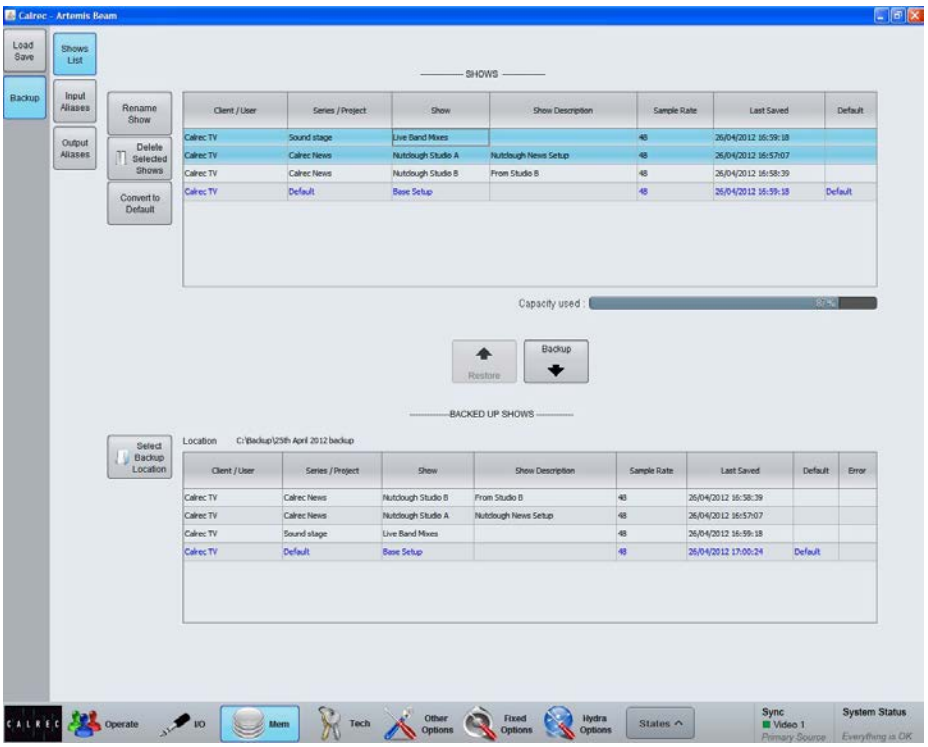
Backing up shows and memories
Shows, and the memories within them can be backed up from the console controller card to the console PC HDD, or a USB drive connected to the console's upstand USB port.

The screenshot on the right shows the console's Main PC Application MEM>BACKUP screen. The list in the upper half displays all the shows currently available on the controller card. The list in the lower half of the screen displays all the shows available in the currently selected backup location. Press SELECT BACKUP LOCATION to choose a folder on the PC HDD, or on a USB drive to make the backups to. It is recommended that dedicated folders are used for backups - When the backup location is changed, the chosen folder is scanned to locate any existing backups. If the folder contains lots of files, it can take some time to scan. New folders can be created from the SELECT BACKUP LOCATION dialog.

Shows can be backed up individually or in multiples. Select the show(s) to backup from the upper list by clicking on them to highlight. Highlight multiple shows individually by holding down the keyboard control key whilst clicking on each, or highlight the first required, then hold shift whilst clicking on the last required to select a group. Press the BACKUP button to copy the selected shows to the desired location.

Restoring shows and memories
Previously backed up show files can be restored back to the console's controller card using a similar process. Press SELECT BACKUP LOCATION to browse to the PC HDD or USB folder containing the show files. Highlight the required show file(s) from the Backed Up Shows list in the lower portion of the screen and then press RESTORE.

CONSOLE MAIN PC APPLICATION>MEM>BACKUP>SHOWS LIST SCREEN



Each backed up show file also contains a copy of the options files they link to for meter layout and user split configuration. Upon restoring a show, if an options file has changed since the show was backed up, the user is presented with the option to use the backed up version of the options file by renaming it. The restored show will automatically link to the restored version of the options file. Choosing DO NOT RESTORE THE CONFLICTING FILE allows the restored show to link to the newer version of the options file already on the console.

Deleting shows
Show files can be deleted from the MEM>BACKUP>SHOWS LIST screen. Highlight the shows to be deleted from the console's shows list in the upper portion of the screen and press DELETE SELECTED SHOWS. Note, default show templates are visible in this list, but can only be deleted by users logged in to the Main PC Application as Technicians.

Renaming shows
The same MEM>BACKUP>SHOWS LIST screen can be used to rename show files located on the console. Highlight the desired show in the console show list and press RENAME SHOW.

Saving user memories

To save a snapshot of the current mix settings (see Shows and Memories Overview) within the current show, press the SAVE button located on the right hand side of the MEM>LOAD/SAVE screen. The Save Memory dialog offers the option to SAVE AS NEW, to create a new memory file, or to OVERWRITE, replacing the currently selected memory. **Note**; the currently selected memory is the memory highlighted in the available memories list - it is not necessarily the last loaded or saved memory. Before overwriting a memory, it is important to select the correct one from the list before pressing SAVE. The current selection is displayed within the save dialog to allow confirmation before overwriting.

Loading user memories

To recall a previously saved snapshot of mix settings, select a file from the memories list on the MEM>LOAD/SAVE list and press LOAD.

Backing up and deleting memories

Memories can be deleted from a show by highlighting them in the memories list on the MEM>LOAD/SAVE screen and pressing DELETE SELECTED MEMORIES. Note, multiple memories can be highlighted by holding the shift or control key whilst clicking on them. Memories are not backed up individually, but as part of the show. See backing up shows and memories on the previous page.

Ordering the memory list

The order in which memories are displayed within the list can be filtered by any of the columns by clicking on their headers. A small arrow next to the column header label shows the current filtering. Click on the Memory Label header to ensure they are in alphabetic order by name.

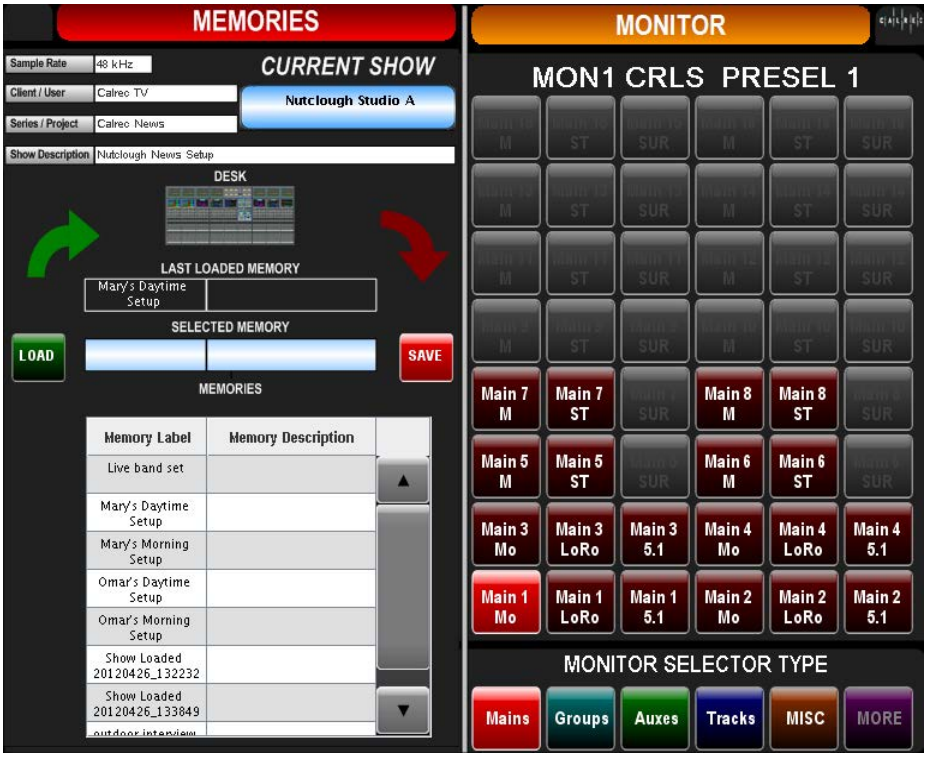
Memory load / save without the PC

To reduce reliance on the system PC, and to increase control from various physical positions along the control surface, user memories can also be loaded and saved from control panels as well as the PC. The left hand side of the TFT screen of any panel in Monitor mode can switch between displaying talkback selection functions and a memory screen. The button cell in the bottom left corner of the Monitor mode panel area switches the TFT screen above for these functions.

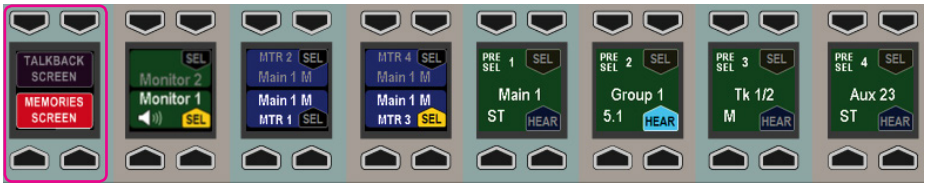
Transferring Shows/Memories between Consoles

User shows / memories can be transferred between mixing consoles of the same type and size, for example, an Apollo User Memory can be transferred to another Apollo surface with the same number of faders.

CONTROL SURFACE TFT DISPLAY OF PANEL IN MONITOR MODE>MEMORIES



CONTROL SURFACE PANEL IN MONITOR MODE - MEMORIES SCREEN SELECT



MEMORY SEQUENCING

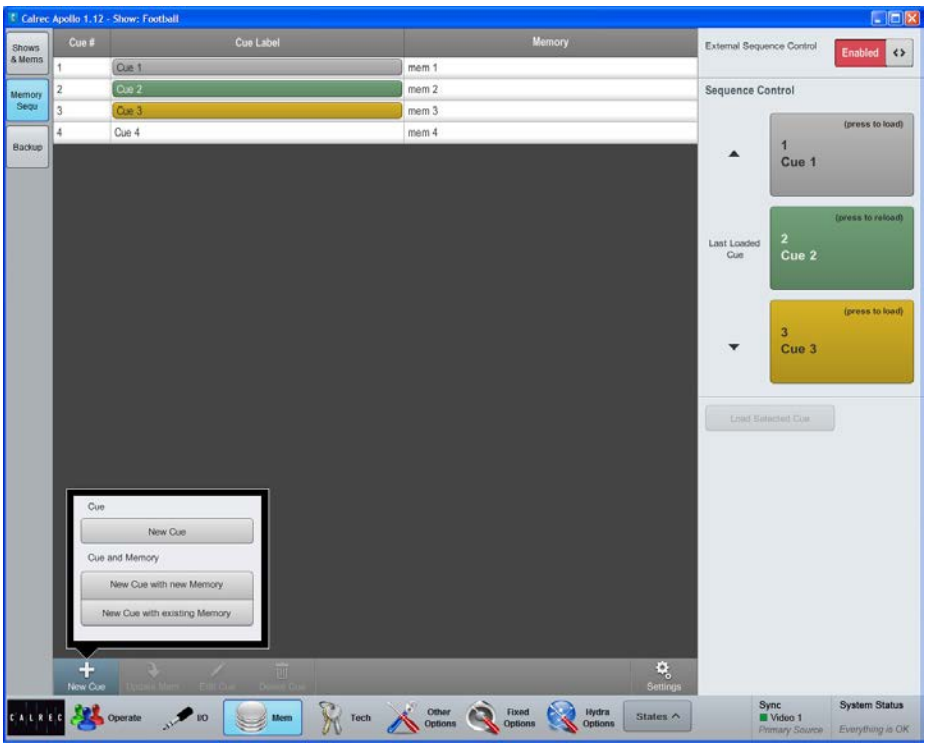
The Main PC Application's Mem>Memory Sequ screen allows for user memories to be stacked in order to be able to recall them in sequence.

Each user memories is added to the sequence list as a "Cue". To add a cue to the list, click the "New Cue" button at the bottom of the screen. Selecting "New Cue" puts a place-holder into the list which can be later edited to add a user memory. Selecting "New Cue with new Memory" will save the current console settings as a user memory and add it to the cue list. This memory also becomes available to load from the standard Shows & Mems list like any other memory. Selecting "New Cue with existing Memory" allows the user to choose a pre-saved user memory from the current show to add to the cue list.

Items in the cue list are color-coded as green for current, yellow for next and gray for previous. Memories in the sequence can be loaded onto the control surface using the buttons on the right hand side of the screen.

The "Update Mem" button at the bottom of the screen can be used to overwrite any memory in the cue list with the current settings on the control surface. Note, this does not replace the cue with a new memory (as with New Cue>New Cue with new Memory), instead it overwrites the memory location being addressed by the cue. This is in essence the same as saving the memory from the standard Shows & Mems page. As with all memory saves, care should be taken to ensure the intended memory is being overwritten with the correct settings and that it will not unduly affect other users. Any changes made to memories by saving from the Shows & Mems page will automatically affect them when they are loaded from the sequence screen - cues do not need updating to "refresh" the memory.

MAIN PC APPLICATION, MEM>MEMORY SEQU SCREEN



Cues can be edited or removed by clicking the Edit Cue or Delete Cue buttons at the bottom of the screen.

Remote control

The load next and load previous cue commands can be triggered remotely, via GPI. The "General Functions" list from the Hydra Options>GPI screen contains "Next Cue" and "Prev Cue" entries which can be assigned to GP inputs.

A slider control (touch/click and slide left or right to change status) in the top right corner of the Memory Sequ screen enables or disables GPI remote control over this functionality.

OPTION FILES

Some of the settings made from the Main PC Application's Other Options page are saved as separate files. Shows contain links to the files that are active within them so that they are automatically loaded when a show is opened.

Upstand meter layout, and user split configurations are saved in this way, allowing their configuration to be used by multiple shows, rather than having to build them for each. If one of these options files is edited, all shows using them will reflect the changes.

When a show is backed up, a copy of the current options files are also saved. Upon restoring a show, if the options files used by the show have changed since its backup, the user has the option to rename the backed up version of the options file. The restored show will then automatically link to the backed up version of options. Choosing DO NOT RESTORE CONFLICTING FILE disregards the backed up options file, causing the restored show to use the newer options file already on the console.

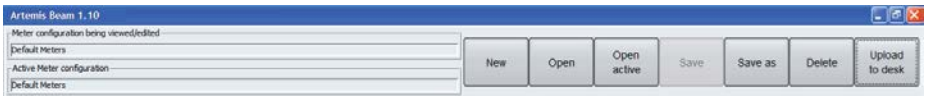
Using options files

Main PC Application screens whose settings are saved to separate options files display the menu controls shown on this page.

The lower, ACTIVE text field displays the name of the option file currently loaded into the system. The VIEWED/EDITED text field displays the name of the file currently being displayed on the screen.

Press OPEN ACTIVE to display and edit the settings currently on the console surface. Press the OPEN button to view and edit other saved options files.

MAIN PC APPLICATION OPTIONS FILES MENU



After editing, press SAVE to overwrite the original file, or SAVE AS to create a new file. Press LOAD TO DESK to make the editing file the active one for the current show. The active options files within a show are automatically recalled when a show is opened.

MEMORY ISOLATION

Memory isolation allows certain paths and ports to have all or some of their settings protected from any memory load operations.

Isolate settings are stored in the continuous memory of each show, therefore each show may have different isolate settings.

Basic path isolation

Paths may be isolated using the MEM ISO button in the button cells above each fader as shown in Figure 1. With this function selected on a fader, the paths on that fader will keep their current settings when a new memory is loaded.

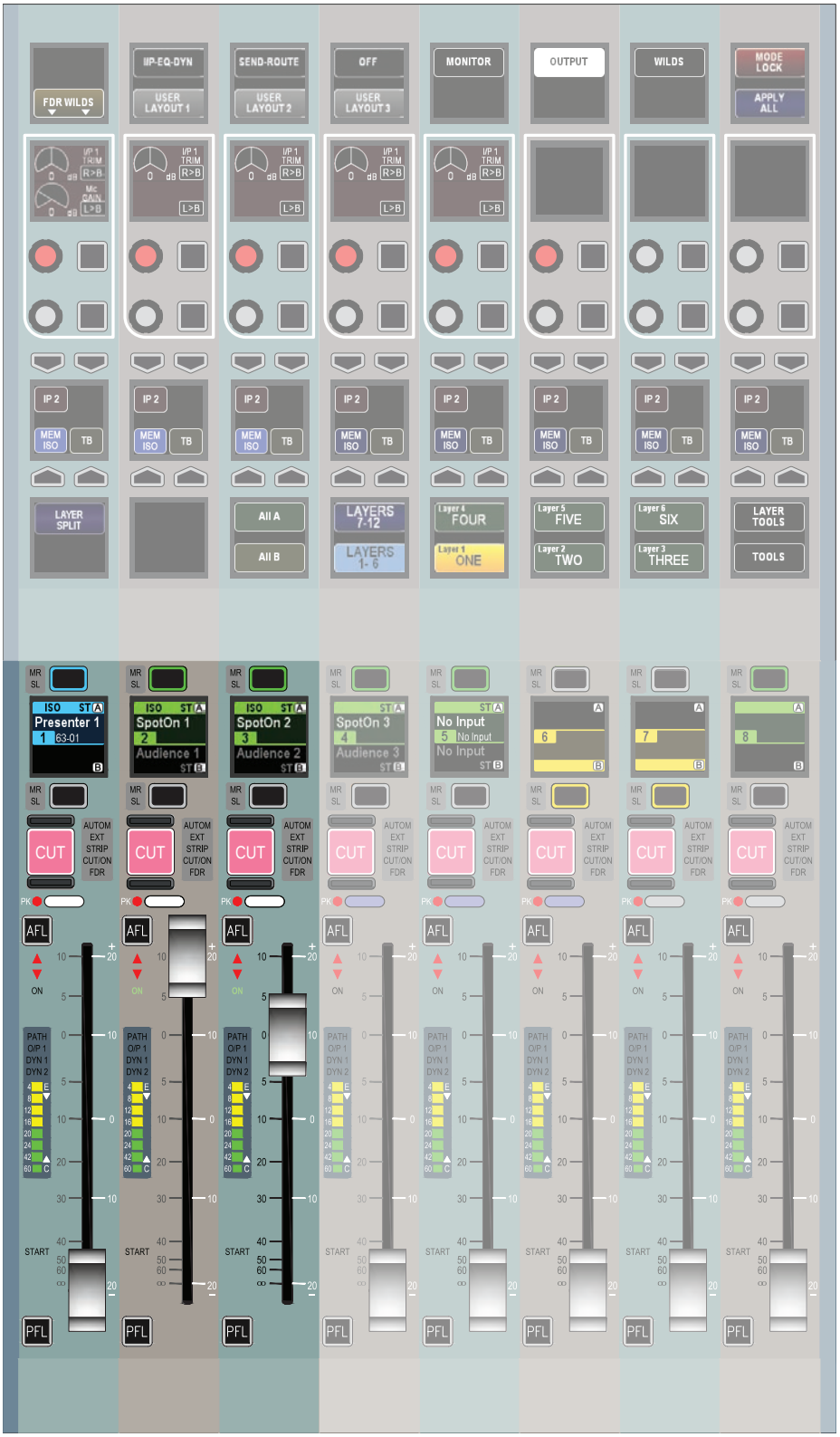
Figure 2 illustrates this function. The MEM ISO function on the first three faders have been activated. These faders have been highlighted to indicate that they will not be altered by any memory load operations.

Setting the scope of memory isolation

Isolating a path does not necessarily mean that all settings associated with the path are isolated. It is possible to only isolate the EQ settings on a certain path, just the EQ and input settings, or maybe all or some of its routing.

FIGURE 1 - MEM ISO BUTTONS

FIGURE 2 - MEM ISO APPLIED TO FADERS



To set the scope, touch the LAYER TOOLS button on the layers row. This will update the row above as shown in Figure 3. Now press the button above the SET MEM ISO graphic on the modes row. This will set the wild assign panel above it into Memory Isolate mode as shown in Figure 4 (apart from the mode title, the TFT screen appears blank in this mode). On entering this mode, the modes row and layers row return to their default state and the MEM ISO buttons are visible again.

The lower two rows of control cells on the wild assign panel will now display the elements of the path which can isolated. They relate to the currently assigned path. These elements may vary depending on the type of path assigned, for example input and input port settings are not applicable to groups.

Press the relevant button to toggle the elements which should be isolated when the assigned path is isolated. The selected elements will illuminate. The SET ALL ISOLATES and CLEAR ALL ISOLATES buttons in the button cells below switch all elements on or off respectively.

The PART ISO button in the button cells toggles partial memory isolation on or off for the assigned path. When a path has been partially isolated, the button cell above the fader on the fader panel will show the green PART ISO indicator instead of the fully isolated blue MEM ISO indicator.

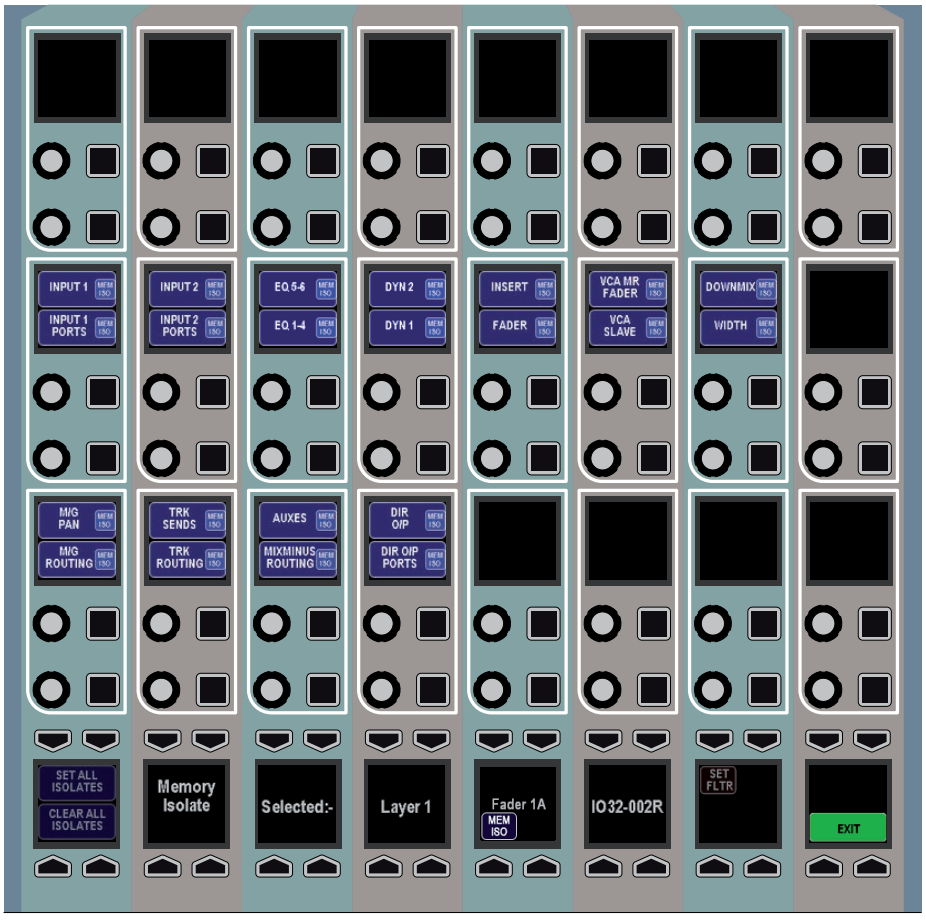
Once the required isolate elements have been set, press the EXIT button on the wild assign panel to return it to the previously used mode.

Applying isolation scope to multiple paths

Instead of applying the isolate settings to just the assigned path, it is possible to

FIGURE 3 - ACCESSING THE SCOPE OF THE MEMORY ISOLATE FUNCTION

FIGURE 4 - MEMORY ISOLATE MODE



quickly apply the settings to a number of paths at the same time.

To do this, press the SET FILTER button on the bottom row of the wild assign panel. This will change the appearance of the row to that shown in Figure 5. The elements to be isolated can now be selected as usual. Hold down the APPLY SEL button and press the assign buttons of the paths to which the settings should be applied.

While holding the APPLY SEL button, the path assign buttons may be in one of three states:

- Button not illuminated. The path has no isolate elements applied to it.
- Button illuminated continuously. The path already has some isolate elements applied to it. Not necessarily the current configuration of elements.
- Button illuminated but flashing. The user has pressed the assign key to assign the current configuration of isolate elements to the path. If the same assign button is pressed again, it will return to one of the above states depending on the path's previous state.

Once the necessary changes have been made the APPLY SEL button can be released. To apply the settings press the EXEC button, or to cancel them press the CNCL button.

Elements available for isolation

- Input 1 Settings
- Input 1 Ports
- Input 2 Settings
- Input 2 Ports
- Direct Output Levels
- Direct Output Ports
- Track Send Levels + Pan
- Track Routing
- Aux Send Levels and Routing
- Fader Level and Settings
- Pan to Mains and Groups

FIGURE 5 - WILD ASSIGN ROW IN SET FILTER MODE

- Routing to Mains and Groups
- Insert
- EQ Bands 1-4
- EQ Bands 5-6
- Dynamics Unit 1 (comp/lim, exp/gate)
- Dynamics Unit 2 (comp/lim)
- VCA Master Fader
- VCA Slave
- Stereo Width
- Downmix
- Mix Minus Routing

Most of these settings are self explanatory. The two which may require further explanation are VCA Master Fader and VCA Slave.

Isolating the VCA Master Fader element isolates the fact that a fader is a VCA master. If the fader is a master then any memories loaded will not change the fact that it is a master or alter any of its master settings (level, cut). Conversely, if the fader is not a master and this element is isolated, any memories loaded will not change it to become a master. This element does not isolate any slaves of the master in any way. If all slaves of this master are removed by a memory load, then the master has to be removed by default. It cannot exist without slaves. Also, if there is a slave path on the same fader (see the VCA Style Groups section for more details), and all other slave faders are removed, the master's settings are coalesced onto the same fader slave to preserve the mix detail.

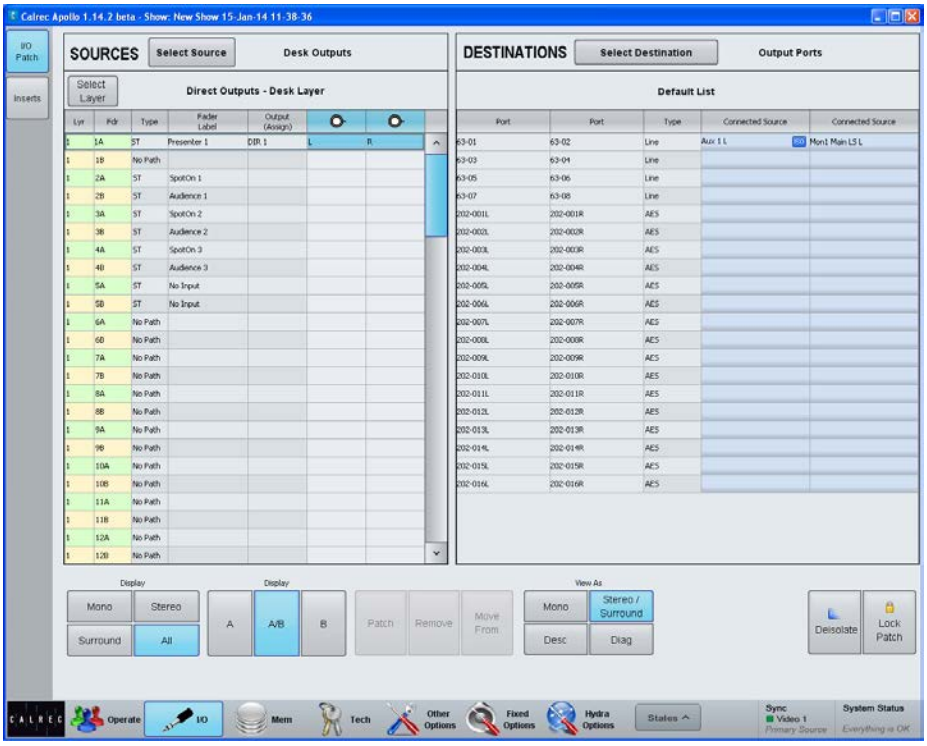
VCA Slave isolates the fact that the fader is a slave. It maintains its link to a certain master if that master still exists after a memory load (the master must be isolated individually). Similarly to the VCA Master Fader element, it also prevents the fader from becoming a slave due to a memory load operation if it is not one already.

Output port isolation

In addition to isolating paths (and possibly their associated ports) from memory load operations, output ports can have their patching isolated. To do this, select an output port and touch the ISO button as shown in Figure 6. It will be highlighted in a yellow color as an indication that it is now isolated.

Repeat the process to remove the isolation.

FIGURE 6 - ISOLATING OUTPUT PORTS



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ON AIR AND REHEARSE MODES

In addition to the normal mode of operation, the console can be switched into one of two modes which impose restrictions on certain console operations.

The broadcast facilities panel contains two buttons labelled REH (Rehearse) and ON AIR. Pressing either of these buttons sets the console to run in the relevant mode.

External interfaces can also trigger the console into switching these modes on or off with a signal sent via the console's general purpose inputs. For GPIO configuration please refer to the GPIO section.

On Air

On Air mode prevents the operator from performing certain actions that could be disastrous to the continued output of intended programme material. It currently imposes the following restrictions:

- Talkback to main outputs is disabled
- All other talkback dims control room loudspeakers
- All tone is disabled

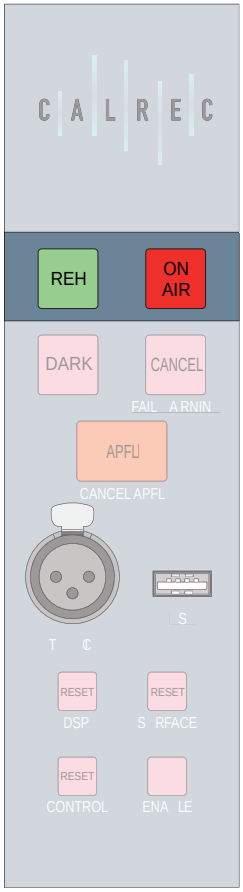
It can also be used to control an external interface (such as an On Air light in the studio) via the console's general purpose outputs. In this case, when the console was switched into On Air mode, the restrictions would be put in place and the On Air light would be lit.

Rehearse

The Rehearse mode provides similar functionality to the On Air mode but imposes a different and usually less severe set of restrictions on the console.

Currently Rehearse mode sets all talkback to dim the control room loudspeakers.

FIGURE 1 - BROADCAST FACILITIES PANEL



It also allows control over a separate external interface via GPOs than the On Air mode, such as a Rehearse light.

Neither mode selected

Restrictions can also be put in place when neither mode is selected. Currently the restrictions are the same as for rehearse mode.

SYSTEM RESET

In the unlikely event that a failure should occur at any point in the Apollo system, the fail component may be reset individually from the other system components.

Fail warning indicator

AWACS (Automatic Warning and Correction System) will detect any errors in the system and issue a warning to the operator. One warning indicator, the FAIL WARNING button, is located on the Broadcast Facilities Panel. This will flash when an error is detected. It can be pressed to acknowledge the error and will stop flashing, but will remain lit until the error has been corrected.

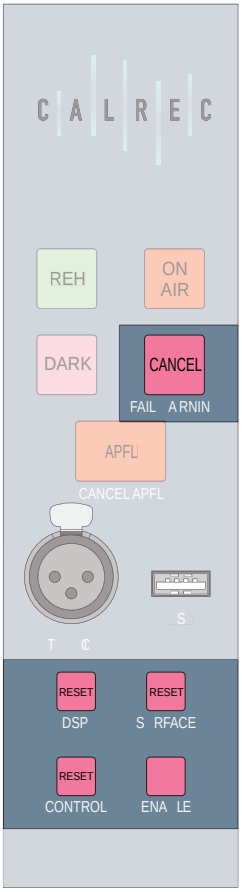
Reset buttons

Buttons on the Broadcast Facilities Panel allow the DSP, surface and control systems to be individually reset. To do this hold the appropriate button for the failed component and then press the ENABLE button.

Similar buttons are also available on the rack, with the addition of the Hydra2 reset button.

Be extremely cautious when resetting the Hydra2 Router/Expander system. If any other consoles on the same network are accessing ports on your system, they will experience signal loss during the reset period.

FIGURE 1 - BROADCAST FACILITIES PANEL



TECHNICIAN MODE

Technician Mode provides access to extra areas of the main application and allows certain restrictions to be placed upon operators.

For example, technicians may lock certain output ports to ensure the patches are never overridden by an operator.

Supervisors, Technicians and Users

There is a hierarchy of three user types in the system. Users are the lowest in the hierarchy and have normal access rights to operational and system settings. Technicians are given access to more critical system settings and operational features and can change their passwords once logged in. Supervisors have the same access as technicians, but also have the ability to create and delete other supervisors and technicians.

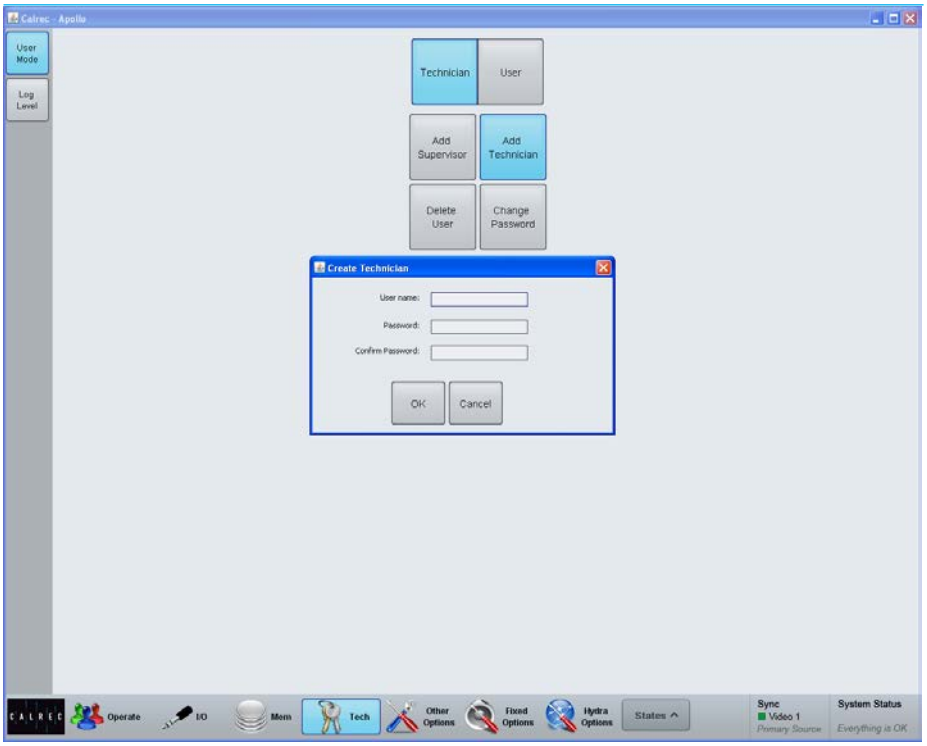
Accessing Technician Mode

To access Technician Mode, navigate to the TECH section of the main application as shown in Figure 1. When in normal user mode, the USER button should be highlighted.

To log into Technician mode, touch the Technician button to bring up a dialog box requesting a username and password. Enter these details for any existing supervisor or technician account and touch the OK button.

If this is the first time that Technician mode has been accessed, or no supervisors have been configured yet, you will be prompted to create a supervisor account by entering a new username and password.

FIGURE 1 - TECHNICIAN MODE



Once this has been done, you should now be logged in to Technician Mode. As an indication of this, the TECHNICIAN button should now be highlighted and the TECH button on the main menu should be flashing.

Managing technician/supervisor accounts

There are three buttons on the USER MODE screen which are available to supervisors:

- ADD SUPERVISOR - Supervisors may create other supervisors. Touching this button will bring up a dialog prompting the new supervisor's details to be entered.
- ADD TECHNICIAN - Supervisors may create new technician accounts. Touching this button will bring up a dialog prompting the new technician's details to be entered.
- DELETE USER - Touching this button will bring up a dialog allowing the supervisor to select a user to delete.

Both supervisors and technicians have access to the CHANGE PASSWORD button which brings up a dialog in which a new password can be entered.

Exiting Technician Mode

To exit technician mode, touch the USER button. Attempts to enter Technician Mode again will require entering a username and password.

SYNCHRONIZATION SOURCES

It is strongly recommended that the Apollo console is locked to the same external sync source as all the external equipment connected to Calrec digital I/O to prevent audible interruptions to audio data.

The Apollo can run on its own synchronization clock if no external source is provided and there are switchable sample rate convertors on all AES3 and SDI digital inputs to adjust the sample rate of the incoming signal to match that of the console if required. If the console cannot receive the same sync source as the connected equipment, it is important to check the SRCs are switched in on the inputs of the equipment fed by Apollo outputs.

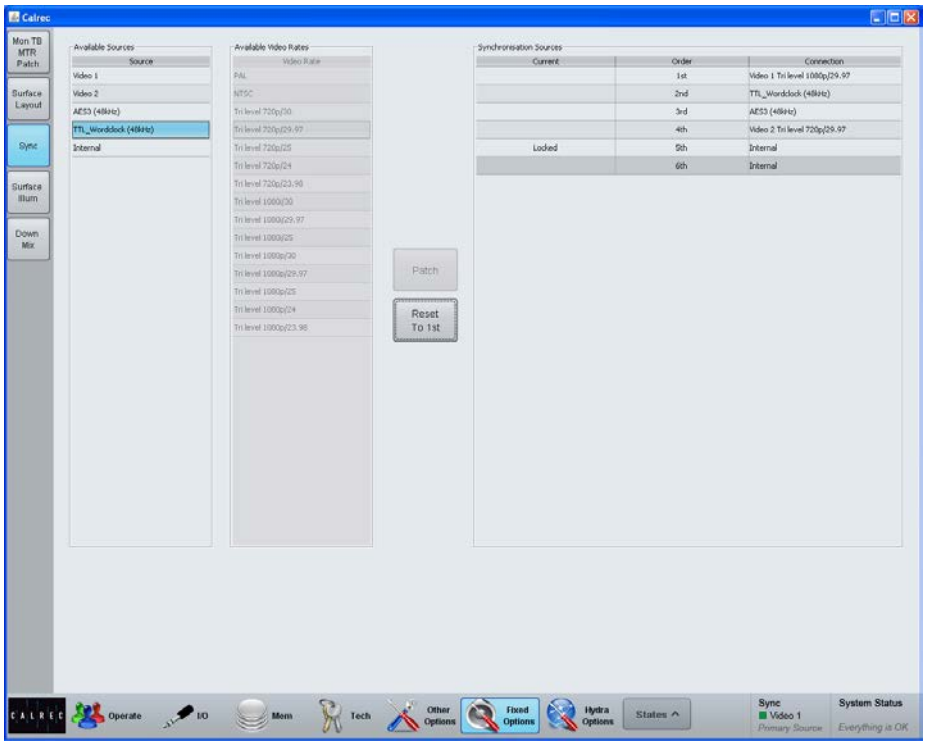
General rules of good practise dictate that all equipment in a facility are locked to the same house reference. For systems where multiple Apollo/Artemis consoles are connected together via a Hydra2 network, this becomes of paramount importance.

Each console and any standalone router racks on the same Hydra2 network must all be connected and locked to the same derived reference source to ensure the online status of the associated I/O.

Each console has external sync input connectors at the top of the front of their processing rack. Four inputs are provided on BNC connectors.

To select or change the console synchronization settings, the Main Application must be in technician mode (Select the Tech page, click on Technician at the top of the screen and enter a valid username and password. Whilst in Tech mode, the Tech page selector icon should flash).

MAIN PC APPLICATION, FIXED OPTIONS>SYNC



Sync settings are on the Fixed Options>Sync page. If not in tech mode, the "keys" icon will be displayed in the upper left and settings cannot be changed.

The available sync sources are displayed on the left. The selected sync sources are displayed in a list on the right. Only one sync source can be active at any given time and this is displayed as "Locked" by the Main Application.

On boot up or reset, the system will attempt to sync to the 1st source, at the top of the selected sync sources list. If it cannot lock to this source it will move down the list one at a time until a source is found that can be locked to. The last item in the selected sources list cannot be changed, this is fixed as internal to ensure that if no suitable external sync can be found that the console will run on its own reference clock.

If the system is not locked to the highest priority source, clicking "Reset to 1st" will cause it to retry, again moving down the list until a source is found that can be locked to.

The connectors on the rack are labelled for the format required on each. There is an input for TTL Wordclock, one for AES digital audio reference as well as two video inputs. Both video inputs can take analogue or digital video in PAL, NTSC or a variety of HD / Tri-level formats. When selecting video as a sync source, the video format should be selected from the centre of the sync screen for each instance of "video" in the selected list on the right.

The current sync source is shown to the right hand side of the Main application menu bar at all times.

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GPIO

Opto isolated General Purpose Inputs can be configured to allow the console to respond to external control signals. Conversely, the console can output control signals via relays to control external equipment.

Assigning GPIs

In the main application on the configuration PC, the HYDRA OPTIONS section contains a screen labelled GPI. The available GPI opto inputs are listed on the left hand side of this screen. FILTER INPUTS allows rapid access to specific Hydra I/O boxes with GPIO connections.

The console functions which can be controlled by the optos are shown on the right hand side of the screen. Select an opto input and a console function and touch the PATCH button to make a connection between the two.

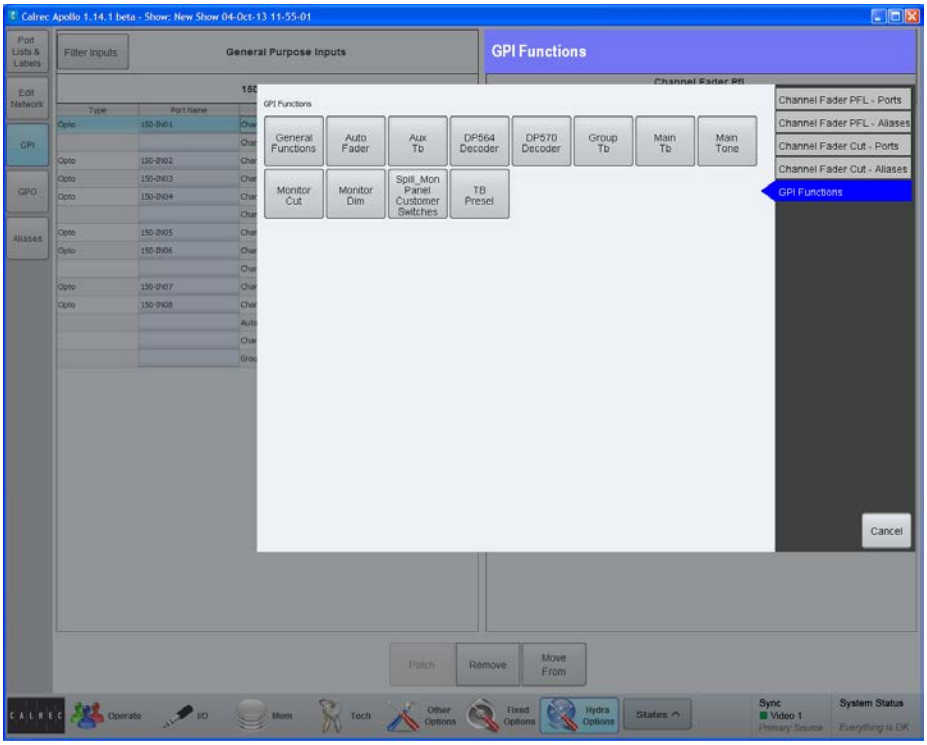
GPI functions

The list of GPI input ports can be filtered using the FILTER INPUTS button above the ports list. This will bring up a popup window showing the available functions grouped into 5 sections as shown in Figure 1.

To set a GPI to control a channel specific function, either PFL or CUT, select one of the first four options for physical ports or Aliases. Then, from the resulting button options, select the correct I/O box for the port(s) you wish to control. The pop-up will then close and the GPI functions window is populated with all ports for the selected I/O box.

All GPI controllable console functions are listed within the 5th option: GPI FUNCTIONS. Within this option there are several button selectors for different GPI function types, for example, TX status (found under the GENERAL FUNCTIONS filter), Auto Faders and a variety of talkback, tone and monitor functions under the appropriate filter buttons.

FIGURE 1 - ASSIGNING GPI OPTOS TO CONSOLE FUNCTIONS



Mon-Spill Panel Customer Switches

In addition to functions that control the console, the eight Customer Switches at the base of the Monitor/Spill panel (Figure 2) all have colored indicators which can be assigned to be activated from GPIs. This can be used as a method for checking the correct operation of a relay/opto circuit. Customer Switches can have up to three different color states allowing them to provide feedback from three separate GPI inputs.

FIGURE 2 - CUSTOMER SWITCHES

Assigning GPOs

The GPO screen in the HYDRA OPTIONS section provides a similar method of assigning console functions to a GPO relay. The list of console functions is shown on the left of the screen and is again organized into various sections. These sections may be accessed by using the FILTER FUNCTIONS button.

Fader start relays can be configured using the CHANNEL FDR OPEN functions list which contains audio input ports. If an input port is assigned to a relay, the relay will be closed if any fader with that input port patched to it is opened.

In addition to general console functions and fader opens, the hardware buttons at the bottom of the dedicated monitor panel can also be assigned to trigger GPO relays.

GPO signal type

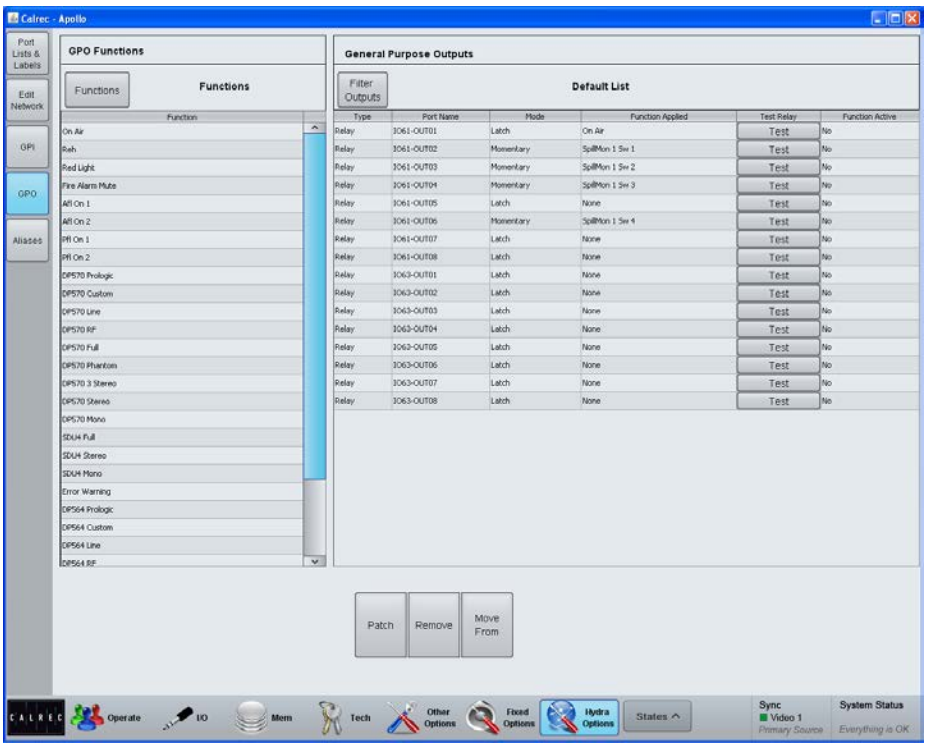
When patched from most control outputs, GPO signals are set to Latch mode. Latch mode causes the relay to remain activated indefinitely. For example, a relay controlled by a fader open function will remain activated the entire time that fader is open.

Assigning GPOs to the Spill/Mon switches changes their mode from Latching to Momentary so the relay is only activated while the button is pressed.

Test GPO

A test button is present on every GPO output to manually trigger the GPO signal.

FIGURE 2 - ASSIGNING CONSOLE FUNCTIONS TO GPO RELAYS



REMOTE CONTROL

In addition to GPI activated controls, the Apollo/Artemis/Hydra2 product range supports various protocols to allow 3rd party equipment to remotely control various features.

Two of these protocols can directly affect control surface operation. EMBER controllers can change the user memory/ show that is on the control surface, as well as changing alias files which can change I/O patching.

CSCP

Calrec Serial Control Protocol (CSCP) allows remote control from 3rd party equipment over fader positions, path CUT/ ON status, PFLs, routing to Auxes and Mains, and Aux output levels.

The Main PC Application's Fixed Options>Ext Control screen allows for these remote control interfaces to be enabled and disabled. This screen displays IP addresses and aliases for the primary and secondary control processor and any serial control interfaces that are installed. Static route addresses are also shown here. Note, that as part of the fixed options, these settings are not saved as part of the user memory.

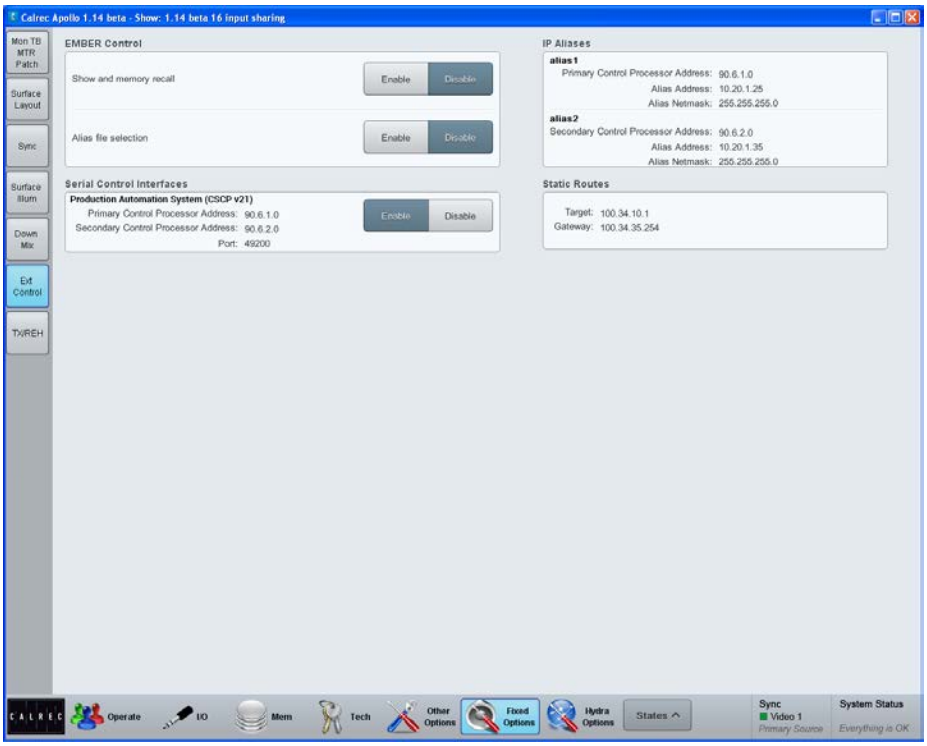
CSCP Per Fader

CSCP can be enabled and disabled per fader using the External Control Enable on/off button in the control cell on the right hand side when in I/P-EQ-DYN mode. If CSCP is enabled globally from the main application, the EXTERNAL CONTROL ENABLE on/off button will allow the user to disable and re-enable CSCP control for the currently assigned fader.

If CSCP is globally disabled from the main application, and an autofader is assigned to the currently assigned fader, the EXTERNAL CONTROL ENABLE on/off button becomes an AUTOFADER ENABLE on/off button (see "Autofaders" on page 94 for more information)

For more information on remote control setup, please refer to the console and Hydra2 installation manuals.

MAIN PC APPLICATION, FIXED OPTIONS>EXT CONTROL



EXTERNAL MONITOR / METER INPUTS

The audio on any input across the network can be monitored or metered using external inputs.

External inputs are typically used to monitor down-stream feeds and “off-air” returns to ensure the console output is reaching its’ intended destination uncompromised.

Configuring external inputs

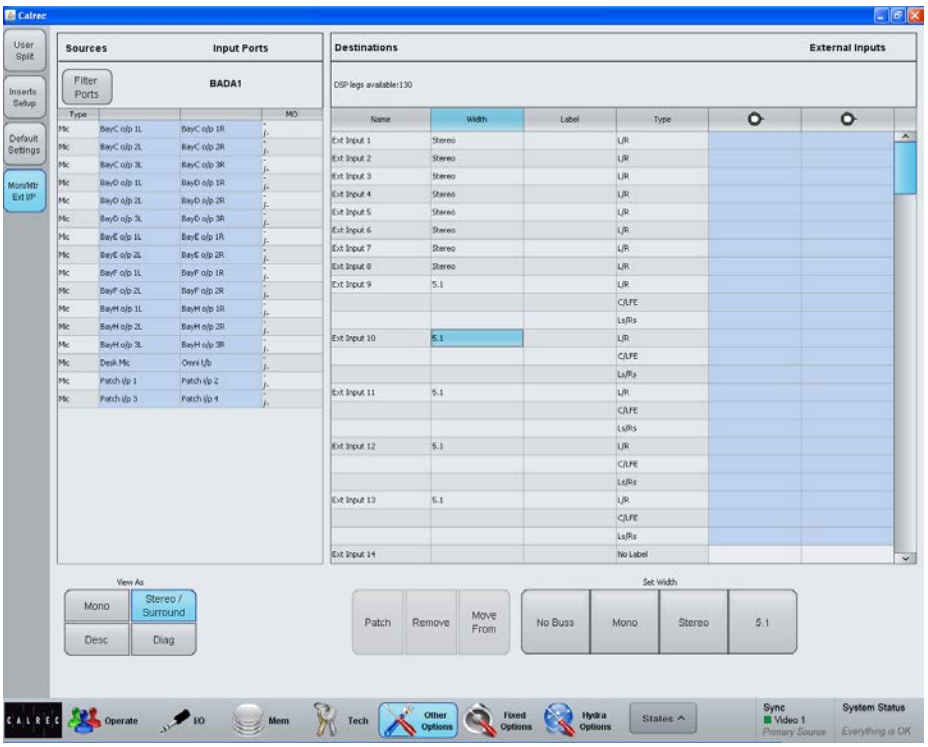
The Other Options>Mon/Mtr Ext I/P screen allows external inputs to be configured. Click on the Width cell for an input in order to be able to select it as mono, stereo or surround. Custom labels can be given to each input by editing the Label column.

Patch I/O ports to external inputs in a similar way to other port patching - sources are listed in the left hand side of the screen, select the required port list from the Filter Ports menu, then highlight the desired port within the list, highlight the chosen external input’s blue patching cell and click Patch.

Monitoring / metering externals

External inputs appear as sources to the monitor and meter selectors. Meters can also be configured to display external inputs directly (rather than via a meter selector).

MAIN PC APPLICATION, OTHER OPTIONS>MON/MTR EXT I/P



MIC OPEN SYSTEMS

Mic Open Systems are used to control external devices, relative to the 'on air' status of a signal source. Mic open systems can CUT or DIM a loud speaker feed to avoid feedback, or control relays for switching purposes, such as turning on ON AIR lights.

There are 5 Mic Open Systems available on the console, each is normally associated with a physical area for control, such as a studio or an area of a studio floor. Mic Open systems work for all input ports, as microphones can be connected to ports other than mic/line inputs.

Mic Open Systems detect whether the assigned signal sources are on air. A signal is deemed to be on air if:

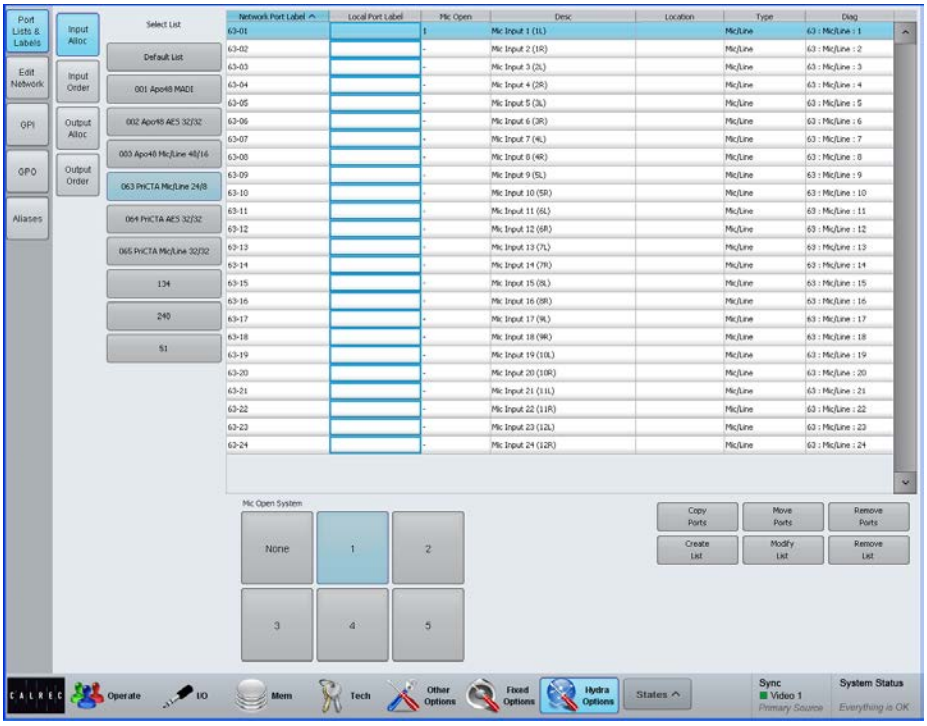
- It is assigned to a channel input (one or two).
- The channel is selected to that input (one or two).
- Its fader is open and not cut.
- It is routed to a main output.
- That main output's fader is open.
- If a signal is routed via a group or a number of groups in series before being routed to a main output, those group faders must also be open and not cut.

Note, the fader open trigger happens at -90dB and the fader close trigger happens at -95dB.

If a signal is routed to a console input via a hydra patchbay and/or an input alias the on air decoding will be the same as described above.

When a Mic Open system detects that a microphone is on air, it switches on and the associated GPO/CUT/DIM is executed.

ASSIGNING A MIC OPEN SYSTEM



Mic Open Systems are console-wide and so do not split in line with user splits.

Assigning Inputs to Mic Open Systems

To allocate an input port to any of the 5 Mic Open Systems, select HYDRA OPTIONS within the Main application, then select PORT LISTS AND LABELS>INPUT ALLOC.

There are 6 buttons at the bottom of the input allocation window for assigning inputs to any of the 5 Mic Open systems. Select an input port list from the Select List down the left hand side of the window, then select an input port from the list and press one or more of the 5 Mic Open System buttons - notice that the corresponding cell in the 3rd column now reflects your choice. This is reflected in all screens where inputs are displayed within

the Main application. Within screens with limited space the Mic Open column will be labelled, 'MO'.

Assigning Aliases to Mic Open Systems

Input Aliases can also be assigned to Mic open systems. These assignments are stored separately within the alias file and only become active once the alias file is active, this allows floating I/O box ports to be automatically set to different Mic Open systems depending on which studio they are being used in.

To set an input alias to a Mic Open System, select HYDRA OPTIONS and enter the ALIAS screen, select INPUT FILES and then the ALIAS MIC OPEN tab. Similarly to the description above, select an alias name and then press one or more of the Mic Open system buttons (1 - 5) along the bottom of the window.

Ports and aliases can be assigned to any number of Mic Open Systems, allowing one microphone to control more than one process.

Assigning Mic Open Systems to GPOs

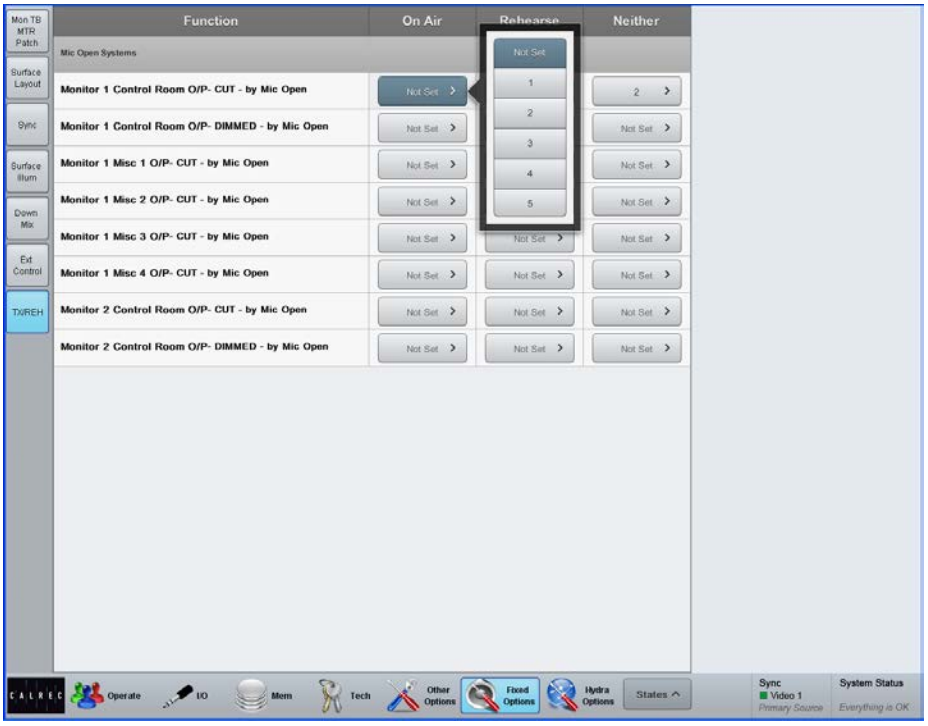
Mic Open systems can be set to control relays by assigning them to GPOs. Select HYDRA OPTIONS, then enter the GPO screen. Tap the FUNCTIONS button at the top left of the window, select GPO FUNCTIONS and then GENERAL FUNCTIONS. Select one of the five Mic Open Systems on the left hand side of the screen and then select one of the available GPOs from the list on the right hand side of the screen. See "GPIO" on page 168 for more information.

Assigning to CUT/DIM Loud Speakers

Mic Open systems can be assigned to CUT or DIM the various loud speakers connected to the console. These settings can be different for the different console modes: On Air (TX Mode), Rehearse (REH mode) and Neither (neither mode selected on the surface).

Select FIXED OPTIONS from the Main PC application, then select TX/REH. The table in the main window lists the various monitor and CUT/DIM options down the left hand side along with columns for the three console modes. The selection buttons in the three columns can be used to select one of the 5 mic open systems to control each Loud Speaker CUT/DIM.

MIC OPEN SYSTEM MONITOR CONTROLS



Mic Open Systems and multi-leg paths

Individual legs of stereo and 5.1 paths can be associated with different Mic Open Systems. In this case, when the path is considered on air, all associated Mic Open Systems will be activated.

A 5.1 path will be considered on air with only one of its legs routed, as long as all other conditions are met. An on air 5.1 path will remain on air even if all its spill legs are closed/CUT as long as the surround master is open and not CUT.

APOLLO
AWACS

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Putting Sound in the Picture

AWACS

Apollo features an Advanced Warning And Correction System which reports warnings, faults and information to the user.

The AWACS system monitors all system components and connections

AWACS notifications

Under normal operating circumstances, the AWACS notifications area to the far right of the menu bar at the bottom of the main application will show 'Everything is OK'.

In the event that a message needs to be displayed, the notifications area will display the relevant color depending on whether there is information, a warning or an error message to be viewed. Touching this notification area will bring up the AWACS screen as shown in Figure 1.

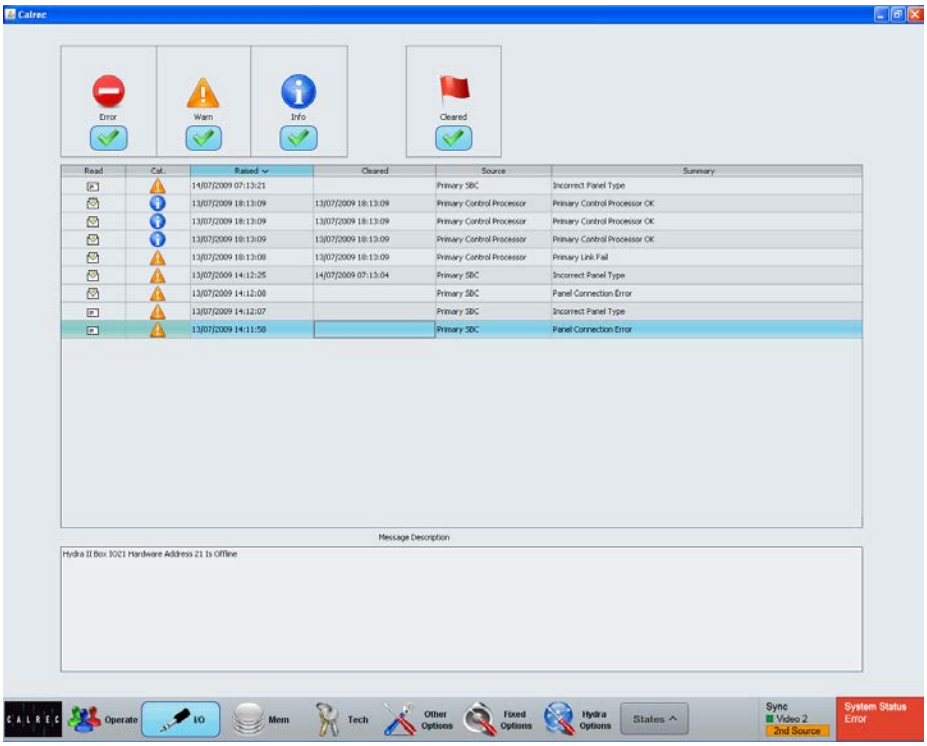
Message types

Three types of message are reported by AWACS:

- Information Messages - Inform the user when certain actions take place. They do not report errors, and no action needs to be taken to respond to them
- Warning Messages - Indicate where the system has located a fault or failure, but will still operate without intervention from the user. The message should be checked as the system may be running on its secondary components.
- Error Messages - Report a serious error that could cause, or has caused the system to fail. Normally requires user intervention to correct the problem before operation can continue.

The messages are reported in a list, as shown in Figure 1. Each message in the list has an associated icon shown in the left column. This identifies the type of message to the user. Message types can be filtered using the buttons above the list.

FIGURE 1 - AWACS SCREEN



Selecting a message in the list will update the MESSAGE DESCRIPTION area below to show the message in greater detail.

Clearing messages

Information messages can be cleared by selecting them and then leaving the AWACS screen.

Warning and Fatal Error messages can only be cleared by correcting the error and restoring the system to its normal operational state.

Surface indication

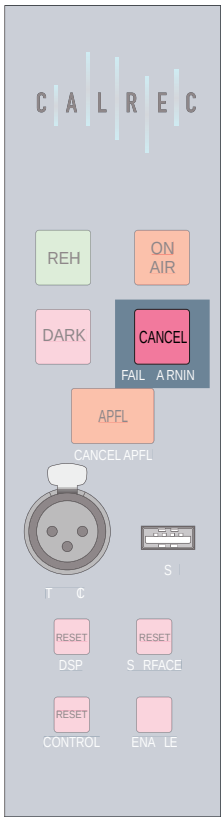
In addition to the main application displaying an AWACS indicator when a message is created, the FAIL WARNING button on the broadcast facilities panel will also flash. This is shown in Figure 2. Pressing this button when it is flashing will cause it to stop flashing and remain illuminated. This will let the system know that the user has acknowledged the error but has not necessarily cleared it.

External indication

It is also possible to set an external indicator to flash when an error message is reported. The FAIL WARNING GPO function should be patched to the relevant GPO port to which the required indicator is connected.

For a more detailed explanation of the GPIO functions of the system, refer to the GPIO section of this document.

FIGURE 2 - SURFACE FAIL WARNING INDICATOR



APOLLO
GLOSSARY OF TERMINOLOGY

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Putting Sound in the Picture

ADC (Analog to Digital Conversion)
The process by which continuous analog signals are sampled and converted into discrete digital representations. The frequency of samples in the resultant digital signal is determined by the Sample Rate of the system (e.g. 48kHz). The dynamic range of the sampled signal is dependant on the wordlength (e.g. 24bit).

AFL
After-Fade Listen. Allows the user to hear only the selected channels after they have been affected by fader position, pan position and channel processing. Multiple AFL signals can be sent to the AFL bus. AFL does not affect the main outputs, so can be seen as being similar to 'safe solo'.

APFL
A bus that combines both AFL and PFL signals. This removes the need to have separate loudspeakers and meters for monitoring AFL and PFL signals.

Assign Mode
An operating mode of the surface in which it acts as an assignable console. A fader is assigned and all controls on an assign panel become relevant to the assigned path.

Assign Panel
When a wild assign panel is set to operate in Assign Mode, it can be referred to as an Assign Panel. The controls and information on this panel will reflect the data associated with the currently assigned path.

Assigned Path
When a path is assigned, certain functionality becomes available to it. For example the spill controls can affect components of a multichannel path, or any Assign Panels can update to display and control data relevant to the assigned path.

Aux / Auxiliary
An Aux is a bus to which signals can be sent and grouped. The send for the originating channel may be pre or post fade. Auxes can be patched to output ports and can be controlled by certain logic functions such as pre-send cut when originating channel is cut, pre-send cut when originating channel fader is closed and Bird Beater.

Auto Fade
Faders can be set to fade in and out in response to GPI signals. This might be set up so that a vision mixer can control relevant audio sources by simply fading up or down the video signal.

AWACS (Automatic Warning And Correction System)
This system provides information and logs of any developing or occurring faults in the system.

Bird Beater
With the function turned on for a given Aux, the pre-fade send from an originating channel can be cut when the originating fader is opened and not cut.

Bluefin 2
The next generation of Calrec's High Density Signal Processing (HDSP) system. Capable of over 1000 input channel paths from just a single card.

Broadcast Facilities Panel
A panel located in the surface upstand. This provides access to useful broadcast functions such as TX/REH modes, system reset indicators and buttons, a talkback microphone input and a USB port for the configuration PC.

Buss Path
A path in which multiple signals can be combined. A bus is the general term and can refer to a number of path types including Group, Aux, Track, Main, Mix Minus, AFL, PFL.

Button Cell
A collection of four buttons around a display.

Channel Faders
Channel Faders are located on the Fader Panels. A generic term, as channels, groups, mains can all be attached to them allowing assignment and level control. They may also be used to control VCA groups.

Configuration PC
The configuration PC is a Windows based computer linked to a touch screen external to the surface, normally mounted on a flexible arm. This PC provides access to system settings.

Continuous Memory
A continually updated memory that stores the state of the system. In the event of a restart after power loss or reset, the system can reload the continuous memory and continue from almost the same state prior to power loss.

Control Bed
The main, shallow angled area of the control surface as oppose to the upstand. The Apollo control bed can be fitted with fader and monitor panels. An Apollo control bed has a second row, mainly populated with assignable control panels.

Control Cell
The collection of controls consisting of a display, two buttons and two rotary controls.

Control Processor Module
The control processor module acts as the main controller of the Apollo system, passing messages between all modules.

The surface communicates with the rack via the control processor module.

Core
Processing rack for a mixing console or standalone router.

DAC (Digital to Analog Conversion)
The reverse of ADC. The digital representation of a signal is converted back into a continuous analog signal.

Desk Output
Type of Main bus output which does not receive the output tone or talkback switching that affects Main Line outputs.

Direct Output
Output from a channel or group path with level control and pre EQ / pre fader / post fader selection. By default a direct output contains only the audio present on the path, but can be switched to output mix-minus - everything routed to the mix-minus bus apart from the path's own audio.

Downmix
The process of converting a signal of a given width into a signal of a smaller width allowing fixed or variable amounts of each of the contributing legs to be included. For example, a downmix must be applied to a 5.1 surround signal for it to be correctly translated into a stereo format. Without a downmix, surround, LFE or center information may be lost and levels may become unbalanced.

DSP
Digital Signal Processing. Discrete mathematical operations applied to a stream of digital audio signals.

DSP Module
A module fitted in the Apollo rack which performs all the DSP functions of the system.

Expansion Router
Apollo and Artemis Shine & Beam (not Artemis light) processing racks have an expansion card slot that can be fitted with an additional router card as an option to double the quantity of I/O ports available within the rack.

Fader
Fader refers to one of the physical faders available on the surface (see Channel Faders, Main Faders and Spill Faders).

Fader Bargraph Meters
LED meters next to each fader on the surface provide input metering.

Foldback
An audio mix sent to a presenter or artist. Applications include enabling them to hear their own input or communications.

Gigabit Ethernet
A family of network technologies used for connecting equipment and efficiently passing large amounts information over copper or fiber links.

GPI/O (General Purpose Inputs/ Outputs)
These connections allow simple on/off signals to be sent and received by the system. Functions of the system can be controlled from external sources via opto-isolated inputs. The system can control external items of equipment based upon surface actions via relay outputs. GPI/O connections are optional fittings on Hydra 2 I/O boxes

Group Buss
A bus to which many audio signals can be routed, summed and controlled simultaneously with a single fader. For example all audience microphones may be sent to the same group bus for easy access. Busses can be patched to physical outputs and have full EQ and dynamics processing. For a non summing group see VCA Groups.

Hydra2
An audio networking system which links I/O boxes to one or many consoles over Gigabit Ethernet. Apollo is based around a Hydra 2 system.

Hydra2 Router Module
All Hydra2 I/O boxes connect to the network via a router. The router module contains 16 SFP sockets that can accept either copper or a range of fiber connections by using the appropriate adaptor.

Interrogation
Interrogating a bus reveals all contributing paths. For example an Aux bus could be interrogated in order to find all the paths which have been routed to it. Routing can also be performed in reverse where a number of paths can be selected and be routed to the currently interrogated bus. (See Reverse Routing).

Interruptible Foldback (IFB)
IFB is a foldback mix which can be interrupted by tone or talkback. This function is normally handled by the track buses.

Layers
Layers allow the faders on the surface to change the paths they are controlling. On each layer, a different path can be attached to and controlled by a given fader. There can be up to 24 layers on the Apollo surface. Given an example surface containing 64 faders and using 6 layers, the user may control up to 384 paths with the faders simply by changing layers.

Line Output
A type of Main output bus, that is interruptible with output tone and talkback selections.

Mix Buss
When multiple signals are routed to a bus they are mixed together. This allows the combined signal to be processed, routed or have it's level controlled from a single location.

MADI (Multichannel Audio Digital Interface)
A coaxial or optical transmission medium providing a 56 or 64 channel capacity. The MADI standard (AES10) allows simple high density connectivity between different manufacturer's equipment. MADI is interfaced with an Apollo system via a Hydra 2 MADI I/O unit.

Main
A main is an output bus, a final point at which signals are mixed and affected before they leave the console. Each main path can be accessed for external patching via a Desk Output and a Line Output.

Main PC Application
The touch screen based configuration PC application that provides additional access to many controls and allows system settings to be configured.

Mic Input Headroom
The amount of headroom above the mic gain setting, used as a safety net in the case of sudden high signal level. The headroom is currently fixed at 36dB. A high headroom offers greater safety at the expense of slightly more noise.

Mix Minus Buss
A dedicated bus used for simple yet powerful creation of mix minus feeds. A unique mix is created for each recipient which consists of the whole mix minus bus, minus their own contribution. Each mix minus feed is sent from a channel or group's direct output.

Mode Buttons
The mode buttons allow the operating mode of each wild assign panel on the surface to be switched.

On Air Mode
On Air mode allows certain operational functions to be activated or inhibited when the system is switched in to it.

Online Documentation
The touch screen based configuration PC application for displaying and providing interaction with Calrec documentation and training materials.

Port
A port refers to any physical audio input or output in a Hydra 2 I/O box. Ports can be of any form of analog or digital I/O. In the case of analog signals, a single port relates to a single signal in the system. Where digital signals are connected, multiple signals become available for each port. A single AES3 port provides two signals, SDI can provide up to 16 signals (or more with Dolby E decoding) and MADI can provide up to 64 signals.

Patch
A patch is a connection made between a source and a destination in the system. For example an input port may be patched to one or more channel inputs, or a main output may be patched to one or more output ports.

Path
A generic term that refers to a DSP process in the system. A signal present at an input port must be routed to a path in order for it to be processed and then sent back out of the system. Paths include channels, groups, auxes, tracks, mains, talkback and monitor paths. Paths can be routed to other paths, for example a channel path can be routed to a group path and a main path simultaneously.

PFL
Pre-Fade listen. A function to allow a signal to be heard before it has it's level altered by a fader. Multiple PFL signals can be sent to the PFL bus.

Power over Ethernet (POE)
A technology used to provide power to equipment through the same Ethernet connection that carries information.

Pre-Selectors
Part of the monitoring controls on the surface, Pre-Selectors allow a number of sources to be preset, ready to be sent to the main control room loudspeakers and meters.

PSU Module
The PSU module provides power to the rack and the other modules contained within it.

Rack
The single 8U enclosure containing all power, processing and networking modules for an Apollo system.

Redundancy
All main components of the system are redundant, meaning that there is always a secondary hot spare ready to step in and take over control if the primary component fails. The failed primary unit can be replaced with a working unit which then becomes the new hot spare, effectively re-introducing redundancy.

Reverse Routing
When a bus is interrogated, routes to that bus may be made in reverse by specifying which paths will be routed to it. Normal routing involves specifying which buses a certain path is routed to. (See Interrogation and Routing)

Rotary
A knob which can be rotated, allowing variable control of a parameter. In some cases it can be pressed giving it extra functionality. Each control cell contains two rotary controls.

Route
A route is a connection made from one path to another within the system. For example a group path may be routed to a main path, or a channel path may be routed to an Aux path via an aux send. (See also Reverse Routing).

Router Core
Processing rack without DSP mix engine, and therefore no control surface connected. Used to expand network capacity.

Row
A row is a horizontal arrangement of controls on a surface panel. For example the row of small displays at the top of a standard fader panel is called the 'Modes Row'.

SDI (Serial Digital Interface)
Although SDI is primarily a means for encoding and transporting video signals, audio signals can also be encoded and sent through in the ancillary data space. Certain Calrec SDI de-embedders can decode all groups and Dolby E encoded audio for a maximum of 128 mono signals per SDI stream.

SFP (Small Form-Factor Pluggable) connections
SFP sockets accept a range of adaptors which provide different interface connections for copper or fiber connectivity. This allows units fitted with SFP sockets to be customized to meet a range of requirements. All main network connections in an Apollo system make use of SFP sockets.

Spill Faders
Allow control of legs of a multichannel signal. For example the overall level of 5.1 surround channels is controlled by a single fader. By using the spill faders, components of the multichannel signal can be altered. If a spill fader is the currently assigned fader, then processing can also be applied to that component using the assign panels. For a 5.1 channel the legs are broken into the following components: L/R (stereo), C (mono), LFE (mono), LsRs (Stereo).

SRC (Sample Rate Conversion)
A sample rate converter is by default switched in on each AES3 input in the event that an incoming external signal is at a different sample rate or not synchronized to the same source as the system. It can be switched out if the incoming signal is known to be synchronous.

Standard Fader Panel
A physical surface panel containing eight faders, a row of cells and three rows of displays. Along with the wild assign panel and TFT meter, the standard fader panel is the most common panel on a surface.

Strip (Channel Strip)
Strip refers a vertical arrangement of controls on the surface which can be a combination of fader and assign panels. There are eight strips on a wild assign panel and on a fader panel.

Surface
The surface is the physical control surface for a Apollo system containing the collection of faders, rotary controls, buttons and displays allowing hands on control of the audio signals. Sometimes referred to as the Console or Desk.

System
The term 'system' encompasses the rack, surface, and configuration PC. From the moment a signal enters a Hydra 2 input it is in the system and remains there until it is passed out of a Hydra 2 output.

TFT display
Generally refers to the larger display screens in the control surface - the upstand meter panels and the large display on Apollo assignable panels.

Tracks
Multi function buses that can be patched to physical outputs. Used for such purposes as generating multiple interruptible clean feeds (IFB) or sending audio to a multitrack machine.

Upmix
The opposite of Downmix. Narrow width signals can be processed in order to be sent to a wider bus. This occurs when monitoring a mono signal through a stereo bus. Here the pan control can be considered an upmix parameter as it varies the resultant stereo upmix.

Upstand
The upper, steeply angled section of the control surface, mainly fitted with TFT and meter panels. Often referred to as the meter bridge.

VCA Groups
The term VCA stands for Voltage Controlled Amplifier. A VCA group, unlike a group bus does not sum any audio. Instead it allows a single fader to control the relative levels of any contributing paths. The controlling fader is known as the master, the contributing paths are known as slaves. This maintains the relative levels of all paths in the group yet still allows individual control where required.

Wild Assign Panel
A panel containing a touch screen TFT and multiple Cells and displays. The function of this panel can be altered during operation of the surface.

Wild Assign Touchscreen
The TFT touch screen display located in a wild assign panel. Provides flexible options for displaying and controlling information directly through touch.

APOLLO
FEATURES BY SOFTWARE VERSION

FEATURES BY SOFTWARE VERSION

The following summarizes key new features by the software version in which they were introduced. If you require features that are not available in the software version you are running, please contact Calrec Customer Support or your local Calrec distributor to discuss upgrade options.

V1.3
- Second compressor/limiter in all path dynamics processing units.
- Downmix defaults
- Partial memory isolates
- VCA style groups
- Surround channel input delay
- Autofaders

V1.4CTA
- External tone input enabled
- Monitor panel buttons for GPIO
- Channel cut from GPI
- Alias file support added
- User defined TFT meter layout
- Dolby unit control using GPIO
- Monitor insert
- Port labels and device names exchanged via Ember. EMBER client may read and edit I/O box and port labels.
- Multi-router software with redundancy.
- Backup of 3rd party routes.
- Basic SW-P-08 port patching and tally (TCP/IP). Patching of input ports to output ports.
- New sync screen and Tri Level sync inputs to allow sync priority to be defined.
- PFL to small LS.

V1.5
- Selectable LoRo or LtRt downmixes on main outputs.

V1.6
- BLITS tone ident added to oscillator
- EQ available in dynamics side-chain
- Bus output delay
- Saving shows as defaults.
- M/S switching on meter selectors.

V1.7
- SDI Embedder output audio channel mute control via EMBER.
- EMBER control over alias files.

V1.8
- Bluelink patchbays.
- SMPTE2020 metadata insertion into SDI embedder outputs.
- User memory load / save from control surface panels.
- EMBER control of user memory loads.
- SW-P-08 mapping file management.

V1.8.1
- Sidecar support.
- 3rd APFL bus set.
- Artemis surround spill / downmix / joystick control panel.

V1.8.1a
- Aux pre cut when fader open option.

V1.8.2
- Calrec Serial Control Protocol supported.

V1.9.2
- Artemis Light support.
- Full router redundancy available for multi-console networks.
- Modular I/O and MADI I/O connections supported by expansion router ports.
- EMBER remote control of console show / memory loads and I/O aliasing.

V1.10
- Support for trunk links to increase bandwidth between routers in multi-rack networked systems.
- Maximum attack time on compressor limiters increased to 200ms.

V1.11
- Delay controls available in units of video frames as well as ms. +/- delay step button controls. Option to set fps & +/- step size.
- Follow Mon1 / Mon2 available as monitor / meter selector sources.
- Hydra Patchbays replace Bluelinks
- Jump to fader feature allows GUI to highlight currently assigned fader.
- Direct talkback button per fader / path enabled.

V1.12
- Automixer
- Dynamics sidechain links
- Display dynamics 1 & 2 processor settings simultaneously on TFT.
- Display dynamics gain reduction for all elements of surround paths along with independence indication.
- Fader setup screen & virtual faders for memories created on larger consoles.
- User memory sequencing.
- Separate brightness controls for buttons/knobs and displays.
- External inputs can directly feed upstand TFT meters.
- System PC support for Windows 7.

V1.12.1
- Support for Dual Router Core Redundancy
- PFL output can be fed from various points in path signal chain (user selectable).
- TFT input meters can be fed from various points in path signal chain (user selectable).

V1.13

- Input port protection (patent pending)
- Output port protection (patent pending)
- Patch Lists in H2O (Hydra2 Salvos)
- Ability to disable external fader control via CSCP
- Monitoring of 144 external inputs
- Tone to Aux outputs
- Option for opening a fader to cancel latched PFL
- Option to disable fader overpress PFL
- Option to disable VCA editing
- Ability to disable a complete automixer
- Simpler and clearer fader labels
- 'Jump to Fader' automatically highlights the patching connectors on the PC Application I/O screens
- Improved consistency of modular I/O native port labels
- Inclusion of DevTools folder in release directory for router diagnostics

V1.14

- Every path now has 2.73 seconds of delay in addition to the assignable input and output delay.
- Mic Open systems. Trigger GPOs when any signal in one of the five Mic Open systems is live to air.
- 16 Loudness meters are now available.
- AWACS messages are now available over SNMP.
- Improved graphics and text rendering on the control surface.
- Further accessibility developments.
- Groups have +/- 24dB of input trim.
- Mix Minus routing can be interrogated.
- EQ strip controls have been rearranged to be more usable.
- Changes to delay unit defaults can be applied to all existing paths.
- H2O can select and overwrite patches made by consoles.
- CSCP interface information is displayed in the External Control screen (PC application).
- Source and Destination Protection now covers channel input1/input2 switching.

V1.14.1

- Replay has been added to allow input 1 to input 2 switching for a definable set of channels.
- Non-Motorised VCA Slave operation has been added as a preference.
- Channel PFLs can now be activated via GPI.
- Trim controls for inputs 1 and 2 can now be linked per channel.
- Surface layouts can now be defined and saved by the user on the fly.
- The range of available compressor ratios has been increased.
- Each path's Cut status is now indicated on its output meter.

V.1.14.2

- More path properties can be copied (Input, Fader, Downmix, Delay, Direct Outputs) and it's now possible to copy between different path types.
- The oscillator can produce a tone sweep and each leg of the oscillator can be cut
- H2O can control SRC, 48V and Gain on Hydra2 sources
- The current sync source is visible at all times in the PC Application footer
- Group PFL and cut can be controlled remotely through GPIs
- A new meter scale is available with markers and color changes at -12 and -18 dBFS.
- The direct output setup process has been improved:
  * Tapping an empty direct output control now brings up the direct output setup dialog
  * The direct output feed can be chosen during setup (Pre EQ, Pre Fader, Post Fader, Mix Minus)
  * The assigned path can be routed to the mix minus bus in the direct output setup dialog
- The Focus Area in Sends-Routes and Outputs modes has been improved
  * The display of which send or output is in focus is much clearer
  * Any adjustment to a send or output will put it in focus
- Minor updates to surface graphics to improve clarity
- Aliases can be created for Hydra Patchbays
- Dual router cores can now be used as slave routers
- Support for MY5792 v2.08

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