

APOLLO OPERATOR MANUAL

V8.1



Digital Broadcast Production Console

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APOLLO

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APOLLO **INFORMATION**

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 radiated emission limits set in the latest EMC (Electro Magnetic Compatibility) standard.

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 its digital products.

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

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

FIG 1 - 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 Fig 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.

FIG 2 - LEAD FREE STICKER



Circuit boards assembled with lead-free solder can be identified (in accordance with IPC/JEDEC standards) by a small oval logo (see Fig 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 (Fig 3) and RAB (Fig 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.

FIG 3 - UKAS REGISTRATION



FIG 4 - RAB REGISTRATION



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 operate 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.

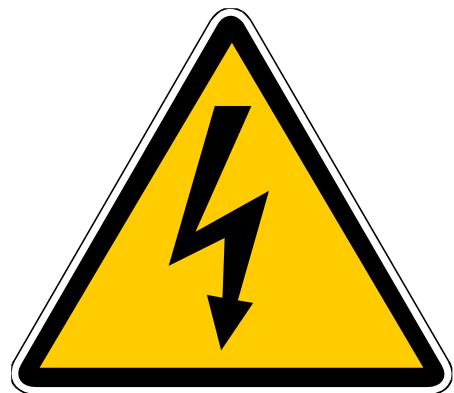
Cleaning

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.

FIG 5 - DANGEROUS VOLTAGES



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. (See Figs 5 & 6)

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 6mm² 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

FIG 6 - IMPORTANT INSTRUCTIONS



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.

TECHNICAL SUPPORT

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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.

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.

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.

APOLLO **INTRODUCTION**

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 utilise 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 48kHz audio

along with control data and error detection on each copper or fibre connection to the router within the console's processing rack.

The physical location of I/O units can be selected to minimise 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 centralise 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 year's 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.

Concord Processors

The 3.0 software release for Apollo and Artemis was huge. So huge, in fact, that it required newer and more capable Concord processors to support all the new functionality. Concord Processors also provide incredible performance improvements to the surface making Apollo and Artemis the most responsive audio mixers available.

To upgrade to software version 3.0 or later, and get access to all the powerful features presented here, surface hardware must be upgraded with Concord Processors.

Control Surface

- Up to 160 standard or dual physical motorised 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

- 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.

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 fibre 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 SAMPLE RATE COMPARISON

SIGNAL PROCESSING AT 48KHZ AND 96KHZ

Apollo	Sample Rate @ 48kHz	Sample Rate @ 96kHz
Input Channels	1020	510
Main Output Buses and LtRt outputs	Up to 16 from Main/Group pool of 128 mono legs 16 LtRt outputs	Up to 8 from Main/Group pool of 64 mono legs Up to 8 LtRt outputs
Audio Group Buses	Up to 48 from Main/Group pool of 128 mono legs	Up to 24 from Main/Group pool of 64 mono legs
Track Output Buses	96	48
Aux Output Buses	Up to 48 mono / stereo from pool of 48 mono legs	Up to 24 mono / stereo from pool of 24 mono legs
Direct / Mix-Minus Outputs	Up to 4 sends per path from pool of 512 mono legs	Up to 4 sends per path from pool of 256 mono legs
Insert Send & Returns	Pool of 256 mono legs	Pool of 128 mono legs
Input Delay	Up to 2.73s per input from pool of 256 mono legs	Up to 2.73s per input from pool of 128 mono legs
Output Delay	Up to 2.73s per output from pool of 256 mono legs	Up to 2.73s per input from pool of 128 mono legs
EQ	6 full bands of parametric EQ on each channel, group & main path	6 full bands of parametric EQ on each channel, group & main path
Dynamics	2 x compressor / limiter & 1 x expander / gate on each channel, group & main path	2 x compressor / limiter & 1 x expander / gate on each channel, group & main path

ROUTER

Apollo	Sample Rate @ 48kHz	Sample Rate @ 96kHz
Integral Router	8192x8192	4096x4096 (minimum) 1 x 96 kHz route = 2 x 48 kHz routes
Hydra2 ports	16 / 32	16/32
Audio Channels per Port	Up to 512	Up to 256

CHANGES TO SCREEN LOCATIONS IN THE MAIN APPLICATION FROM V6.0

For a long time, the Apollo and Artemis main application has grouped functions under the top-level menu items "Other Options" and "Fixed Options".

These titles have been changed to "Show Settings" and "System Settings" respectively. In the screens contained under each of these top-level menus some screens have been moved and in some cases renamed to make them easier to find, and to make it clearer where the data is stored and how it changes.

The "Show Settings" area contains only settings that are stored and recalled at show level.

The "System Settings" area contains the remaining functions that are stored at system level, and do not change with shows.

The table in Fig 1 shows the Old and New names and locations of the various screens for reference purposes before and after the V6.0 release.

FIG 1 - SCREEN LOCATION AND NAME CHANGES IN V6.0 ONWARDS

Pre V6.0	Post V6.0
Misc/Default Settings	General Settings
Inserts Setup moved to System Settings	
Meter Setup	Meter Layout
Mon/Mtr Ext I/P moved to System Settings	
User Split	User Split
Down Mix	Down Mix
Ext Control	Ext Control
Mon TB MTR Patch	External Inputs (from Other Options) (was Mon/Mtr Ext I/P)
	Fixed I/O
Surface Illum	Inserts Setup (from Other Options)
Surface Layout	LAN Config (for 2015 cores only)
Sync	Surface Illum
TX/REH	Surface Layout
	Sync
	TX/REH

96KHZ OVERVIEW FOR APOLLO

With v8.0, Apollo consoles can now work at 96kHz sampling frequency (sample rate).

The following list is a quick overview of the impact of running Apollo consoles at 96kHz:

The consoles can switch between 48kHz & 96kHz working as required.

Consoles switch sampling frequency by loading a show at the required sample rate built from a template at that rate.

The numbers of channels and buses are reduced at 96kHz but the numbers at 48kHz are the same as before.

There is no reduction in the numbers of monitor inputs and outputs at 96kHz.

I/O boxes can be set to 48kHz or 96kHz, or to follow the sample rate of a specific console, via H2O.

The Hydra2 network supports 48kHz and 96kHz consoles and I/O boxes simultaneously.

Hydra2 runs at 48kHz irrespective of whether the consoles and I/O boxes are running at 96kHz or not. It simply uses 2 samples per 96kHz signal.

Because Hydra2 always runs at 48kHz, the system will still require a 48kHz sync (if using its AES3 & Wordclock inputs) even if all consoles and I/O are at 96kHz.

The console patching screens and required list indicate which ports, HPB, aliases, or boxes are at a different sample rate to the desk. These ports etc can be patched (except for System level patches) but will not work until the sample rates are matched.

The H2O patching screens filter the ports visible by sample rate, as it can make patches at either rate.

Consoles cannot successfully make port to port patches (including via aliases) for I/O that is at a different sample rate to the desk. Note these patches can be made in H2O and by SW-P-08 and will work if patched there.

System Status messages are produced for I/O boxes & HPB that are in the required list but are not set to the same sample rate as the desk.

An I/O box can run at 48kHz or 96kHz irrespective of which rack it is plugged into. If a console is running at 48kHz, an I/O box plugged into that rack could be running at 96kHz with another console.

Fixed format 1U MADI boxes do not support 96kHz. They are shown offline when the box is at 96kHz.

SDI de-embedder modules do not support 96kHz on the SDI stream. They are shown offline when the box is at 96kHz.

SDI embedder modules do not support 96kHz on the SDI stream. They are shown offline when the box is at 96kHz.

For the following, at 96kHz the Apollo consoles have half the numbers as at 48kHz for each desk/pack size:

- Channels.
- Mains & LtRt processes.
- Groups.
- Main/Group buses pool.
- Auxes & aux buses pool.
- Tracks & track buses pool.
- Inserts pool.
- Direct Outputs pool.
- Input Delay pool (but each element is still 2.73 sec).
- Output Delay pool (but each element is still 2.73 sec).
- Loudness meters.

For the following, at 96kHz the Apollo consoles have the same numbers as at 48kHz for each desk/pack size:

- Mix Minus bus.
- 4 Track Sends per path.
- 4 Direct Outputs per path.
- Path Delay of 2.73 sec per path.
- EQ & Dynamics per path.
- Dynamics Links.
- Automixers.
- Main Output Downmixes/Main.
- Autofaders.
- External Monitor Inputs.
- Monitor systems and outputs (pre & LS), including Mon 1 Insert.
- PFL & AFL systems including Side-chain listen, APFL and outputs (pre & LS).
- 4 Meter Selectors and outputs.
- Assignable Meter Processes.
- TB & RTB.
- Tone/oscillator including interrupts, external inputs and outputs.

APOLLO CONTROL OVERVIEW

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.

No control, audio or router processing is carried out by the system PC. Processing is carried out on dedicated independent hardware located in the processing rack. The system PC provides a control interface for setup and configuration. The control surface itself, as well as audio and routing systems will all boot and continue to run irrespective of whether or not the PC is active or powered.

Peripherals

A standard control surface will have the PC's touchscreen monitor mounted to an adjustable arm on the right hand side. A keyboard with trackball is normally located in a retractable tray mounted to the underside of the surface at the right hand side. As an option, consoles can be built with the PC peripherals on the left-hand side. Consoles are also often ordered with PC monitor screens and keyboards on both sides of the surface. In these cases only one of the pair will be connected to the system PC, the other set is typically used to control 3rd party equipment such as playout systems.

Windows login

The default user login for operators is '**calrec**' and requires no password.

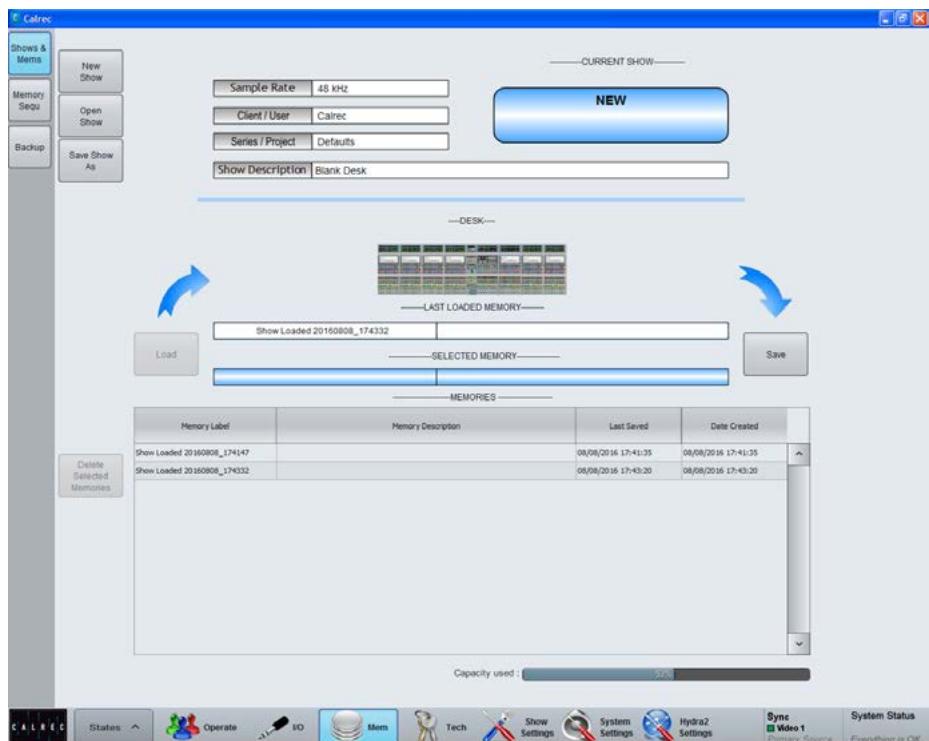
Main application

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 Start menu.

Fig 1 shows the layout of the main application. Along the bottom edge of the application is the main menu which

FIG 1 - MAIN APPLICATION



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 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.

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.

Installing 3rd party software

Although not relied upon for console operation, the system PC should be considered as broadcast equipment. Installation of software unauthorised by Calrec may impact on the PC's performance and as such can invalidate the warranty.

Power and reset

The system PC should automatically boot up when the control surface is powered. If the PC screen is dark and does not wake up when the trackball is moved, check the AC power to the back of the monitor and that it has not been turned off by pressing its' power switch. A simple way to check if the PC is powered is to press Caps Lock on the keyboard and check if the Caps Lock LED on the keyboard responds. A reset switch for the PC is located behind the keyboard, at the rear left-hand side. If the PC has been shutdown but is still powered. Pressing the reset switch should reboot it.

Online Documentation

Electronic versions of all documentation may be accessed on the configuration PC.

TOUCH OVERVIEW

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

The configuration 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 Fig 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 while touching other controls. Fig 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 Fig 3.

FIG 1 - TOUCH/TAP

Touch the screen momentarily and then release in the same position

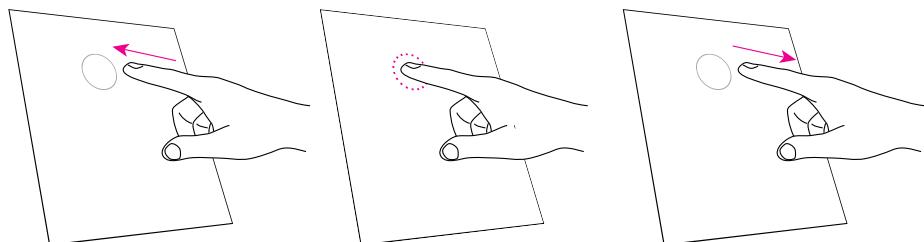


FIG 2 - HOLD AND TOUCH

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

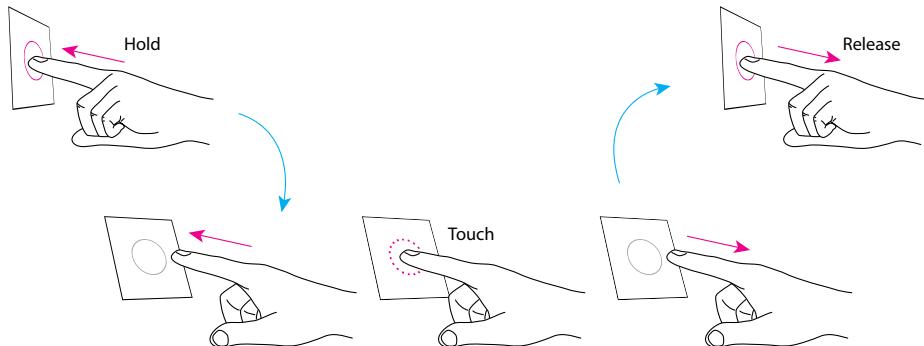
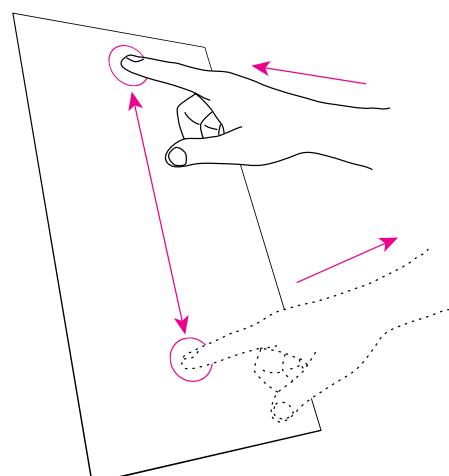


FIG 3 - SWIPE

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:

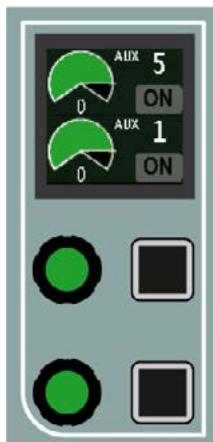
Rotary controls

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

Buttons

The small square and triangular buttons, like the rotary controls, change colour 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.

FIG 1 - CONTROL CELL



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 Fig 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 in Fig 2, the buttons map directly to the nearest control cell display. Each graphic display is split into up to four functions. Buttons above and below point to the functions on the displays that they control. Some functions are shown the full width of the display. In these cases, pressing either of the two buttons will activate the function.

A strip across the centre of a button cell is sometimes used as a label. Labels sometimes span across more than one display and sometimes a cell may have a label but no associated button functions.

FIG 2 - BUTTON CELL



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 dependent on the wild assign panel mode.

Rows

Certain horizontal sets of controls are used together to group similar controls. These are known as **rows**. See Fig 3. Each row on the surface has a name, such as 'Functions row' or 'Modes row'. The rows are identified on the next page.

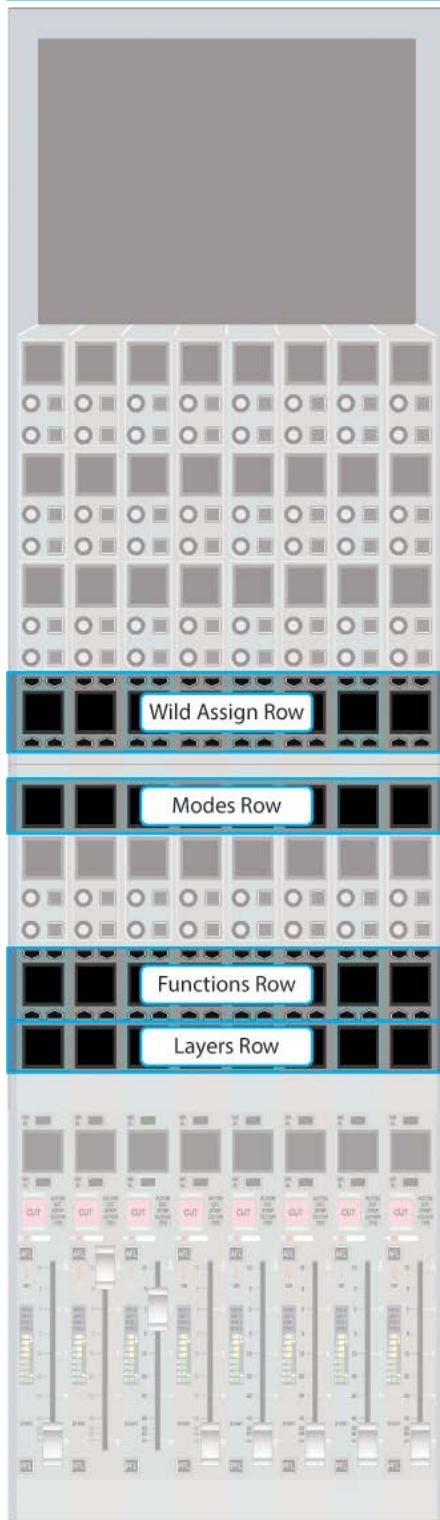
The Layers row and Modes row always span the width of the panel and contain controls that do not relate directly to a specific fader.

TFT touchscreen

Various control parameters in the different panel modes are changed using buttons located on the TFT touchscreen of the Wild Assign panel.

If a touchscreen is found to be inaccurate, it can be calibrated - Press the Tools button in the right-hand button-cell of the modes row. This replaces the fader layer select buttons with setup functions. Press the Misc button, then select CAL TFT from the row of button cells above. From a normal seating position, press the TFT touchscreen in the centre of the targets presented. Once complete, change the panel mode to refresh the display.

FIG 3 - ROWS

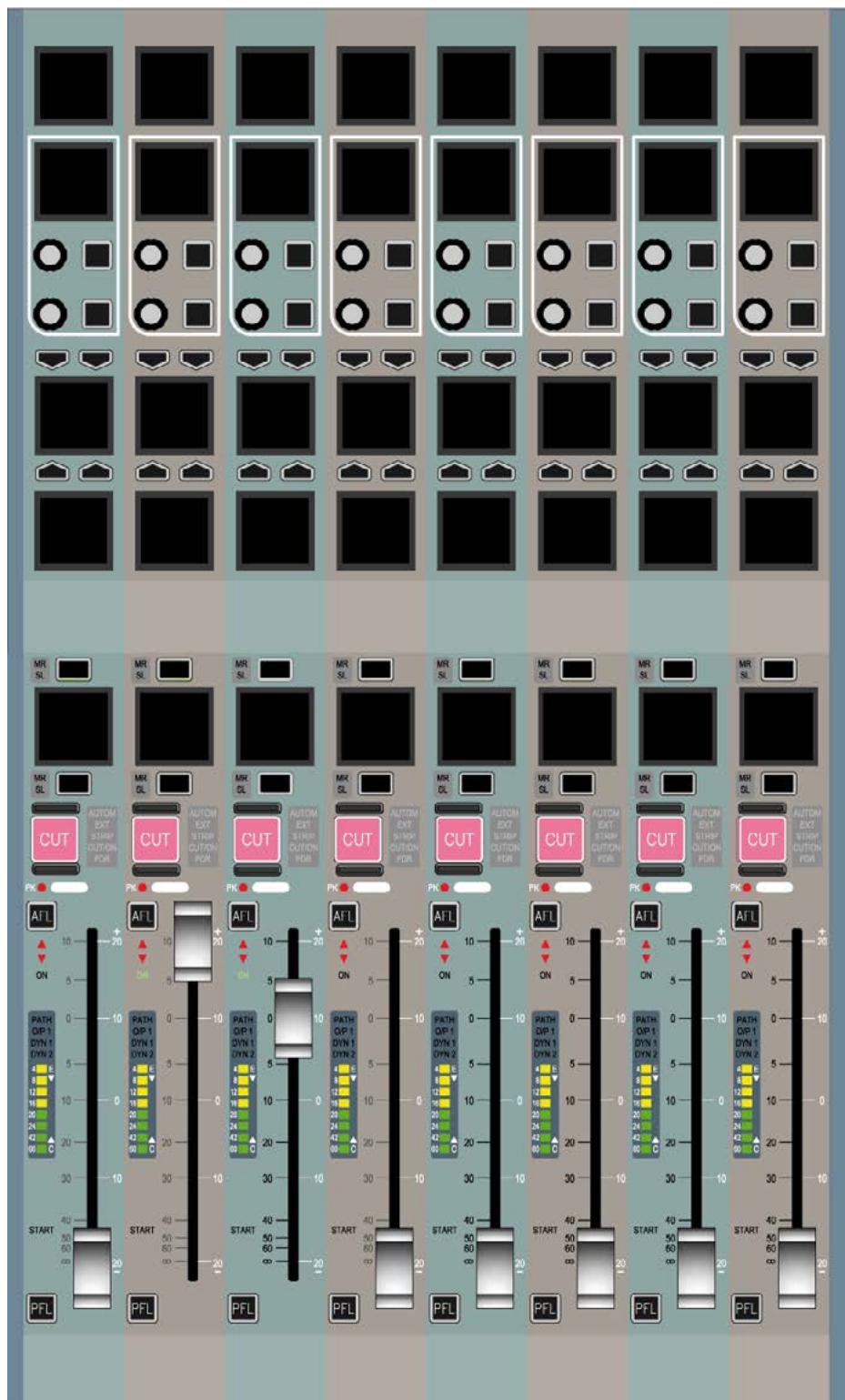


SURFACE PANEL OVERVIEW

Fader Panel

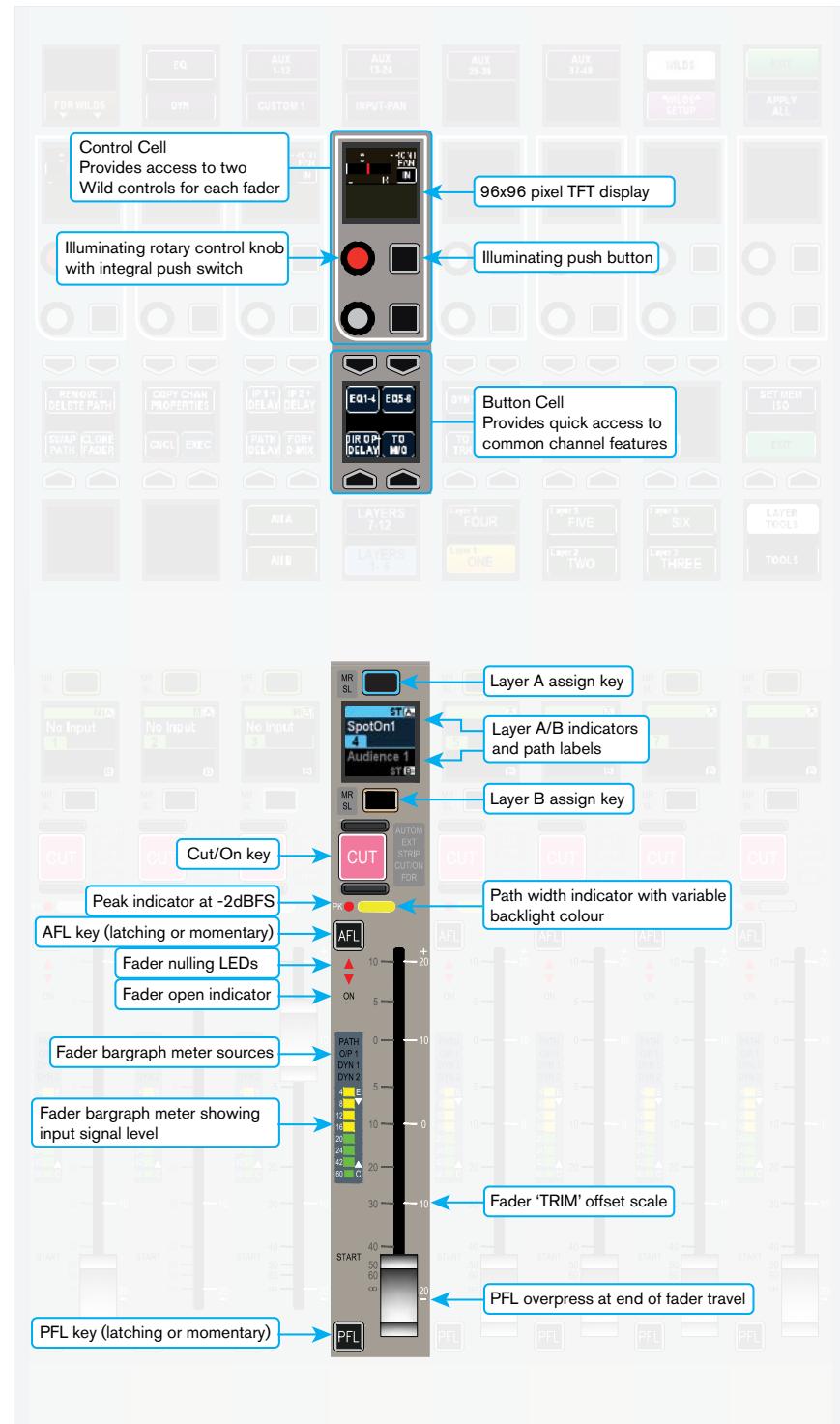
Each fader panel consists of 8 fader strips at a fader pitch of 30 mm. Each fader strip contains an A/B assign section, a button cell and a control cell. A blank fader panel is shown in Fig 1.

FIG 1 - FADER PANEL



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

FIG 2 - FADER PANEL CONTROLS



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

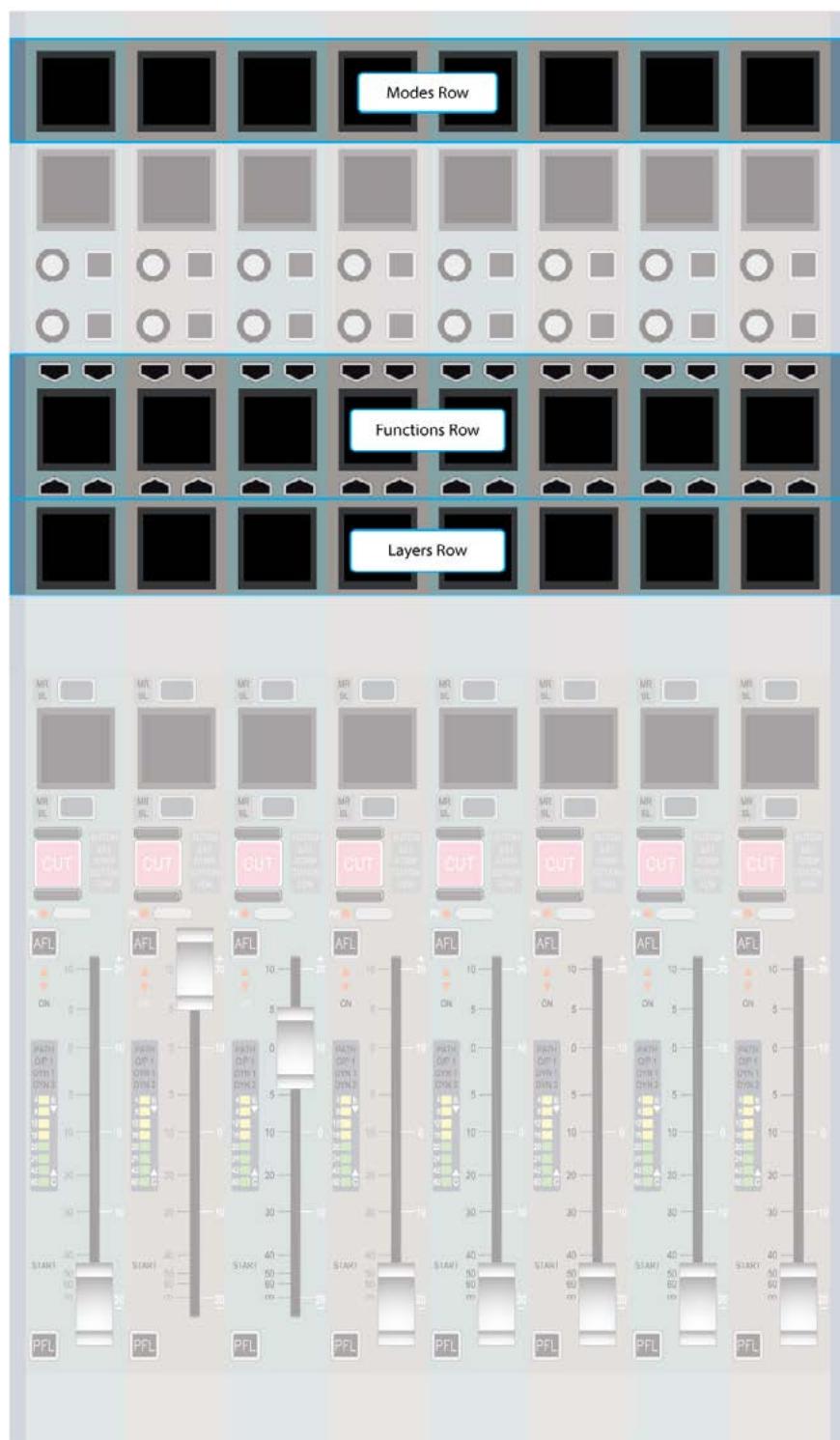
The Modes row is used to control the mode of the wild assign panel above it.

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.

FIG 3 - FADER PANEL ROWS



Wild assign panel

Each wild assign panel consists of 24 identical dual rotary control cells and a row of 8 identical quad button control cells as shown in Fig 4.

The bottom row of the wild assign panel is used to provide additional switch controls for the assigned channel or page selection for the 'rotary' 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, Strips or Wilds mode.

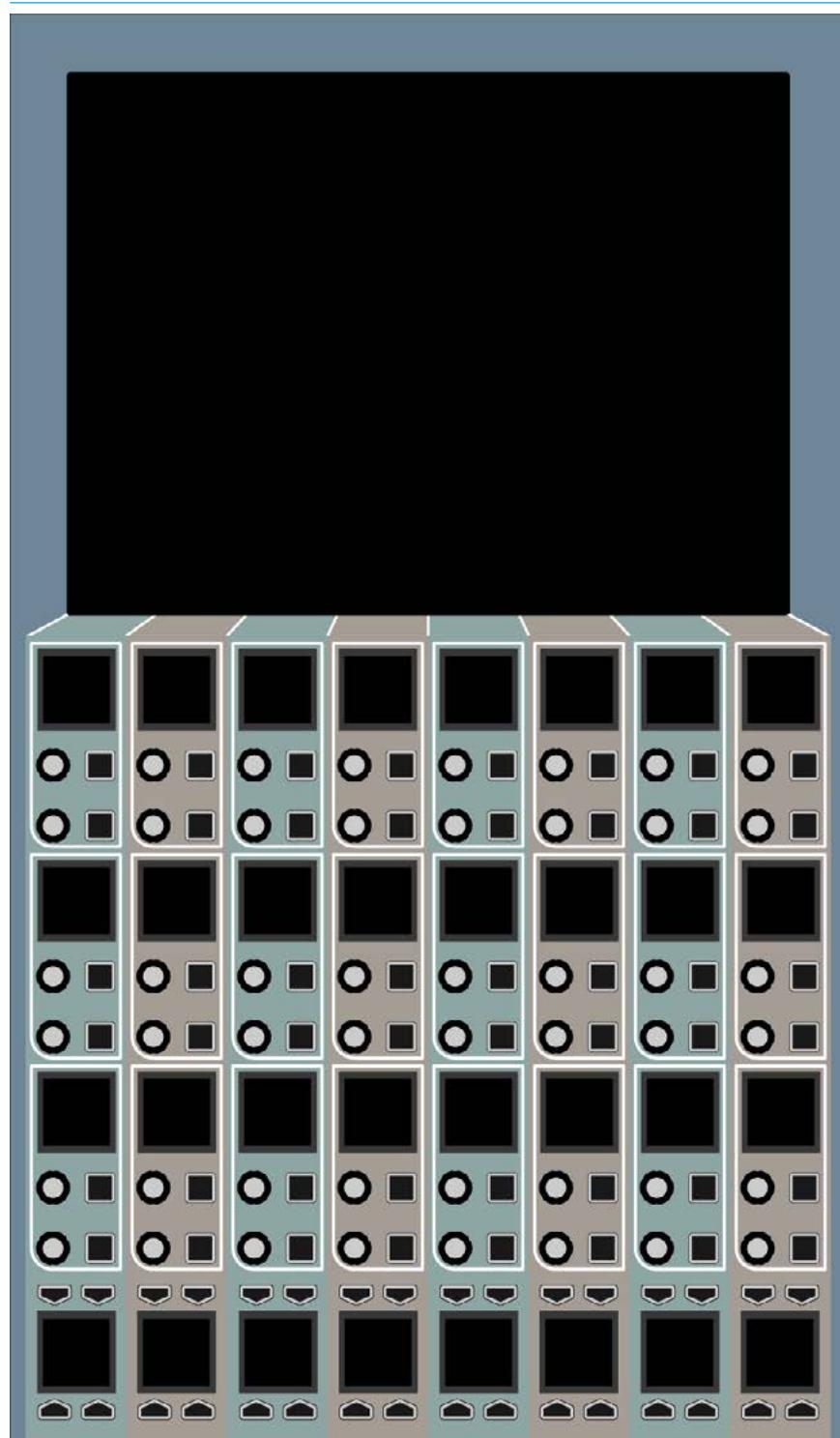
Assign mode makes the panel function as an assignable panel. In much the same way as previous Calrec assignable consoles, such as Alpha, a range of parameters are displayed that reflect the values of, and allow control over, the currently assigned path.

Strips or Wilds mode splits the panel up into eight vertical strips effectively providing six additional strips 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.

FIG 4 - WILD ASSIGN PANEL



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

FIG 5 - WILD ASSIGN PANEL CONTROLS

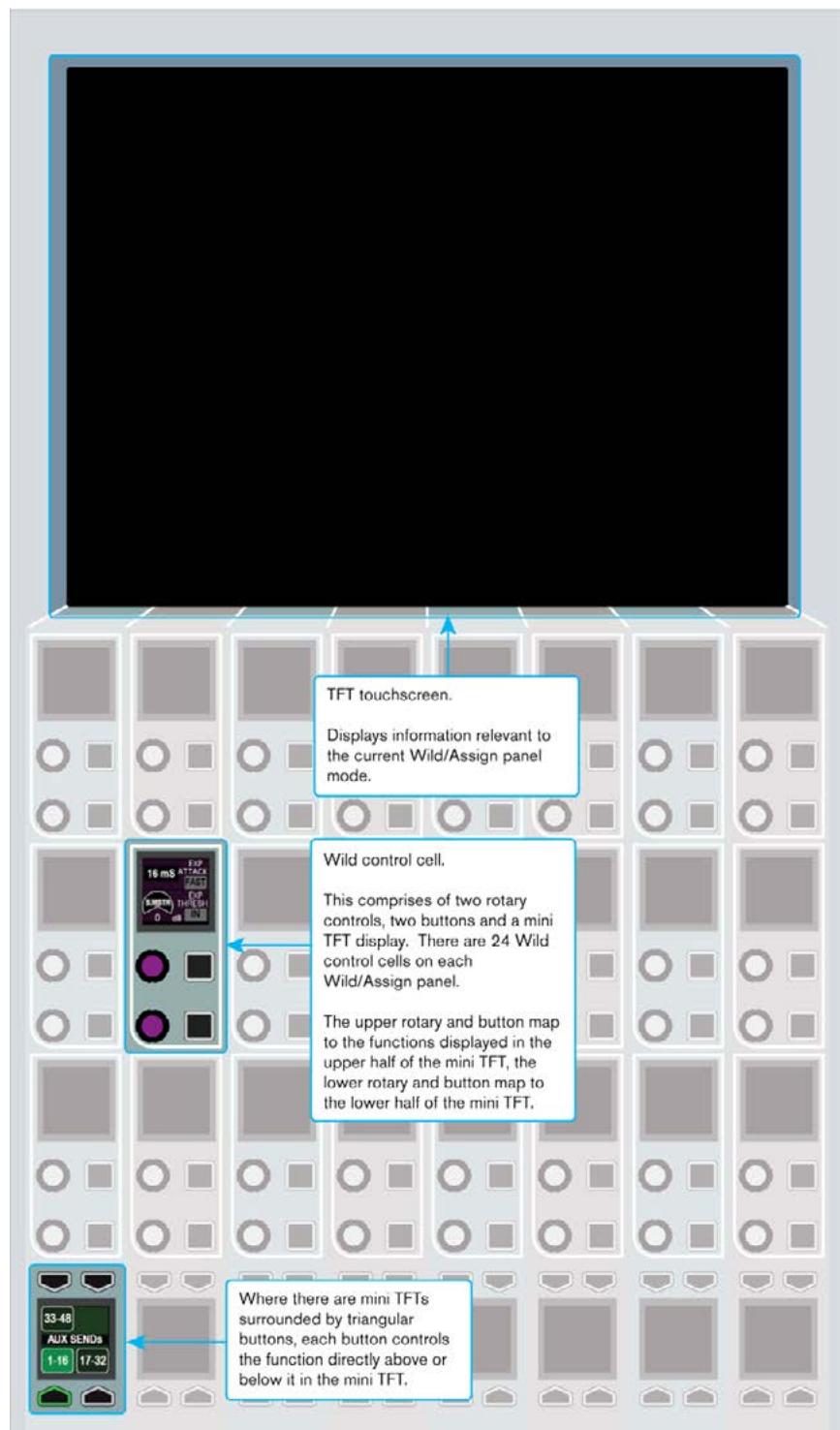
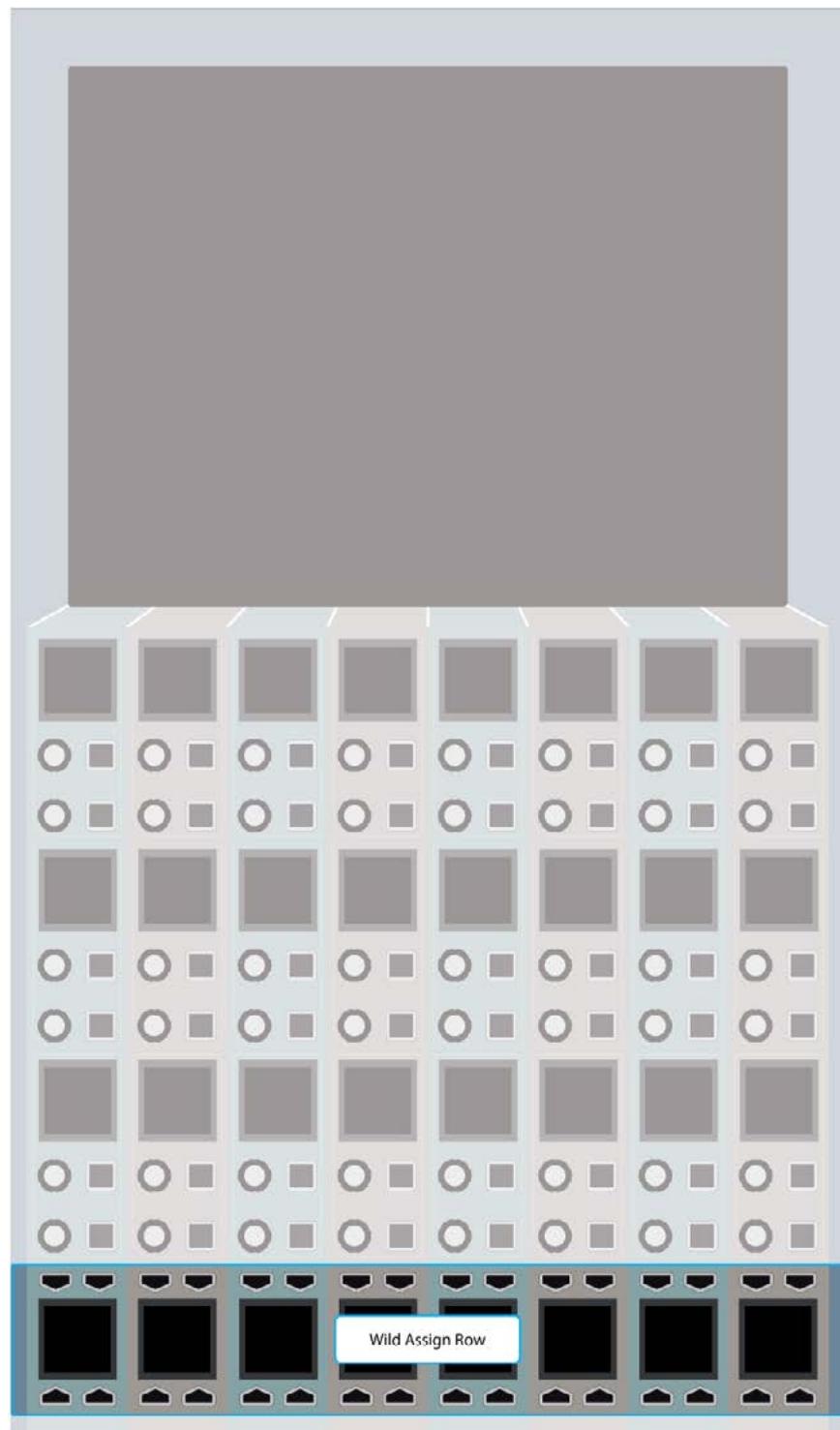


Fig 6 highlights the quad button row at the bottom of the wild assign panel. This row is known as the wild assign row. In Assign, Outputs or Monitor mode this functions as a panel wide row working with various controls in the control cells and mini TFTs above.

In Strips or 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 per fader.

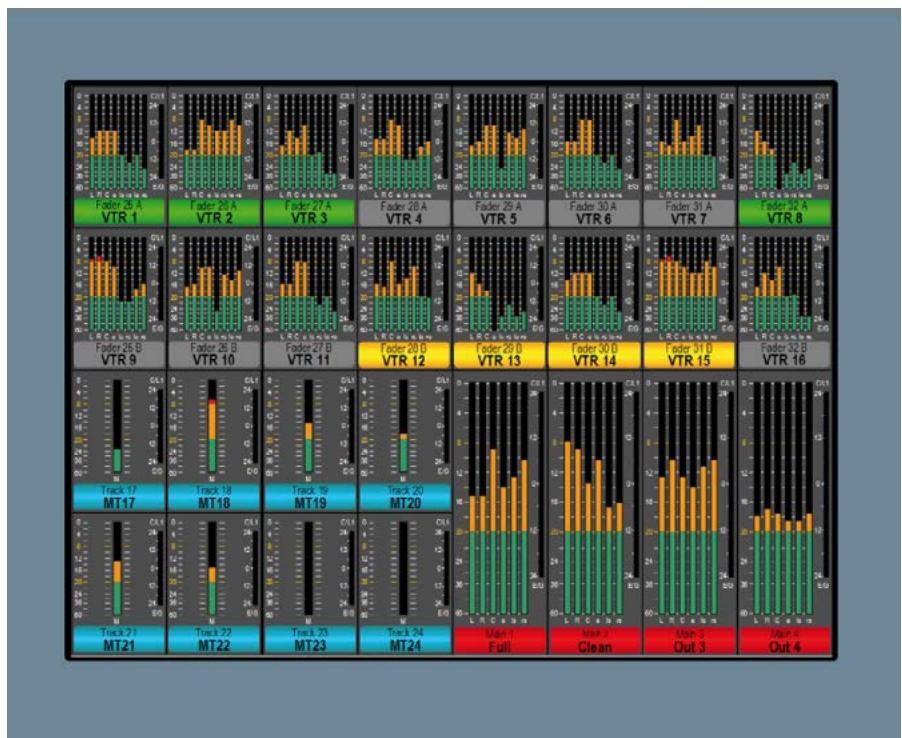
FIG 6 - WILD ASSIGN PANEL ROWS



TFT Panel

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

FIG 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 motorised 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 customer illuminating buttons which can be configured to act as general purpose controls or indicators. See Fig 8.

FIG 8 - MONITOR PANEL

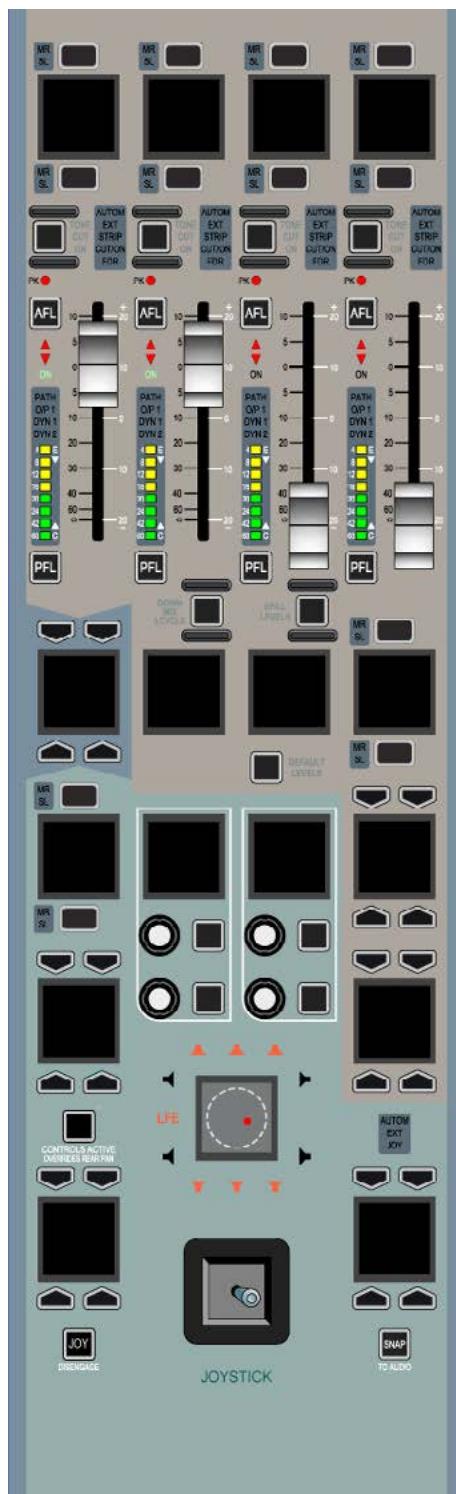


Joystick Panel

Like the monitor panel, this panel (see Fig 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 motorised joystick.

FIG 9 - JOYSTICK PANEL



Broadcast Facilities Panel

The Broadcast Facilities panel is shown in Fig 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.

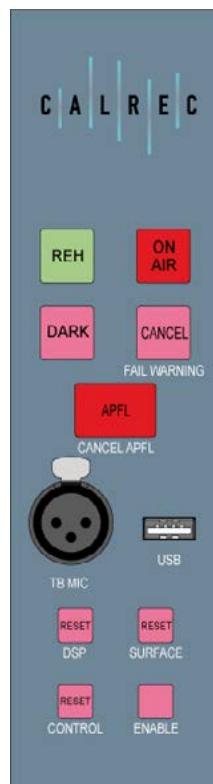
Under these is an APFL indicator which lights if the main monitoring is being overridden by AFL or PFL. This is also used to clear any latched AFL and PFL when pressed.

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.

FIG 10 - BROADCAST FACILITIES PANEL



Dual Fader Panel

The Apollo dual fader panel is shown in Fig 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 motorised 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

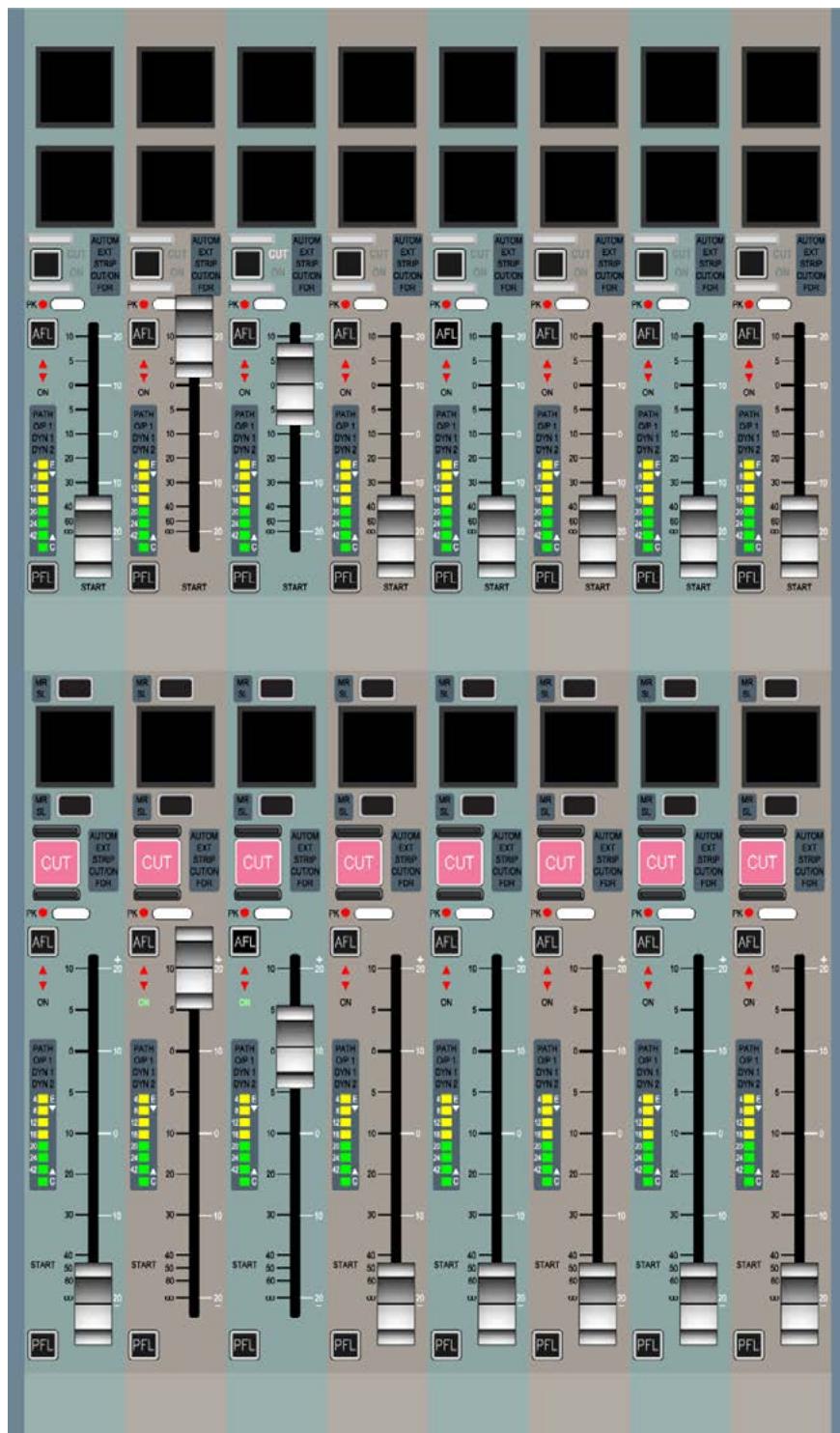
The Layers row and Modes row from the standard fader panel remain in place but are both situated at the top of the panel as shown in Fig 12. Both rows are touch sensitive as on the standard fader panel.

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.

FIG 11 - DUAL FADER PANEL



The A and B assign buttons assign the paths to any 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 its assign button illuminated blue as on the standard fader panel.

Strips or Wilds mode

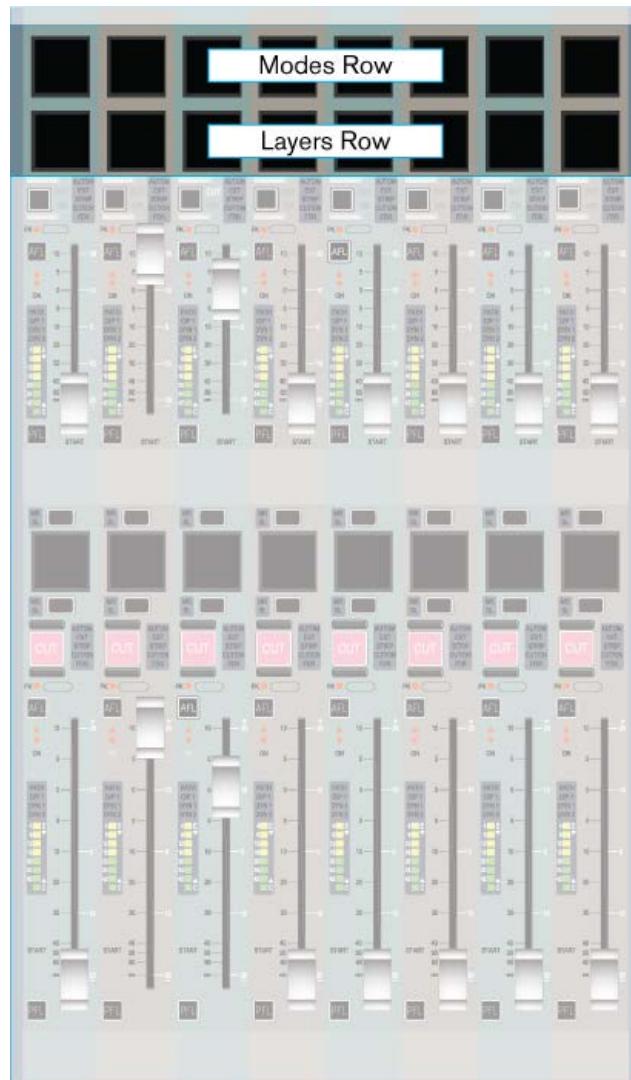
When a wild assign panel is located above a dual fader panel and is switched into Strips or Wilds mode, the path which the controls relate to (the active path) is determined by which assign button A or B is selected for each fader. The active path for each fader can be changed by pressing the relevant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

FIG 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++ (Fig 13) or the RTW 10800 range (Fig 14).

FIG 13 - DK METERING PANEL

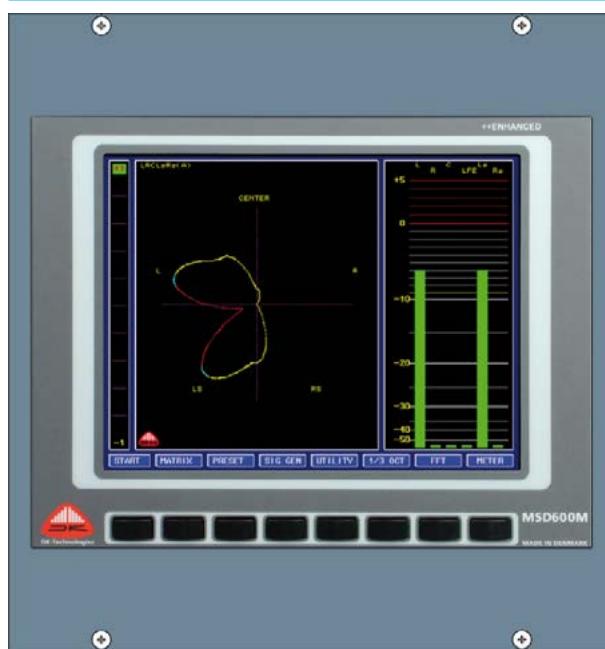
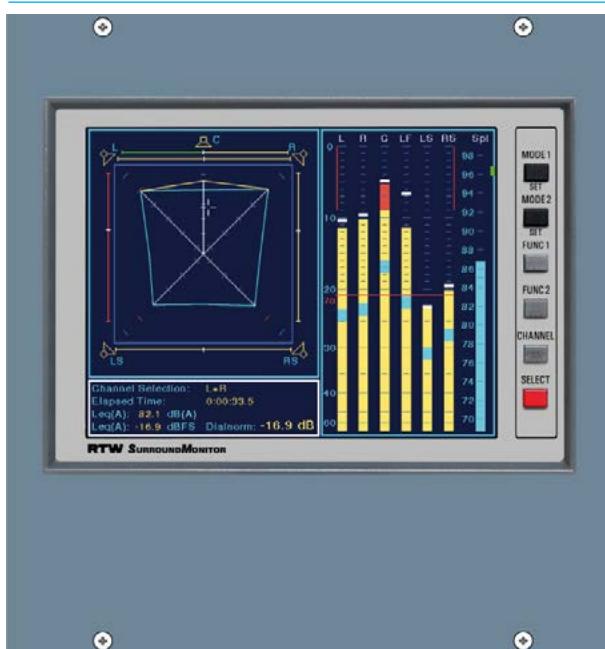


FIG 14 - RTW METERING PANEL



PANEL MODES

Wild assign panels can operate in six 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 six panel modes available are:

- PROCESSING
- SEND-ROUTE
- BUSES & OUTPUTS (Outputs)
- MONITOR (Monitoring)
- WILDS (customer defined controls)
- STRIPS (in-line controls)
- OFF Each panel-mode area can be set to off if only one instance of each mode on the surface is to be shown.

To set a wild assign panel into one of these modes, touch the desired mode on the modes row shown in Fig 1. This is located at the top of the fader panel, as highlighted in Fig 2. The modes row on a given fader panel sets the mode of the wild assign panel directly above it.

Apply Mode to All Panels

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

Mode Lock

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 MODE TO ALL PANELS is used to change the rest of the surface. Press the MODE LOCK button again to unlock.

Fixed layout

FIXED LAYOUT is a fixed arrangement of modes on the surface panels included to allow the user to return to a default layout.

User Layout

User layout is a stored arrangements of modes on the surface panels. The USER LAYOUT button in the lower half of the modes row allows switching to this layout.

An example layout is shown at the top of Fig 3 on the next page. 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 Strips or Wilds controls and a centrally assignable surface at the touch of a button, and switch back with the same ease.

Setting up/Recalling the User Layout

To set up the 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 the USER LAYOUT button. The text will change briefly to USER LAYOUT SAVED to show that the process has been successful.

Press the USER LAYOUT button to recall the saved panel mode arrangements.

Assignable modes

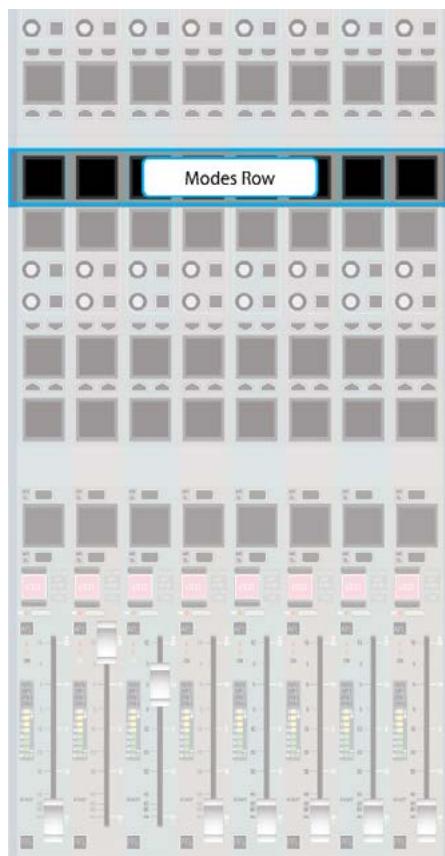
The PROCESSING and SEND-ROUTE panel mode are two of the most commonly used modes. Both are assignable control modes, in that they display information for, and can adjust parameters of the currently assigned audio path.

Unless user splits have been put in place for multiple operators, only one audio path is assigned at any given time. The currently assigned path is shown on

FIG 1 - PANEL MODE OPTIONS (SET TO OFF)



FIG 2 - LOCATION OF MODES ROW



the TFT screen in the upstand when displaying either of the two assign modes.

If the currently assigned path is on an active fader layer, it is highlighted by its fader label display & 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 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 currently assigned. For example, mono and stereo paths have different pan controls available. Paths with analogue 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.

FIG 3 - EXAMPLE LAYOUTS

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

Assign Modes

Monitor Mode

Outputs Mode



As above but with Strips or Wilds Mode on unused wild assign panels

Strips or Wilds Mode

Assign Modes

Monitor Mode

Outputs Mode

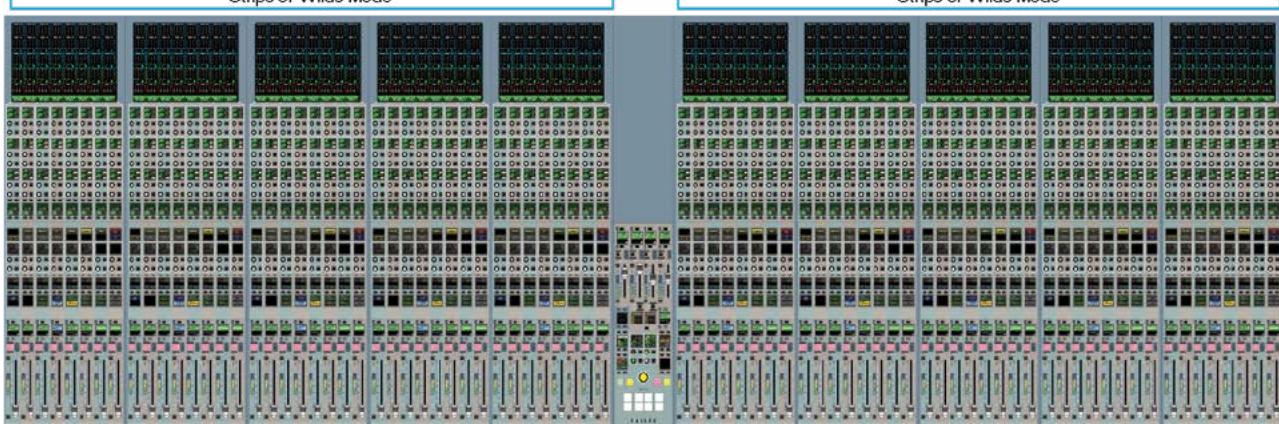
Strips or Wilds Mode



Strips or Wilds Mode on all wild assign panels

Strips or Wilds Mode

Strips or Wilds Mode



ASSIGNING PATHS

An important concept of Calrec consoles is that of assignability.

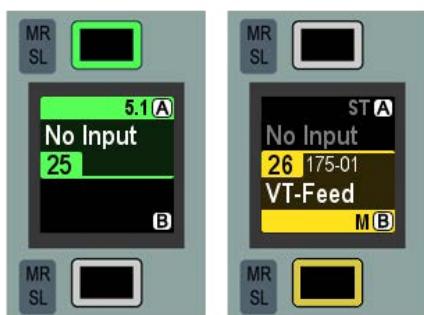
This allows controls to be shared amongst all paths, reducing physical space requirements and providing quick and familiar access.

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 a display and two buttons as shown in Fig. 1 below. The display shows the name of the A and B paths of each fader. The lower section (green) shows the A path and the upper 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 coloured with the relevant colour and has the relevant assign button lit.

FIG 1. - ASSIGN BUTTONS



To assign either of these paths, press the relevant button above or below the display (above for path A, below for path B).

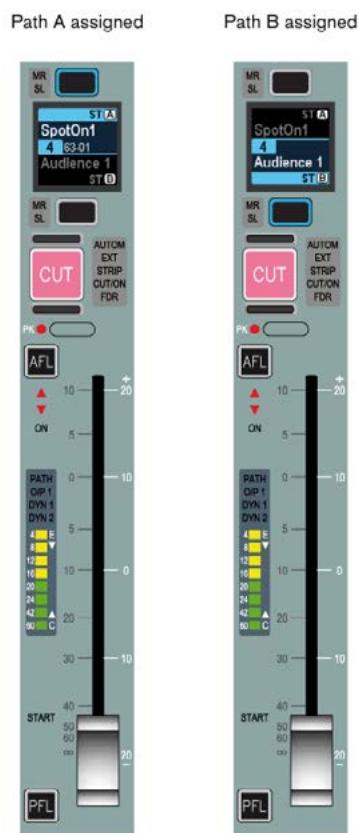
Note that the positions of the A and B buttons are swapped over if a dual fader panel is included in the surface layout.

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 Fig 2 (shown right).

Other areas of the surface that are set up to respond to Assignments will display and control parameters of this selected path.

FIG 2. - A/B PATH ASSIGNMENTS

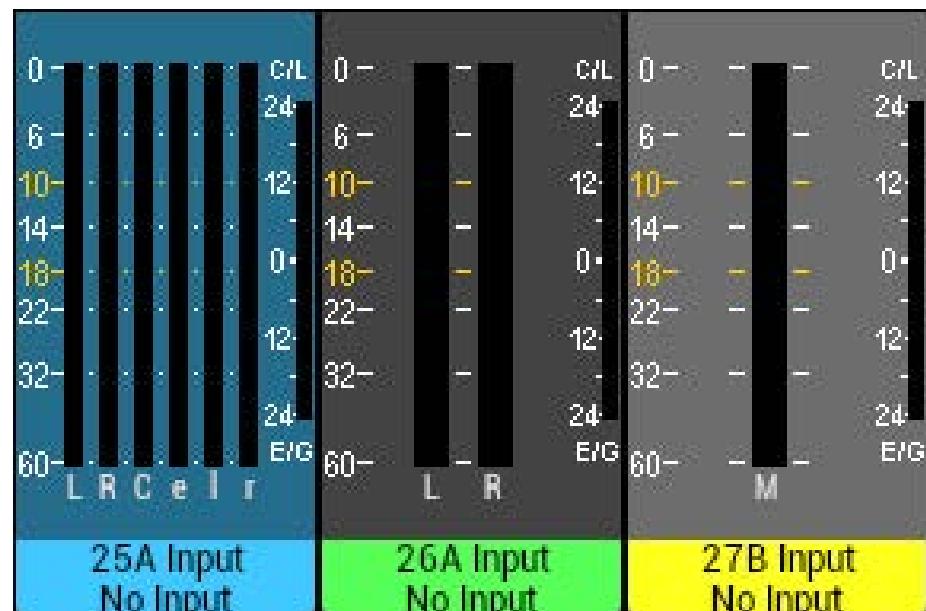


Current Assign and Fader Touch indication shown on meters

When an Assign button is pressed the associated meter highlights in a matching colour to the blue Assign button and blue background for the Fader display. This is to further clarify which is the currently assigned path, see Fig 3 Fader 25A below.

In addition when fader knobs are touched the background of the associated upstand meter highlights to indicate those paths, see Fig 3. Fader 27B below right.

FIG 3. - CURRENT ASSIGNMENT AND FADER TOUCH SHOWN ON METERS



USER SPLITS

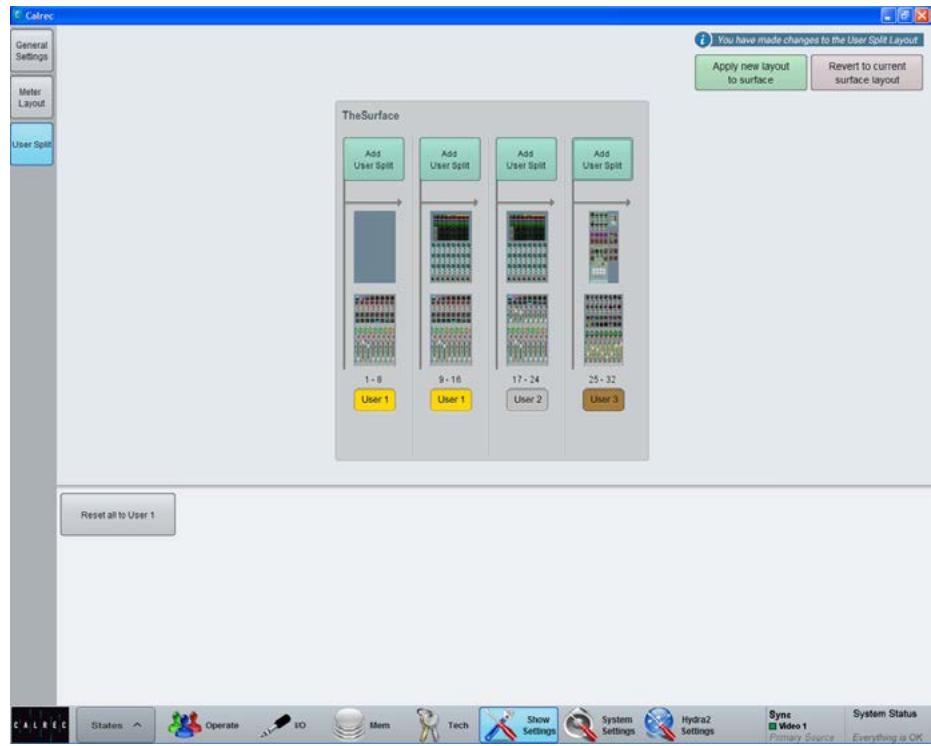
User splits allow the control surface to be sectioned, allowing multiple operators to work without impacting upon each other.

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 PROCESSING & 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 area 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 other's monitoring. Please refer to Monitoring section for details on configuring monitoring for multiple users. See "Monitoring for multiple users" on page 140.

FIG 1 - MAIN APPLICATION, SHOW SETTINGS>USER SPLIT SCREEN



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. See Fig 2.

FIG 2 - ACTIVE USER SPLIT ON LAYERS ROW



Creating / removing user splits

User splits are managed from the Main Application >Show Settings>User Split screen. See Fig 1. 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 'Apply new layout to surface' button in the top right corner to apply the user split settings on the screen to the control surface, or 'Revert to current surface layout' to put it back as it was.

The User split configuration is saved in the Show. No changes are applied to the surface until the 'Apply new layout to surface' button is clicked.

Clicking the 'Reset all to User 1' button will remove all user splits.

LAYERS

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

Layer selection is performed from the right hand side of the Layers row of any standard control bed panel, as shown right. If the layer select controls are not visible on a particular panel, it is likely to be in Tools or Layer Tools mode - press the Tools/Layer Tools button, or the exit button in the row above to return to the default modes row menu. Fig 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 its 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 organised collections of sources. A path may appear on multiple layers simultaneously.

FIG 1 - LAYERS ROW

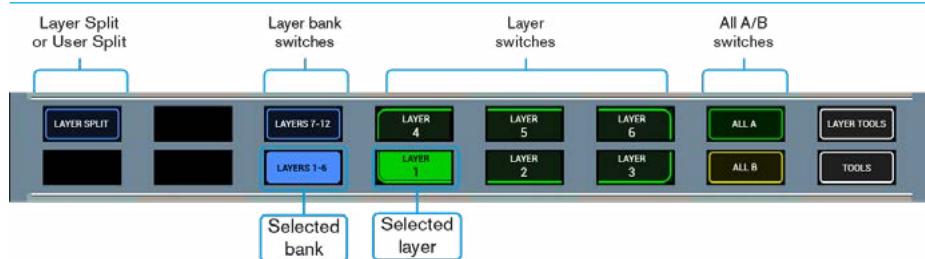


FIG 2 - LAYER TOOLS



Layer Locking

A path can be locked to a fader and remain 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. See Fig 2.

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.

APOLLO **CONTROL PANEL MODES**

PROCESSING

The Processing mode is actually a set of viewing modes to control the processing of an assignable path, in that it displays information for, and can adjust certain parameters of the currently assigned audio path.

The currently assigned path, and therefore the focus of the control panel is shown on the TFT screen. The controls available in an assignable panel mode may change depending upon the type of audio path which is currently assigned. For example, paths with mic inputs patched have additional gain and power controls, whilst paths with digital inputs have sample rate convertor controls.

The view shown in Fig 1 is known as the Overview mode which gives you access to a combination of critical operational controls. You can adjust EQ gain and frequency for all bands. Tweak the threshold and ratio of a compressor, or the threshold and depth for a gate. Quickly dial in input delay, path delay, or output delay if on a bus. Switch the insert on or off, change stereo path width, disable AutoFaders, and override remote control.

Overview provides the essential controls you need to reach quickly. If you need more detailed control, change to the dedicated EQ, Dynamics 1, Dynamics 2, Delay, or AutoFader views by selecting them from the icon button cells at the bottom of the panel mode area which show a thumbnail representation of each processing function as shown.

Path input controls are coloured red, running down the left hand side of this panel mode with buttons extending into the TFT display above. EQ controls are colour coded teal and spans 7 columns of control cells.

Dynamics controls also span 3 control cell columns and are colour coded purple. The remainder of the rotary controls deal with Delay, Stereo Width and Pan. In addition there are a number of switch controls related to Inserts, Autofaders and External Control.

FIG 1 - PROCESSING ASSIGNABLE PANEL OVERVIEW MODE CONTROL LAYOUT



The TFT screen above shows the Equaliser curve with its band markers, numerical values and response type, it also shows separate Dynamics 1 & 2

curves with numerical values and gain reduction bargraphs, the AutoFader status diagram with its settings and the current position of the Insert in the audio chain.

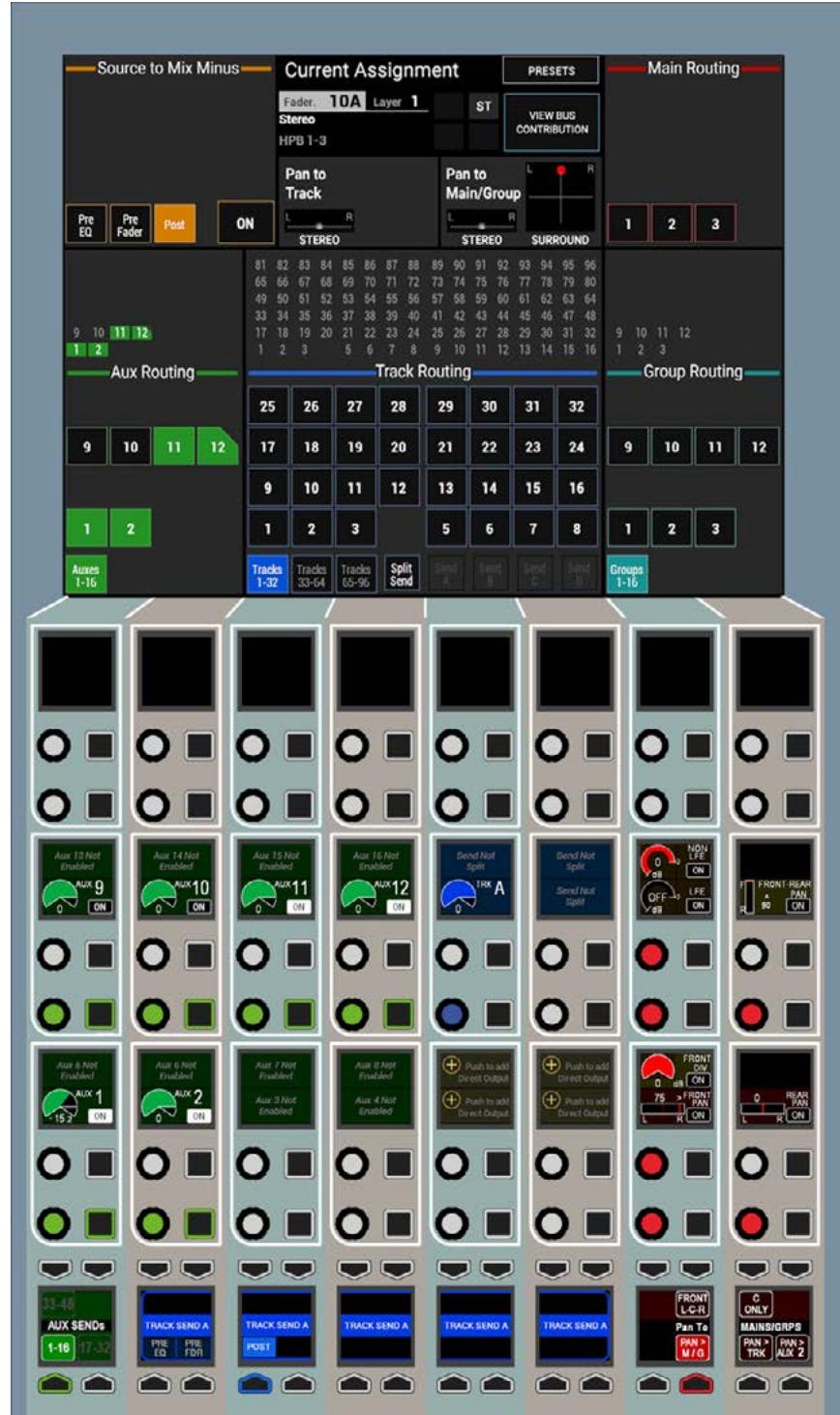
SEND-ROUTE

The Send-Route mode is also an assignable panel mode, in that it displays information for, and can adjust parameters of the currently assigned audio path.

Like the Processing mode, the currently assigned path, and therefore the focus of the control panel is shown on the TFT screen.

This panel mode allows for the currently assigned path to be routed to the various buses / outputs that are available. The TFT screen provides routing buttons and displays whilst the panel below provides colour coded rotary controls for send levels to applicable outputs, such as Auxs, Track sends and Direct outputs. Pressing down on a rotary encoder highlights that send in the bottom row of controls providing further options such as pre-fader / post fader switching. The last two columns of control cells provide pan controls for positioning of the path's output. See Fig 1.

FIG 1 - SEND-ROUTE ASSIGNABLE PANEL MODE CONTROL LAYOUT



OUTPUT MODE

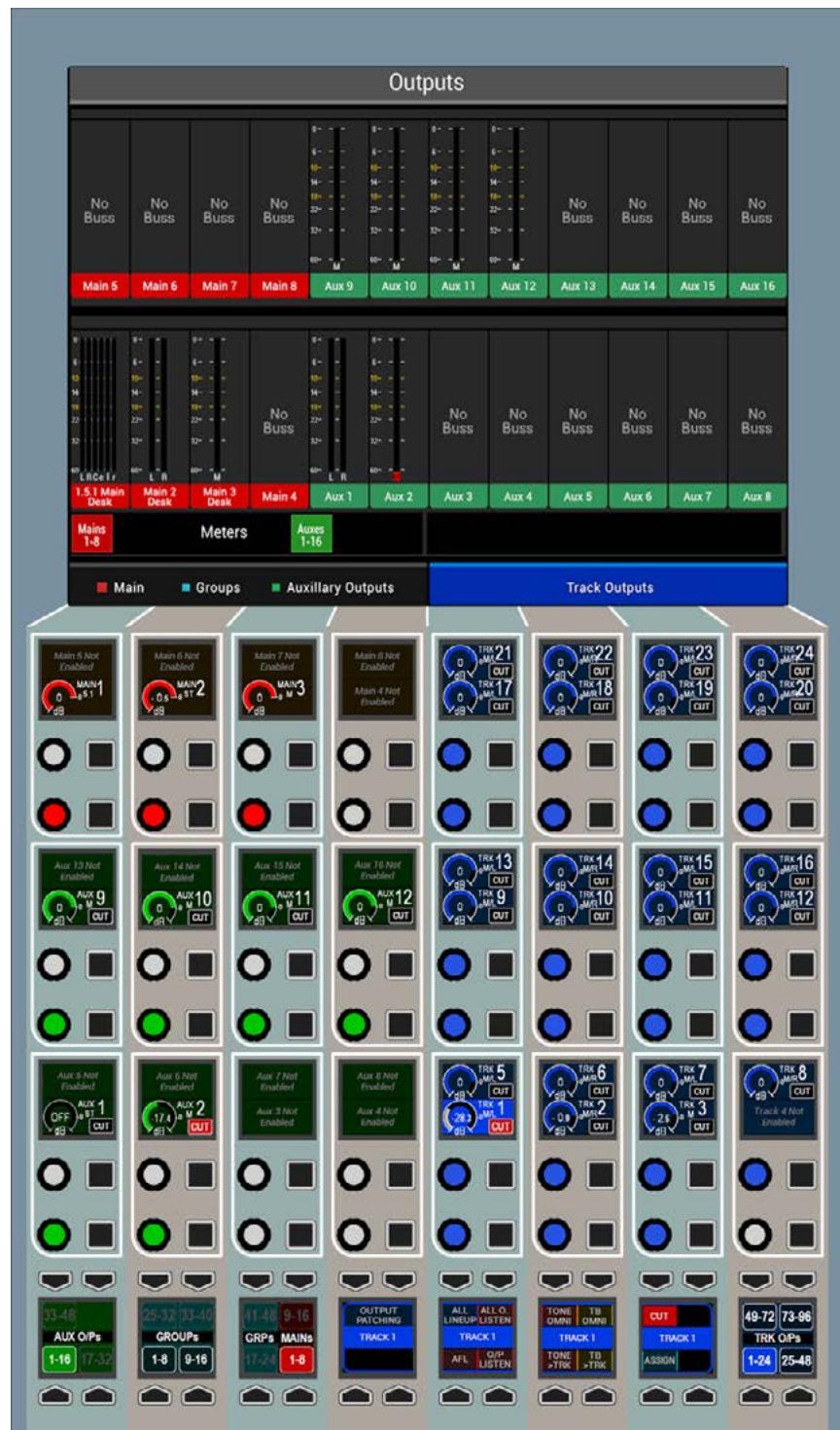
Outputs mode provides controls for manipulating output paths such as Main outputs, Track outputs, Aux outputs and Groups.

The TFT display provides audio bargraphs for Main and Aux buses. The control cells below are colour coded by output type, providing level controls and cut buttons if applicable for each output / bus. Button cells in the bottom row allow for different groups of outputs / buses to be viewed in the control cells above.

Pressing down on a rotary control highlights that output/bus in the bottom row for additional controls such as listens, tone and talkback selectors.

For Main and Group buses, this area also includes an Assign button, allowing that bus to be assigned and be the focus of PROCESSING & SEND-ROUTE panel modes without the need to have the bus on a physical fader. See Fig 1.

FIG 1 - OUTPUTS MODE CONTROL LAYOUT



MONITOR MODE

Monitor mode complements 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.

The four monitor pre-selectors, along with four meter selectors are located in the bottom row. Pressing SEL on any of these makes it the focus of the right hand side of the TFT screen, allowing for the source to be changed and for miscellaneous settings to be applied.

The button cell to the left of the meter selectors allows for the panel to switch between controlling monitor output 1 and monitor output 2. See Fig 1.

The button cell at the bottom left switches the left hand side of the TFT screen between talkback functions and a user memory load / save screen see Fig 2.

FIG 2 - MEMORIES SCREEN ON CONSOLE MONITOR MODE

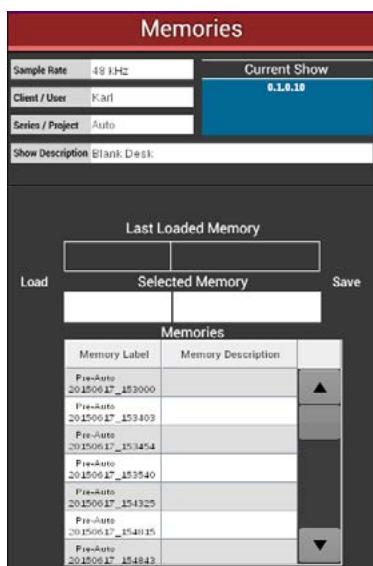


FIG 1 - MONITOR MODE CONTROL LAYOUT



WILDS MODE

WILDS mode allows the user to configure custom wild controls within the Assign and single Fader panels. It requires another panel in that User section to use as the selection source.

Setting Up Wilds mode

To access Wilds mode across both the Assign and single Fader panels, select the SET UP WILDS key on the modes row whilst in WILDS mode. If WILDS mode is **not** selected, then the SET UP WILDS key is shown as SET UP FADER WILDS and solely acts on the single Fader panel see “[Setting Up Fader Wilds](#)” on page 48 for details.

Dual fader panels will only show the SET UP WILDS key if WILDS mode is engaged, as Fader Wilds are not available.

To show a panel is in SET UP WILDS mode, the fader display toggles between normal and ‘Setting Up Wilds’.

To leave Set Up Wilds mode, press the BACK TO MODES touch key in the modes row.

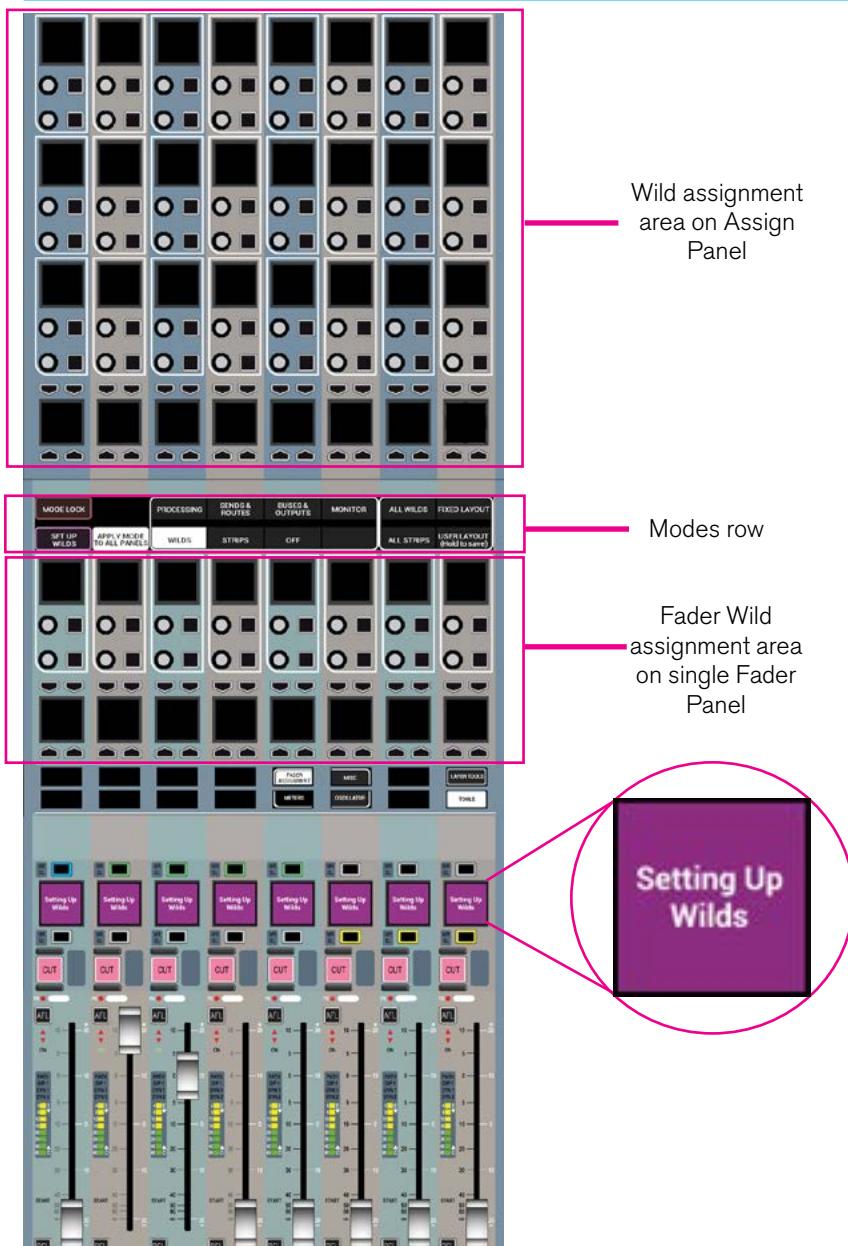
Selecting Wilds

Any combination of Wildable path controls can be assigned to the rotary controls and buttons in the Wild assignment areas in Fig 1.

In SET UP WILDS mode, press the rotary control or button of the assignable wild to be set which will flash red to indicate that selection for change. Note that only one rotary control or button can be selected at the same time in the same column.

A range of controls can be selected by pressing and holding two similar wild controls on the same row at the same time.

FIG 1 - WILD ASSIGNMENT IN WILDS MODE



If the LINK WILD SELECTIONS button is selected, any subsequent press of a wild control will select the entire row - through all layers of the console - and put them all into selected wild assignment flashing red.

Memorising Wilds

Once wild assignments have been created they are stored in memories and can be copied elsewhere using the Copy Path tool or using Presets which also allows Wilds to be transferred between Apollo & Artemis consoles.

Assigning and Clearing

Once a wild control has been selected for assignment, any other valid control from a different panel within the same user section can be used as the source for duplication. Once applied, the wild will immediately display the same control as the source.

The process for selecting and assigning wilds is shown in Fig 2.

If an invalid source selection is made, the relevant fader display will show the message 'Cannot Assign Control':



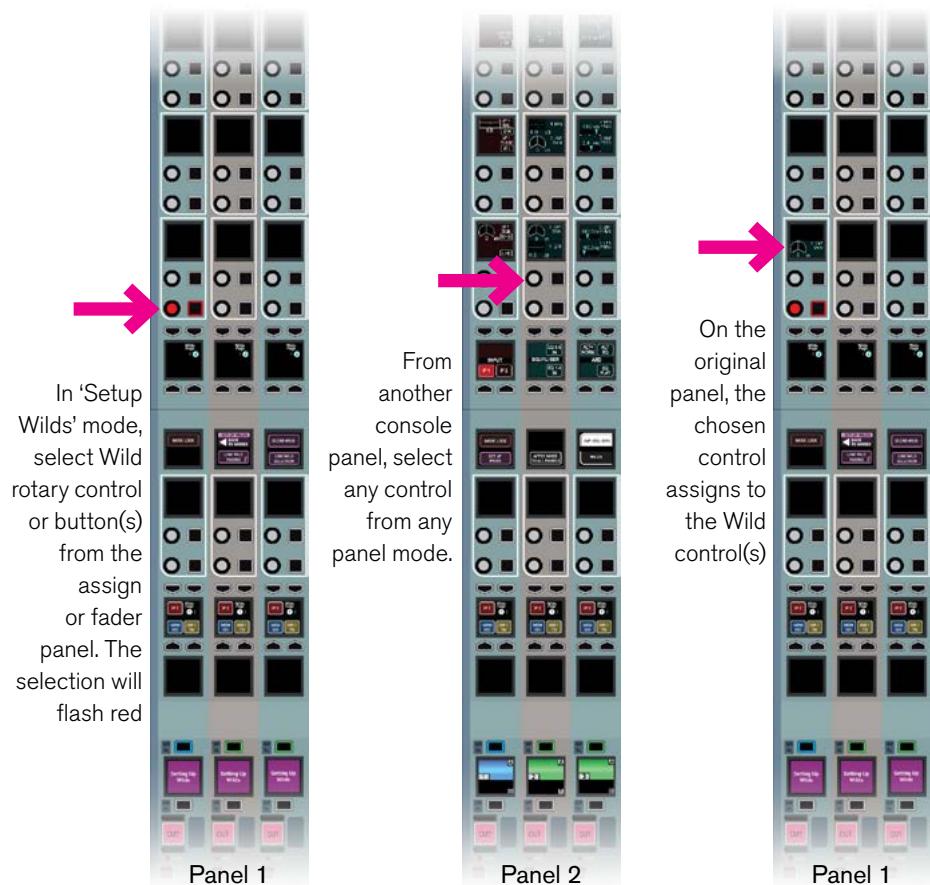
Wilds are assigned on a fader rather than a path basis so an unassigned fader can be given wild controls which only become active once a path has been assigned to that fader.

Wilds and/or fader wilds can be copied from one path to another using the Copy Path settings function within LAYER TOOLS (see Getting Signals into Apollo>Paths and Faders for more details).

If a path is moved or cloned, all wilds assignments will move along with it. As wilds are fader/layer based, wilds can also be set differently for each layer.

To clear any selected wild control, press the CLEAR WILD touch key on the modes row. Note the CLEAR WILD key will deselect after any successful 'clear' operation.

FIG 2 - SELECTING AND ASSIGNING WILDS



Wildable controls

The rotary control and button cells in wild assignment areas can be assigned to many controls including input, output, equaliser, dynamics, auxs, pan, group and monitor levels. For a full list of assignable controls see "["Wildable Controls" on page 49](#).

For instance, path delay, and if assigned, input delay, direct output delay, aux output delay, track output delay and main output delay, could be assigned to a wild control.

Some controls such as pre eq/pre fader & post fader, PFL, AFL and assign delay, are not Wildable and will show the 'Cannot Assign Control' message as above.

Alternate Fader Wilds

Whilst assigning a control, if a faders assign button is held down whilst touching its fader knob, rather than pushing an assign rotary control, the fader control for the alternate A/B sub-layer will be assigned to the wild control. For example, while operating on sub-layer A then the fader control of sub-layer B would be placed on the selected wild control.

Alternate fader wilds allow dual fader functionality on a single fader panel.

Setting Up Fader Wilds

Note that Fader Wilds are only available on Apollo Single Fader Panels.

To set up Fader Wilds exclusively (existing settings within the Assign panel are not affected), select the SET UP FADER WILDS key on the modes row. SET UP FADER WILDS is only available when **not** in WILDS mode. If WILDS mode **is** selected, then the same key becomes SET UP WILDS and acts on both Fader Wilds on the single fader panel and Wilds on the Assign panel, see Wilds mode above.

As in Wilds mode, the fader display toggles between normal and 'Setting Up Wilds' to show a panel is in Set Up Wilds mode. The assignable wilds controls within the single Fader Panel are shown in Fig 3.

Other functionality is the same as described for Wilds mode, except the user is confined to assigning Fader Wilds.

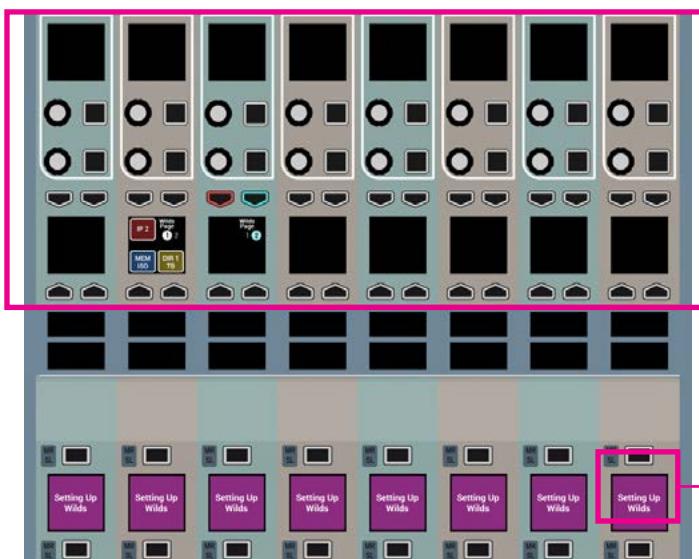
Memory Isolation

The Memory Isolation function includes the ability to prevent the wilds of any path from being overwritten when loading a memory.

To do this, you must set the scope of memory isolation to include Wilds and/or Fader Wilds using the LAYER TOOLS button in the layers row.

See "[Memory Isolation](#)" on page 177.

FIG 3 - SETTING UP FADER WILDS



Assignable Fader Wilds controls. Red indicates a selected rotary control or button

'Setting Up Wilds' flashes in Fader Wilds Set Up mode

FIG 4 - LINK WILD PAGING



Wilds pages

The system provides two pages of wilds, per fader, allowing twice as many controls as there are control and button cells. The top right button in each fader quad button cell toggles between pages 1 and 2.

Pressing LINK WILD PAGING in SET UP WILDS mode links all wilds page buttons together, and any page toggle changes all paths to show page 1 or 2. When wilds pages are linked, a link symbol appears on each - see Fig 4.

WILDABLE CONTROLS

Valid Controls for Wilds Mapping

Button Cells	Control Cells	with	Button	Control Cells	with	Button	Control Cells	with	Button
Input									
IP1 (Double Cell)	IP1 Trim	R>B (ST)		IP2 Trim	R>B (ST)				
IP2	IP1 M/L Gain	L>B (ST)		IP2 M/L Gain	L>B (ST)				
PHL / PHR / PH	IP1 Bal (ST)	Ph R (ST)		IP2 Bal (ST)	Ph R (ST)				
48L / 48R / 48	IP1 Delay	IN		IP2 Delay	IN				
SRCL / SRCR / SRC									
LB / RB (ST)									
6dB STEPS (Double Cell)									
Equalizer	EQ1-4 IN	EQ 1-4 Gain		EQ 5-6 Gain	SCEQ 1-2 Gain				
	EQ5-6 IN	EQ 1-4 Freq		EQ 5-6 Freq	SCEQ 1-2 Freq				
	EQ A-EQ B	EQ 1-4 Q/Resp		EQ 5-6 Q/Resp	SCEQ 1-2 Q/Resp				
Dynamics	SCEQ IN	DYN1 Cmp-Lim Threshold	IN	DYN1 Exp/Gate Threshold	DYN2 Cmp Threshold				
	SC LSTN	DYN1 Cmp Lim Attack		DYN1 Exp/Gate Attack (No Pot)	DYN2 Cmp Attack				
		DYN1 Cmp-Lim Recovery	AUTO	DYN1 Exp/Gate Recovery	DYN2 Cmp Recovery				
		DYN1 Cmp Ratio		DYN1 Exp/Gate Depth	DYN2 Cmp Ratio				
		DYN1 MakeUp Gain		Wilds below are mutually exclusive	DYN2 MakeUp Gain				
				DYN1 Exp Ratio (No Pot)	VAR				
				DYN1 Gate Delay	GATE				
Other	INPUT, GROUP & MAIN	INS IN							
	STWIDE (ST)	IN							
		EXT CTRL							
		AutoFdr							
		IN							
	PATH DELAY								
Auxes at 96kHz the number of Aux Sends are halved max 48 >max 24 Apollo max 32 > max 16 Artemis	Apollo/Artemis			Apollo					
	Aux Sends 1-32	ON		Aux Sends 33-48	ON				
	Aux Front Pan 1-32	IN		Aux Front Pan 33-48	IN				
Track	Track Send A			Track Sends B,C,D					
	Track Front Pan A	IN		Track Front Pans B,C,D	IN				
Direct Output									
DIR TBn	DIR O/P 1 Send			DIR O/P 1 Delay	IN				
	DIR O/P 2 Send			DIR O/P 2 Delay	IN				
	DIR O/P 3 Send			DIR O/P 3 Delay	IN				
	DIR O/P 4 Send			DIR O/P 4 Delay	IN				
Pan									
M/G PAN FRONT LCR	M/G Front Pan	IN		M/G Front DiVergence	IN				
M/G PAN C ONLY	M/G Rear Pan	IN		M/G Non LFE Gain	IN				
	M/G Front Rear Pan	IN		M/G LFE Gain	IN				
Main Output at 96kHz the number of Mains are halved max 16 >max 8	Apollo/Artemis								
	MAIN O/Ps 1-16 Level			MAIN O/Ps 1-16 Path Delay	IN				
	MAIN O/Ps 1-16 Line 5.1 Delay	IN		MAIN O/Ps 1-16 Desk 5.1 Delay	IN				
	MAIN O/Ps 1-16 Line ST Delay	IN		MAIN O/Ps 1-16 Desk ST Delay	IN				
	MAIN O/Ps 1-16 Line M Delay	IN		MAIN O/Ps 1-16 Desk M Delay	IN				
Group at 96kHz the number of Groups are halved max 48 >max 24	Apollo/Artemis								
	GRP O/Ps 1-48 Level	CUT							
	GRP O/Ps 1-48 Path Delay	IN							
	STWIDE (ST)	IN							
Aux Output at 96kHz the number of Auxes are halved max 48 >max 24 Apollo max 32 > max 16 Artemis	Apollo/Artemis			Apollo Only					
	AUX O/Ps 1-32 Level	CUT		AUX O/Ps 33-48 Level	CUT				
	AUX O/Ps 1-32 Path Delay	IN		AUX O/Ps 33-48 Path Delay	IN				
	AUX O/Ps 1-32 O/P Delay	IN		AUX O/Ps 33-48 O/P Delay	IN				
Track Output at 96kHz the number of Tracks are halved max 96 >max 48 Apollo max 64 > max 32 Artemis	Apollo/Artemis			Apollo Only					
	TRK O/Ps 1-64 Level	CUT		TRK O/Ps 65-96 Level	CUT				
	TRK O/Ps 1-64 Path Delay	IN		TRK O/Ps 65-96 Path Delay	IN				
	TRK O/Ps 1-64 O/P Delay	IN		TRK O/Ps 65-96 O/P Delay	IN				
Monitor									
STEREO	MON1 CRLS (Full CELL)	CUT		MON2 CRLS (Full CELL)	CUT				
MONO	Misc Mon 1-4 (Full CELL)	DIM/CUT		Small LS	C/O				
MON1 PRESEL 1-4	AFL 1 Level			AFL 2 & 3 Level					
MON2 PRESEL 1-4	PFL 1 Level			PFL 2 & 3 Level					
	DIM level	DIM							
Special Case									
Hold Assign and Touch Fader Knob	Alternate Layer Fader		PFL						
MEM ISO									

STRIPS MODE

Strips mode arranges the wild assign panel controls and touchscreen into vertical strips with the same controls above each fader on a panel by panel basis. This provides quick access to up to six strip controls and a section of the TFT touchscreen for each fader.

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

Accessing Strips mode

To set a wild assign panel into Strips mode, touch the STRIPS button on the Modes row at the top of the fader panel.

If the Strips button is not visible on the Modes row, make sure that the panel is not locked by checking the status of the MODE LOCK button also located on the Modes row. The MODE LOCK button is always available even in strip type select mode, allowing the user to switch between STRIPS mode and strip type select mode while locked to STRIPS.

Selecting STRIPS mode will display the last used strip type on the panel and show the available strip type buttons.

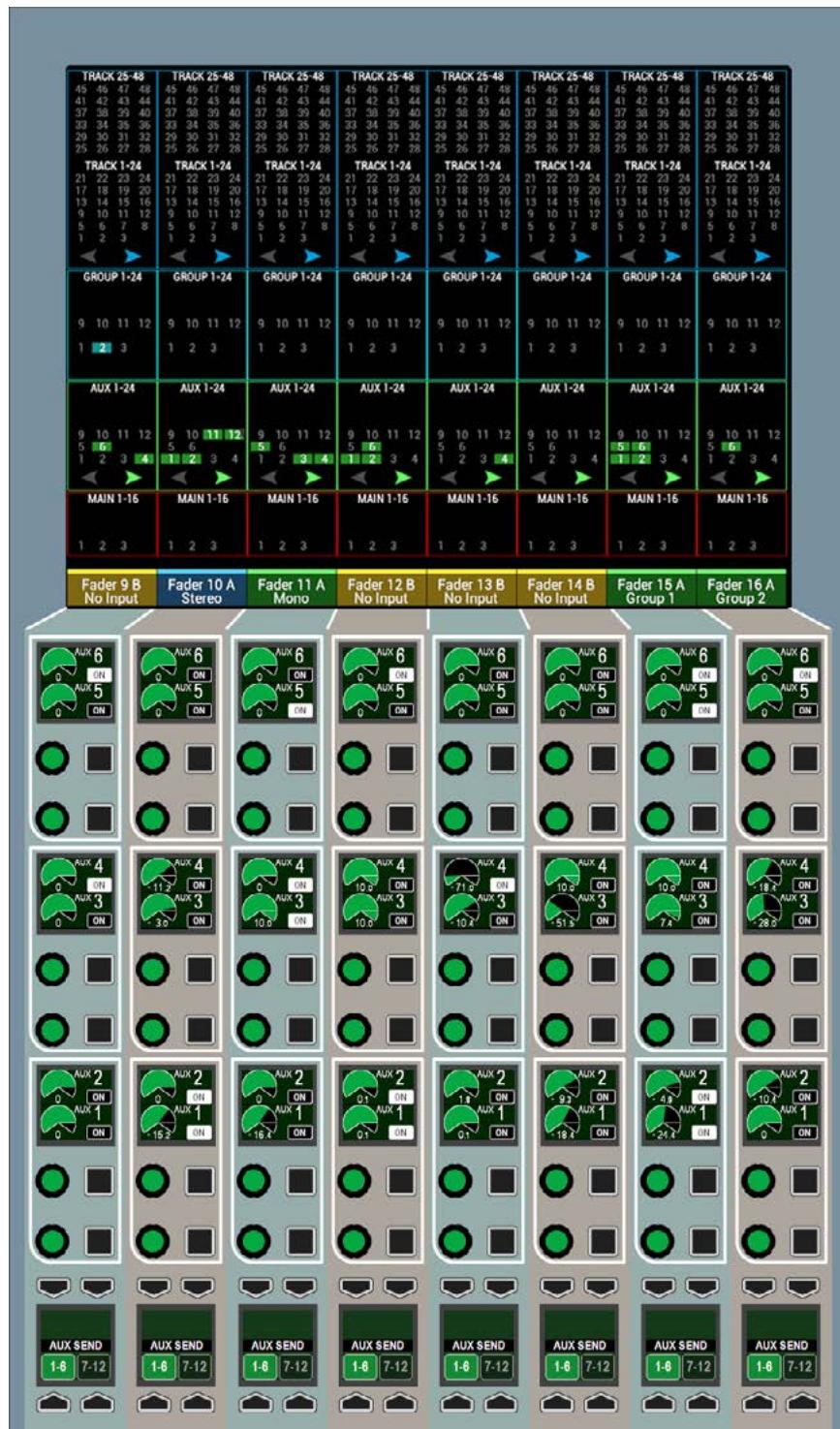
Apply to All Strips

By default, the user-wide Apply To All Strips button is ON, and pressing the strip type applies it to all panels in that console area. Turn Apply To All Strips off to allow individual panels to change to different strip types.

Routing display

Each strip on the TFT contains a routing overview for the relevant fader. Tapping on the TFT overview expands that strip to allow access to all the bus outputs of that type to add or remove routes to that output from that channel.

FIG 1 - STRIPS MODE LAYOUT



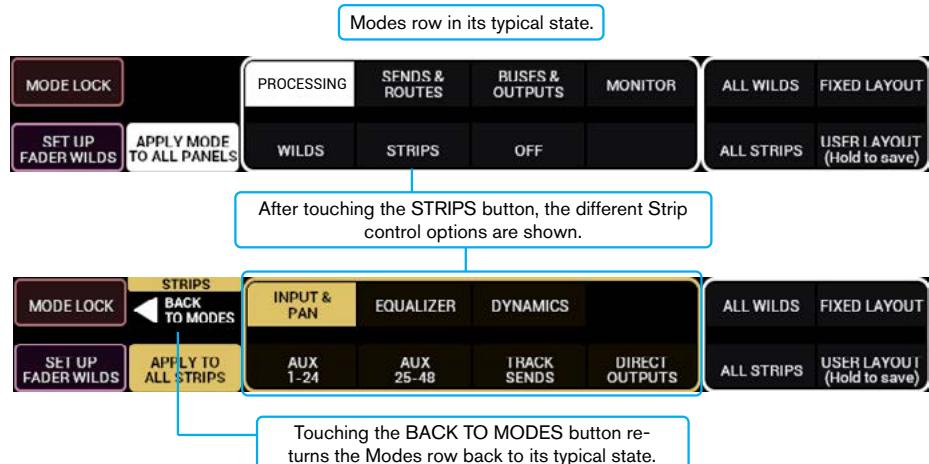
A/B path indicator

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

Changing Strips types

When STRIPS mode is selected on the Modes row, the available strips types are shown here: Input & Pan, EQ, Dynamics, Aux 1-24, Aux 25-48, Track Sends and Direct Outputs. To select an arrangement of strips, touch the desired strip to assign it to the panel. Touch the BACK TO MODES button to return to the typical Modes row display. This process is illustrated in Fig 2.

FIG 2 - SETUP STRIPS ON THE MODES ROW



APOLLO

GETTING SIGNALS INTO APOLLO

I/O BOXES & HYDRA PATCHBAYS SAMPLE RATE SELECTION IN H20

From Version 8, Apollo consoles can now work at 96kHz sampling frequency.

There are 2 elements to 96kHz operation of Apollo consoles:-
Configuring the DSP and configuring the I/O to run at different sample rates.

Consoles at 96kHz

The consoles can switch between 48kHz & 96kHz working as required and they switch their sampling frequency by loading a show at the required sample rate built from a template at that rate.

The numbers of channels and buses are reduced at 96kHz but the numbers at 48kHz are the same as before.

There is no reduction in the numbers of monitor inputs and outputs at 96kHz.

I/O and Hydra2 Patchbays at 96kHz

Before the I/O can be used with a 96kHz console its sample rate has to be changed to match. In H20 a new button labelled "Sample Rate" is made available, selecting this opens the list of I/O boxes connected to the Hydra2 Network.

The list shown in Fig 1 shows the sample rate set for each I/O box or Hydra2 Patchbay. In order to change the sample rate the user first selects the required I/O box or Hydra2 Patchbay box, this enables the Set Sample Rate button at the bottom left of the screen.

Clicking on this opens the Set Sample Rate popup, allowing the I/O boxes and Hydra2 Patchbays to be set to 48kHz or 96kHz, or to follow the sample rate of a specific console. This is shown in Fig 2, please note that certain older I/O boxes cannot be set to run at 96kHz such as the fixed format MADI box.

The Hydra2 network supports 48kHz and 96kHz consoles and I/O boxes simultaneously, it achieves this by running at 48kHz irrespective of whether the Consoles and I/O boxes are running at 96kHz or not. It simply uses 2 samples per 96kHz signal.

FIG 1 - I/O BOXES & HYDRA2 PATCHBAYS SAMPLE RATE SCREEN IN H20

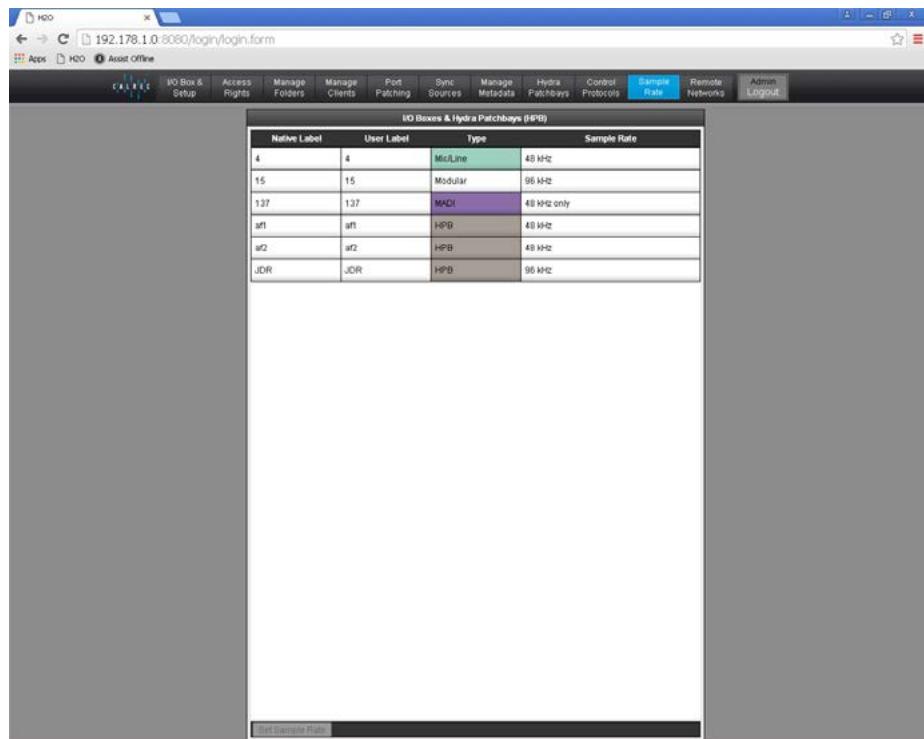
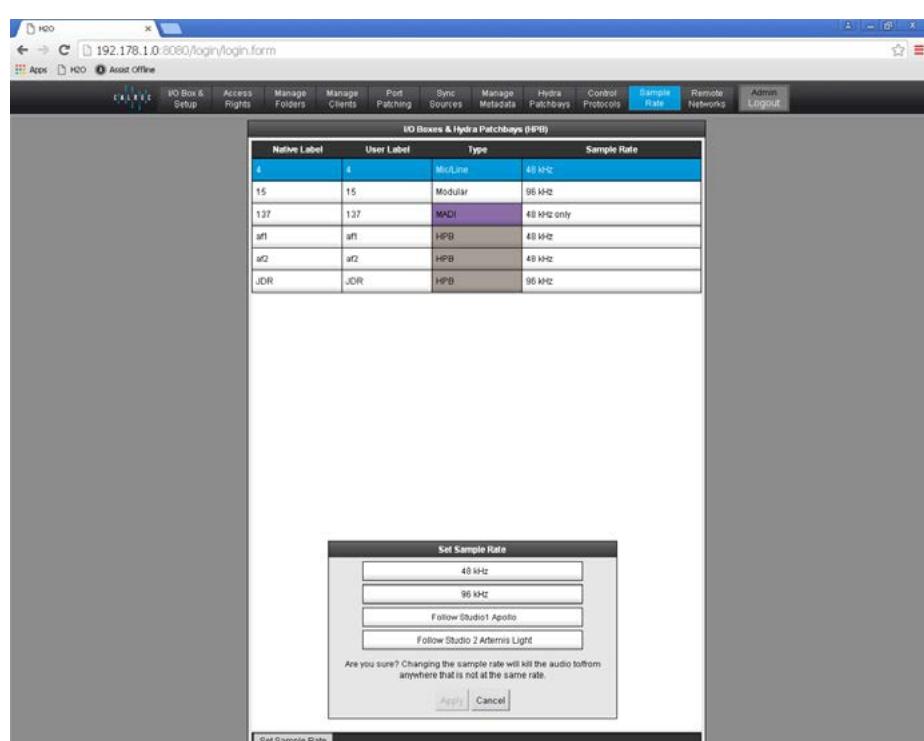


FIG 2 -SET SAMPLE RATE POPUP SCREEN IN H20



INPUT SOURCE ORGANISATION

Input sources may take the form of physical audio input ports, DSP outputs from the same console, Hydra2 patchbay outputs from other consoles connected to the same Hydra2 network, or Hydra2 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 Fig 1.

Open >[Hydra2 Settings](#)>Edit Network screen in 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.

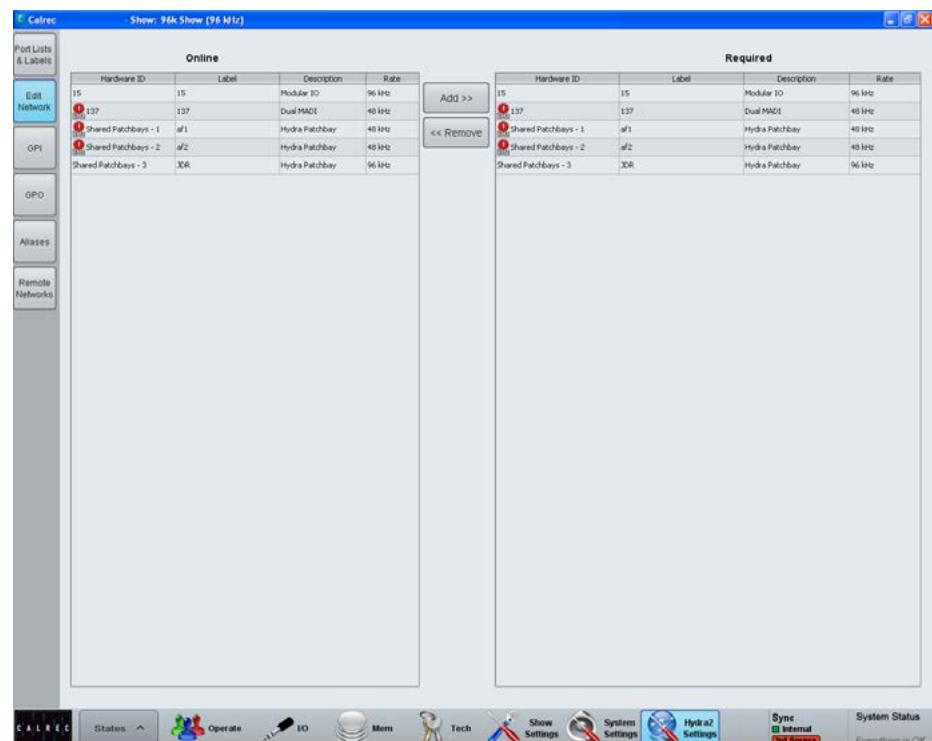
Boxes at different sample rates

Note that now different sample rates are available, boxes whose I/O is set to a different sample rate to that of the show appear with the SR kHz warning icon to indicate that it cannot be used unless the sample rate of the I/O box is changed in H2O, or a different show is loaded using the correct sample rate. See Fig 1.

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.

FIG 1 - EDIT NETWORK SCREEN



Hydra2 Patchbays

Hydra2 patchbays are virtual patchbays within the Hydra2 domain. Like hardware patchbays, Hydra2 Patchbays have a set of input ports which are 'hard wired' to output ports. For port patching purposes, Hydra2 Patchbay inputs are destinations and Hydra2 patchbay outputs are sources. When a source is patched to a Hydra2 patchbay input, it immediately becomes available at the corresponding Hydra2 Patchbay output.

Once configured in H2O, Hydra2 patchbays appear as online in the Edit Network screen and can be added to the Required list to make them available from the I/O patching screens on each console.

For example, if a console operator patches a direct output to a Hydra2 Patchbay input, the Direct Output feed becomes available to all Hydra2 users (who have been granted access) as the corresponding Hydra2 Patchbay output. Hydra2 Patchbays are described in more detail at the end of this section see "[Hydra2 Patchbays](#)" on page 80.

Hydra2 Patchbays at different sample rates

Note that now different sample rates are available, Hydra2 patchbays can be created to operate at a different sample rate (as shown in the rate column in Fig 1) to that of the show appear with the SR kHz warning icon to indicate it cannot be used unless the sample rate of the Hydra2 patchbay is changed in H2O or a different show is loaded using the correct sample rate.

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 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 **>Hydra2 Settings>Port Lists & Labels** screen in the main application see Fig 2. In this screen, touch the 'Input Alloc' or 'Output Alloc' button to access the available input or output ports. Double click a 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 reviewing 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.

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 **>Hydra2 Settings>Port Lists & Labels** screen in the main application (Fig 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.

FIG 2 - PORTS LIST SETUP SCREEN

Network Port Label	Local Port Label	Mic Open	Desc	Location	Type	Diag
135-1-01	1	-	MADI 1 Input 1 (SL)		MADI	135 : MADI : 1
135-1-02	-	-	MADI 1 Input 2 (SR)		MADI	135 : MADI : 2
135-1-03	-	-	MADI 1 Input 3 (SL)		MADI	135 : MADI : 3
135-1-04	-	-	MADI 1 Input 4 (SR)		MADI	135 : MADI : 4
135-1-05	-	-	MADI 1 Input 5 (SL)		MADI	135 : MADI : 5
135-1-06	-	-	MADI 1 Input 6 (SR)		MADI	135 : MADI : 6
135-1-07	-	-	MADI 1 Input 7 (SL)		MADI	135 : MADI : 7
135-1-08	-	-	MADI 1 Input 8 (SR)		MADI	135 : MADI : 8
135-1-09	-	-	MADI 1 Input 9 (SL)		MADI	135 : MADI : 9
135-1-10	-	-	MADI 1 Input 10 (SR)		MADI	135 : MADI : 10
135-1-11	-	-	MADI 1 Input 11 (SL)		MADI	135 : MADI : 11
135-1-12	-	-	MADI 1 Input 12 (SR)		MADI	135 : MADI : 12
135-1-13	-	-	MADI 1 Input 13 (SL)		MADI	135 : MADI : 13
135-1-14	-	-	MADI 1 Input 14 (SR)		MADI	135 : MADI : 14
135-1-15	-	-	MADI 1 Input 15 (SL)		MADI	135 : MADI : 15
135-1-16	-	-	MADI 1 Input 16 (SR)		MADI	135 : MADI : 16
135-1-17	-	-	MADI 1 Input 17 (SL)		MADI	135 : MADI : 17
135-1-18	-	-	MADI 1 Input 18 (SR)		MADI	135 : MADI : 18
135-1-19	-	-	MADI 1 Input 19 (SL)		MADI	135 : MADI : 19
135-1-20	-	-	MADI 1 Input 20 (SR)		MADI	135 : MADI : 20
135-1-21	-	-	MADI 1 Input 21 (SL)		MADI	135 : MADI : 21
135-1-22	-	-	MADI 1 Input 22 (SR)		MADI	135 : MADI : 22
135-1-23	-	-	MADI 1 Input 23 (SL)		MADI	135 : MADI : 23
135-1-24	-	-	MADI 1 Input 24 (SR)		MADI	135 : MADI : 24
135-1-25	-	-	MADI 1 Input 25 (SL)		MADI	135 : MADI : 25
135-1-26	-	-	MADI 1 Input 26 (SR)		MADI	135 : MADI : 26
135-1-27	-	-	MADI 1 Input 27 (SL)		MADI	135 : MADI : 27

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 dialogue 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 dialogue. This dialogue 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 dialogue 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 Fig 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 **>Hydra2 Settings>Port Lists & Labels** screen in the main application and select either 'Input Order' or 'Output Order' from the buttons at the left of the screen, see Fig 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 are 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 dialogue which allows the user to select the destination set.

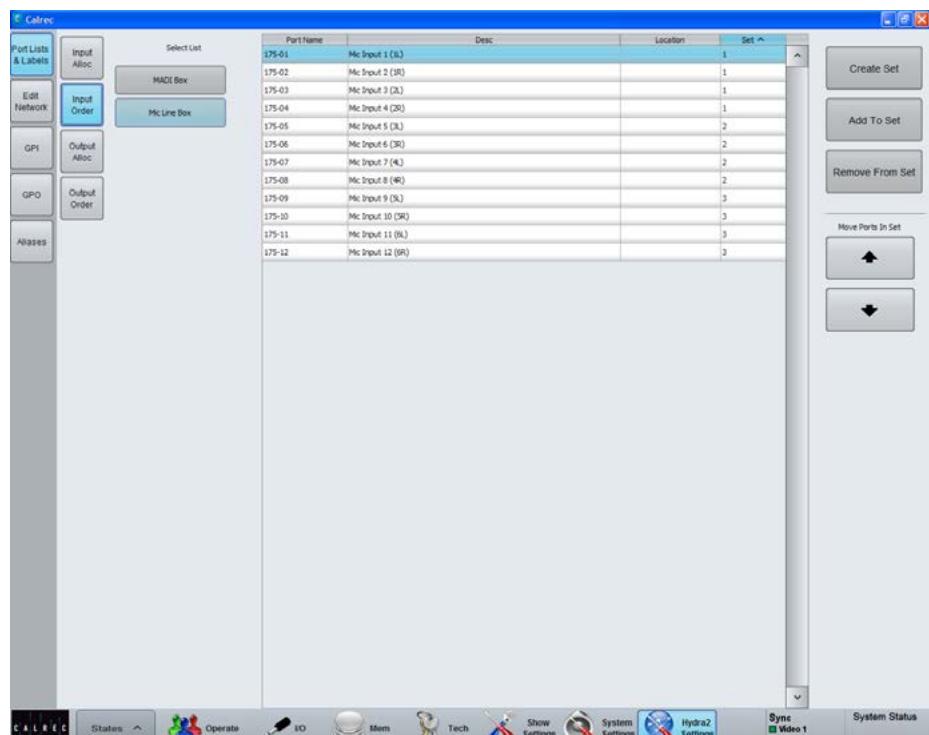
FIG 3 - SETS EXAMPLE

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 related 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.

Playback 1 C	Playback 1 L	Playback 1 C
Playback 1 L	Playback 1 R	Playback 1 LFE
Playback 1 LFE	Playback 1 LS	Playback 1 LS
Playback 1 LS	Playback 1 RS	Playback 1 RS
Playback 1 R		
Playback 1 RS		
Playback 2 C	Playback 2 L	Playback 2 C
Playback 2 L	Playback 2 R	Playback 2 LFE
Playback 2 LFE	Playback 2 LS	Playback 2 LS
Playback 2 LS	Playback 2 RS	Playback 2 RS
Playback 2 R		
Playback 2 RS		
Playback 3 C	Playback 3 L	Playback 3 C
Playback 3 L	Playback 3 R	Playback 3 LFE
Playback 3 LFE	Playback 3 LS	Playback 3 LS
Playback 3 LS	Playback 3 RS	Playback 3 RS
Playback 3 RS		

FIG 4 - SETS



ALLOCATING SIGNAL PATHS TO FADERS

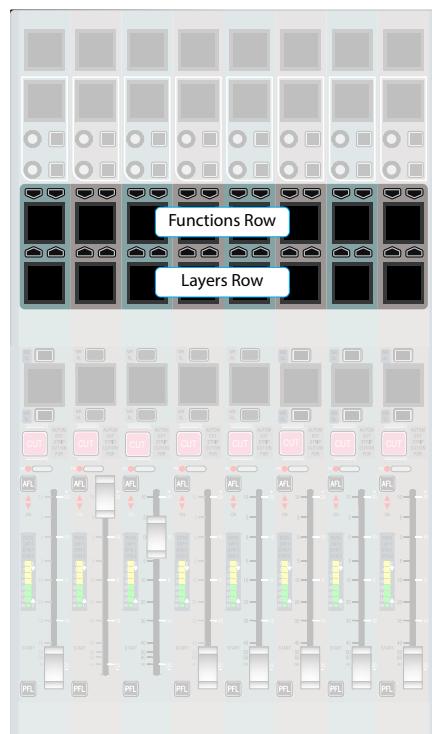
A path is a generic term that refers to a DSP process in the system. A signal present at an input port must be routed to a Channel path in order for it to be processed, routed, then sent back out of the system.

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.

Assigning channels to faders

For a path to be directly controlled, processed and routed, it must be attached to a fader on the surface. Input Channels and Output buses need 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.

FIG 1 - ROW LOCATIONS



Select **TOOLS>FADER ASSIGNMENT** from the Layers row, as shown in Fig 2 and then **NEW CHANS** from the row above to display the input channel types available for allocation.

Select a blank fader by pressing its' assign button above (A layer) or below (B layer) its label display to highlight it blue and make it the currently assigned path - the focus of assignable controls. From the New Chans menu, select a width of input channel to allocate to the fader – 5.1 surround, stereo or mono. On releasing the button, a DSP input channel of the chosen width is instantly allocated to the assigned fader and its label display is updated accordingly.

Paths of the same width can quickly be assigned to multiple faders by holding a channel width button down whilst then selecting the assign buttons of the blank faders to allocate the channels to.

Once a fader has a signal path on it, the path type or width cannot be changed, the path must first be removed before a different path can be allocated.

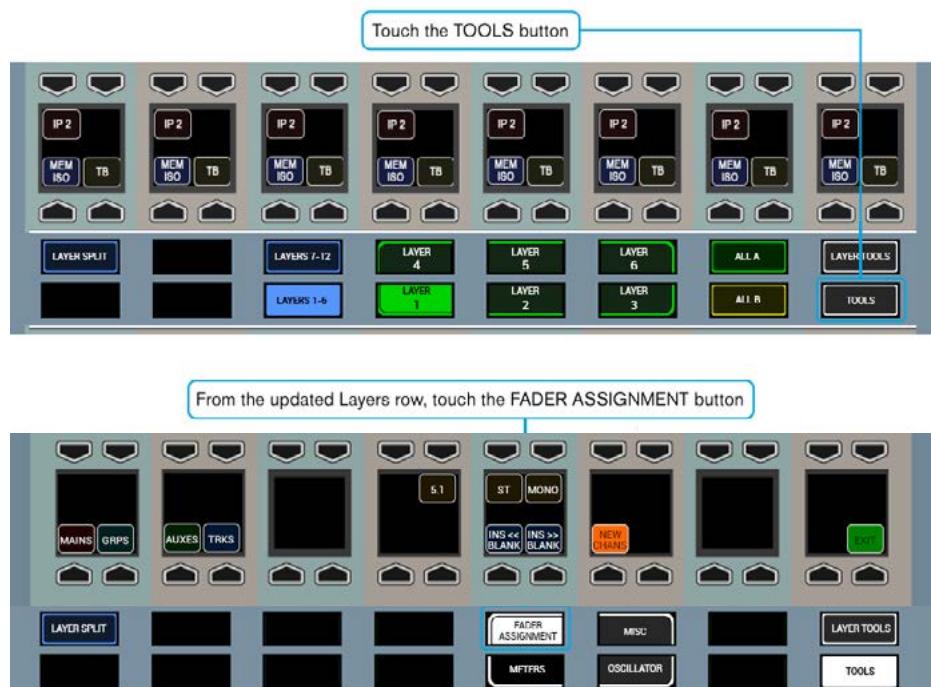
When assigning input channels to paths in this way, a new input channel is allocated to each fader from the available DSP resource pool. DSP resources are quoted in mono channel legs. When a stereo channel is allocated, 2 mono paths are used from the resource pool, and 6 are used to create a 5.1 surround channel.

Assigning buses to faders

Main Output buses and audio sub-group buses that have been configured can also be allocated to faders if required. Selecting Mains or Groups from the **TOOLS>FADER ASSIGNMENT** menu displays the relevant bus types that are available. If more groups are available than can be displayed across the panel, buttons will be present to allow the view to page through the different groups.

Selecting a Main or group will allocate that DSP path to the currently assigned fader as long as the fader does not already have a path allocated. Main output paths can also be allocated to the faders on the dedicated monitor panel if the full-featured version with faders is fitted. When allocating to these faders,

FIG 2 - ASSIGN FADERS VIEWS ON THE SETUP ROW



ensure the panel is not in spill or Downmix mode. Unlike input channels which are configured as they are allocated to faders, the buses need to already be configured from the main application **>Operate>Bus Config** screen. Please see the Buses Overview section for more detail. Each numbered main or group is a unique bus signal path. If the same main or group bus, e.g. 'Main1' is allocated to more than one fader, each fader is controlling the same bus path and adjustment of any of them will be reflected by the others. Cloning bus faders in this way can be useful to provide access to a bus from different physical locations or different fader layers.

Assigning auxs and tracks to faders in the Tools menu

From V7.0 it is possible to assign auxs and tracks to faders from the Tools menu in exactly the same way as groups & mains. The aux buses are arranged in three pages of 16 for up to 48 auxs and the track buses arranged in six pages of 16 for up to 96 tracks.

Inserting blank faders

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. Fig 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.

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 / DELETE PATHS button, then

FIG 3 - INSERTING BLANKS

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



INS >> BLANK

Inserting a blank and shuffling existing faders to the right is allowed here. There is nothing to block the path of the shuffled faders.



INS << BLANK

Inserting a blank and shuffling existing faders to the left is NOT allowed here. Locked faders are blocking the path of the faders to be shuffled.



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 / DELETE PATHS button and touch either the EXEC or CNCL buttons to execute or cancel the selection respectively.

Layer locking faders

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 CNCL 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 PATH button and press the EXEC button to confirm the process or press the CNCL 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.

FIG 4 - COPY PATH SETTINGS



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)
- 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)
- WILDS
- FADER WILDS
- AUTOFADE
- 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 Fig 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 stereo or surround spill leg the stereo or 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 new 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 main application screen. See "[Input Port Protection](#)" on page 71 for more information.

FADER SETUP SCREEN

Fader / path management can also be carried out from the main 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 Fig 1.

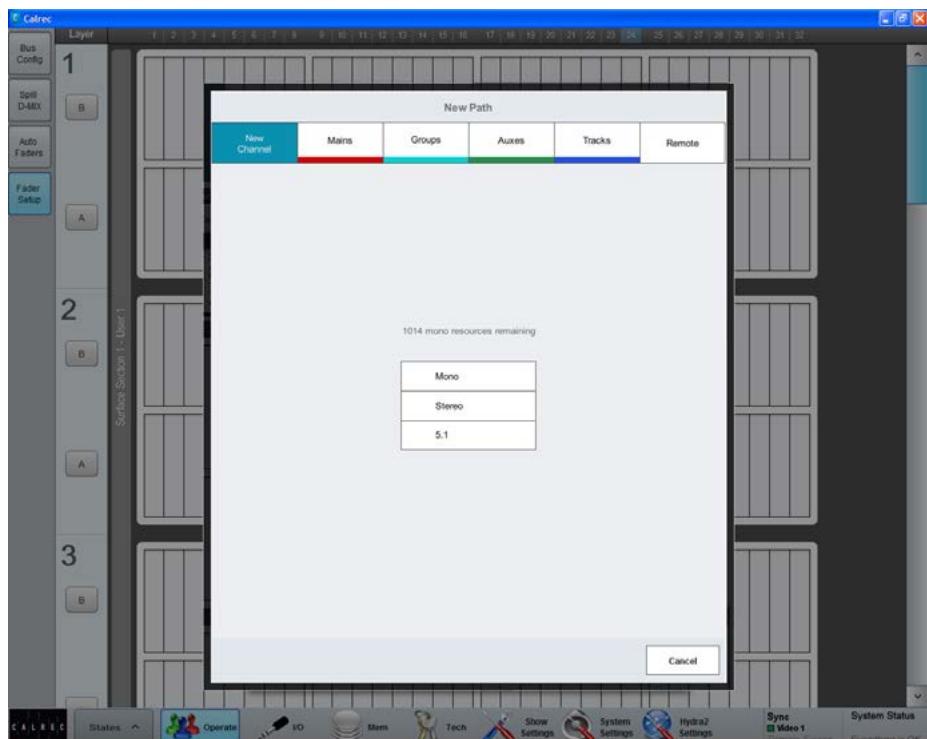
If the selected fader already has a path assigned, options will be presented to create a clone, to move, or to delete the path. If 'Clone' or 'Move' is selected, the user should next select the destination fader - where the clone will be placed, or where the path is to be moved to.

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.

The fader setup screen now follows fader access on the surface, in the same way as the patching screen. This behaviour can be toggled in the States button in the left hand side of the footer of the main application.

FIG 1 - MAIN APPLICATION, OPERATE>FADER SETUP SCREEN



Memories from larger consoles

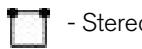
User shows / memories can be transferred between mixing consoles of the same type, for example, an Apollo User Memory can be transferred to another Apollo surface.

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-organise the paths needed on to available physical faders / layers.

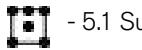
FIG 2 - PATH WIDTH ICONS



- Mono



- Stereo



- 5.1 Surround

The icons shown above in Fig 2 are used to show the widths of various paths.

Assigning auxs and tracks to faders in the Fader setup screen

From V7.0 it is now possible to assign auxs and tracks to faders from the Fader setup screen in the same way as channels, groups and mains see Fig 1 above, these can also be assigned from the Tools menu.

Remote Production Option

From V8.0 it is now possible to assign remote paths from RP1 remote production units by clicking on the 'Remote' option as shown in Fig 1. This allows the user to map the remote faders and remote aux masters of RP1 units on to the console surface. The operation and integration of the RP1 remote production unit with the Apollo console is the subject of a separate manual :-

[Remote Production RP1 System Manual \(926-222\)](#) which can be downloaded from the Calrec Website. In the manual is a chapter 'Operation Via Host Console' which shows how to setup and operate the RP1 remote production unit via a host console in this case an Apollo .

INPUT TYPES AND PATCHING

The main application >I/O>I/O Patch screen is used to route Hydra2 audio input & 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. See Fig 1.

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

Ports at different sample rates

Note that now different sample rates are available, ports set to a different sample rate to that of the show appear with the SR kHz warning icon to indicate that it cannot be used unless the sample rate of its associated I/O box is changed in H2O or a different show is loaded using the correct sample rate. See Fig 1.

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. See Fig 2. 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 >[Hydra2 Settings>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 customised, 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,

FIG 1 - MAIN APPLICATION, I/O>I/O PATCH SCREEN SHOWING DESK INPUTS

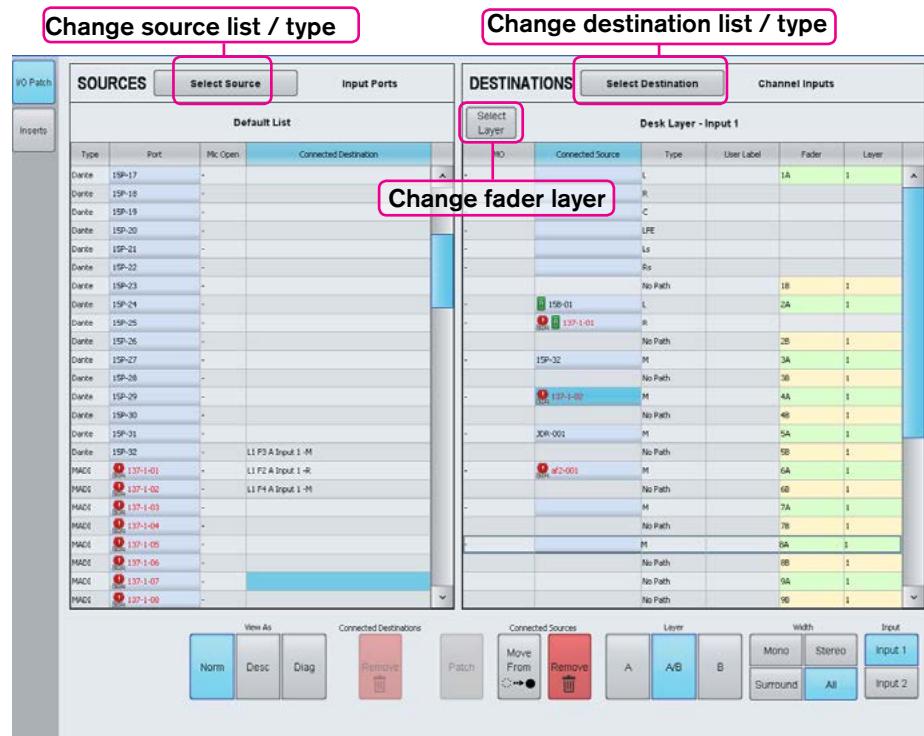


FIG 2 - AVAILABLE SOURCES POP-UP



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 right 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.

Channel input 2

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 utilises 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 analogue 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 PROCESSING panel mode.

Faders in the table run in numerical order and are colour 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.

The 'Type' column shows the width of the path as M for mono, and two rows for the L and R for stereo. Surround paths take up six rows in the table: front L and front R; C and LFE; and rear Ls and rear Rs. Faders with no DSP path allocated are displayed as 'No Path' in the type column.

Patching input sources to faders

Patching is carried out by highlighting the required light blue 'Port' cell in SOURCES, and highlighting the desired Fader row in DESTINATIONS then pressing 'Patch'.

The example in Fig 3 shows input port 135-1-01 being highlighted. Find the desired channel / fader from the list on the right and highlight it by clicking on the light blue 'Connected Source' cell - turning the row darker blue, the example above shows a mono path on fader 1B - Layer 2 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 light 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.

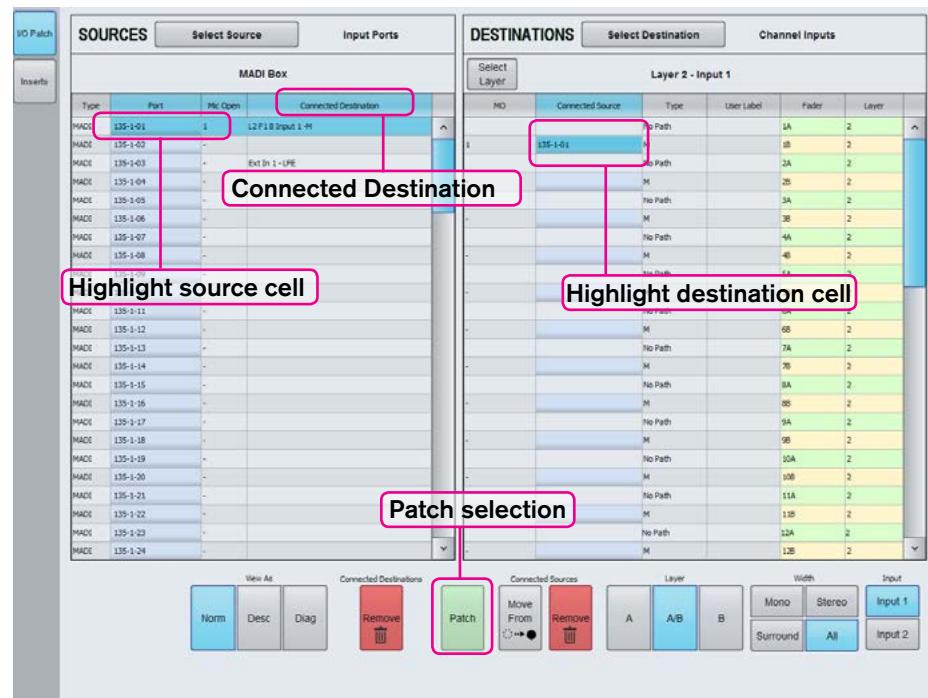
Once patched, the source label is shown as a 'Connected Source' in the destination cell, as well as the fader's label display on the control surface, and audio will be passing from the port to the channel input.

Note the 'Connected Destination' field in SOURCES, is to quickly show the user all the places a particular source is going to.

Patching at different sample rates

Sources at different sample rates to the show including ports, hydra patchbays and aliases can be patched (except for System level patches) to desk inputs but will not work and are shown as **!! pending !!** until

FIG 3 - PATCHING HYDRA2 INPUT PORTS TO INPUT CHANNEL PATHS ON FADERS



the sample rates are matched. Similarly with desk outputs to destinations at different sample rates.

Port to port patches cannot be made for I/O that is at a different sample rate to the desk. However they can be made in H2O and by SW-P-08 providing the source and destination ports are at the same rate.

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.

Protection against removing multiple destinations

In order to prevent accidental removal of multiple connected destinations. When a source has more than one destination and

the connected destinations remove button is pressed, a message appears warning the user that "All connected destinations selected above will be removed. Are you sure you want to do this?". They can then press the Remove button or the Cancel button if the user changes their mind.

Mic Open field

The Mic Open (MO) field shows if a mic open bus is assigned, with a number from 1-5. If no mic open bus is assigned then a single dash is shown - as above. More information on mic open can be found in the Mic Open Systems section within External Interfacing.

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 relevant destination's 'Connected Source' blue cell and clicking 'Remove Source'. Similarly, destinations can be removed from sources by highlighting the destination in the 'Connected Destination' column and clicking 'Remove Dest'.

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 (analogue 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 analogue 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.

Hydra2 Patchbays

Any Hydra2 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 Hydra2 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 Hydra2 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 Hydra2 Patchbays.

HPB's at different sample rates

Any Hydra2 Patchbays that has been set to operate at a different rate than the desk will behave in the same way as ports do at different sample rates than the desk.

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 analogue / 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 - analogue 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 "[Output Types and Patching](#)" on page 130 for more details on output patching.

Patching Shortcuts

From V6.0 there are some added shortcuts on the Apollo and Artemis surfaces and in the main application, which will dramatically speed up the patching workflow.

The first few shortcuts are in the patching screens on the main application. In any source list, double tapping (or double clicking) any connected destination cell will change the destination area to display a list containing the relevant destination, which will be selected ready to be easily moved, replaced, or removed.

Similarly, you can double tap (or double click) on any connected source cell in any destination list. Doing this will change the source area to display a list containing the relevant source, which will be selected ready for you to remove it, or make another connection. See Fig 4.

The remaining shortcuts are available on the surface. In the area at the top of the touch display in Processing mode, INPUT PATCHING, OUTPUT PATCHING and INSERT PATCHING buttons are available, depending on the type of path accessed. Tapping one of these buttons will change the main application to show the relevant patching screen, show the appropriate source and destination lists, and select the specific sources and destinations. See Fig 5.

In the Focus Area, at the bottom of Routing mode when you tap on a direct output level rotary control, or at the bottom of Buses & Outputs mode when you tap on an output level control, we have added an "Output Patching" button. Pressing this button changes its display to show 'SEE PC' and will again instruct the main application to show the relevant patching screen, show the appropriate source and destination lists, and select the specific sources and destinations. See Fig 6.

FIG 4 - PATCHING SHORTCUTS IN MAIN APPLICATION

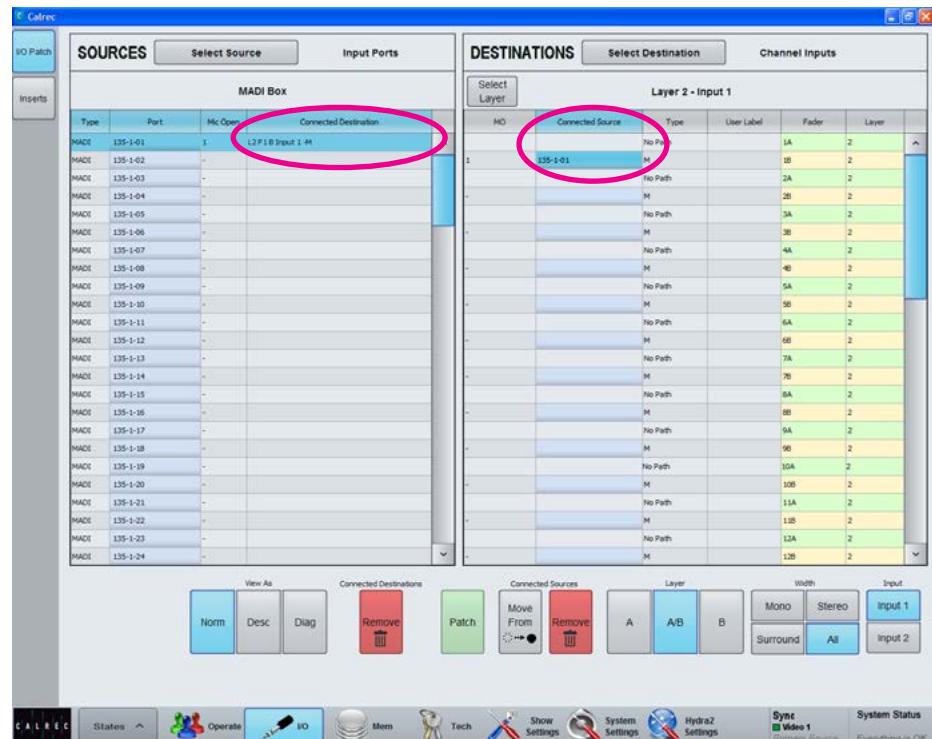


FIG 5 - PATCHING SHORTCUTS IN THE CONSOLE PROCESSING MODE SCREENS

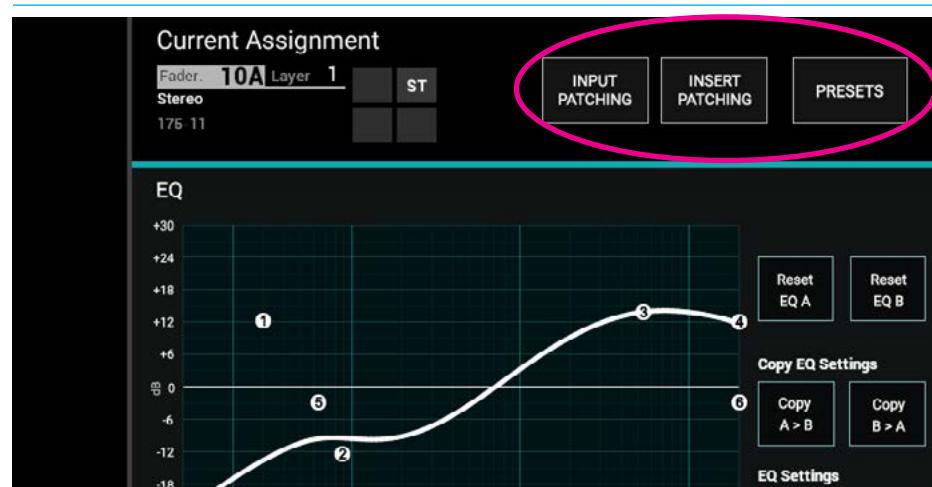


FIG 6 - PATCHING SHORTCUTS IN THE BUSES & OUTPUTS FOCUS AREAS



Custom fader labels

The 'Label' 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. See Fig 7.

FIG 7 - ENTER CUSTOM FADER LABEL

DESTINATIONS					Select Destination	Channel Inputs
Select Layer					Desk Layer - Input 1	
MO	Connected Source	Type	Label	Fader	Layer	
	L		1A	I		
	R					
	M		1B	I		
62-02	M	CD	2A	I		

Ability to Receive External Source Labels via SW-P-08

Apollo and Artemis can now receive and display external labels over SW-P-08.

This can be incredibly useful when integrating with external matrices, as it allows the source labels from the external matrix to be passed through to faders on the surface.

Source Label Hierarchy

Path labelling has been improved providing consistency across all path widths and types. There is a hierarchy of labels available: from system defined default labels, through network level user labels, all the way up to user defined path labels:

1. User Path Label
2. External Label (from SW-P-08)
3. Hydra2 Patchbay Source (if source connected to channel via a Hydra2 Patchbay)
4. Source Alias Label (if connected through an alias)
5. Source Label - Local (if given a label in the main application)
6. Source Label – Network (if given a label in H2O)
7. Source Label – System (combination of the box and port ID)

By default, the highest level of label in this hierarchy is displayed, but you can choose to force this to show whichever level of label you prefer. This can be very useful for diagnostics. It's also possible to turn off dynamic labels received via SW-P-08, or when showing the sources of Hydra Patchbays, see Fig 8.

FIG 8 - SOURCE LABEL HIERARCHY

Port Name	Desc	Location	Set
175-0-1	Mic Input 1 (SL)		1
175-02	Mic Input 2 (SL)		1
175-03	Mic Input 3 (SL)		1
175-04	Mic Input 4 (SL)		1
175-05	Mic Input 5 (SL)		2
175-06	Mic Input 6 (SL)		2
175-07	Mic Input 7 (4L)		2
175-08	Mic Input 8 (4L)		2
175-09	Mic Input 9 (SL)		3
175-10	Mic Input 10 (SL)		3
175-11	Mic Input 11 (SL)		3
175-12	Mic Input 12 (SL)		3

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 customised by the user, this section will detail the controls available on a panel in Assign Mode using any of the standard PROCESSING layouts.

Fig 1 shows the layout of input controls in the PROCESSING - Overview 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

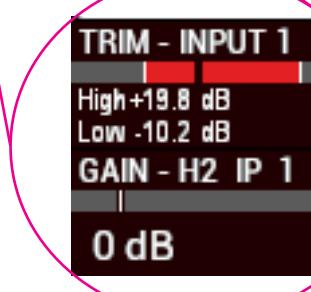
The gain of any connected mic/line input can be adjusted with this control. The gain range varies from +78 to -18 dB. This gain control alters the gain at the input port in a Hydra2 I/O unit and will only be available to the owner of that port. Port ownership is discussed in the Input Sources section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

If the gain is not the same on all legs of a channel then the gain display will show the highest and lowest value, as highlighted in Fig 1's exploded view. (Shown Right)

±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.

FIG 1 - INPUT CONTROLS COLUMN ON PROCESSING OVERVIEW



Input trim

Input trim boosts or attenuates an input signal by $\pm 24\text{dB}$ inside the channel path. This is the only input gain control available for digital input signals. As the gain is 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

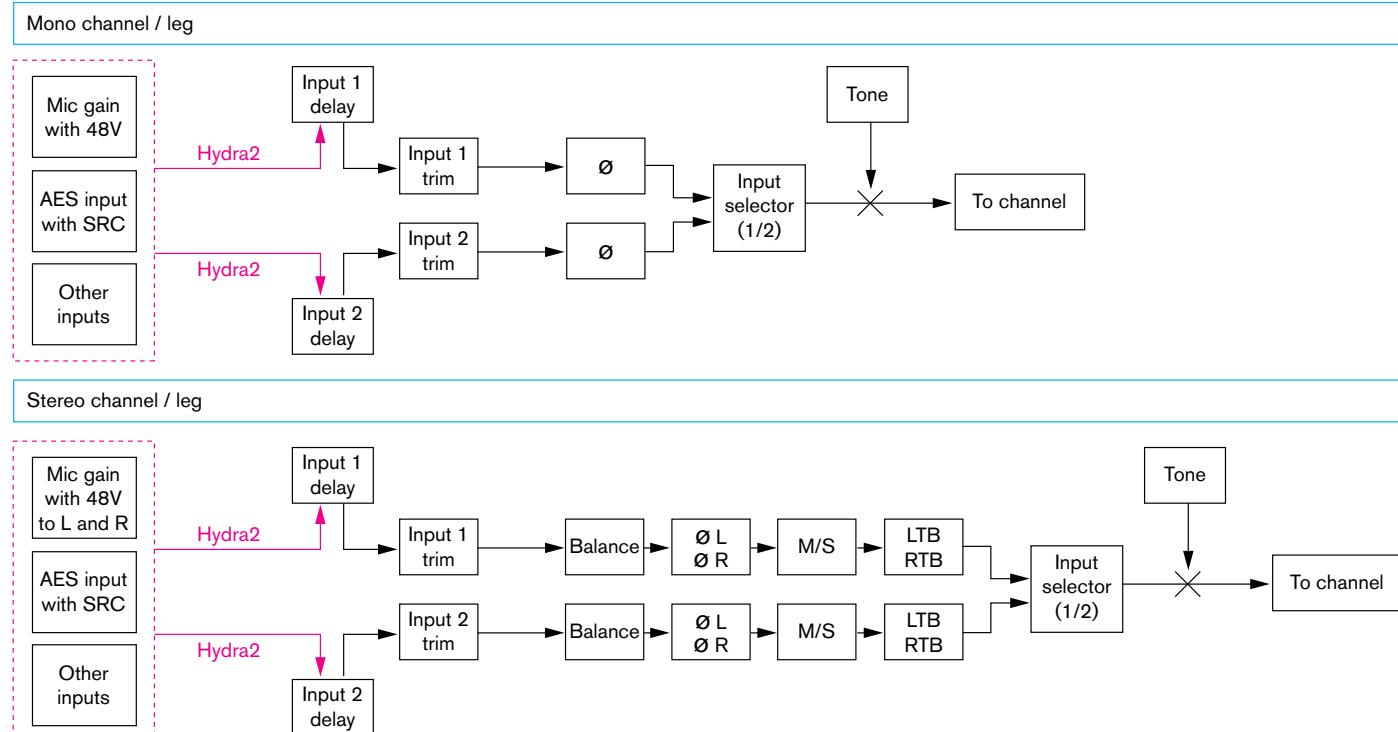
A button on the TFT touchscreen overrides the input of the path with tone at the frequency and level currently set. When tone is applied to a channel an indicator will appear on the input controls, the fader and any meters relevant to the fader as a visual aid to the user.

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 PROCESSING - DELAY panel mode, see "Delay" on page 93.

FIG 2 - INPUT SIGNAL FLOW



The following controls allow manipulation of mono or stereo input signals. Should a fader have a surround path assigned to it, each 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 +/- 3dB left/right, through centre stereo.

L>B and R>B

Path leg routing options L>B (left to both) and R>B (right to both) allow you to route the left or right legs to both sides of a stereo channel. With both switches in the off position the left signal feeds the left leg and the right signal feeds the right leg of the stereo path, this is a 'normal' stereo setup. Switching on L>B feeds the left signal to both left and right sides of the stereo path, and switching on R>B feeds the right portion of the signal to both left and right sides of the stereo path. Switching both switches on sums the left and right portions of the signal together and outputs this on both the left and right legs.

With both switches in the same position, either on or off, you have access to the input balance control. When they are both off the balance control responds as described above but with both controls switched on the it is a full range balance control i.e turning the dial all the way to the left outputs the left hand signal from both legs of the path.

With either L>B or R>B switched on independently, the balance control is unavailable—it would have no effect as the left and right portions of the signal would be the same.

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. The buttons for this are found in the same location as the 48v buttons when a Digital Source is selected.

Signal flow

Fig 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

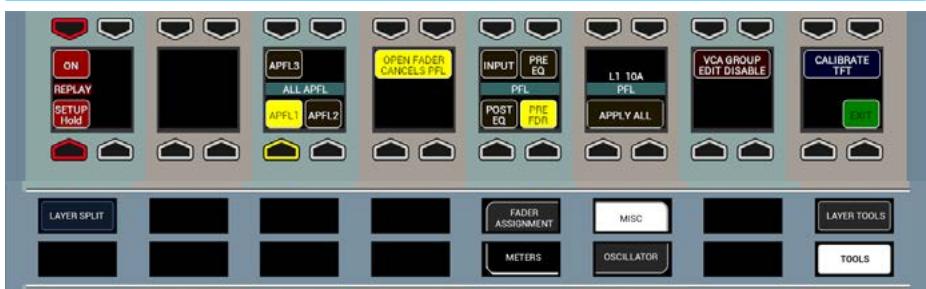
Paths can be added or removed from the Replay Set by pressing their ASSIGN button whilst holding the Replay SETUP button down, as indicated in Fig 1 above.

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, see Fig 1.

FIG 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 PROCESSING mode TFT screens showing the names of all sharing consoles, see Fig 1. 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 (greyed out) on the input (left hand) column of all the PROCESSING mode assign layouts.

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 172.

If memories are loaded which affect protected inputs, a pop-up appears on the main application screen, see Fig 2 above right.

FIG 1 - SHARED INPUT NOTIFICATION POP-UP - CONSOLE

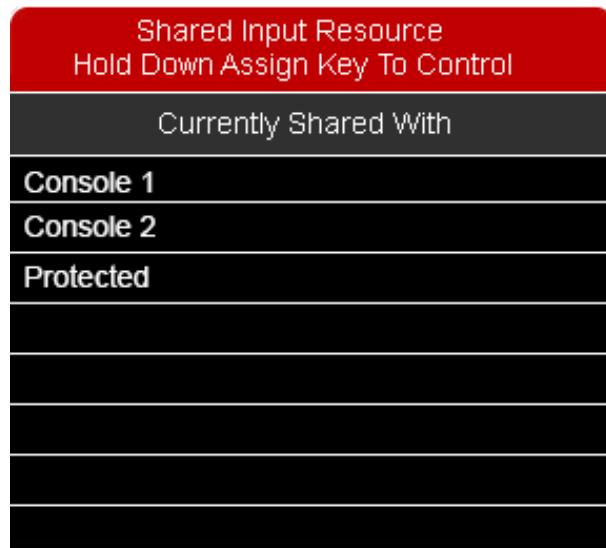
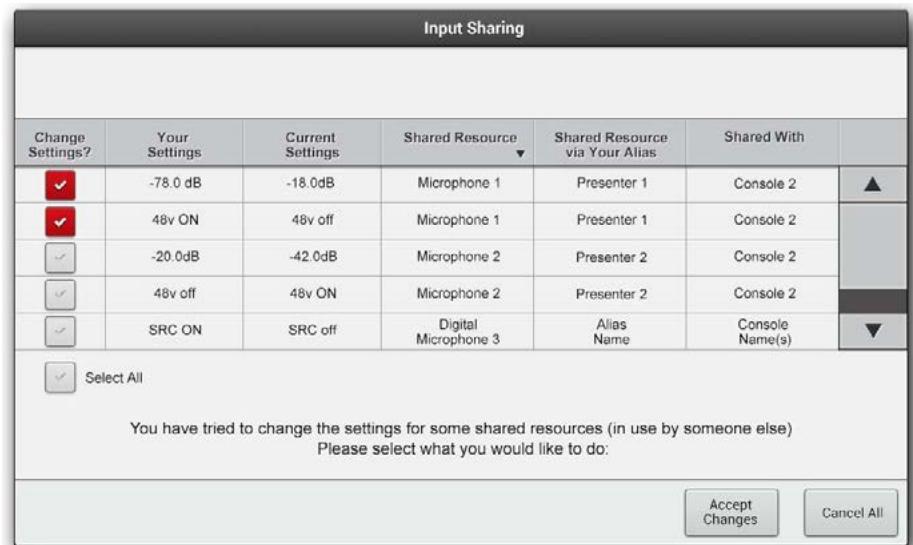


FIG 2 - INPUT SHARING POP-UP - MAIN APPLICATION



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 if they are really sure about the changes before being prompted to ACCEPT CHANGES again. See Fig 3.

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 pop-up in the main application 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 Fig 4, also see "[Output Port Protection](#)" on page 131 for more information.

FIG 3 - SHARED INPUT NOTIFICATION POP-UP - MEMORIES SCREEN

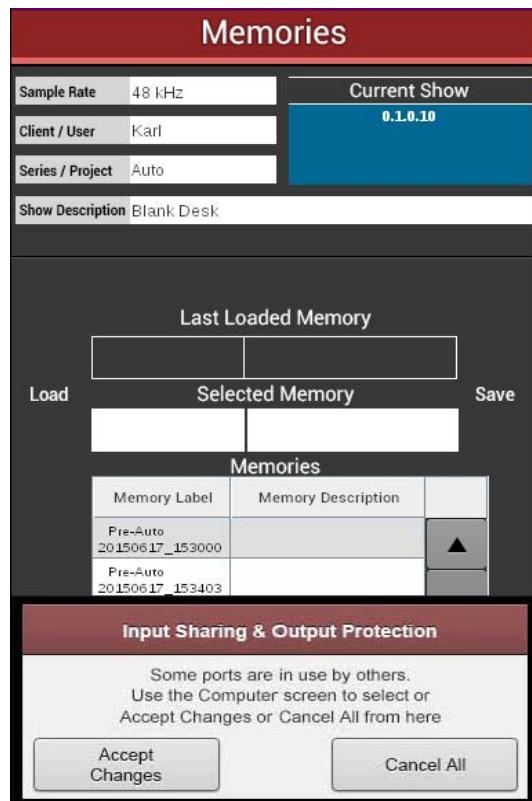
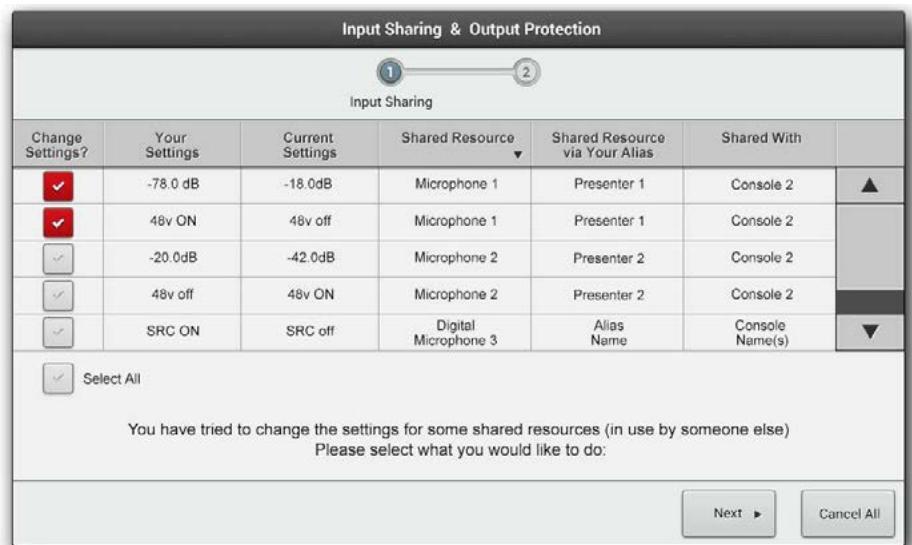


FIG 4 - INPUT SHARING AND OUTPUT PROTECTION 2 STAGE POP-UP



DOLBY E DECODING

Dolby E decoders are no longer available as an option for fitting in Hydra2 modular I/O boxes. However there are a number of existing mixing consoles that have these fitted.

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 customised, 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 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 Fig 1, also see "[Input Types and Patching](#)" on page 62 for more details on I/O patching.

FIG 1 - AES INPUT PATCHED TO OUTPUT PORTS FEEDING A DOLBY E DECODER

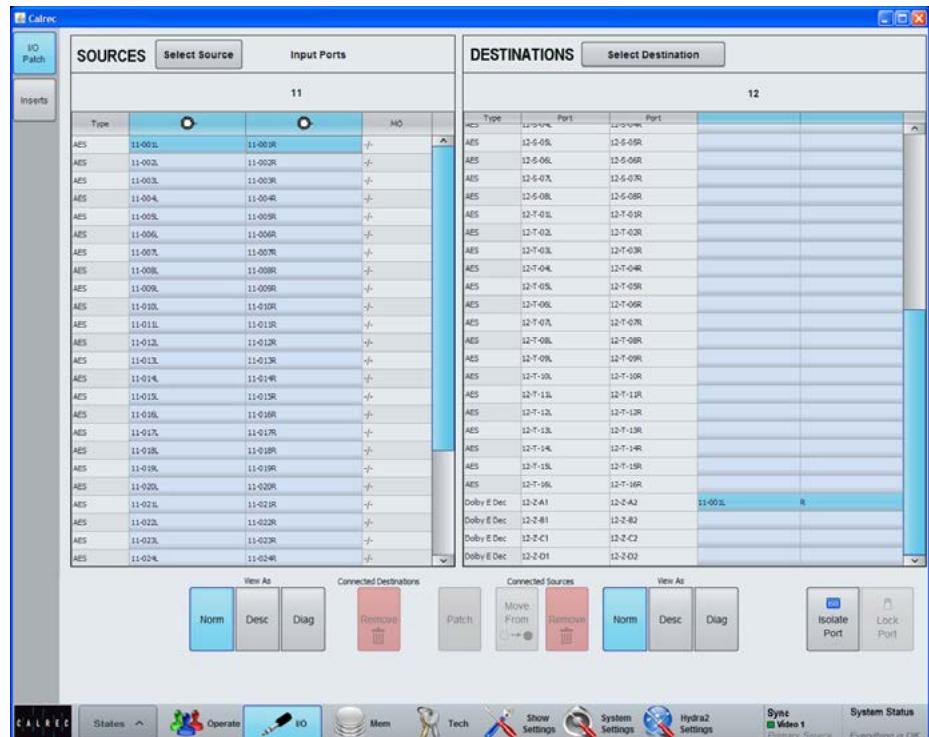


FIG 2 - OUTPUT FROM A DOLBY E DECODER PATCHED TO AN INPUT CHANNEL



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 Source** 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. 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 any of the PROCESSING panel modes. 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 - synchronisation

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 AES and AES within SDI do have sample rate convertors 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 any of the PROCESSING panel modes 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.

Note: DolbyE will not function at sample rates other than base rate i.e. it won't work at 96kHz.

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 **>Hydra2 Settings>Aliases>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 Fig 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.

Aliases at different sample rates

Although the alias is sample rate agnostic the alias is made up from ports that may be at a different rate to the desk. Only ports inside the aliases that are at the same sample rate as the desk will work.

FIG 1 - INPUT ALIAS FILE EDITING

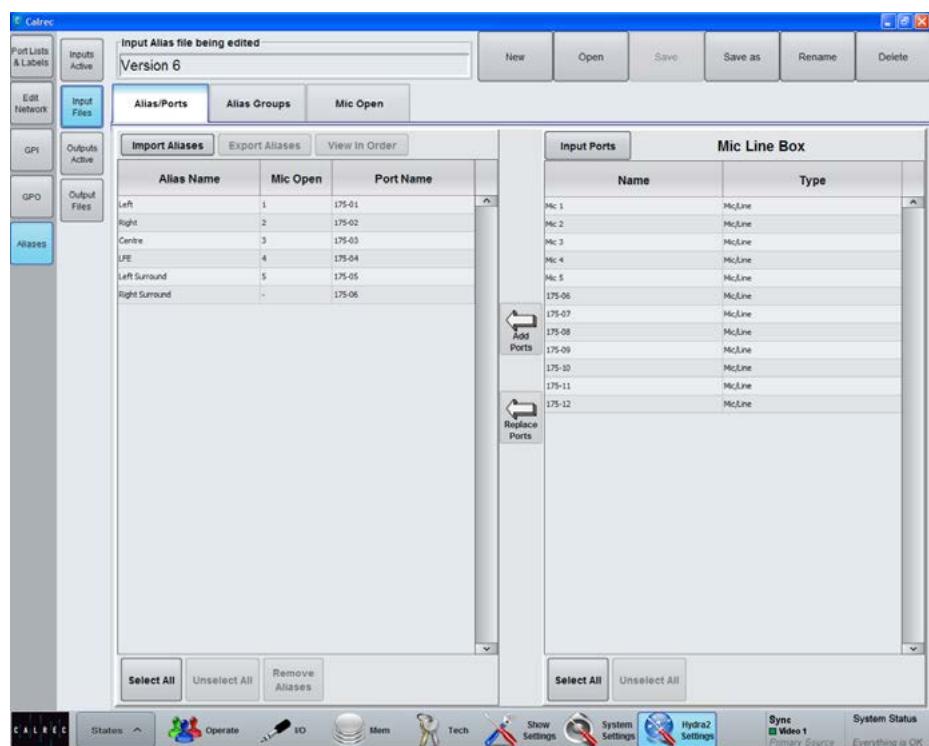
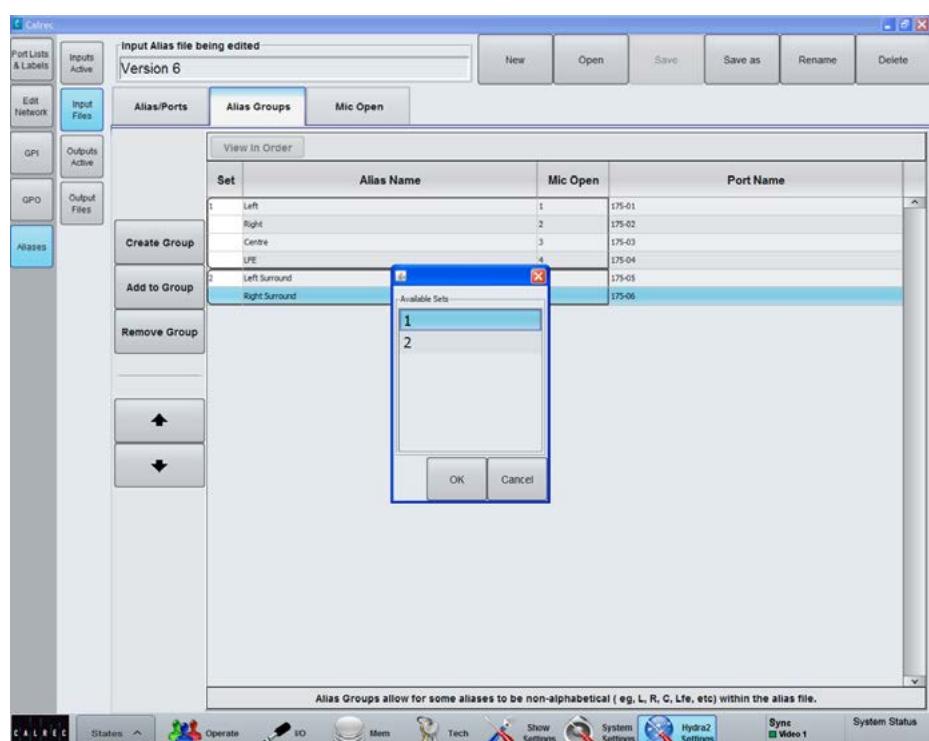


FIG 2 - ALIAS GROUPS



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 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 Fig 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 Fig 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 Fig 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.

FIG 3 - ALIAS ENABLING

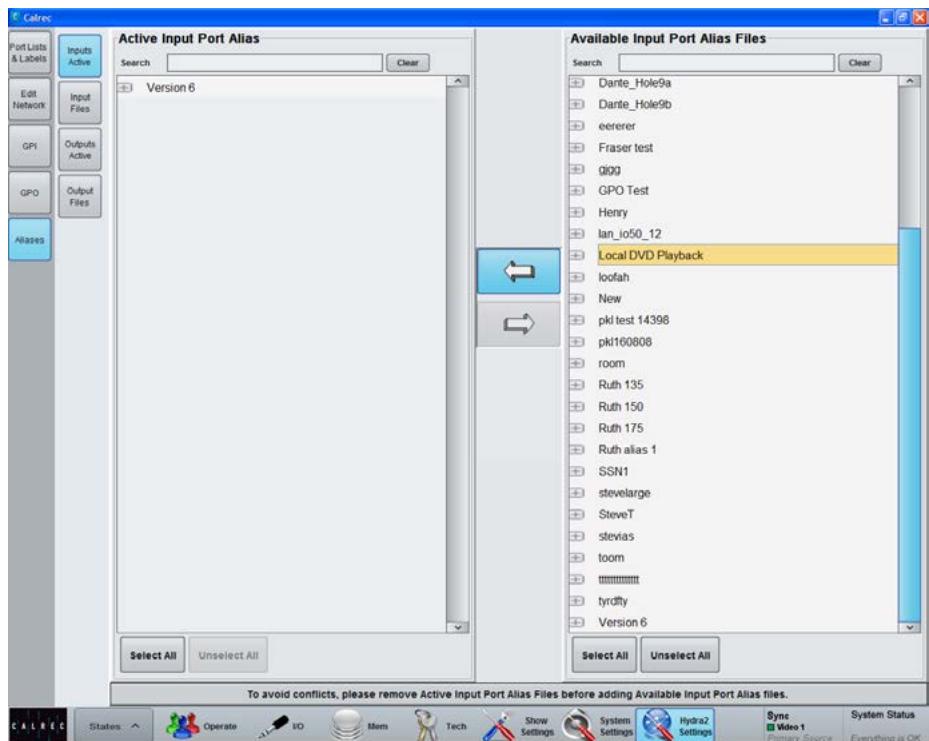
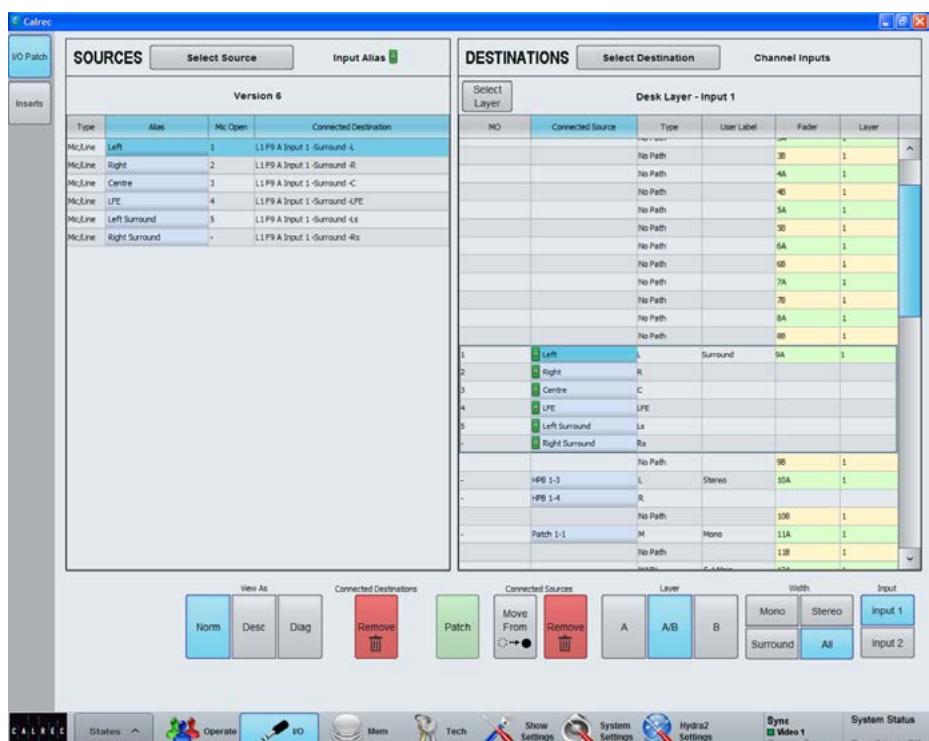


FIG 4 - USING AN INPUT ALIAS



TONE / OSCILLATOR CONTROLS

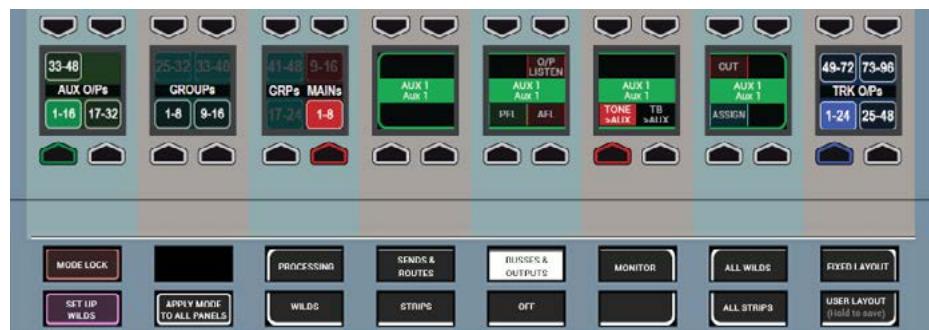
There are many tone injection points within the Apollo DSP to aid with path checking and line-up.

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 any PROCESSING mode 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.

FIG 1 - 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

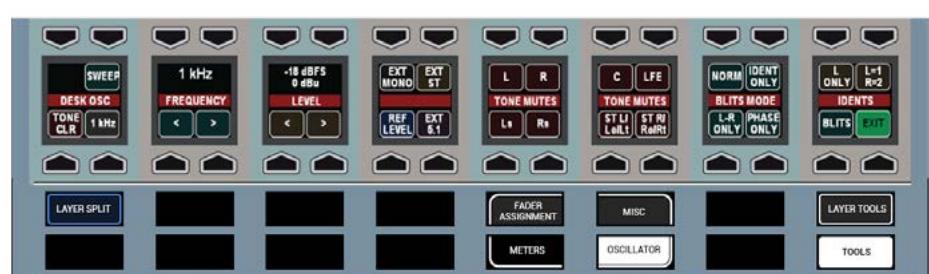
The Functions row provides controls to adjust the internal oscillator's level and frequency, including a repeating tone sweep function and mute options for each leg of the accessed path:

- 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.

FIG 2 - 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, Centre at 1320Hz, Lfe at 82.5Hz and

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 BLITS can be used in conjunction with the Oscillator sweep function. Selecting BLITS 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 main application, [>System Settings>Fixed I/O>Select Destinations](#) in the upper right area of the screen and choose TONE + TB. From the upper left, 'Select Source' 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 converters 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 phantom 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 CLR 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 Patchable to Output Ports

Tone can be selected to multiple points throughout the DSP from channel inputs to bus outputs, and is also available to be patched directly to output ports for use by others. This makes the tone oscillator available as an externally available source without using the DSP.

Tone is available as a source to be patched to output ports from
[>My Desk Outputs>Tone Outputs.](#)
See Fig 3.

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.

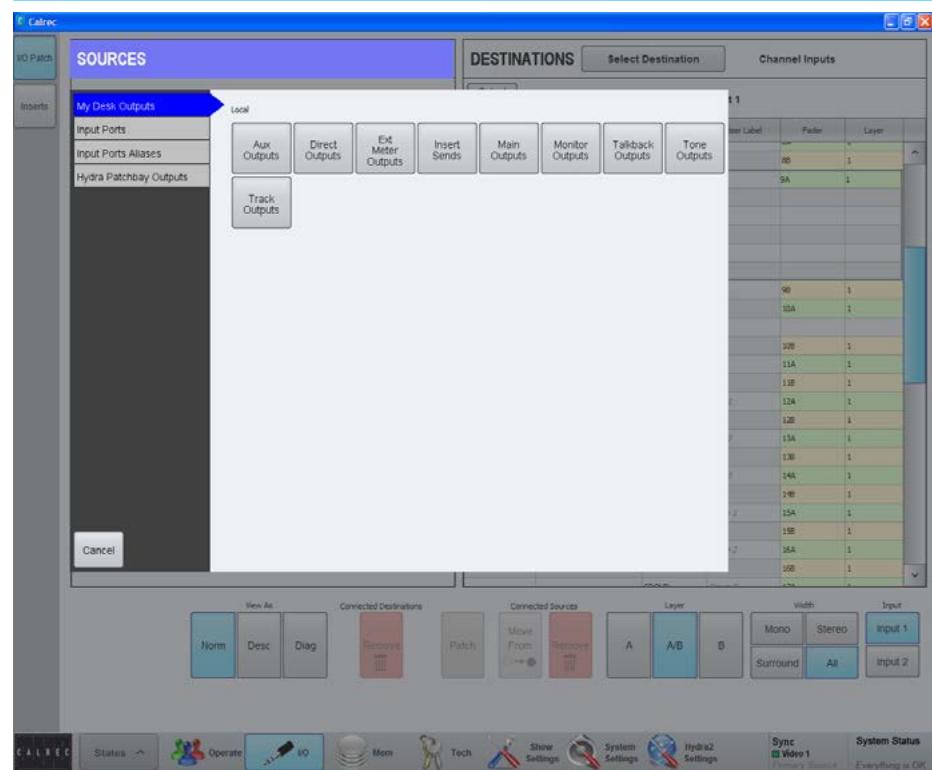
Tone on stereo downmixed / encoded outputs lower than expected

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

FIG 3 - PATCH TONE TO OUTPUT PORTS



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 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.

HYDRA2 PATCHBAYS

Hydra2 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, Hydra2 Patchbay inputs are destinations and Hydra2 Patchbay outputs are sources, see Fig 1.

When a source is patched to a Hydra2 Patchbay input, it immediately becomes available at the corresponding Hydra2 Patchbay output.

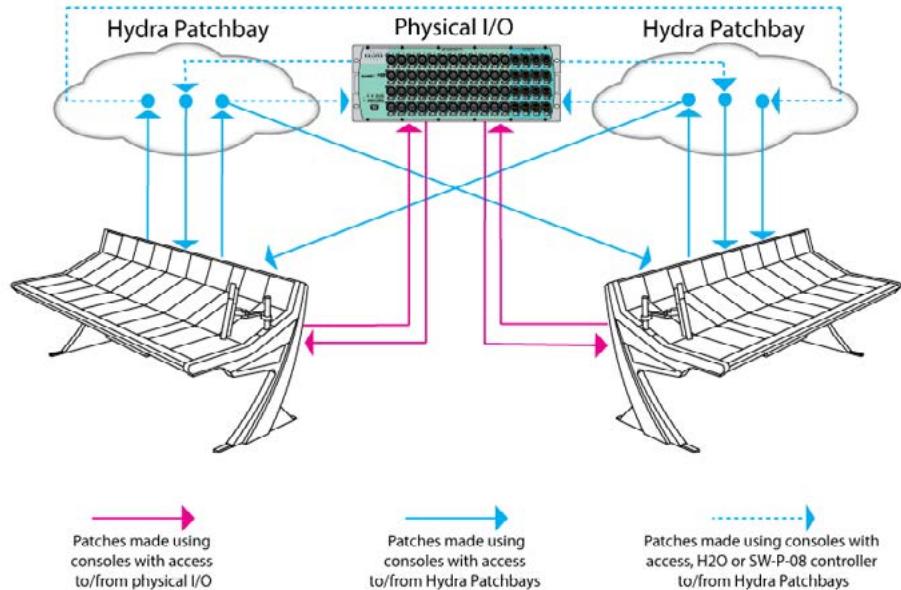
For example, if a console operator patches a direct output to a Hydra2 Patchbay input, the direct output feed becomes available to all Hydra2 users (who have been granted access,) as the corresponding Hydra2 Patchbay's output.

There are two types of HPB: 'console specific' and 'shared'. Console specific Hydra2 Patchbays are available to the console that they have been created for, plus H2O and 3rd party controllers via SW-P-08.

Shared Hydra2 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 Hydra2 Patchbay inputs in the same way they patch to physical output ports.

FIG 1 - HYDRA2 PATCHBAYS



Hydra2 Patchbays allow network administrators (via H2O) to patch console inputs and outputs (which have been patched to Hydra2 Patchbay ports) to physical I/O ports.

H2O users can choose physical input ports to connect to console's Hydra2 Patchbay inputs, and physical output ports to connect to console's Hydra2 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 Hydra2 patchbays enabling 3rd party control over console patching.

Hydra2 patchbays are created from the H2O user interface. See the H2O user guide for more information.

HPBs and different sample rates

From version 8.0 Hydra2 patchbays can be configured to operate at 48kHz, 96kHz or follow the sample rate of a particular console when it loads a show. See "[I/O Boxes & Hydra Patchbays Sample Rate Selection in H2O](#)" on page 54

A Hydra2 Patchbay set to a different rate than the desk will behave in the same way as ports at different sample rates to the desk. See the H2O user guide for more information.

Once created, Hydra2 patchbays are available for patching, they appear 'online' in the [>Hydra2 Settings>Edit Network](#) screen of main application from where they can be added to the console's Required List for use in port patching.

Port Sharing

Input and output port protection works as normal when dealing with Hydra2 Patchbays for both console and H2O users. In situations when two or more consoles are using the same feed from a Hydra2 Patchbay (as shown in Fig 2) 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 Hydra2 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 Hydra2 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 unpatched, their input settings (Mix Gain, SRC, 48V) are reset to their default values. However, when using Hydra2 Patchbays it is possible to unpatch a port at two points in the signal chain, as shown in Fig 3 on the right.

If the port is first unpatched at point 2, the I/O box port's input settings will be retained, even when the port is also unpatched at point 1.

FIG 2 - HYDRA2 PATCHBAY - CONSOLE PATCHING CHANGE

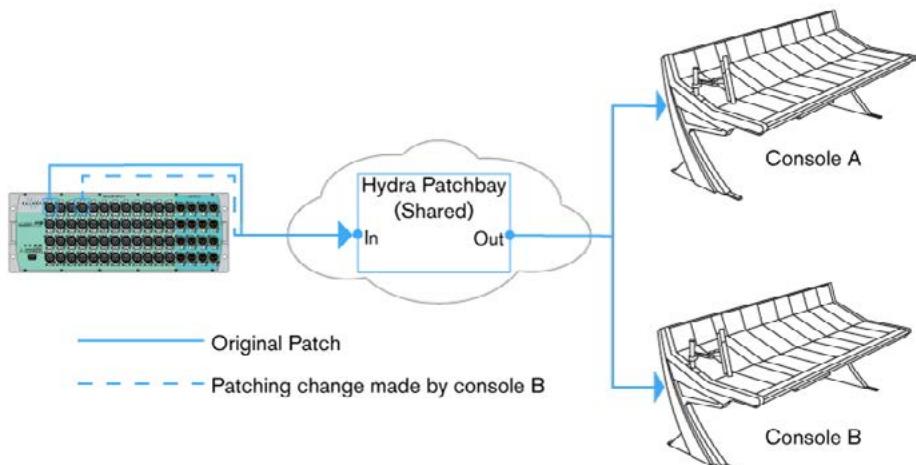
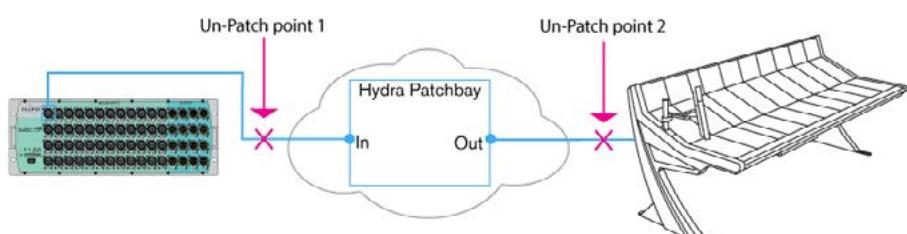


FIG 3 - HYDRA2 PATCHBAY - UNPATCH

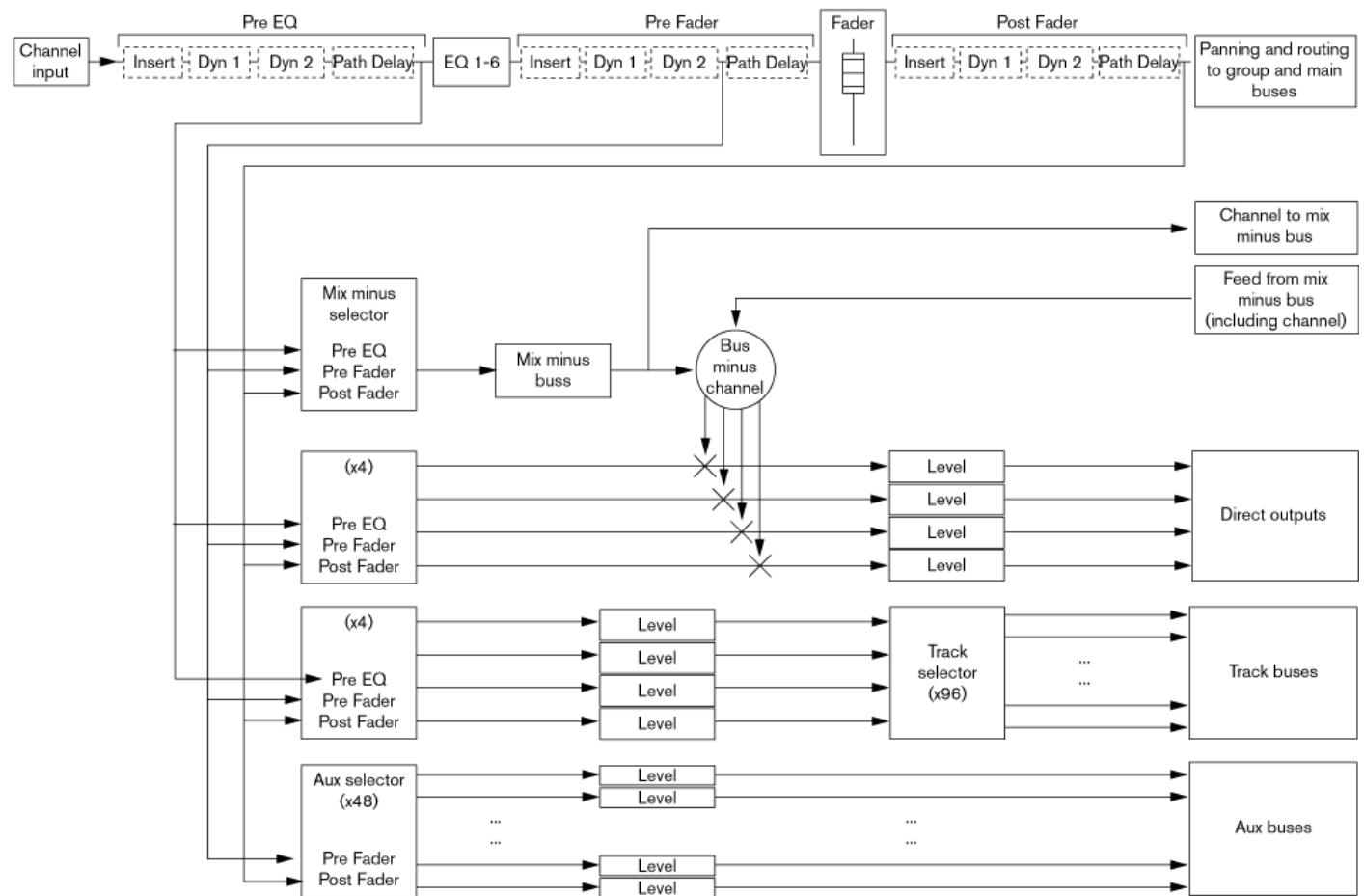


APOLLO PROCESSING AUDIO

CHANNEL SIGNAL FLOW

Fig 1 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.

FIG 1 - 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. See Fig 1.

Given the flexible and configurable nature of the surface, the EQ control layouts used here are available on both the PROCESSING-OVERVIEW mode which was briefly described in the CONTROL PANEL MODES section and the PROCESSING-EQUALISER mode as shown and described here in greater detail. 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.

A & B alternate EQ Settings

Two EQ curves can be created per channel using the EQ Settings A & B buttons on the TFT screen. Tapping these flips between the two EQ curves for quick EQ changes or comparisons. The Copy EQ Settings buttons on the TFT screen copies EQ A > EQ B or EQ B > EQ A.

Reset EQ A and Reset EQ B

Holding the Reset EQ A or Reset EQ B buttons 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.

FIG 1 - EQ CONTROLS ON THE PROCESSING-EQUALISER ASSIGN MODE LAYOUT



Frequency

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

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. Fig 2 shows the Response Types and parameters

EQ curve display

The touchscreen shows a graphical representation of the current EQ curve for the assigned channel. With its band markers, numerical values and response type.

Note that a thumbnail view of the EQ curve is also made available in the PROCESSING-EQ button cell selector.

FIG 2 - 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 1

Every channel / group / main path has to two dedicated dynamics processing units that are always available to them. Dynamics 1 shown right provides a Compressor / Limiter and Expander or Gate.

Dynamics controls

The dynamics controls and related displays are all located in the PROCESSING-DYNAMICS 1 panel mode, as shown in Fig 1.

Dynamics controls and displays are all colour-coded purple. The controls are arranged in 3 blocks:- Compressor /Limiter controls for ON, Threshold, Ratio, Attack, Recovery and Gain Make-up. Expander or Gate controls for ON, Threshold, Ratio, Attack, Recovery and Depth and 2 bands of Dynamics sidechain EQ controls for Gain, Frequency and Q / Response types.

The TFT screen displays a graph of input level versus output level along with switchable gain reduction meters, the position of the Dynamics 1 processing in the Signal Path and switches for control and gain reduction independence of legs for stereo and 5.1 path legs. With SCEQ selected on the TFT screen, it also displays the EQ curve for the dynamics 1 side-chain. Also shown are the 8 Dyn Links selector which this path can be linked to or can be left as No Link for independent operation .

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.

FIG 1 - DYN CONTROLS ON THE PROCESSING-DYN 1 ASSIGN MODE LAYOUT



The Expander in Dynamics 1 can be switched to perform as a gate by pressing the Gate button in the 4th control cell in the bottom control row of the wild assign panel.

Processing order

Buttons on the TFT screen 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 colour 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 colour 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 gain reduction independence from the surround master.

Sidechain EQ

The 'SC EQ IN' button in the 8th control cell in the bottom row of the wild assign panel is used to switch sidechain EQ in and out.

Pressing the sidechain 'LISTEN' button in the same cell allows the user to listen to the effect that the sidechain EQ is having on the signal. 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 side-chain can be viewed by selecting SCEQ ON from the TFT screen on the left of the EQ curve or from the panel as described.

About Dynamics Sidechain & EQ

All Dynamics 1 processors have optional sidechain EQ. Channels have 2 band of SCEQ, whilst Groups and Mains have a 1 band of SCEQ.

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 bussed 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.

Fig 2 shows the available parameters for the Dynamics Processors.

FIG 2 - 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

DYNAMICS 2

Every channel / group / main path has two dedicated dynamics processing units that are always available to them. Dynamics 2 shown right provides a second Compressor / Limiter or can be retasked to provide AutoMixer Processing

Dynamics 2 controls

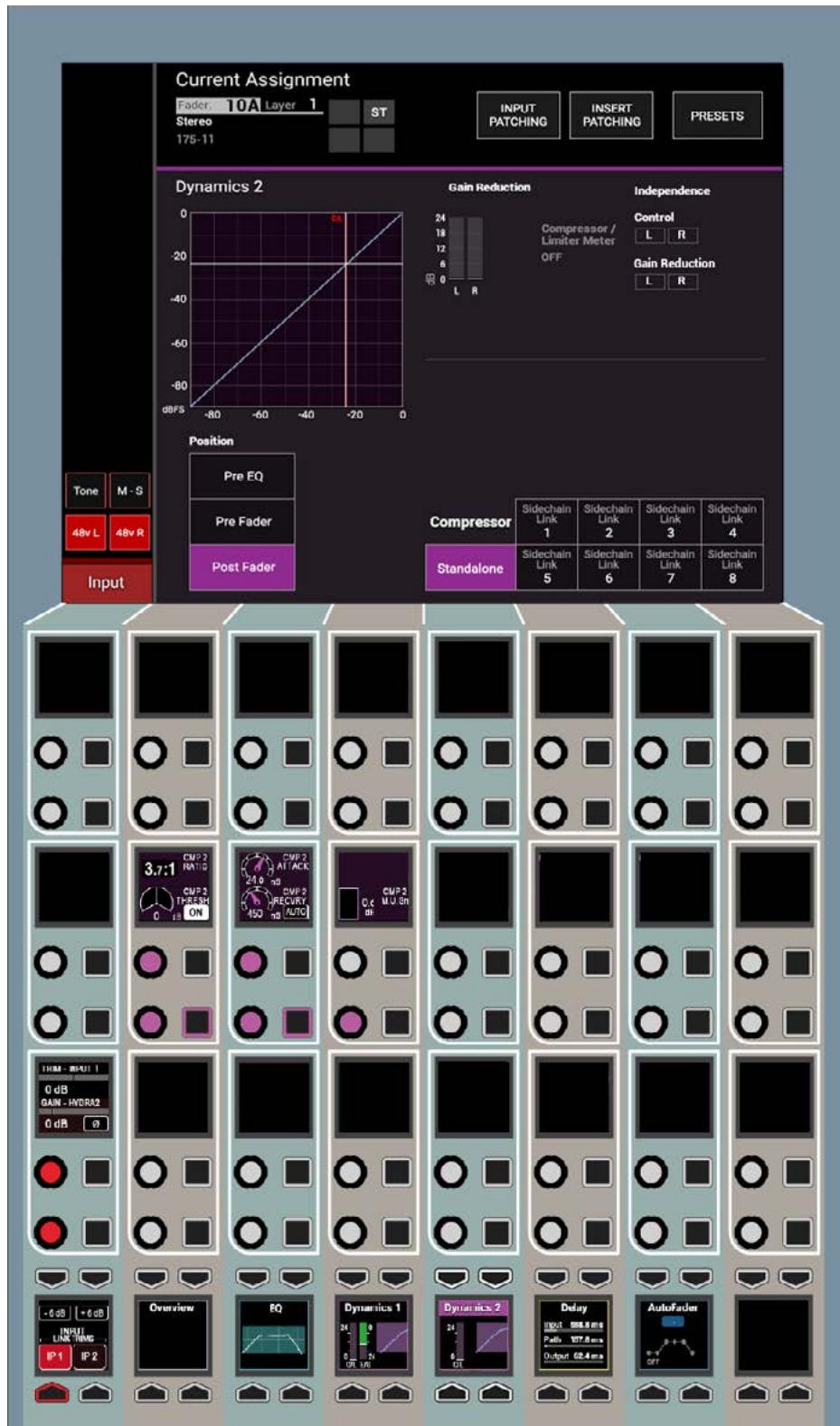
The Dynamics 2 controls and related displays are all located in the PROCESSING-DYNAMICS 2 panel mode, as shown in Fig 1.

Dynamics controls and displays are all colour-coded purple. The controls are arranged in 1 block:- Compressor /Limiter controls for ON, Threshold, Ratio, Attack, Recovery and Gain Make-up.

The TFT screen displays a graph of input level versus output level along with switchable gain reduction meters, the position of the Dynamics 2 processing in the Signal Path and switches for control and gain reduction independence of legs for stereo and 5.1 path legs. Note in this image a Mono Path is being displayed so no independence controls are on show. Also shown are the 8 Dyn Links selector which this path can be linked to or can be left as No Link for independent operation .

Mono paths also allow the Dynamics 2 process to be replaced with 1 of 8 Automixers which are selected from the TFT screen.

FIG 1 - DYN CONTROLS ON THE PROCESSING-DYN2 ASSIGN MODE LAYOUT



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 & Artemis 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.

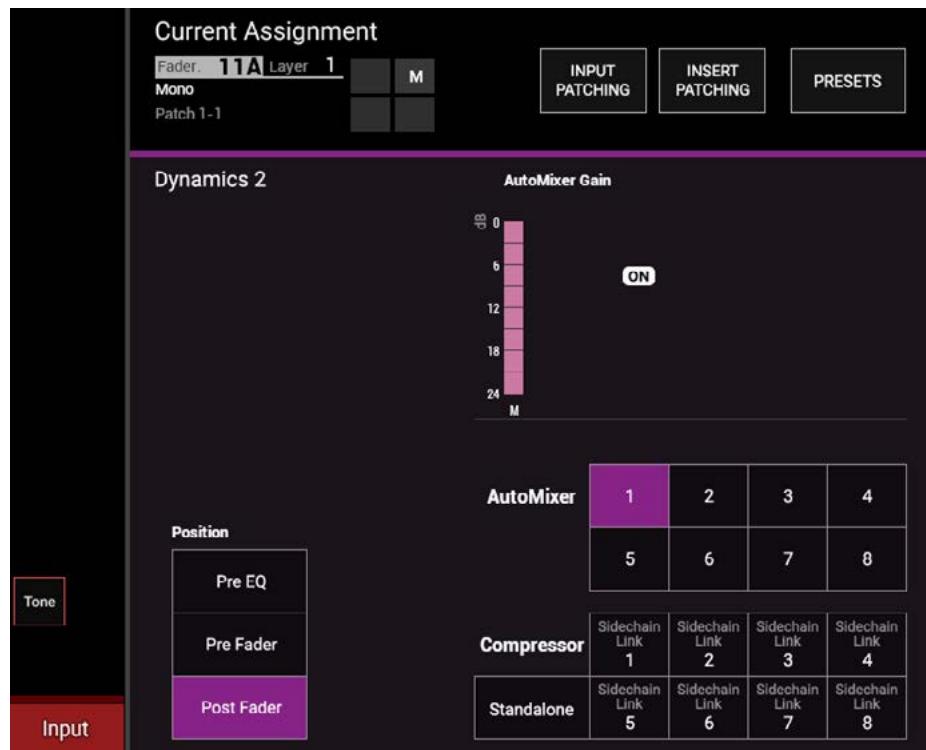
Automixers are embedded within the 'Dynamics 2' processing unit and are assigned using the same menu as the dynamics side-chain links. See Fig 1.

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 or gate.

Assigning control

To assign a path to automixer control, select the PROCESSING-DYNAMICS2 panel mode. In this mode, the TFT screen displays the settings for the Dynamics 2 processors. Call attention to the chosen path by pressing its fader assign button. Select one of the eight Automixer modes for the dynamics 2 processor by pressing one of the buttons on the TFT screen note that these only appear on Mono paths - if the path is not currently assigned to an automixer or dynamics 2 side-chain link,

FIG 1 - AUTOMIXER CONTROLS ON THE PROCESSING-DYN2 TFT SCREEN LAYOUT



the 'No Link' button will be lit. 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 'No Link' from the Dyn Links area on the TFT screen. To place the path under the control of a different automixer, simply select a different numbered automixer.

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, as shown in Fig 3 on the following page.

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 colour 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 applied, the meter drops to indicate the amount it's being reduced by. See Fig 3 on the next page for an image of the Automixer metering in the meter bridge.

Adjustment controls

The automixer controls appear when one of the eight automixers have been selected. Buttons on the same TFT screen 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 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. See Fig 2 for automixer controls.

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.

FIG 2 - AUTOMIXER CONTROLS ON THE PROCESSING-DYN2 PANEL LAYOUT



FIG 3 - 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.

DELAY

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

- Input delay - up to 2.73s available per input 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). This can be assigned from the PROCESSING-DELAY panel
- Path delay - up to 2.73s always available for all paths from the PROCESSING-DELAY panel which can be placed, pre-eq, pre-fader or post fader.
- Output delay - up to 2.73s available per path from a pool of 256 mono legs this delay can be applied to Direct Outputs, Mains, Tracks and Auxs when assigned to the surface from the Bus Output panel.

Note that Input, Path and Output delay can be used individually or in combination. See Fig 1.

Assignable Delay at different sample rates.

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

At the higher sample rate the pool size for input and output delay is halved, meaning that the pool of 256 mono legs worth of delay becomes 128 mono legs of delay, however the amount of delay per leg remains unchanged at 2.73s.

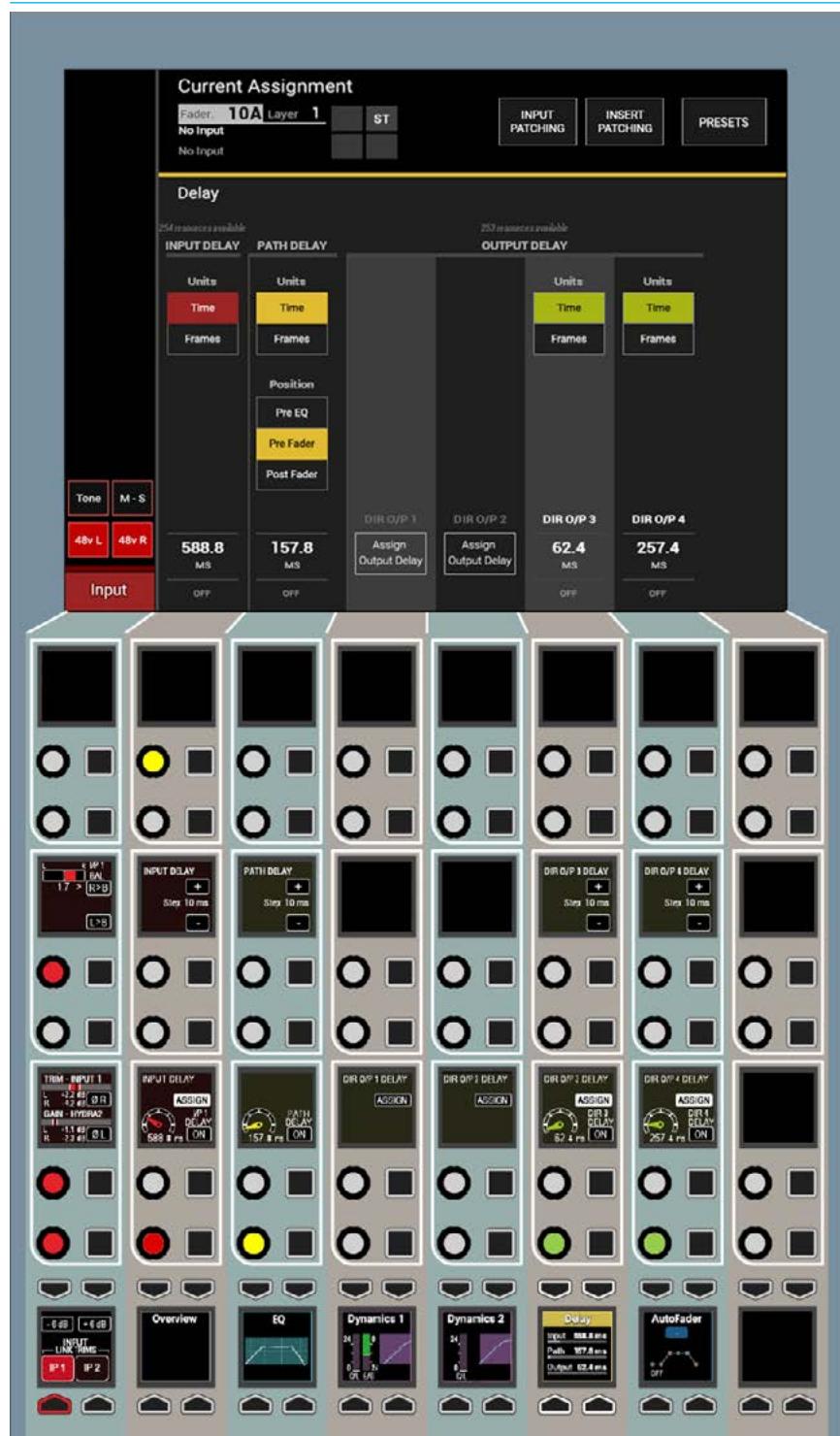
Individual Assignable Delay

To apply an assignable delay, select the PROCESSING-DELAY panel mode and press the appropriate assign button (Input or Output) on the lower control row. Note that for direct outputs the outputs themselves have to be assigned first before delay can be assigned to them.

Individual Path Delay

The Path Delay control is always available on all Channel, Group, Main, Aux or Track paths and can be placed, pre-eq, pre-fader or post fader using the Position buttons in the PATH DELAY column on the TFT screen. Working from the top of the

FIG 1 - DELAY CONTROLS ON THE PROCESSING-DELAY ASSIGN MODE LAYOUT



position block, 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 84, 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.

DELAY SETTINGS

Once Input or Output Delay is assigned (or for Path Delay already present), the rotary controls and up/down stepper buttons for use as an alternative to the rotary controller for setting the delay time become available to the user.

The TFT screen shows the Delay Units either in Time format in milliseconds / seconds or Frame format which can be set for each delay type from the screen buttons.

The current delay settings and ON / OFF status are shown at the bottom of the screen. See Fig 1 on the previous page for the Delay processing mode.

Assigning Delay to a Path which is not attached to a Fader

To assign 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 delay in the usual way from any surface panel that is in PROCESSING-DELAY mode, see Fig 1.

Global Delay Settings

Global delay controls can be accessed from the main application by selecting: >Show Settings>General Settings

There are three global delay settings as shown in Fig 2 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'.

FIG 1 - ASSIGNING DELAY WHEN A PATH IS NOT ASSIGNED TO A FADER

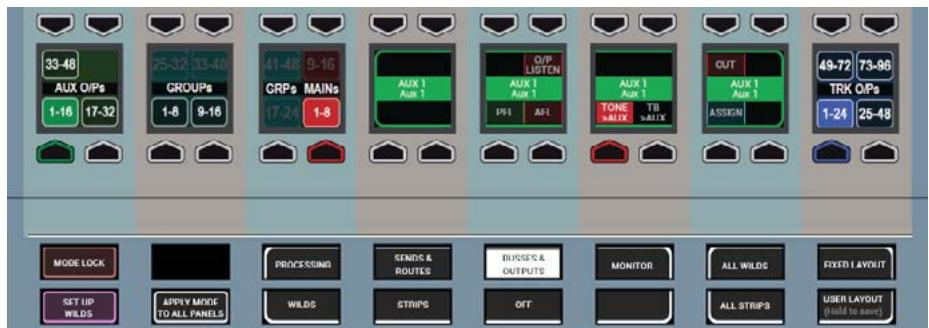
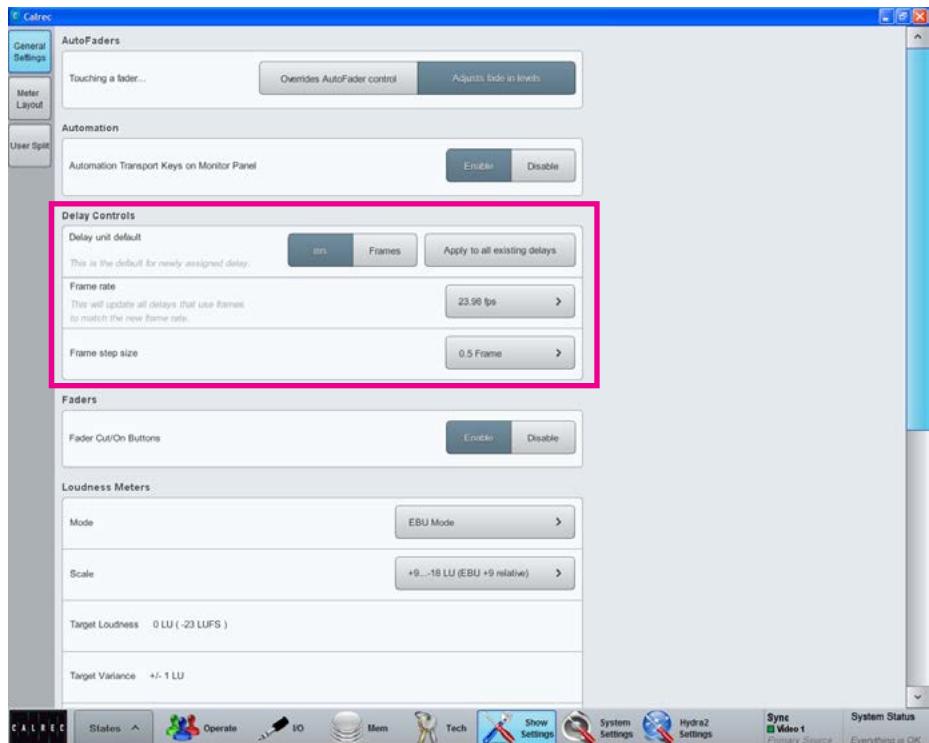


FIG 2 - GLOBAL DELAY CONTROLS - MAIN APPLICATION



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.

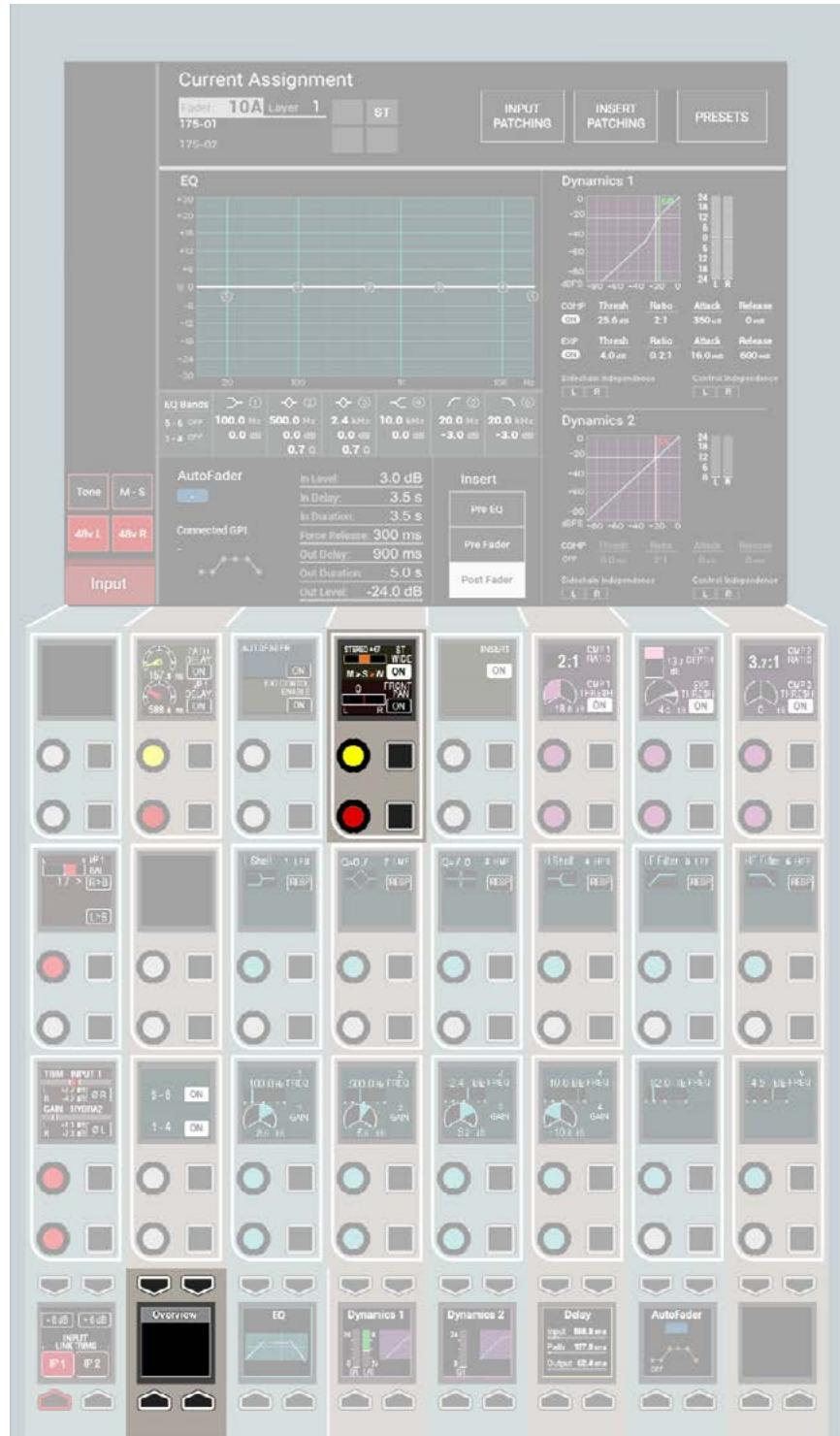
STEREO WIDTH

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 it's rotary control and ON switch appears on the PROCESSING-OVERVIEW panel mode. It must be switched in circuit using the ON button in the 4th Control cell , top row as shown in Fig 1.

FIG 1 - STEREO WIDTH CONTROL



STEREO/SURROUND SPILL

Apollo makes very efficient use of surface controls for accessing and controlling stereo/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 Fig 1 (or the Joystick panel which has the exact same upper section as highlighted right) press the SPILL LEVELS button. This upper section will now allow access and control of the individual legs of a stereo or surround path via the spill faders.

Spill faders

The spill controls follows the currently assigned path. When a fader which controls a stereo or 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 path, the spill panel will become unavailable until a fader controlling a stereo or surround path is assigned.

The faders on the spill panel behave in the same way as every other fader on

FIG 1 - SPILL CONTROLS



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.

Depending on the width of the signal present on the assigned fader, the component signals will be arranged differently on the spill faders. Stereo components of a 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.

In spill mode with a stereo path selected, the first two faders control the left and right channels. 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. 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

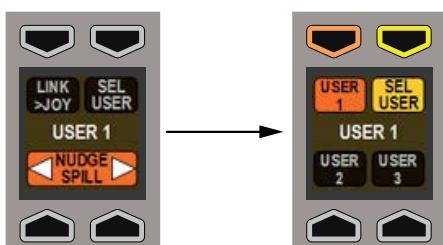
The spill controls contain a function that will nudge the current path assignment along the surface in either direction. Pressing the right nudge button changes the fader assignment to the fader on the right of the currently assigned fader. The left button moves the assignment to the left along the surface.

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 Fig 2 below. 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.

FIG 2 - SEL USER



Assigning paths on the spill panel

When a stereo or surround path is accessed on the spill panel, each leg of the 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 stereo/surround path will still appear blue but will also strobe. This indicates that any assign modes will affect a single component of the stereo/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 stereo or 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 stereo or surround signal, for example the C leg of a 5.1 path.

A surround path which is being processed will be referred to as the surround master in the following example. Note that a stereo path can be treated similarly.

EQ independence

By default, the EQ set on the surround master is applied to all legs of the path except the LFE leg.

Independence can be set for each band of EQ. Fig 1 shows EQ controls for the LFE leg of a surround channel set to be independent. Also note the Reset Independence EQ button on the TFT screen this resets the values to default for legs set to be independent, it does not remove their independence.

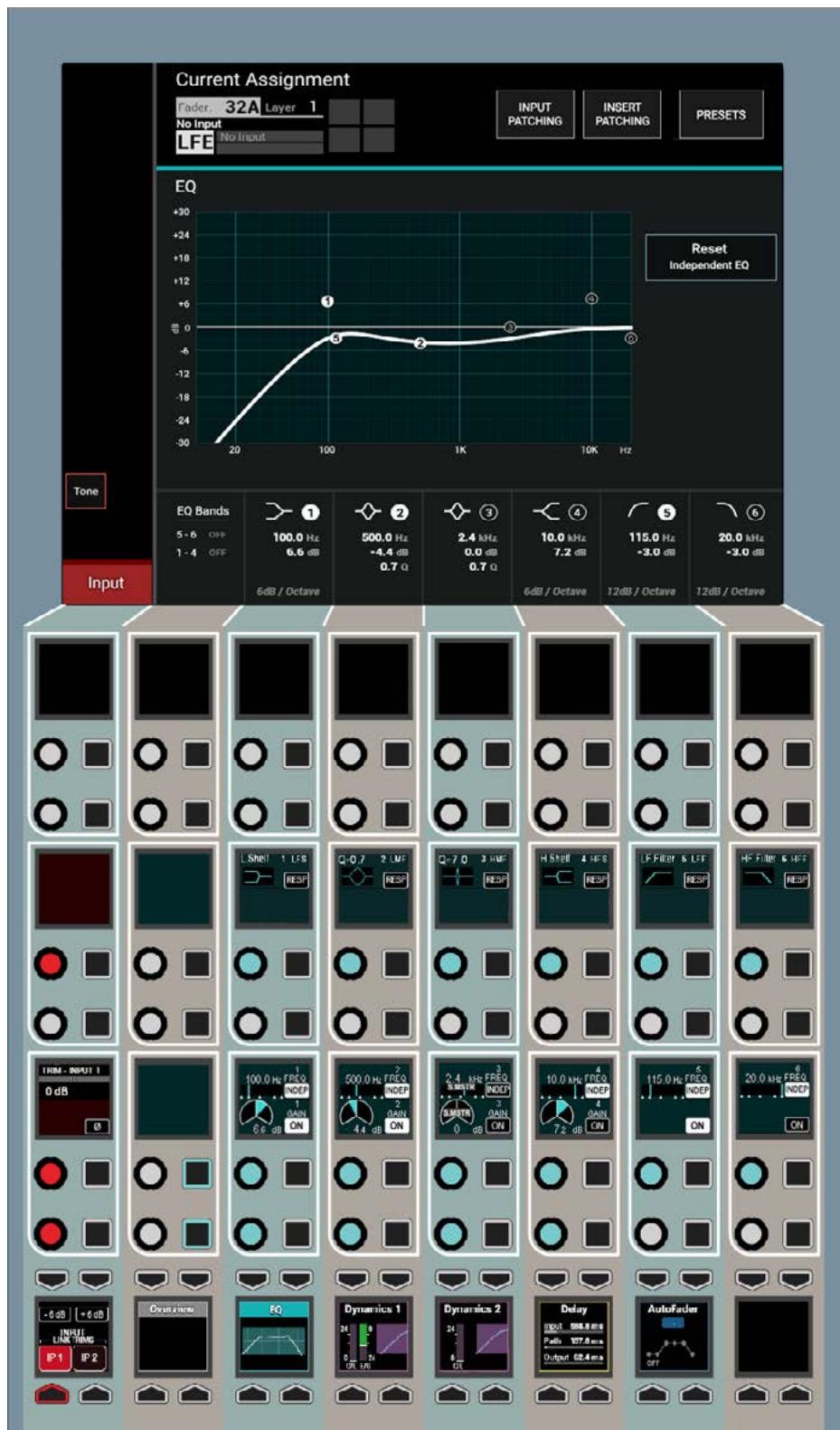
To apply independent EQ to an individual leg of the path, first assign the required leg on the spill faders (see "Stereo/Surround Spill" on page 96 for further information on this process).

Now in PROCESSING-Overview mode or PROCESSING-EQ mode press the INDEP button next to the EQ band (shown right) 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 see Fig 1- EQ Band 3 (right).

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

Note that switching off the Equaliser independence of an EQ band restores its the Surround Master Path settings.

FIG 1 - EQ INDEPENDENCE CONTROLS



Dynamics independence

By default, the DYN settings on the surround master is applied to all legs of the path except the LFE leg.

Dynamics of individual legs can be made independent from the surround master in two ways. Fig 2 shows an LFE leg of a surround path made independent.

The independence over dynamics settings for the assigned surround element are switched for control and sidechain independence for stereo and 5.1 path legs on the PROCESSING-DYNAMICS mode TFT screen as shown right.

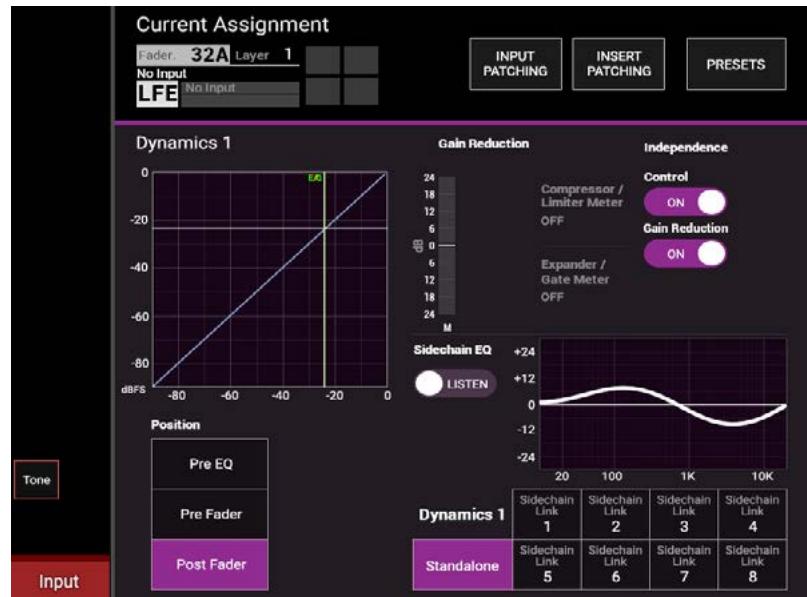
The first way to make a given leg e.g. LFE dynamics processing independent is to make the gain reduction independent.

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 gain reduction 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 gain reduction linking independent, assign the required leg of the surround master go to:- PROCESSING - DYN1 mode and tap the DYN1 gain reduction independence button (or the PROCESSING-DYN2 mode equivalent to make the second dynamics unit linking independent). This is shown on the right hand side of the TFT screen.

FIG 2 - DYN INDEPENDENCE CONTROLS



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. To make the dynamics controls independent, assign the required leg of the surround master go to:- PROCESSING - DYN1 mode and tap the Control Independence button (or the PROCESSING-DYN2 mode equivalent to make the second dynamics unit independent). This is also shown on the right hand side of the TFT screen.

When gain reductions are linked, but control is independent, different dynamics parameters, such as threshold and ratio can be set for the elements, but the same amount of gain reduction will be applied to all gain reduction linked elements if the audio on any of them crosses their threshold settings. This allows for different dynamics settings to be applied to each element whilst maintaining the overall mix level between them. If gain reduction independence is set for an element, gain reduction will only ever be applied to that element if the audio if its own audio crosses its own threshold settings.

As well as EQ & dynamics, other settings can be applied to elements of a stereo/ surround path that do not require an independence setting, such as input gain and routing. These parameters can simply be selected or adjusted whilst the stereo/ surround element is the currently assigned path.

By default the LFE leg of a surround path has independent EQ and dynamics from the surround master.

Note that switching off the Dynamics Independence for that control restores its Surround Master Path settings.

Independence status indicators

The status of EQ bands 1-6 equaliser Control independence and DYN1 or DYN2 dynamics Control and/or gain reduction independence is indicated on the monitor and/or joystick panel. When a surround path is assigned and the faders on the monitor or joystick panel are set to show spill or downmix levels, the two displays highlighted on the right show a blob next to any processing which has been made independent. See Fig 3.

By default all the controls for an LFE leg of a 5.1 channel are made independent.

FIG 3 - 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 Fig 1.

Patching insert resources to ports

Insert sends and returns can be patched to ports in the **>I/O>I/O Patch** screen of the main application. This screen is shown in Fig 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.

Inserts at different sample rates

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

At the higher sample rate the pool size for inserts is halved, meaning that the pool of 256 mono inserts becomes 128 mono inserts.

The image in Fig 2 shows the Insert sends to Output Ports. Note that the first 2 inserts have been made at a matched sample rate whilst Inserts 3 & 4 have been patched to output ports at the wrong sample rate.

FIG 1 - INSERT ABSTRACTION

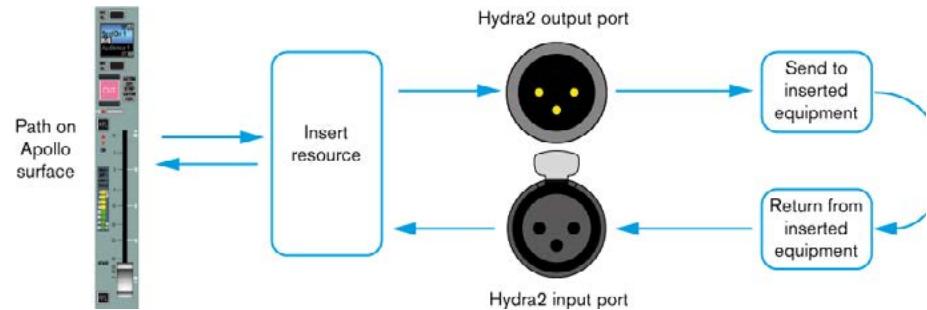
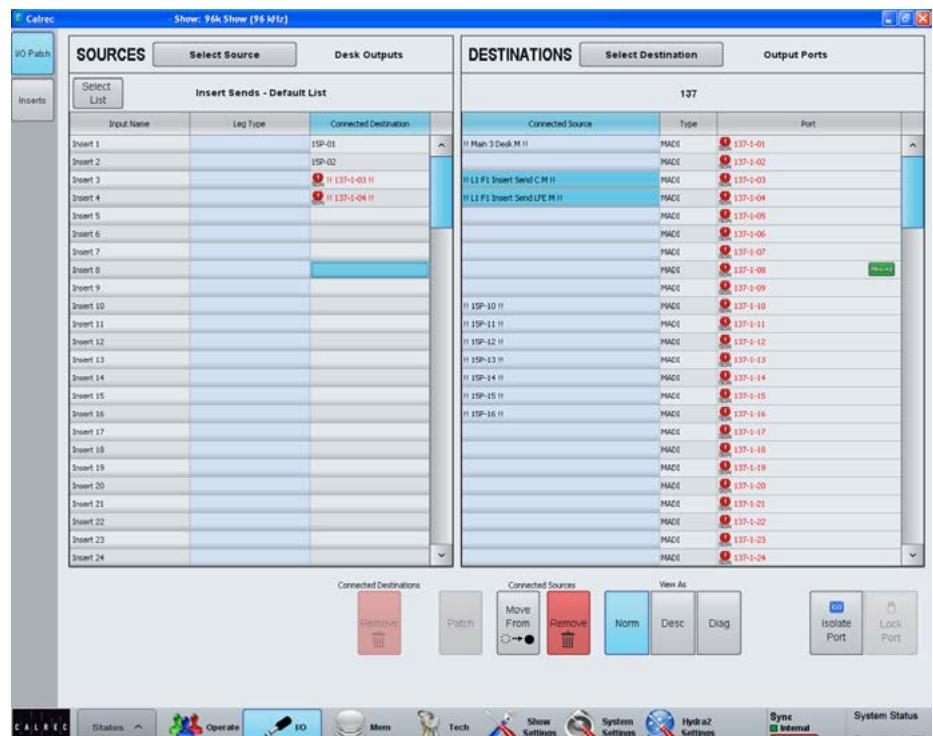


FIG 2 - PATCHING INSERTS



The image in Fig 3 shows the Inserts to faders screen, note that Inserts that are unavailable when operating at a higher sample rate are shown in pale red and cannot be used. For Apollo this would be inserts 65 and upwards.

The example shown in Fig 3 is from an Artemis Light, which normally has 128 inserts but when running at the higher sample rate, this reduces to 64 which is why inserts 65 and upwards appear unavailable.

Connecting insert resources to paths

Navigate to the >I/O>Inserts screen as shown in Fig 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 Show Settings section of the main application, as shown in Fig 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 Show Settings 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.

FIG 3 - CONNECTING INSERTS TO FADERS

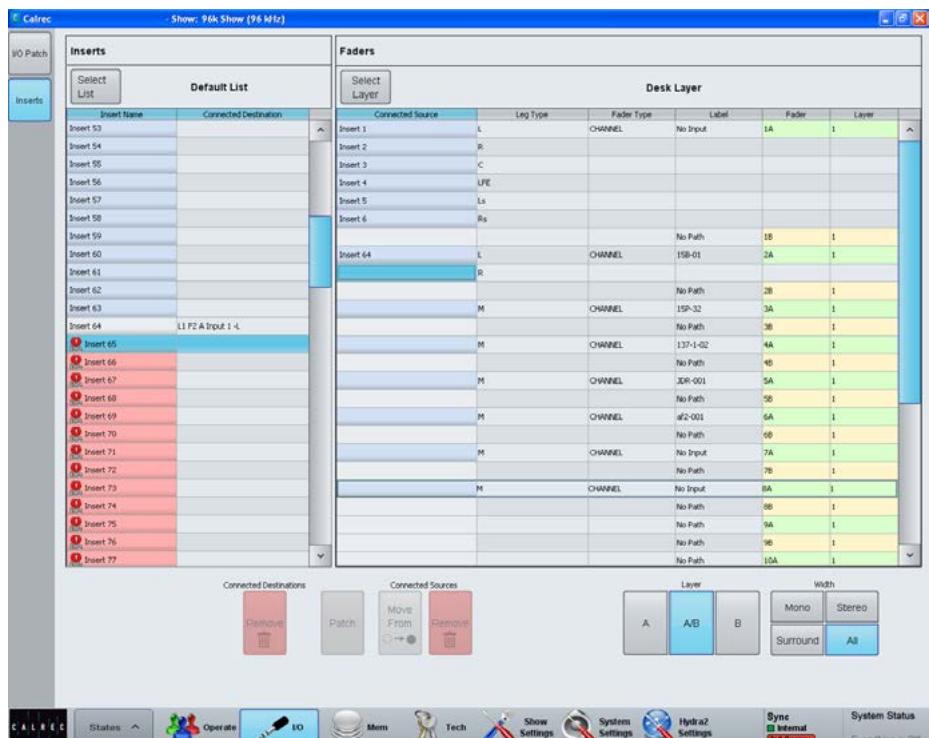
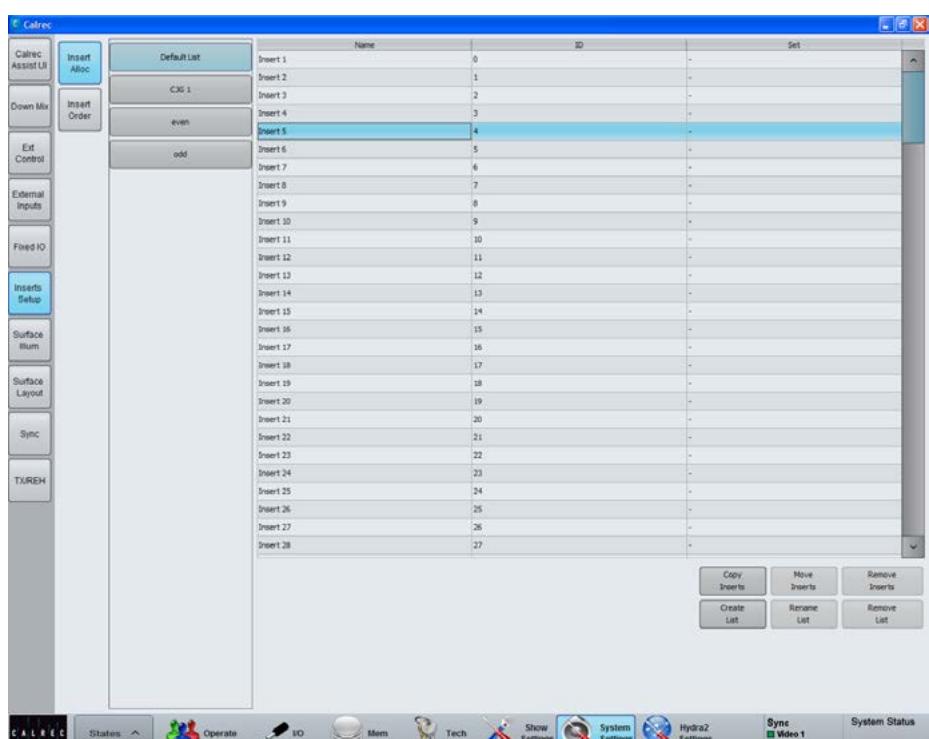


FIG 4 - INSERTS SETUP SCREEN



The new list will appear below the default 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 dialogue 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 dialogue. This dialogue 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 dialogue will appear asking for confirmation of the removal.

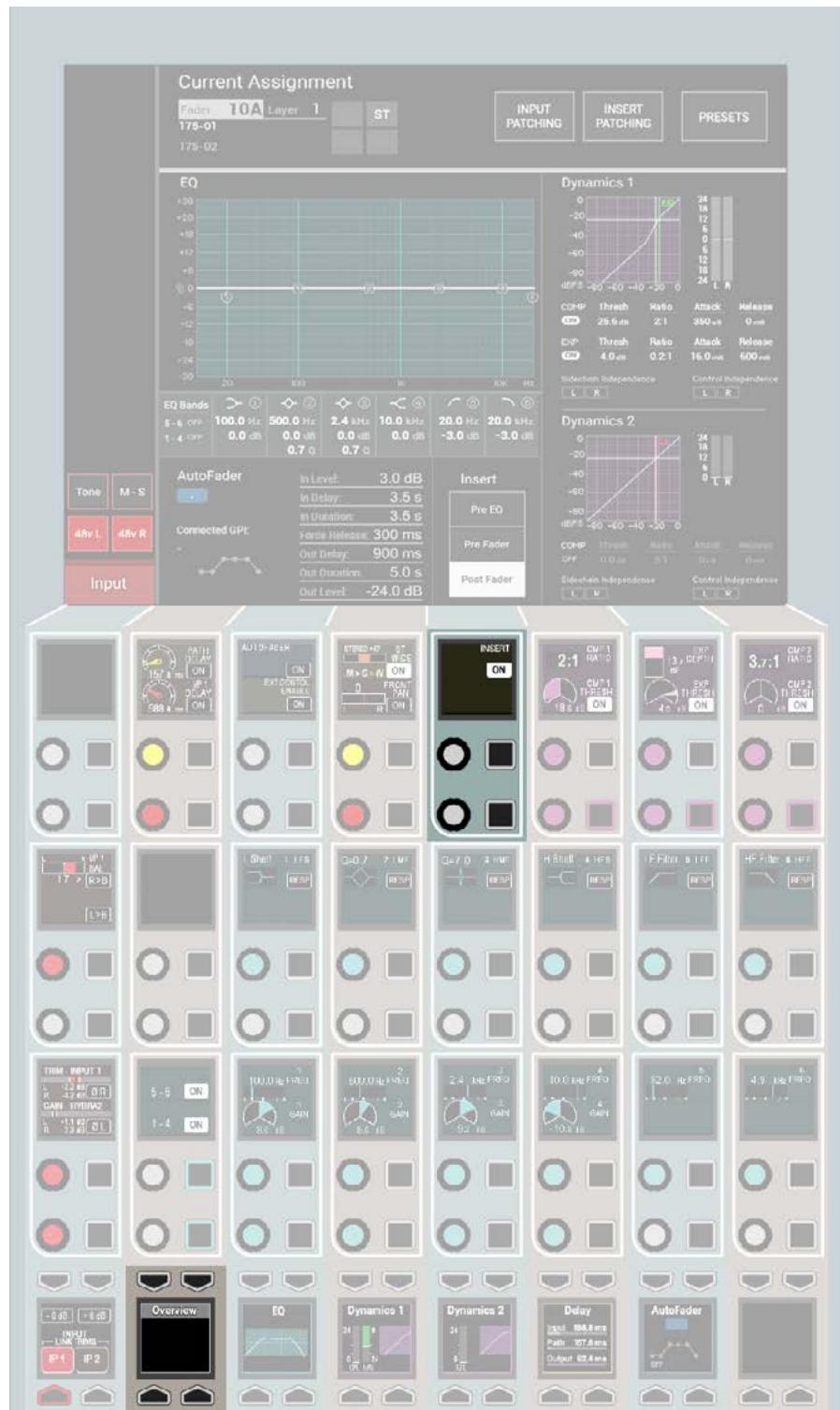
Insert Order and Sets

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.

Insert ON / OFF Control

The Insert ON / OFF switch appears on the PROCESSING-OVERVIEW panel mode. It must be switched in circuit using the INSERT ON button in the 5th Control cell , top row as shown in Fig 5.

FIG 5 - INSERT ON / OFF CONTROL



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. Fig 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 in Fig 2.

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

FIG 1 - GROUP HIERARCHY

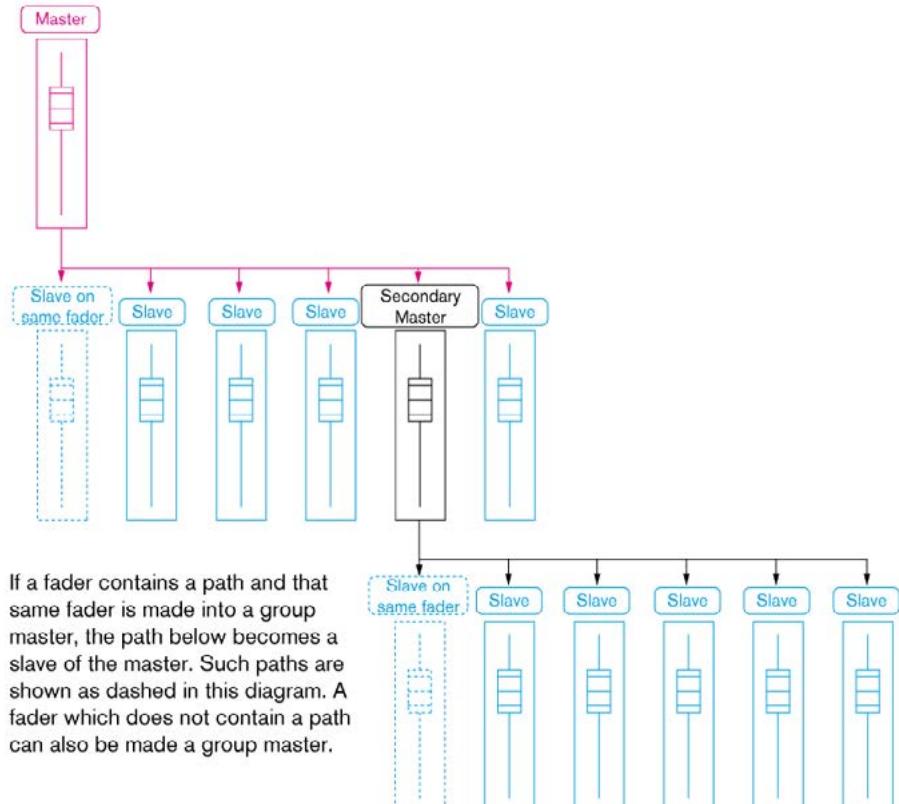


FIG 2 - FADER STATUS



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

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 in Fig 3.

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.

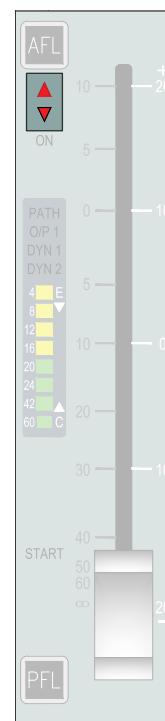
5.1 Surround channels

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.

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.

FIG 3 - NULLING INDICATORS



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 main application, navigate to >[Show Settings>General Settings](#).

The last 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 in-line 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 faders to be opened and closed under the control of another system using GPIOs.

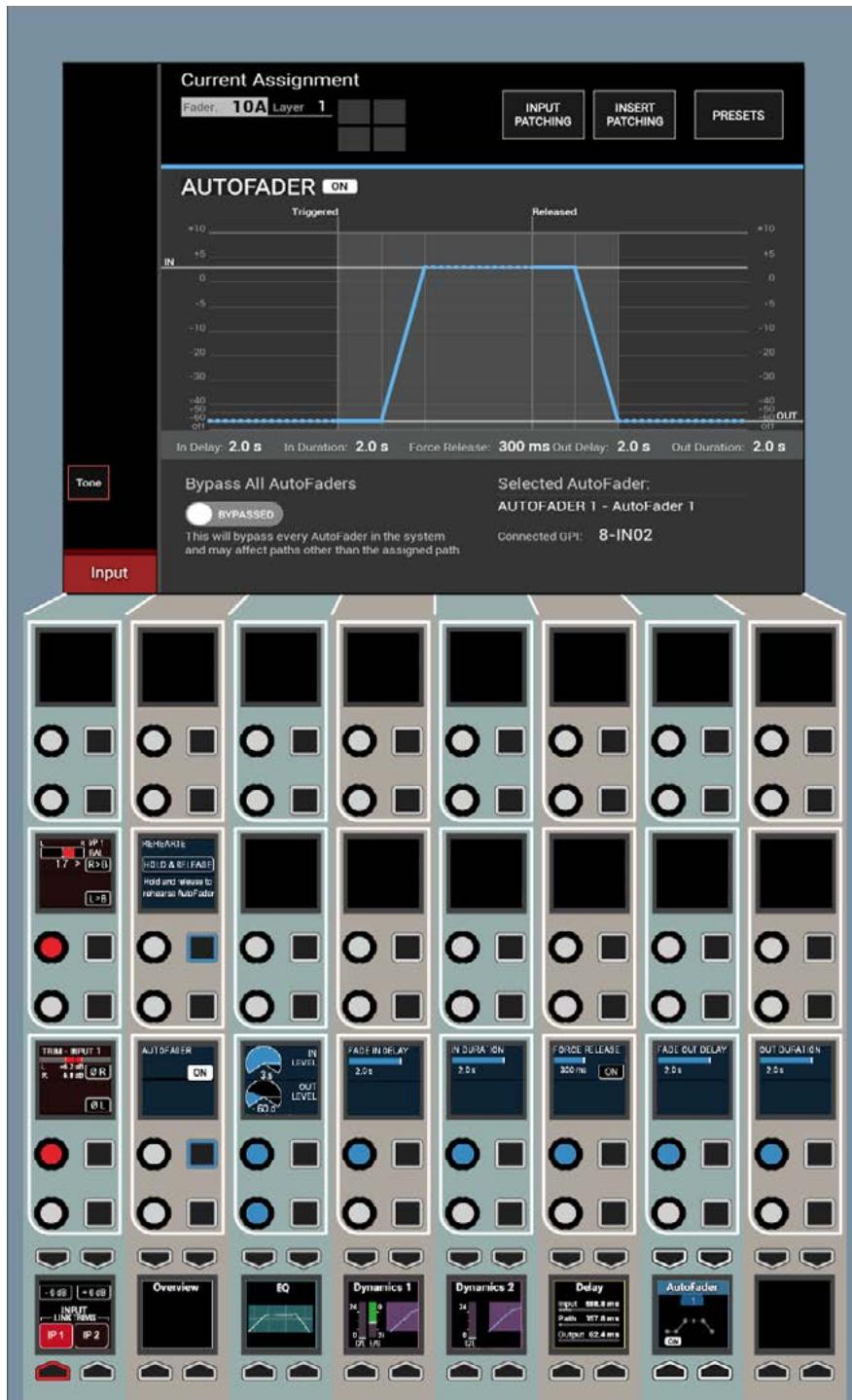
To control an assignable autofader, select the PROCESSING-AUTOFADE panel mode and press the appropriate assign button for the channel whose autofader is to be accessed.

The AutoFader TFT screen gives a visual representation of the behaviour of the autofaders position over time and provides information about which autofader is in use and which GPI the autofader is being triggered from. See Fig 1.

There are 9 individual autofader controls provided and a global on screen switch to Bypass All Autofaders.

- **AUTOFADE ON** - Enables the Autofader on this assign path. Note if the autofader is shared across several paths only this path is affected by this switch.
- **REHEARSE** - Press and Hold this button to trigger the autofader and release to release the autofader. This button allows the user to walk through the action of the autofader and adjust parameters if necessary.
- **IN LEVEL** - This is the level that the fader goes to when the GPI is triggered shown as an 'IN' line.
- **OUT LEVEL** - This is the level that the fader goes to when the GPI is released shown as an 'OUT' line.
- **FADE IN DELAY** - This is the delay period before the fader starts to ramp up to the IN LEVEL.
- **IN DURATION** - This is the fader ramp up period.
- **FORCE RELEASE** - When ON this time period is used to force the autofader into the fade out delay phase even if the autofader is still triggered via the GPI.

FIG 1 - AUTOFADE CONTROLS ON THE PROCESSING-AUTOFADE ASSIGN MODE



Note if the control is set to 'Never' the AutoFader remains triggered indefinitely whilst the connected GPI is triggered

- **FADE OUT DELAY** - This is the delay period before the fader starts to ramp down to the out level

- **OUT DURATION** - This is the fader ramp down period.

Note that the autofader thumbnail shows which autofader is in use and its On / Off state even when the PROCESSING mode is on a different control page.

Setting Up autofaders for use

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 GPI's to autofaders

GPIs are assigned to autofaders in the >Hydra2 Settings>GPI section of the main application as shown in Fig 2.

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 'AutoFader' 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 in the >Operate>AutoFaders screen in the main application, as shown in Fig 3.

The Autofaders are listed at the left side of the screen, and the surface faders are listed at the right.

FIG 2 - PATCHING GPIS TO AUTOFADERS

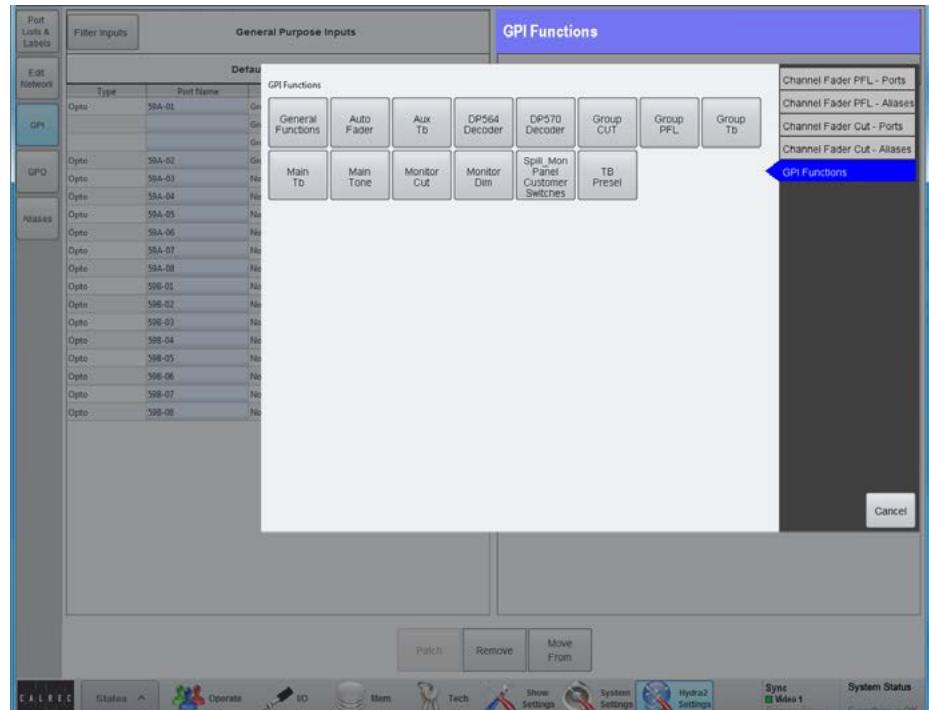
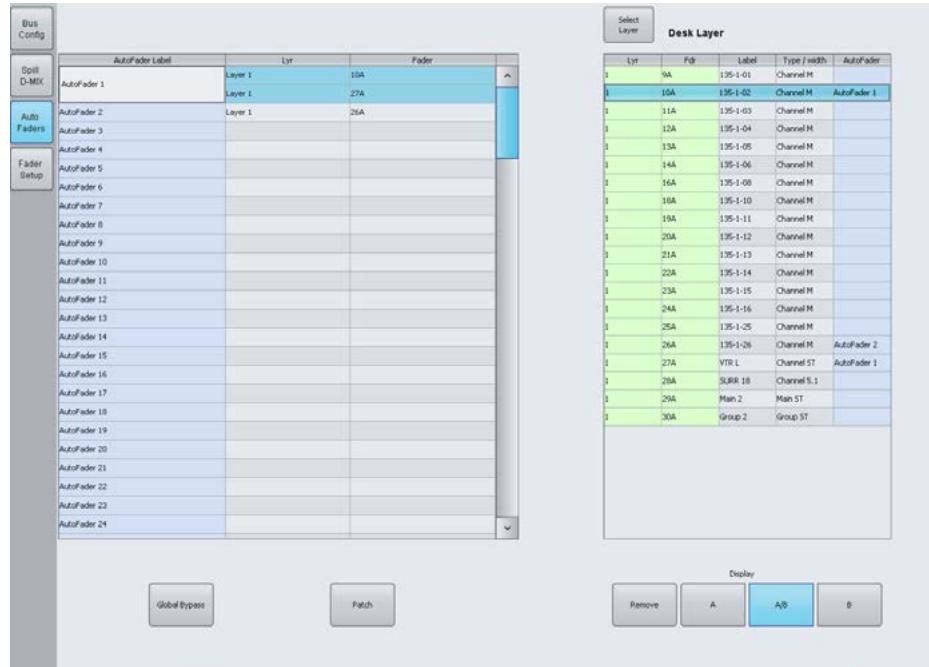


FIG 3 - ASSIGNING AUTOFADERS TO FADERS



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 go to the OUT LEVEL complying with the Fade-Out Duration parameter, rather than snapping the audio to the Fade-Out level. If an autofader is enabled, either from path or global enable, for a path whose GPI is currently triggered, the audio should fade (up or down) to the Fade-In Level (if it is not there already), complying with the Fade-In Duration parameter, rather than snapping the audio to the Fade-In level. When the trigger signal is present, the fader will follow the settings made on the PROCESSING-AUTOFADER screen.

Autofader parameter settings

The AUTOFADE screen allows the settings of the autofaders to be configured. The available settings for all the Time based controls are :

- 0 to 100ms in 10ms steps
- 100ms to 1s in 100ms steps
- 1s to 5s in 500ms steps.

The IN and OUT gain level settings are -100dB to +10dB in 1dB steps.

Global Autofader Bypass

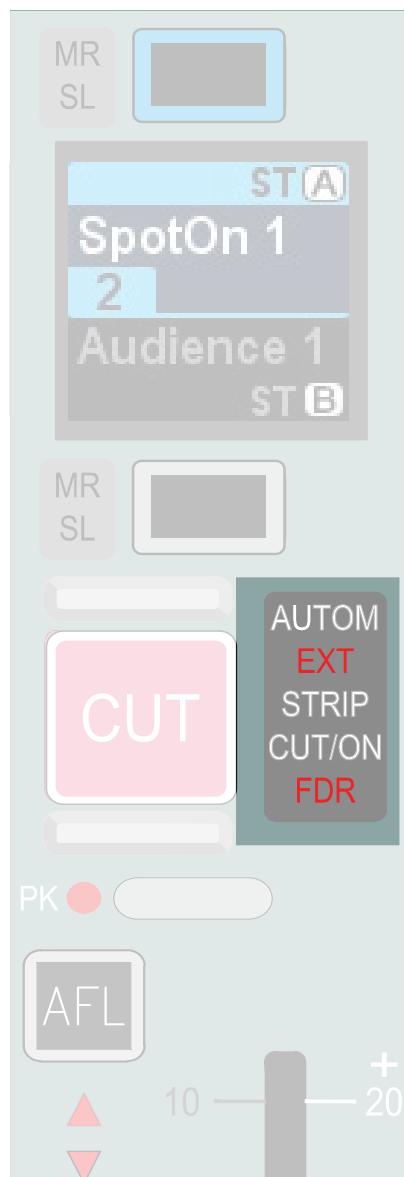
On the Operate section of the main application there is a copy of the Global Bypass button which effectively disables all Autofaders.

Autofader indicators

When an autofader is assigned to a fader, the fader will show the EXT and FDR indicators as shown in Fig 4.

FDR indicates that the fader is automated and EXT indicates that the control is an external source.

FIG 4 - AUTOFADER INDICATORS



Default Fader Interaction Mode

This section describes the operational interaction conditions when settings and fader positions are modified in combination with autofaders.

Faders in this default mode allow the user to temporarily override autofader control using the path fader to open, close or adjust the path's level. Faders can be manually adjusted, and their output will reflect the manually set physical position, whether the autofader is active or inactive. Adjustments affect current audio, but do not affect subsequent autofades.

Autofaders do not fight manual control. If a fader is being touched at the time an autofader is fired, OR when an autofader transitions from its initial 'Fade In Delay' period into its 'Fade-In' period, then the autofader fade-in is cancelled. This does not cancel the fade-out for this autofade event (which will be triggered as normal if the fader has been manually opened in the interim).

If a fader is touched whilst an autofader fade-in is in progress, the auto-fader immediately relinquishes control of the fade-in (but can still perform the subsequent fade out if the fader is no longer being touched at that point in time)

Similarly, if a fader is being touched or moved when an autofader enters the fade-out stage, or during the fade-out stage, the autofader again immediately relinquishes control of the fade out to the operator.

Autofader fade-in's & fade-out's begin from the current physical position of the fader - If they have been manually adjusted, this becomes the start point, they do not have to go to their specified or expected On or Off level first.

Fade in and fade out values are absolute in that the time taken from the beginning to the end of the fade-in or fade-out period lasts for the duration set by the relevant control, regardless of the actual physical starting level that may have been manually set and differ to that of the autofader's set On/Off level.

If a fader is positioned at or below its autofader's set Off-Level when a fade-out is instigated, the fade-out will be cancelled.

If a fader is positioned at, or above its autofader's set On-Level when a fade-in is instigated, the fade-in will be cancelled.

If the Fade-In Level is being adjusted whilst an autofader Fade-In is in progress, or similarly, the Fade-Out Level is being adjusted during a Fade-Out then the Fade-In/Out continues at a constant rate-of-fade until the fader level and In/Out level meet. At this point the autofader stops due to the target level being met. (The Fader will then track with the In/Out level control until the next autofader fade In/Out by virtue of the fader being fully in/out).

Fade-In Delay, Force Release & Fade-Out Delay can all be adjusted whilst the autofader is in their phase of operation, and the adjustments affect the phase they are in (rather than being applied to the next autofader trigger cycle).

Each phase can be extended up to its maximum duration whilst that phase is ongoing.

When reducing the duration, the relevant phase will end and the next phase start when the length of time passed since the start of the phase meets that set by the control.

When an AF is fully In or Out, adjusting the relevant In/Out Level control will directly affect the level output by the path - the fader will track the adjustments in real time - it will not apply a fade in/out to track the adjustments.

APOLLO ROUTING AUDIO

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 Fig 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 busses at 48kHz. The maximum number of Aux busses that can be configured in the system is 48 and these would all be mono. The maximum number of stereo Aux busses that can be created is 24. It takes two mono DSP resources to create a stereo bus and so the maximum number of Auxiliaries that can be created is reduced..

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

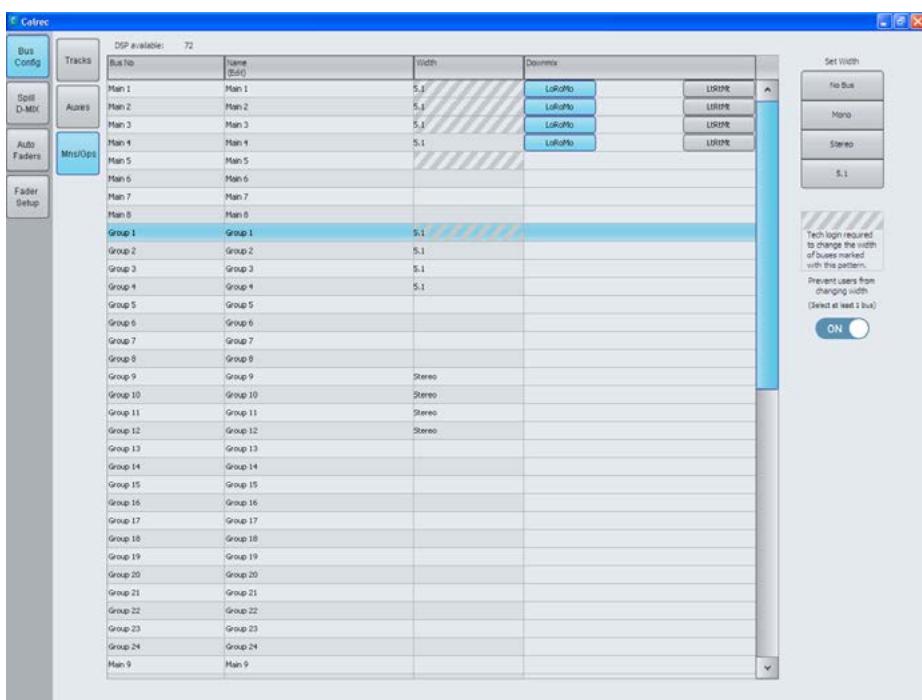
The number and width of buses chosen for use are defined in the **>Operate>Bus Config** screen in the main application., see Fig 2. Select a bus type using the buttons on the left of the screen. The total number of buses will now be listed, which in the case of Auxiliaries at 48kHz is 1-48.

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.

FIG 1 - BUS RESOURCES FOR APOLLO AT 48KHZ

Bus Type	Mono Resources Available	Max Number Configurable Buses
Mains & Groups	128	16 Mains, 48 Groups
Auxes	48	48
Tracks	96	96

FIG 2 - BUS SETUP 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 busses may be created unless more resource is made available. This can be achieved by setting previously configured busses to NO BUS in the WIDTH column.

Admin protection for Bus widths

Admin users can prevent bus widths from being changed by non-admin users. Once logged in the administrator can click on each Main, Group Aux or Track Bus as required and using the ON slider switch as shown in Fig 2 can prevent the widths of those buses from being changed.

Buses at different sample rates

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

As a consequence the pool of buses available at the higher sample rate for Mains & Groups, Auxes and Tracks is halved for Mains & Groups on an Apollo running at 96kHz. Fig 3 on the next page shows the availability of buses at 96kHz for Apollo.

See "Apollo Sample Rate Comparison" on page 13 for further information on the effect of available resources when running the desk at different sample rates.

LtRt / LoRo downmixes

For each 5.1 main bus, the stereo down mix can be chosen to be LoRo or LtRt. LoRo maximises mono compatibility at the expense of losing the front rear separation that a Dolby ProLogic decoder could recover when using an LtRt downmix.

Note that because the number of main outputs is halved at higher sample rates the number of available LtRt downmixes is also halved so only 8 Lt Rt processes will be made available at 96kHz.

Bus routing

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

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

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>Bus Config>Auxes** page of the main application, as shown in Fig 4.

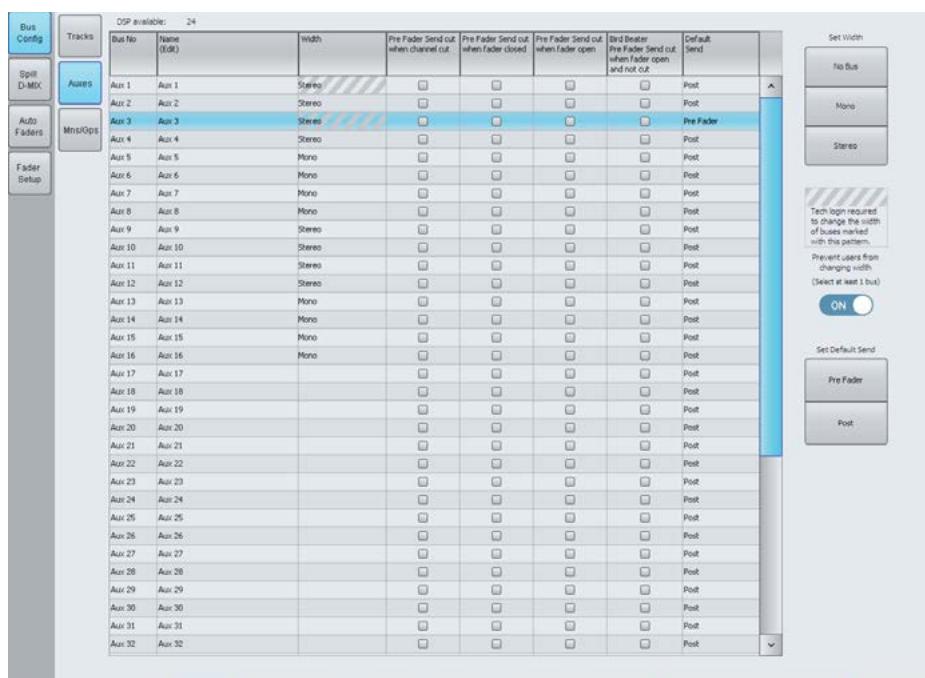
The options are set on an output basis, but it is the send from each path feeding the outputs that are independently cut depending on the status of each path routed to the aux output.

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.

FIG 1 - BUS RESOURCES FOR APOLLO AT 96KHZ

Bus Type	Mono Resources Available	Max Number Configurable Buses
Mains & Groups	64	8 Mains, 24 Groups
Auxes	24	24
Tracks	48	48

FIG 4 - MAIN APPLICATION, OPERATE>BUS CONFIG>AUXS SETUP SCREEN



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.

MAKING A ROUTE

Using Assign Mode

Routes can be made using the SENDS-ROUTES assign panel as shown in Fig 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.

Note: If individual legs of a 5.1 or Stereo path are routed to a bus the corner of the box is cut off to show that it is only partially routed, as shown right for Aux 12.

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**

control - this makes it the focus of the central five button cells at the bottom of the panel - Track Send A is the focus in this image. These 5 button cells highlighted below provide access to positional controls such as pre/post fader and on/off switching.

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.

Note that any undefined buses are removed from the display rather than greyed out.

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.

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



Using Strips or Wilds Mode

Routes to buses can also be made when using Strips or 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 Fig 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 as shown in Fig 3.

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

FIG 2 - STRIPS OR WILDS MODE ROUTING ON TOUCHSCREEN

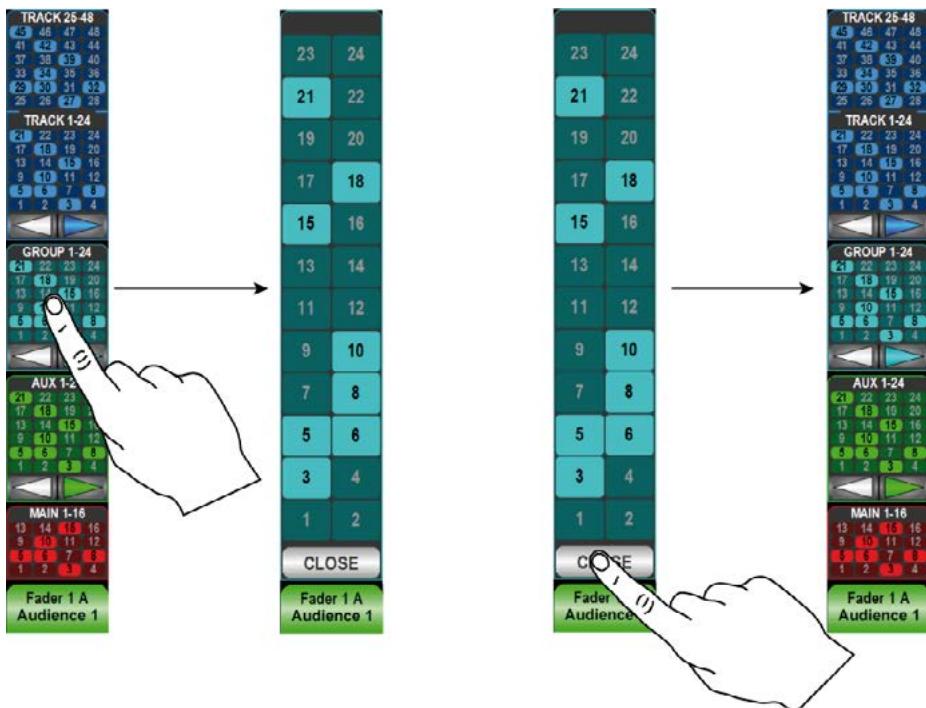
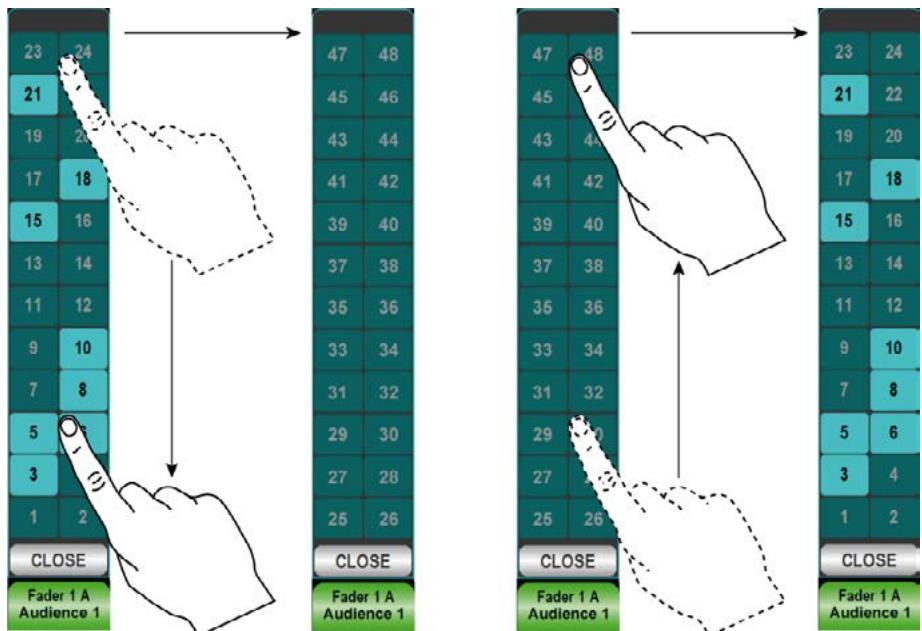


FIG 3 - SWIPE THROUGH BUSES



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 path's contribution to its 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.

Multiple Pan Positions per Path

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 centre 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.

Note, with a Joystick active on the same path the Rear Pan is disabled.

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.

JOYSTICK PANNING

In addition to using the pan controls in Send-Route, Strips and Wilds mode (if assigned), panning can be achieved using the joystick panel, if fitted.

The panel is shown in Fig 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 for 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.

FIG 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 centre of the joystick controls displays a range of information. The hidden-till-lit loudspeaker indicators provide an 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 Fig 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.

Note that output pan controls are only available on mono & stereo paths.

Surround paths are made up of mono and stereo channels which default to the correct pan positions to provide the surround output. If required, panning can be changed on the individual legs of the surround master, either by use of rotary controls or the joystick.

To change the parameters of the elements that make up a surround path, first select the assign button for the surround path, then select the element to be adjusted by pressing the relevant assign button on the surround spill faders. For more information on accessing the elements that make up a surround path, see "Stereo/Surround Spill" on page 96".

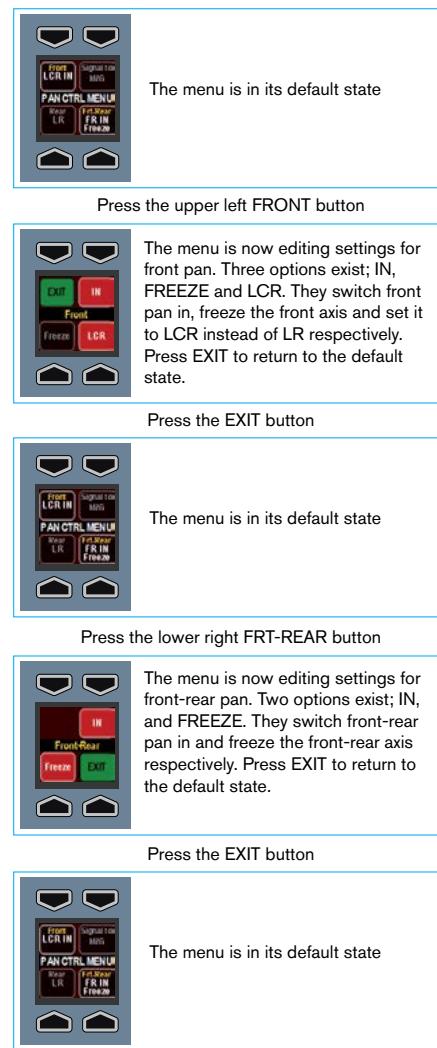
Pan control menu

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 Fig 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.

FIG 2 - PAN CONTROL MENU



CONTRIBUTION MODE

Contribution mode allows the user to see all contributing paths that have been routed to a selected bus, previously known as reverse routing interrogation. It also provides the user with the ability to AFL the selected Aux, Track and Group buses as they are routed and further provides the ability to put Aux Sends on Faders to allow Aux mixes to be created from the fader bed.

Accessing Bus Contribution

To get into Contribution mode set a panel on the surface to SEND & ROUTE Assign mode by pressing the Send & Route button. The assign touchscreen then shows controls for routing the assigned path to the many destinations available, as shown in "Making a Route" on page 114.

Notice in the central title area at the top right of the screen containing the text 'View Bus Contribution' touching this area will switch the screen into the No Bus Selected configuration screen as shown in Fig 1 above right.

When the screen is switched to bus contribution mode, tap to select any destination that you wish to interrogate. If a path on the current layer is routed to the selected main, group, track, aux or mix minus bus, its path assign button will strobe. The path assignment buttons of any paths that are not routed to the selected bus will be unlit.

This alerts users to paths routed from any fader layer on the surface, including those located within other user sections, allowing operators to check routing is correct, or quickly find offending paths that are incorrectly routed.

Fig 2 to the right shows 'Main 1' on the contribution screen and Fig 3 below right shows Group 1 on the contribution screen.

FIG 1 - ROUTING SCREEN

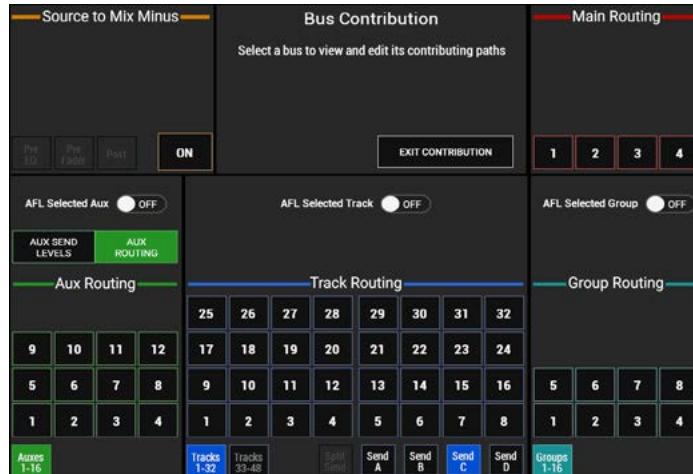


FIG 2 - MAIN 1 ON BUS CONTRIBUTION ROUTING SCREEN

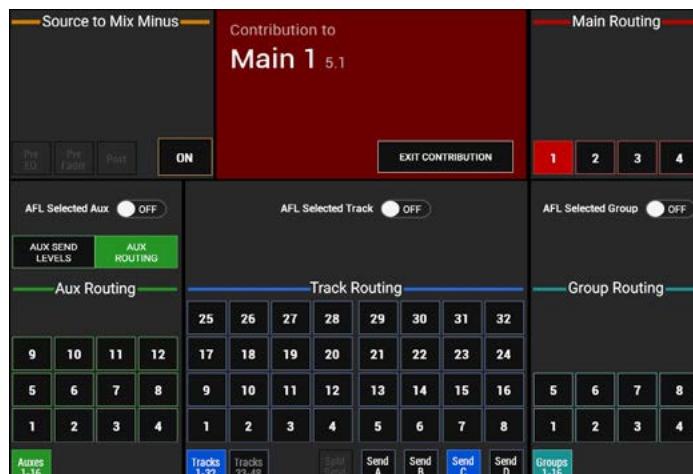
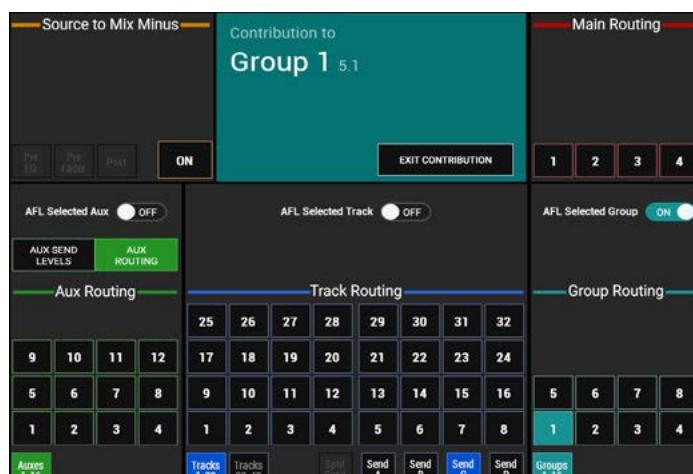


FIG 3 - GROUP 1 ON BUS CONTRIBUTION ROUTING SCREEN



Fader assign keys are made to strobe to indicate fully routed paths and also show the 'Routed' label in the fader displays. The layer select buttons also strobe for layers that are not in view that contain paths routed to the output being interrogated (see Fig 4). The layer select bank buttons (1-6/7-12) for the selector buttons not currently in view also strobe if there is a route made from any of those layers.

Partial Routing Indication

If only some of the legs of a Stereo or 5.1 path are routed the assign keys flash rather than strobe and this partial route is further indicated by showing the 'Partial' label in the fader displays

By scanning the assign buttons of the current fader layer, the layer select buttons, and the bank select buttons, users are guided to the faders that are routed to the bus under interrogation in contribution mode.

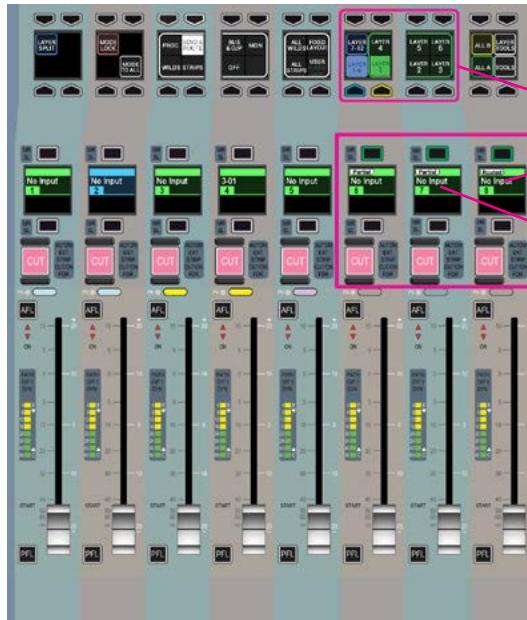
In addition, users are informed of routes made from other user areas by notification in the top central contribution box as in Fig 5 which shows 'Track 1' on the contribution screen which is being contributed to from User 2.

While in contribution 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. The Layer and ALL A/B buttons may be switched whilst in this mode.

Note that the assign buttons no longer alter the current assignment in Contribution mode when pressed and released.

However this can still be achieved by holding the access button for a second longer.

FIG 4 - STROBING/FLASHING INDICATES ROUTED PATHS



Layer Select and Fader assign buttons strobe to indicate fully routed paths which is further indicated as 'Routed' in the fader displays.

They flash to indicate partially routed when only some of the legs of a Stereo or 5.1 path are routed which is further indicated as 'Partial' in the fader displays

FIG 5 - TRACK 1 ON BUS CONTRIBUTION ROUTING SCREEN

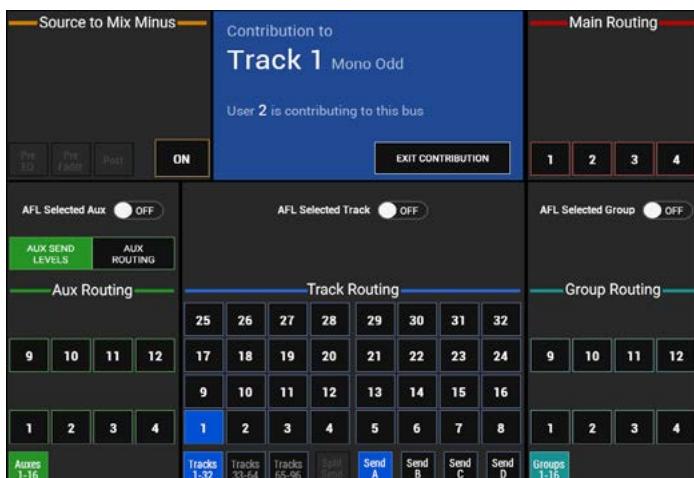


FIG 6 - AUX 1 ROUTING ON BUS CONTRIBUTION ROUTING SCREEN

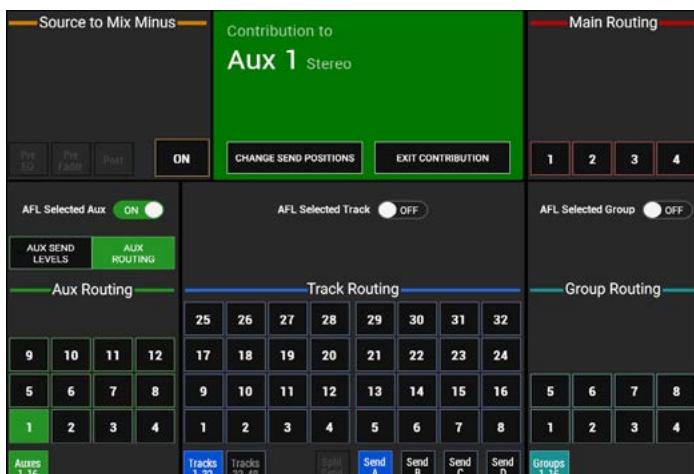


Fig 6 on the previous page shows the bus contribution screen when an auxiliary bus is selected note there are some extra controls in the auxiliary contribution area that allow either the normal 'AUX ROUTING' displays to appear on the fader assign buttons or by selecting 'AUX SEND LEVELS' the user can control the aux send levels from the faders for the selected auxiliary bus.

Aux Sends on Faders

Fig 7 above right shows the bus contribution screen when an auxiliary bus is selected in 'Aux Send Levels' mode, pressing this button puts all the selected auxiliary send levels (in this case Aux 1) from the contributing paths onto their faders, as shown in Fig 8 right.

When an Aux is selected, the faders will change from displaying their channel or group path level, to showing the relevant send level from that channel or group to the selected destination. See Fig 8:- faders 2A, 4A, 7B and 8B for examples of this. (Note:- When viewing bus contribution to Mains, Groups, Tracks or Mix minus, the faders will always display the channel or group path level and the 'Fader=Aux send' message is removed from the fader display).

If the channel or group path on a fader is not routed to the selected destination, or no valid path exists the fader will move to the off position and have no contribution to the selected destination. Also the path type indicator will extinguish. See Fig 8:- faders 1A, 3A, 5A and 6B for examples of this.

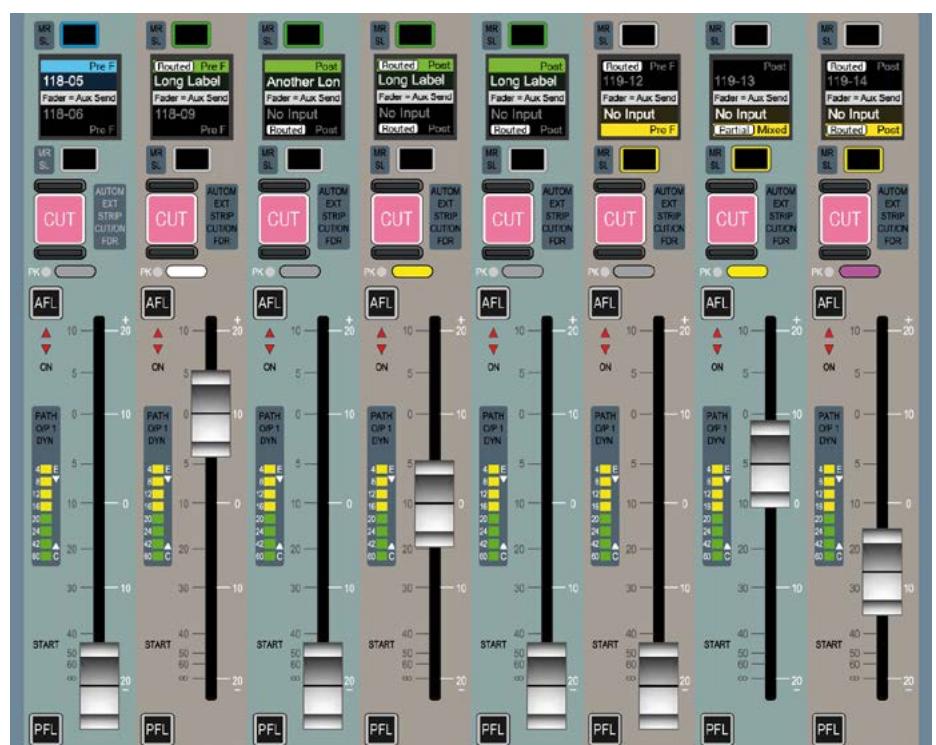
An alternate graphic appears in the centre of the fader displays, to indicate to the user that the faders are showing the send levels, not path levels. This is the 'Fader=Aux send' message.

The fader display will also show the routing and the send position of the sources contributing to that bus.

FIG 7 - AUX 1 SEND LEVELS ON BUS CONTRIBUTION ROUTING SCREEN



FIG 8 - AUX 1 SEND LEVELS ON BUS CONTRIBUTION ROUTING SCREEN



Access AFL in Contribution Mode

When in contribution mode any auxiliary, track or group bus can be AFLed by switching on the AFL Selected Aux, Track and/or Group slider and pressing the required bus on the screen. This AFL behaves like any other normal AFL.

It can be turned off manually on the BUSES & OUTPUTS focus window, or cancelled globally using the APFL clear button, it follows AFL level controls, and other AFLs may be activated before or after this one.

Note: this uses the AFL system that the user section is set to. If another Aux, Track or Group bus is selected, AFL on the previously selected Aux, Track or Group bus is turned off if active, and AFL on the newly selected Aux, Track or Group bus is turned on.

When used in conjunction with the 'AUX SEND LEVELS' option the user can listen to the bus whilst adjusting the levels being sent to it.

Default Send Positions

The User can change the default send positions for all paths that can be routed to a particular Aux bus by tapping the 'CHANGE SEND POSITIONS' button in the Contribution header when viewing contribution to that Aux bus.

There is also an options button in the dialogue box that will also change the default send position for all new paths to that set by the selected send position. See Fig 9 above right.

Mix Minus Bus Contribution

Fig 10 right shows the Contribution screen for the Mix Minus Bus.

This is the only Mix Minus bus currently in the system and is routed to in the same way as the other buses.

This bus can also have its default send positions for all paths routable to it altered by tapping the 'CHANGE SEND POSITIONS' button in the Contribution header when viewing contribution to the Mix Minus bus. See Fig 11 below right.

Leaving Contribution Mode

When the bus routing task is complete, touch the 'Exit Contribution' button to return to the Sends-Routes page as shown in "Making a Route" on page 114.

FIG 9 - AUX 1 DEFAULT SEND POSITION DIALOGUE

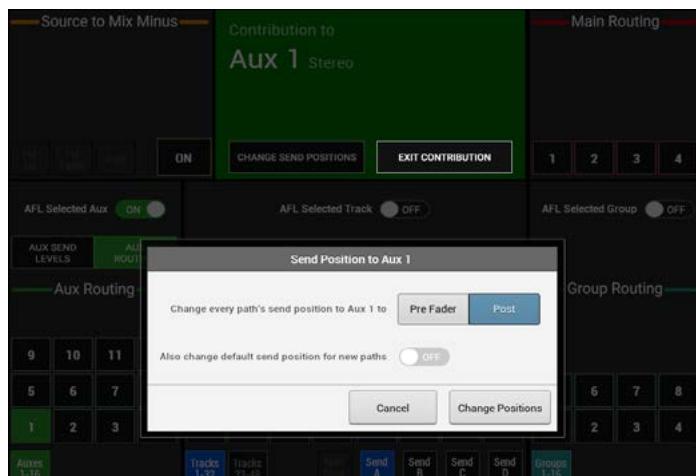


FIG 10 - MIX MINUS ON BUS CONTRIBUTION ROUTING SCREEN

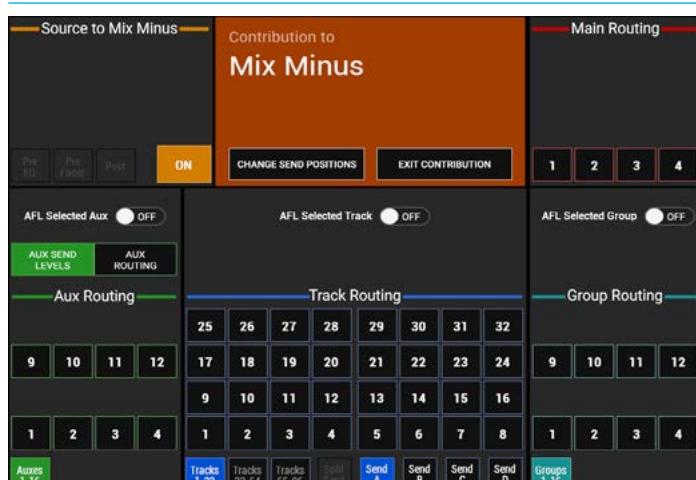
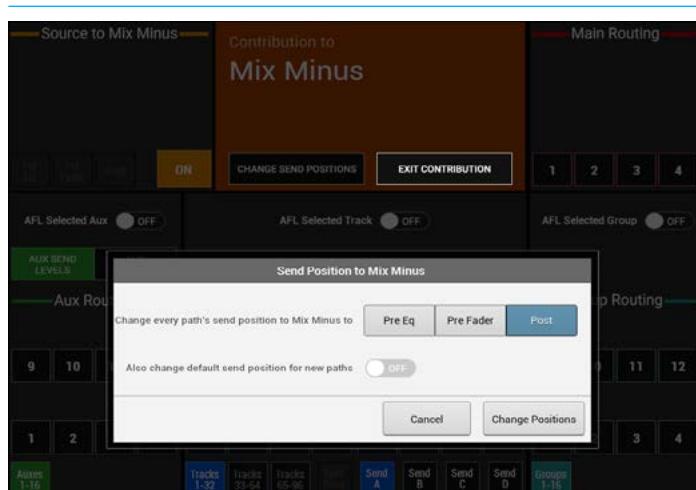


FIG 11 - MIX MINUS DEFAULT SEND POSITION DIALOGUE



SPLITTING TRACK SENDS

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

To 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 Fig 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.

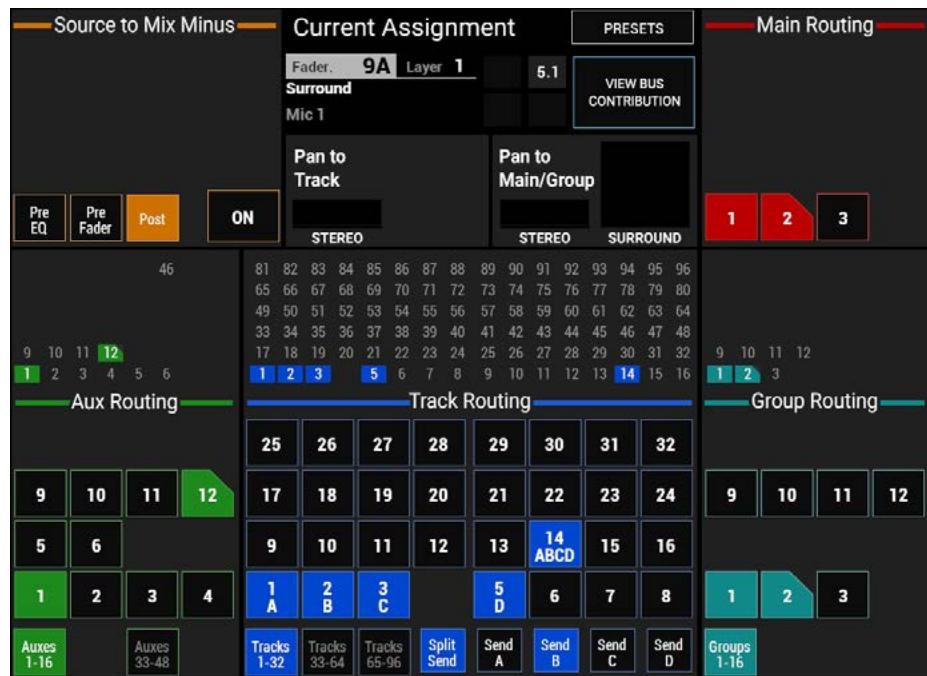
This enables access to a wider range of controls for that specific send such as pre or post fade.

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 into 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.

FIG 1 - ROUTING SCREEN



Partial sends

Note: If individual legs of a 5.1 or Stereo path are routed to a bus the corner of the box is cut off to show that it is only partially routed, as shown right in Fig 1 for Aux 12, Main 2 and Group 2

Track 14 in Fig 1 shows that all the legs have been routed L/R to Send A, C to Send B, Lfe to Send C and LsRs to Send D which is why it shows as a fully routed button image.

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 Fig 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

FIG 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 “[Making a Route](#)” on page 114.

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 see “[Technician Mode](#)” on page 186.

Navigate to **>System Settings>DownMix** in the main application as shown in Fig 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 or 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.

FIG 2 - DOWNMIX DEFAULTS

User Labels	CALREC DEFAULT	Set 1	Set 2	Set 3	Set 4	Set 5
Overall LoRo level for Monitoring/Meters, except APFL (only applies to surround sources)	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
Overall LoRo level for APFL, buses to stereo Mon/Meters (applies to all sources)	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
Overall LoRo level for downmix faders	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB
LR level for LoRo	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
C level for LoRo	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB
LFE level for LoRo	OFF	OFF	OFF	OFF	OFF	OFF
Ls/Rs level for LoRo	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB
Resulting LR level for downmix faders	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB
Resulting C level for downmix faders	-7.5 dB	-7.5 dB	-7.5 dB	-7.5 dB	-7.5 dB	-7.5 dB
Resulting LFE level for downmix faders	OFF	OFF	OFF	OFF	OFF	OFF
Resulting Ls/Rs level for downmix faders	-10.5 dB	-10.5 dB	-10.5 dB	-10.5 dB	-10.5 dB	-10.5 dB
LR level for LtRt	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
C level for LtRt	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB
LFE level for LtRt	OFF	OFF	OFF	OFF	OFF	OFF
Surround level for LtRt	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB
Overall LtRt level	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB

CALREC States Operate I/O Mem Tech Show Settings System Settings Hydra2 Settings Sync Video 1 Primary Source System Status Everything is OK

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 **>Operate>Spill D-MIX** screen in the main application as shown in Fig 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 down mix 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 default. See Fig 4.

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

User Label	CURRENT DEFAULT D-MIX	CALREC DEF A	Set 1	Set 2	Set 3	Set 4	Set 5
Overall LoRo level for Monitoring/Meters except APFL (only applies to surround sources)	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
Overall (LoRo) level for APFL buses to stereo Mon/Meters (applies to all sources)	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
Overall (LoRo) level for downmix faders	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB
L/R level for LoRo	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
C level for LoRo	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB
LFE level for LoRo	OFF	OFF	OFF	OFF	OFF	OFF	OFF
LoRs level for LoRo	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB
Resulting L/R level for downmix faders	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB
Resulting C level for downmix faders	-7.5 dB	-7.5 dB	-7.5 dB	-7.5 dB	-7.5 dB	-7.5 dB	-7.5 dB
Resulting LFE level for downmix faders	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Resulting LoRs level for downmix faders	-10.5 dB	-10.5 dB	-10.5 dB	-10.5 dB	-10.5 dB	-10.5 dB	-10.5 dB
L/R level for LRI	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB	0.0 dB
C level for LRI	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB	-3.0 dB
LFE level for LRI	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Surround level for LRI	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB	-6.0 dB
Overall LRI level	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB	-4.5 dB

Apply Levels and update all down mix faders

Updates all downmix faders by the difference between the new and old levels.
This will not affect the levels in existing memories

FIG 4 - DOWNMIX DEFAULT

126 APOLLO Digital Broadcast Production Console

Routing Audio

LO/RO & 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, Centre and Lfe content. Ro is a mix of Right front, Right rear, Centre 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 Main 1 bus is routed on to stereo only Main 2 bus, or if a full surround bus is being monitored in stereo i.e the chosen source is full 5.1 but the monitor is in stereo mode. Fig 1 shows the Main Output patching for Main 1 its Lt Rt appear at the bottom of the Main 1 Leg Type column.

Lt/Rt outputs conform to the downmix settings applied on the 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.

Note that because the number of main outputs is halved at higher sample rates, the number of available LtRt downmixes is also halved so only 8 Lt Rt processes will be made available at 96kHz.

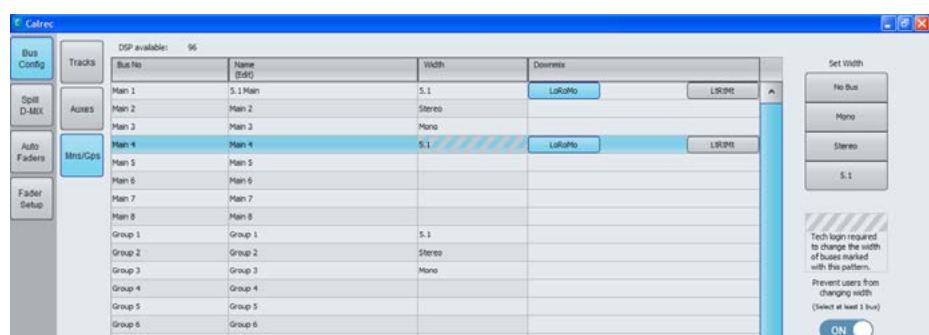
Selecting Lt/Rt or Lo/Ro

The downmix format for surround main output patching is selected from the [>Operate>Bus Config>Mns/Gps](#) page of the main application., see Fig 2 below.

FIG 1 - MAIN OUTPUT PATCHING

SOURCES		Select Source	Desk Outputs
Main Outputs			
O/P Name	Leg Type	Connected Destination	
Main 1 Desk	Mt		
	L		
	R		
	C		
	LFE		
	Ls		
	Rs		
	S		
	Lt		
	Rt		
Main 1 Line	Mt		
	L		
	R		
	C		
	LFE		
	Ls		
	Rs		
	S		
	Lt		
	Rt		
Main 2 Desk	L		
	R		
	M		
Main 2 Line	L		

FIG 2 - MAIN APPLICATION, OPERATE>BUS CONFIG>MNS/GPS



APOLLO **PASSING SIGNALS OUT OF APOLLO**

OUTPUT TYPES AND PATCHING

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

Ports at different sample rates

Note that now different sample rates are available, ports set to a different sample rate to that of the show appear with the SR kHz warning icon to indicate that it cannot be used unless the sample rate of its associated I/O box is changed in H2O or a different show is loaded using the correct sample rate. See Fig 1.

Patching

Output patching is performed in exactly the same way as input patching, using the I/O screens in the main application.

From the >I/O>I/O Patch screen (shown in Fig 1), click the 'Select Source' 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.

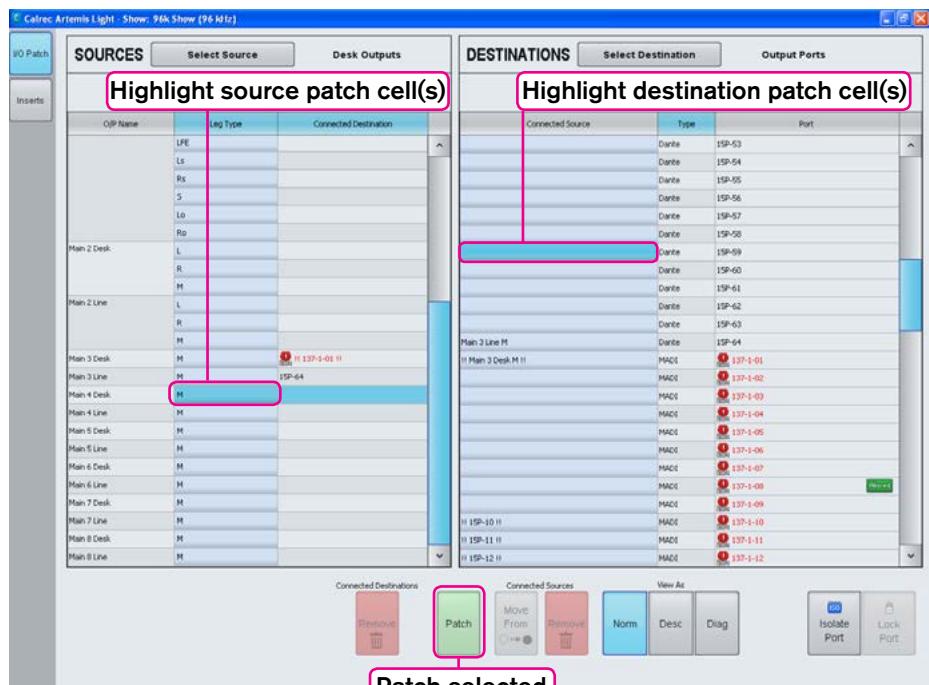
Select the required destination list on the right hand side in the same way by clicking the 'Select Destination' button. Highlight the desired blue source cell on the left, and the desired blue destination cell on the right and then click 'Patch'. The blue cell on the right should now display the source that has been patched and the Destination appears in the Connected Destination column.

Patching at different sample rates

Destinations at different sample rates to the show including ports, hydra patchbays and aliases can be patched (except for System level patches) to desk inputs but won't work and are shown as **!! pending !!** until the sample rates are matched. Similarly with desk outputs to Destinations at different sample rates.

Port to port patches cannot be made for I/O that is at a different sample rate to the desk. However they can be made in H2O and by SW-P-08 and will work if patched

FIG 1 - MAIN APPLICATION I/O>I/O PATCH SCREEN - I/O PATCHING



there providing the source and destination ports are at the same sample rate.

Patching Shortcuts

Note that the Patching Shortcuts described earlier equally apply with output patching as they did with input patching. See "Patching Shortcuts" on page 65.

Hydra2 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 Hydra2 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, Hydra2 Patchbays can be patched to / from physical I/O and other Hydra2 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.

HPB's at different Sample Rates

Any Hydra2 Patchbays that has been set to operate at a different rate than the desk will behave in the same way as ports at different sample rates to the desk.

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 padlock symbols on both source and destination as shown above.

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, see "Technician Mode" on page 186.

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 by other people 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.

You can always overpatch your own patches. They are only protected from being overpatched by someone else.

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 main application screen containing a table of information to assist in choosing whether to go through with the new patching or to keep the current settings. See Fig 1.

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.

FIG 1 - OUTPUT PROTECTION POP-UP

The screenshot shows a 'Output Protection' dialog box. At the top is a table with columns: Change Source?, Your Source, Current Source, Protected Destination ▾, Protected Destination via Your Alias, Protected By, and two small arrows. Below the table is a 'Select All' checkbox. A message in the center says: 'You have tried to change the patching for some protected destinations (in use by someone else) Please select what you would like to do:' followed by 'Accept Changes' and 'Cancel All' buttons.

Change Source?	Your Source	Current Source	Protected Destination ▾	Protected Destination via Your Alias	Protected By	
<input checked="" type="checkbox"/>	Main 1	Console 2 Aux 7	Output 1		Console 2	▲
<input checked="" type="checkbox"/>	Headphones 1	Presenter 1	Output 2		Console 2	
<input type="checkbox"/>	Headphones 2	Presenter 2	Output 3		Console 2	
<input type="checkbox"/>	Headphones 3	Presenter 3	Output 4		Console 2	
<input type="checkbox"/>	New Source Name	Existing Source Name	Output Port Name	Alias Name	Console Name(s)	▼

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 from local lock of output ports. Local lock is a manual process which locks an output for all operators of that console, 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 Fig 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

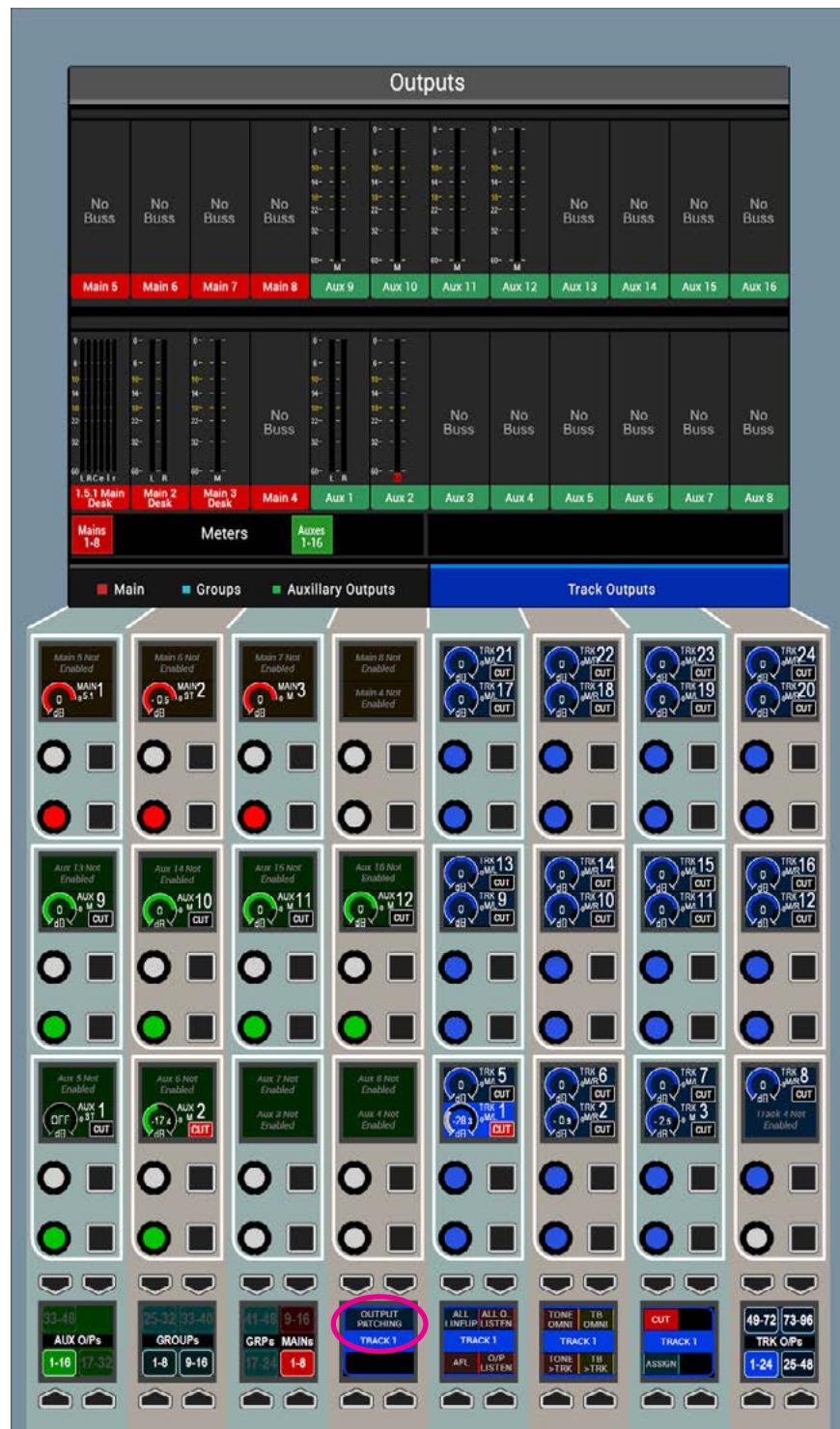
Four of the button cells at the bottom of the panel are used for more detailed control over the currently selected output.

To select an output, push down on its rotary control.

The current selection is indicated by the colour of the four control cell displays and also by a text label which spans across the centre 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.

FIG 1 - OUTPUTS MODE CONTROL LAYOUT



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 update each other's 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. See "[Allocating Signal Paths to Faders](#)" on [page 58](#) 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 PROCESSING-DELAY 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 PROCESSING-DELAY 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 PROCESSING-DELAY 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.

The amount of delay is displayed in either milliseconds or video frames. The +/- buttons above the rotary controls allow the user to step up or down the delay amount by a preset quantity as an alternative to using the rotary control.

Selecting the [>Show Settings>General Settings](#) page of the main 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.

Output Patching Shortcut

From V6.0 the Output Focus window at the bottom of the Buses & Outputs page has an Output Patching button added to speed up the patching workflow as shown in Fig 1, for more details on this see "[Patching Shortcuts](#)" on [page 65](#).

Assignable Delay at different sample rates

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

At the higher sample rate the pool size for bus output delay is halved, meaning that the pool of 256 mono legs worth of bus output delay becomes 128 mono legs of bus output delay for Apollo, however the amount of delay per leg remains unchanged at 2.73s.

MAIN PATHS ON SPILL/MONITOR AND SPILL/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. See ["Allocating Signal Paths to Faders" on page 58](#) 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. See Fig 1.

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.

FIG 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.

Direct Outputs at different sample rates

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

At the higher sample rate the pool size for Direct Outputs is halved, meaning that the pool of 512 legs at 48kHz for Apollo becomes 256 legs at 96kHz.

Assign 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 centre-right control cells will read: 'Push to add Direct Output', see Fig 1. Push one of these cell's rotary controls and the Direct Output pop-up appears on the TFT above, as shown in Fig 2.
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.

Assign Direct Outputs from the PC

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

1. Select **>I/O>I/O Patch** from the menu bar in the main application.
2. Press 'Select Source' and then '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.
4. 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.

FIG 1 - DIRECT OUTPUT ASSIGN FROM POP-UP



FIG 2 - 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
- 3. Click on the Output (Assign) cell in the table for the required path and the direct output setup pop-up appears.
- 4. 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.

Like other console DSP outputs, each direct output can be simultaneously patched to multiple destinations—physical output ports, Hydra2 patchbays, or channel inputs.

Direct Output Controls

If a path has direct outputs assigned to it, level controls, colour-coded olive, 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 Fig 3. The send that is the current focus of this area is displayed across the centre 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 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.

FIG 3 - 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 centre of these displays

Alternatively, find the same screen on the main application from >I/O>I/O Patch> Select Source>Direct Outputs and click on the output cell for the required fader.

To switch in and adjust delay, see Processing “[Delay](#)” on page 93 . As with input delay and bus output delay, the value can be displayed in either milliseconds, or video frames.

The control area on that panel allows the user to either nudge the delay value with +/- buttons to allow the delay value to be stepped up or down by a pre-determined amount, or use the rotary control to allow finer control of delay settings

The [>Show Settings>General Settings](#) page of the main 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 (see above button top row next to last). When a direct output is selected will momentarily replace audio on that direct send with talkback. A ‘TB’ button is also 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.

Direct Output Patching Shortcut

From V6.0 the Direct Output Focus window at the bottom of the Sends-Routes page has an Output Patching button added to speed up the patching workflow as shown in Figs 1 & 3, for more details on this see “[Patching Shortcuts](#)” on page 65.

APOLLO MONITORING

MONITOR MODE

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

Fig 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.

FIG 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 (Favourites)

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 Fig 1. The label 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 touchscreen displays the available sources which the user can set to a pre-selector. This is also shown in Fig 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 touchscreen 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.

FIG 1 - CONTROL ROOM MONITORING



Control room monitor controls

The control room monitor level can be altered using the rotary control below the large dial display. A CUT button is located to the left of this control to cut the main loudspeakers. Note these controls also appear on the Apollo Monitor Panel.

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 Small LS C/O 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 dedicated 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 centre 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 miscellaneous monitor outputs do not have APFL injection.

Monitoring at different sample rates

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

It should be noted that there is no reduction in monitor inputs and outputs at 96kHz, or any reduction in monitor processing capabilities.

DEDICATED MONITOR CONTROLS

A subset of monitoring controls can be accessed on the dedicated monitor panel. See Fig 1.

The panel features hard controls for main loudspeaker level, Dim, Cut and Stereo. The display in the upper left button cell shows the control room monitor level.

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.

The MON SEL button cell allows you 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 using the Pre selectors.

Eight general purpose customer buttons and indicators are located at the bottom of the monitor panel for customer use.

The configuration and operation of these is described in the section External Interfacing, see "[Mon-Spill Panel Customer Switches](#)" on page 190.

FIG 1 - APOLLO MONITOR PANEL



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 AFLd. 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 PFLd or AFLd at the same time, creating a summed mix of pre or post fader path solos.

Output Listen (OPL)

Mains, Tracks, Auxs 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.

Access 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.

By default, PFL is automatically cancelled when a fader is opened e.g. if a fader reaches ∞ whilst PFL is activated, PFL will be deactivated when the fader reaches

FIG 1 - 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.

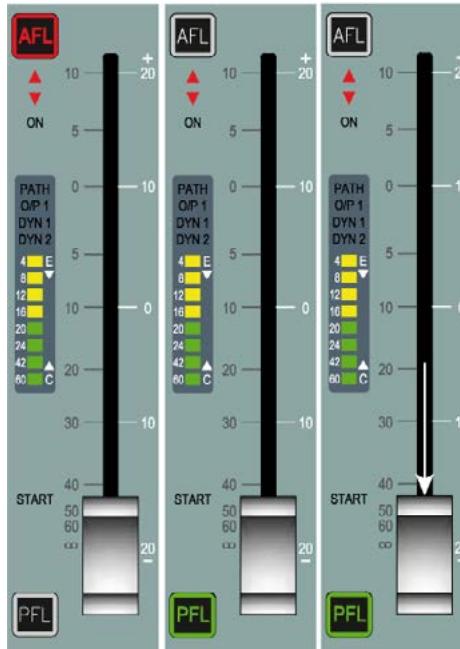


FIG 3 - APFL INDICATOR/CANCEL BUTTON ON BROADCAST FACILITIES PANEL



FIG 2 - ACCESS AFL AND OUTPUT LISTEN FOR OUTPUT BUSES



-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. See Fig 1.

This is a momentary setting so as soon as you release the fader, PFL is deactivated.

If you wish to disable this feature, navigate to [>Show Settings>General Settings](#) from the left hand button menu and click DISABLE for the PFL overpress option.

Access bus AFL, PFL and OPL

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. See Fig 2.

Access AFL in Contribution Mode

When in Contribution mode any Auxiliary, Track or Group bus can be AFLd by switching ON on the AFL Selected Aux, Track and/or Group slider and pressing the required Bus on the screen. Note that when another bus is selected the previous bus AFL is turned off. When used in conjunction with the 'AUX SEND LEVELS' option the user can listen to the bus whilst adjusting the levels being sent to it. See the Contribution Mode section for details.

Cancel 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. See Fig 3 on the previous page.

There is also an APFL cancel button on the TFT screen when in Monitor mode.

Move PFL within signal chain

PFL can be selected to output from various points within a path's signal flow (see Fig 4 above right). Select TOOLS>MISC from any fader panel's Layers row to bring up APFL options in the row above (see Fig 5). 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 the APPLY TO ALL/APPLY TO USER SECTION button, then press the required PFL selection point. When a path fader PFL is activated, the fader label display momentarily displays the PFLs selected location.

Patch AFL/PFL to external monitors

Navigate to >System Settings>Fixed I/O screen of the main application. Touch the 'Select Source' 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.

Send 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.

FIG 4 - PFL OPTIONS WITHIN PATH SIGNAL FLOW

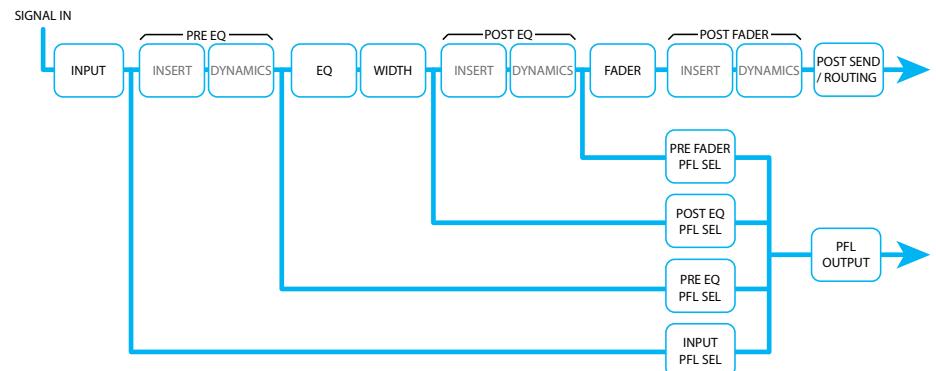
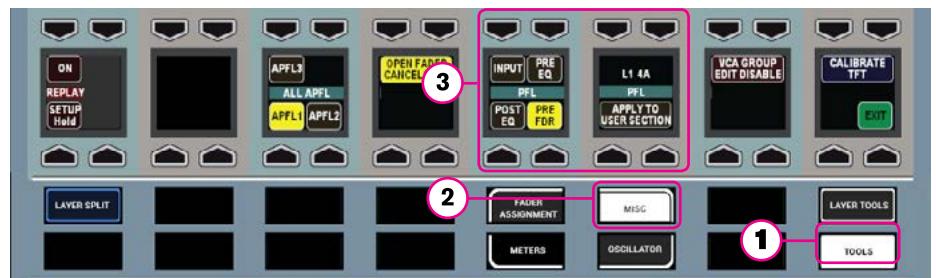


FIG 5 - TOOLS>MISC, CONTROL SURFACE PFL OPTIONS



Send 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. See Fig 6 below.

FIG 6 - MONITOR PANEL MODE PFL TO MON



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 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 'Monitor 1' and 'Monitor 2'. To do this 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 Settings' 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. See Fig 8.

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 PFL via GPI 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.

Patch 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.

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 190 for details on patching GPIOs to surface functions.

FIG 7 - APFL SELECTION FOR MULTIPLE USERS

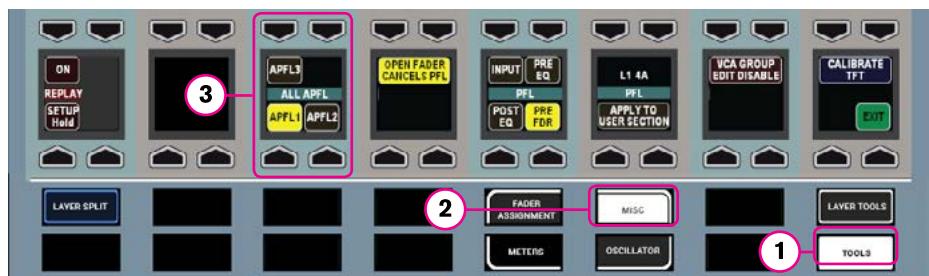
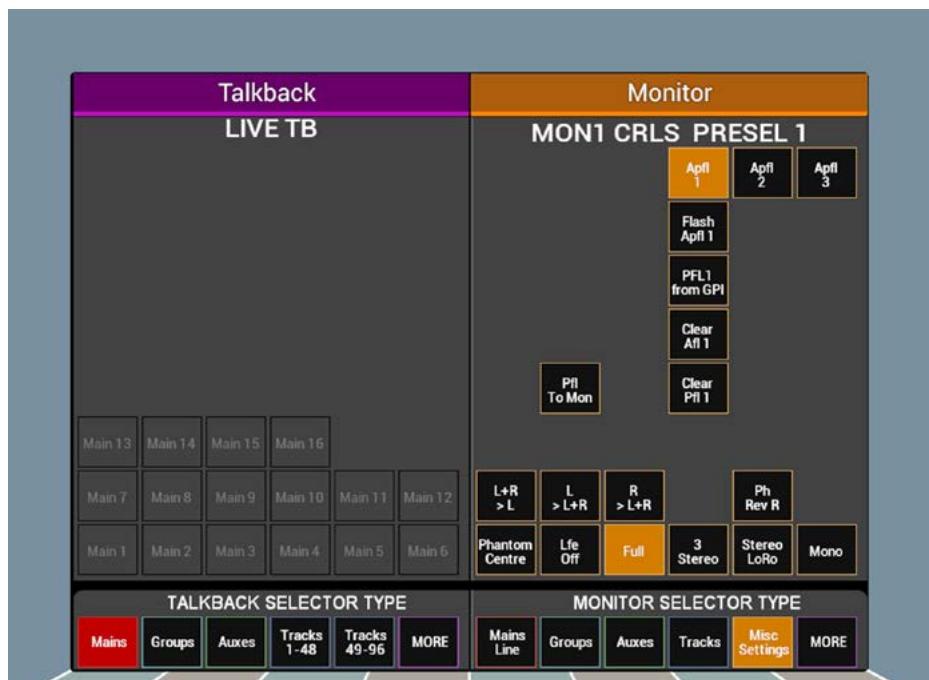


FIG 8 - APFL INDICATOR OPTIONS



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.

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 Fig 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 analogue 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.

Patch the headphone output

Navigate to [>System Settings>Fixed I/O](#) shown in Fig 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'.

FIG 1 - DEFAULT LOCATION OF HEADPHONE JACK SOCKET

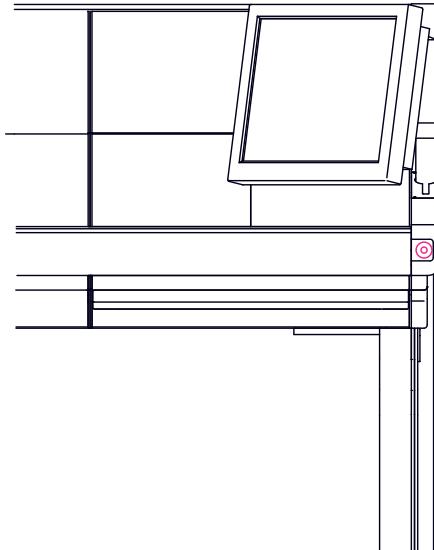
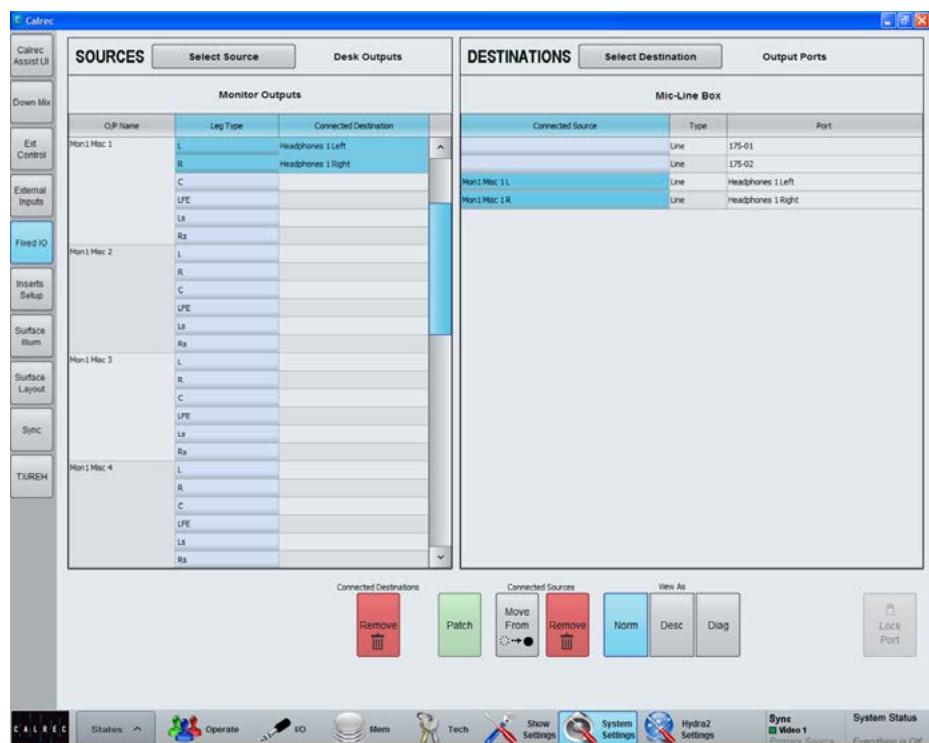


FIG 2 - PATCHING HEADPHONE CONNECTIONS



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 Fig 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, the width (M, ST, 5.1) and name of the elected source and indications of the output level and dim status.

Alter 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.

Patch miscellaneous monitor outputs

The miscellaneous monitor outputs are patched in [>System Settings>Fixed I/O](#) shown in Fig 2.

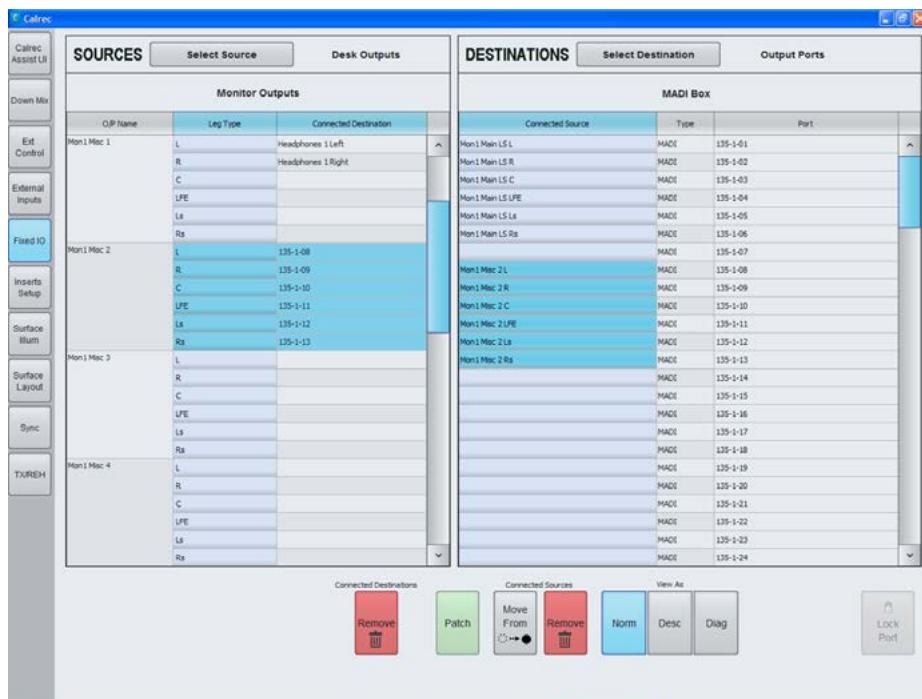
In the sources list on the left, press the filter button and select 'Monitor Outputs'. From the list select one of the Misc Mon outputs.

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

FIG 1 - MISCELLANEOUS MONITOR OUTPUT CONTROLS



FIG 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 Settings' button to reveal the controls. Different control arrangements appear for surround and stereo outputs as shown in Figs 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 on the next page in Fig 3. Note that all Misc Mon Outputs are surround capable so a stereo option isn't presented.

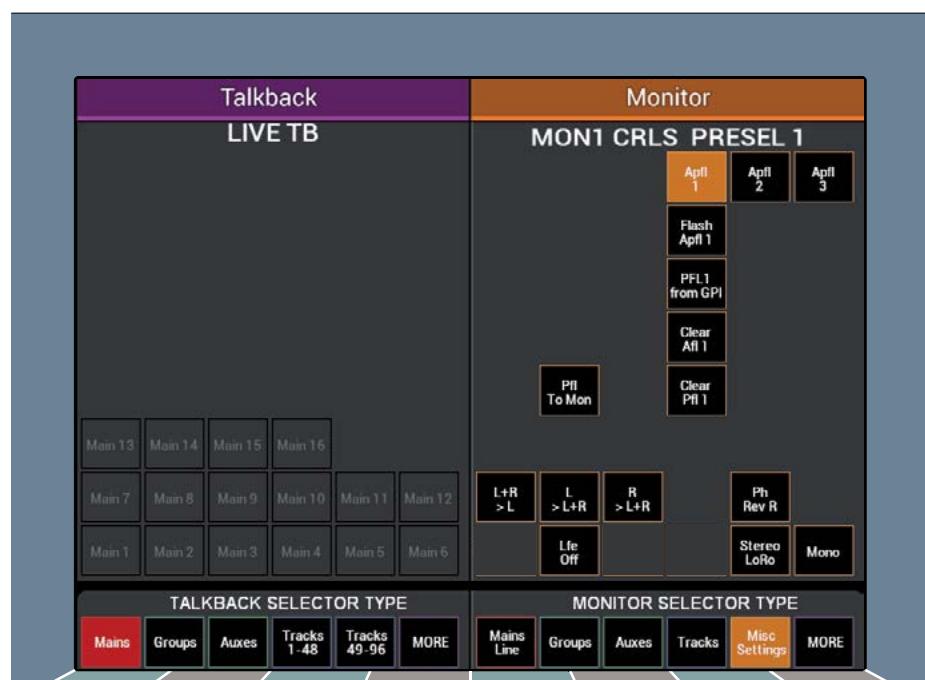
The lower area of the touchscreen is common to both Main LS and Misc LS selections. It contains controls over individual legs and downmixes of the signals sent to the monitoring outputs

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

FIG 1 - MAIN LS SURROUND OPTIONS



FIG 2 - MAIN LS STEREO OPTIONS



Monitoring controls

The lower area of the touchscreen contains controls over individual legs and downmixes of the signals sent to the monitoring outputs.

L+R > L - toggles the sending of both left and right signals to the left speaker.

L > L+R and R > L+R - send the left and right signals to either the left speaker or right speaker respectively.

Ph Rev R - reverses the phase of the right speaker.

Phantom Centre - mutes the centre speaker and sends the centre information to the left and right speakers to create a phantom centre image.

Lfe Off - mutes the Lfe signal to the speakers.

Full - sends the full surround signal out to the speakers. It removes any speaker cuts that may be in place.

3 Stereo - downmixes the monitored signal to LCR stereo.

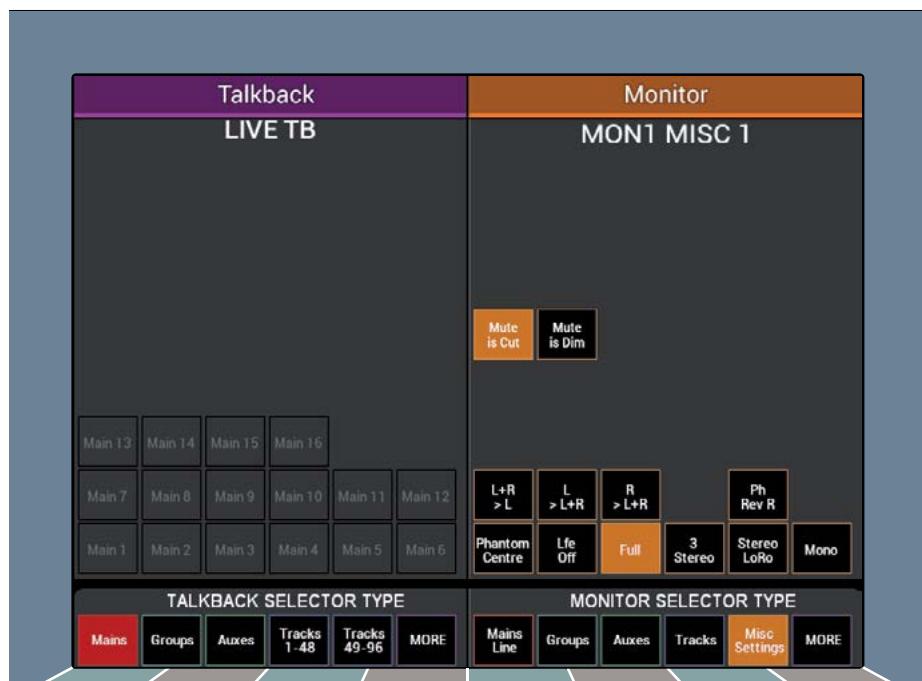
Stereo LoRo - performs a stereo downmix when monitoring a surround path, or outputs the full signal and removes any speaker cuts when monitoring a stereo signal.

Mono - performs a mono downmix on the monitored signal.

APFL controls

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

FIG 3 - MISC LS SURROUND 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).

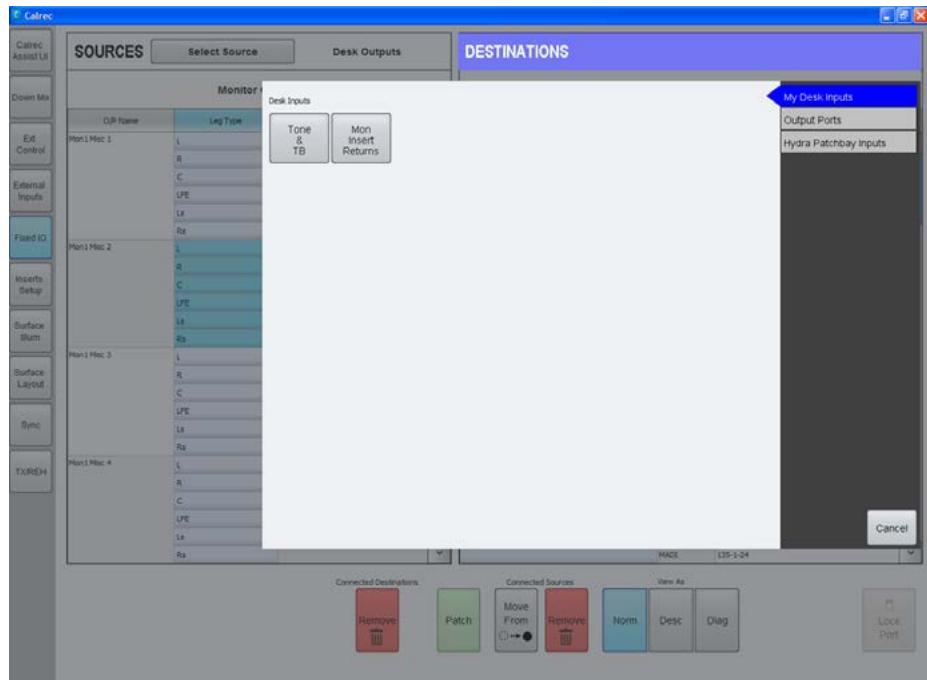
The console monitor system has insert points to allow the console selectors to route audio to the external unit and to bring it back into the signal path. The console can also provide GPO control outputs via relays and display the status of the external unit via GPI tallies and indicators on a wild assign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

To enable a monitor insert use the main application and go to **>System Settings>Fixed I/O** and touch the 'Select Source' button then choose 'Monitor Outputs' (in the Desk Outputs column).

Then touch the 'Select Destination' 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, see Fig 1.

FIG 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, see Fig 2.

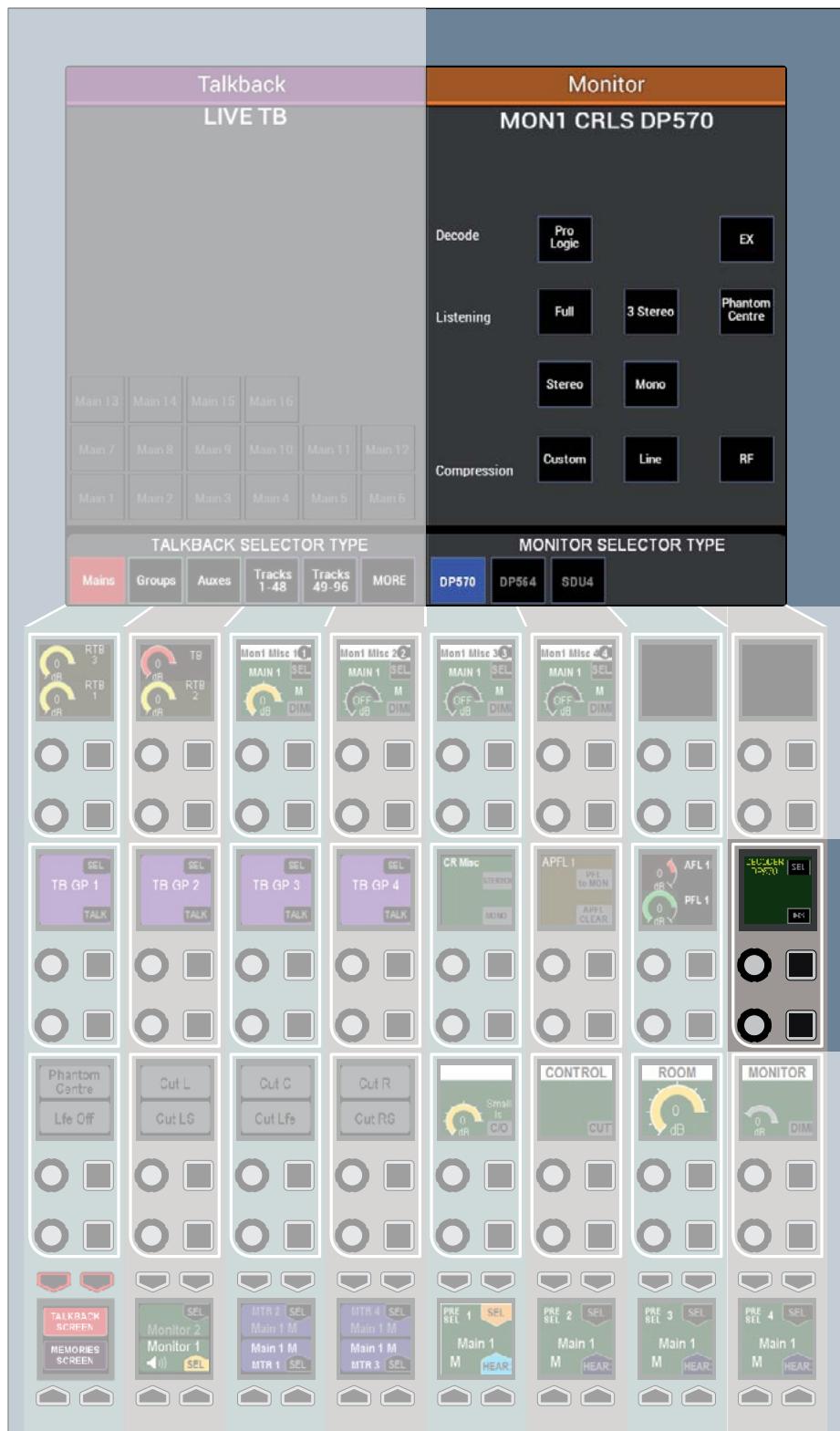
To manage the mode of the surround encoder/decoder use the SEL button to bring up a remote encoder screen in the right half of the TFT touchscreen. The software has specific touchscreen controls and indicators for three different models of Dolby unit and the required one is chosen at the bottom of the 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 [Hydra2 Settings](#) 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.

FIG 2 - MONITOR INSERT



IMMERSIVE MONITORING

The requirement to add a height element to the monitoring system is available from V7.0 onwards.

This feature provides support for monitoring immersive signals from an external source

A new option called "Immersive Monitoring" is available in the >Show Settings> General Settings screen of the main application see Fig 1.

.When this option is enabled, the Misc Mon LS1 output in Monitor System 1 is linked to the Main LS output, allowing external 5.1.2 or 5.1.4 signals from an external renderer to be monitored through monitor system 1, of the console using simple and familiar monitor controls.

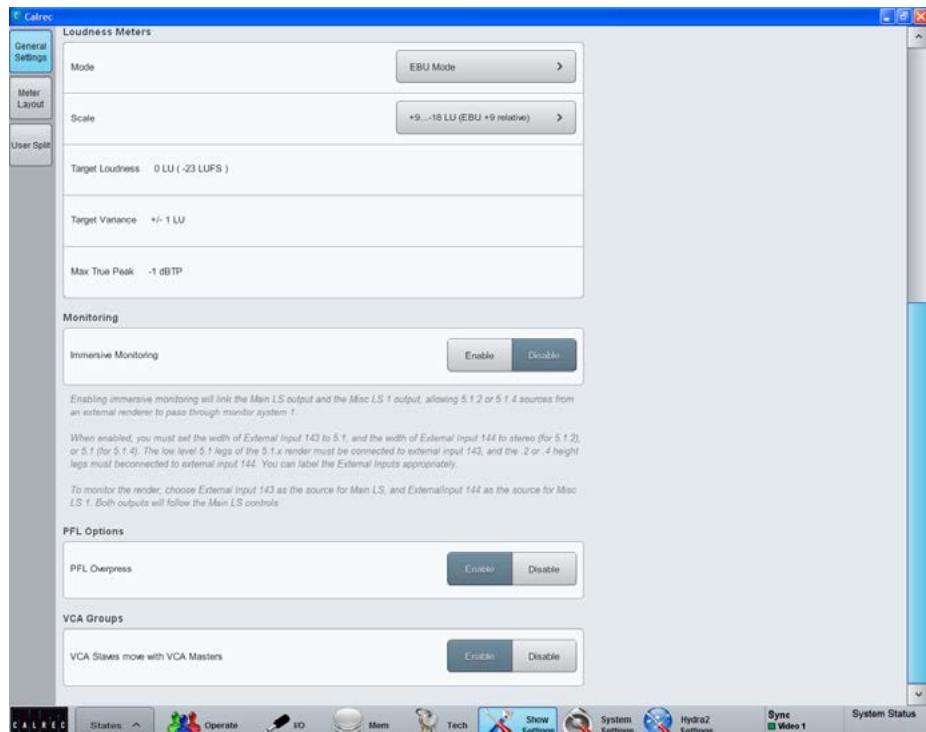
When Enabled, the user must set the width of External Input 143 to 5.1 and the width of External Input 144 to stereo (for 5.1.2) or to 5.1 (for 5.1.4).

The normal 5.1 legs of the 5.1.x render must be connected to External Input 143 and the .2 or .4 height legs must be connected to External Input 144. The user can label the External Inputs as appropriate for ease of identification.

To monitor the renderer, choose External Input 143 as the source for the Main LS output and External Input 144 as the source for the Misc Mon LS1 output.

Both Outputs will have their monitoring level controlled from the Main LS controls.

FIG 1 - ENABLING THE IMMERSIVE MONITORING SYSTEM



APOLLO COMMUNICATIONS

TALKBACK

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

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.

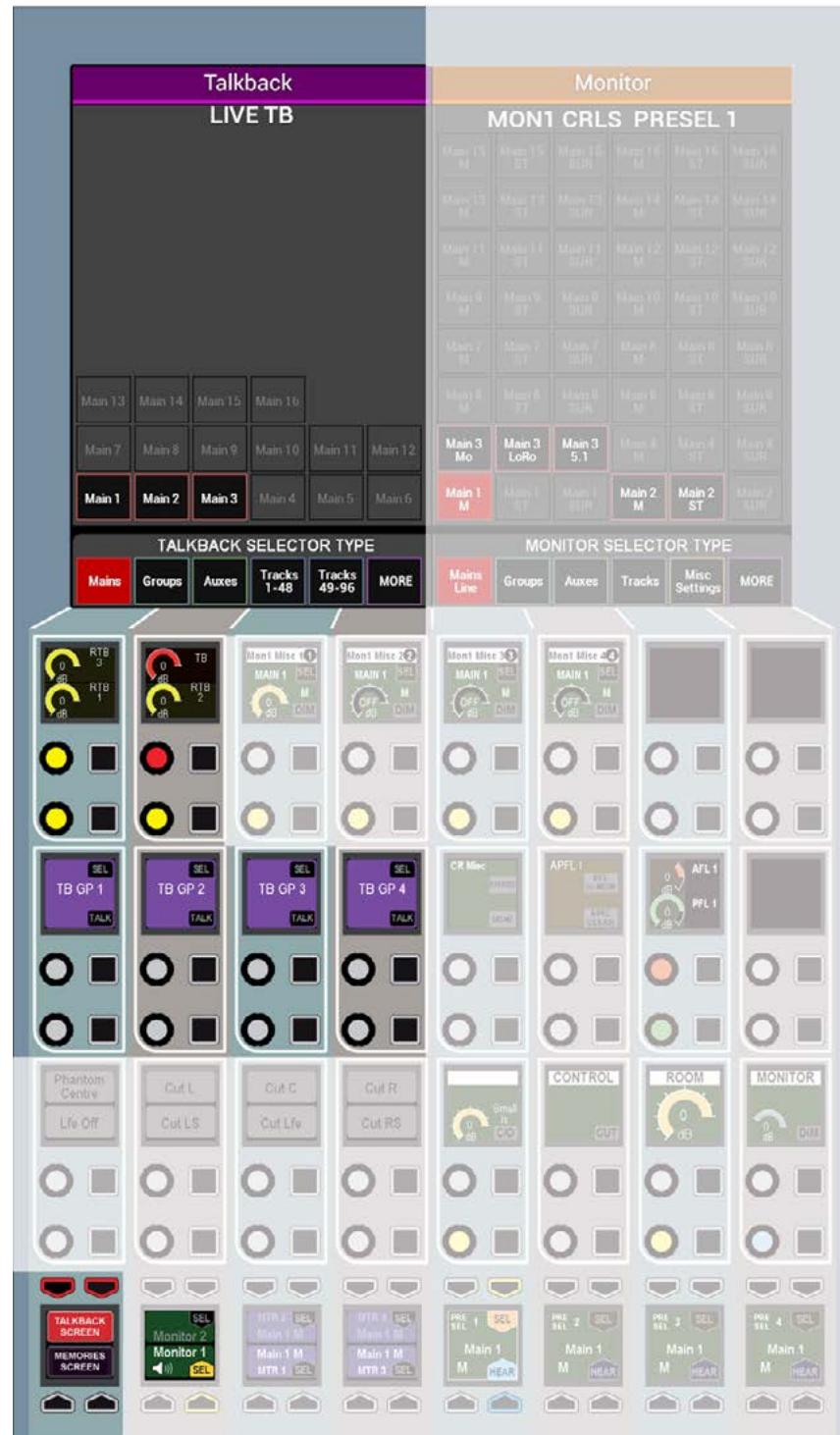
Talkback & Reverse Talkback levels

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

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.

The Talkback level controls are located in the two top left control cells in Talkback/ Monitor page of the Wild Assign panel.

FIG 1 - TALKBACK CONTROLS IN MONITOR MODE



Patching talkback/reverse talkback inputs

Navigate to **>System Settings>Fixed I/O** as shown in Fig 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 (analogue inputs) or SRC applied (AES3 inputs) by checking the relevant box as shown in Fig 2. To adjust the gain of a microphone, the relevant 'Analogue Gain' cell should be touched to bring up a dialogue 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.

Inhibiting Talkback

If you require further control over whether talkback is routed to a loudspeaker use Monitor 1's Misc outputs. You can choose to permanently inhibit talkback to a Misc output or set the inhibit to be activated when one of the Mic open systems becomes active. These settings can be configured separately for when the desk is in On Air, Rehearse or Neither mode. See Fig 3.

To access the settings select **>System Settings>TX/REH** from the left hand menu.

FIG 2 - TALKBACK INPUT PATCHING

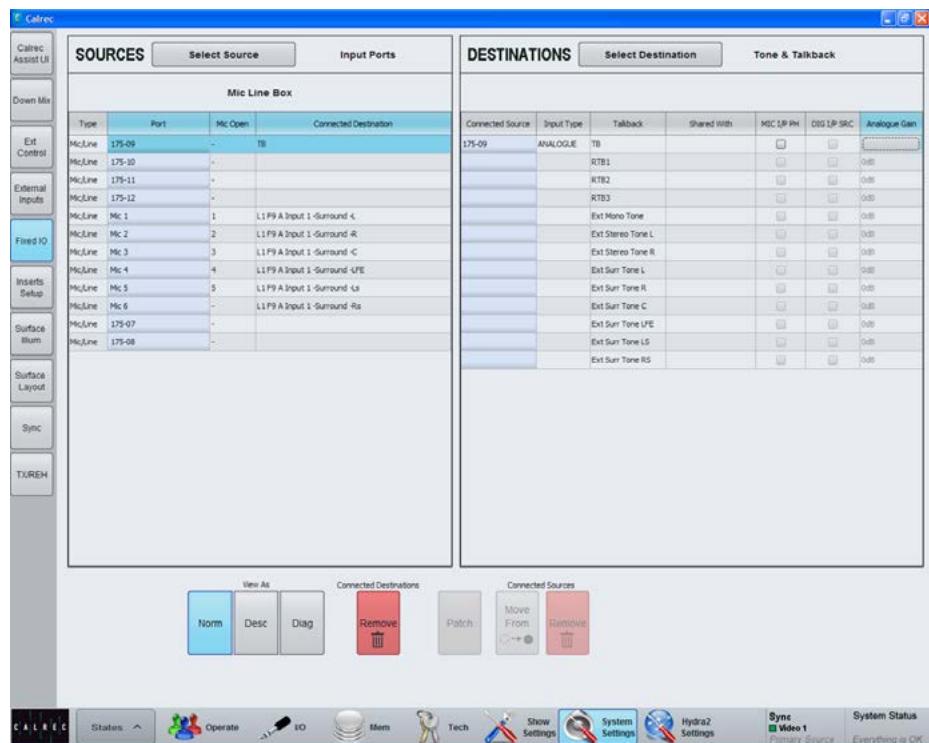
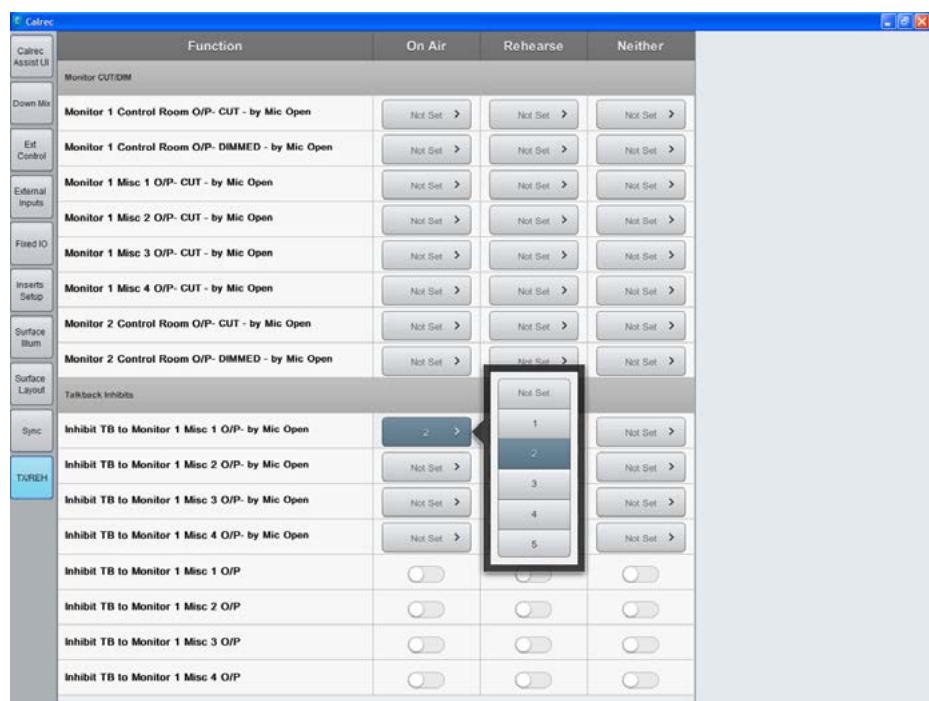


FIG 3 - TALKBACK INHIBIT SETTINGS



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.

Fig 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 its 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 Fig 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.

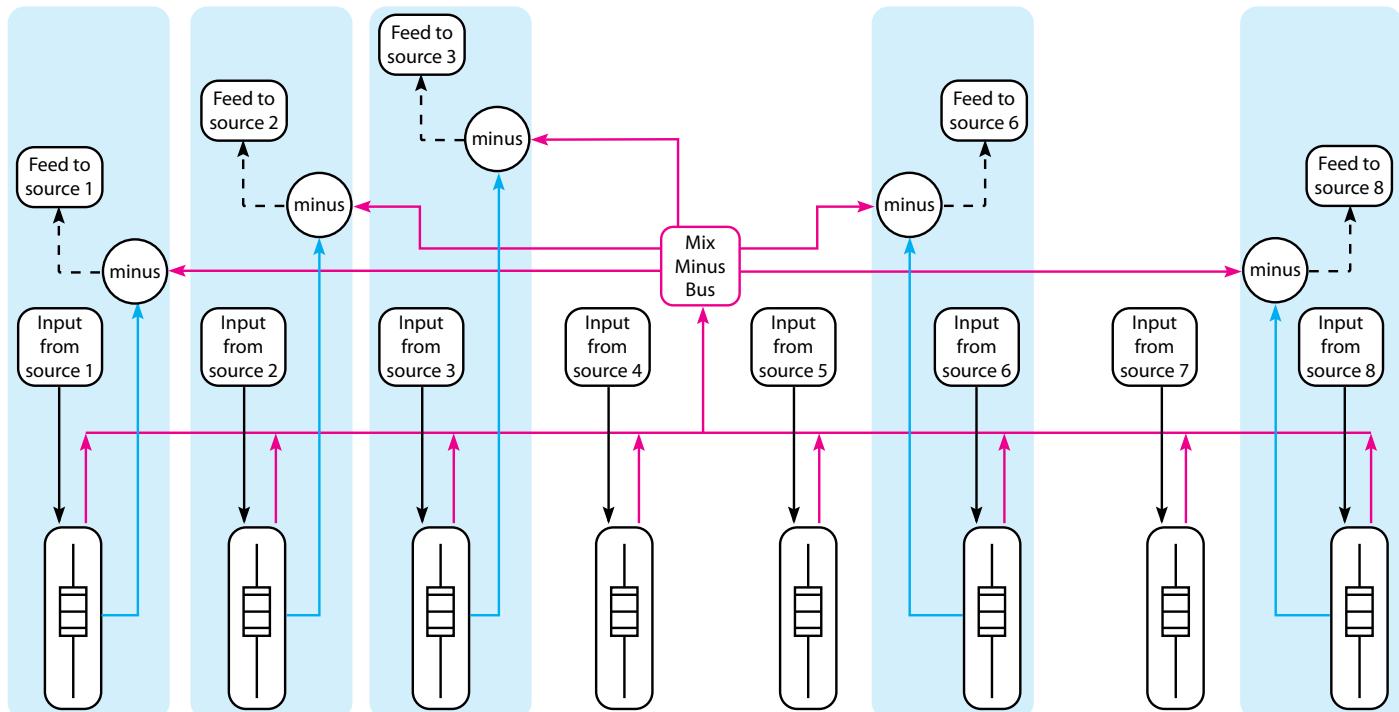
It can be very difficult to speak while hearing your own voice returned to you with even a slight delay. By using a mix minus feed to the reporter, their own contribution to the audio is removed before it is fed back to them eliminating this problem.

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 to.

FIG 1 - MIX MINUS ABSTRACTION



To send a signal to this bus, first assign the chosen path and press the ON button in SENDS-ROUTES mode as seen in Fig 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, go to the [> I/O>I/O Patch](#) page in the main application. Touch the 'Select Source' 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 'Select 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 "[Direct Outputs](#)" on page 135.

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 Fig 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.

FIG 2 - SENDING SIGNALS TO THE MIX MINUS BUS

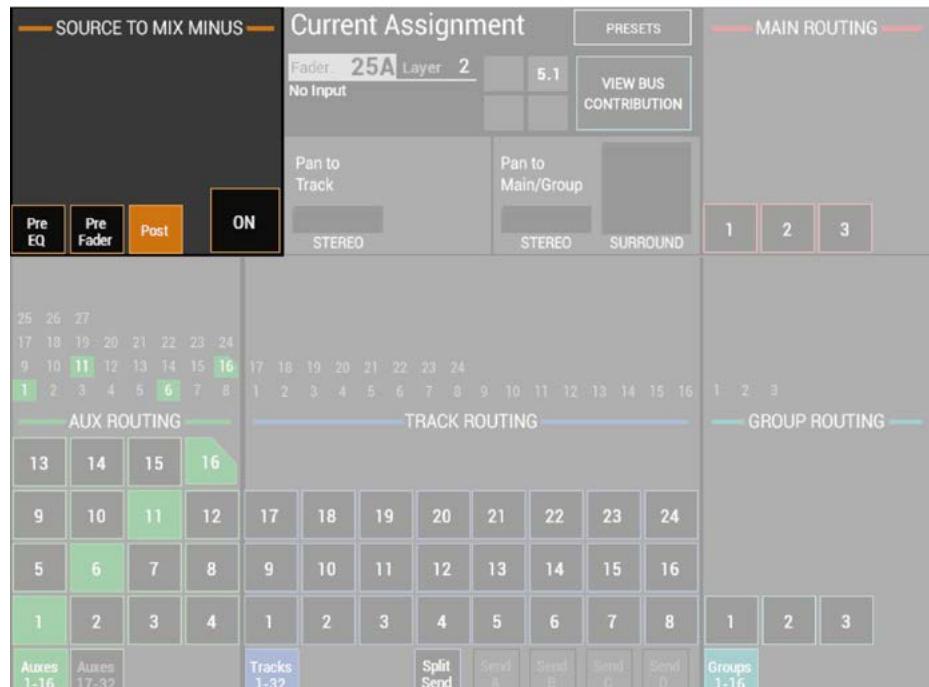


FIG 3 - MONITORING A MIX MINUS SIGNAL



APOLLO **METERING**

TFT METERS

The Apollo TFT meter layouts can be customised in several ways.

Fig 1 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

Meter cells

Each TFT meter is divided into four vertical sections marked I, II, III and IV as shown in Fig 2.

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. This will then provide 8 meters across the width of the TFT screen.

Meter Grid Configuration

Select >Show Settings>Meter Layout, from the buttons on the left hand side.

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 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 the 'Grid' tab subdivides the window to show the current layout see Fig 3.

FIG 1 - EXAMPLE TFT METER LAYOUT

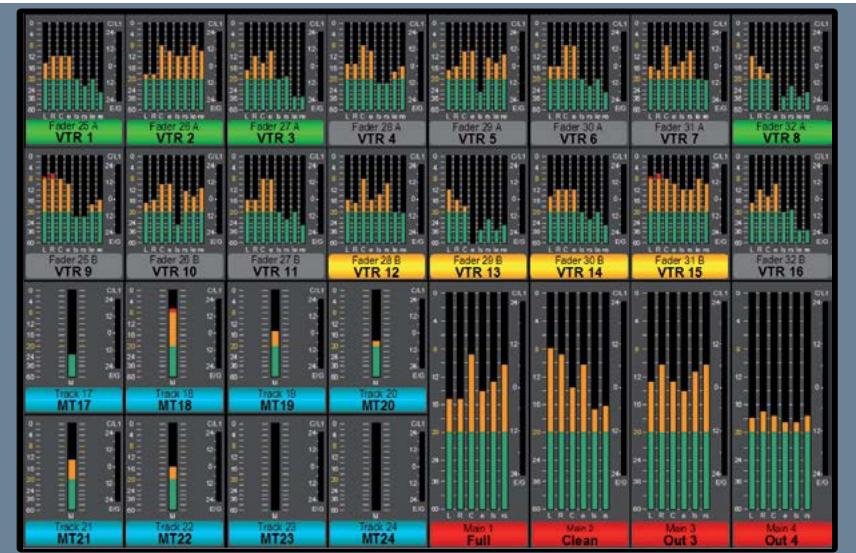


FIG 2 - EXAMPLE LAYOUT GRID

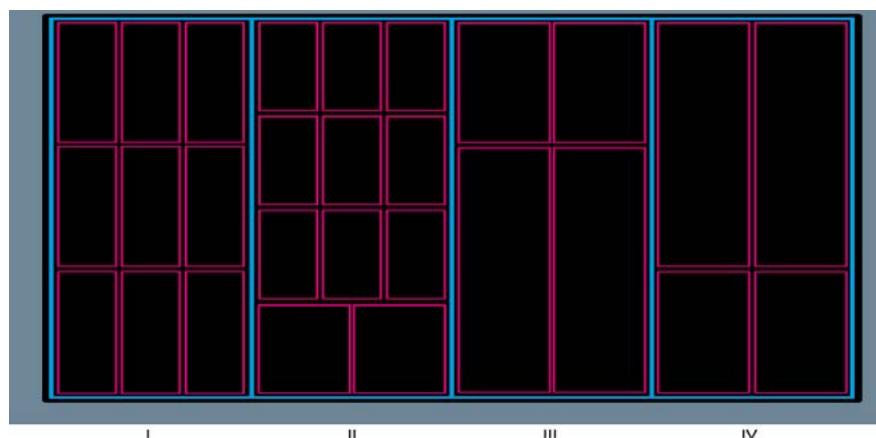


FIG 3 - GRID CONFIGURATION



The buttons at the base of each vertical section set the vertical cell division 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 $\frac{1}{3}$ and $\frac{1}{4}$ height meters with 2 and 3 wide cells allows a vast range of alternative grids. To reduce the vertical meter height that are bigger than one cell select it and touch 'Split cell'.

As soon as changes are entered, the message '*You have made changes to the meter layout*' appears and the user can then Click the 'Apply new layout to surface' button in the top right corner to apply the meter settings on the screen to the control surface, or 'Revert to current surface layout' to put it back as it was.

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, see Fig 4.

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.

FIG 4 - METER ASSIGNMENT



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'.

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 four PPM scales, -8...-20, -9...-15, -10...-18 and -12...-18. and there are three VU scales are -8...-20, -12...-20 and -20. Scale settings can be copied to adjacent similarly sized meter cells by choosing 'Apply to end'.

Meter labels and colours

The colour bar beneath each meter relates to the colouring of paths used throughout the surface. Red corresponds to main paths, dark blue to tracks, green to auxs, light blue to groups and so on. A and B path colours correspond to the A and B path selector buttons above the faders which are green and yellow respectively. Note that the current assign meter is also now highlighted in Blue.

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 88](#). Dynamics meters can show either DYN1 or DYN2. This option is set from the surface by selecting TOOLS>METERS.

Peak Sample meters

Each meter on the TFT screen has a peak sample meter which shows the peak level and rides on top of the signal. When the signal level drops, the peak sample persists for a period of 2 seconds. The bargraph meter adjacent to each fader, which has 8 LED segments and no peak sample indication, has an instantaneous attack and 30dB/s decay time. Therefore a single sample event will result in full 'deflection' and subsequent 30dB/s decay.

Peak Overload indicators

Each Fader has a Peak Overload indicator labelled 'Peak' which comes on at -3dBFS on both Apollo and Artemis and when the Overload is removed the indicator turns off when the display drops below -3dBFS based on the rate of 30dB/s decay. So a single sample at 0dBFS would result in the peak overload LED being on for $(0\text{dBFS} - 3\text{dBFS})/30\text{dB} = 0.1\text{s}$.

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 for the path on the surface.

The labels under each meter display the fader label, port description and port name in priority depending on which have been set.

Meter Layout Presets

From V6.0 the data structure for Metering files has been altered and each show now contains its own meter layout.

Just as with Path Presets, you can export a shows meter layout and save it for later using the Meter Layout Presets option in the main application. See Fig 5.

This allows meter layouts to be easily imported into multiple shows selectively, removing the potential for unintended changes across shows.

Meter Layouts can be saved into a Preset, another show loaded and the saved preset applied to the other show by selecting and loading the preset into it.

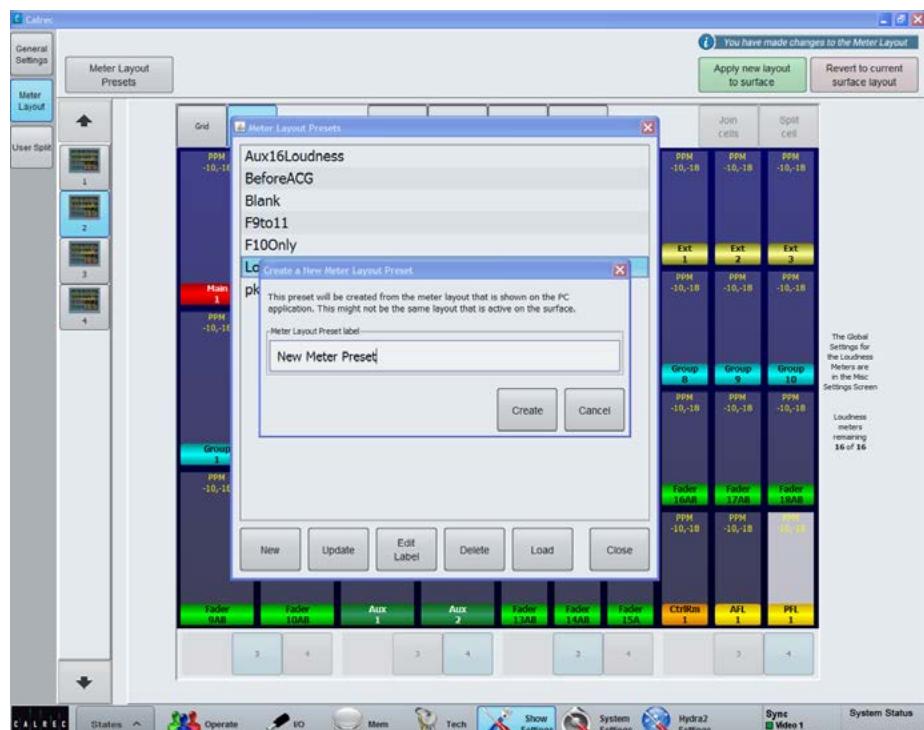
Select >**Show Settings>Meter Layout**, from the buttons on the left hand side.

At the top left of the Meter Layout screen is a new button ' Meter Layout Presets' accessing this allows the user to:-

- Create a New Meter Preset from the meter layout .
- Update a selected Meter Preset from the meter layout in the main application.
- Edit the name of a Meter Preset.
- Delete an unwanted Meter Preset.
- Load a Meter Preset from a selection of Presets into your show(s).

Note: No changes are applied to the surface until the 'Apply new layout to surface' button is clicked, loading the Meter Preset just loads it into the main application for examination/further editing ready to be applied.

FIG 5 - METER PRESETS



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 upstand TFT is done as normal from >[Show Settings>Meter Layout](#).

MTR1-4 are located within the 'Other Meter' source menu. Patching the meter selector output to an audio output is done from >[System Settings>Fixed I/O](#) then select 'Ext Meter Outputs' from the 'Select Source' 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 Settings' page from where it is possible to send tone to the external meter or put the meter in M/S mode. See Fig 6.

FIG 6 - METER SELECTORS



FADER AND DYNAMICS METER SETTINGS

Some additional upstand TFT meter settings can be selected from any panels Layers row, TOOLS>METERS menu, as shown in Fig 1.

Fader meters

Upstand 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. See Fig 1.

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. Fig 2 shows the TFT Fader Meter selection points.

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 DYN2 or below DYN1 as shown in the TOOLS>METERS menu above right will change all relevant TFT meters to display the selected information.

FIG 1 - TOOLS>METERS - CONTROL SURFACE METER OPTIONS

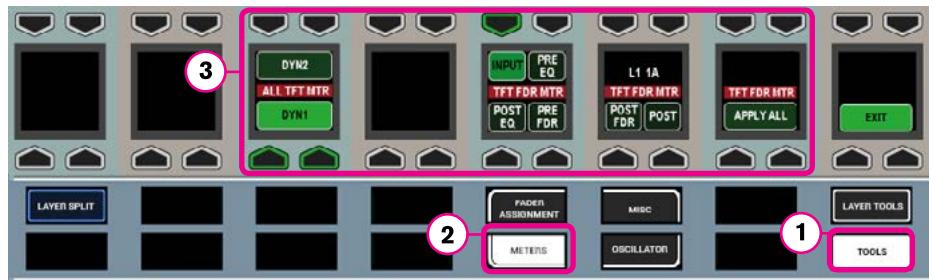
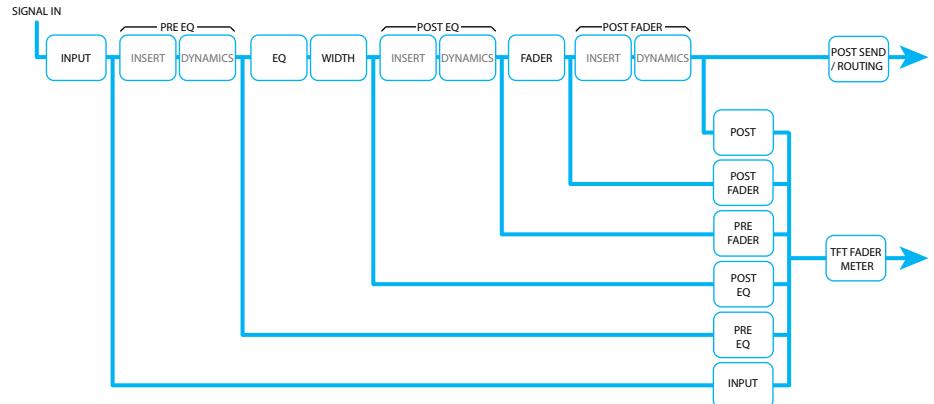


FIG 2 - PATH SIGNAL FLOW & TFT FADER METER SELECTION POINTS



EXTERNAL METER OUTPUTS

External meters can be fed by the Apollo metering system in a similar way to loudspeakers.

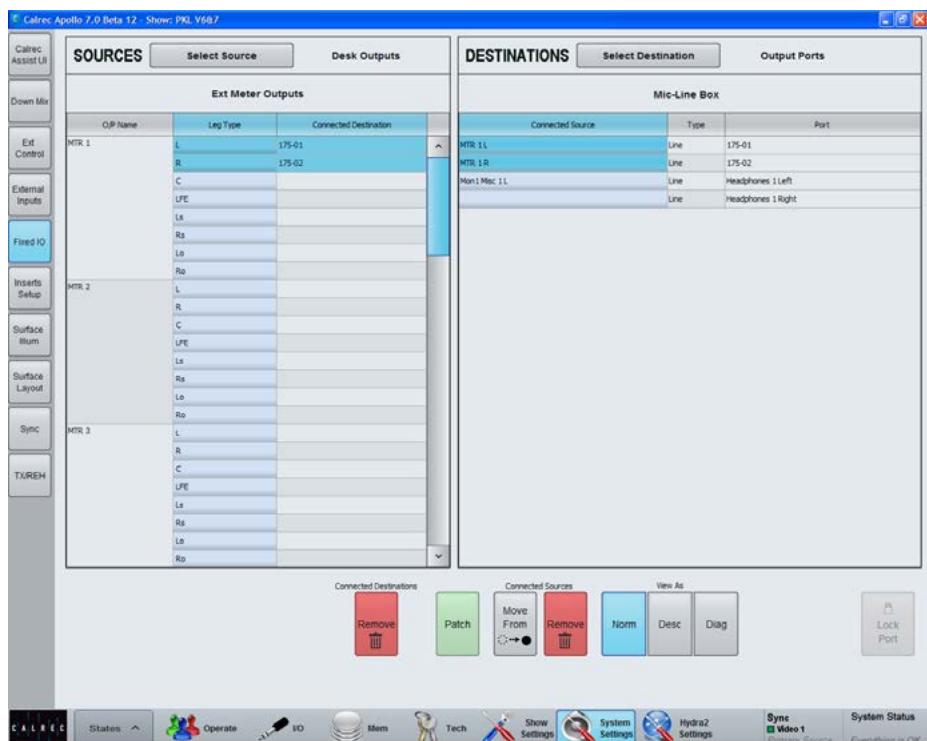
Navigate to >System Settings>Fixed I/O of the main application see Fig 1.

Touch the 'Select Source' 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.

FIG 1 - EXTERNAL METER PATCHING



LOUDNESS METERS

Loudness meters provide a way to monitor and regulate average loudness levels over the duration of a programme.

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 160. The Meter Setup screen in the main application displays how many loudness meters are available at any time.

Loudness metering at different sample rates

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

At the higher sample rate the number of loudness meters is halved, meaning that 8 Loudness meters are available at 96kHz. instead of 16 Loudness meters at 48kHz.

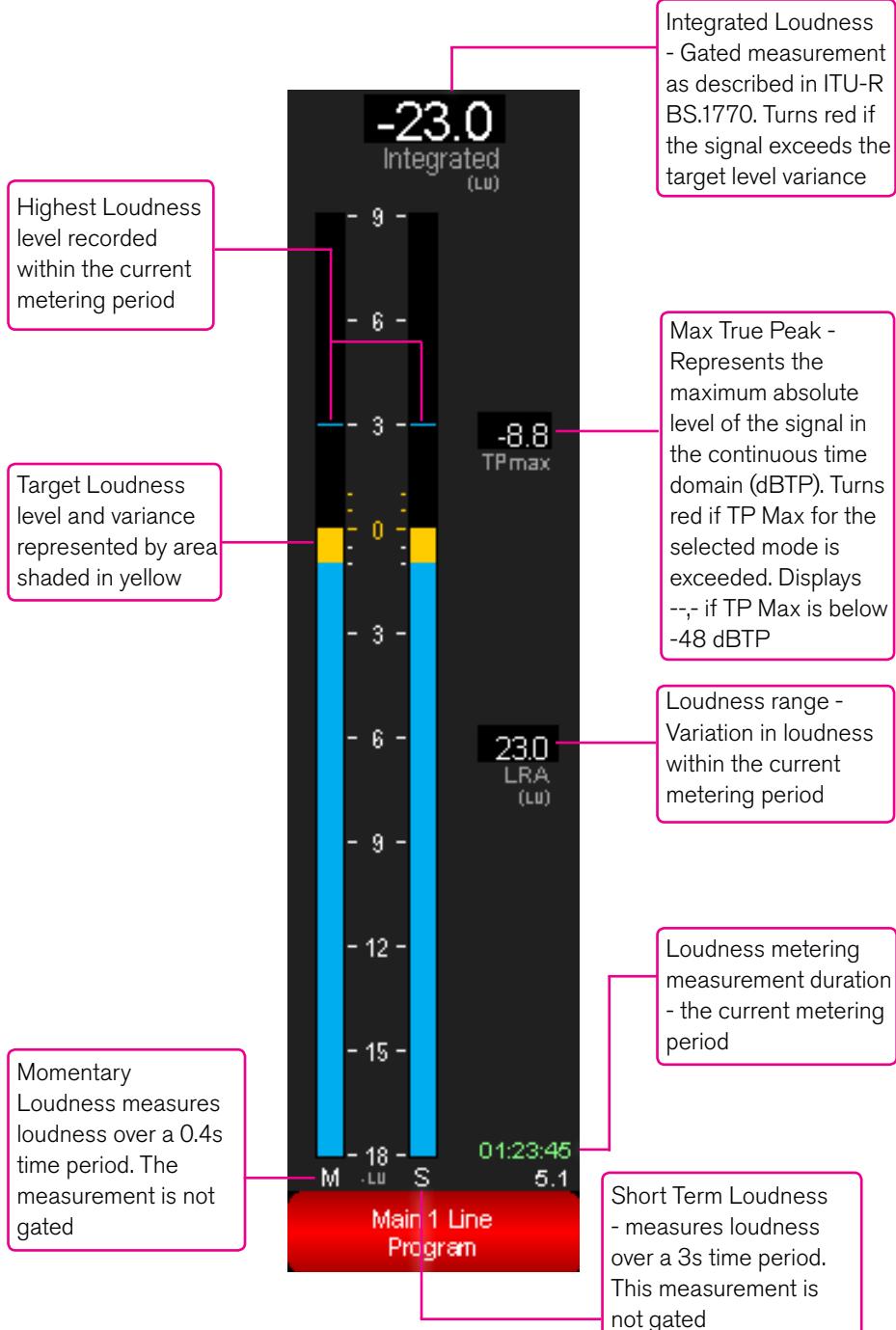
Loudness Metering Modes

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 **>Show Settings>General Settings** within the main application and select a metering mode from the button selector.

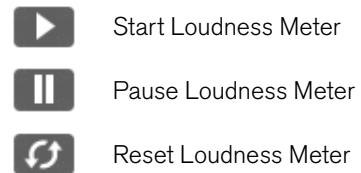
An appropriate loudness metering scale can also be set from this screen, which alters the scale of all loudness meter bar graphs - the example shown in Fig 1 on the right is displaying EBU mode with +9...-18 LU scale.

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. See Fig 3 on the next page for a table of Loudness Metering Modes.

FIG 1 - LOUDNESS METER - DESCRIPTION OF COMPONENTS



- 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. See Fig 2. 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, and the Joystick/Spill panel.

FIG 2 - LOUDNESS METER CONTROLS



- Loudness meter controls shown within the wild assign row and the bottom row of the wild assign panel

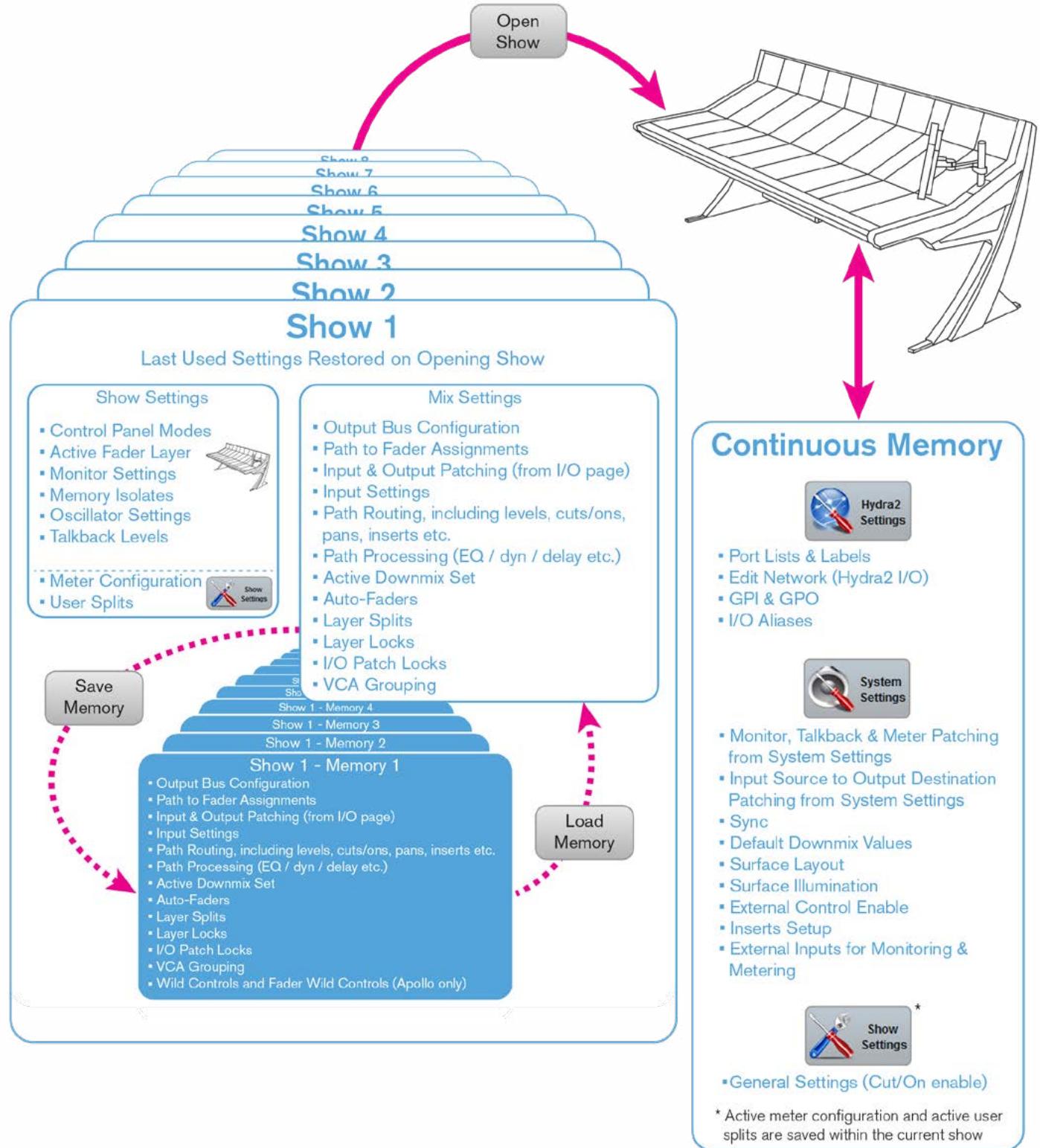
FIG 3 - LOUDNESS METERING MODES

	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)	+/- 1 LU	-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)	+/- 2 LU	-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)	+/- 1 LU	-2 dBTP	-10.0 LU
DPP Live	+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)	+/-2 LU	-1 dBTP	N/A
DPP Non-Live	+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	N/A

APOLLO SHOWS, MEMORIES AND PRESETS

OVERVIEW

FIG 1 - 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 organised 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 Fig 1 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 customisation, 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, 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 saved as part of the show.

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 Hydra2 Settings and System Settings pages of the main application, as well as some of the settings applied from the Show Settings page (See Fig 1 opposite).

Shows, memories, and Show Settings 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 dependent upon the amount of available storage space on the controller cards, which is displayed on the Memory Load / Save page of the main 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 application, >Mem screens.

The upper section of the >Mem>Load/Save screen (as shown in Fig 1 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 dialogue. See Fig 2.

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.

FIG 1 - MAIN APPLICATION>MEM>LOAD/SAVE SCREEN

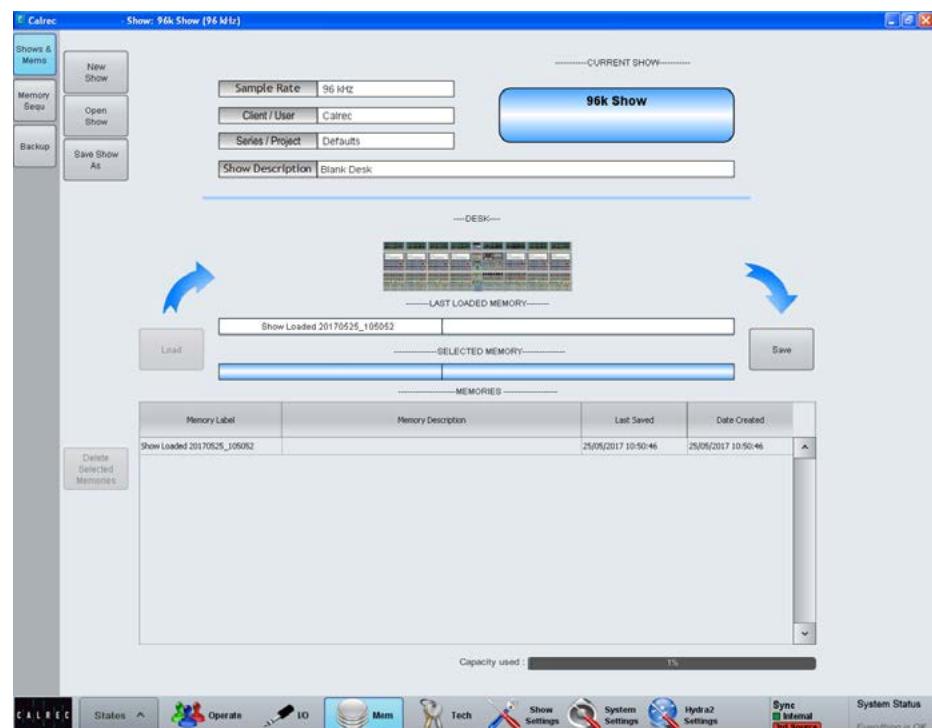
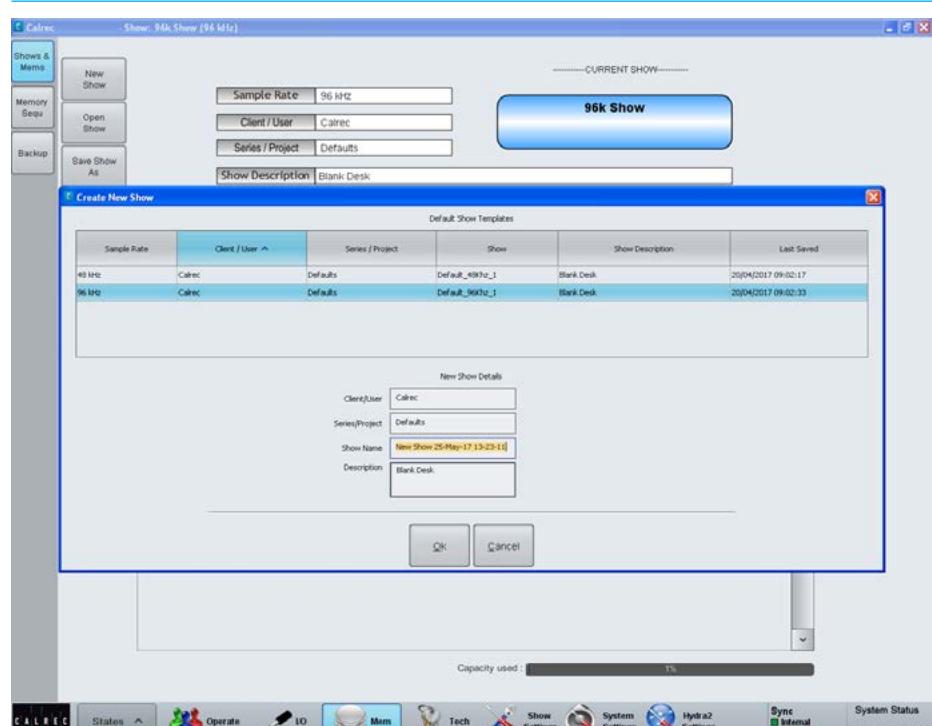


FIG 2 - MAIN APPLICATION>MEM>DEFAULT SHOW TEMPLATES SCREEN



Creating shows at different sample rates

From version 8.0 the desk can be configured to operate at different sample rates such as 48kHz & 96kHz.

Fig 2 shows the 'Create New Show' template page from which either a 48kHz show or a 96kHz show can be created. At the higher sample rate the capacity of the DSP is reduced. See "[Apollo Sample Rate Comparison](#)" on page 13 for details.

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. See Fig 3.

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.

Opening Shows at different sample rates

Note that the sample rate of the show is shown in the left hand column of the show list, method for opening remains unchanged.

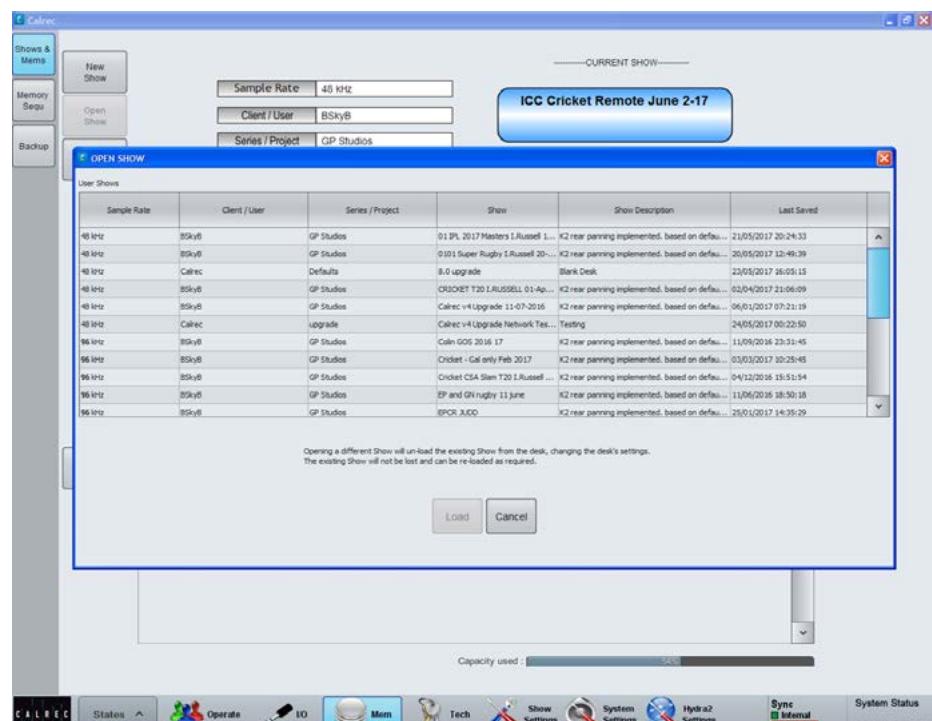
Saving / duplicating shows

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.

FIG 3 - MAIN APPLICATION>MEM>OPEN SHOW SCREEN



Creating and editing default shows

Users logged in to the main 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', 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 unauthorised or accidental changes.

Users logged in as technicians also have the ability to open default shows from the 'Open Show' dialogue. 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 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 unauthorised 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. Fig 4 on the right shows the main 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 existing backups. If the folder contains lots of files, it can take time to scan. New folders can be created via the 'Select Backup Location' button.

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.

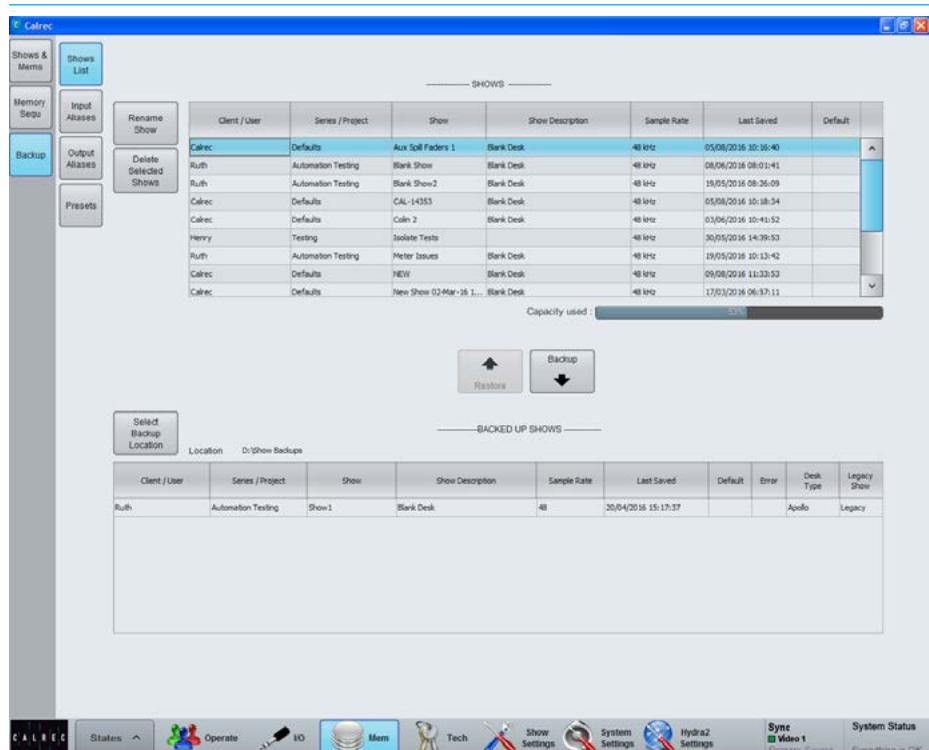
Backup Shows at different sample rates

Note that the sample rate of the show is shown in the left hand column of the show list, the backup method remains unchanged.

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'.

FIG 4 - MAIN APPLICATION>MEM>BACKUP>SHOWS LIST SCREEN



Renaming shows

The >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'.

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 application as technicians.

Changes to Format of Show Data and Backups

In previous versions, Apollo and Artemis allowed the creation of multiple meter layout files, and multiple user split files. Each show referenced one of these files so that when you loaded a show, you would also load the settings from these referenced files.

From V6.0, this data structure has changed, and each show now contains its own meter layout and its own user split configuration. This means that whenever you load a show, you can be sure that the meter layout, and the position of user splits, will be exactly as you left them.

To support the changes made to the structure of show data mentioned above, the format of shows that are backed up, or exported, from a desk has also changed.

Previously, when you made a show backup, a folder structure was created on the backup device, based on the information client, series, and show labels of each show. Each show you back up, is now contained in its own file, with a ".CalRecShow" extension. When you export multiple shows, you get a simple collection of files – one for each show.

The main application maintains support for the legacy format, so you can still import show backups made in the old folder-based format.

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 dialogue 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 dialogue 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 screen 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, see Fig 3.

The button cell in the bottom left corner of the Monitor mode panel area switches the TFT screen above for these functions, see Fig 4.

Transferring Shows/Memories between 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-organise the paths needed on to available physical faders / layers.

Note: Presets are Transferable between Apollo and Artemis.

FIG 3 - SURFACE TFT DISPLAY OF PANEL IN MONITOR MODE>MEMORIES

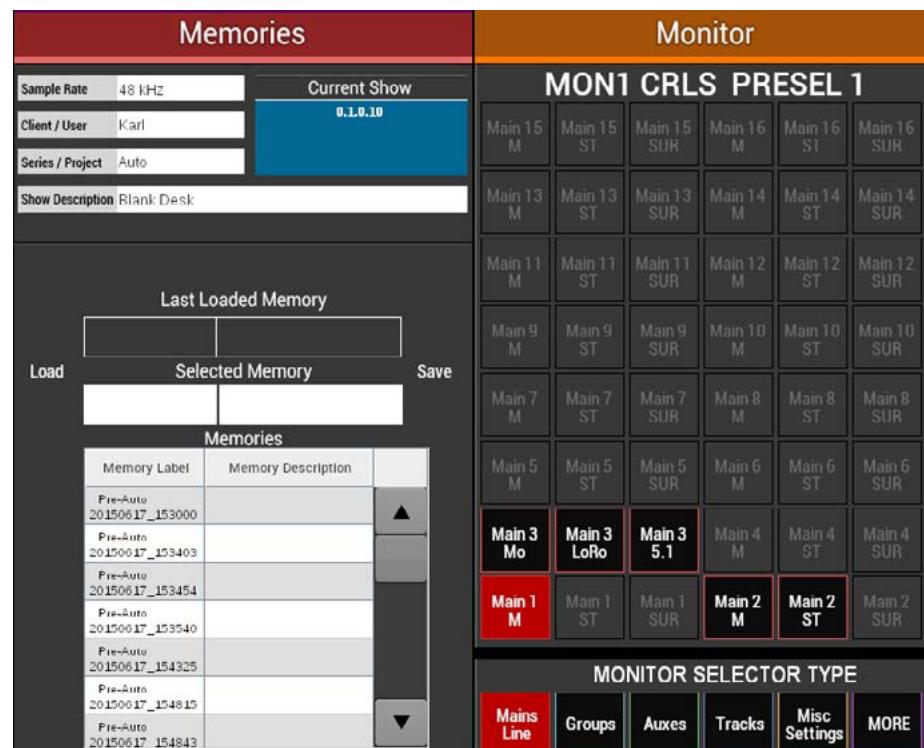


FIG 4 - SURFACE PANEL IN MONITOR MODE - MEMORIES SCREEN SELECT



MEMORY SEQUENCING

The main application >Mem>Memory Sequ screen, see Fig 1 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.

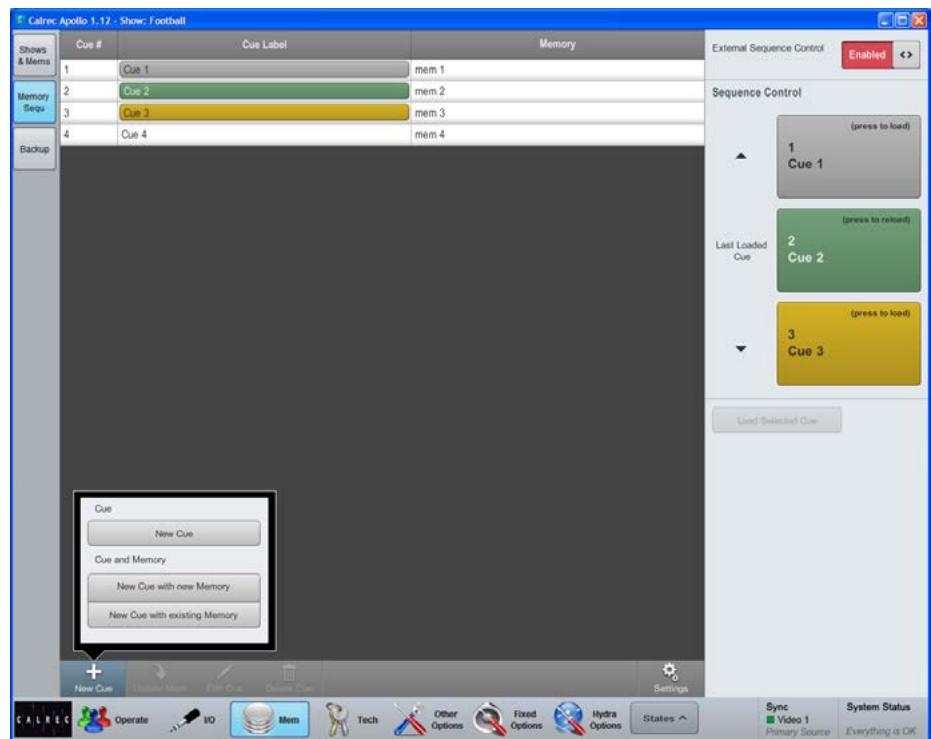
Selecting 'New Cue with new Memory' will save the current console settings as a user memory and add it to the cue list. This memory also becomes available to load from the standard 'Shows & Mem' list like any other memory. Selecting 'New Cue with existing Memory' allows the user to choose a pre-saved user memory from the current show to add to the cue list.

Items in the cue list are colour-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 & Mem' 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.

FIG 1 - MAIN APPLICATION, MEM>MEMORY SEQU SCREEN



Any changes made to memories by saving from the 'Shows & Mem' page will automatically affect them when they are loaded from the sequence screen - cues do not need updating to 'refresh' the memory.

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 >[Hydra2 Settings>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.

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 Fig 1. With this function selected on a fader, the paths on that fader will keep their current settings when a new memory is loaded.

Fig 2 illustrates this. 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.

FIG 1 - MEM ISO BUTTONS



FIG 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 Fig 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 Fig 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 be 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.

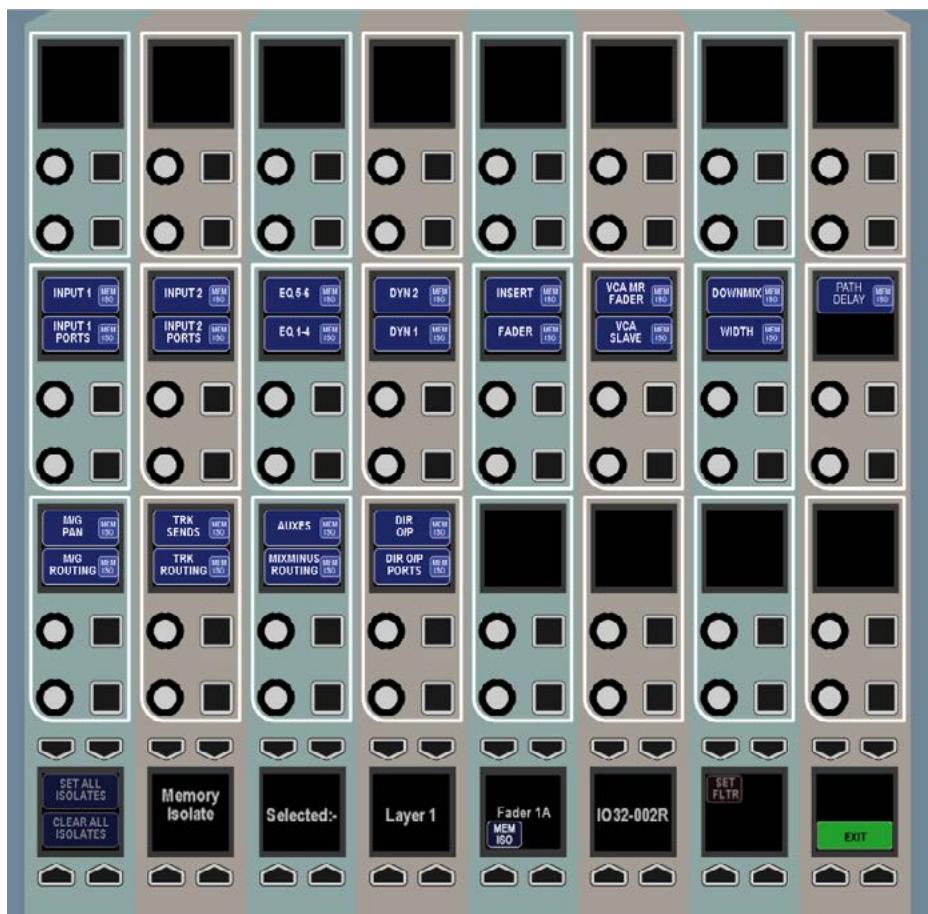
Press the relevant button to toggle the elements which should be isolated when the assigned path is isolated. The selected elements will illuminate. The SET ALL ISOLATES and CLEAR ALL ISOLATES buttons in the button cells below switch all elements on or off respectively.

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.

FIG 3 - ACCESSING THE SCOPE OF THE MEMORY ISOLATE FUNCTION



FIG 4 - MEMORY ISOLATE MODE



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 quickly apply the settings to a number of paths at the same time.

To do this, press the SET FLTR button on the bottom row of the wild assign panel. This will change the appearance of the row to that shown in Fig 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.

FIG 5 - WILD ASSIGN ROW IN SET FILTER MODE



Elements available for isolation

- Input 1 Settings
- Input 1 Ports
- Input 2 Settings
- Input 2 Ports
- EQ Bands 1-4
- EQ Bands 5-6
- Dynamics Unit 1 (comp/lim, exp/gate)
- Dynamics Unit 2 (comp/lim)
- Insert
- Fader Level and Settings
- VCA Master Fader
- VCA Slave
- Downmix
- Stereo Width
- Path Delay
- Pan to Mains and Groups
- Routing to Mains and Groups
- Track Send Levels + Pan
- Track Routing
- Aux Send Levels and Routing
- Mix Minus Routing
- Direct Output Levels
- Direct Output Ports
- Wilds
- Fader Wilds

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 Fig 6. It will be highlighted with an ISO icon as an indication that it is now isolated.

Repeat the process to remove the isolation.

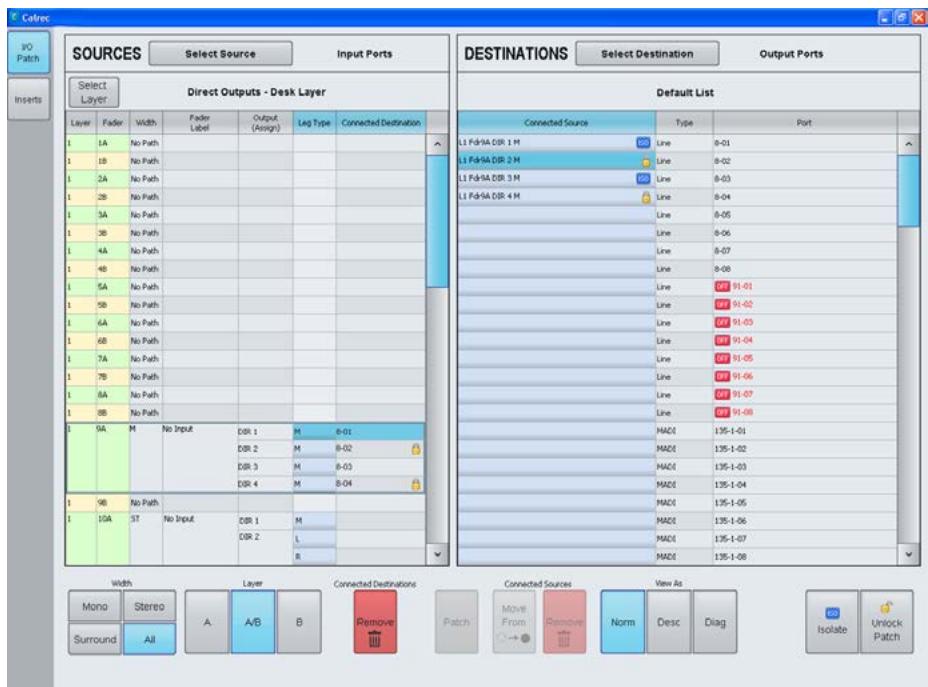
Improvements to Memory Isolate System

From V7.0 Mains, Auxes, and Tracks can now be isolated in the same way as Channels and Groups.

From V7.0, when a bus is patched to a destination, and that destination is isolated, the width of the relevant bus is also isolated. This prevents an incoming memory from changing the width of a bus, and removing the isolated patches.

Conversely, and if appropriate, when a bus is isolated, all the destinations to which it is connected can also be isolated automatically.

FIG 6 - ISOLATING OUTPUT PORTS



PRESETS

A Preset is a snapshot of a path's parameter settings which can be loaded on to other paths. The scope of each preset determines which parameters will be loaded, and can be changed after it has been saved.

Using presets can speed up workflow when several paths with similar settings are required.

Creating a Preset

To create a preset from the currently assigned path:

1. From any Processing panel mode on the panel touch screen (next to Current Assignment - see Fig 1), or from the Send-Routes mode, tap PRESETS.
2. Navigate to the folder you wish to save the preset, making a new folder if necessary.
3. Tap NEW.
4. Select the scope of parameters that will be recalled when you load the preset (these can be changed later), and choose NEXT.
5. Enter a label and description, then tap OK.

Loading a Preset

To load a preset to the currently assigned path:

6. From any Processing panel mode on the panel touch screen (next to Current Assignment - see Fig 1) tap PRESETS.
7. Navigate to and select the preset that you wish to use.
8. Tap LOAD.

Editing a Preset

Once a preset has been created you can edit its scope (see Fig 2), label and description at any time by tapping PRESETS, selecting the relevant file from the popup and tapping EDIT.

FIG 1 - SELECT PRESETS FUNCTION

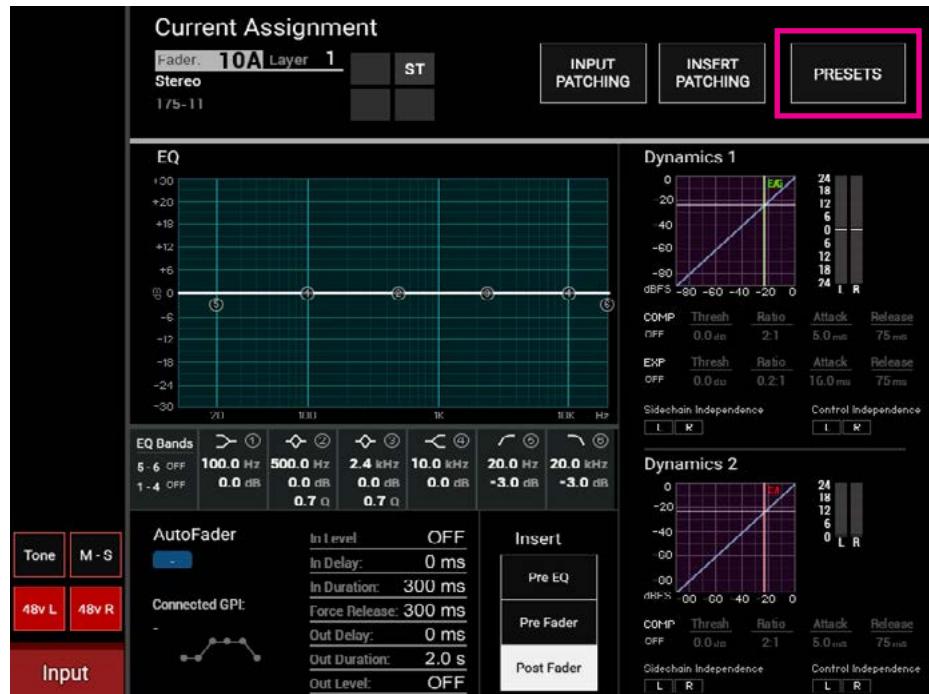
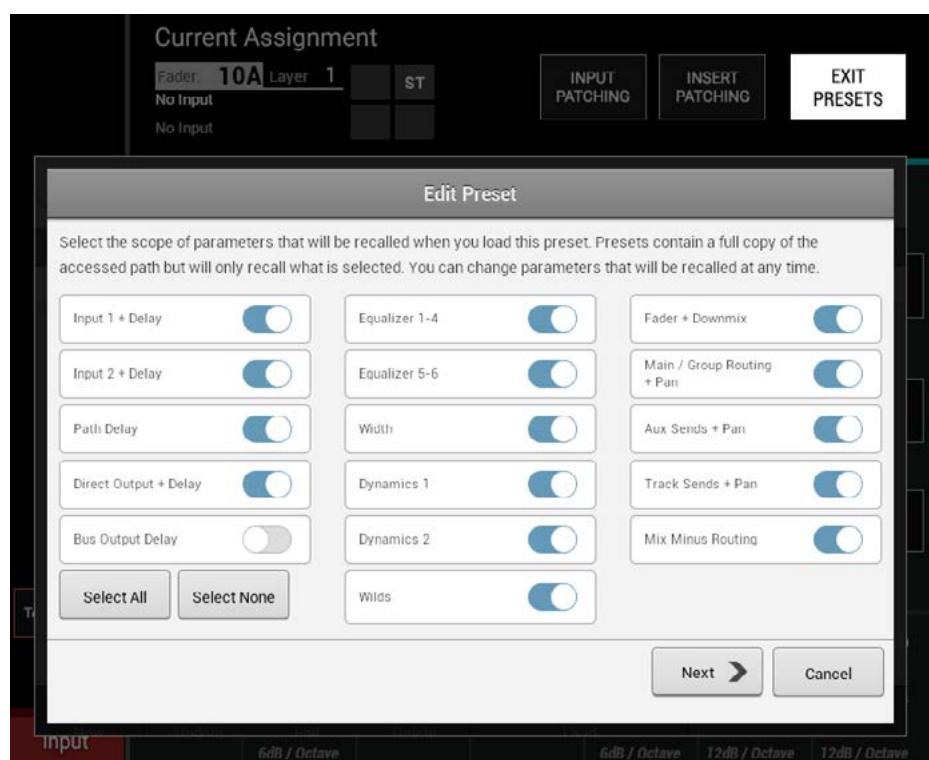


FIG 2 - EDIT PRESETS



Backing Up Presets

Presets are stored on the console's controller card. Like Shows and Mem, users can backup preset files to the system PC or USB memory.

Fig 3 shows the main application **>Mem>Backup>Presets** screen. The list in the upper half displays all the presets and folders containing presets on the controller card.

The list in the lower half of the screen displays all the presets 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' dialogue.

Presets can be backed up individually or in multiples. Select the preset(s) to backup from the upper list by clicking on them to highlight.

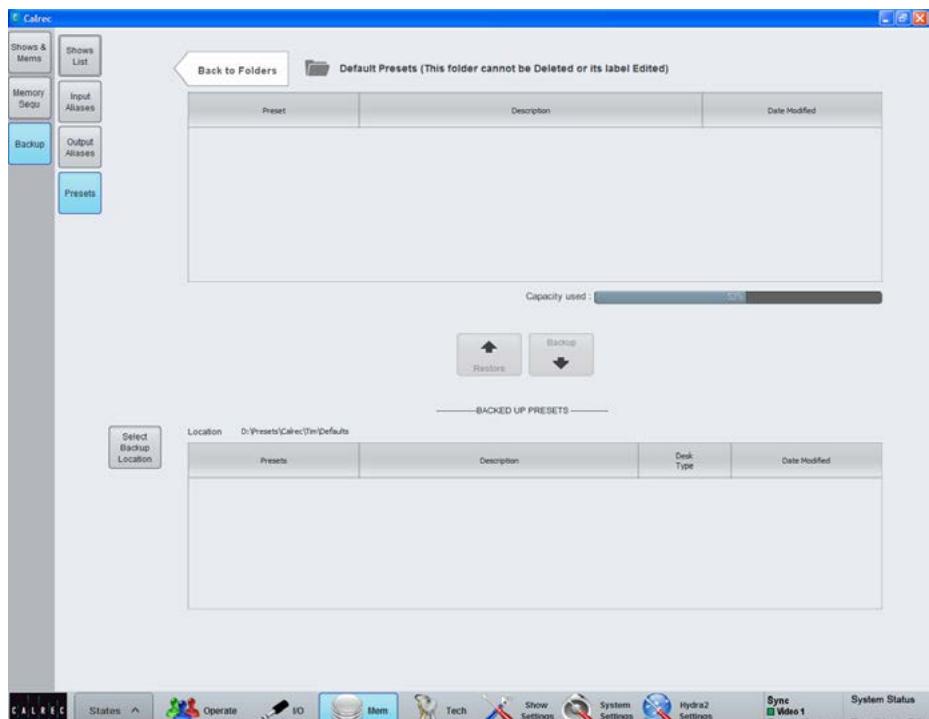
Press the 'Backup' button to copy the selected preset(s) to the desired location. Note that if the presets menu on the TFT is open, then the 'Backup' function will be unavailable.

Restoring Presets

Previously backed up presets 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 preset files.

FIG 3 - BACKUP PRESETS



Highlight the required preset file(s) from the 'Backed Up Presets' list in the lower portion of the **>Mem>Backup>Presets** screen and then press 'Restore'.

Note: Presets are Transferable between Apollo and Artemis.

Pooled Resources

When presets are loaded for 'pooled' resources, such as input and output delay modules, they will be assigned up to the point where the pool runs out.

If not enough resources are available to complete the load, a dialogue appears to tell you that some resources have not been applied.

APOLLO **CONSOLE FACILITIES**

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. See Fig 1.

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 see "GPIO" on page 190.

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.

FIG 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 failed component may be reset individually from the other system components.

Fail warning indicator

System Status 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, as shown in Fig 1. 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 as shown at the bottom right of Fig 1.

Similar buttons are also available on the rack, with the addition of the Hydra2 Router 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.

FIG 1 - FAIL WARNING AND RESETS



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

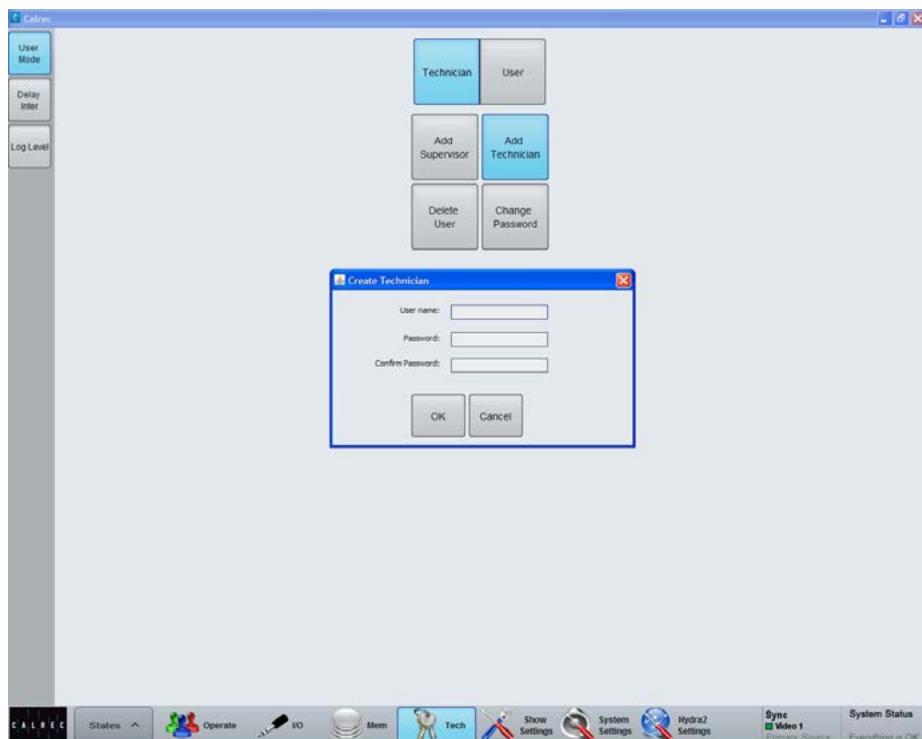
To access technician mode, navigate to the TECH section of the main application as shown in Fig 1. When in normal user mode, the USER button should be highlighted.

To log into technician mode, touch the technician button to bring up a dialogue 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 user name and password.

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.

FIG 1 - TECHNICIAN MODE



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 dialogue prompting the new supervisor's details to be entered.
- ADD TECHNICIAN - Supervisors may create new technician accounts. Touching this button will bring up a dialogue prompting the new technician's details to be entered.
- DELETE USER - Touching this button will bring up a dialogue allowing the supervisor to select a user to delete.

Both supervisors and technicians have access to the CHANGE PASSWORD button which brings up a dialogue 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.

SYNCHRONISATION 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 synchronisation 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.

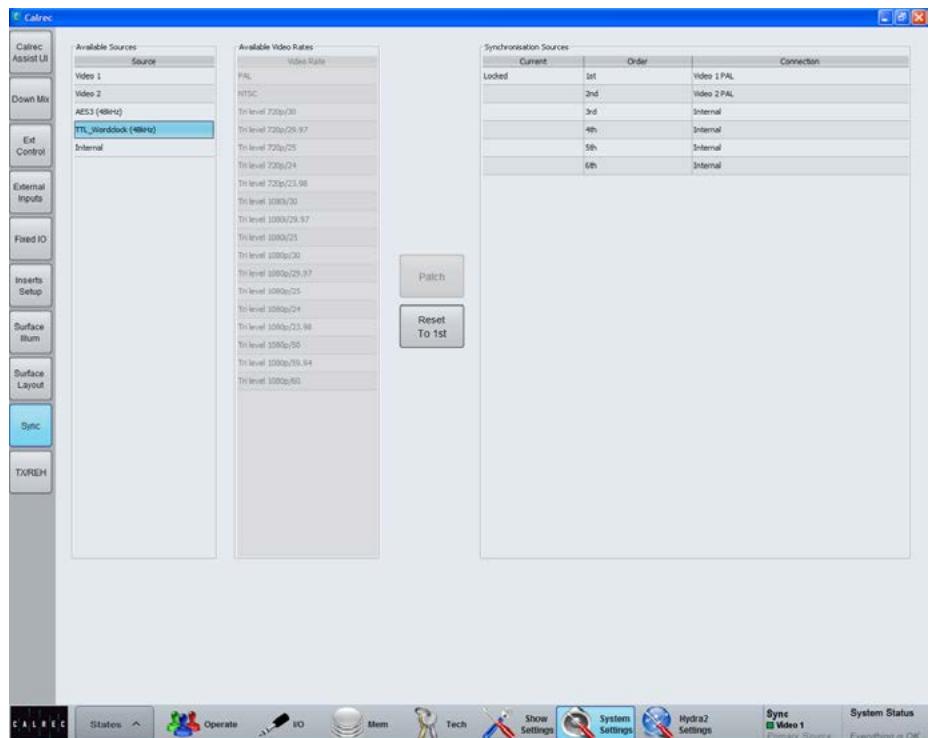
Each console and any standalone router racks on the same Hydra2 network must all be connected and locked to the same derived reference source to ensure the online status of the associated I/O.

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 synchronisation 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).

Sync settings are on the [>System Settings>Sync](#) page as shown in Fig 1. If not in tech mode, the settings cannot be changed.

FIG 1 - MAIN APPLICATION, SYSTEM SETTINGS>SYNC



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.

Synchronisation at different sample rates

Hydra2 runs at 48kHz irrespective of whether the consoles and I/O boxes are running at 96kHz or not. It simply uses 2 samples per 96kHz signal..

Hydra2 always runs at 48kHz, the system will still require a 48kHz sync if using its AES3 or Wordclock inputs even, if all consoles and I/O are operating at 96kHz.

APOLLO **EXTERNAL INTERFACING**

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

>Hydra2 Settings>GPI shows the available GPI opto inputs listed on the left hand side of this screen. 'Filter Inputs' allows rapid access to specific Hydra2 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.

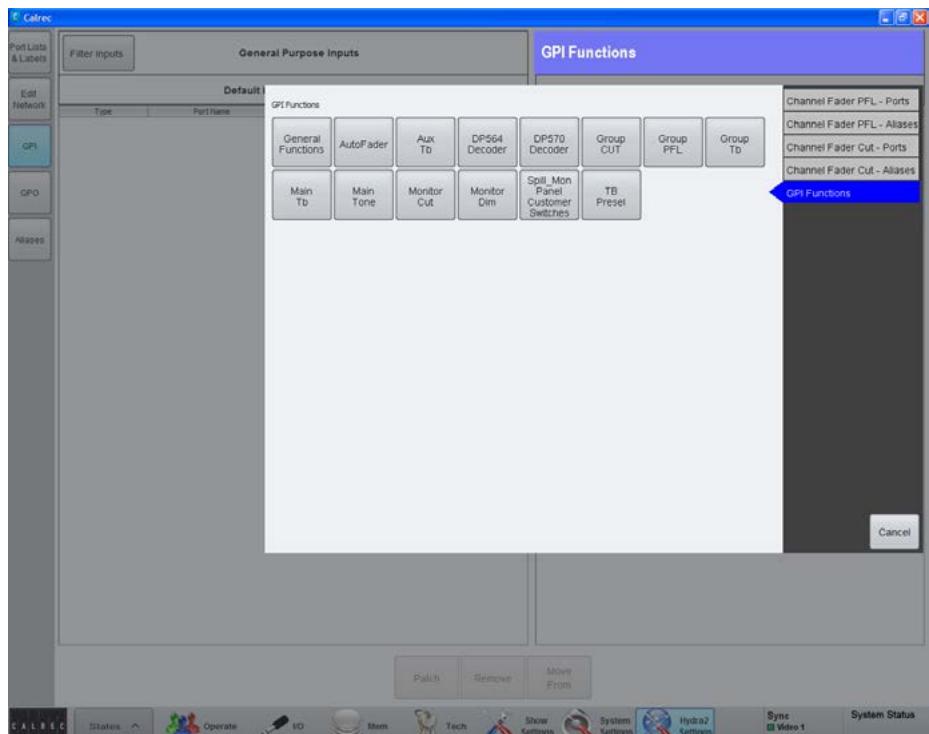
GPI functions

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 Fig 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.

FIG 1 - ASSIGNING GPI OPTOS TO CONSOLE FUNCTIONS SELECTOR



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 (Fig 2 shown below) all have coloured 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 colour states allowing them to provide feedback from three separate GPI inputs.

FIG 2 - CUSTOMER SWITCHES



Assigning GPOs

>Hydra2 Settings>GPO provides a similar method of assigning console functions to a General Purpose Output relay. The list of console functions is shown in Fig 3 on the left of the screen and is again organised into various sections. The GPO Functions button selects between General Functions and the Customer Switches accessing the General Functions accesses a range of functions that can be associated with a GP Output as shown in Fig 4.

Common Console Functions

A range of console functions are available to trigger GPO. In addition to these general functions, are Fader Open and Path Open.

Fader Open and Path Open are port-based functions and will be triggered by any fader where that port is in use.

Channel Fader Open function is commonly used for Fader Starts. Path Open is similar, but requires the path is On/Not Cut to trigger the GPO.

In addition to general console functions and fader opens, the hardware user 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.

When assigning GPOs to the customer switches 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.

FIG 3 - ASSIGNING GPO RELAYS TO CONSOLE FUNCTIONS SELECTOR

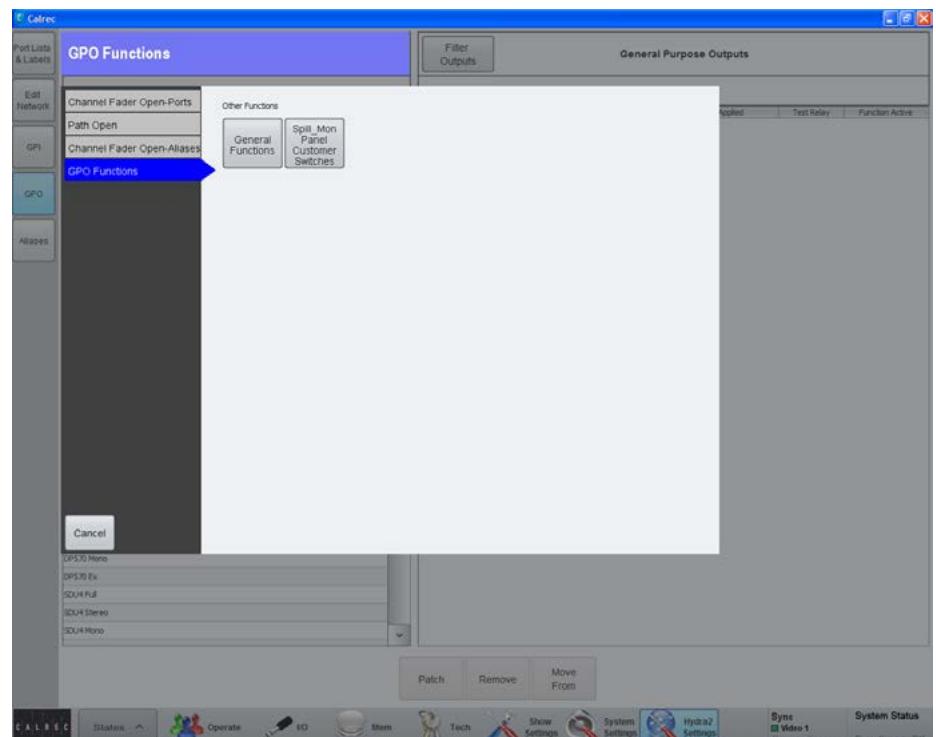
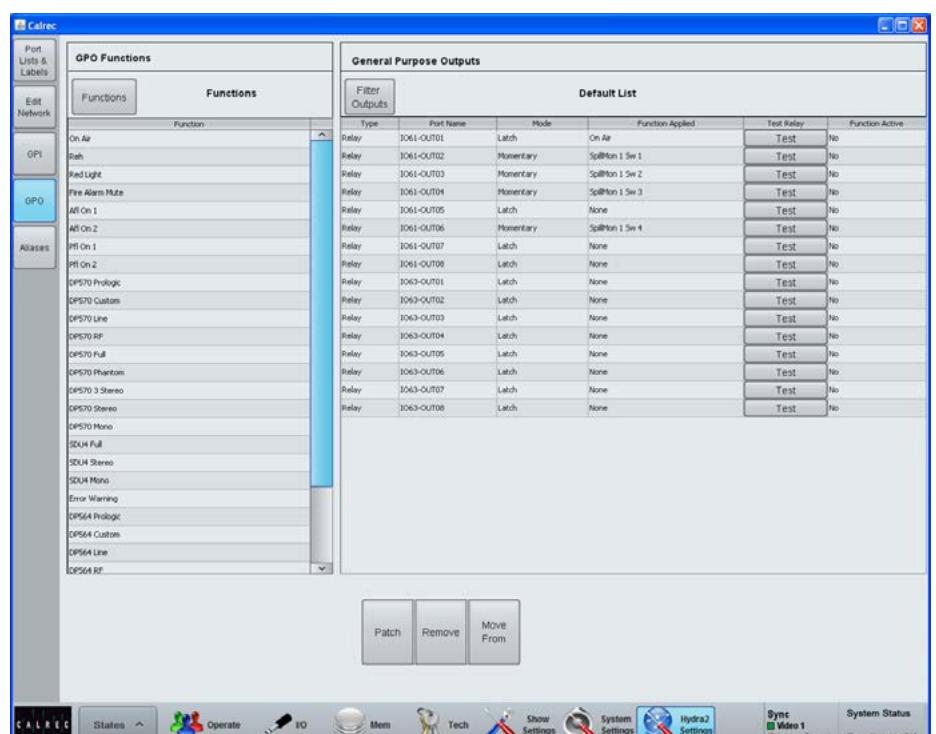


FIG 4 - ASSIGNING CONSOLE FUNCTIONS TO GPO RELAYS



EMBER+ VIRTUAL GPIO

V6.0 onwards adds 256 Virtual GPIs and GPOs, available over the Ember+ protocol.

Virtual GPIO can control and respond to all functions that have been available to traditional physical GPIO. This includes triggering AutoFaders, Channel Cut and PFL, Talkback, Tone, and responding to Mic Open Systems, Fader open and/or on, and On Air Protection status.

On accessing >Hydra2 Settings>GPI or >Hydra2 Settings>GPO the user is now presented with two GPI or GPO sources, the normal GPI/GPO Lists and the newly added Virtual GPI/GPO Ember+ GPIO ports.

Fig 1 shows the assignment of GP Inputs to control console functions. Note the 'All Ember+ GPI off' button and the individual 'Status' switches which allow the user to set or clear GPI's Manually.

Fig 2 shows the assignment of GP Outputs to respond to console functions. Note the test button is present on every Virtual GPO output to manually trigger the Virtual GPO signal.

Labels for each virtual GPI and GPO are also available to Ember+. These labels are editable by the Ember+ controller, and reflected in the Apollo and Artemis UI.

Figs 1 & 2 both highlight the labelling of the eight Virtual GPI ports and the three Virtual GPO ports which have been edited by the Ember+ controller.

Virtual GPIO has been tested with VSM software version 16.1.1. Please contact Calrec if you intend to use virtual GPIO with any other control system.

FIG 1 - ASSIGNING VIRTUAL GPI TO CONSOLE FUNCTIONS WITH LABELS

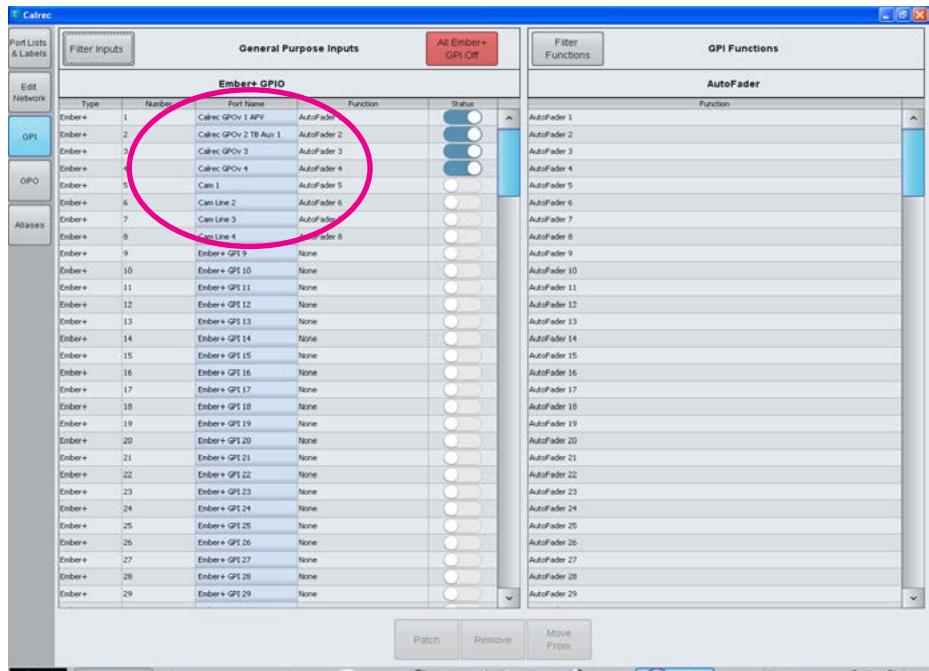
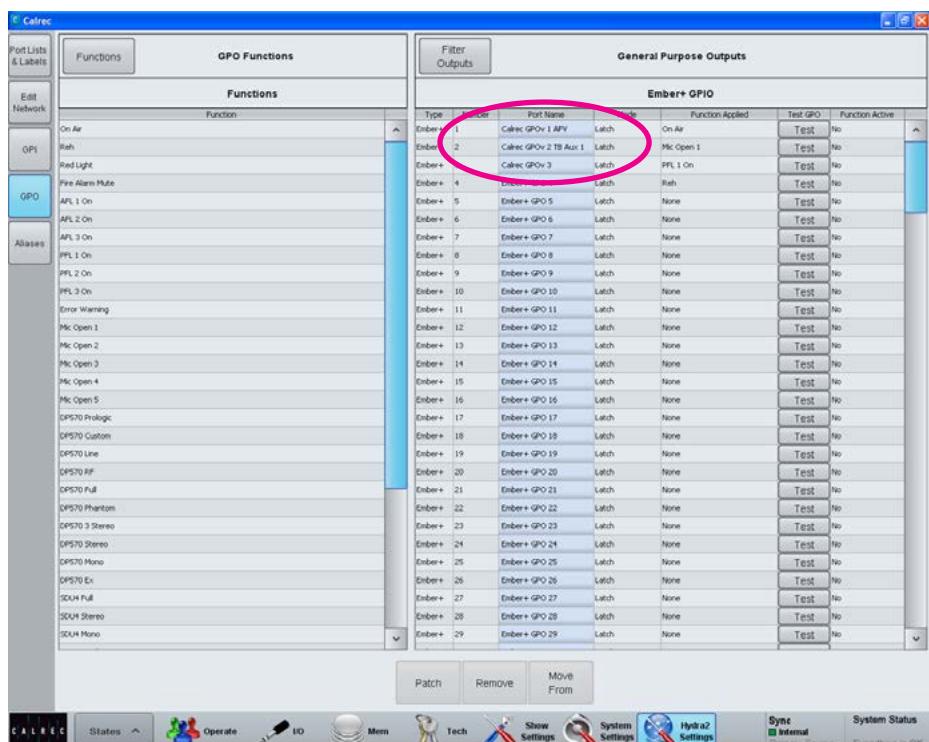


FIG 2 - ASSIGNING VIRTUAL GPO TO CONSOLE FUNCTIONS WITH LABELS



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

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. Input port settings which can be controlled include:

- Mic input gain
- Mic input phantom power switching
- SRC switching

See the Apollo Installation Manual for more details.

CSCP

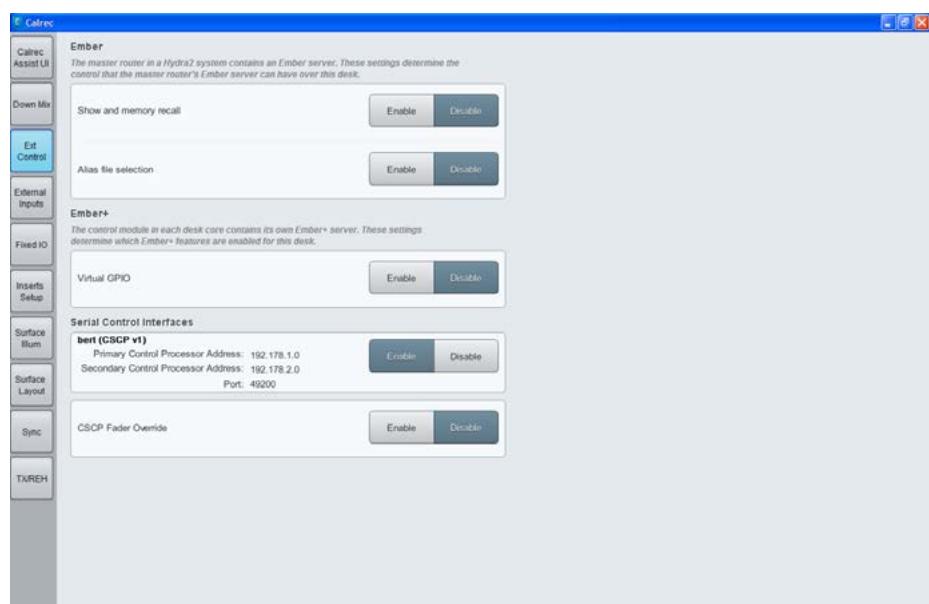
Calrec Serial Control Protocol (CSCP) allows remote control from 3rd party equipment over fader positions, path CUT/ON status, PFLs, routing to Auxs and Mains, and Aux output levels.

Selecting the main application >[System Settings](#)>[Ext Control](#) screen allows for these remote control interfaces to be enabled and disabled. This screen shown in Fig 1, 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 System Settings, 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 PROCESSING-Overview 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.

FIG 1 - MAIN APPLICATION, SYSTEM SETTINGS>EXT CONTROL



Note that the EXTERNAL CONTROL ENABLE on/off button and AUTOFADEER ENABLE on/off button are now on separate controls.

For more information on remote control setup, please refer to the console and Hydra2 installation manuals.

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

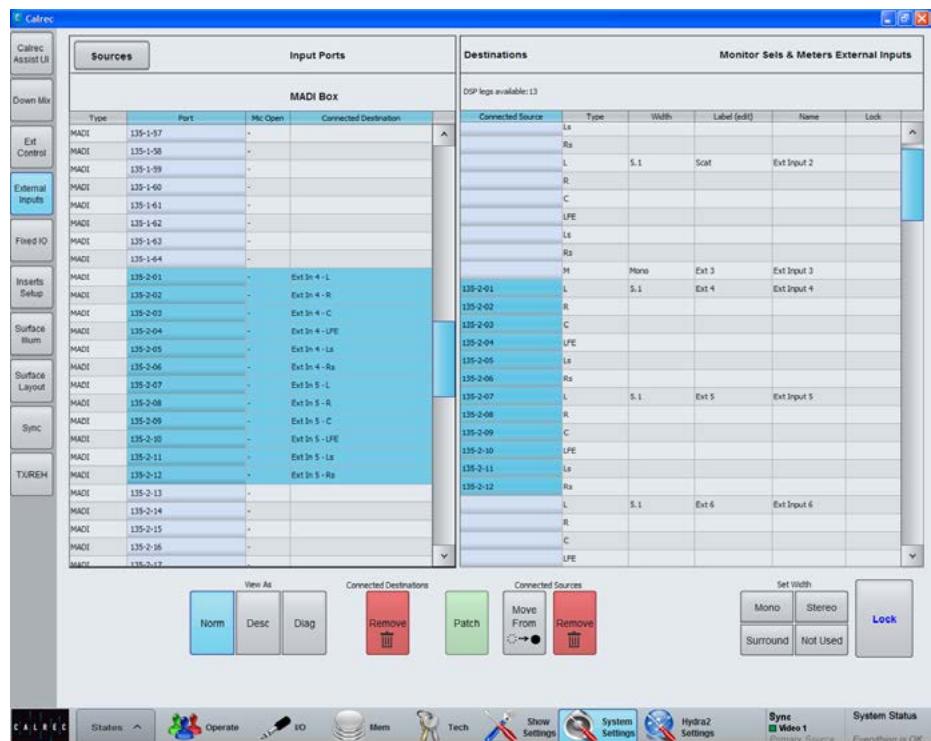
In the main application selecting:
>Show Settings>External Inputs
allows external inputs to be configured, see Fig 1. Click on the Width cell for an input in order to be able to select it as mono, stereo or surround. Custom labels can be given to each input by editing the Label column.

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).

FIG 1 - MAIN APPLICATION, SHOW SETTINGS>EXTERNAL 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.

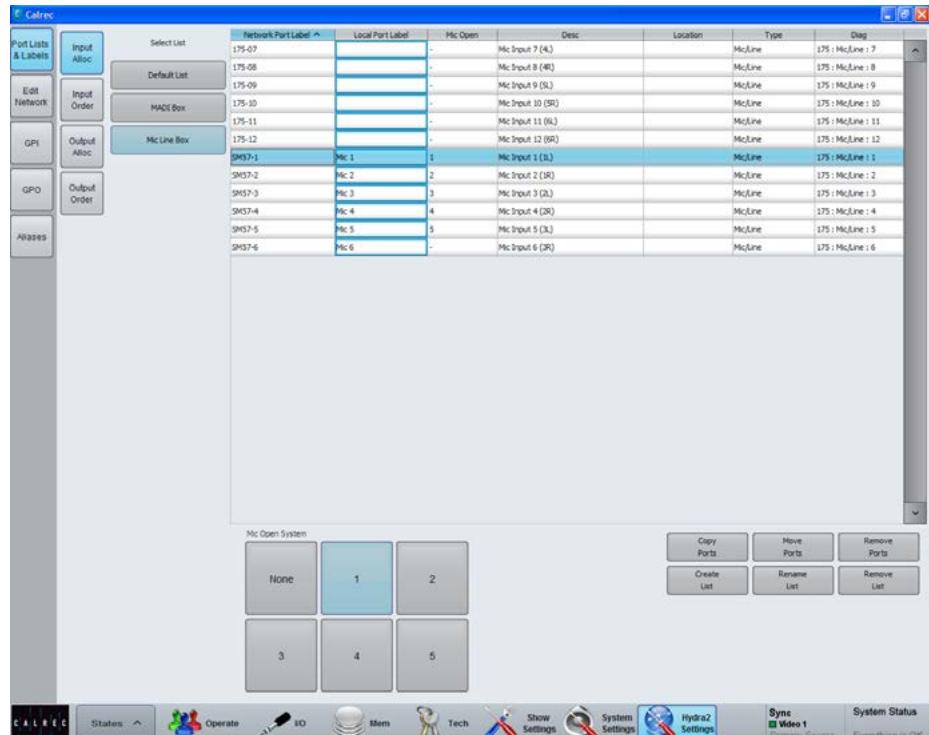
Note, the fader open trigger happens at -90dB and the fader close trigger happens at -95dB.

If a signal is routed to a console input via a hydra2 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.

Mic open systems are console-wide and so do not split in line with user splits.

FIG 1 - ASSIGNING A MIC OPEN SYSTEM



Assigning Inputs to Mic Open Systems

To allocate an input port to any of the 5 Mic Open Systems, select : **>Hydra2 Settings>Port Lists & Labels>Input Alloc** as shown in Fig 1.

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:

>[Hydra2 Settings>Aliases>Input Files](#)
and then the Alias Mic Bus 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:

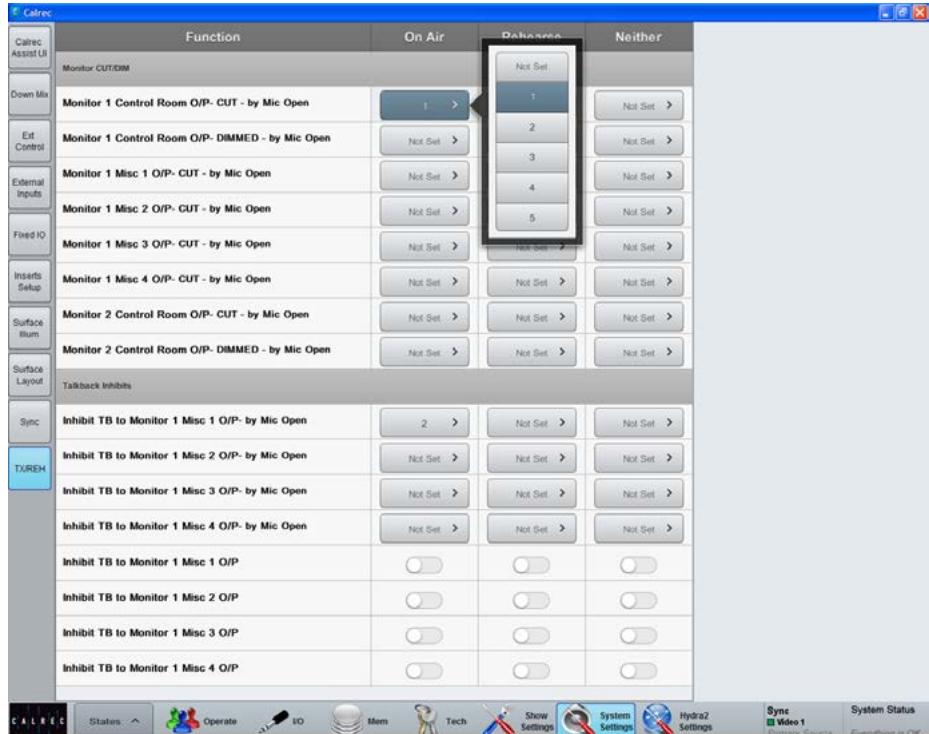
>[Hydra2 Settings>GPO>Functions](#)
>[GPO Functions>General Functions](#).

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 190 for more information.

Assigning to CUT/DIM Loud Speakers

Mic open systems can be assigned to CUT or DIM the various loudspeakers connected to the console or inhibit talkback routing to any of Monitor 1 misc outputs.

FIG 2 - MIC OPEN SYSTEM MONITOR CONTROLS



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 >[System Settings>TX/REH](#). The table in the main window as shown in Fig 2, lists the various CUT/DIM and talkback inhibit 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 Loudspeaker CUT/DIM.

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.

AUTOMATION OPTION

From V7.0 Apollo and Artemis have Dynamic Automation available as an option. The Calrec Automation system is designed to record, playback and edit the movements of console controls in real time.

The Calrec Automation System is supplied as a 3RU controller, which communicates using two ethernet ports connected to the Primary and Secondary Control cards of the console, to provide a redundant Automation interface.

Real Time Automation operates while timecode is running, and allows the user to record control adjustments made while listening to the audio. Note that this depends on the presence of timecode, the user must ensure that it is properly synchronised with the recording and/or sequencing units, before automation can be used.

An important aspect of this automation system is to be "user transparent" as far as possible during a Show or 'On-Air' live broadcast production, whilst the automation "first pass" is being recorded.

This is achieved by hiding the Automation controls from the user with a single button once the show is underway, the system records console control adjustments in the background leaving the user free to concentrate on the production.

Once the "first pass" is made and the Show or 'On-Air' live broadcast complete, the user can access the Automation with a single button and all the automation controls are made visible on the console surface.

The user can then locate to any part of the Show or Broadcast, replay the recording and make control adjustments to the audio using exactly the same controls on the console surface or alternatively save the Show's console setup, Automation data and Audio recording for Post Production purposes at a later date.

Spill Automation

The Calrec Automation System also allows the user to access, automate and edit individual 'Spill Legs' for Stereo and Multichannel Paths for all the parameters listed in the Automatable Controls List.

Editing Suite

The user can utilise the special on-screen editor, which displays the automation "events" which were made in real time, and lets the user edit the effect and the timing of each event. When used in conjunction with the console controls, this comprehensive set of editing tools make automating a mix-down or re-purposing the material for quick turnaround a simple process.

Redundancy

Like other Calrec Products the Calrec Automation system offers a redundancy mechanism, in this case between the Automation system and the Primary and Secondary control processors on the Calrec console, to ensure that recording continues in the event of a control processor failure.

External Machine Control

The Calrec Automation System Controller provides a number of external interfaces to connect with 3rd Party equipment, including 9-Pin RS422 used for Machine Control and a Video Sync reference to ensure that the Automation data is truly locked to the External Media.

The 9-Pin may be used directly with a single machine or via a 3rd Party synchroniser to provide multi machine control.

If you require this option, please contact your regional Calrec distributor. Customers within the UK or Ireland should contact Calrec directly.

Automatable Controls List

- Faders and Cuts for :- Inputs, Groups, Aux Outputs, Track Outputs Main Outputs and VCA Masters.
- Input 1/2 switch, Insert IN/OUT, Input 1 & 2 Balance (ST only), Input Width (ST only),
- Equaliser Bands 1-6 Set A with :- IN, Response type, Gain, Q & Frequency for Inputs, Groups & Mains.
- Equaliser Bands 1-6 Set B with :- IN, Response type, Gain, Q & Frequency for Inputs, Groups & Mains.
- Equaliser A-B Switch and Reset.
- Dynamics SideChain Eq Bands 1-2 with:- IN, Response type , Gain, Q & Frequency for Inputs, Groups & Mains.
- Dynamics 1 & 2 Compressor /Limiter with :- IN, Threshold, Attack, Recovery, Ratio & Make-up Gain for Inputs, Groups & Mains.
- Dynamics 1 Expander & Gate with:- IN, Threshold, Attack, Recovery, Ratio, Depth, GATE switch and Gate Delay for Inputs, Groups & Mains.
- Pan to Mains and Groups with:- Front Pan & IN, Rear Pan & IN, Front-Rear Pan & In, Front Div & IN, Front LCR-LR Switch, C Only Switch. LFE Gain & ON, Non-LFE Gain & ON, either via rotary controls or Joystick.
- Auxiliaries up to 48 with:- Send Gain per path, Send Pan & IN per ST path.
- Tracks up to 96 with:- A,B,C & D Send Gains per path and Send Pan & IN per Odd / Even pair.
- Direct Outputs 1-4 Gain.
- External Cuts generated by GPI.
- External Levels generated by CSCP.

REMOTE PRODUCTION RP1 OPTION

From V8.0 Apollo and Artemis have the ability to act as 'Host Consoles' for the RP1 remote production unit.

The RP1 remote production unit is designed to be a self-contained compact mixing console without a control surface.

RP1 gives you the power to manage I/O and create zero-latency monitor mixes at venues all over the world, all from the comfort and familiarity of the Calrec console at the host production facility over long distance using IP services. For an overview of remote production see the [Guide to remote production \(926-253\)](#) downloadable from the Calrec website.

Once the RP1 unit has been setup at the remote site using a Web browser interface called "Calrec Assist" it can be accessed and controlled from the surface of an Apollo or Artemis console at the host studio, either as a standalone system or as part of a Hydra2 network after it has been added as a 'Remote Network' in the host networks H2O application.

The operation and integration of the RP1 remote production unit with the Apollo and Artemis console range is the subject of a separate manual :-

[Remote Production RP1 System Manual \(926-222\)](#) downloadable from the Calrec website. In this manual, is a chapter called 'Operation Via Host Console' which shows how to setup and operate the RP1 remote production unit via a host console in this case an Apollo.

Function Table for Parameter Control of Remote Paths

Once the RP1 is connected, the Apollo and Artemis surfaces currently allow the user to control a range of functions for the 'Remote Faders' and 'Remote Aux Masters' from the host as shown in Fig 1.

The table is arranged as mono, stereo & 5.1 remote fader types and mono & stereo remote aux master types arranged in columns. Each of the rows across the table represent a different parameter that can be controlled from the host console.

In addition to the table, all the controls that are relevant to the RP1 remote faders and remote aux masters are available as wild controls.

FIG 1 - REMOTE PATH PARAMETER CONTROLS FROM HOST

Mono RP1 Fader	Stereo RP1 Fader	5.1 RP1 Fader	Mono RP1 Aux	Stereo RP1 Aux
Fader Level	Fader Level Master	Fader Level Master	Fader Level	Fader Level Master
Cut	Cut Master	Cut Master	Cut	Cut Master
	Spill Fader Levels For L&R	Spill Fader Levels For LR, C, Lfe & LsRs		Spill Fader Level For L & R
	Spill Cuts For L&R	Spill Cuts For LR, C, Lfe & LsRs		Spill Cut For L & R
		Downmix Fader Levels For LR, C, Lfe & LsRs		
On the Processing	Processing	Overview page		
IP Trim Level	IP Trim Level Master	IP Trim Level Master		
	Spill IP Trim Levels For L&R	Spill IP Trim Levels For LR, C, Lfe & LsRs		
IP1-IP2 Switch	IP1- IP2 Switch	IP1- IP2 Switch		
Link IP1 & IP2 Trims	Link IP1 & IP2 Trims	Link IP1 & IP2 Trims		
Polarity M	Polarity L&R			
	IP Bal/IN	IP Bal/In on LR & LsRs		
	L>B & R>B	L>B & R>B on LR & LsRs Spill Legs		
	MS Decode	MS Decode on LR & LsRs Spill Legs		
	ST Width/In	ST Width/In on LR & LsRs Spill Legs		
Mic Gain (Protected)	Mic Gain (Protected) Master	Mic Gain (Protected) Master		
48v (Protected)	48L&48R (Protected) Master			
	Spill Mic Gains (Protected) For L&R	Spill Mic Gains (Protected) For LR, C, Lfe & LsRs		
	Spill 48v (Protected) For L&R	Spill 48 L, 48R or 48v (Protected) For LR, C, Lfe & LsRs		
SRC (Protected) AES	SRCL&SRCR (Protected) Master			
	Spill SRC (Protected) For L&R	Spill SRC, SRCL, SRCR (Protected) For LR, C, Lfe & LsRs		
On the Sends &	Routes page for	RP1 Aux Sends	1-12 from	each RP1 fader
RP1 Aux Send Level	RP1 Aux Send Level Master	RP1 Aux Send Level Master		
RP1 Aux Send On/Off or Route on TFT	RP1 Aux Send On/Off Master or Route Master on TFT	RP1 Aux Send On/Off Master or Route Master on TFT		
RP1 Aux Send Pre-Fader/Post in Focus Window	RP1 Aux Send Pre-Fader/Post Master in Focus Window	RP1 Aux Send Pre-Fader/Post Master in Focus Window		
	*RP1 Spill Aux Sends Levels, On/Off & Pre/Post	*RP1 Spill Aux Sends Levels, On/Off & Pre/Post	*Note these are now Aux Sends	as yet undefined, are Masters only
RP1 Stereo Aux Send Pan Position/In	RP1 Stereo Aux Send Pan Position/In Master			
	RP1 Spill to Stereo Aux Send Pan Positions/In For L&R	RP1 Spill to Stereo Aux Send Pan Positions/In For LR, C, Lfe & LsRs		
On the Strips	IP subpage	for each Remote	RP1 Fader	
IP1/2 Trim Level	IP1/2 Trim Level Master	IP1/2 Trim Level Master		
Mic Gain	Mic Gain Master	Mic Gain Master		
Polarity M	Polarity L&R			
	Stereo Width			
	IP1/2 Bal			
IP2 button	IP2 button	IP2 button		
	more IP (Artemis) when active swaps IP1/2 Bal and Stereo Width controls			
On the Strips	Aux 1-12 subpage	for each Remote	RP1 Fader	
RP1 Aux Send Level	RP1 Aux Send Level Master	RP1 Aux Send Level Master		
RP1 Aux Send On/Off	RP1 Aux Send On/Off Master	RP1 Aux Send On/Off Master		
RP1 Aux bank buttons	RP1 Aux bank buttons	RP1 Aux bank buttons		

APOLLO **SYSTEM STATUS**

SYSTEM STATUS

Apollo features System Status which reports warnings, faults and information to the user.

System status monitors all system components and connections.

System status notifications

Under normal operating circumstances, the system status 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 colour depending on whether there is information, a warning or an error message to be viewed. Touching this notification area will bring up the system status screen as shown in Fig 1.

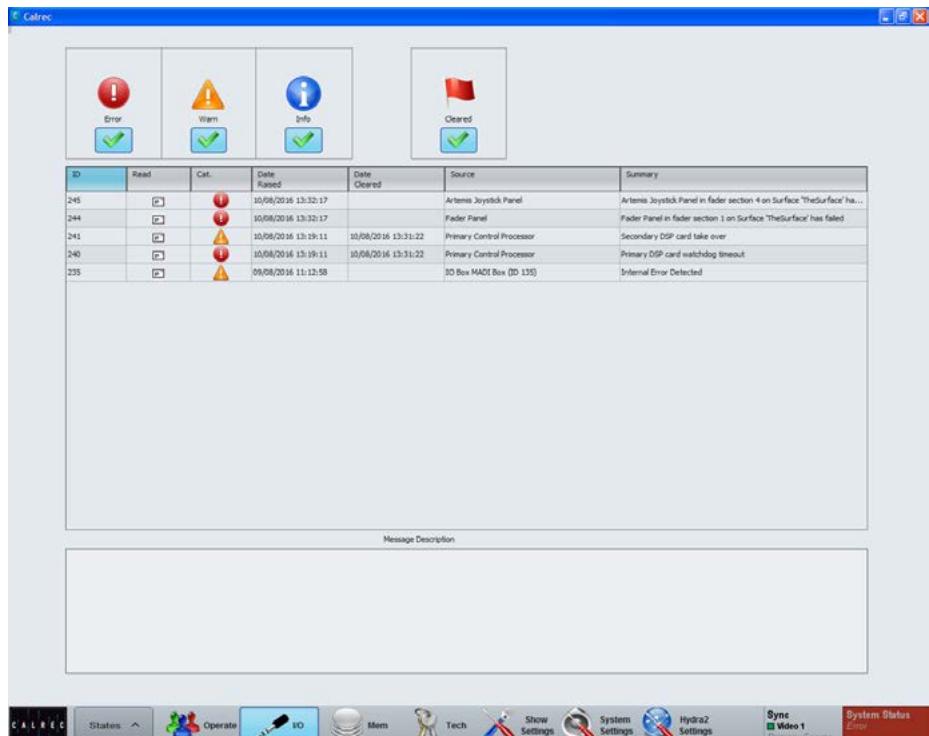
Message types

Three types of message are reported by system status:

- 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 Fig 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.

FIG 1 - SYSTEM STATUS SCREEN



Selecting a message in the list will update the MESSAGE DESCRIPTION area below to show the message in greater detail.

Status messages at different sample rates

Messages are produced for I/O boxes and Hydra2 Patchbays that are in the required list but are not at the same sample rate as the desk.

Clearing messages

Information messages can be cleared by selecting them and then leaving the system status 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

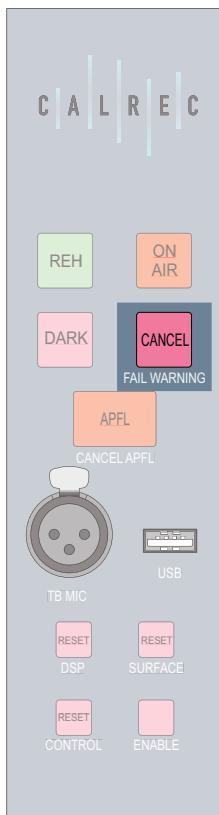
In addition to the main application displaying a system status indicator when a message is created, the FAIL WARNING button on the broadcast facilities panel will also flash. This is shown in Fig 2. Pressing this button when it is flashing will cause it to stop flashing and remain illuminated. This will 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, see "GPIO" on page 190.

FIG 2 - SURFACE FAIL WARNING



Intermittent Cable Failures

If intermittent cable failures exist on the system, the System Status screen now displays these as new messages and when the user clicks on the message, a 30 second timer starts which automatically clears the intermittent error from the message list.

Source Offline indication on a path

In the Assign display if the source assigned to that fader is taken offline this is indicated by means of a Red exclamation mark as shown in Fig. 3 below.

The display shows that both sources for the A and B paths are offline.

FIG 3. - SOURCE OFFLINE INDICATION



APOLLO

GLOSSARY OF TERMINOLOGY

ADC (Analogue to Digital Conversion)

The process by which continuous analogue 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 dependent 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. Auxs 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.

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.

Bluefin2

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.

Bus 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.

Calrec Assist

This is a web browser application which when connected to a console, allows an alternative control interface which works in parallel.

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 touchscreen 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 Analogue Conversion)

The reverse of ADC. The digital representation of a signal is converted back into a continuous analogue 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 centre 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.

Fader Panel

A panel containing a touchscreen TFT and multiple Cells and displays. The function of this panel can be altered during operation of the surface.

Fader Touchscreen

The TFT touchscreen display located in a fader panel. Provides flexible options for displaying and controlling information directly through touch.

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 of information over copper or fibre 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 Hydra2 I/O boxes

Group Bus

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. Buses can be patched to physical outputs and have full EQ and dynamics processing. For a non-summing group see VCA Groups.

Host Console

A Host console is one which is configured to act as a remote controller for RP1 units.

Hydra2

An audio networking system which links I/O boxes to one or many consoles over Gigabit Ethernet. Apollo is based around a Hydra2 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 fibre 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 Bus

When multiple signals are routed to a bus they are mixed together. This allows the combined signal to be processed, routed or have its 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 (AES 10) allows simple high density connectivity between different manufacturer's equipment. MADI is interfaced with an Apollo system via a Hydra2 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 Application

The touchscreen 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 Bus

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 touchscreen 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 Hydra2 I/O box. Ports can be of any form of analogue or digital I/O. In the case of analogue 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, auxs, 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 its 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.

Presets

Path presets allow you to save a complete copy of all a path's parameters. This preset can be recalled onto any other path at any time.

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.

Remote Aux Masters

When a RP1 unit is being controlled from a console, the RP1 Aux Masters can be mapped onto the console surface which act in parallel with the RP1 Aux Masters, these are called Remote Aux Masters.

Remote Faders

When a RP1 unit is being controlled from a console, the RP1 channel inputs are placed on the RP1 Faders. These faders can be mapped onto the console surface which act in parallel with the RP1 faders, these are called Remote Faders.

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'.

RP1

This is a Remote Production unit designed to be a self-contained compact mixing console without a control surface. Its purpose is to provide latency free mixing at a remote site for commentary mixes.

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 fibre connectivity. This allows units fitted with SFP sockets to be customised 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 synchronised 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 button cells, a row of control cells and 2 rows of touch cells. Along with the wild assign panel which has a button row and 3 rows of control cells, and a 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.

Strips mode

Strips mode arranges the wild assign panel controls and touchscreen into vertical strips with the same controls above each fader on a panel by panel basis.

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 Hydra2 input it is in the system and remains there until it is passed out of a Hydra2 output.

System Status

This system provides information and logs of any developing or occurring faults in the system.

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 touchscreen TFT and multiple cells and displays. The function of this panel can be altered during operation of the surface.

Wild Assign Touchscreen

The TFT touchscreen display located in a wild assign panel. Provides flexible options for displaying and controlling information directly through touch.

Wilds mode

Wilds mode allows the user to assign any combination of path controls to the rotary controls and buttons on any panel above each fader.

APOLLO FEATURES BY SOFTWARE VERSION

FEATURES BY SOFTWARE VERSION

The following summarises 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-track 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.
- Hydra2 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 (Hydra 2 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 main 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.
- System Status 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 (main 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.

V1.14.2

- 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 Hydra 2 sources.
- The current sync source is visible at all times in the main application footer.
- Group PFL and cut can be controlled remotely through GPIs.
- A new meter scale is available with markers and colour 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 dialogue.

- * 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 dialogue.
- 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 Hydra2 Patchbays.
- Dual router cores can now be used as slave routers.
- Support for MY5792 v2.08

V1.14.5

- CSCP override by fader touch
- Talkback to Misc. Monitors can be configured to dim or cut the Main LS output.

V1.14.6

- Each console core has a unique MAC for each control processor card allowing connection of several control processor cores to a LAN.

V1.14.7

- Look ahead limiter on Main bus outputs

V1.14.8

- SNMP agent can be configured to send System Status messaging to multiple SNMP servers for redundancy.

V1.16

- Auto promotion of slave routers.

V1.16.1

- The new Dante modular I/O card is now supported, providing an interface between Dante and Hydra 2 networks.
- New COM express-based control processors are now supported for Artemis Light systems due to obsolescence.

- Talkback to Misc Monitors can now be inhibited either fully or in conjunction with Mic Open systems.
- PFL overpress can now be disabled from the main application.
- DPP Live and DPP non-Live settings are now available for loudness meters.

V3.0 for New Concord Processors

- New Processing Mode for simplified access to Eq, Dyn, Automixers, Delay & AutoFaders.
- Refined Modes and Layers switching for simplified navigation.
- Presets, which are snapshots of a path's parameter settings, can be created, backed up and restored.
- New Wilds mode allows user to configure custom controls within the assign panels.
- Pre-v3.0 Wilds mode now known as Strips
- Patching screen redesigned to show connected destinations for each source.
- New Path Based AutoFader system with full control over delay duration and level for fade in and fade out.
- Multi-layer interrogate: allows user to see all contributing paths across layers.
- Spill controls can now access and control stereo signal's left and right legs independently.
- Additional Meter Scales for more regional requirements.
- Tone output available to output ports.
- EMBER control of input source settings.
- GPO available for triggering playout devices from fader open AND on.
- Mic/Line gain: display now shows highest and lowest value if the gain is not the same on all channel legs.
- Trim gain: display now shows highest and lowest value if the gain is not the same on all channel legs.
- New Waves Soundgrid modular I/O card available providing an interface between Waves Soundgrid Plug in Server and Hydra 2.
- Allows creation of Input Aliases for Hydra2 Patchbays.
- User Logging.

V4.0

- Send Levels on Faders, surface faders can now show their send level to a selected Aux, instead of their usual path level, allowing Aux mixes to be easily produced.
- Routing and Reverse routing reworked, now known as Contribution Mode with improved routing indication and handling of individual legs belonging to multichannel paths.
- When viewing contribution to an Aux, Track or Group, user can automatically AFL the selected bus.
- User can change the default send position for all paths routable to Mix Minus and Aux buses.
- Surface Display improvements:- Touching a fader highlights the relevant upstand meter.
Current assign upstand meter highlights in blue to match the fader display and indicator LED.
Undefined buses are no longer displayed.
Artemis now displays 16 Auxs in the Sends-Routes page rather than 8 to match Apollo.
Fader displays indicate when connected source is offline.
- Admin protection for bus widths, Admin users can prevent the width of each bus output from being changed by regular users.

V4.0.1

- Restricted H2O User Account -H2O previously only provided an "Admin" account. There is now a "User" account which provides limited access to a small range of H2O functions.
- The following functions are available to the H2O User account:
Full access to the "Port Patching" screen, including:
Patching sources to destinations
Control of source settings
Mic Gain / 48V and AES3 SRC)
Creating and recalling Salvos
Control of source settings from the "I/O Box and Port Labels" screen
Read-only access to all remaining H2O screens and functions.

V6.0

- Patching Shortcut - Shortcuts have been built into the Apollo and Artemis surfaces and the main application, which dramatically speed up patching workflow.
- Ember+ GPIO - adds 256 Virtual GPIOs and GPOs, available over the Ember+ protocol. Virtual GPIO can control and respond to all functions that have been available to traditional physical GPIO.
- Receive External Source Labels via SW-P-08 - Apollo and Artemis can now receive and display external labels over SW-P-08.
- Path labelling has been improved providing consistency across all path widths and types. There is a hierarchy of labels available: from system defined default labels, through network level user labels, all the way up to user defined path labels.
- The fader setup screen now follows fader access on the surface, just like the patching screen.
- Changes to Show data structures on Apollo and Artemis - this data structure has changed, and each show now contains its own meter layout and its own user split configuration.
- Meter Presets - the user can now export a show's meter layout into a Meter Layout Preset for use with other shows.
- Changes to the Show backup format on Apollo and Artemis - Each show backup, is now contained in its own file, with a ".CalrecShow" extension.
- Changes to the location of screens in the Apollo & Artemis main application - For a long time, the Apollo and Artemis main application has grouped functions under the top-level menu items "Other Options" and "Fixed Options". These titles have been changed to "Show Settings" and "System Settings" respectively. The screens contained under each of these top-level menus have been moved and in some cases renamed to make them easier to find.

See "[Changes to Screen Locations in the Main Application from V6.0](#)" on page 14.

V7.0

- Auxes and Tracks Can Be Assigned to Faders - the user can now assign Aux and Track buses to faders, in the same way as Channels, Groups, and Mains.
- Improvements to the Memory Isolate System - Mains, Auxes, and Tracks can now be isolated in the same way as Channels and Groups.
- When a bus is patched to a destination, and that destination is isolated, the width of the relevant bus is also isolated. Conversely, and if appropriate, when a bus is isolated, all the destinations to which it is connected can also be isolated automatically.
- Support for Monitoring Immersive Signals from an External Source- a new option "Immersive Monitoring" is now available in ">Show Settings >General Settings" screen of the main application. When this option is enabled, the Misc LS 1 output in Monitor System 1 is linked to the Main LS output, allowing external 5.1.2 or 5.1.4 signals to be easily monitored.
- Calrec Automation System Option, for recording, replaying, and editing of control data for mixes.
- Support for AoIP box, for direct integration with a range of IP networks.
- Support for H2Hub, allowing multiple remote I/O boxes to be consolidated onto a single, larger Hydra2 link.
- Support for SW-P-08 Extended tally dump
- Long fader labels are no longer truncated with an ellipsis in the fader displays, allowing for more of the label to be visible
- The number prefix for bus labels on the upstand meters has been shortened to allow more of the label to be visible
- Improvements to the handling of VCA slave faders at low levels when the master is below 0 dB.
- Improvements to the SNMP system.

V8.0

- Support for RP1- RP1 provides a powerful solution for remote, or at-home, productions. RP1 gives you the power to manage I/O and create zero-latency monitor mixes at venues all over the world, all from the comfort and familiarity of the Calrec console at the host production facility. The Apollo and Artemis Consoles can host multiple RP1 units allowing remote production control. RP1 also features a convenient HTML interface called Calrec Assist, accessible from any PC with a browser. You can use this to set up, configure, control, or diagnose RP1 even when you're not next to a console.

- 96 kHz Operation

Apollo & Artemis consoles can now work at 96 kHz, switching between 48 kHz & 96 kHz working as required. Consoles switch sampling frequency by loading a show at the required sample rate. The amount of channel and bus resources is reduced when working at 96 kHz but the numbers at 48 kHz remain the same as always. There is no reduction in monitor inputs and outputs at 96 kHz, or any reduction in path processing capabilities.

- I/O boxes can be set to work at 48 kHz or 96 kHz, or to follow the sample rate of a specific console as it changes rates. The Hydra2 network supports 48 kHz & 96 kHz consoles and I/O boxes simultaneously.

- Support for third party Hydra2 Products- support for third party products with Hydra2 interfaces, such as the Evertz 7800EMR-HYDRA2 TDM to Hydra2 Bidirectional Interface Module and the TSL MPA1-Mix/Solo-HYDRA2.

- Protection against accidental removal of multiple connected destinations in the patching screen.
- Pressing the access button to route a path in contribution mode will no longer cause the accessed path to change. Paths can be accessed in contribution mode by holding an access button for half a second.

- Sidechain' Independence renamed to 'Gain Reduction' independence.

- Improved visibility of intermittent cable failures.
- Access buttons respond correctly on changing layers using All A or All B.

V8.1

- Support for AD6365 Transformer Isolated Mic/Line modular I/O card.

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