



Networked Audio Production System

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SUMMA

PRODUCT INFORMATION

INFORMATION

Should you require any technical assistance with your Calrec product 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.

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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 e-mail to all customers.

Calrec after sales support includes:

- Free of charge comprehensive technical advice and support by phone and e-mail
- Repairs
- Quick supply of replacement or loan hardware in the event of a failure
- Provision of export documentation for the return of faulty parts
- Operational training
- Maintenance / technical training
- Supply of replacement components
- Supply of documentation
- Service contracts

We offer a range support contracts which can be arranged directly through Calrec for UK and Ireland customers or by contacting your local agent. We offer 24/7 telephone support, regular health checks and extended warranty, amongst other benefits. Please contact our customer support team for more information on support contracts.

Product Warranty

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

Repairs

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

Standard of Service

We strive to ensure the highest possible standards. 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.

Whenever you contact Calrec Customer Support please have the following information to hand:

- Name
- Company
- Email address
- Full details of enquiry (e.g. fault report)
- Serial number of faulty hardware (if applicable)

Once this information has been provided, a service ticket will be created to log your enquiry. The service ticket reference number will be given via email.

Serial Numbers

All units produced by Calrec are given a serial number and are booked into a central record system at the time of manufacture. These records are updated whenever a piece of hardware is dispatched to or received from a customer. When contacting Calrec Customer Support with a hardware inquiry it is important that the correct Calrec serial number is provided to enable the customer support team to provide a high level of service. Summa serial numbers can be found on the label on the rear of the chassis.

FIGURE 1 - LABEL ON REAR OF CHASSIS



After Sales Modifications

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

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

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

Installation

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

Service Personnel

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

Third Party Equipment

Integrating third party equipment into a Calrec system may compromise the product's ability to comply with the Class B radiated emission limits set in the 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.

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.

In the unlikely event of a customer having to carry out any re-soldering on Apollo, Artemis or Hydra2 hardware, it is imperative that lead-free solder is used; contaminating lead-free solder with leaded solder is likely to have an adverse effect on the long-term reliability of the product. Circuit boards assembled with lead-free solder can be identified (in accordance with IPC/JEDEC standards) by a small oval logo 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 and RAB registration, is the most comprehensive of the ISO9000 international standards. Granted in recognition of excellence across design, development, manufacture and after-sales support, the certification follows a rigorous and thorough review of Calrec's internal and external communication and business procedures.

FIGURE 2 - LEAD FREE



FIGURE 3 - LEAD FREE STICKER



FIGURE 4 - UKAS REGISTRATION



FIGURE 5 - ANAB 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 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.

The lightning flash with arrow head symbol within an equilateral triangle, as shown below, 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 below, is intended to prompt the user to refer to important operating or maintenance instructions in the documentation supplied with the product.

FIGURE 1 - DANGEROUS VOLTAGES

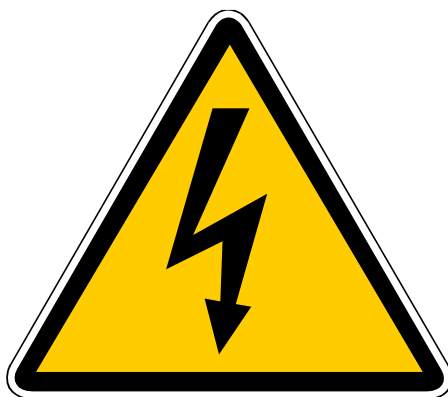


FIGURE 2 - IMPORTANT INFORMATION



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.

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.

SUMMA SYSTEM OVERVIEW

SURFACE OVERVIEW

The Summa surface is shown here in its smallest format, 12+8, which includes one 8 fader section with a large TFT touchscreen (touch display), and one 12 fader section with a large TFT display (meter display). Summa is available in two larger formats: 24+8 and 36+8. Each have the same 8 fader section with multiple 12 fader panels. All surface sections of the Summa are described in detail in the following pages.

FIGURE 1 - SUMMA 12+8 SURFACE

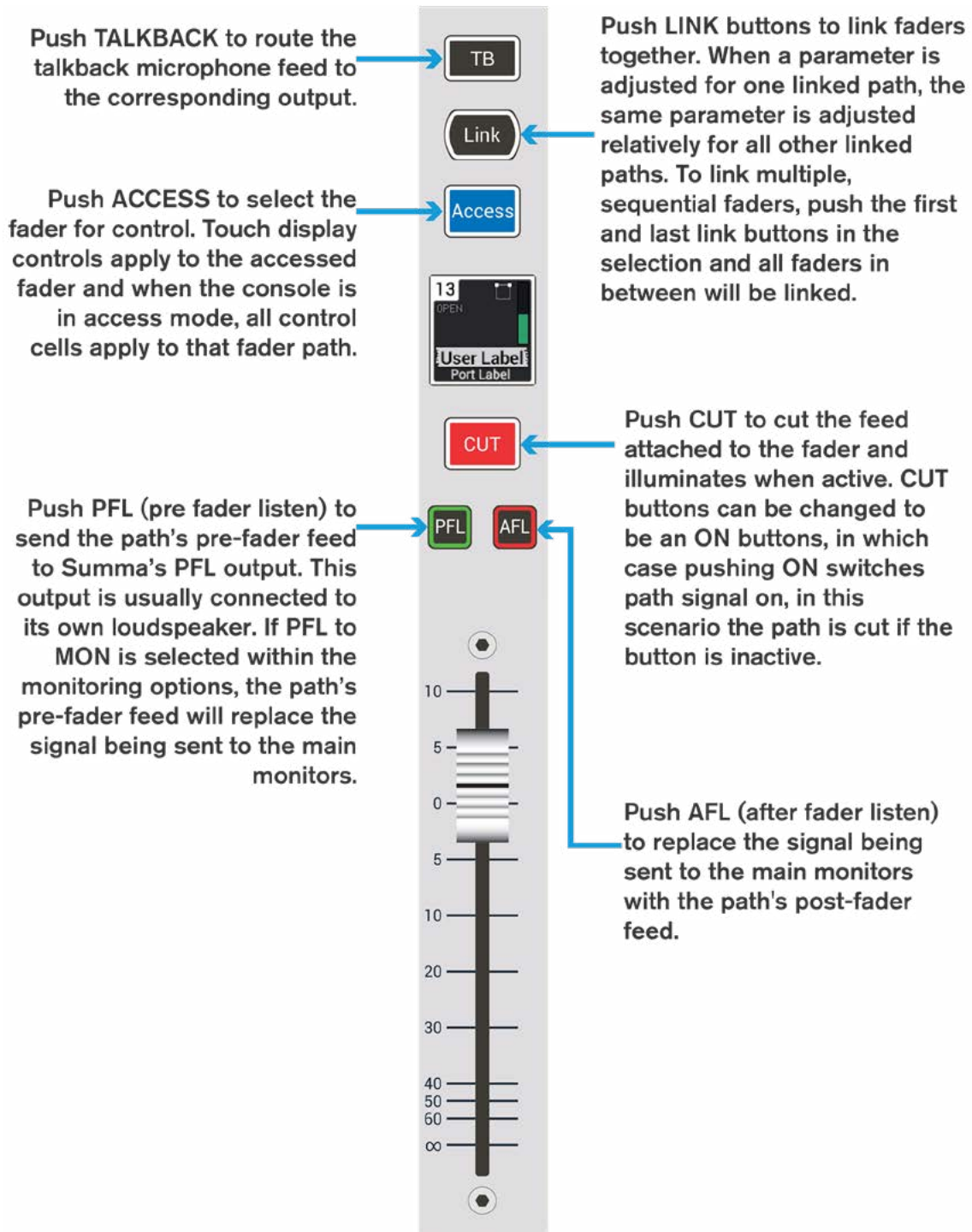


CONTROL SURFACE SECTIONS

Fader Strip

Each Summa 12 fader panel is made up of 12 fader strips, each combining a motorised fader, several push buttons and a small TFT fader display. The image below explains the operation of each button.

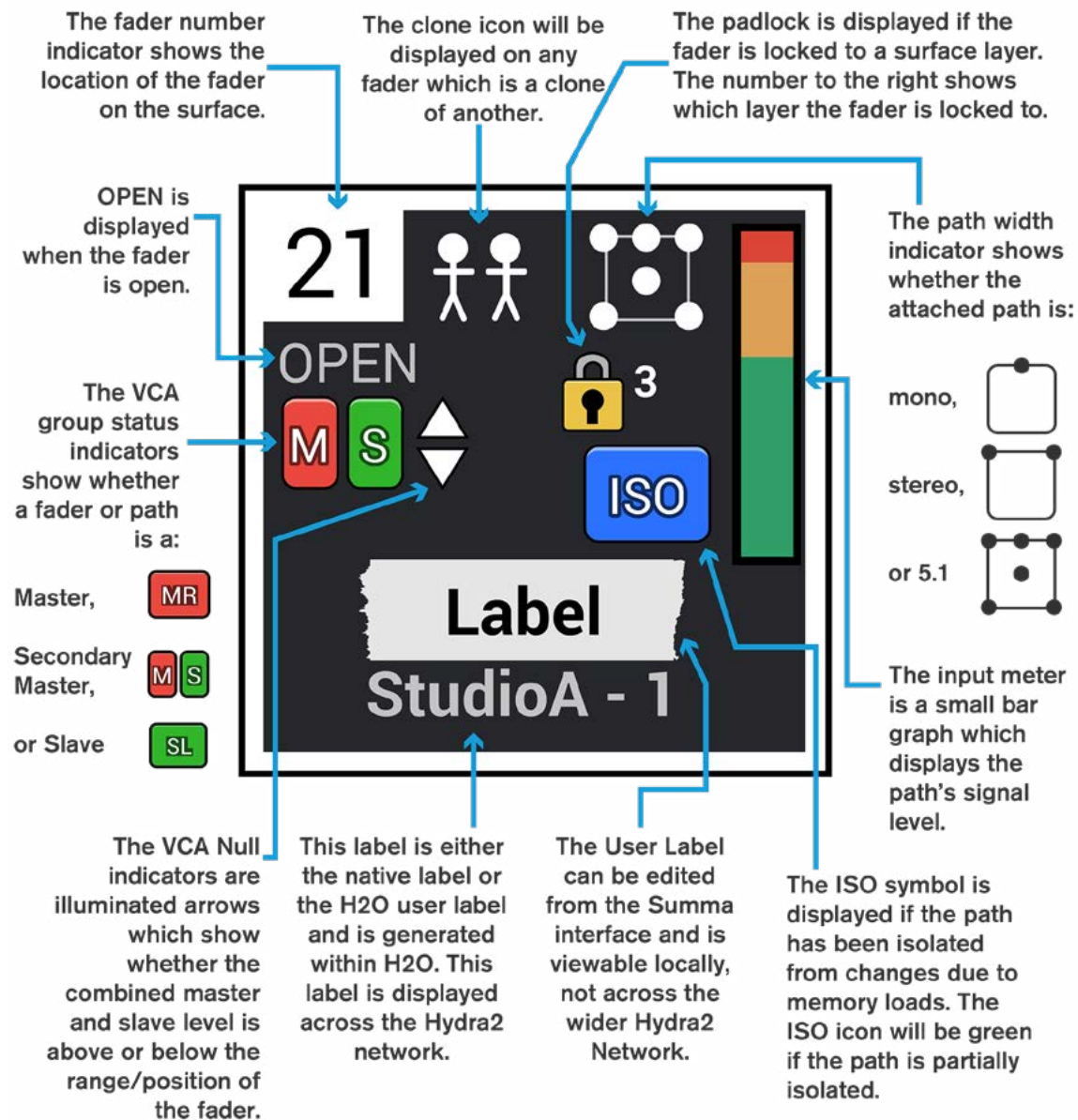
FIGURE 1 - FADER STRIP



Fader Display

Each fader strip includes a small TFT display. The image below highlights each icon which can appear on the display.

FIGURE 2 - FADER DISPLAY



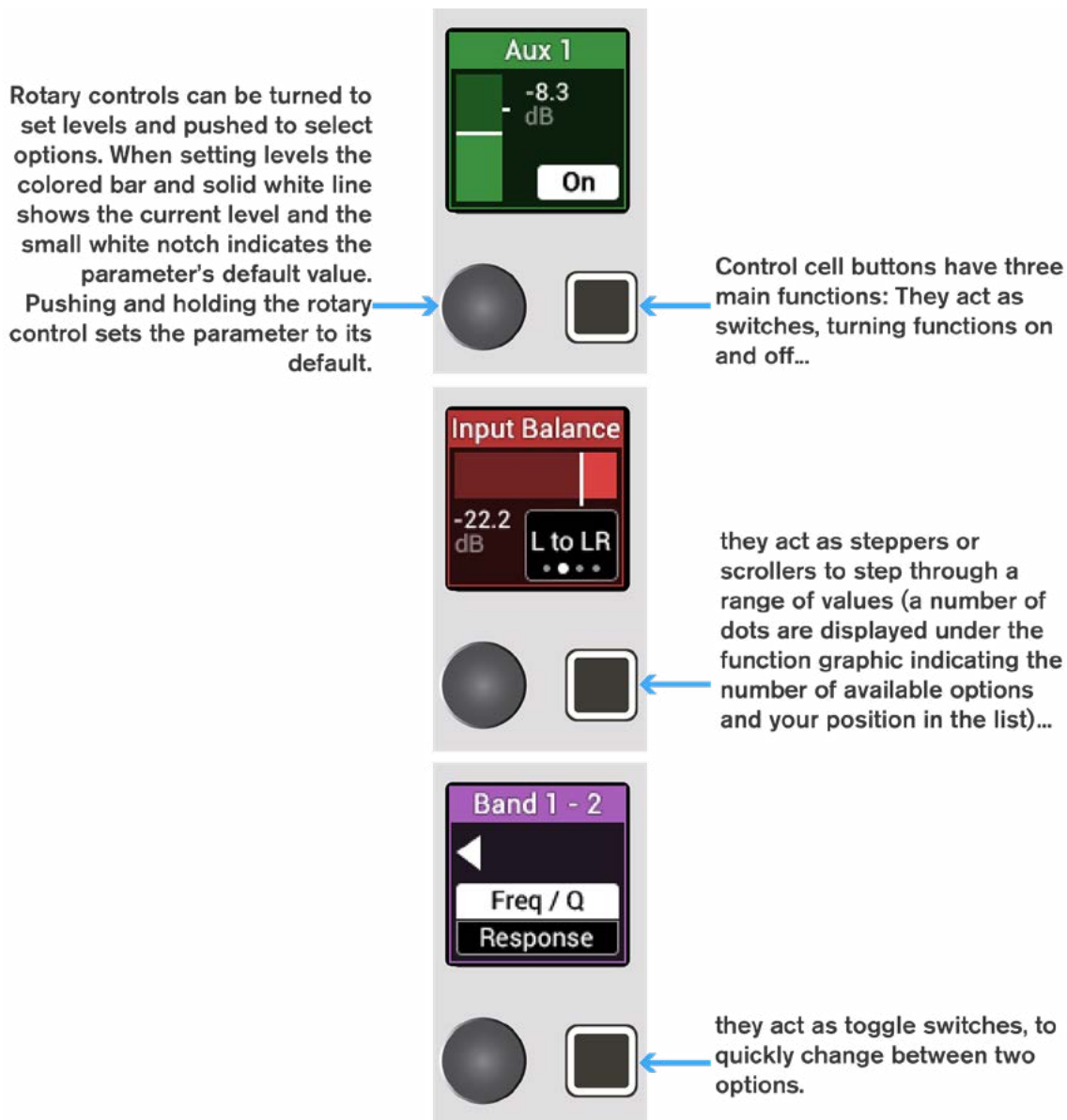
Control Cell

A control cell combines a small TFT display, an illuminating button and a rotary control. There are two control cells situated above each fader strip. The function of these control cells varies depending on which control mode you have selected.

In access mode, all control cells on the surface show EQ and dynamics controls for the currently accessed path.

In function-specific—strip—control modes, the control cells correspond to the faders below them, for example, in pan mode, each control cell operates the pan controls for the fader below.

FIGURE 3 - CONTROL CELL

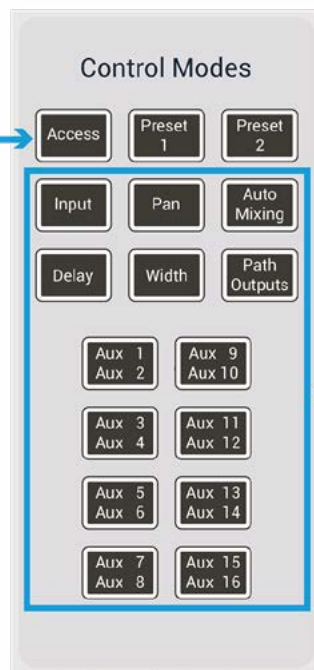


Control Modes

Control modes allow you to set how the control cells function across the surface. The two main styles of layout are the 'strip' modes, which are function-specific and follow a channel strip style layout (i.e. control cells are associated to the fader directly below them), and access mode, in which all control cells show dynamics and EQ controls for the currently accessed path. See ["Control Modes" on page 44](#) for more information.

FIGURE 4 - CONTROL MODES

The ACCESS control mode populates all control cells across the surface with parameter controls for EQ and dynamics for the currently accessed fader. When in ACCESS mode on a 12+8 Summa, the control cell above fader one reads "show EQ controls" and "show dynamics controls" allowing you to switch between the two. On larger format surfaces, dynamics and EQ parameters are available simultaneously.

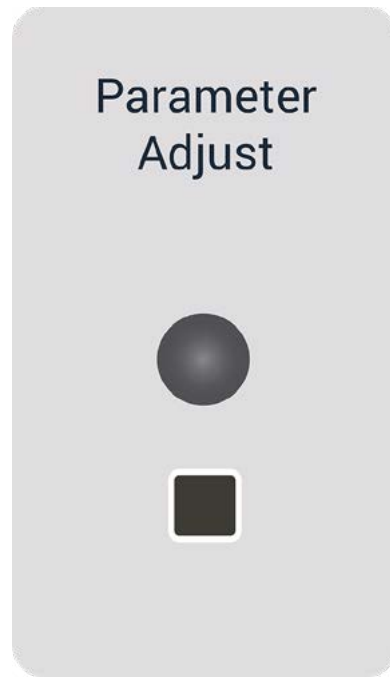


The buttons below the horizontal line set the surface into the various 'strip' control modes, i.e. control cells only apply to the fader directly below them. For example, selecting the PAN control mode assigns pan controls for each path to the control cells above the corresponding fader.

Parameter Adjust

The parameter adjust control combines a rotary control and a push button, and can be used to adjust all touch display controls—as you tap to select controls on the touch display they are automatically linked to the parameter adjust button and rotary control. Controls are mapped logically to the rotary control and button; switches and buttons on the touch display are attached to the physical button, and level controls and menu scrollers are attached to the rotary control.

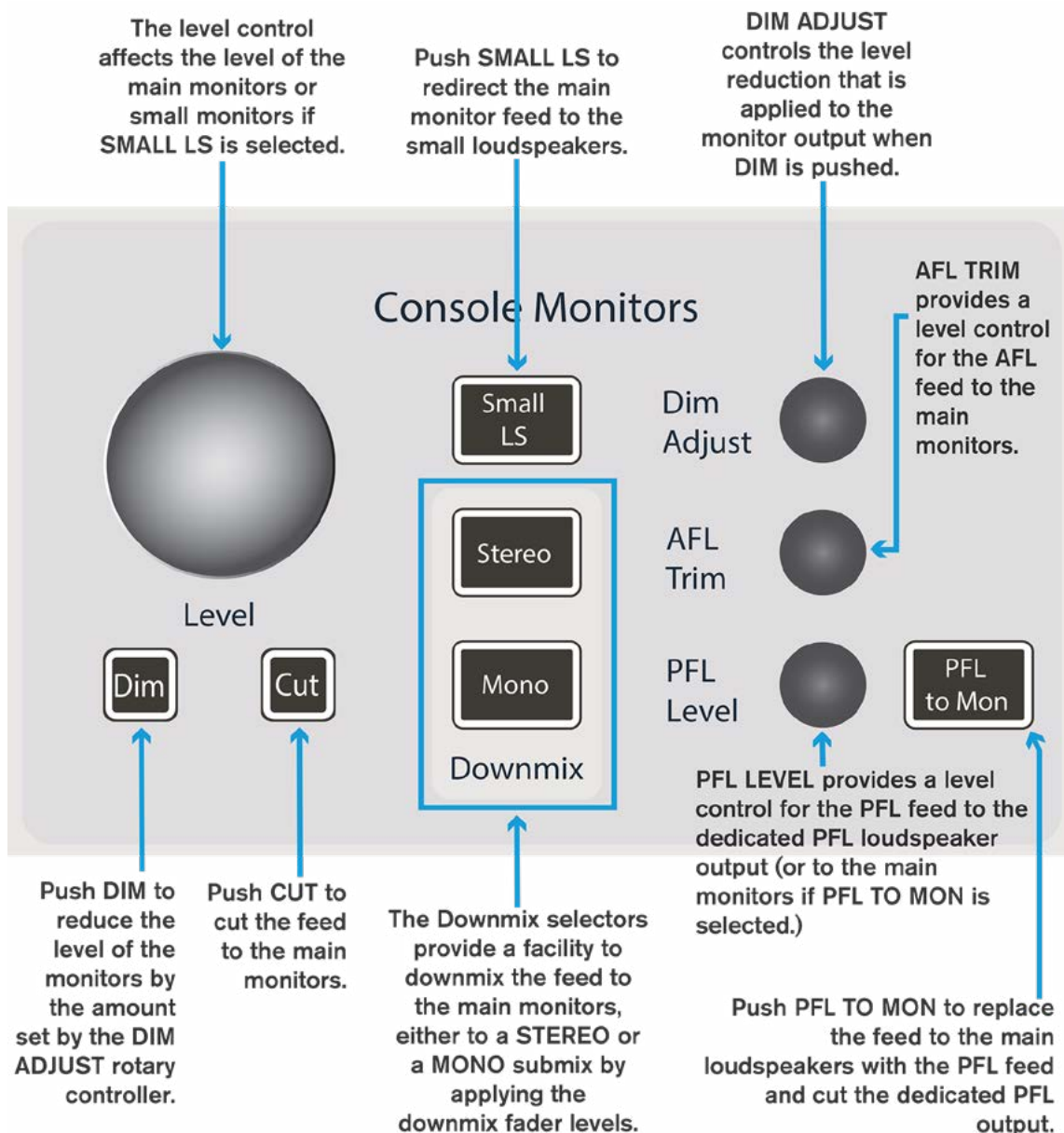
FIGURE 5 - PARAMETER ADJUST



Console Monitors

Two sets of loudspeakers can be fed from Summa's console monitor bus, one 'main' and one 'small' set. There is also provision for a separate loudspeaker for monitoring the console's PFL feed. The console monitors section of the surface allows control of all sets of loudspeakers. The image below explains each loudspeaker control in detail.

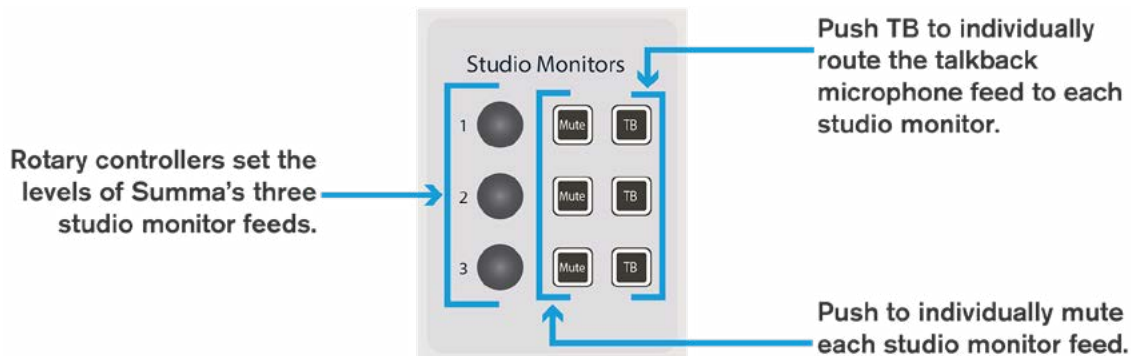
FIGURE 6 - CONSOLE MONITORS



Studio Monitors

Summa has three dedicated studio monitor feeds for relaying signals back to the studio floor. This section of the surface provides level, mute and talkback control for these feeds.

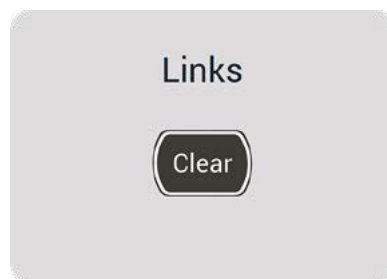
FIGURE 7 - STUDIO MONITORS



Linking Paths

When paths are linked, adjustments to the parameters of one linked path are also made for all other linked paths. Adjustments are made relatively across all paths, preserving any offsets. The **CLEAR** button, as shown here, provides a quick way to clear all path linking on the surface. See ["Control Linking" on page 135](#) for more information.

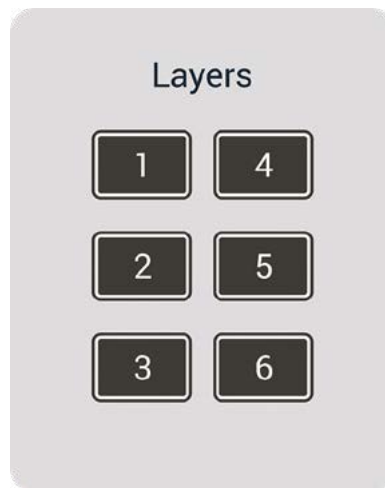
FIGURE 8 - LINK BUTTON



Surface Layers

The Summa surface has six layers in total, allowing fader-control of 6 times as many paths as there are faders on the surface. You can switch between layers using the layer selection buttons 1–6 on the surface. When selecting a layer, all fader positions, button states and control cell states change immediately to reflect faders on the newly selected layer.

FIGURE 9 - SURFACE LAYERS

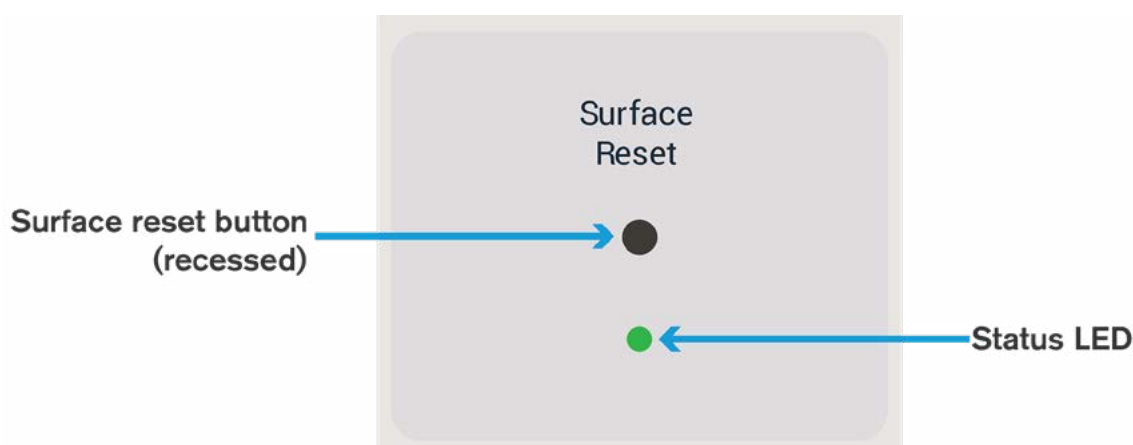


Surface Reset

The surface reset button is recessed to avoid it being pressed accidentally. If a reset is required a pointed implement should be used to push it. Two types of surface reset can be performed using the surface reset button:

- If a non-critical error occurs, such as a user interface crash or freeze, press the reset button and release within 5s. The surface will reboot from local memory which is stored on an internal SD card. The reset LED will flash green throughout.
- If a more serious error occurs, such as the surface not booting correctly or a corruption of the user interface, a full reprogram should be performed: Press and hold the reset button and release after 5s. The surface is reprogrammed from memory stored within the core processing rack. The LED will flash Red throughout.

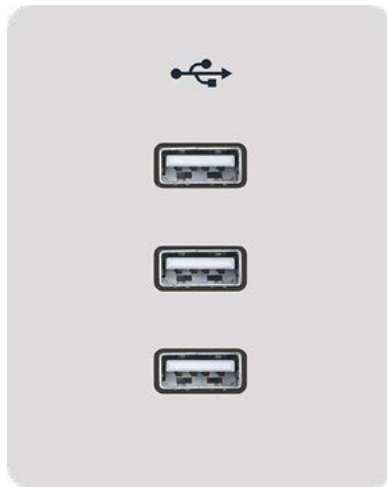
FIGURE 10 - SURFACE RESET



USB Ports

Summa's USB ports can be used to connect a QWERTY keyboard to the system.

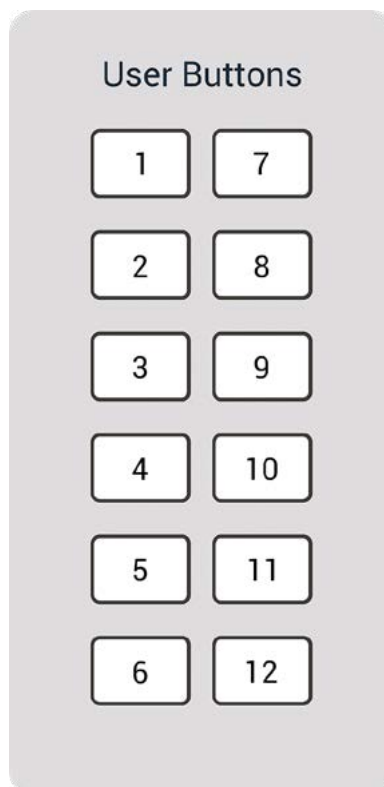
FIGURE 11 - USB PORTS



User Buttons

Summa's User Buttons can be used in conjunction with Hydra2 general purpose inputs and outputs (GPIO).
See ["General Purpose Inputs and Outputs" on page 170](#) for more information.

FIGURE 12 - USER BUTTONS



TOUCH INTERFACE

The touch display interface is simple and intuitive, using established finger gestures familiar from tablet computers and smartphones. The image on the following page should help you get familiar with the names used to describe various sections of Summa's touch interface.

Touch Display Views

There are three main views within the Summa Touch Display interface. The Active Show view provides access to operation screens and settings for the currently loaded Show. The Shows List provides access to the list of Shows stored on the Summa console, shows can be loaded, edited, saved and backed up here. System Settings provides access to Summa's settings that are stored outside the Show. These settings are still recalled in the event of a surface reset as they are stored within Summa's continuous memory. See "[Shows](#)" on page 64 and "[Memories](#)" on page 70 for more information.

DSP PROCESSING RESOURCES FOR SUMMA 180 / SUMMA 128

Signal Processing

	Summa
DSP Processing Paths	348 for 180 channels / 296 for 128 channels
Input Channels	180 / 128
Main Outputs	4 (mono, stereo or 5.1)
Audio Sub-Groups	8 (mono, stereo or 5.1)
Track Outputs	32 (mono or stereo)
Aux Outputs	16 (mono or stereo)
Direct Outputs	1 per Channel *
Mix Minus Outputs	1 per Channel*
Insert Sends & Returns	1 per Channel, Group, Main and Console Monitor Output
Auto Minus Bus	1
Off Air Conference Bus	1
External Monitor/Meter Inputs	152
VCA Groups	Unlimited
EQ	6-Band Parametric EQ on every Channel, Group, Main
Dynamics Processing	2 x Compressor/Limiter, Expander, Gate, Side Chain EQ/ Filters on every Channel, Group, Main
Input Delay	2.73 s per Channel from a pool of 128 blocks
Path Delay	2.73s for every path
Output Delay	2.73 s per Channel from a pool of 128 blocks

* from a pool of 188 resources shared between Direct outputs and Mix Minus Outputs

INPUTS, OUTPUTS AND BUSES

Path is a term used to represent a **DSP** process within the **Summa** system, which carries audio and enables it to be processed. **Paths** include channels, groups, mains, tracks and auxs.

All paths can be controlled by faders and channel paths must be attached to faders to exist.

Identifying Paths

Paths can be identified easily on the surface; they are colour-coded as follows:

Channels - white, **groups** - blue, **mains** - red, **tracks** - purple and **auxs** - green.

Inputs

Channel Inputs

- Channel input paths receive Hydra2 signals.
- Input signals can be patched directly to channels from I/O box input ports, Hydra patchbay outputs or directly from Summa's own output buses.
- Any signal present at an input port must be connected to a channel path before it can be processed and routed.

FIGURE 1 - INPUT SIGNAL FLOW – MONO CHANNEL

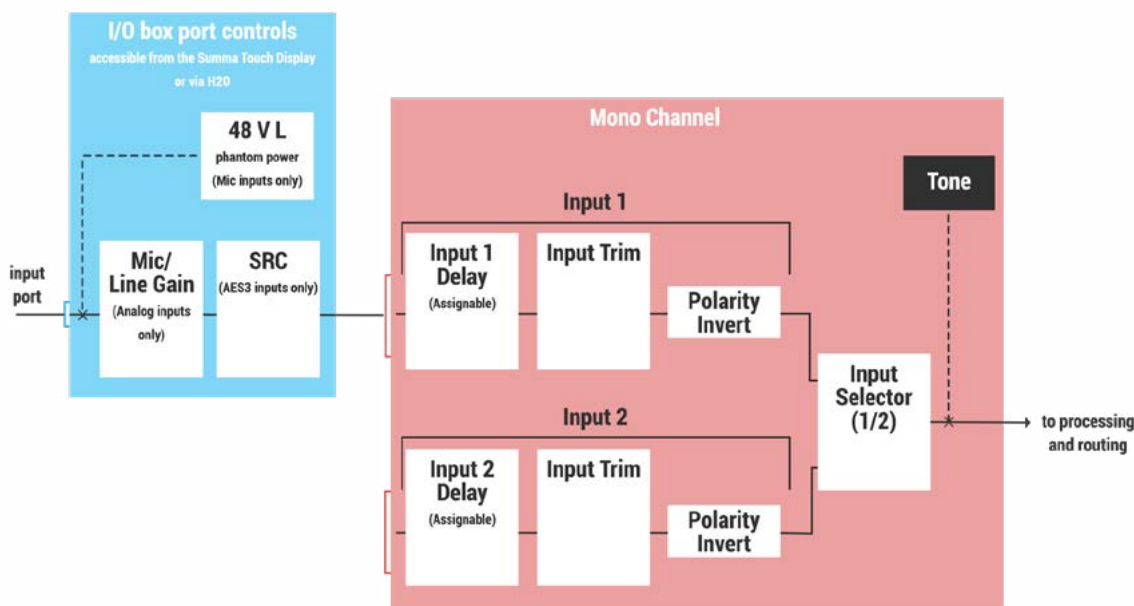
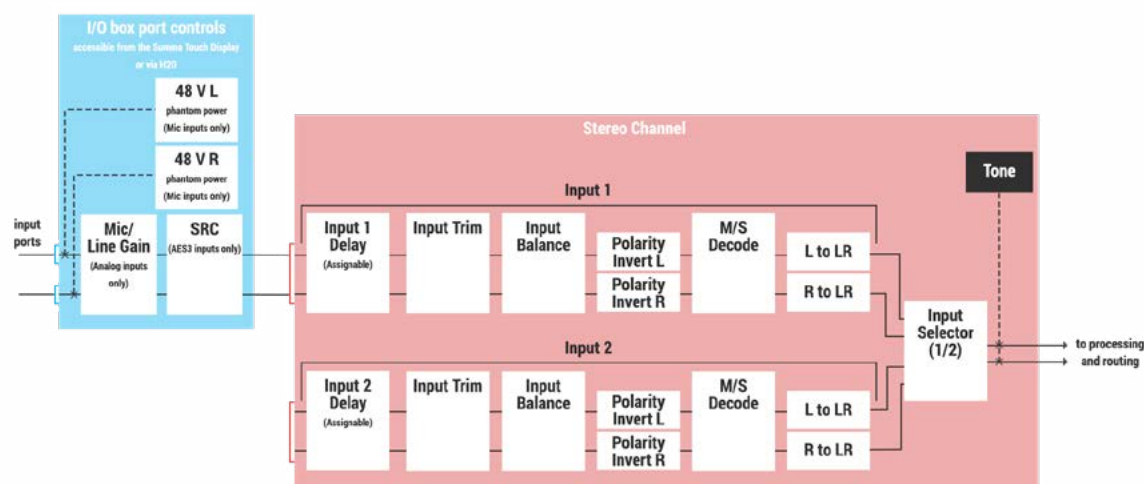


FIGURE 2 - INPUT SIGNAL FLOW – STEREO CHANNEL



External Inputs

- External inputs take signals into Summa from I/O box input ports, Hydra patchbay outputs or Summa's own output ports, and make them available for monitoring and metering.

External Tone Input

- Patching a third party tone generator to the external tone input allows the external tone to be used as the tone source across the console, rather than the internal oscillator.

Talkback Input

- Patching to the talkback input allows any microphone connected to any I/O box input port to be used as the talkback source. The built-in talkback microphone connects directly to Summa's back panel and must be connected to an I/O box input port and then patched to the talkback input in order to be used.

Buses

Groups

- Multiple channel Inputs can be sub-mixed by routing them to groups.
- Groups can be processed.
- Groups can be routed to any other output or bus.
- Groups are not available for patching.

AFL

- The after fader level signals from multiple paths can be sub-mixed by routing them to the AFL bus.
- When paths are AFL'd the console monitor feed is replaced by the AFL bus, providing a non-destructive solo.

PFL

- The pre fader level signals from multiple paths can be sub-mixed together by routing them to the PFL bus.
- Settings are available to output the PFL bus to its own dedicated loudspeaker, the small loudspeakers or the console monitors.

Output Listen

The output listen bus is used in a similar way to AFL although signals are routed to the output listen bus post output delay. Bus outputs can be routed to the output listen bus.

See [“PFL, AFL and Output Listen” on page 111](#) for more information.

Bus Outputs

Mains

- Multiple paths can be routed to mains. Mains can be routed to other mains.
- Mains are primarily used to feed transmission and/or recording devices.
- Mains are available for patching.

Tracks

- Multiple paths can be routed to tracks to create mixes.
- Each channel has one global send level control for all tracks sends.
- Tracks can be used in conjunction with mix minus outputs to create interruptable foldback feeds.
- Tracks cannot be routed to any other bus or output.
- Tracks are available for patching.

Aux Outputs

- Multiple mixes can be created by routing paths to auxs.
- Each channel has individual send level and position controls for each of the 16 Aux outputs.
- Auxs can be used in conjunction with mix minus outputs to create interruptable foldback feeds.
- Auxs can be controlled by logic functions to cut the pre fader send to each individual Aux, for controlling foldback feeds in on/off air situations.
- Auxs cannot be routed to any other bus/output.
- Auxs are available for patching.

Path Outputs

Mix Minus Outputs

- Each channel can have one mix minus output assigned to it, from a pool of 188 mono legs (shared with direct outputs), providing an easy way to create a mix for a contributor using any track or aux, or the dedicated auto minus bus. See [“Mix Minus” on page 155](#) for more information.

Direct Outputs

- Each channel can have one direct output assigned to it from a pool of 188 mono legs (shared with mix minus outputs) to make signals available for patching. Direct outputs can be pre EQ, pre fader or post fader.

Console Outputs

Monitor Outputs

- Each monitor output is available for patching to any I/O box output port which can, in turn, be connected to a loudspeaker.
- Monitor source controls are available from the touch display footer when in ‘active Show’ view allowing you to quickly change monitor sources.
- Summa has several monitor outputs available. For more detailed information see [“Monitoring” on page 105](#).

Meter Outputs

- Each of the four meter outputs are available for patching directly to I/O box output ports to feed external, third party meters.

Talkback Output

- The talkback output feed is provided to allow you to patch the talkback feed to a specific location.

Tone Output

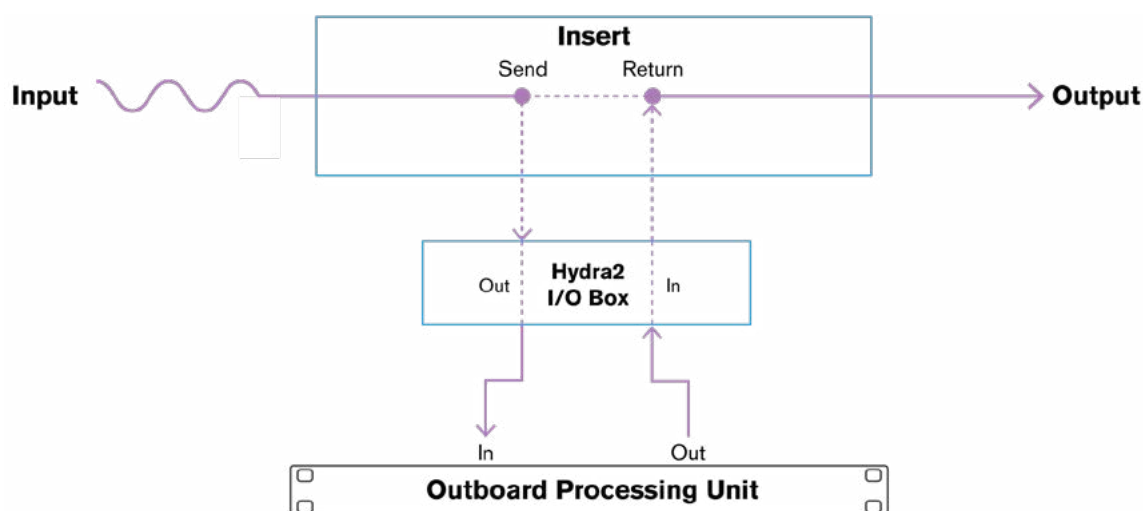
- As well as being routed to paths, tone can be hard-patched to an I/O box or Hydra patchbay output using the tone output.

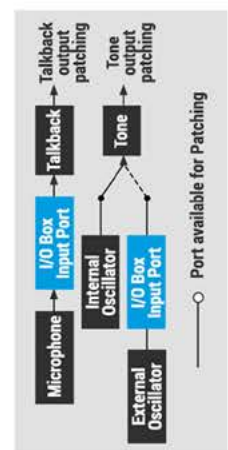
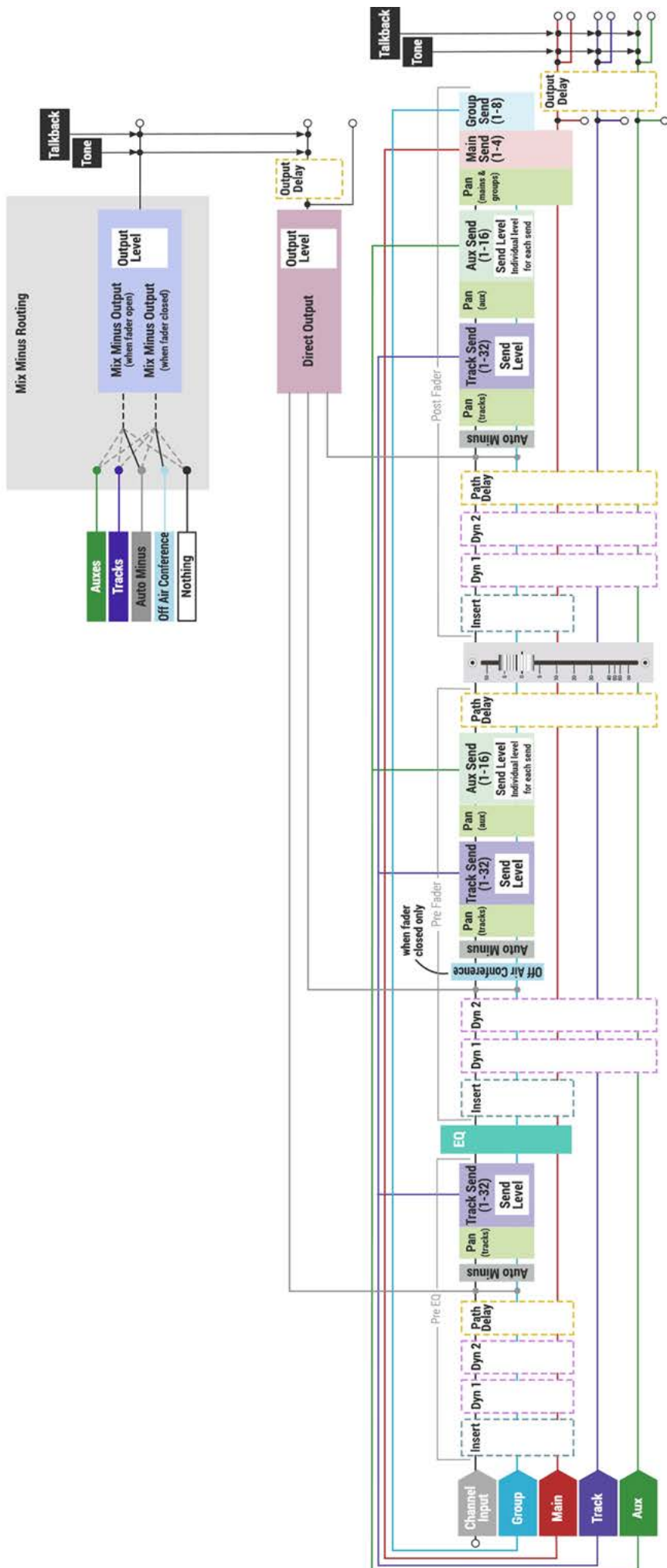
Inserts

- Inserts provide a quick way to insert third-party signal processing equipment into a system.
- Each insert has a send and a return, providing a convenient break in the signal chain.
- Insert sends and returns appear in the I/O patching screen from where they can be patched to I/O box ports for connection to external devices.
- Inserts are available for faders, mains, groups and console monitors.
- A fader insert is available for each fader on the surface. Anything inserted into a fader's insert affects the path currently attached to that fader. If the path is moved to a different fader, the insert will move along with it.
- Each insert has an individual 'IN/OUT' switch.
- Although mains and groups can be attached to faders and so fader inserts can be used, main and group inserts are also provided for processing these paths when they are not attached to faders.
- Monitor inserts are used to insert processing into monitor feeds.

See ["Inserts" on page 140](#) for more information

FIGURE 3 - INSERTS—GENERAL OPERATION





HYDRA PATCHBAYS

Hydra patchbays (HPBs) allow console users to make selected DSP audio outputs available across the Hydra2 network, allowing other Hydra2 users to access them, as well as allowing console input sources and output feeds to be changed remotely. Hydra patchbays are created from the H2O user interface. See the H2O user guide for more information.

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

When a source is patched to a Hydra patchbay input, it immediately becomes available at the corresponding Hydra patchbay output. For example, if a console user patches a direct output to a Hydra patchbay input, the direct output is available to all Hydra2 users (who have been granted access), in the form of the corresponding Hydra patchbay output.

Console Specific or Shared

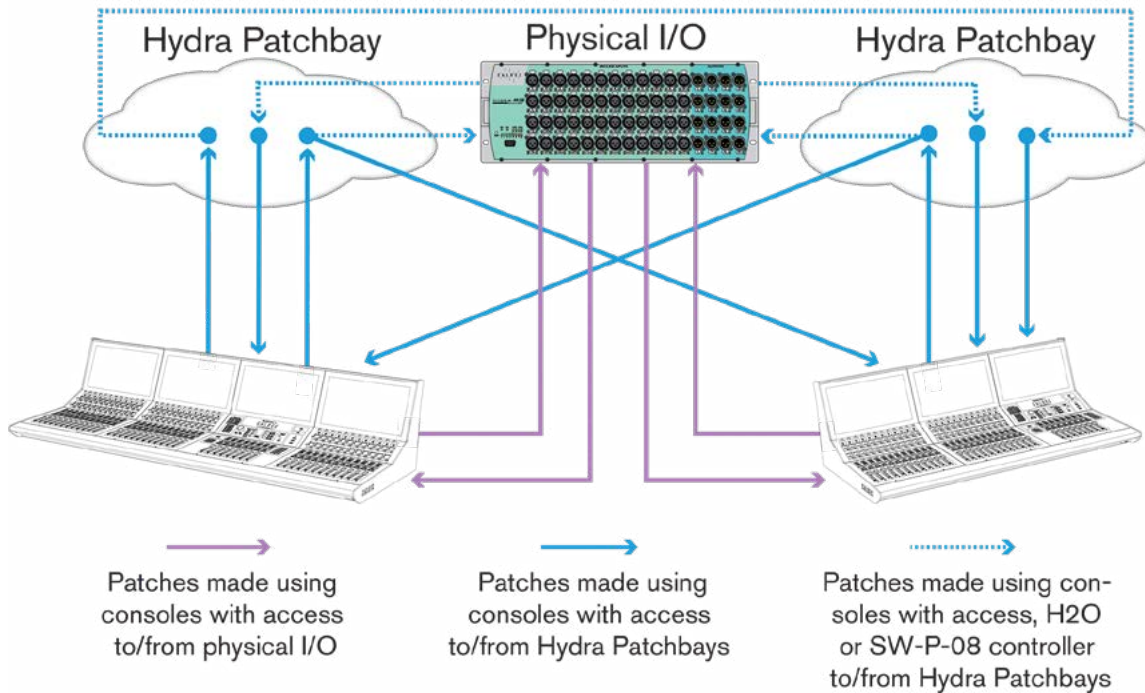
There are two types of HPB: 'console specific' and 'shared'. Console specific HPBs are available to H2O, 3rd party controllers (via SW-P-08) as well as the console that they have been created for. Shared HPBs are available to all Hydra2 users who have been granted access as well as H2O and 3rd party controllers (via SW-P-08). You can patch signals to your own, or shared Hydra patchbay inputs, in the same way as patching to physical output ports.

Remote Patching

HPBs allow network administrators (via H2O) to patch console inputs and outputs that have been patched to HPB ports to physical I/O ports. H2O users can choose physical input ports to connect to console HPB inputs, and physical output ports to connect to console HPB outputs, allowing them to choose and change console feeds and output destinations.

External routers, supporting the SW-P-08 protocol, can also access HPBs, enabling 3rd party control over console patching. Once created, HPBs can be made available for patching. They appear 'online' and can be added to the console's 'required list'. See ["Editing The Network" on page 62](#) for more information.

FIGURE 1 - HYDRA PATCHBAY OPERATION

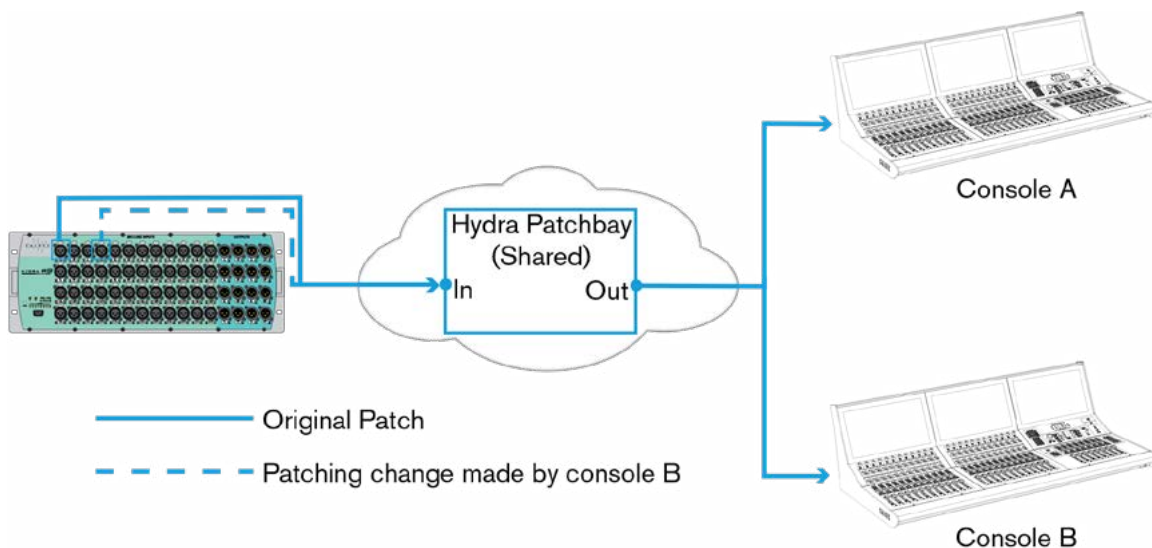


Port Sharing

Source and destination protection works as normal when dealing with HPBs for both console and H2O users. In situations when two or more consoles are using the same feed from a HPB it is possible for one console to change the patching of the other by changing the I/O box port which is feeding the shared Hydra patchbay input, either through a memory load, or through changing the individual patch. In these circumstances it is important that you understand the contents of the source and destination protection pop-up before accepting any changes, as these changes directly affect other network users.

To create a fully flexible system, you can change the source feeding an HPB, which is also feeding other consoles. However, we advise that all I/O box port to Hydra patchbay input patching is controlled from H2O or a third party controller to avoid unwanted changes to other consoles' source feeds.

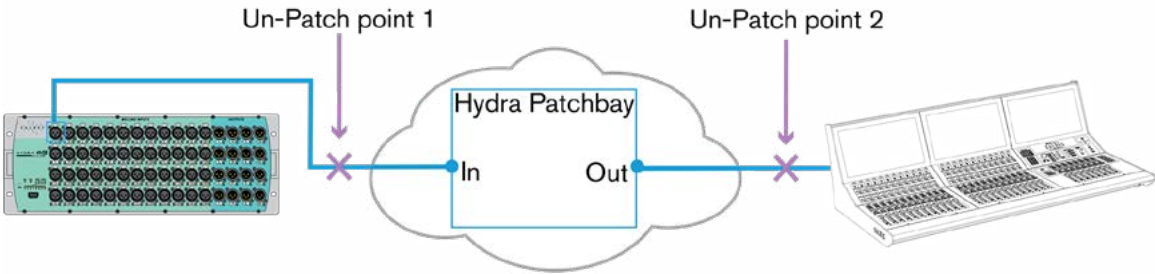
FIGURE 2 - HYDRA PATCHBAY PATCH CHANGE



Unpatching

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

FIGURE 3 - HYDRA PATCHBAY UN-PATCH



Hydra2 Patchbays at different sample rates

Note: now different sample rates are available, Hydra2 patchbays can be created to operate at a different sample rate (as shown in Figure 4) to that of the current show which is at 48kHz. HPBs and I/O Ports at a different sample rate to the console appear with a Sample Rate 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 into the console, using the correct sample rate.

Note that although Summa does not operate at 96kHz in versions 7 thru 8.1, it can be connected to a network that supports ports operating at a 96kHz sample rate.

FIGURE 4 - HYDRA2 PATCHBAY AT A DIFFERENT SAMPLE RATE

Desk Outputs			I/O Boxes			Hydra Patchbays		
Source: Hydra Patchbay Outputs - Shared Patchbays - 96kHPB			Destination: Desk Inputs - Channel Inputs 2			Layer: A/B A B		
Number	Patch Point Output	Connected Destination	Connected Source	Fader				
1	96kHPB-001	1 A Input 2-M	96kHPB-001	M	96kHPB-001	1A		
2	96kHPB-002			L	No Input	1B		
3	96kHPB-003			R				
4	96kHPB-004			C				
5	96kHPB-005		96kHPB-001	LFE				
6	96kHPB-006			Ls				
7	96kHPB-007			Rs				
8	96kHPB-008			M	No Input	2A		
					No Input...	2B		
				M	No Input	3A		
					No Input...	3B		
				M	No Input	4A		
					No Input...	4B		

INTERFACING STYLES

Interfacing with Summa is simple and the touch display will be familiar from using consumer technologies such as smartphones and tablet PCs.

Aspects of the interface will be referred to throughout this manual but this section should give you a good starting point from where you can start exploring Summa's intuitive interface for yourself.

Physical Controls

Faders

- Faders are used to control signal levels, either by having paths attached for direct control or as VCA master faders for controlling the overall level of a range of paths.

Buttons

- All buttons on the Summa surface are labelled and LED back-lit to indicate their 'on' statuses. Buttons can either be momentary (they trigger the function until you release them), latching (switch on or off each time they are pressed) or auto (they latch if you tap them or act as momentary buttons if you hold them).

Rotary controls

- All physical rotary controls on the Summa surface are continuous—they have no stopping point at either extreme. This allows the surface to be fully flexible, as all physical controls are able to control a wide range of functions within one project.
- When a rotary control is attached to a function or parameter, the function name and options are displayed, either on the touch display, or in the smaller fader displays.
- Once a function's extreme—either lower or higher—is reached its value will stop updating when the rotary is turned. When a rotary is controlling a level value or a value which has a default setting, press and hold the rotary control for a short time to return to the default value.

Touch Display

Summa's touch display uses the same general interfacing styles as a smartphone or tablet computer. Below is a rundown of the main gestures that you will use:

Tap

- Buttons, switches, selection fields and table column labels (for ordering purposes) can all be accessed with a short light tap.

Two Finger Tap

- Tapping with two fingers can reset settings to their default level. For example, within the fader processing tab, the fader can be set to zero by tapping on the fader space with two fingers.

Drag

- To turn a rotary control up or down, simply drag it vertically up/right to turn it up, or down/left to turn it down.

Touch and Drag

- To select more than one item in a table or list, touch your first selection, hold your finger in place for a short time then drag in any direction to extend your selection. Selections are always in order, usually numeric, so if you drag to the left or right in a vertically arranged grid, such as the external inputs window, you will select all cells between your first and last selection. Touch and drag can also be used to move a selection around, for example in the fader layout screen, make a selection then hold and drag to move paths to a different set of faders.

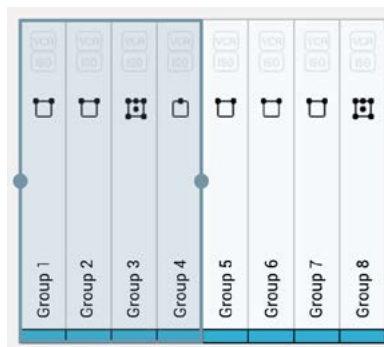
Scrolling

- Whenever a window is too large to be fully displayed on the touch display, drag the screen to scroll in any direction. Scrolling and 'flinging' will allow the screen to scroll quickly, then decelerate to a stop.

Drag Handles

- A multiple selection can be made by dragging the selection handles once an initial selection has been made, as shown below:

FIGURE 1 - DRAG HANDLES TO SELECT MULTIPLE ITEMS



Buttons



Summa uses standard and sectional buttons. Sectional buttons are split into two or more sections, each representing a different state. One state is always selected and the selected state is indicated with a colour fill.

Switches



Tap or drag to switch between on/off states.

Keyboard

- There are several Summa functions which require the use of a Qwerty keyboard. An external keyboard can be attached to one of Summa's USB ports. Alternatively, if no external keyboard is connected, a software keyboard is provided.
- Whenever the keyboard function is needed and no external keyboard is connected, the software keyboard will appear from the bottom of the touch display. If there are several text fields to complete, **NEXT** and **PREVIOUS** buttons are provided to move between text fields in order, alternatively, just tap the text fields on the touch display to move between them.
- **SAVE** and **CANCEL** buttons are provided to exit the text input mode, either saving or discarding any changes. Alternatively tap the touch display outside the text fields to exit.
- Standard **CUT**, **COPY** and **PASTE** functions are available using the keyboard.

CONTROL MODES

Access Mode

With access mode selected, all control cells on the surface are populated with EQ and dynamics controls for the currently accessed path. Access mode is activated on the console by pressing the ACCESS control modes button on the surface.

Summa 24+8 and 36+8 display the full complement of EQ and dynamics controls when in access mode. Summa 12 + 8 shows either the EQ or dynamics controls and the two control cells on the far left of the surface provide the option to switch between the two. The touch display can also be put into access mode by selecting ACCESS from the Show menu. As for the surface controls, when in access mode on the touch display, all touch controls correspond to the accessed fader/path.

FIGURE 1 - SURFACE ACCESS MODE



Strip Modes

The surface control mode buttons allow you to quickly change between the various 'strip' modes and access mode at any time during operation. The lower control mode buttons are used to put the surface into the various 'strip' modes, which place path-specific controls in the control cells directly above each fader, replicating analogue channel strips. For example, selecting pan mode places pan controls for each path above each fader, as shown here:

FIGURE 2 - CONTROL CELLS IN PAN CONTROL MODE



Strip Mode Controls

There are 14 strip modes in total. The controls associated with the upper and lower control cells are shown in the following table:

Strip Mode	Control Cell Rotaries (Default)	Control Cell Buttons
Input	Input Trim (0 dB)	Toggle Input 1 and 2
	Input Balance (Centre)	Toggles through input leg routing
Pan	Left/Right Pan (Centre)	Left/Right Pan On/Off
	Front/Rear Pan (Front)	Front/Rear Pan On/Off
Auto Mixing	Scroll through AutoMixer 1-4 or Off	Select AutoMixer 1-4 or Off
	Weighting	Path to AutoMixer On/Off
Delay	Input Delay Value (0 ms)	Input Delay Value On/Off
	Path Delay Value (0 ms)	Path Delay Value On/Off
Width	-	-
	Stereo Width Range (Stereo)	Stereo Width On/Off
Path Outputs	Direct Output Level (0 dB)	Direct Output AFL
	Mix Minus Output Level (0 dB)	Mix Minus Output AFL
Aux x/y	Aux x Send Level (0 dB)	Aux x On/Off
	Aux y Send Level (0 dB)	Aux y On/Off

PRESETS

A preset is a complete copy of a path from which you can choose elements to load onto another path. Using presets can speed up workflow when several paths with similar settings are required.

When a new preset is made a full copy of the path is taken. Setting the scope of a preset defines which elements of the path are copied to a path when the preset is loaded. The scope of the preset can be set at any time.

FIGURE 1 - PRESETS SCOPE

Create A New Path Preset

Fader 22
Layer 1

No Input

Select the scope of parameters that will be recalled when you load this preset.

The preset actually contains a full copy of the accessed path and you can change the parameters that will be recalled at any time.

Processing

Input 1

Width

Input 2

Insert

EQ

Fader

Dynamics 1

Downmix

Dynamics 2 / AutoMixer

AutoFader

Delay

Input 1 Delay

Input 2 Delay

Path Delay

Direct Output Delay

Bus Output Delay

Routing

Main Routing

Group Routing

Aux Sends

Track Sends

Auto Minus Routing

Pan

Main & Group Pan

Aux Pan

Track Pan

Path Outputs

Direct Output

Mix Minus Output

Preset Label

Preset Description

Select All

Select None

Create New Preset

Cancel

Creating a Preset

To create a preset from the currently accessed path:

1. Tap **PATH PRESETS** in the Access bar.
2. Navigate to where you wish to save the preset, making a new folder if necessary.
3. Tap **NEW**.
4. If you are overwriting a previously saved preset a red dialogue will be displayed to warn you of the potential overwrite. Tap **OVERWRITE** or **CANCEL**. Otherwise, you will be directed to enter a label and description and set the scope of the preset, then tap **CREATE NEW PRESET** or **CANCEL** to discard any changes.

FIGURE 2 - CREATING A PRESET

Shows List

Currently Loaded Show Label

User - Project - 48kx42

On Air Protection

ON

Sync

Video 1

Primary Source

System Status

Everything is ok

System Settings

Access

Fader 14

Layer 1

No Input

ISO

Full

Path Presets

Copy

Paste

Path Preset Folders

Preset

Date Modified

Presets 1

15 Oct 2014

16:42:09

Presets 2

15 Oct 2014

16:42:13

Presets 3

15 Oct 2014

16:42:40

Presets 4

15 Oct 2014

16:42:36

Presets 5

15 Oct 2014

16:42:04

Create New Folder

Select Folder to Edit

Select Folders to Delete

Loading a Preset

To load a preset to the currently accessed path:

1. Tap **PATH PRESETS** in the Access bar.
2. Navigate to and select the preset that you wish to use.
3. Tap **LOAD**.

If you load a preset to a path which is part of the [control link](#), the in-scope preset elements will be loaded for all paths in the control link. Any elements of the preset which don't apply to the path will be automatically ignored.

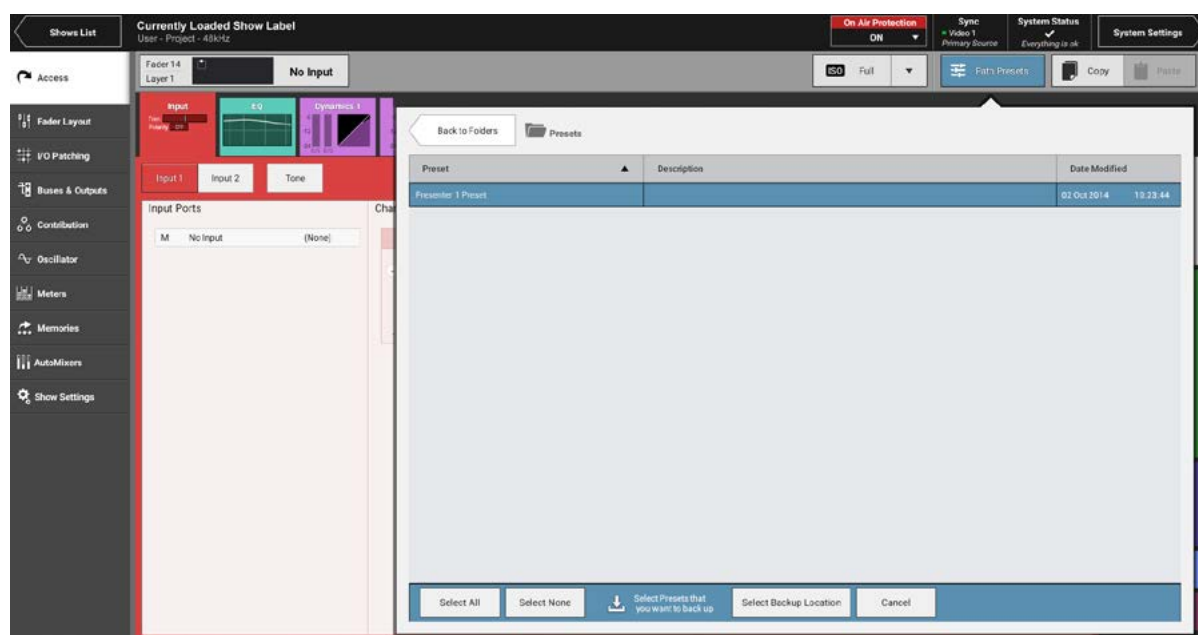
Backing Up and Restoring Presets

Presets can be backed up to a USB drive connected to one of Summa's USB ports.

To back up a preset:

1. Tap **PRESETS** in the Access bar.
2. Navigate to and select the preset that you wish to backup from the list.
3. Tap **BACKUP**. You can now select multiple Presets from the same location if required.
4. Tap **SELECT BACKUP LOCATION** and ensure your USB drive is connected to one of Summa's USB ports.
5. Navigate to your desired backup location, creating a new folder if necessary
6. Press **BACKUP HERE** or **CANCEL**. If you have previously saved a version of the same preset, a pop-up will appear to ask if you wish to **OVERWRITE** or **CANCEL** the backup.

FIGURE 3 - BACKUP PRESETS



To restore a Preset from an external drive:

1. Press **RESTORE** and navigate to select the Preset that you wish to restore to the internal memory.
2. Press **RESTORE** or **CANCEL**.

Editing a Preset

Once a preset has been created you can edit its scope, label and description at any time by tapping **PRESETS** in the Access bar, selecting the from the pop-up and tapping **EDIT**.

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.

COPY AND PASTE

It's quick and easy to copy properties from one path and paste them to another:

- 1. Access the path that you wish to copy properties from and tap **COPY** in the Access bar.
- 2. Tap to select the properties that you wish to copy **SELECT ALL** and **SELECT NONE** can be used if required and tap **COPY** or **CANCEL** .
- 3. Access the path that you wish to paste the properties to and tap **PASTE** in the Access bar.

FIGURE 1 - COPY PATH PARAMETERS

Copy Path Parameters

Fader 22
Layer 1

No Input

Select the scope of parameters that will be copied

Processing

Input 1

Width

Input 2

Insert

EQ

Fader

Dynamics 1

Downmix

Dynamics 2 / AutoMixer

AutoFader

Delay

Input 1 Delay

Input 2 Delay

Path Delay

Direct Output Delay

Bus Output Delay

Routing

Main Routing

Group Routing

Aux Sends

Track Sends

Auto Minus Routing

Pan

Main & Group Pan

Aux Pan

Track Pan

Path Outputs

Direct Output

Mix Minus Output

Select All

Select None

Copy

Cancel

LAYERS

The Summa surface has six layers allowing fader-control of 6 times as many paths as there are faders on the surface. You can switch between layers using the layer selection buttons 1– 6 on the surface. Layer switching options can be set per fader section. Fader sections can be 'linked', so that if a section's layer is changed, the layer will also change for all linked sections.

Layer linking options are set from the Surface Layer pop-up which is accessible from the Monitor bar along the bottom of the Touch Display. This should be used along with Layer Switching Options which are located within Show settings. When changing layer, all fader positions, button states and control cell states (if in a strip mode) change immediately to reflect faders on the newly selected layer.

Layer Switching Options

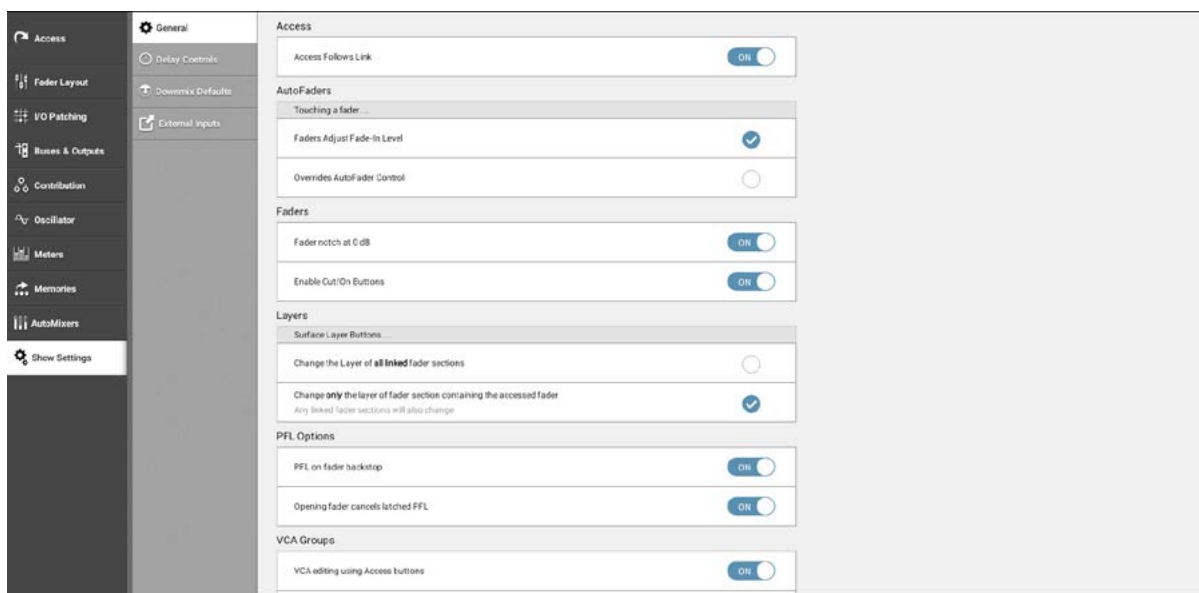
To access layer switching options, tap **SHOW SETTINGS** in the Show menu and select 'General'. One of these two options can be chosen:

- Change the layer of all linked fader sections
- Change only the layer of the fader section containing the Accessed fader (any linked fader sections will also change too)

The first option can be used if you wish to prevent a section of the desk from ever switching layers. For example, on a Summa 36+8, linking sections 1, 2 and 4 and selecting the first layer switching option means that all surface sections, other than section 3, will switch layers when surface layer buttons or pop-up layer buttons are pressed. Fader section 3 will stay on which ever layer you select for it within the Surface Layer pop-up.

The second layer switching option should be chosen if you always want the section containing the currently accessed fader to switch layers (along with any linked surface sections) regardless of whether you have set some fader sections to lock to a specific layer.

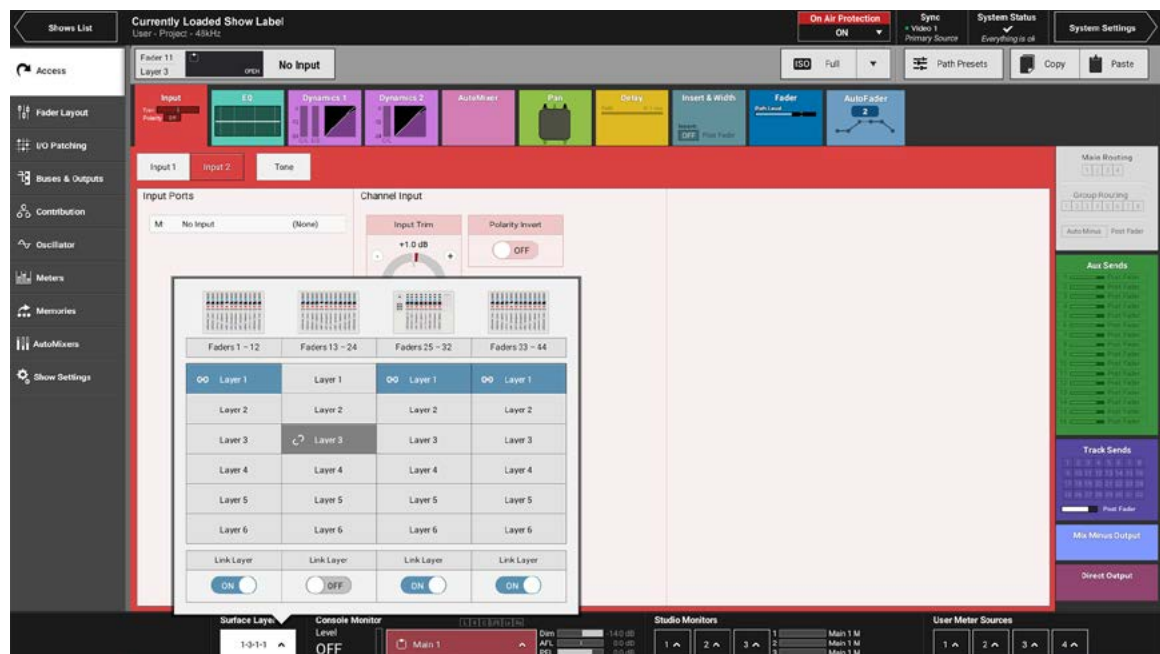
FIGURE 1 - LAYER SETTINGS



Surface Layer Pop-up

Each surface section (12 or 8 fader) is represented along the top of the pop-up. Link layer switches along the bottom of the pop-up can be set to 'on' or 'off' to enable or disable layer linking. Linked layers will always be on the same surface layer.

FIGURE 2 - SURFACE LAYER POP-UP



SUMMA SETTING UP

GENERAL SETTINGS

To access Summa's general settings, ensure the touch display is in 'active Show' view and tap **SYSTEM SETTINGS** in the top right of the screen and then select 'general settings' from the menu on the left hand side. To edit these settings you must be logged in as an administrator.

General Settings

The following general settings are available:

- The analogue level at 0 dBFS can be calibrated to 15, 18, 20, 22, 24 or 28 dBu.
- The reference level (dBFS) can be set to an integer value between -6 and -32 dBFS. The reference level sets default level values for the dynamics and oscillator modules.
- The point at which the input impedance changes between mic and line level can be set to 18, 20, 22 or 24dBu.
- The mic input headroom for the system can be chosen. Options range from 20 dB to 36 dB.
- The default meter style can be set for all meters on the meter displays. PPM or VU scales can be chosen along with various colour split points, controlling the level ranges of the green, yellow and red elements of the meter bar graphs.
- Cut/on button functionality can be set: With cut selected, paths are cut when cut/on buttons are active; with on selected, paths are switched on when the cut/on buttons are active, and so paths are cut when cut/on buttons are not active.
- If you have not routed the PFL bus to the console monitors, you can choose to route it to the small LS, rather than using the dedicated PFL LS output.
- When faders are under CSCP control, this can be overridden when the fader is touched; Summa's faders are touch sensitive. This feature can also be disabled.
- You can choose whether or not to report system status messages for the redundant core modules.
If you have chosen a Summa with 128 channels and no redundancy you should set this to OFF.

FIGURE 1 - SYSTEM SETTINGS—GENERAL

General Settings

Analog Levels at 0dBFS	18 dBu	>
Reference Level (dBFS)	Analog equivalent: 0 dBu	-18 dBFS >
Gain at which mic/line input impedance changes from 2 kΩ (Mic) to 10 kΩ (Line)	24 dB	>
Mic input headroom	28 dB	>
Default Meter Style	Calrec PPM 10/18	>
Cut or On Buttons	Cut	On
If 'PFL to Mon' is off, PFL is sent to	Small LS	PFL/RTB Output
Fader touch overrides CSCP control	☐ OFF	

Report System Status messages for redundant Control, DSP and Router

Control	☐ OFF	DSP	☐ OFF	Router	☐ OFF
---------	------------------------------	-----	------------------------------	--------	------------------------------

Surround Leg Suffixes

You can enter suffixes in H2O port labels at the end of the individual legs of surround path which appear in the I/O patching screen. This allows the system to automatically display the legs in the correct order. Suggested suffixes are L, R, C, LFE, Ls, Rs. These suffixes keep the surround legs together and in the correct order when sorting tables within the I/O patching window. The example below right in figure 3. shows different suffixes being applied.

FIGURE 2 - SURROUND LEG SUFFIXES

Surround Label Suffixes for Port Sorting

Left	
Right	
Center	
LFE	
Left Surround	
Right Surround	

FIGURE 3 - SURROUND LEG SUFFIXES EXAMPLE

Surround Label Suffixes for Port Sorting

Left	FL
Right	FR
Center	C
LFE	SUB
Left Surround	SL
Right Surround	SR

FIGURE 4- I/O PATCHING SHOWING SORTED SUFFIXES EXAMPLE

I/O Boxes Hydra Patchbays			Desk Inputs I/O Boxes Hydra Patchbays		
Box - 240			Destination: Desk Inputs - Channel Inputs 1		
Input		Connected Destination	Connected Source		Fader
Waves	PKL FL	L1 F33 Input 1 -L			No Input...
Waves	PKL FR	L1 F33 Input 1 -R			No Input...
Waves	PKL C	L1 F33 Input 1 -C			No Input...
Waves	PKL SUB	L1 F33 Input 1 -LFE			No Input...
Waves	PKL SL	L1 F33 Input 1 -Ls			No Input...
Waves	PKL SR	L1 F33 Input 1 -Rs			No Input...
Waves	240R-07		PKL FL	L	PKL FL
Waves	240R-08		PKL FR	R	
Waves	240R-09		PKL C	C	
Waves	240R-10		PKL SUB	LFE	
Waves	240R-11		PKL SL	Ls	
Waves	240R-12		PKL SR	Rs	
Waves	240R-13				No Input...
Waves	240R-14				No Input...

Figure 4 above shows the labels entered in H2O and the effect of entering the surround leg suffixes to sort the ports in the correct order when sorting is applied.

Date and Time

The current date and time are displayed towards the bottom of the general settings.

FIGURE 5 - DATE AND TIME

Date & Time

+

27

day

-

+

Mar

month

-

+

14

year

-

+

10

hour

-

+

50

minute

-

+

32

second

-

License and Logs

The **'License information'** button provides information on the various applications used in creating the user interface.

The **'Save Logs to USB Drive'** is described in the Console Facilities section.
See ["COLLECTING SYSTEM LOGS"](#) on page 190.

FIGURE 6 - LICENSE AND LOGS

License information

Save Logs to USB Drive

ENERGY SAVER

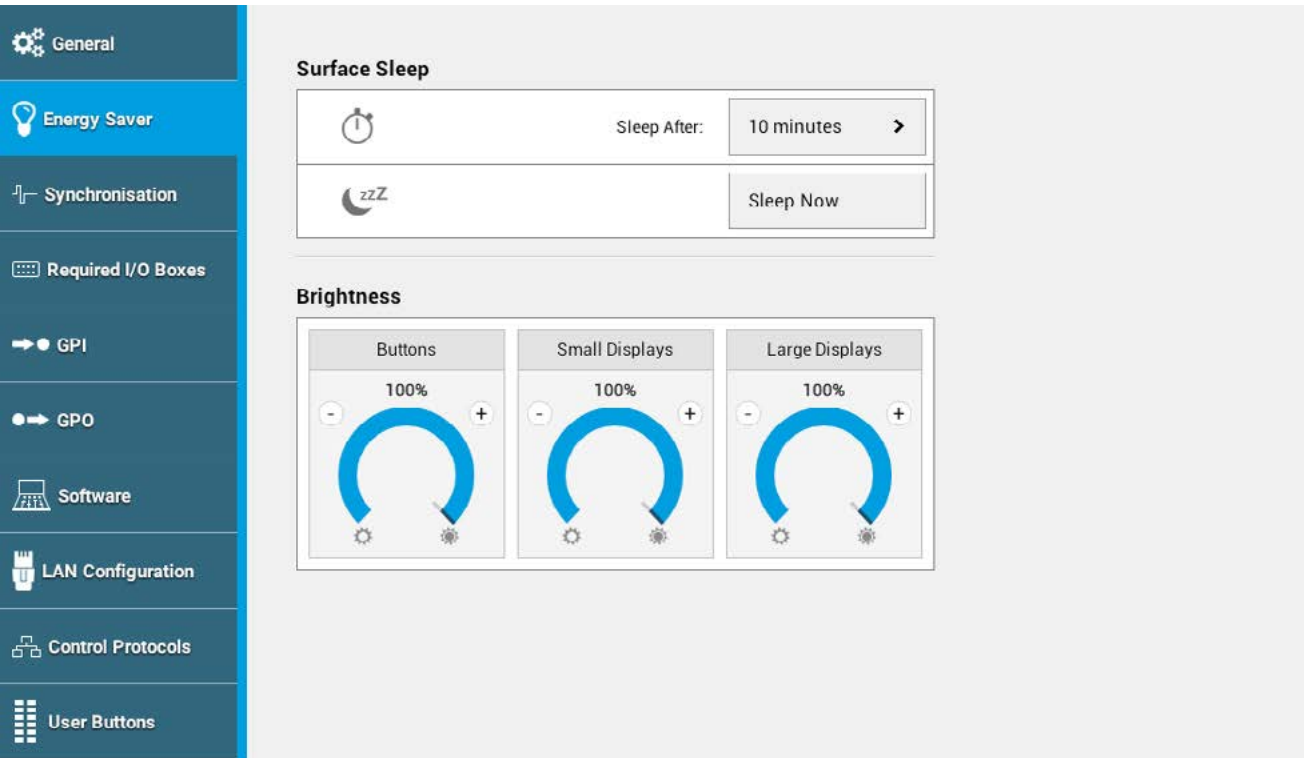
Brightness

Summa's energy saver settings allow you to control the brightness of all surface buttons and displays. There are three rotary controls to independently set the brightness of buttons, small displays, and large displays. Drag these rotary controls up and down to see the relevant brightnesses change.

Dark Mode

Putting Summa into dark mode turns off all lights across the surface apart from the surface reset LED, which pulses blue to indicate that the console is functioning. Dark mode has no effect on audio or operation. Dark mode can be set to activate after a specified duration of inactivity, ranging from one minute, to an hour. Alternatively you can select **NEVER**.

FIGURE 1 - ENERGY SAVER SETTINGS



SYNCHRONISATION

It is essential that all elements of a Hydra2 network are synchronised to the same clock source.

The Summa processing rack has five synchronisation inputs and six levels of synchronisation source priority. The sixth is always set to 'internal reference', so that, as a last resort, if all other sync sources fail, Summa can always run off its own internal clock. If a clock source does fail, Summa will automatically jump to the next sync source in the priority list. One is the highest priority, six is the lowest.



In 'active Show' view, the current sync source is always displayed within the notifications area at the top right of the touch display.

Setting Synchronisation Source Priorities:

1. Tap SYSTEM SETTINGS in the top right of the touch display and select 'synchronisation' from the menu.
2. Tap the selection cell for the sync priority level that you wish to alter. A pop-up appears with a scrolling menu of possible sync sources. (The following figure shows the pop-up resulting from selecting sync source priority 4).
3. Tap to make your selection, scrolling down if necessary.
4. The pop-up closes and Summa refreshes and syncs to the highest priority viable source.

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.

Note that although Summa does not operate at 96kHz, the synchronisation information is still valid as when connected to a network various I/O boxes on the network may be operating at a different sample rate to the Summa.

FIGURE 1 - SYNCHRONISATION OPTIONS

Shows List

Currently Loaded Show Label
User - Project - 48kHz

General

Energy Saver

Synchronisation

Required I/O Boxes

GPI

GPO

Software

LAN Configuration

Control Protocols

User Buttons

Synchronisation Source Priority

1 AES (48kHz) >

2 TTL Wordclock (48kHz) >

3 Video 1 >

4 Internal Reference >

5 Internal Reference >

6 Internal Reference

Internal Reference

AES (48kHz)

TTL Wordclock (48kHz)

Video 1

Video 1 - PAL

Video 1 - NTSC

Video 1 - 720p 30

Video 1 - 720p 29.97

Video 1 - 720p 25

Video 1 - 720p 23.98

Video 1 - 1080i 30

Video 1 - 1080i 29.97

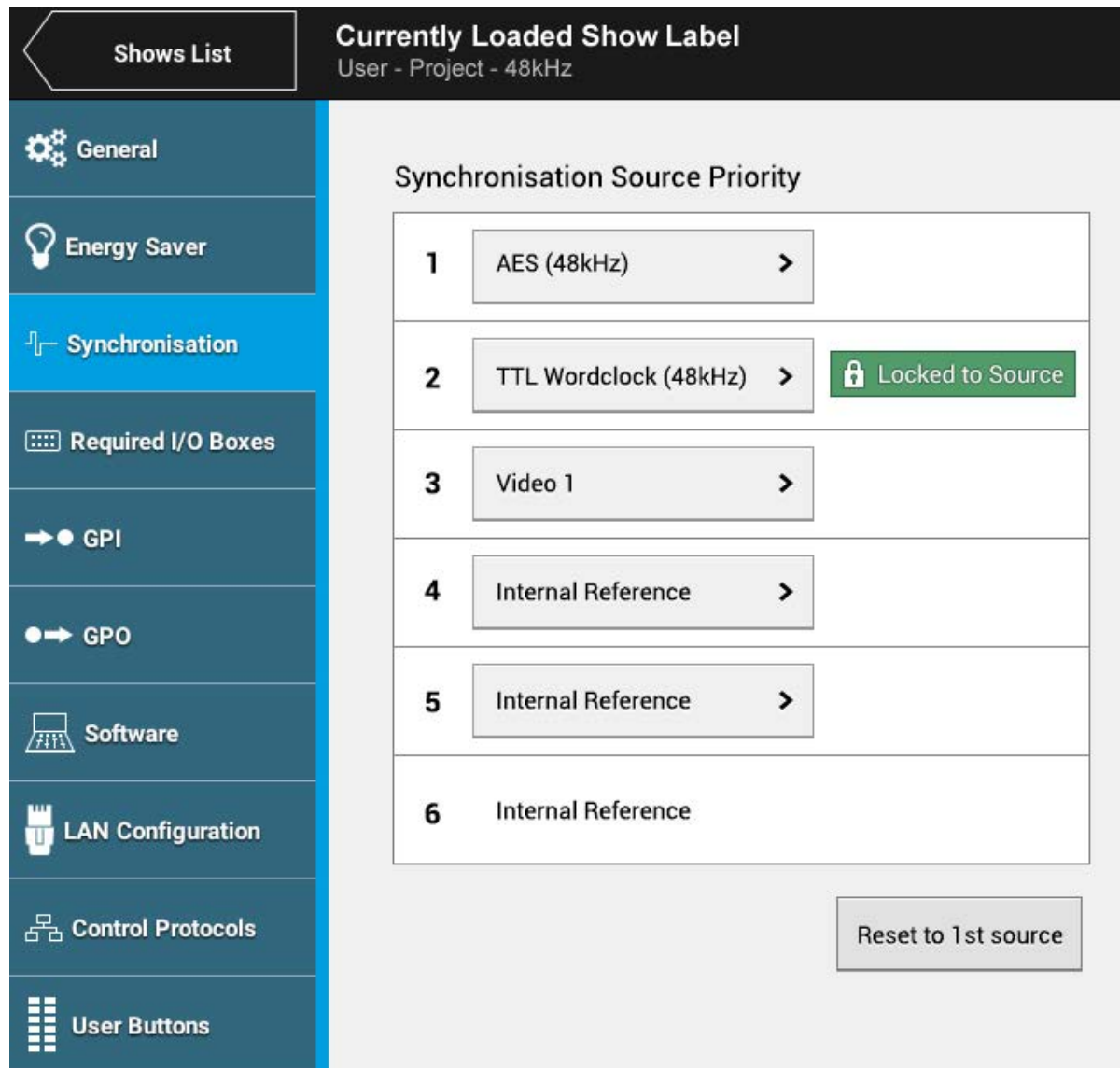
Video 1 - 1080i 25

Video 1 - 1080p 30

Reset to First Source

It may sometimes be necessary to reset Summa's synchronisation. To start the synchronisation reset process tap **RESET TO 1ST SOURCE**. Summa will attempt to synchronise to each source in priority order, starting at priority one. Once a viable synchronisation source is found the process will stop and the new sync source will display the 'locked to' tab as shown here.

FIGURE 2 - RESET TO FIRST SOURCE



Sources and Frame-Rates

Summa has 5 sync source options:

- Video 1
- Video 2
- AES3 (48 kHz)
- TTL Wordclock (48 Hz)
- Internal Reference

Summa supports the following frame-rates:

- PAL
- NTSC
- 720p/30
- 720p/29.97
- 720p/25
- 720p/24
- 720p/23.98
- 1080i/30
- 1080i/29.97
- 1080i/25
- 1080p/30
- 1080p/29.97
- 1080p/25
- 1080p/24
- 1080p/23.98
- 1080p/50
- 1080p/59.94
- 1080p/60

EDITING THE NETWORK

All I/O resources on a Hydra2 network can be used by all consoles as long as they have been granted access from the network administration tool, H2O, the resources have been added to the consoles 'required list' and that the I/O boxes are set to the same operating sample rate as the console.

Due to the scalable nature of Hydra2 you may have access to a large amount of I/O resources, some of which you won't always need. The 'required list' provides a way to narrow the scope for individual consoles, speeding up workflow and making port identification easier. Only I/O resources in the 'required list' will be available for patching to and from the console.

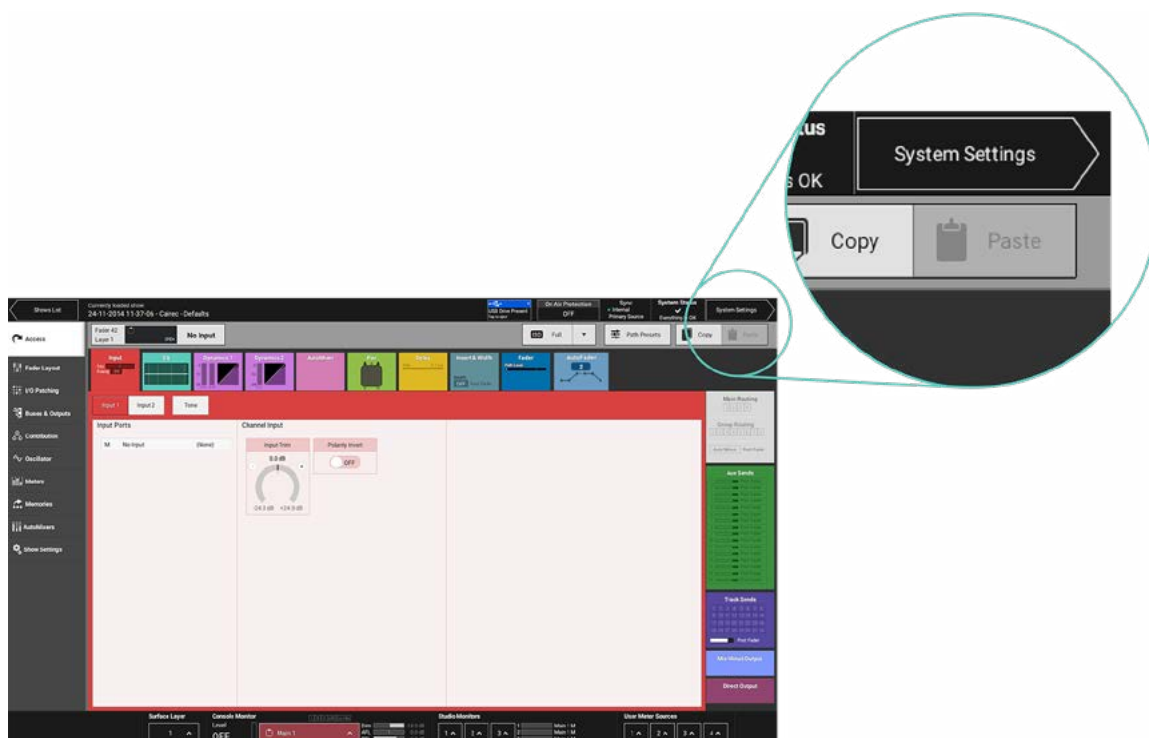
Viewing Resources

Tap **SYSTEM SETTINGS** in the top right of the touch display, then select 'Required I/O Boxes'. You will see a split screen with all online resources on the left and the 'required list' on the right.

Both lists are held in tables with 4 columns: Hardware ID, Label, Sample Rate and Type. It may help to sort these tables by tapping on column headers. Multiple taps will switch sorting to be either ascending or descending.

Hardware IDs for physical I/O boxes are set from the dip switches on the back of the units (See "Audio I/O Connections" in the Installation manual for more information). Hydra patchbay IDs are taken from H2O and are related to folder names. Labels are explained in detail, here: ["Input and Output Patching" on page 81](#).

FIGURE 1 - ACCESSING SYSTEM SETTINGS



Tap to select a single online resource on the left (hold and drag or drag handles to select multiple resources) then tap **ADD TO REQUIRED LIST** at the bottom left of the online resources window. The resources will then appear in the Required List on the right. You will notice that they are shaded green, with a green 'required' tag attached. This is mirrored in the online list on the left so you can quickly see which resources you have already added. If any of the resources in the Required List go offline, they will be shaded red with an 'offline' tag attached. The 'require' and 'offline' tags can be seen in the image below.

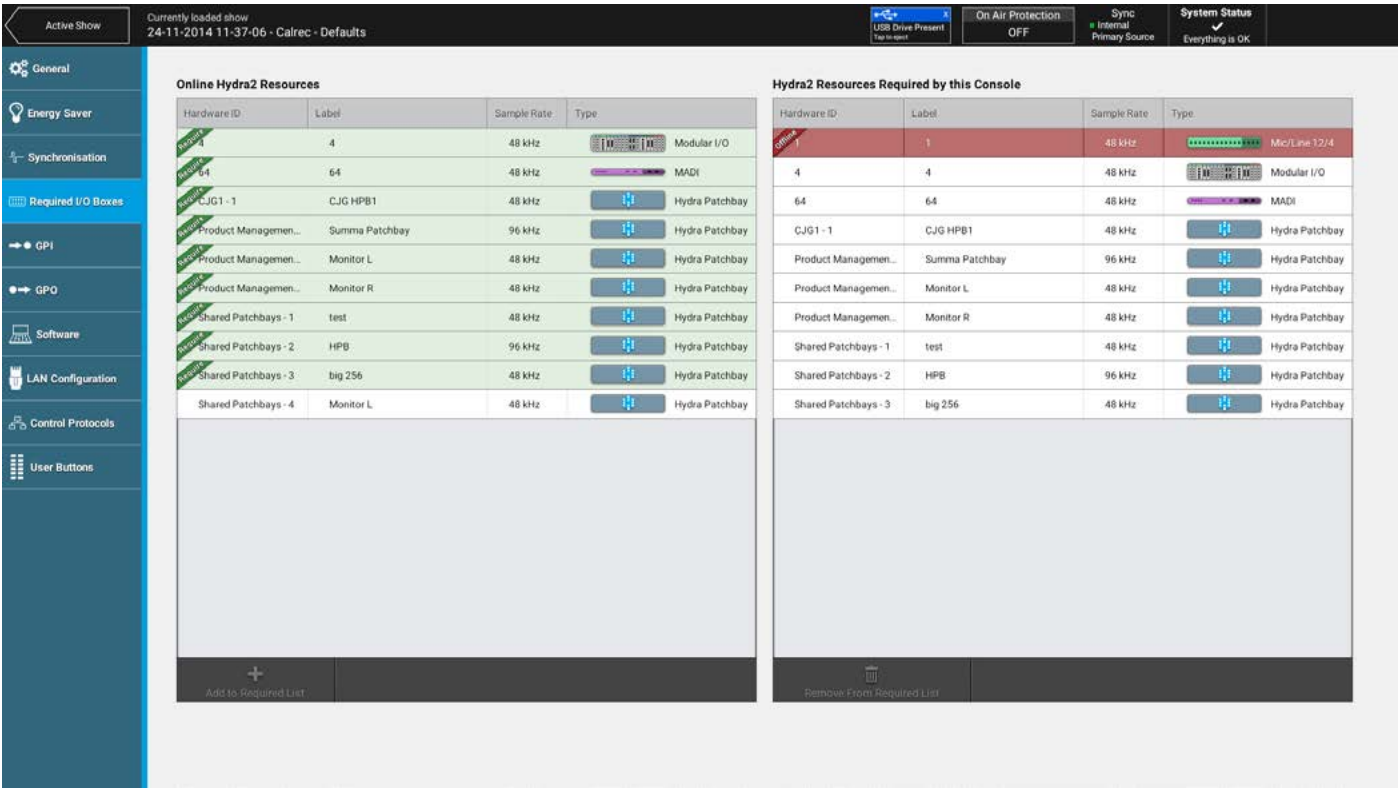
Adding and Removing Resources

To remove a resource from the list, select it, then tap **REMOVE FROM REQUIRED LIST**.

Boxes at Different Sample Rates

The show in Figure 2 is a 48kHz show, but the sample rate field shows that although Summa is set to the correct sample rate (i.e. 48kHz) there are resources that are set to 96kHz and therefore are unavailable to Summa.

FIGURE 2 - THE 'REQUIRED LIST'



SHOWS

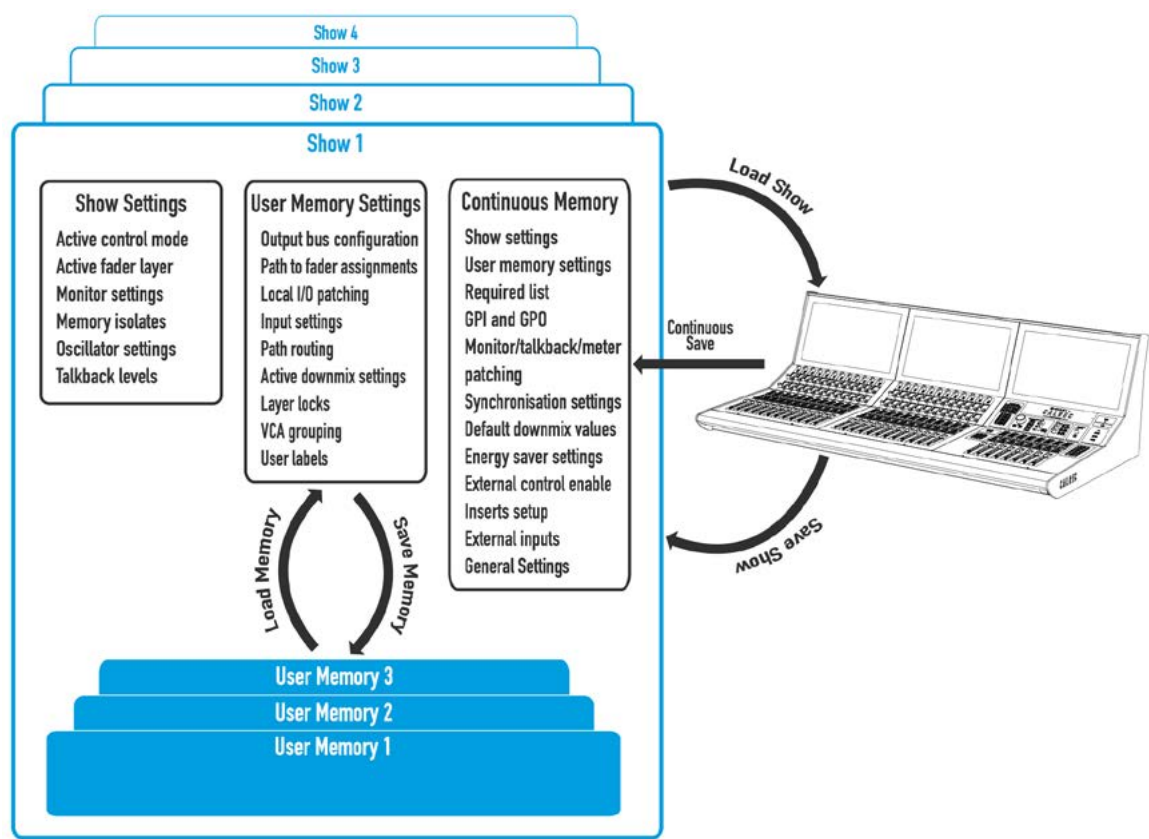
Summa uses a system of **Shows**, user memories and continuous memory to store settings for later recall. **Shows** are used to organise user memories into sub-categories making them easier to manage, rather than having to search through a long list of varied memories each time, you can select a **Show** and view the user memories associated with that **Show**.

A possible use for this would be to create Shows for each type of production, e.g. 'Morning News', 'Football', 'Chat Show' etc. and then create multiple user memories within each Show for different users and situations. Before saving multiple memories into a Show, it is good practice to create one default user memory, test it, and use it as a template to create multiple user memories. This avoids the repetitive and time consuming task of having to make the same changes to multiple memories.

During operation, Summa constantly updates its continuous memory, which is also saved within the currently active Show. When a Show is recalled, it is this continuous memory that is recalled, not a user memory.

Note, loading a Show recalls the last-used settings, not the last-saved settings.

FIGURE 1 - SHOWS AND MEMORIES

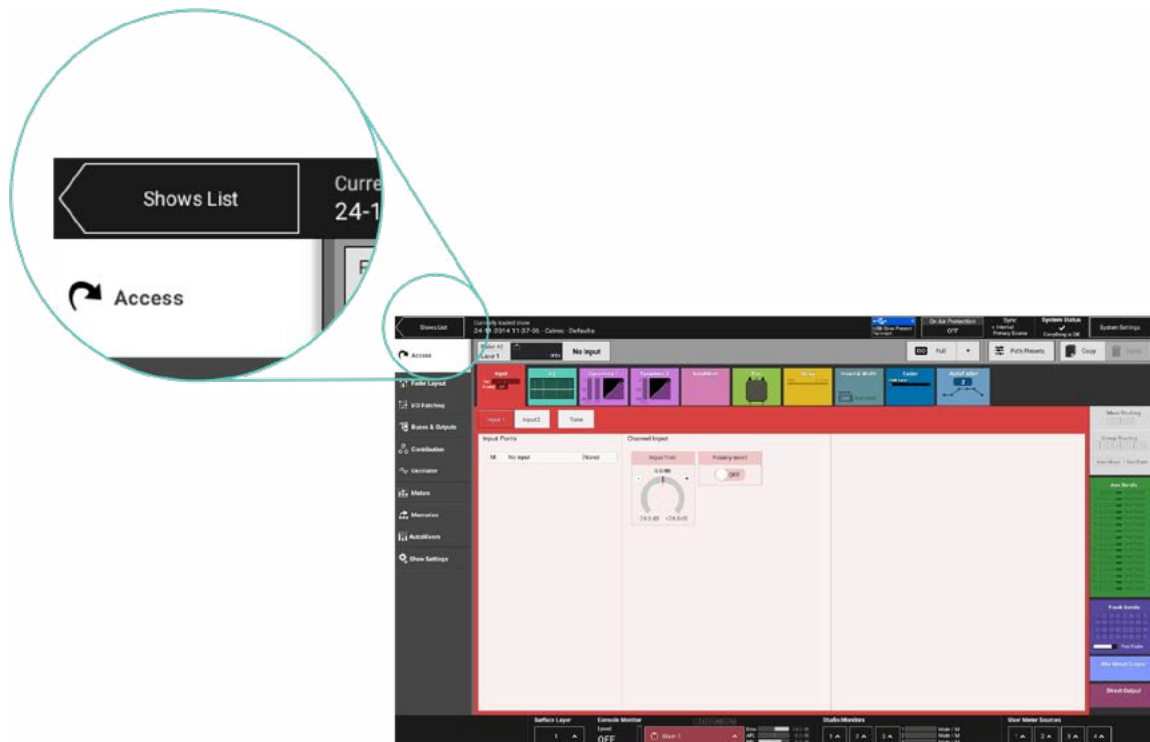


	Show	Continuous Memory	User Memory
Output bus configuration		X	X
Path to fader assignments		X	X
I/O patching (from Summa)		X	X
Input settings		X	X
Path routing		X	X
Path processing		X	X
Active downmix settings		X	X
Layer locks		X	X
VCA grouping		X	X
User labels		X	X
Required list		X	
GPI and GPO		X	
Monitor, talkback, meter patching		X	
Synchronisation settings		X	
Default downmix values		X	
Energy saver settings		X	
External control enable		X	
Inserts setup		X	
External inputs		X	
General System Settings		X	
Active control mode	X	X	
Active fader layer	X	X	
Monitor settings	X	X	
Memory isolates	X	X	
Oscillator settings	X	X	
Talkback levels	X	X	

Entering the Shows List

Tap **SHOWS LIST** to the top left of the touch display. All available Shows are presented within a sortable table. To return to 'active Show' view, tap **ACTIVE SHOW** in the top right of the touch display.

FIGURE 2 - ACCESSING THE SHOWS LIST



Active Show



The Show that is currently active is identified by the 'active' tab.

Loading a Show

Locate and select the Show you wish to load, then tap **LOAD** in the control window footer, then **LOAD** again to confirm your choice.

Setting up a New Show

All new Shows are based on pre-configured Show templates. To set up a new Show:

1. Tap **NEW** in the control window footer.
2. Pick a template within the 'new Show' pop-up.
3. Enter a label and some details for the Show and tap **CREATE SHOW**.

The client and series text fields will already be populated for you as they are taken from the template.

Duplicating a Show

Duplicating Shows can save time when several very similar Shows are needed:

1. Select a Show and tap **DUPLICATE** in control window footer.
2. Enter a new label.
3. Tap **DUPLICATE** or **CANCEL**.

Deleting a Show

1. Tap to select one or more Shows within the list.
2. Tap **DELETE** in the control window footer.
3. Tap **DELETE SELECTED**, or **CANCEL**.

Editing a Show

Once a Show has been created it is possible to edit its label and description:

1. Select the Show that you wish to edit and tap **EDIT** in the control window footer.
2. Make changes to the label and description in the pop-up.
3. Tap **SAVE** or **CANCEL**.

Moving Shows between Summa Systems with 180 and 128 channels

When moving a show from a 180 channel Summa to a 128 channel Summa, it is possible that some channels cannot be created due to the smaller DSP capacity. The user is notified about which channels were not created, allowing them to understand how the mix will be affected.

Summa also supports moving shows between systems with different surface sizes. If the user loads a show made on a large surface, onto a surface with fewer faders, they will have access to virtual fader sections, allowing the user to move the inaccessible paths onto faders and layers that they can access on the smaller surface.

Show Templates—Admin Only

Whenever you create a new Show it must be based on a template. The generic Calrec template is always available. Additional templates can be created by Summa administrators. Show templates hold the same data as Shows but they cannot be opened, edited or deleted without logging in as an administrator.

Setting Up and Editing Templates—Admin Only

Enter the shows list screen and tap **SHOW TEMPLATES** to the left of the window header. You are required to enter the admin username and password for the system you are using, then tap **LOG IN** and you have access to the available Show templates.

From here you can create a new template by tapping **NEW** and entering client, series and label information. You can delete a template (other than the Calrec default template) by selecting it and tapping **DELETE**. You can edit a template's details by selecting it and tapping **EDIT**.

Updating Templates—Admin Only

You can update Show templates to reflect the current System Settings by tapping **UPDATE**. You will then be asked to confirm or cancel the update.

Backing Up Shows

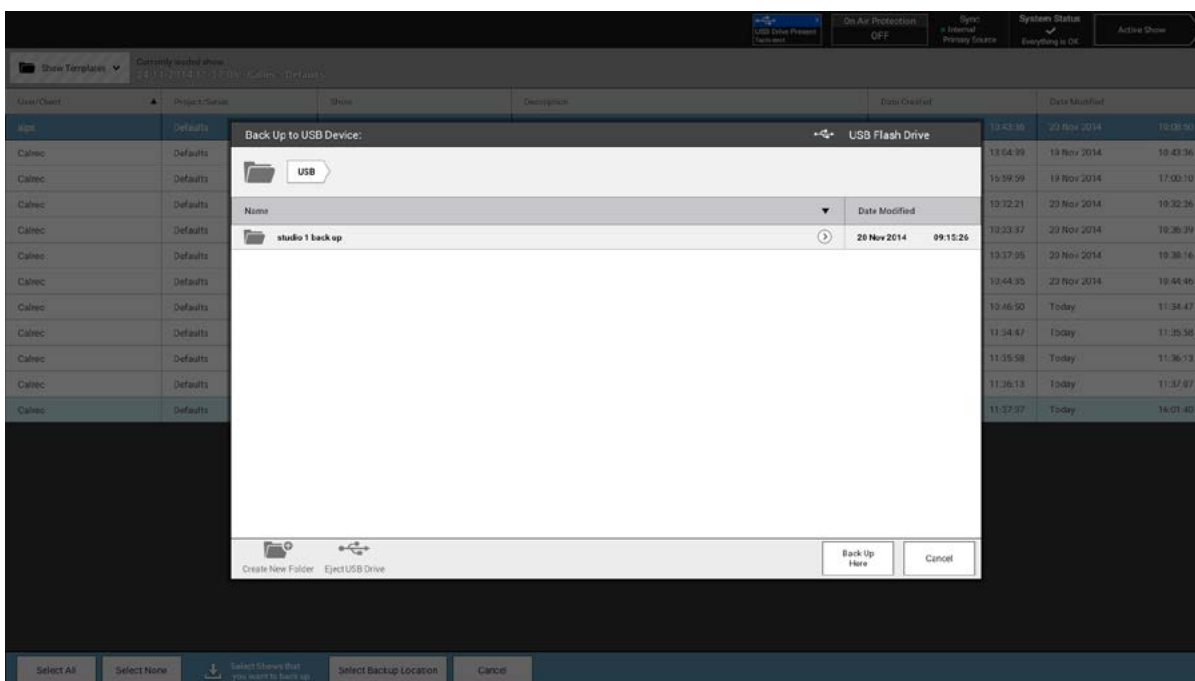
Shows and their user memories can be backed up to a USB drive connected to one of Summa's USB ports. To back up a Show:

1. Select the Show that you wish to backup from the Shows list.
2. Tap **BACKUP** toward the bottom right of the display. If you wish to select multiple Shows, select them all now.
3. Tap **SELECT BACKUP LOCATION** and select a destination for your back up, making a new folder if necessary.
4. Tap **BACKUP HERE** or **CANCEL**. If you have previously saved a version of the same Show a pop-up will appear to ask if you wish to **OVERWRITE** the show or **CANCEL** the backup.

Restoring Shows

1. Tap **RESTORE** in the footer of the Shows List and navigate to select the Show that you wish to restore.
2. Tap **RESTORE**.

FIGURE 3 - BACKING UP SHOWS



Capacity

The "Capacity Used" bar-meter, below the Shows 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.

Settings Stored within Shows

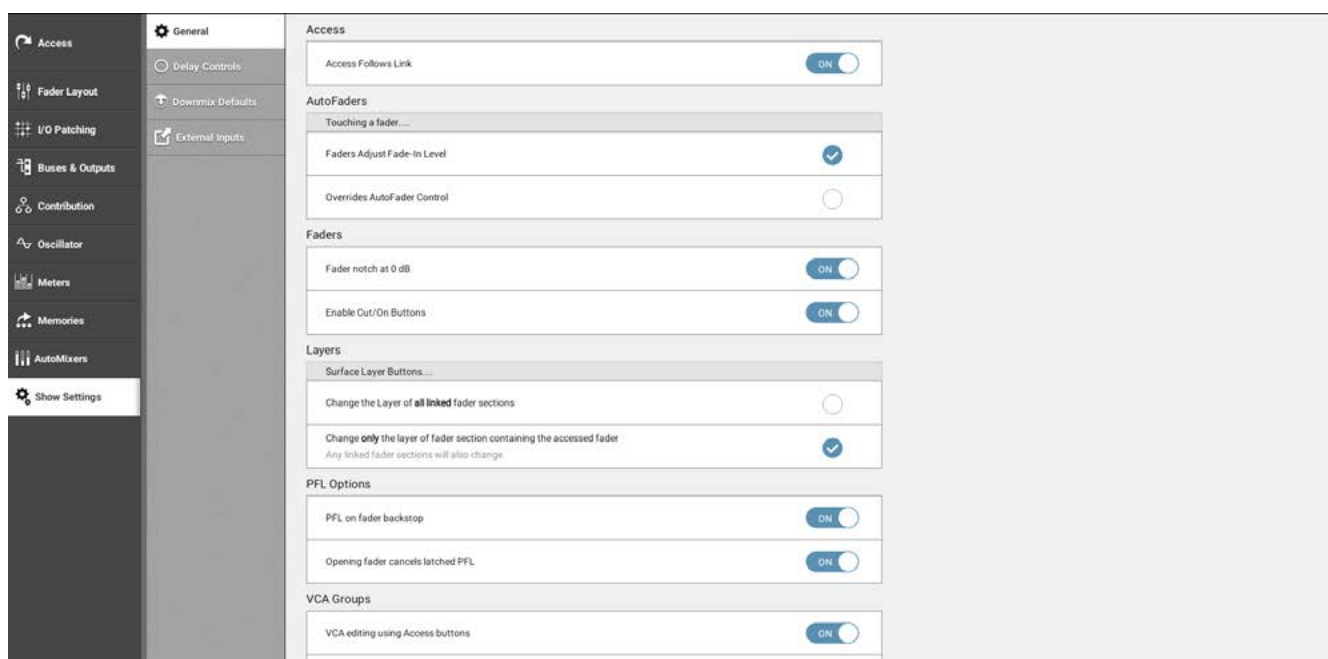
Tap Show Settings within the Show menu on Summa's touch display and you will see four options: General, Delay Controls, Downmix and External Inputs.

General Settings:

- By default, a notch can be felt at the '0' point on the fader scale. This can be switched off if required.
- The surface layer buttons can be set to operate in one of two ways. They either change all linked fader sections or only the sections which contains the accessed fader, plus any sections which are linked to that section.
- By default, PFL can be activated momentarily by pulling the fader down below its lowest point, and deactivated once released. This feature can be switched off for the whole surface.
- By default, if a fader is closed and it's PFL is activated, it will be automatically deactivated once the fader is opened. This feature can be switched off for the whole surface. (see [“PFL, AFL and Output Listen” on page 111](#)).
- VCA groups are generally made and dissolved by pressing fader access buttons but this process can be disabled to protect all VCA assignments or to stop VCA groups being made accidentally.
- By default, VCA slave faders move automatically when their levels are changed by their masters. If you would rather, this functionality can be switched off and instead slaves will remain stationary. Combined master/slave levels will still be indicated by the nulling indicators in the fader displays. (see [“VCA Groups” on page 142](#))

Other settings are explained in the relevant sections: [“Delay” on page 138](#) , [“Downmixing” on page 167](#) and [“External Inputs” on page 93](#)

FIGURE 4 - SHOW SETTINGS



MEMORIES

User memories are files which store processing, routing and patching information which can be recalled at any time.

Loading a User Memory

1. Tap **MEMORIES** in the Show menu and you will see a list of all user memories that are available within the current Show.
2. Tap to select the user memory that you wish to use and tap **LOAD** .
3. The footer changes to ask for confirmation, tap **LOAD SELECTED** or **CANCEL**.

Creating a new User Memory

To create a new user memory with current surface settings:

1. Tap **NEW** in the memories window footer.
2. Enter a name and a short description for the new user memory.
3. Tap **CREATE** or **CANCEL** .

Updating a User Memory

To update a previously saved user memory with the current surface settings:

1. Select the user memory that you wish to update and tap **UPDATE** in the memories window footer.
2. You will be prompted to confirm by tapping either **UPDATE SELECTED**, or **CANCEL**.

Creating Multiple User Memories

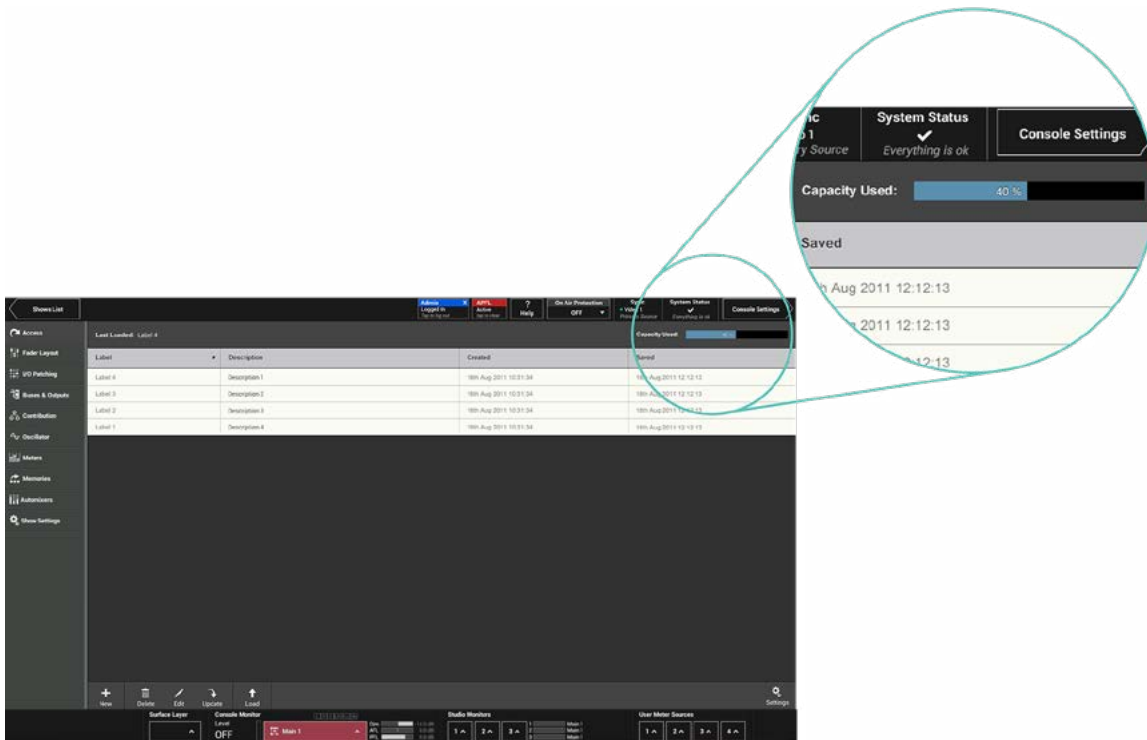
Best practice is to create one 'default' user memory, test it, make any necessary changes, and then use this as the basis for all other user memories within the Show. This speeds up the process by reducing the need to make the same changes to many different user memories.

To do this, create, test and update what is to be the 'default' user memory as described above, then, with the this user memory still loaded on the surface, tap **NEW**, and the information will be saved into a new user memory, effectively duplicating it.

Storage Capacity

There is a capacity indicator at the top of the memories window which shows how much storage space is available. If you require more space, delete any old Shows and user memories which are no longer needed. The capacity indicator 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.

FIGURE 1 - MEMORY CAPACITY

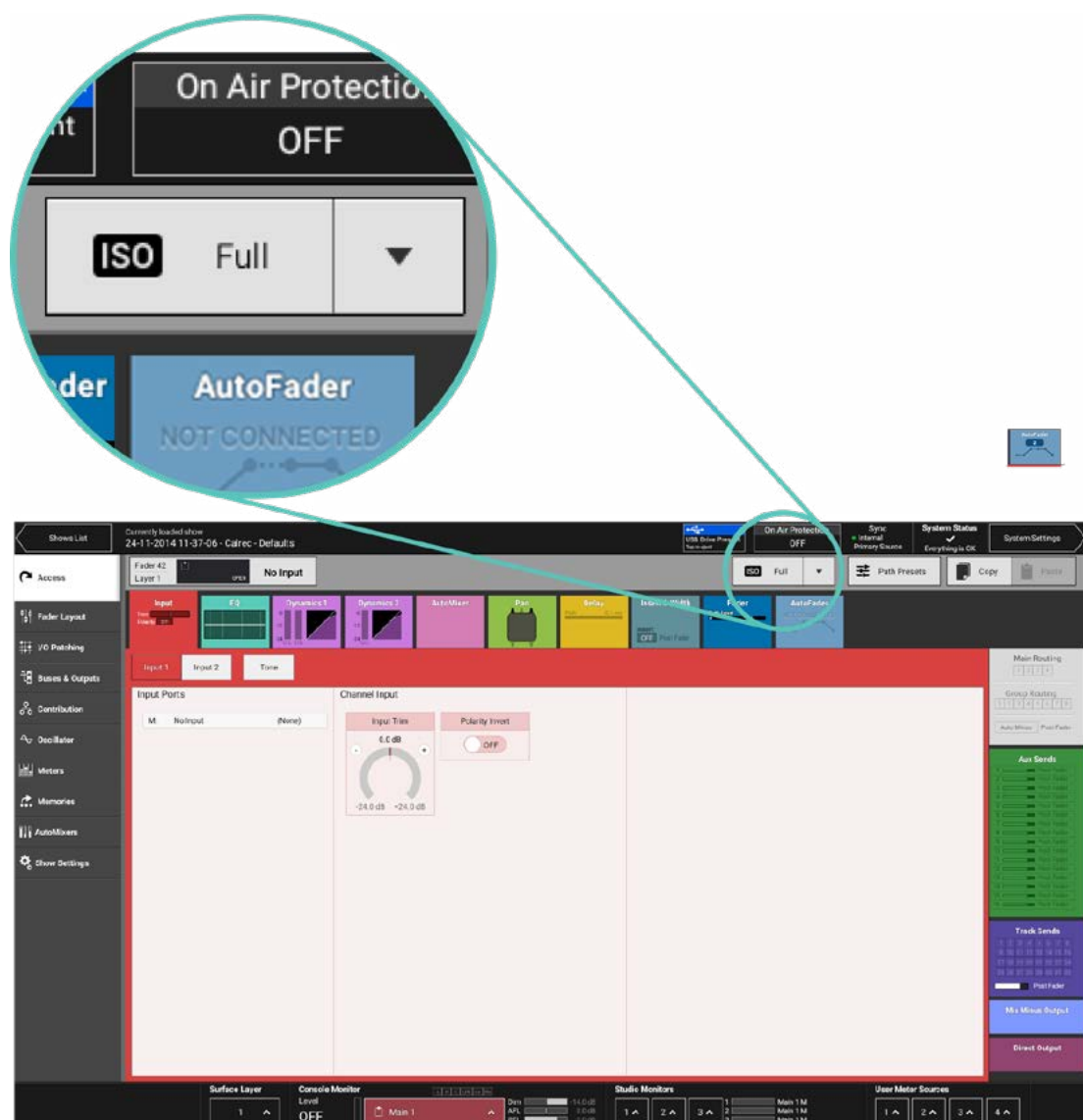


Memory Isolation

Memory Isolation is a system whereby paths or individual path parameters can be protected from being updated when a user memory is loaded. When in 'active Show' view, memory isolation options are available per-path from the ISO drop-down menu in the right hand side of the access bar: use the drop-down menu to select which parameters you wish to isolate for the currently accessed path. **ISOLATE ALL** or **ISOLATE NONE** options are also available.

Note: From version 3.2 onwards Paths that have been isolated from memory loads can be moved around the surface.

FIGURE 2 - LOCATION OF ISOLATION CONTROLS



The Isolation status of each path is indicated on its fader display—a blue ISO icon indicates a fully isolated path and a green ISO icon indicates partial isolation is in operation for that path.

FIGURE 3 - ISO ICONS



The following settings can be isolated:

- Input 1 ports
- Input 1 parameters
- Input 2 ports
- Input 2 parameters
- EQ Settings
- Dynamics 1 settings
- Dynamics 2 settings inc Automixer
- Insert
- Fader position
- The VCA master status of the fader
- The VCA slave status of the fader
- Downmix settings
- Width settings
- Main/Group Routing
- Main/Group Pan
- Aux Routing Sends and Pan
- Track Routing
- Track Sends and Pan
- Auto Minus routing
- AutoFaders
- Direct Output parameters
- Direct Output ports
- Mix Minus Output parameters
- Mix Minus Output ports
- Path Delay
- Output Delay
- Output ports

FIGURE 4 - ISOLATE SELECTOR WINDOW



SUMMA

GETTING SIGNALS IN AND OUT

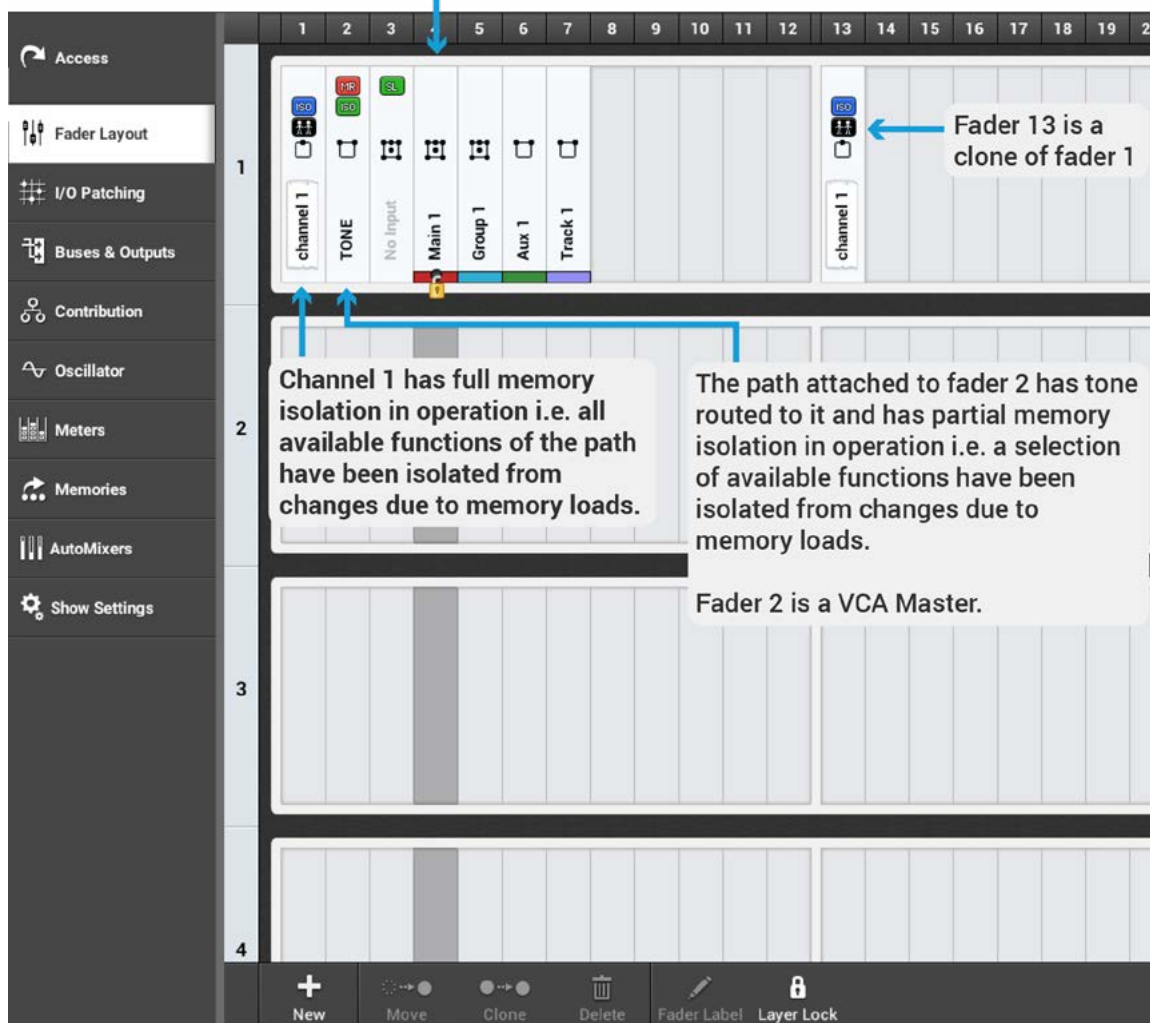
FADER LAYOUT

The first stage of passing audio into the Summa system is to attach a channel to a fader. Audio feeds to Hydra2 input ports must be attached to channels in order to be processed and routed; channels must be attached to faders to exist. Faders can be used to control channels, mains, groups, aux masters and track masters.

Tap **FADER LAYOUT** in the Show menu. You will see a visual representation of all faders on all six layers—drag in any direction to view the entire screen. The image below shows examples of all path types as viewed in the fader layout screen.

FIGURE 1 - THE FADER LAYOUT SCREEN

Fader 4 is locked to layer 1. Whichever layer is selected on the surface, fader 4, layer 1 will always stay available on the surface.



Attaching a Path to a Fader

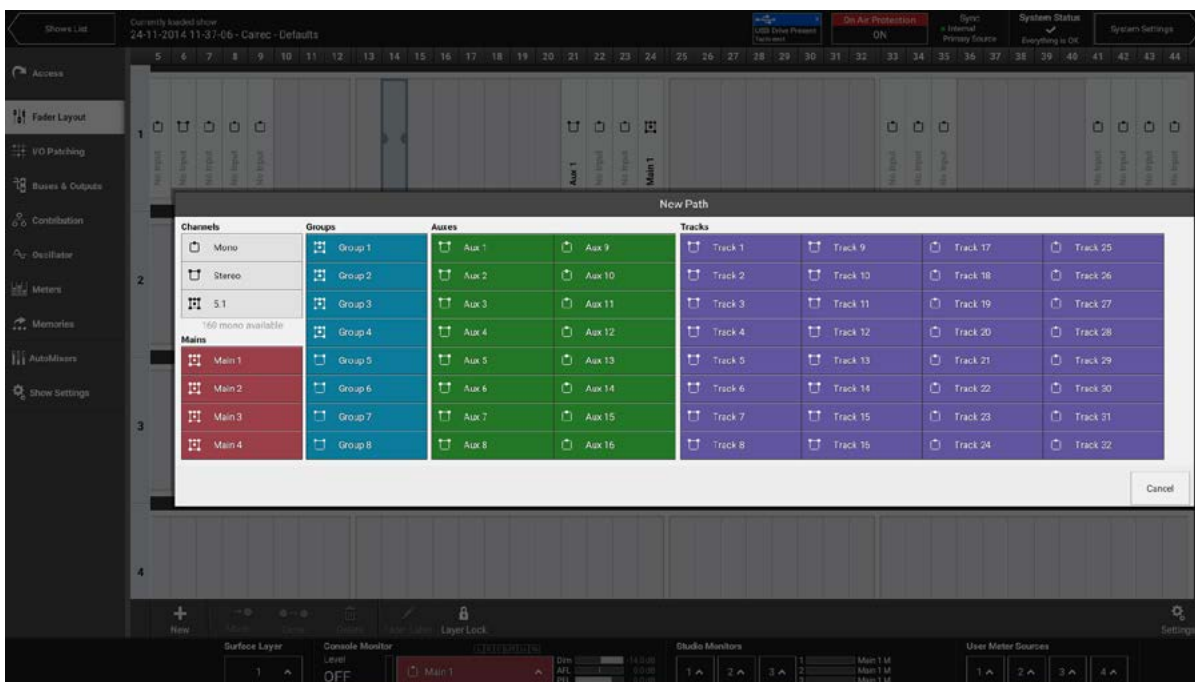
To attach a path to a single fader:

1. Tap an empty fader space to select it.
2. Tap **NEW** in the control window footer.
3. A pop-up opens to show all path options, ranging from different widths of channel to mains, groups, auxes and tracks. Tap to select the desired width/type and the pop-up closes, or tap **CANCEL** to return to the fader layout screen without making any changes.

To attach paths to multiple faders:

1. Either hold and drag or tap and drag selection handles to select the desired range of faders.
2. Tap **NEW** and select your path/width choice from the pop-up. All selected faders will then be populated with the chosen path type/width. If a main, group, aux or track is chosen, the selected faders will be populated with buses in consecutive order. For example, if you select four faders, and then choose aux master 4, the faders will be populated with aux masters 4, 5, 6 and 7.

FIGURE 2 - FADER LAYOUT — NEW PATH POP-UP



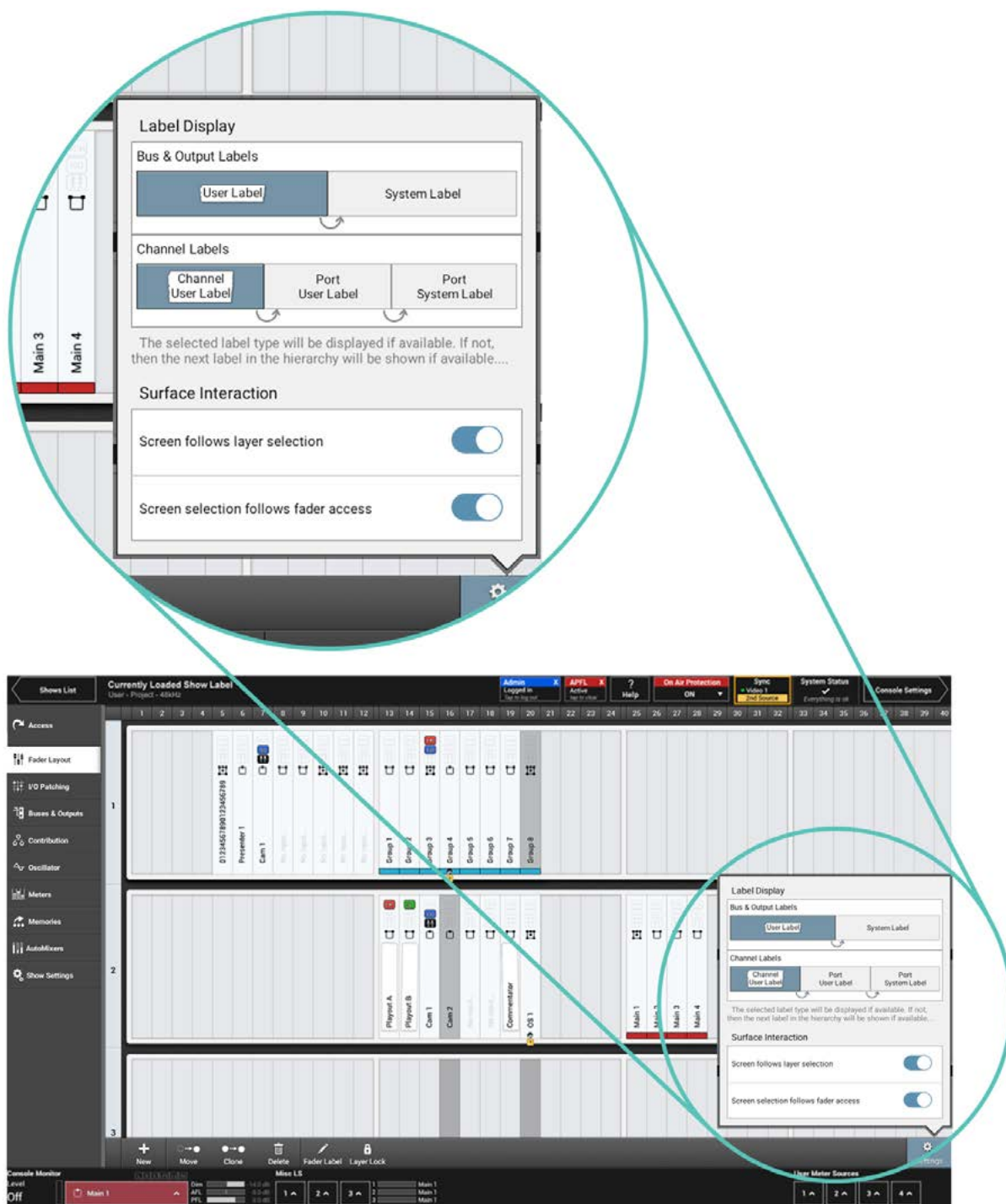
Settings

Tap **SETTINGS** in the bottom right of the fader layout window and a pop-up appears containing settings for controlling how information is displayed. The top half allows you to set how fader/port labels are displayed. Tap to select which of the three label types you would prefer to view. Your choice of label type will then be displayed if possible, if not, the next type in the priority order will be displayed, and so on.

The bottom half of the pop-up, 'surface interaction', provides two check box options:

- **SCREEN FOLLOWS LAYER SELECTION** allows the screen to scroll, bringing the selected layer into focus.
- **SCREEN SELECTION FOLLOWS FADER ACCESS** allows the screen to scroll to bring the currently accessed fader into focus.

FIGURE 3 - FADER LAYOUT SETTINGS



Editing Labels

To edit a user label:

1. Select one or more faders and tap **USER LABEL** . The footer changes to display a text entry field and four buttons, **PREVIOUS**, **NEXT** , **DONE**, **CANCEL** .
2. Enter fader labels using either the software keyboard or an external keyboard connected via one of the three surface USB ports.
3. Scroll through the fader label fields by tapping them, or by tapping **PREVIOUS** and **NEXT** .
4. Once you are happy with your changes, tap **DONE** .

Port Labels

User Label:

A label given to a port/path/bus from the Summa interface. This is only viewable on the console that it was made on.

Port User Label:

A label given to a port by the network administrator via H2O. This label is viewable across the Hydra2 network.

System Label:

A port label generated within an I/O box and viewable across the Hydra2 network.

Cloning Paths

To clone a path:

1. Select one or more faders, at least one of which must have a path attached.
2. Tap **CLONE** in the control window footer.
3. Tap the fader(s) to which you wish to clone the selected path(s).
4. Tap **CLONE** again to confirm your choice.

As you tap possible destinations, previews of the potential placements appear to help with your decision. A colour indication system is used to indicate the possible outcome of your choice: green when the destination is empty, orange when a path other than a channel is assigned to the fader, and red when a channel path is assigned to the fader. Red is used to indicate channel paths because if a channel is removed from a fader it no longer exists.

Once you have selected your destination you are presented with two options, **CANCEL** or **CLONE & OVERWRITE** which replaces the destination path with a clone of your original selection and removes the original path(s) from the surface. As channels don't exist once they are removed from faders, a pop-up appears if you attempt to overwrite a channel, requiring you to confirm your choice.

Moving Paths to Different Faders

1. Select one or more faders, at least one of which must contain a path.
2. Tap **MOVE** in the control window footer and tap the fader that you wish to move the selected paths to.
3. Tap **MOVE** again to confirm your choice.

Alternatively, once your chosen faders are selected, touch and hold again to make your selection float over the fader layout screen. From here drag your selection across the screen to your desired location. As you tap or drag across possible destinations, previews of new path placements appear to help with your decision. The colour indication system described above is used.

Once you have selected your destination you are presented with three options: **CANCEL**; **SWAP**—swaps the original paths with those on the chosen destination faders; **OVERWRITE** —replaces the destination path with your original selection and removes the destination paths from the surface. As channels don't exist once they are removed from a fader a pop-up appears if you attempt to overwrite a channel requiring you to confirm your choice.

Deleting Paths from Faders

To remove a path from a fader:

1. Select one or more faders, at least one of which must have a path attached.
2. Tap **DELETE** in the window footer.

As channel paths don't exist once they are removed from faders, if you attempt to delete a channel, a pop-up appears showing the paths that you are attempting to delete, requiring you to confirm your selection.

Lock a Fader to the Surface

Layer lock allows you to ensure some faders are always present on the surface, regardless of which layer is selected.

1. Select one or more faders (with or without paths attached).
2. Tap **LOCK** in the window footer.

The selected faders are then locked to the surface and will remain there regardless of layer selection.

I/O BOXES & HYDRA PATCHBAYS SAMPLE RATE SELECTION IN H2O

From Version 8.1 Apollo, Artemis and Brio consoles can now work at 96kHz sampling frequency (sample rate).

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

Consoles at Different Sample Rates

These consoles can switch between 48kHz & 96kHz working as required, based on the show template, however for Summa the sample rate is still fixed at 48kHz. When on a Hydra2 network, Summa needs to recognise the sample rates that the I/O and Hydra patchbays are set to and either ignore them or change their sample rate in H2O so it can use them.

I/O and Hydra2 Patchbays at Different Sample Rates

Before the I/O can be used with a Summa console its sample rate may have to be changed to match. In H2O 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 Figure 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' pop-up, allowing the I/O boxes and Hydra2 Patchbays to be set to 48kHz or 96kHz, or for 96kHz enabled consoles follow the sample rate of that specific console.

This is shown in Figure 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 H2O

Native Label	User Label	Type	Sample Rate
4	4	ModLine	48 kHz
15	15	Modular	96 kHz
137	137	MADI	48 kHz only
af1	af1	HPB	48 kHz
af2	af2	HPB	48 kHz
JDR	JDR	HPB	96 kHz

FIG 2 -SET SAMPLE RATE POP-UP SCREEN IN H2O

Native Label	User Label	Type	Sample Rate
4	4	ModLine	48 kHz
15	15	Modular	96 kHz
137	137	MADI	48 kHz only
af1	af1	HPB	48 kHz
af2	af2	HPB	48 kHz
JDR	JDR	HPB	96 kHz

Set Sample Rate

48 kHz

96 kHz

Follow Studio1 Apollo

Follow Studio 2 Artemis Light

Are you sure? Changing the sample rate will kill the audio to/from anywhere that is not at the same rate.

Apply Cancel

INPUT AND OUTPUT PATCHING

Summa desk inputs and outputs can be patched to physical I/O box ports or virtual Hydra patchbay ports, or to each other. To enter the I/O patching screen, tap 'I/O patching' in the Show menu.

Patches are made between sources and destinations.

- A source can be an I/O box input port, a Hydra patchbay output, or a desk output from the local Summa console.
- A destination can be an I/O box output port, a Hydra patchbay input, or a desk input from the local Summa console.

Each source can be patched to multiple destinations but a destination can only have one source. When patching an input port to multiple input channels it is important to remember that phantom power (48 V), input gain and sample rate conversion are all set within the Hydra2 domain and so altering these controls from any point on the surface will affect that feed for every instance of it across the surface and across the Hydra2 network.

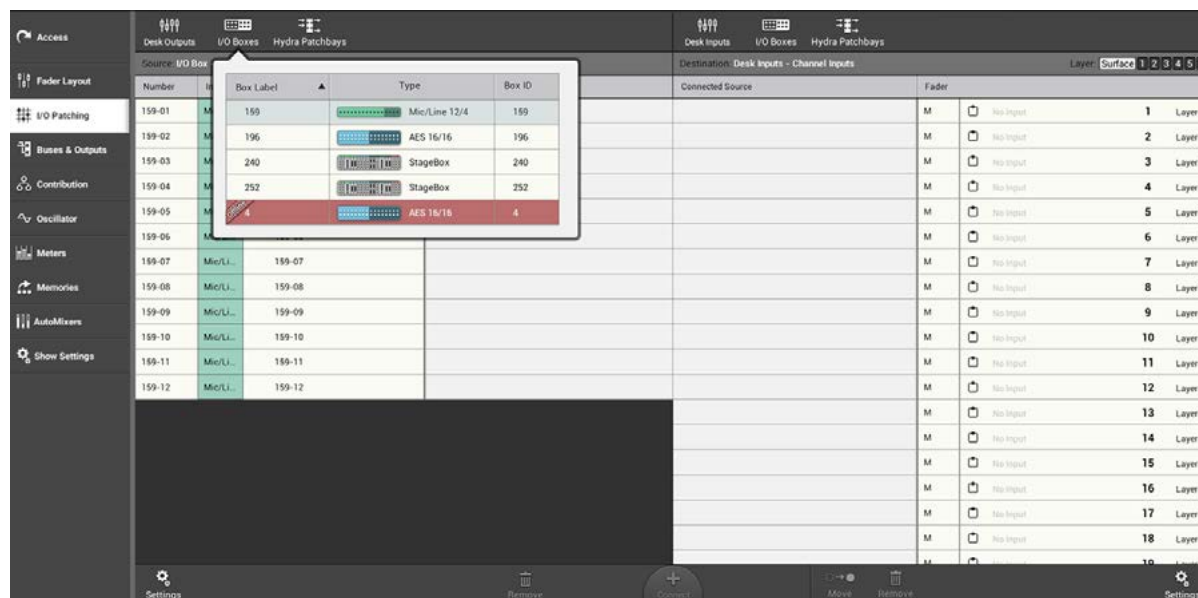
The I/O Patching Window

The I/O patching window is split into two halves, sources are displayed on the left and destinations on the right. Each side has a series of buttons running along the top for you to select which source/destination type you wish to access.

Selecting Sources and Destinations

Tap a source or destination selection button and a pop-up reveals all available options of that type, either as a set of buttons, or, in the case of I/O boxes, within a sortable table. Tapping to select one of these options, i.e. 'Aux Outputs', populates the source/destination window with the associated ports.

FIGURE 1 - I/O PATCHING WINDOW—SELECTING A PORT TYPE



Understanding Ports

The images below show how different port types are displayed within the I/O patching screen.

FIGURE 2 - PORT TYPES AS VIEWED IN THE IO PATCHING WINDOW

		
Desk Outputs	I/O Boxes	Hydra Patchbays
Source: Desk Outputs - Fader Insert Sends		Layer: Surface 1 2 3 4 5 6
Output		Connected Destination
Layer 1	1	Presenter 1
		M

		
Desk Outputs	I/O Boxes	Hydra Patchbays
Source: I/O Box - 159		
Number	Input	Description
159-01	Mic/Line	Mic Input 1 (1L)

		
Desk Outputs	I/O Boxes	Hydra Patchbays
Source: Hydra Patchbay Outputs - Shared Patchbays		
Number	Patch Point Output	Description
1	Shared Patchbays-1	Shared Patchbays-1

Port groupings are always displayed within sortable tables under the following headings:

Numbers

The port number is a combination of the I/O box hardware ID (HID) and the port number within the box—See H2O user guide for more detailed information. This is the port's native label and is generated directly from the I/O box itself.

Port labels

The port label can be either the user label, the port user label or the system label. See the port labels information box on this page for more information.

Description

The network administrator can include a brief description of a port, if so, this will be included in the I/O patching screen table. The description cells can be changed to display the connected source/destination if preferred.

Connected Source/Destination

The label of the source/destination that is connected to the port is displayed.

Icons

The following icons can be displayed in the I/O patching window:



This symbol will be displayed if you have been denied access to the port via H2O by the network administrator.



Whenever a port goes offline this icon is displayed.



Whenever a box or port is set to a different sampling frequency to the console.



If a port has been patched to/from by another Hydra2 user this icon is displayed.



If a port has been patched to/from via H2O this icon will be displayed.



If a port has been patched via a 3rd party controller this icon will be displayed.

Within the I/O patching window, sources and destinations have separate settings, which are accessible from the left and right of the control window footer. The available settings vary depending on which port type is in view:

Channel Settings

If channel inputs are in view, you can globally switch between viewing input 1 or input 2.

Layer View

When viewing fader specific paths, such as channel inputs or fader inserts, layer view options will be available.

Select layers 1–6 to view only faders on that layer, or select **SURFACE LAYER** to view the layer which is currently active on the surface.

Surface Interaction

When viewing fader specific paths, such as channel inputs or fader inserts, surface interaction options are available.

Checking the **FADER SELECTION FOLLOWS FADER ACCESS** check box brings the currently accessed fader directly into view within the I/O patching screen at all times.

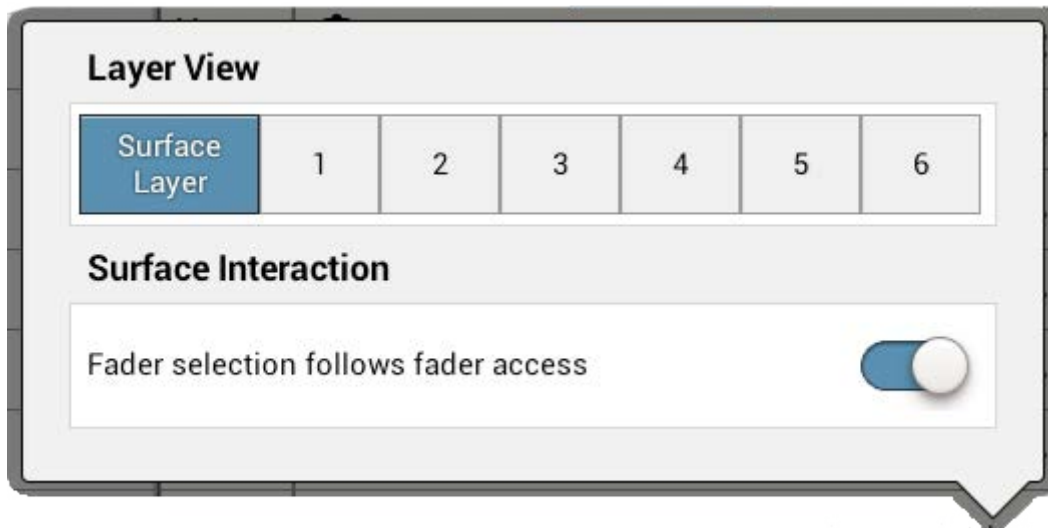
Connected Destination

You can view connected destinations from sources and view connected sources from destinations. Both are displayed within the centre columns with this option selected.

Information Display

When viewing Hydra patchbays or I/O boxes, the information display split-selection button is available to choose between viewing path descriptions or connected source/destinations within the two centre columns of the screen.

FIGURE 3 - SETTINGS POP-UP



Viewing and Sorting

Ports are displayed within sortable tables. The sorting options vary between port types:

- Fixed format and modular I/O boxes can be sorted by number (native label), port label or description (if available). To keep I/O boxes together in the viewing table, sort by 'number' as this includes the box's HID which will be the same for all ports in that I/O box.
- Hydra patchbays can be sorted by patchbay name or patch-point number.
- Desk connections can only be sorted by resource number e.g. main 1 to 4.

In order to keep the individual legs of a 5.1 path together within the display you can add a suffix to each leg, for example L, R, C LFE, Ls, Rs. See ["General Settings" on page 59](#) for more information.

Making a Patch

To patch a source to a destination:

1. Select a source type from the source window header.
2. Select a destination type from the destination window header.
3. Tap to select a source.
4. Tap to select a destination.
5. Tap **CONNECT**.

Moving a Destination

Once a patch has been made, the destination can easily be changed:

1. Select a destination.
2. Tap **MOVE** in the window footer.
3. Select an alternative destination, (at this point you can select a new destination type).
4. Tap **MOVE** once more.

Protect a Patch from Memory Loads

Patches can be 'fixed', which makes the patch at 'System' level, this means they are unaffected by memory or show load changes as they are not stored in memories or shows. Fixed patches are not protected under the port protection system, unlike ports which are in use by multiple Hydra2 network users (See ["Source and Destination Protection" on page 89](#)).

To Fix a patch:

1. Select one or more patched destinations.
2. Tap **FIX** in the window footer.
3. To un-fix the patch, tap **FIX** again.

Isolating a Patch

Isolating a patch protects it from changes due to memory loads. Note that patch isolation only relates to actions performed on the local Summa console. Isolated patches can still be over-patched by other Hydra2 users and by memory loads on other consoles on the network.

To isolate a patch:

1. Select one or more patched destinations.
2. Tap **ISO** in the window footer.
3. To de-isolate the patch, tap **ISO** again.

Removing a Patch

To remove a patch from the system:

1. Select either the source or destination (or one of the destinations if the source is patched to more than one).
2. Tap **REMOVE** in the window footer. The patch is automatically removed, unless it is 'fixed' on the surface or was made by another Hydra2 user, in which case a pop-up appears requiring confirmation of the removal.

Inputs 1 and 2

Every Summa channel has two inputs, 1 and 2, to which two entirely separate feeds can be patched. Input 2 is generally used for patching a back-up microphone so that if the feed to input 1 fails, you can quickly switch to use input 2, which has exactly the same processing, routing and output patching applied to it as input 1.

Patching Outputs to Inputs

Desk outputs and buses can be connected directly back into channel inputs. This method of control is different to just attaching a console output to a fader. From the I/O patching screen select **DESK OUTPUTS** in the sources window and **DESK INPUTS** in the destinations window and patch as normal.

INPUT CONTROLS

With the touch display in 'active Show' view, tap the input processing tab to view all input controls for the currently accessed channel or group.

Depending on the type of input port that is connected to a channel, you will see some or all of the controls described here. The input controls window is split into three sections, the header contains general controls, the physical I/O box port controls are on the left and Summa's channel controls are on the right. In the control window header the Input 1 / Input 2 toggle button allows you to switch between two entirely separate I/O box input ports which may be patched to the currently accessed path. The tone switch toggles tone on and off to the channel.

I/O Box Input Port

Controls and information fields on the left of the Input window relate to the physical I/O box input port; at the top, the port's native/user label is displayed. The rotary control and switches control mic/line gain and phantom power settings for the connected physical input port.

If the port is shared with other Hydra2 network users this will be indicated, as shown in the image below, with a padlock icon along with a list of all network users who are sharing the port. The **ENABLE TEMPORARY CONTROL** button is used when altering shared port controls, see ["Source and Destination Protection" on page 89](#) for more information.

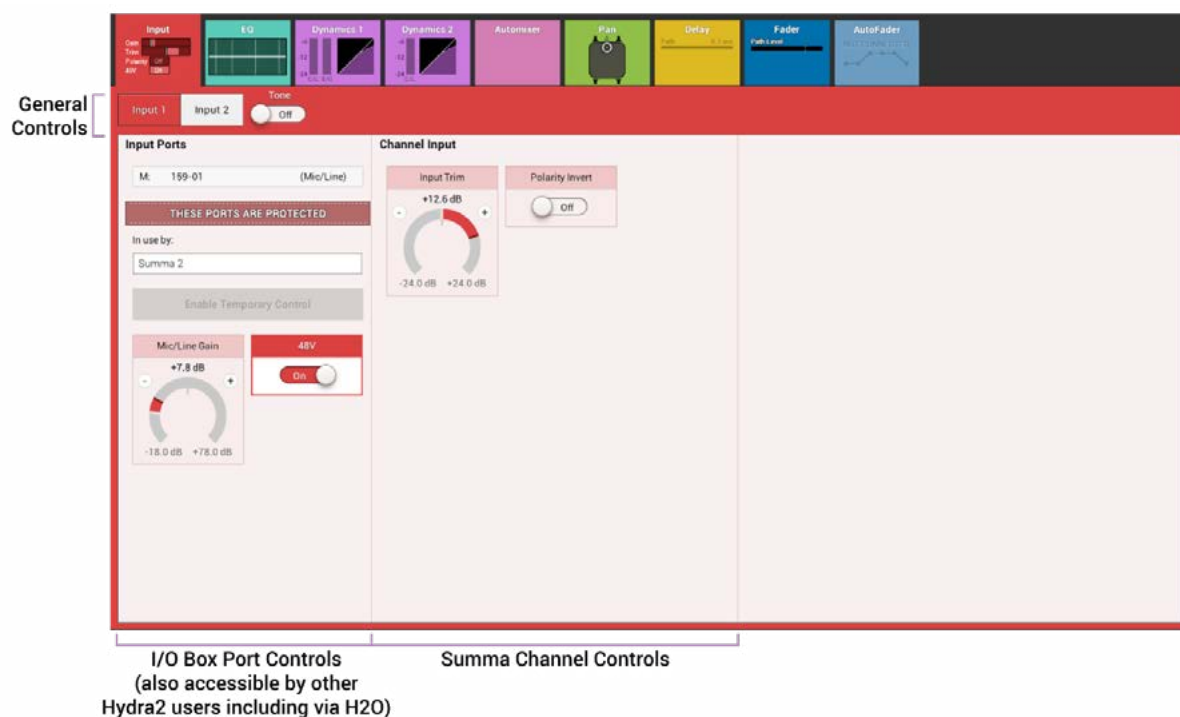


The Channel Input

The channel input controls on the right of the screen control the DSP settings within the Summa processing core for the currently accessed path:

- Input Trim increases or reduces the level of the incoming signal between -24 dB and +24 dB.
- There are polarity invert switches for each leg of the path.
- If a stereo path is accessed, a middle and side (M/S) decoder will be available. Switching this on automatically treats the incoming stereo signal as a middle and side microphone array.
- Input balance allows you to alter the weighting of the stereo signal between the left and right legs of the path.
- Path leg routing options **L TO LR** and **R TO LR** 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 **L TO LR** to the on position feeds the left signal to both left and right sides of the stereo path, and switching on **R TO LR** 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 it is a full range balance control i.e. turning the dial all the way to the left just outputs the 0 dB left hand signal from the left leg of the path. With either **L TO LR** or **R TO LR** 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.

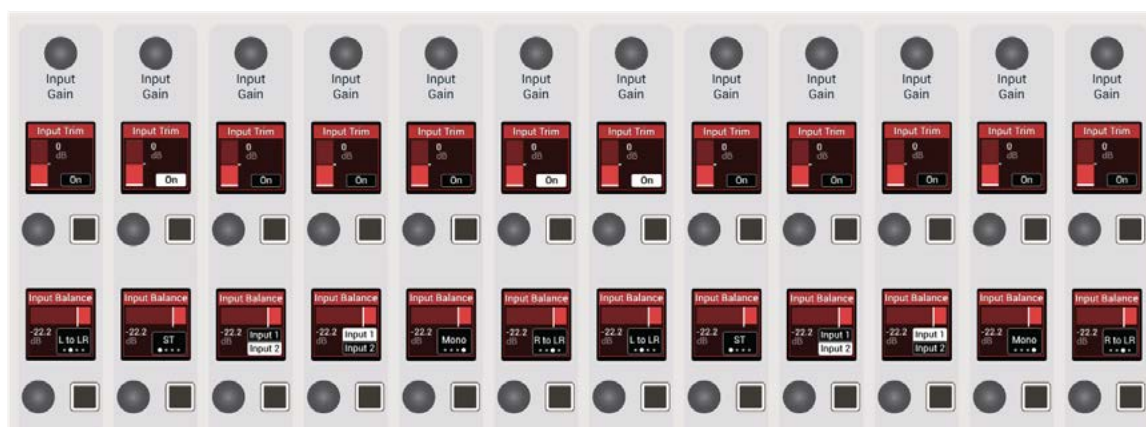
FIGURE 1 - INPUT CONTROLS



Input Control Mode

Push the **INPUT** control mode button on the surface to populate each pair of control cells with input controls for the fader below. The top control cell is for controlling input trim and the button switches between input 1 and 2. The bottom control cell controls input balance for stereo paths, the button toggles through the various path leg routing options. The balance control is only operational with both path leg routing options either on (mono) or off (stereo).

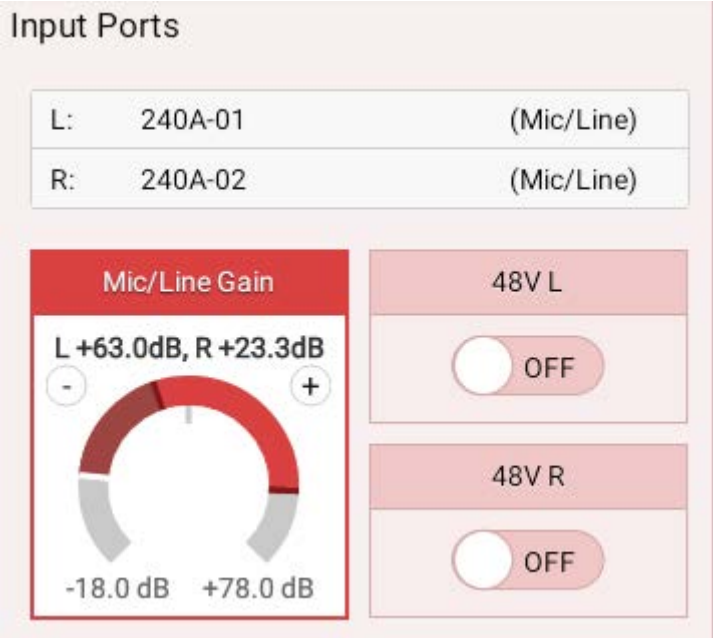
FIGURE 2 - CONTROL CELLS—INPUT CONTROL MODE



Mic/Gain

If the gain of any connected mic/line input is not the same on all legs of a stereo or surround channel, then the gain display will show the highest and lowest value for surround sources, left and right values for stereo sources , as highlighted below:

FIGURE 3 - MIC/GAIN



Group Input Controls

When a stereo or mono group is accessed an input trim control is available from the input window as shown below. Path leg routing buttons are also provided for stereo groups:

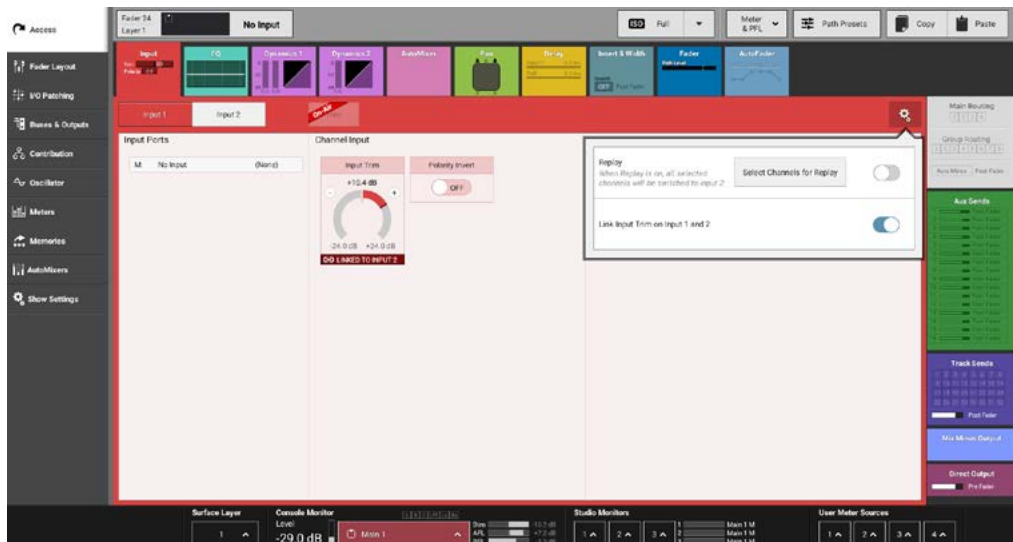
FIGURE 4 - GROUP INPUT CONTROLS



Linking Input 1 and Input 2 Trims

Inputs 1 and 2 have separate input trim controls . These can be linked from the Tools menu on the Access> Input screen as shown in Figure 5 below. The wording on the Control Cell changes to show the words 'Trims Linked' between the Input 1 and Input 2 source identifiers. The display on the screen also shows the fact that the Input trims are linked.

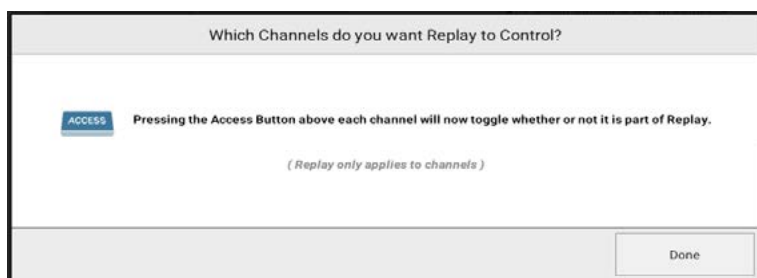
FIGURE 5 -LINK TRIMS



Replay

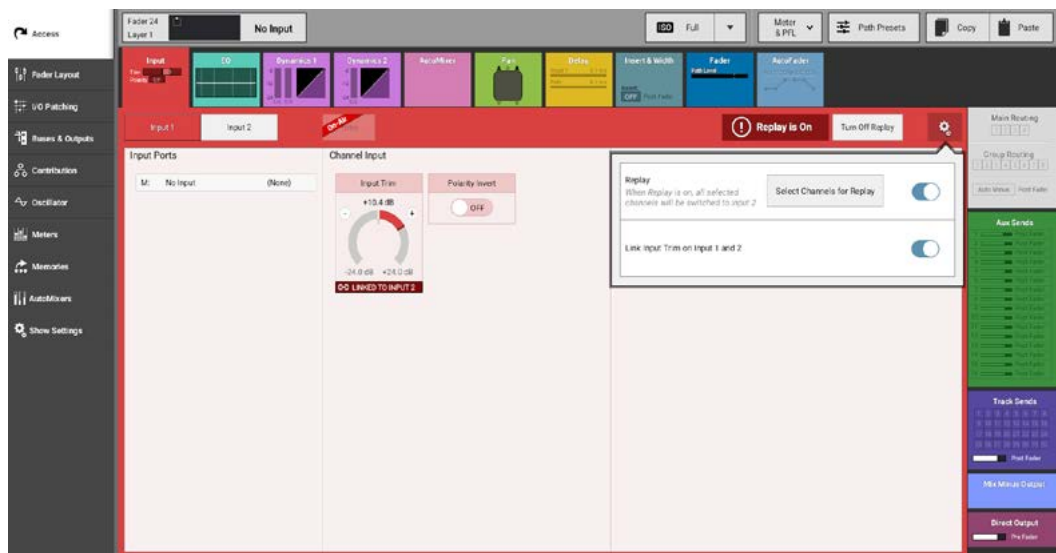
Replay allows the user to select a number of channels to switch between input 1 and input 2 from one control which can be a user button or be controlled from the screen. This is also achieved from the Tools menu on the Access>Input screen shown in Figure 5 above. The user then selects paths for replay using the ACCESS keys. see Figure 6 below. The fader displays change to say 'REPLAY' rather than 'not in replay' as appropriate.

FIGURE 6 -REPLAY CHANNEL SELECTOR



When Replay is active these channels will switch to Input 2, when Replay is turned off the input channels switch back to input 1. Replay makes setting up a virtual soundcheck easy. With the sources connected to input 1 each source is sent to a recorder and its returns are connected to input 2. When the talent leaves the user can turn replay on play the recording and continue the soundcheck. On completion the replay is turned off to switch all the inputs back to the live sources. Note: Replay can also be controlled from a GPI if required. Figure 7 shows system in Replay.

FIGURE 7 -SYSTEM IN REPLAY

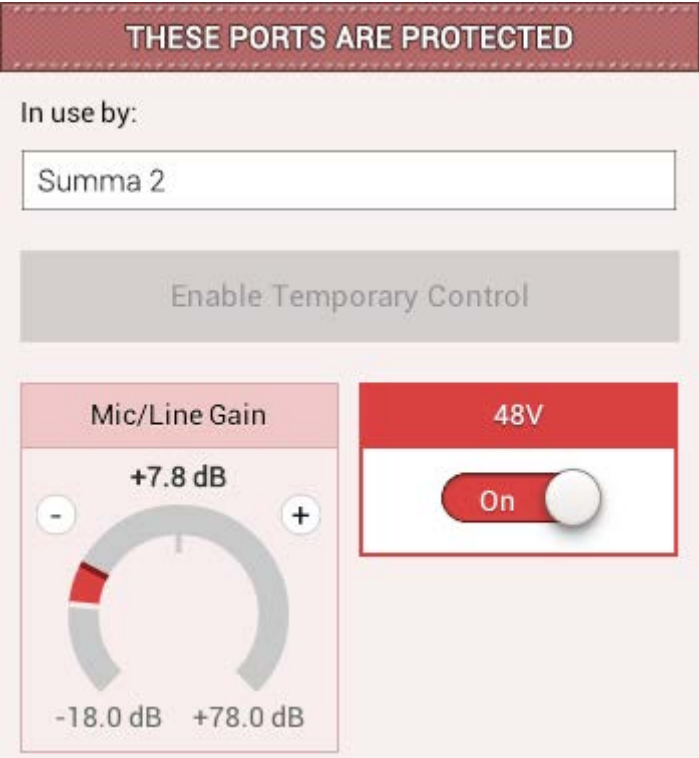


SOURCE AND DESTINATION PROTECTION

Source and destination protection is a simple system using pop-ups and buttons to protect input parameter settings and output destinations when ports are in use by multiple users across a Hydra2 network.

When viewing inputs on Summa, you will notice if it is being shared, as the following label will be displayed:

FIGURE 1 - INPUT PROTECTED



The same protection applies if the port has been 'protected' within H2O, if this is the case, the following will be displayed:

FIGURE 2 - INPUT PROTECTED BY H2O



Destination Protection

The image on the next page shows the I/O port patching screen during the process of making a source to destination connection. A 'traffic-light' colour coding system is used. The coloured arrows indicate any issues associated with the potential source to destination patch.

- A green arrow indicates that there is no source currently connected to the destination so the patch can be made with no issues.
- The yellow arrow indicates that currently the destination has a local source connected to it.
- The red arrow indicates that the destination has had a source patched to it by another user on the network.
- The grey arrow indicates that the patch will not be made because you have been denied access to the port by the network administrator.

If you decide to go ahead with the patch and the indication arrow is either red or yellow, the protection pop-up shown below will appear as an extra level of protection, allowing you to review all potential changes before committing.

FIGURE 3 - PROTECTION ARROWS

Desk Outputs I/O Boxes Port Folders Hydra Patchbays				Desk Inputs I/O Boxes Port Folders Hydra Patchbays			
Source: I/O Box - Box Label				Destination: Hydra Patchbay Inputs - Patchbay Label			
Number	Input	Connected Destination		Connected Source	Patch Point Input	Number	
10-001	Mic/Line	Port Label			HPB In 1	1	
10-002	Mic/Line	Port Label		IO032-002	HPB In 2	2	
10-003	Mic/Line	Main 1 - Main Prog L		IO032-003	Main 1 - Main Prog L	HPB In 3	3
10-004	Mic/Line	Main 1 - Main Prog R	IO032-004	IO032-004	Main 1 - Main Prog R	HPB In 4	4
10-005	Mic/Line	Main 1 - Main Prog C	IO032-005	IO032-005	Main 1 - Main Prog C	HPB In 5	5
10-006	Mic/Line	Main 1 - Main Prog LFE	IO032-006	IO032-006	Main 1 - Main Prog LFE	HPB In 6	6
10-007	Mic/Line	Main 1 - Main Prog Ls		Aux 1 - Foldback	Main 1 - Main Prog Ls	HPB In 7	7
10-008	Mic/Line	Main 1 - Main Prog Rs			Main 1 - Main Prog Rs	HPB In 8	8
10-009	Mic/Line	Embed 1R				HPB In 9	9
10-010	Mic/Line	Embed 1C				HPB In 10	10
10-011	Mic/Line	Embed 1LFE				HPB In 11	11
10-012	Mic/Line	Embed 1Ls				HPB In 12	12
						HPB In 13	13
						HPB In 14	14

Source Protection

Audio sources can be shared by all consoles on the Hydra2 network. Source protection adds an layer of protection when making changes to the following input controls:

- Mic/line gain.
- Phantom power (48 V).
- SRC (if using AES sources).

As indicated in the input control window, to make changes to these protected input controls, simply tap **ENABLE TEMPORARY CONTROL**, then make the desired changes. This remains active until you touch any control outside the input window, at which point it will need to be activated again to make any changes to the protected input controls.

User Memory Load Protection

Loading a user memory will generally include changes to patching and input controls, if these changes affect shared/protected inputs, or patching to outputs which are already in use by other users on the network, source and destination protection will come into play.

When a user memory with conflicting settings/patching is loaded, a pop-up, like the one shown below, is displayed on the touch display. The number of pages within the pop-up depends on whether there are conflicts relating to sources, destinations or both.

Once you have checked all conflicts and selected those that you wish to accept, tap **OVERWRITE SOURCE & DESTINATION SETTINGS**. Tapping **DON'T MAKE ANY CHANGES** rejects all changes to shared sources and destinations, but makes all other changes associated with the memory load.

Ensure that you fully understand the effect of any accepted changes as you will be directly affecting other users on the network.

FIGURE 4 - SOURCE AND DESTINATION POP-UP—MEMORY LOAD

Source and Destination Protection

1

2

Destination Patching

The following destinations are protected. Tap on your new sources to overwrite the existing connections made by other users.

Select AllDe-select All

Destination ▲	Current Owner	Current Source	Your Source
IO100-001	Desk A	Desk A - Main 1	Main 3 L
IO100-002	Desk A	Desk A - Main 1	Main 3 R
Studio Out 1	H2O User	OS Feed 7	Prod Send
Studio Out 2	Another Desk	VT Input	Headphone Output
Studio Out 2	Another Desk	VT Input	Prod Send

Back to Protected Sources

3 of 7 source settings will be changed

2 of 4 destination patches will be changed

Overwrite Source & Destination Settings

Don't Make Any Changes

EXTERNAL INPUTS

Summa has a pool of 152 mono external input resources from which you can create any combination of mono, stereo and 5.1 inputs, using one, two or six resources respectively. External inputs can be monitored and metered and are available as patching destinations within the I/O patching window.

External inputs are typically used to monitor down-stream feeds or 'off-air' returns to ensure the console output is not being compromised on its way to its intended destination.

To view the external inputs window, tap **SHOW SETTINGS** at the bottom of the Show menu, then tap **EXTERNAL INPUTS**.

Creating External Inputs

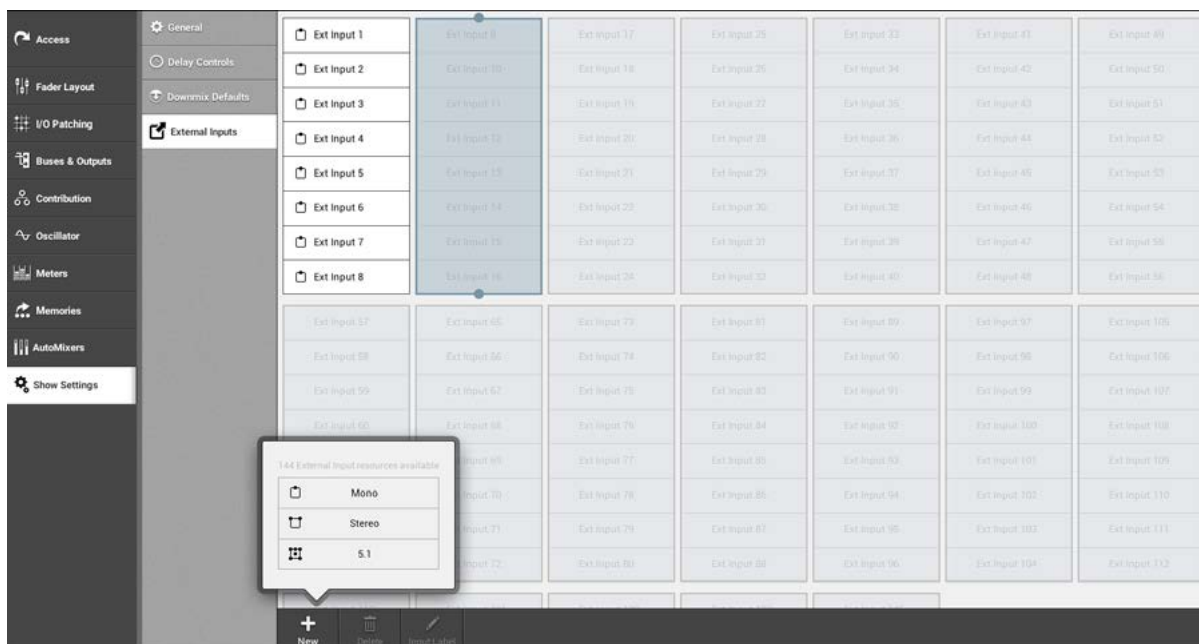
Within the external inputs window, select one or more cells using one of the following options:

- Tap to select a single cell.
- Touch and drag to select multiple cells.
- Tap, then drag selection handles to select multiple cells.

... then tap **NEW**.

Select a path width from the pop-up—mono, stereo and 5.1—and your selected cells are populated with your choice. Note, within the pop-up the number of remaining external input resources is displayed.

FIGURE 1 - CREATING EXTERNAL INPUTS



Removing External Inputs

To remove external inputs:

1. Select one or more external input cells using one of the methods described above.
2. Tap **DELETE** .
3. A pop-up appears showing all external input paths to be deleted, tap **DELETE** to accept. The deleted resources are returned to the resource pool to allow more external inputs to be created.

Labelling External Inputs

By default, external inputs have labels which correspond to the cell that they were created in, for example "External Input 5" in cell 5. You may wish to add your own labels. To do this:

1. Select one or more external inputs using one of the methods described above.
2. Tap **EDIT LABEL** .
3. The control window footer changes to text input mode, with navigation buttons: **PREVIOUS**, **NEXT** , **DONE** and **CANCEL** . Move between the external inputs and edit each label individually either by using these buttons or by tapping on the individual text fields.
4. Once you are happy with your labels, tap **DONE** .

Patching to External Inputs

External inputs appear within the 'desk connections' patching destination list. They can be patched-to using the usual method, as described here: ["Input and Output Patching" on page 81](#).

Monitoring External Inputs

To monitor an external input:

1. Tap the console monitor source selection button in the monitor bar.
2. Select the EXTERNAL INPUTS tab within the pop-up.
3. Select the external input that you would like to monitor.

Monitoring is explained in more detail here: ["Monitoring" on page 105](#).

FIGURE 2 - MONITORING POP-UP—EXTERNAL INPUTS



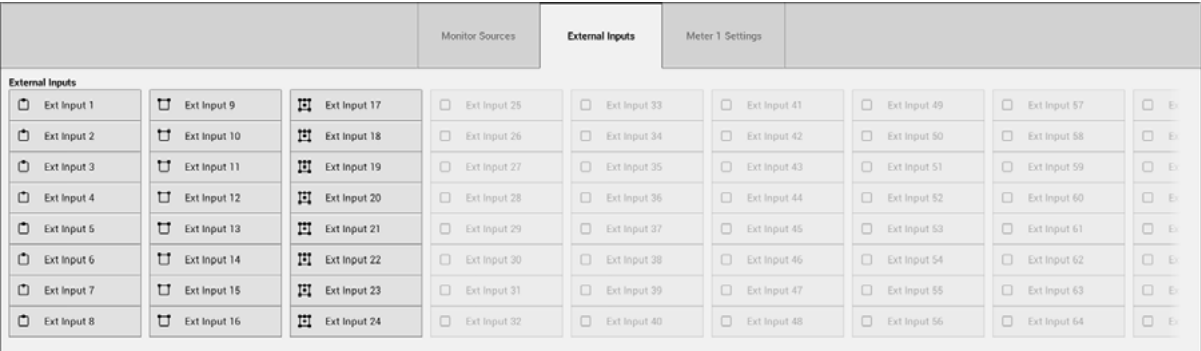
Metering External Inputs

To meter an external input:

1. Tap one of the four meter selectors to the bottom right of the touch display.
2. Select the external input tab within the pop-up.
3. Select the external input that you wish to meter.

Metering is explained in more detail here: [“Meter Types” on page 117](#).

FIGURE 3 - METERING EXTERNAL INPUTS



DIRECT OUTPUTS

Direct outputs are path specific desk outputs, which are available for patching. Summa has a pool of 188 resources, which can be assigned to be direct outputs or mix minus outputs.

Assigning a Direct Output

To assign a direct output to a path:

1. In 'active Show' view, tap the direct output routing tab.
2. Tap **MONO**, **STEREO** or **5.1** to choose a direct output width.
3. If not enough resources are available for the output that you want to create you can remove other direct / mix minus outputs to free-up resources.

Note, within the pop-up the number of remaining direct / mix minus resources is displayed.

Removing a Direct Output

To remove a direct output:

1. Tap to choose **NO PATH** from the path width drop-down menu in the direct output control window header.
2. A pop-up will appear asking you to confirm the removal of the direct output, tap either **REMOVE OUTPUT** or **CANCEL**.

Downmix/Spill

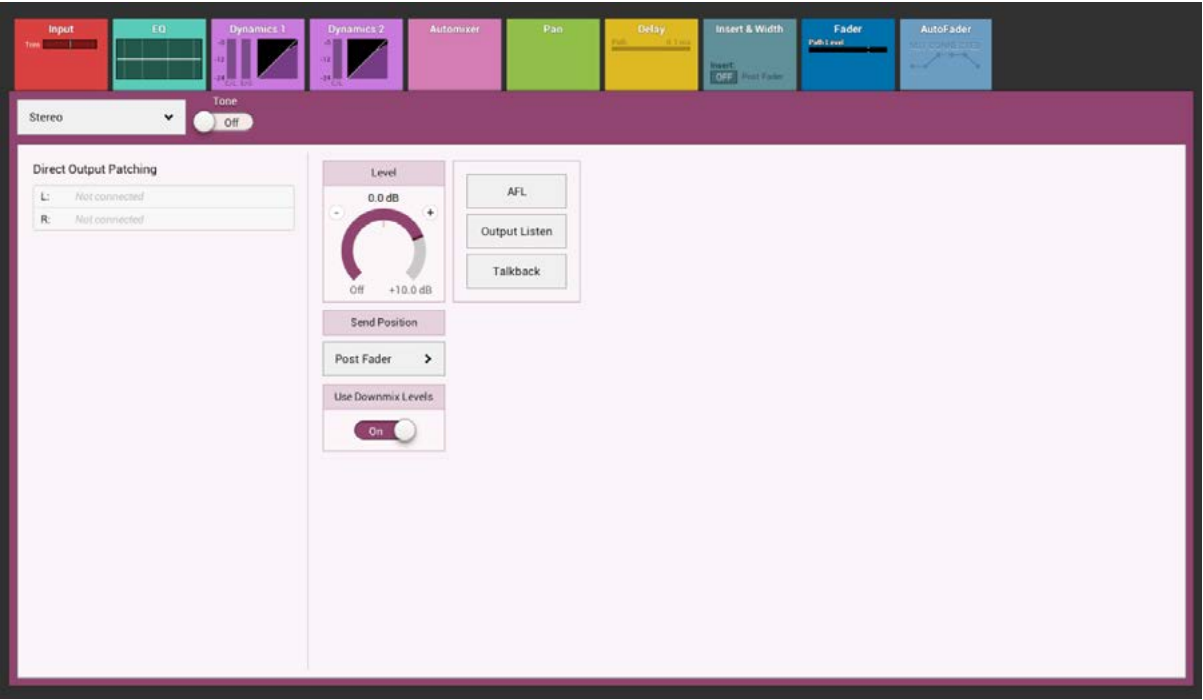
If a direct output is assigned to a surround path, two options appear to the bottom of the direct output window that allow you to set whether the downmix or spill faders are used for downmixing the path to mono or stereo.

See "[Downmixing](#)" on [page 167](#) for more information.

Direct Output Controls

- Tap the width drop-down menu to change the width of the direct output or select 'no width' to remove it.
- Tone: Tap to inject tone into the direct output, replacing the direct output feed with the correct tone for the width of the path.
- Direct Output Patching: The direct output's patch destination is displayed.
- Level: Turn the level rotary control to alter the level of the direct output between 'off' and +10 dB.
- Send Position: Direct outputs can be taken at different points in the associated path's signal flow, pre EQ, pre fader or post fader.
- Use Downmix Levels: If the direct output's associated path is 5.1 and the direct output is stereo or mono you can choose whether or not to use the downmix fader levels during the downmixing process.
- AFL: Tapping AFL replaces the console monitor source with the direct output feed, post level control, providing a non-destructive solo for the direct output.
- Output Listen: Similar to AFL but the feed is taken post output delay.
- Talkback: Replaces the direct output feed with whatever is routed to the talkback input.

FIGURE 1 - THE DIRECT OUTPUT WINDOW



MIX MINUS OUTPUTS

Mix minus outputs are path- specific desk outputs, which are available for patching. Summa has a pool of 188 resources which can be assigned to be mix minus outputs or direct outputs.

Mix minus outputs are used to create foldback feeds using a comprehensive contribution system for defining the paths or buses that feed the output. See [“Mix Minus” on page 155](#) for detailed information on how to set up and use the mix minus system, including a list of all mix minus controls.

Assigning a Mix Minus Output

To assign a mix minus output:

1. In ‘active Show’ view, tap the mix minus output routing tab.
2. Tap **MONO** or **STEREO** to select the mix minus output width that you wish to create for the currently accessed path.

If not enough resources are available for the desired output, you can remove other direct/mix minus outputs to free-up resources. Note, at the bottom of the pop-up the number of remaining resources is displayed.

Removing a Mix Minus Output

To remove a mix minus output:

1. Choose **NO PATH** from the path width drop-down menu in the mix minus control window header.
2. A pop-up will appear asking you to confirm the removal of the mix minus output. Tap either **REMOVE OUTPUT** or **CANCEL**.

BUS OUTPUTS

Summa's bus outputs—4 mains, 16 auxs and 32 tracks—are all available for patching from the I/O patching screen. Bus outputs appear under desk outputs in the sources window.

Multiple paths can be routed to each bus using the routing tabs down the right hand side of the control window.

See [“Routing a Signal” on page 164](#) for more detailed information.

Mains

Mains are generally used as main broadcast outputs of the system as well as to feed monitoring systems.

Two versions of each main are available for patching out of the system: main and main (pre talkback and tone).

Main (pre talkback and tone) is generally used for monitoring output, for example, during rehearsals.

Tracks and Auxs

Tracks and Auxs are generally used to feed external signal processing devices or to create interruptable foldback feeds.

Auxs differ to tracks in that each path has individual level controls and send position switches for each of the 16 aux feeds, allowing a high level of control over 16 separate mixes. Each path has one level control and position switch for all 32 track sends—auxs also have an additional level of logic control, allowing you to set conditions under which each pre fader aux send should be cut.

See [“Buses and Outputs” on page 162](#) for more detailed information on using and configuring buses.

TONE AND OSCILLATOR

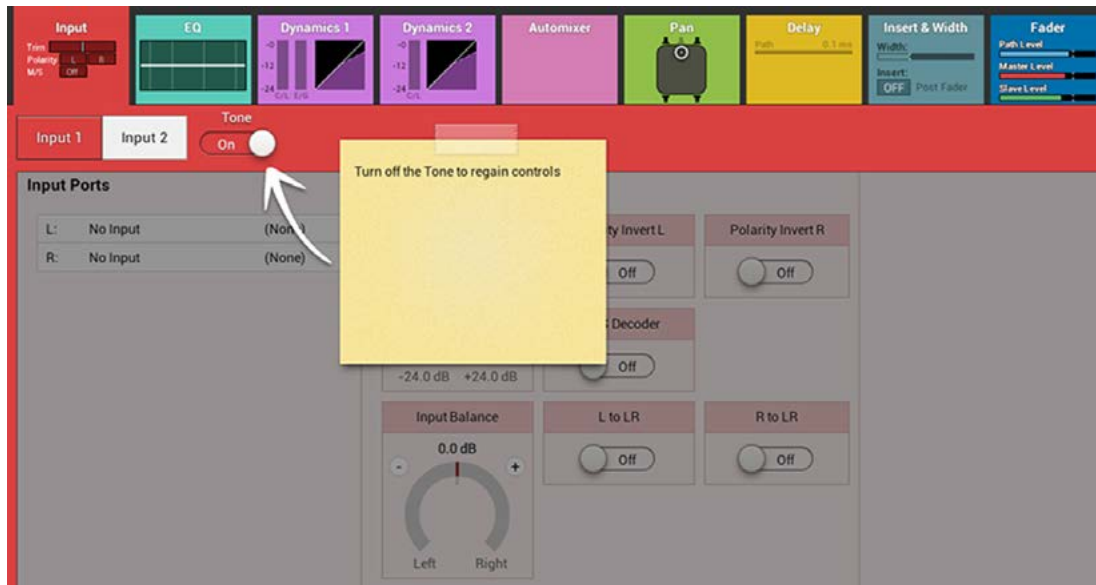
Summa provides many ways to inject tone within the system to help with path-checking and line-up.

Routing Tone to a Channel

1. Press the fader **ACCESS** button for the channel to which you wish to inject tone.
2. Tap the input processing tab.
3. Tap **TONE** in the input control window header.

It is easy to see if tone has been routed to a channel input as a note appears in the input window as shown below:

FIGURE 1 - TONE TO CHANNEL INDICATOR



Routing Tone to Buses

1. Tap **BUSES & OUTPUTS** in the Show menu.
2. Select the group/track/aux/main tab depending on which bus/output type you wish to route tone to.
3. Tap **TONE** for the chosen bus/output. (tone is routed to main 1 in the image below).

FIGURE 2 - ROUTING TONE TO A BUS OR OUTPUT



Routing Tone to Path Outputs

1. Select either the mix minus or direct output routing tab.
2. Tap **TONE** in the control window for mix minus outputs or in the control window header for direct outputs.

FIGURE 3 - ROUTING TONE TO A MIX MINUS OUTPUT

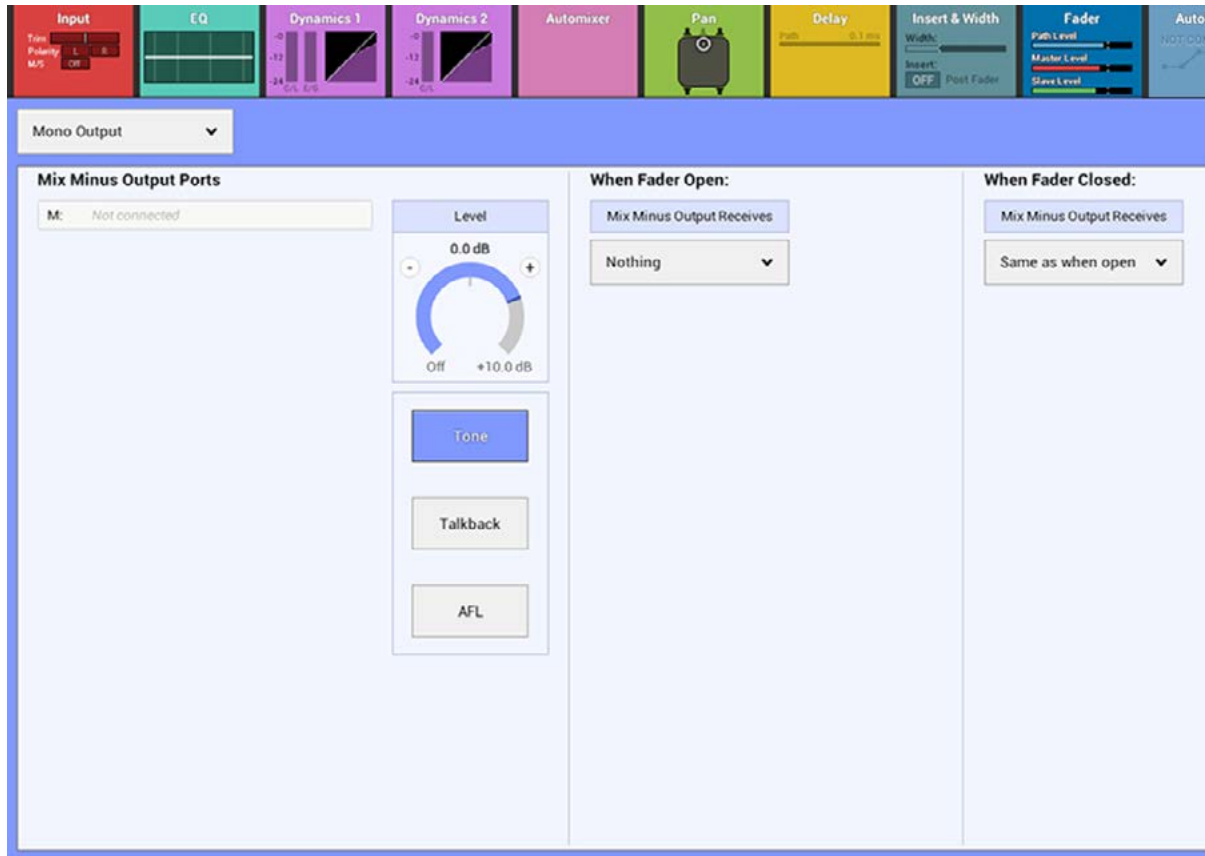
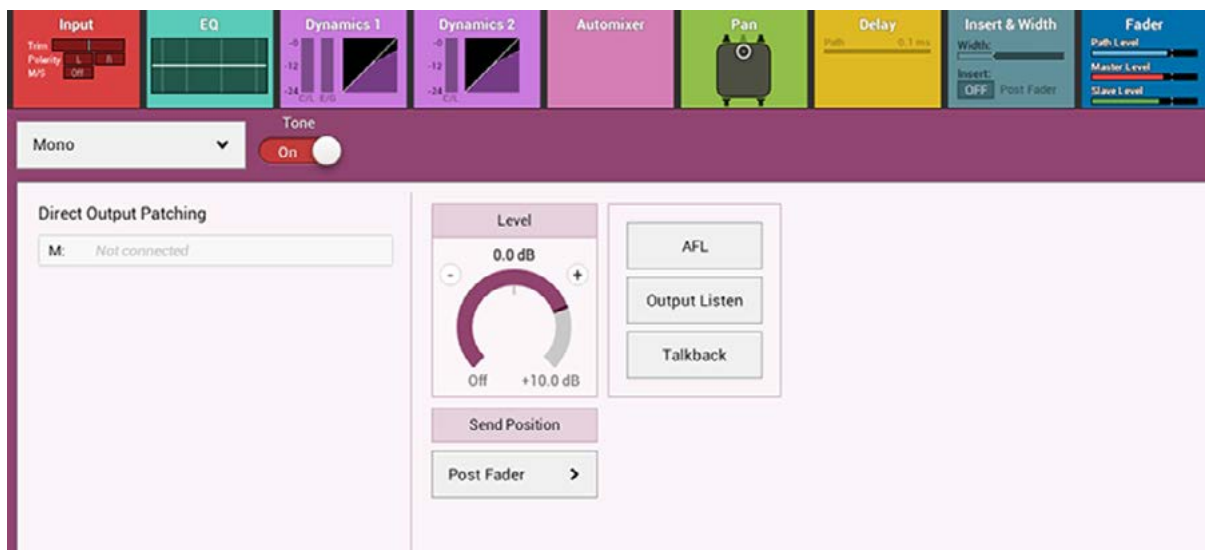


FIGURE 4 - ROUTING TONE TO A DIRECT OUTPUT



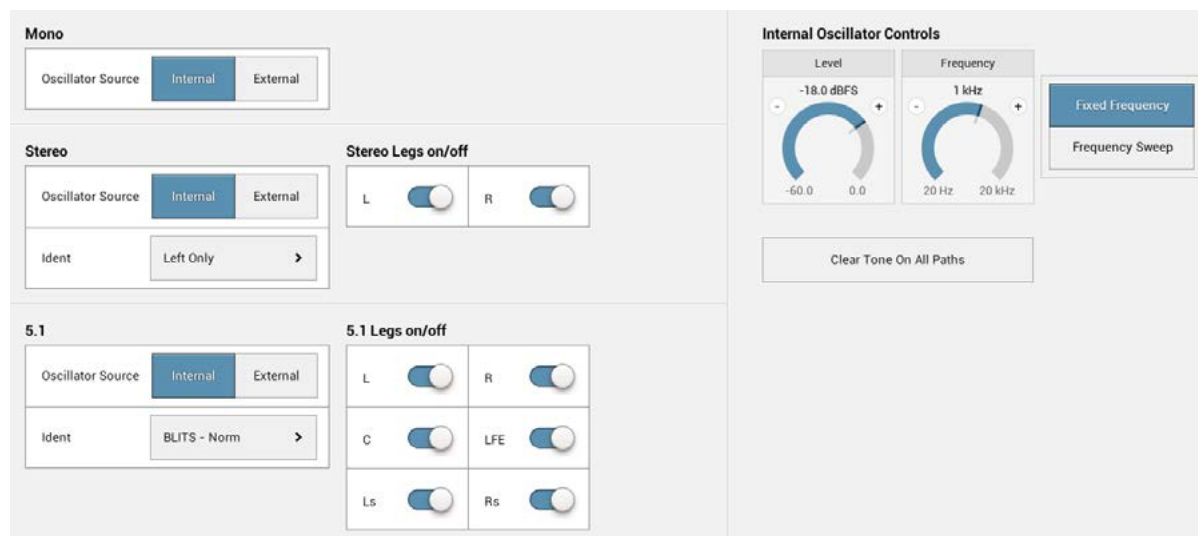
Oscillator Controls

Internal tone signals are generated by Summa's oscillator which can be controlled from the oscillator setup area. To access this, tap **OSCILLATOR** in the Show menu.

Summa has one internal oscillator which is controlled using the two rotary controls towards the bottom of the window: level and frequency. You can set the oscillator to generate a fixed tone at the specified frequency, or a stepped 20 Hz to 20 kHz tone sweep.

Different tone sources can be set for each path width (mono, stereo and 5.1) using the internal and external tone source buttons. Selecting **INTERNAL** uses Summa's internal oscillator as the tone source for that path width, whereas selecting **EXTERNAL** uses the feed that is currently patched to Summa's external tone input. Each leg of a stereo or 5.1 tone source can be muted individually.

FIGURE 5 - OSCILLATOR CONTROLS



Clearing Tone

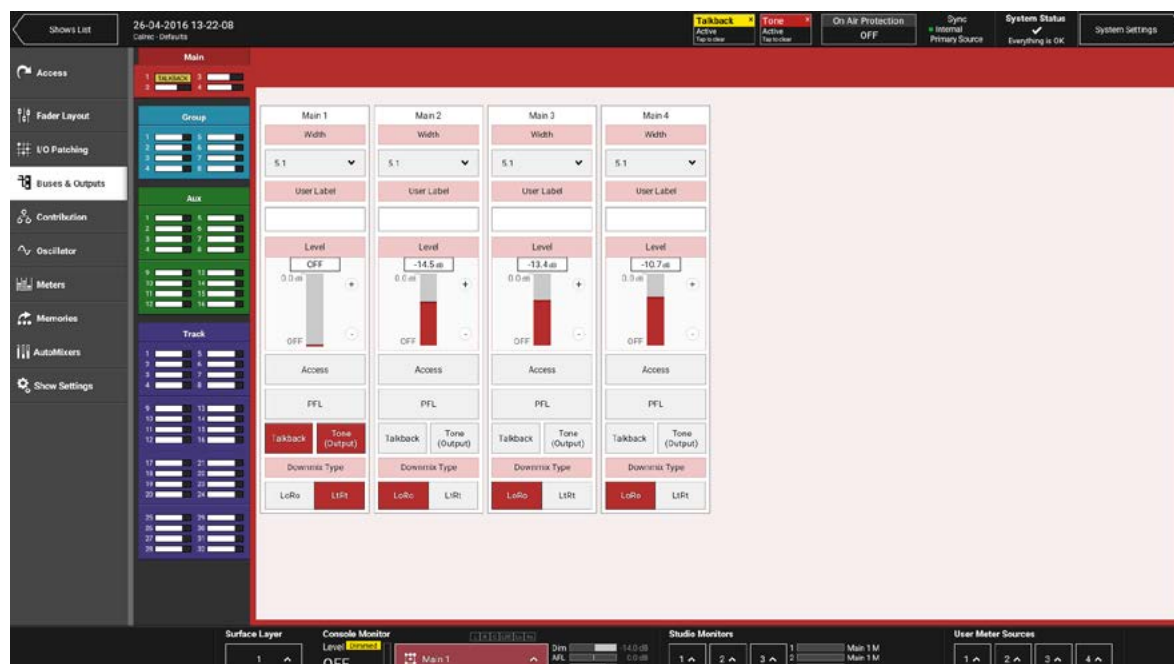
Tap **CLEAR TONE** at the bottom of the **OSCILLATOR** window to quickly switch off all tone on all paths.

Tone and Talkback Active Notification

Notifications appear in the main header when any tone or talkback is active.

The notifications can be tapped to clear all tone or talkback. See Figure 6 below.

FIGURE 6 - TONE AND TALKBACK ACTIVE NOTIFICATIONS



Tone Idents

Tone idents are variations in the tone signal used to identify legs of multichannel paths when verifying routing and patching. To set an ident for a stereo or 5.1 path, tap the **IDENT** selector button in the oscillator window for the chosen path width to display a pop-up menu populated with path width specific ident options, as shown in the following table:

Ident	Description	Width
L Only	Similar to the EBU ident specification. The tone routed to the left hand audio channel is repeatedly interrupted while the right channel remains constant (stereo paths only).	Stereo
L=1, R=2	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.	Stereo
BLITS "NORM"	First, a short burst of tone is applied to each of the six 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 880 Hz, center at 1320 Hz, LFE at 82.5 Hz, Ls/Rs at 660 Hz. This is followed by 1kHz tone on the L and R legs only. The right channel is continuous, whilst the left channel is repeatedly interrupted. The last stage of the cycle applies 2 kHz tone on all six channels simultaneously before beginning the cycle again. Each cycle lasts approximately 13 seconds. The different frequencies used help to identify each part of the cycle, for example, if 1 kHz can be heard anywhere other than front L/R, there must be a problem with routing or patching.	5.1

SUMMA MONITORING

CONNECTING MONITORS

No audio is passed through the Summa surface for processing, therefore, loudspeakers must be connected to the system via Hydra2 I/O ports and patched from Summa’s various monitor outputs.

All Summa’s monitor outputs are available as sources within the I/O patching screen from where they can be patched to I/O box output ports and then connected to loudspeakers.

Once loudspeakers have been connected and correctly patched, all monitoring control is achieved from the surface monitor controls, as described in “Control Surface Sections” on page 23 , or the monitor bar at the bottom of the touch display. The figures below show an example of how loudspeakers can be connected and arranged along with an image showing how the I/O patching screen should look for this loudspeaker setup.

FIGURE 1 - MONITORING PATCHING EXAMPLE

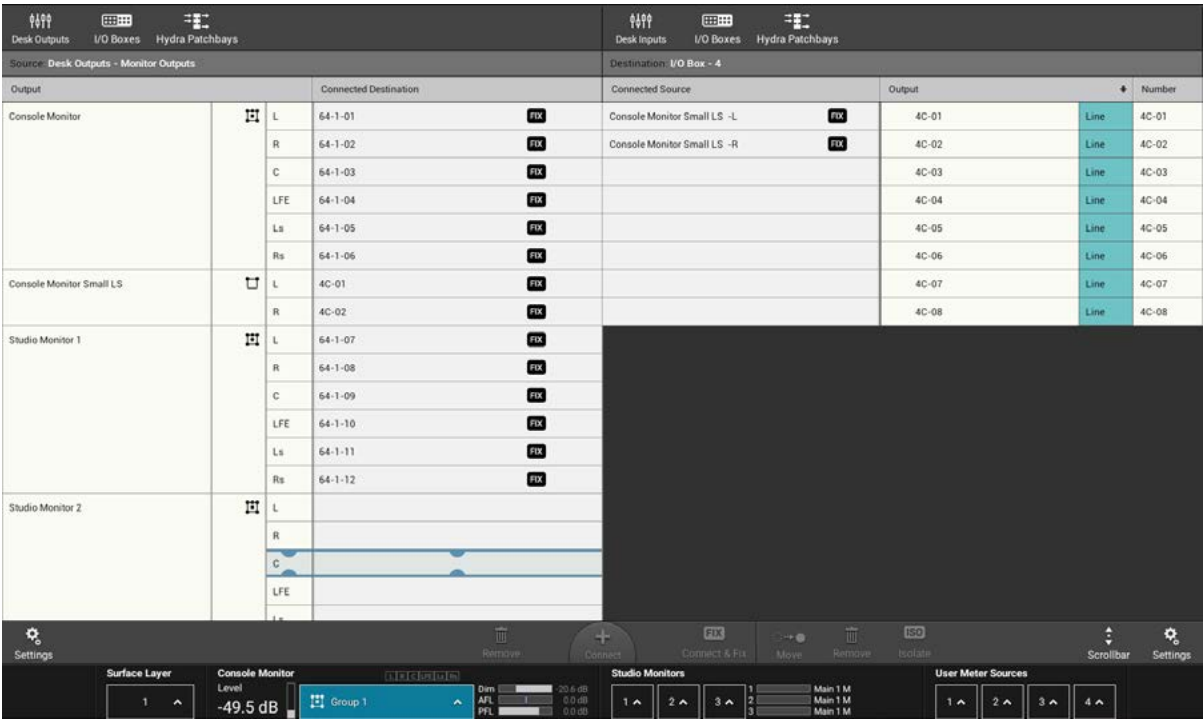
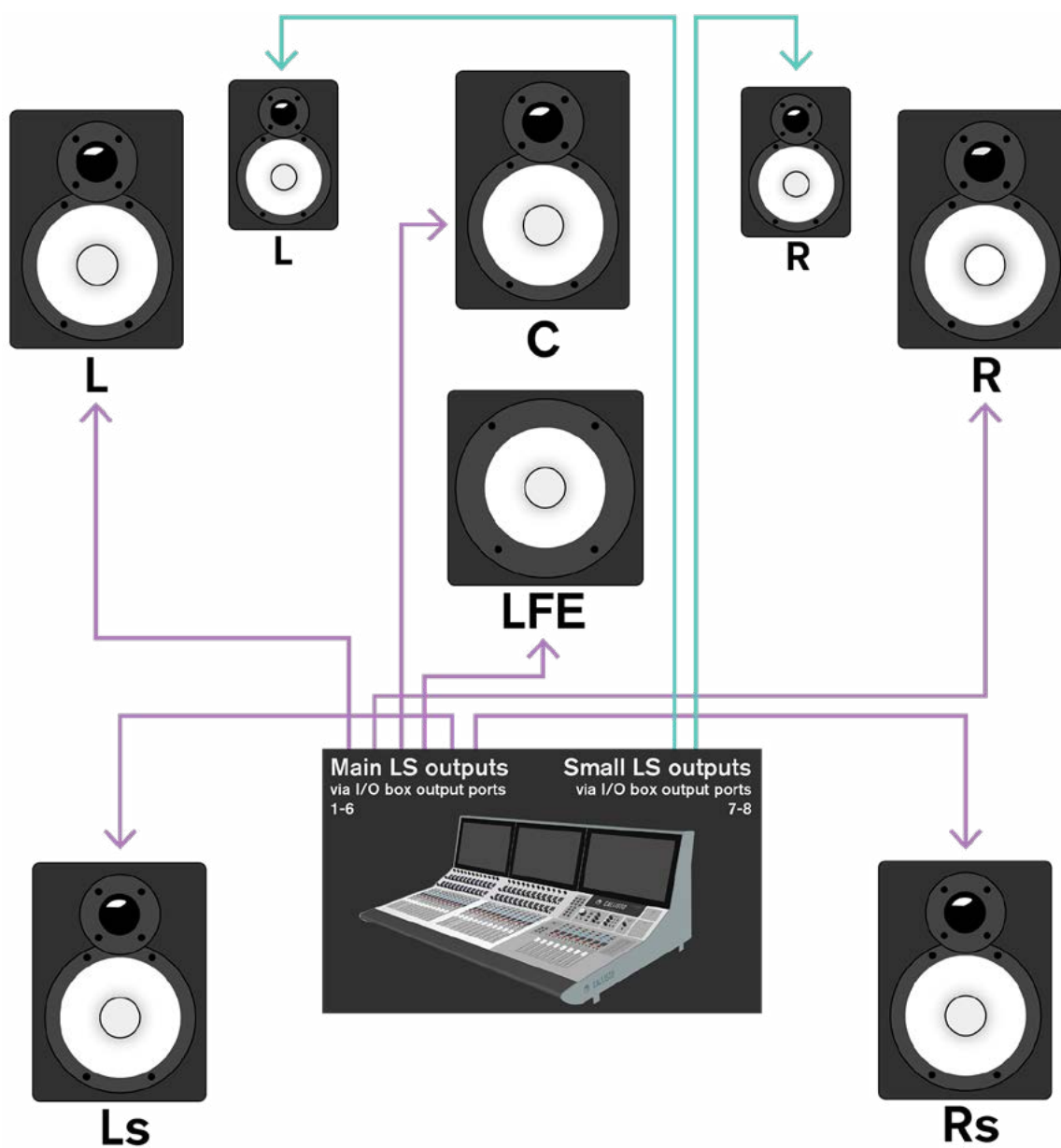


FIGURE 2 - EXAMPLE LOUDSPEAKERS SETUP

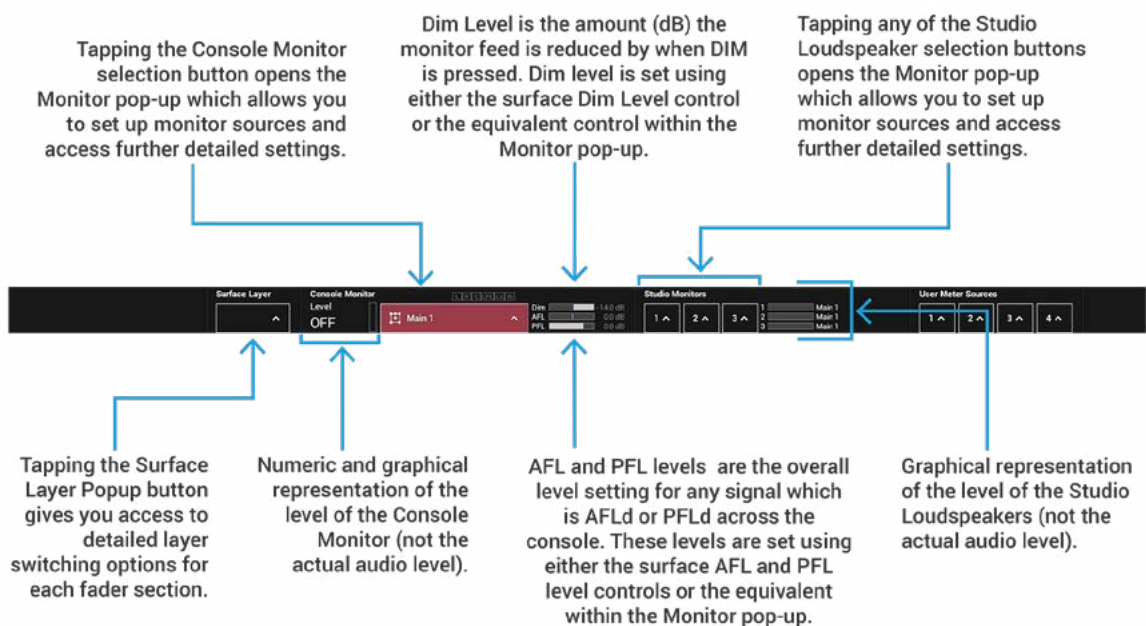


MONITOR CONTROLS

The monitor bar provides access to monitor controls, monitor source settings and visual feedback from the surface monitor controls.

Tap either the console monitor or one of the studio monitor selection buttons to view the monitor pop-up, which is described in detail here: [“The Monitoring Pop- Up” on page 109](#) . The image on this page explains each control available from the monitor bar.

FIGURE 1 - THE MONITOR BAR EXPLAINED



THE MONITORING POP-UP

The monitor pop-up allows you to quickly select a monitor source as well as providing detailed controls for the selected output. It is accessed by tapping any of the monitor source select buttons from the Monitor bar.

The first two tabs in the monitor pop-up are used for selecting a monitor source. If you have accessed the monitor pop-up for the console monitors, tap any path selector to see the console monitor source select button change to display the correct source label and colour, indicating that the selected source is now feeding the console monitors.

Favourite Monitor Sources

Three 'favourites' boxes are provided towards the bottom left of the monitor pop-up. Any monitor source can be placed into a favourites box making it more readily available during operation—drag and drop your three most commonly used monitor sources into these favourite boxes to speed up monitor source switching.

Monitoring External Inputs

The external inputs tab allows you to select any external input as a monitor source.

Settings

- **Listen Modes:** Allow you to monitor the source at either its current path width (full), using the left, right and centre speakers (3 stereo), in stereo or mono.
- **Insert:** Switch the monitor insert on and off.
- **Misc Functions:** Various functions ranging from leg routing options, LFE on/off, phantom centre (meaning to route the C monitor feed to both left and right speakers) and polarity invert right (which allows you to monitor the stereo content of your monitor source by cancelling out the mono content).
- **APFL Settings:** Gives control over where the PFL bus is routed along with an 'APFL clear' button to clear all
- **AFL/PFL/Output Listen** routing across the surface.
- **Solo Legs:** Each leg of the monitor source has its own solo checkbox, checking any of these disables all other legs, so each can be auditioned individually.

The controls along the bottom of the pop-up are visible whichever tab is selected:

- **Favourites:** Allows you to make up to three monitor sources available for quick selection at any time. Simply drag and drop sources from the first two monitor pop-up tabs.
- **Console LS Controls:** Control the level of the console monitors and cut or dim the feed.
- **Dim Adjust:** Set how much the monitor level will be reduced when DIM is selected.
- **AFL Trim:** Adjust the level of the AFL feed between -10dB and +10dB.
- **PFL Level:** Sets the level of the dedicated PFL output.

The settings tab contains settings for the currently accessed monitor feed. The individual controls are explained in more detail in the following pages.

FIGURE 1 - THE MONITORING POP-UP



PFL, AFL AND OUTPUT LISTEN

Summa has comprehensive built-in, after fader listen (AFL), pre fader listen (PFL), and 'output listen' systems, allowing you to listen to multiple combined audio feeds at various points in the signal chain.

Multiple paths can be PFL'd, AFL'd or have 'output listen' activated at any time to create summed mixes of pre/post fader path feeds.

AFL

Selecting AFL for any path replaces the current feed to the console monitors with the path's post fader feed. AFL provides a 'non-destructive solo,' allowing you to quickly check individual paths whilst maintaining all mixes as they are. Only the monitor output is affected by AFL, no paths are cut and the mix to all other buses is preserved.

PFL

By default, selecting **PFL** anywhere across the surface feeds the pre fader feed of the path to Summa's dedicated PFL speaker output. If **PFL TO MON** or **PFL TO SMALL LS** is activated within the monitor pop-up, the PFL feed will replace the monitor source, as described for AFL above.

Output Listen

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

The figure to the below shows the location of **AFL** and **PFL** buttons on the surface. Both are either latching when pushed, or momentary when held. PFL can also be activated momentarily by pulling the fader down below its lowest point, and deactivated once released. Also by default if a fader is closed and its PFL is activated, it will be deactivated once the fader is opened. These features can be switched off within the general Show settings: Tap 'Show settings' in the Show menu and select 'General'.

PFL Position in Audio Chain

The PFL point may now be placed at the Input, Pre EQ, Post EQ or Pre Fader in the Audio Path. This is accessed from the Meter & PFL button in the Screen Header. These Selections can be made per path, or applied easily to all Paths See Figure 1 below.

FIGURE 1 - PFL POSITION SELECTOR

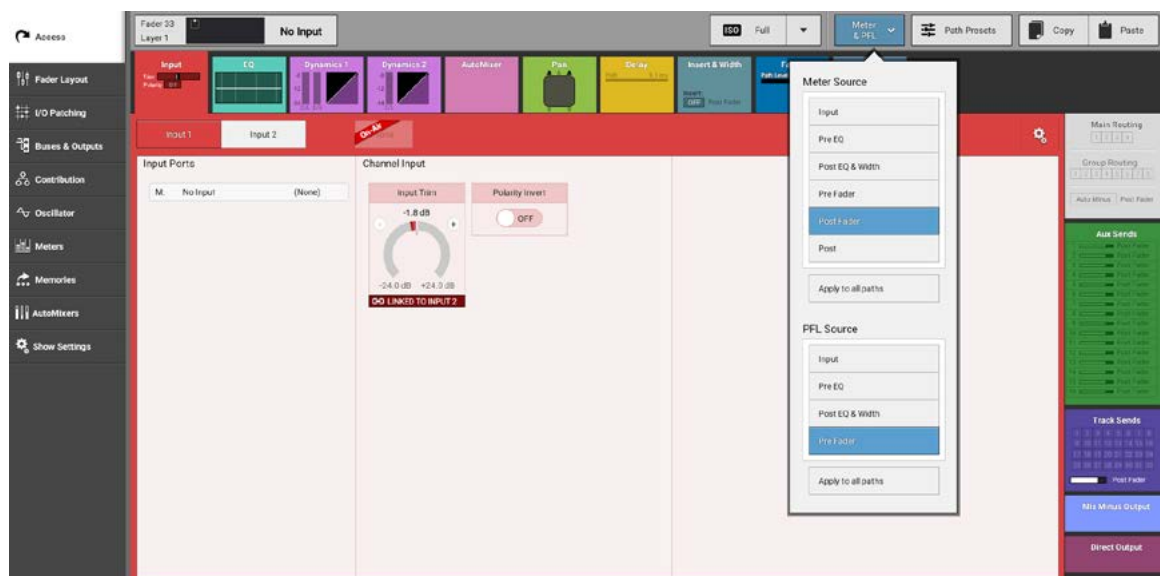
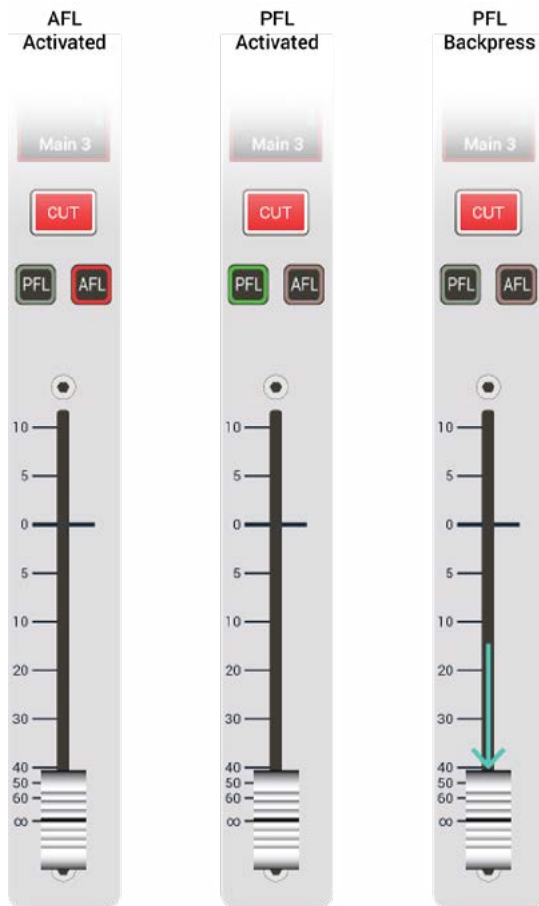


FIGURE 1 - FADER STRIP AFL AND PFL CONTROLS



Access from the Touch Display

AFL, PFL and 'output listen' can all be accessed from the routing and fader control windows as well as from the 'buses & outputs' window

Global Cancel



AFL, PFL and output listen can be globally cleared across the surface by tapping the 'APFL Active' icon in the notifications area.

Sending PFL to the Console/Small Monitors

Within the monitor pop-up, tapping **PFL TO MON** routes all PFL feeds to the console monitors, rather than the PFL loudspeaker output. Tapping **USE SMALL LS**, routes the PFL feed to the small LS rather than the console monitors.

When AFL, PFL (if **PFL TO MON** is selected) or output listen are activated anywhere across the surface, the console monitor button in the monitor bar changes to display the feed that you are currently monitoring.

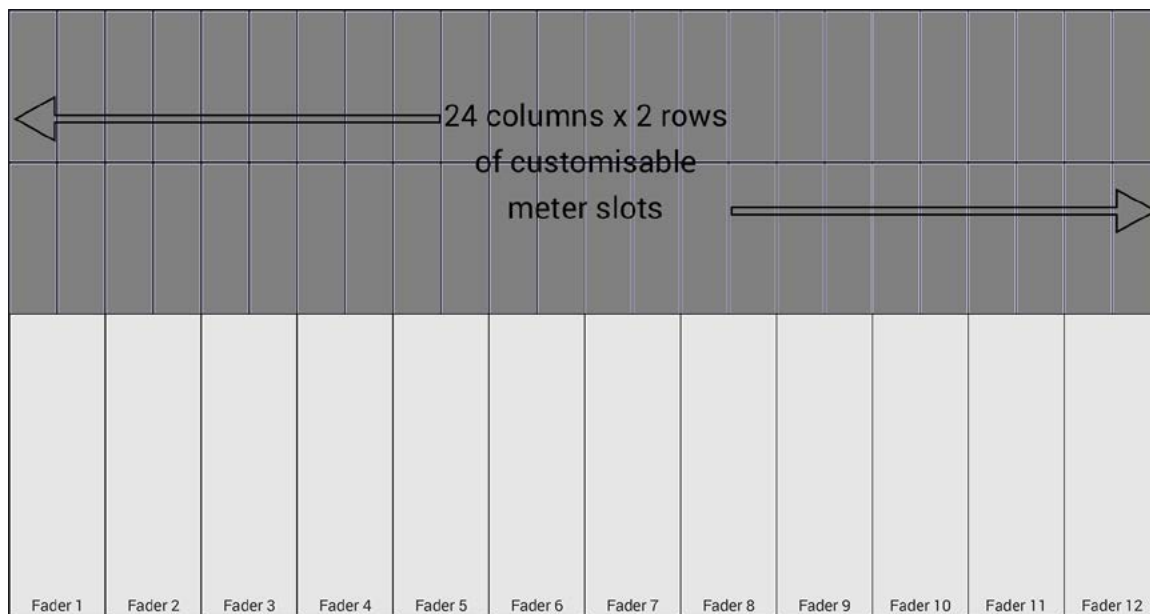
SUMMA METERING

METER DISPLAY LAYOUT WITH CUSTOMISATION

Summa upstand meters are now arranged and displayed in two halves. The lower half displays the meters for the access fader paths in a fixed layout each corresponding to the fader below. The upper half of each meter panel is arranged into 2 rows of 24 meter slots which are fully customisable.

This allows for Mains, Groups, Auxs, Tracks, Console LS, PFL, AFL, APFL, Off Air Conference, Autominus and External Input metering to be mapped out. Summa 12+8, 24+8 and 36+8 have one, two and three meter panels respectively. Figure 1 shows the empty layout for the first 12 faders.

FIGURE 1 - METER LAYOUT FOR FADERS 1-12



Customising Meter Layouts

Figure 2. shows the meter layout screen for the first 12 fader panel and part of the second. The lower section shows the usage of the 2 rows of 24 meter slots shown here empty. The upper section is used to create the meter from source and options required which varies depending on the type. The minimum slot usage is 1 slot for Auxs, Tracks, Off-air & Mix minus sources or 2 slots for Mains, Groups, Console LS, AFL, PFL, APFL, User Meters and External Inputs. Depending on the options selected for that source this can expand the custom meter up to 10 slots. The primary option available for all meters is to provide full height meters which doubles the slot usage vertically. The rest of the options vary in the number of meter slots used depending on meter source type.

FIGURE 2 - METER LAYOUT SCREEN EMPTY

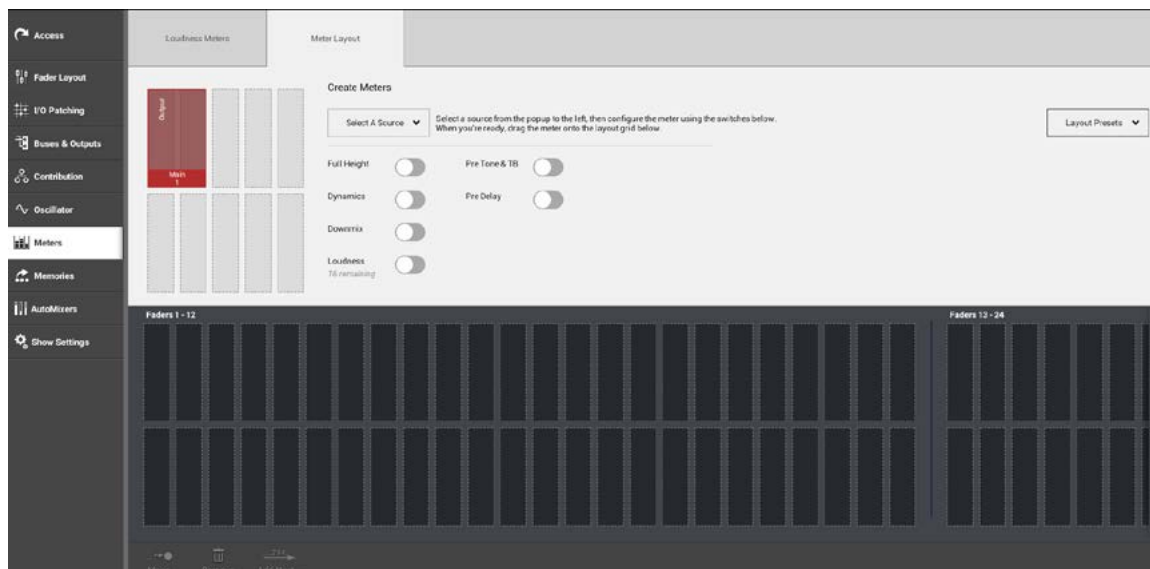
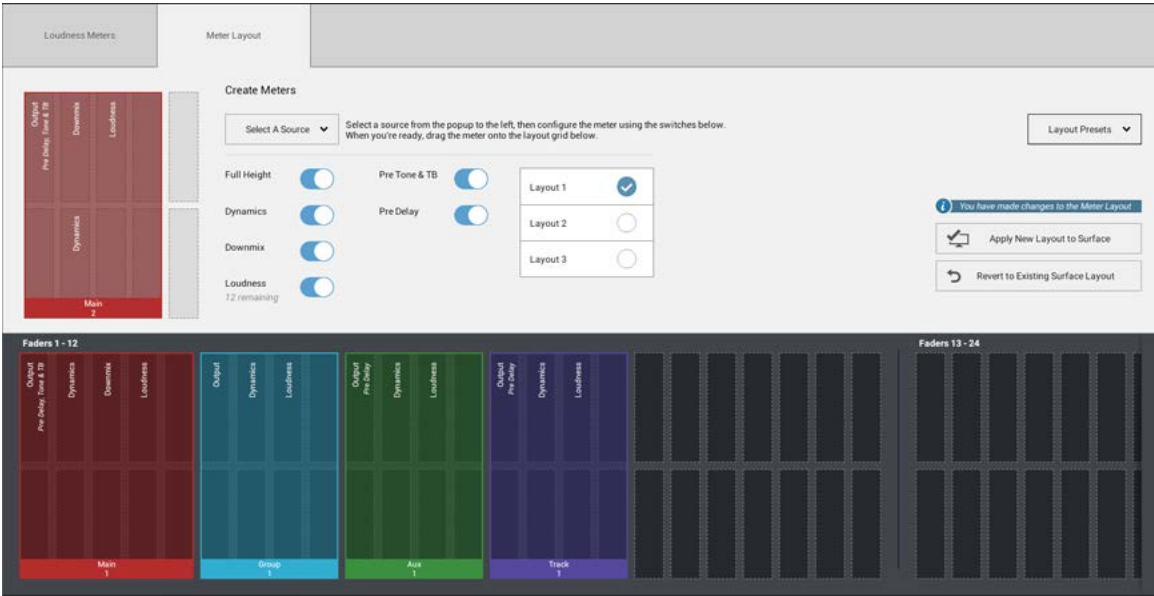


Figure 3. below shows a partially customised meter layout using the largest single Main, Group Aux and Track meter slot usage. The options apart from Full Height can add Dynamics, Downmix, Loudness, Pre Tone & TB and PreDelay metering to the basic meter source and type, these other options vary depending on source type. Note that for some meters a number of Layouts are made available for instance Main 2 can show the same information in an 8, 6 or 10 slot configuration for layout 1,2 or 3 depending on user preference. Once a meter layout has been completed the user can simply 'Apply New Layout to Surface' which puts the Meter layout onto the TFT screens or can tap the Layout Presets button to Create New Presets from the layout, Load Old Presets from memory or Backup and Restore Meter Presets for use with this or other Summa consoles.

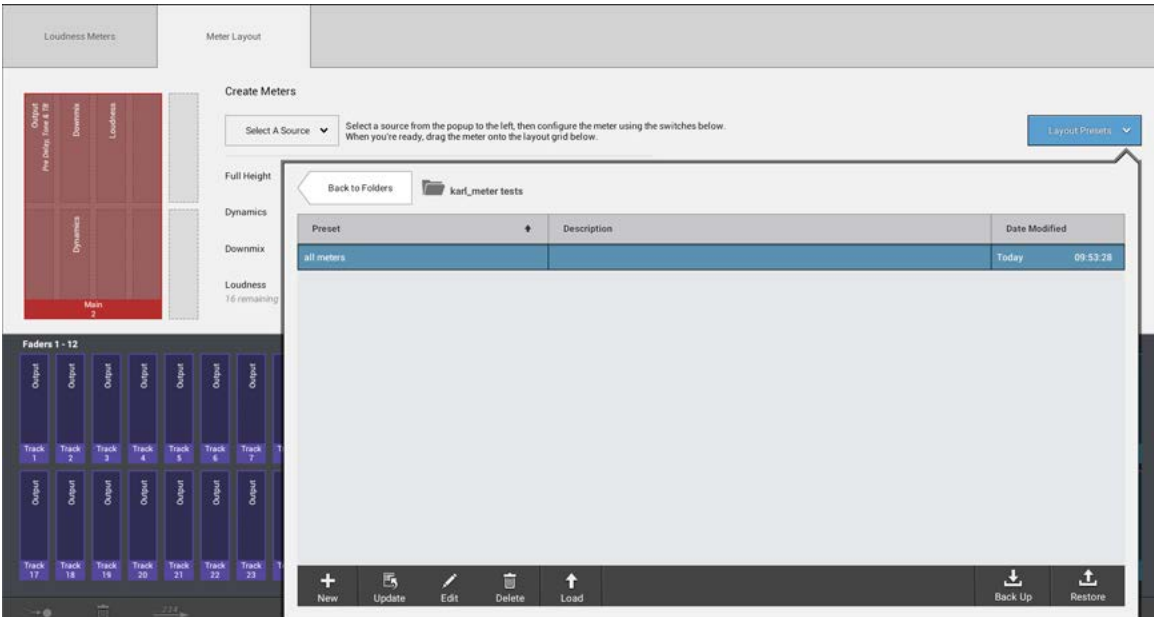
FIGURE 3 - METER LAYOUT SCREEN PARTIALLY CUSTOMISED.



Meter Layout Presets

Figure 4. below shows the Layout Presets pop-up for the custom meters. From here the user can go back to select, create, rename or delete another Meter folder. Or can in this meter folder:- make a New preset from the Meter layout, Update a selected preset with the Meter Layout, Edit the name of a preset, Delete presets or Load a preset into the Meter Layout screen. Note this does not apply the meter layout to the surface until the 'Apply New Layout to Surface' button is tapped. Two further functions are available:- Backup and Restore, these allow the Meter Layout presets to be backed up to / restored from a backup location. Typically this is held in a directory on a USB flash drive which is selected from the screen once the Backup or Restore buttons have been tapped. This allows the user to transfer customised meter layouts to/from a storage medium for subsequent use with this or other Summa consoles as the meter presets are independent from Shows and Memories storage.

FIGURE 4 - METER LAYOUT PRESETS



METER TYPES

Summa meter types and ballistics can be set globally within System Settings. Available meter options are shown in the following table:

Meter Type	Color Break
PPM	8 dB/20 dB
PPM	9 dB/15 dB
PPM	10 dB/18 dB
PPM	12 dB/18 dB
VU	8 dB/20 dB
VU	12 dB/20 dB
VU	0 dB/20 dB

Fader, group and main meters all include integrated dynamics meters for both Dynamics 1 and Dynamics 2 modules. Each dynamics meter displays a small 'C' (compressor/limiter) and 'G' (expander/gate) below, which illuminate as the modules are enabled.

All Summa meters include a peak-spot-on meter bar which remains for a short time to make peak monitoring more accurate. If a signal reaches the clipping point, the meter background turns red and holds for the peak spot duration, then fades out over one second, letting you trace overloads very easily.

PPM or VU?

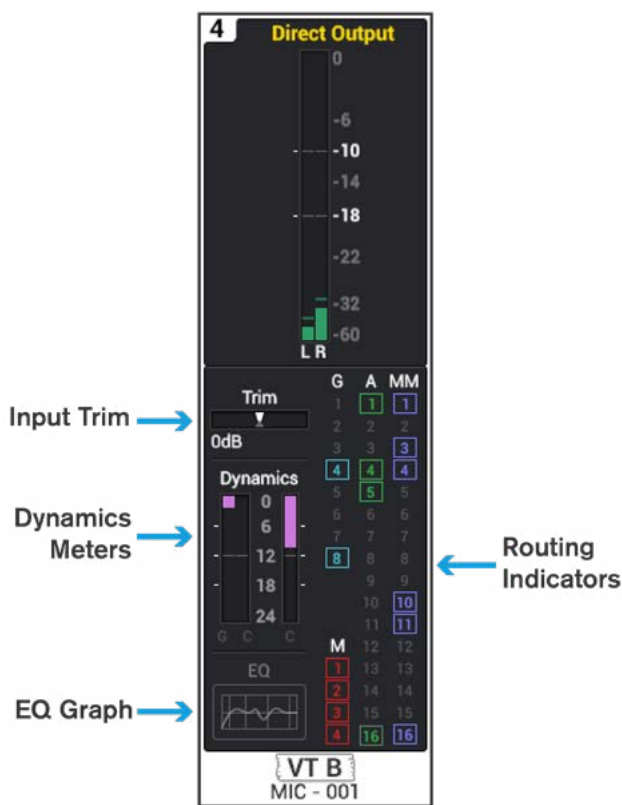
VU (Volume Unit) meters use the amplitude and duration of signals to provide an indication of the perceived loudness of a program. PPM (Peak Program) meters have short attack and long fall-back times in order to give an indication of the peak amplitude of an input signal.

Fader Meters

Each fader on the Summa surface has a dedicated fader meter displayed on the meter panel above it, along with a small input meter bar in the fader display. The border of each fader meter is shaded to match its attached path type, to ease identification. Fader meters provide a wide variety of essential information from routing to processing and CUT/ON status.

When a fader cap is touched the corresponding meter background is highlighted with a slightly paler shade of grey. When the fader's **ACCESS** button is pushed, the label along the bottom of the fader meter becomes highlighted with the correct path colour to clearly draw attention to it.

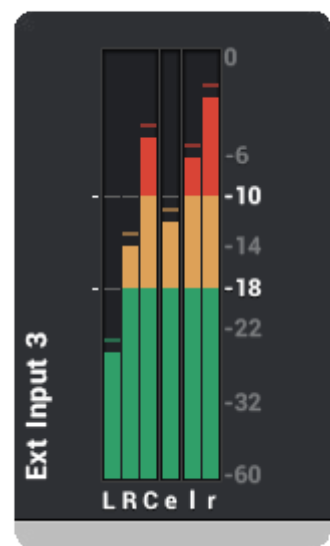
FIGURE 1 - FADER METER



External Input Meters

Any of the 152 external input meters are available on the customisable meter layout. An example of a 5.1 external input meter is shown below:

FIGURE 2 - EXTERNAL INPUT METER



Bus and Output Meters

As described earlier the Bus and Outputs/ Monitoring can display a variety of information depending on how it is created in the customisable meter layout page. Examples of each bus/output meter type are shown on the next page.

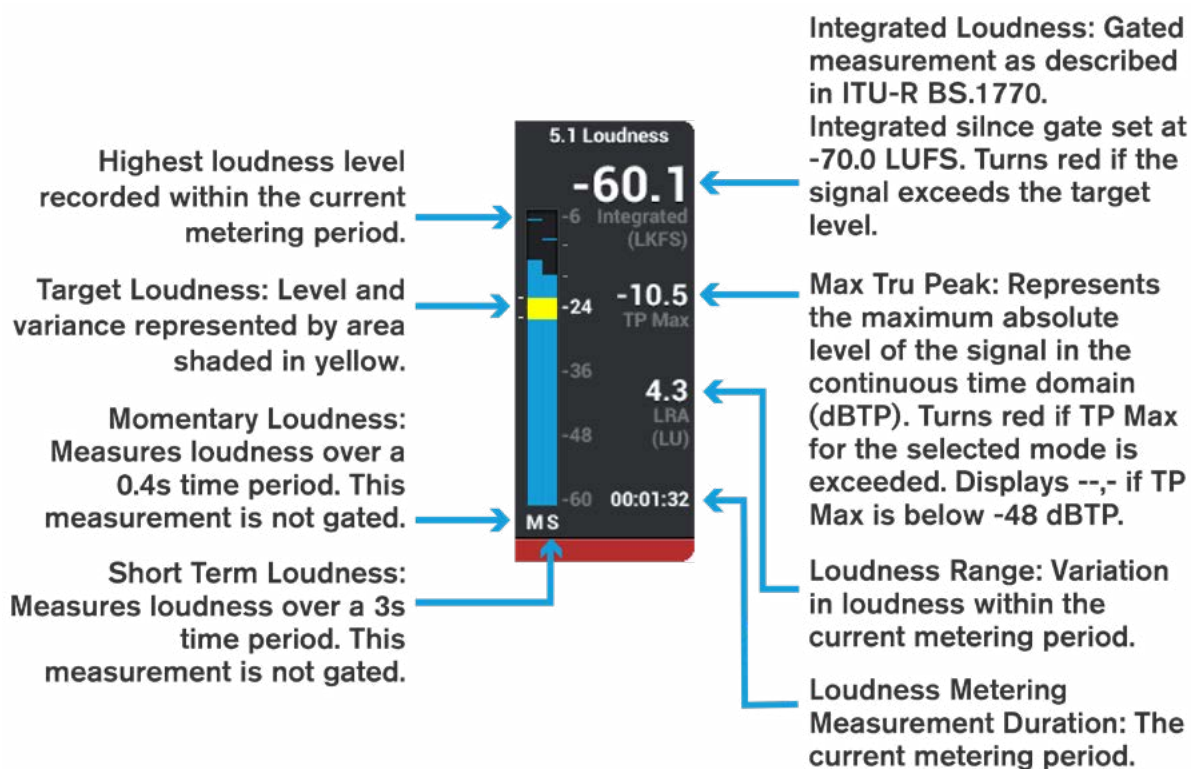
FIGURE 3 - BUS AND OUTPUT METERS



Loudness Meters

Loudness meters provide a way to monitor and regulate average loudness levels over the duration of a program. Loudness meters are displayed as part of each Main meter on the Meter Panel(s).

FIGURE 4 - LOUDNESS METERS



There are six loudness metering modes available on the console, the details of which are displayed in a table below. The loudness meter mode is set globally for the console: Tap **METERS** in the Show menu and tap the **MODE** button to view a drop-down list of loudness modes to choose from. An appropriate loudness metering scale can also be set from this screen, which alters the scale of all loudness meter bar graphs.

Loudness meter modes relate to standards set by organisations 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. Two extra modes called DPP Live and DPP Non-Live have been added to provide additional guidelines in Live and Non-Live production environments. This was set up by various broadcasters in a group known as the DPP (Digital Production Partnership).

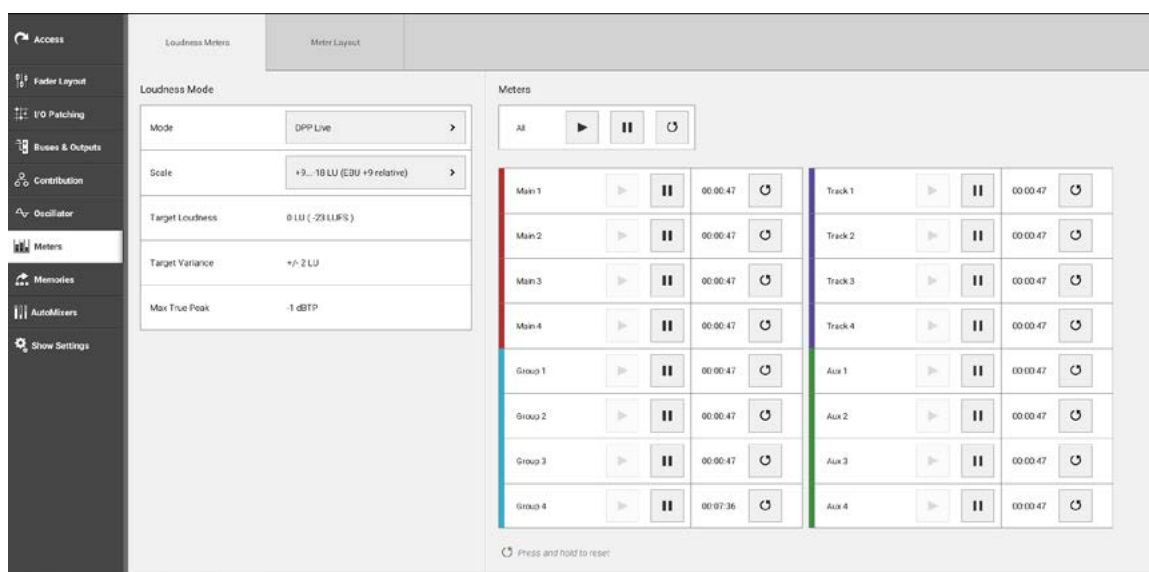
LOUDNESS METERING MODES

	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

Controlling Loudness Meters

Controls for Loudness metering can be accessed from the Active Show>Meters>Loudness Meters page. The Loudness Metering Mode and Scale is set globally and can be configured for up to 16 Loudness Meters. There are individual play, pause and refresh controls for each meter and global controls to play, pause and refresh all the Loudness meters at once. See Figure 5 below.

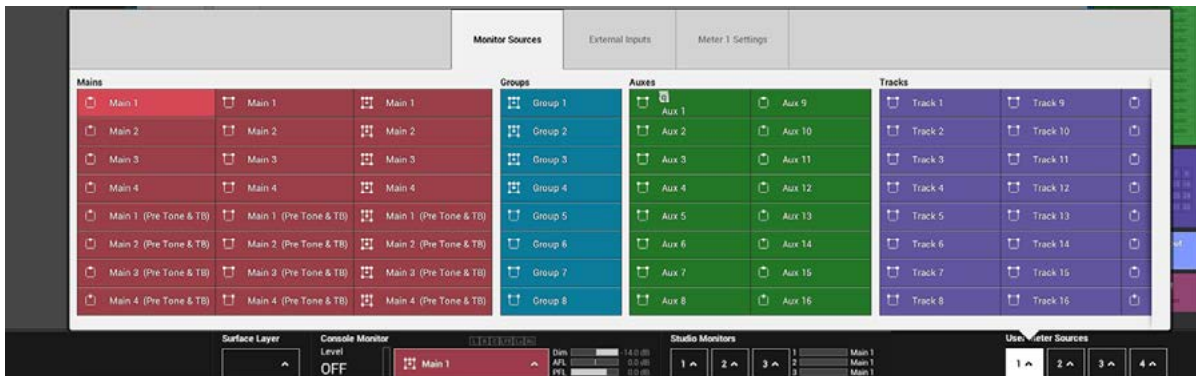
FIGURE 5 - LOUDNESS METER CONTROLS



User Meters

User meters 1-4 provide metering for paths which the user wishes to display. The 4 user meters are placed on the meter bridge as part of the configurable meter layout. Any bus output can be chosen as a user meter source. User meter sources can be selected quickly using the meter selector buttons to the bottom right of the touch display when in 'active Show' view for each of the 4 user meters. The image below shows the user meter 1 selection pop-up, which follows a similar structure to the monitor pop-up, with a source select tab, an external inputs tab and a settings tab. The sources tab is shown here.

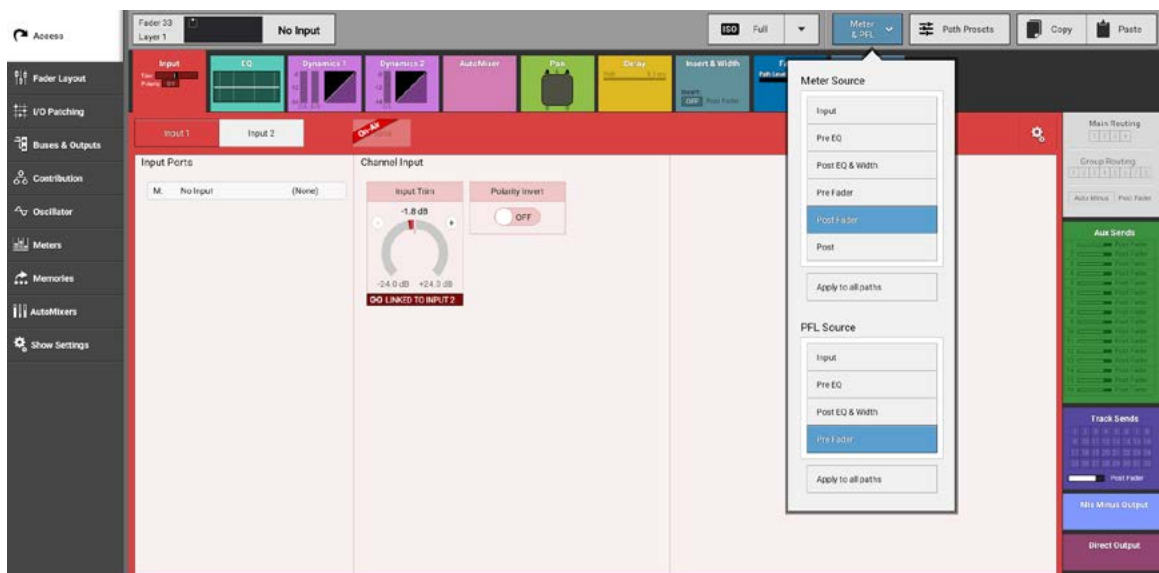
FIGURE 6 - USER METER SELECTION POP-UP



Meter Position in Audio Chain

The Metering point may now be placed at the Input, Pre EQ, Post EQ, Pre Fader, Post Fader or Post which is the last point in the Audio Path. This is accessed from the Meter & PFL button in the Screen Header. These Selections can be made per path, or applied easily to all Paths See Figure 7 below.

FIGURE 7 - METER POSITION SELECTOR



SUMMA PROCESSING

EQUALISER

A six band parametric EQ module is available on every channel, group and main.

The frequency range for all bands is 20 Hz to 20 kHz and the available range in gain is -18 dB to +18 dB. The Q control for the bell curve can be set at: 0.3, 0.5, 0.7, 1, 2, 3, 5, 7 or 10, and for all other bands is set at 0.7. Each band has an On/Off button.

From the surface, push the ACCESS control mode button to populate the control cells with EQ and dynamics controls for the currently accessed path. On a Summa 12+8 the control cells on the far left allow you to switch between viewing dynamics and EQ controls. On the two larger surfaces both are always displayed. EQ controls are shown here:

FIGURE 1 - CONTROL CELLS—ACCESS MODE—EQ



Touch Display EQ Controls

With the touch display in 'active Show' view tap the EQ processing tab to view controls for the currently accessed path.

Tap on any of the 6 EQ band tabs along the top of the control window to highlight that band in the EQ graph display. The EQ controls to the right of the screen apply to whichever EQ band is currently selected. The graph instantly updates to reflect all EQ parameter changes. Any EQ band can be set to any response type but good practice is to set them in a logical, frequency-based order: band 1—low cut filter, up to band 6—high cut filter.

- Each EQ band has a dedicated on/off switch.
- Response: Select the desired EQ response curve for the selected band, from high cut filter, high shelf, notch, bell, low shelf, low cut filter.
- Frequency: Sets the frequency that the EQ band is operating around.
- Gain: Sets the gain increase or reduction for the band.
- Q: Sets the width of the frequency band for the selected response. The higher the Q, the narrower the bandwidth.

Once a response type is selected, the relevant Frequency/Gain/Q controls become active. There are several ways to manipulate these controls:

- Drag up and down or left or right on the touch display to turn the rotary control.
- Drag the band node up, down, left or right within the EQ graph.
- Tap to select the control that you wish to adjust and it is automatically assigned to the parameter adjust rotary on the surface.

FIGURE 2 - EQ TOUCH DISPLAY CONTROLS



Bypass and Alternate EQ

BYPASS in the EQ window header bypasses the whole EQ module.

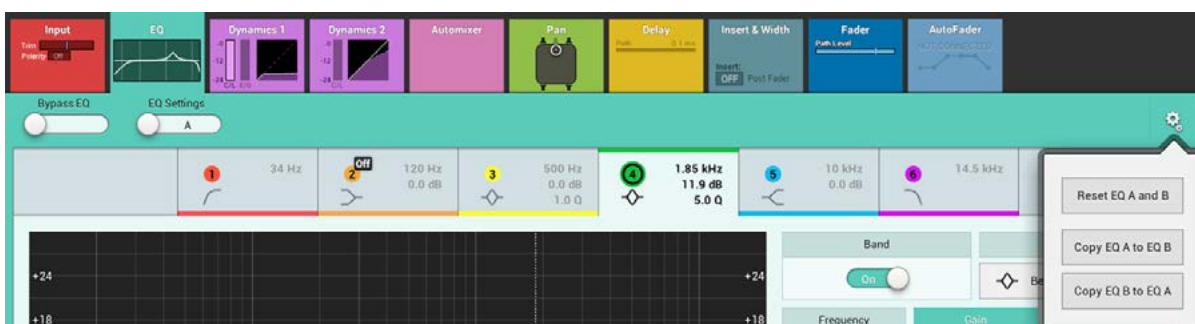
The A/B alt EQ button allows you to compare two EQ setups, simply tap to switch between EQ A and EQ B and change the parameters within each. Then tap to switch between the two to compare.

EQ Settings

Tapping the cog icon in the top right of the EQ window header displays three EQ settings options:

- **RESET EQ A AND B** returns all EQ settings to their defaults.
- **COPY EQ A TO EQ B** and **COPY EQ B TO EQ A** allow you to duplicate EQ settings which can be useful if you wish to audition subtle differences in EQ. Modify either EQ A or B, copy these settings to the other EQ module and use the EQ A/B switching button towards the top right of the EQ window header to quickly switch between the two.

FIGURE 3 - EQ SETTINGS



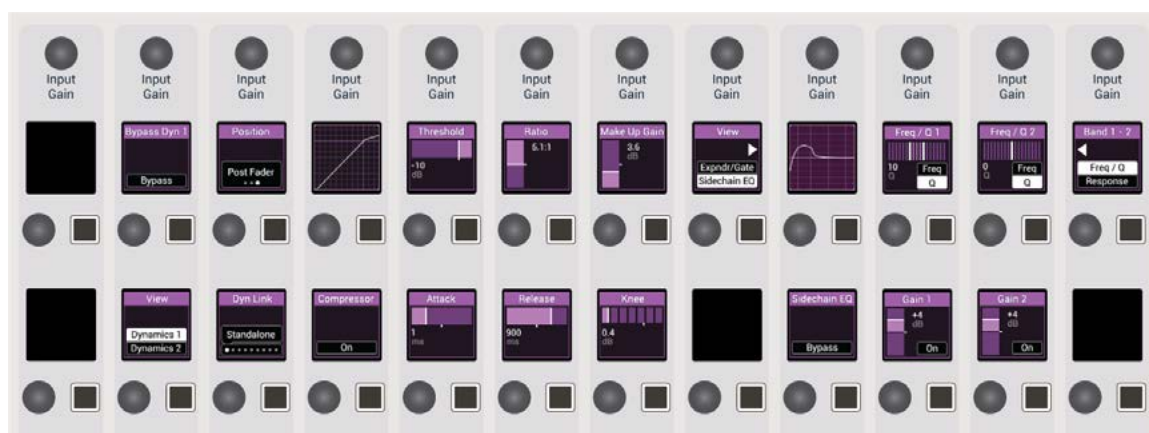
DYNAMICS

Every channel, main, group, aux and track has two dynamics processing modules available to it: **Dynamics 1** includes a compressor/limiter and an expander/gate which act in parallel and can be used simultaneously, **Dynamics 2** is a compressor/limiter. Dynamics 1 and 2 modules act in series on the associated path.

Dynamics controls can be accessed from either the touch display or the surface control cells:

- With the touch display in 'active Show' view, tap the Dynamics 1 or Dynamics 2 processing tabs to access the relevant module controls.
- From the surface, push the **ACCESS** control mode button to populate the control cells with dynamics and EQ controls for the currently accessed path. On a Summa 12+8 surface the control cells on the far left allow you to switch between viewing dynamics and EQ controls. On the two larger surfaces, both sets of controls are always displayed. The dynamics controls are shown here:

FIGURE 1 - CONTROL CELLS—ACCESS MODE—DYNAMICS



Dynamics Modules

Dynamics 1 includes a compressor/limiter module and an expander/gate module, both of which can be switched on and off individually by tapping the **ON/OFF** toggle switches. The Dynamics 2 module is a compressor/limiter.

	Compressor
Threshold	-48 dBFS – 0 dBFS
Ratio	1:1 to 4:1 in steps of 0.1 4:1 to 10:1 in steps of 0.2 10:1 to 20:1 in steps of 1 20:1 to 40:1 in steps of 5 50:1 (Limiter)
Attack	50 μ s – 0.2 s
Release	Auto, 75 ms – 4 s
Make Up Gain	0 dB – 20 dB
Knee	Hard, 0.4 dB, 0.8 dB, 1.5 dB, 3.6 dB, 12 dB, 24 dB
	Expander
Threshold	-60 dBFS – -6 dBFS
Depth	40 dB – 0 dB
Attack	50 μ s – 0.2 s
Release	0 ms – 4 s
Knee	Variable soft knee or 2:1 hard knee
	Gate
Threshold	-60 dBFS – -6 dBFS
Depth	40 dB – 0 dB
Attack	50 μ s – 0.2 s
Release	0 ms – 4 s
Delay	0 ms – 1 s

Compressor/Limiter

Compressor/limiters provide controls for reducing and smoothing the dynamic range of an audio signal. Compressors proportionally reduce the gain of a signal as it exceeds a definable threshold. When the compressor is set to be a limiter (by selecting a ratio of 50:1), the input signal must increase by a massive 50 dB above the threshold in order for the output to increase by a negligible 1 dB.

Expander/Gate

An expander acts in the opposite way to a compressor: When a signal exceeds the expander threshold it is passed through unchanged, and when it falls below the threshold it is reduced, effectively increasing the dynamic range of the signal and reducing unwanted audio content.

A gate is effectively an extreme version of an expander, with a very high ratio, resulting in the gain of the input signal being significantly reduced almost immediately as it falls below the threshold. Gates are often used to minimise unwanted audio content.

Calrec expander/gates have 6dB of built-in hysteresis to avoid unwanted 'chatter' (constant on/off switching) resulting from an input signal residing on or around the threshold.

Global Module Controls

When looking at a dynamics module, any control situated within the window header affects the whole module, i.e. the compressor/limiter and expander/gate together. This includes the following:

- Each Dynamics module can be inserted either pre EQ, pre fader or post fader. Tap the dynamics position button in the window header and select an option.
- By default, dynamics modules operate as standalone units. The third button in the window header allows the module to be put into one of eight Dynamics Links.
- Dynamics modules can be bypassed by tapping the **BYPASS** toggle switch in the window header.

FIGURE 2 - GLOBAL DYNAMICS CONTROLS



Dynamics Links

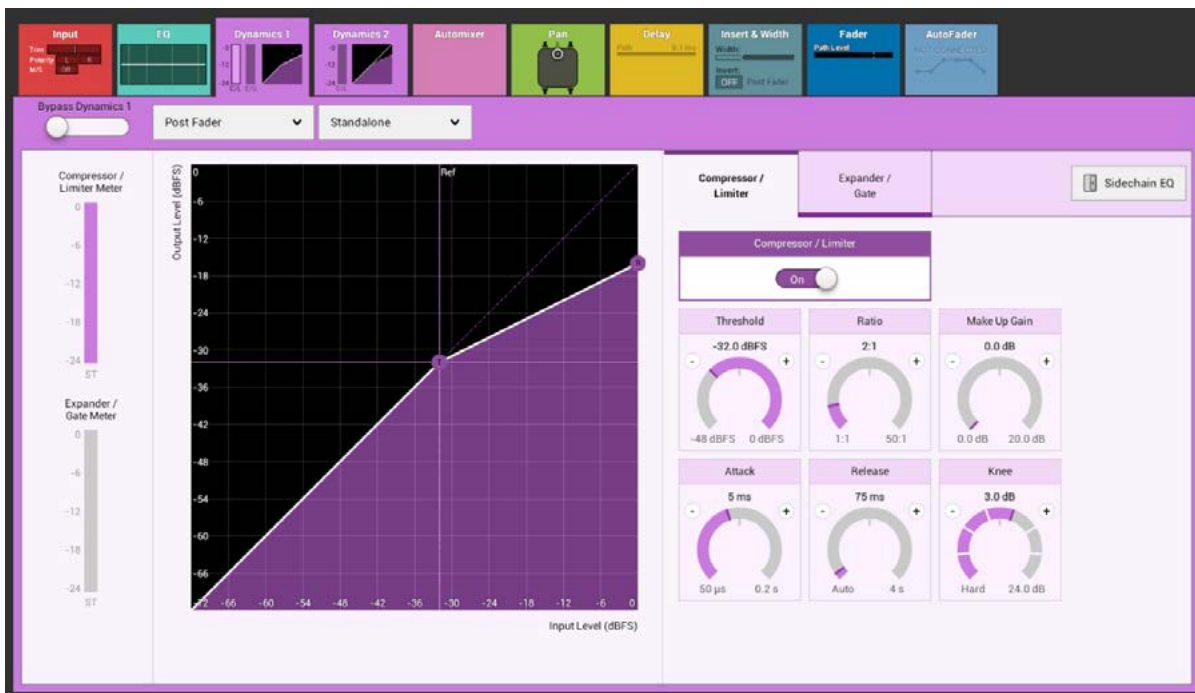
Dynamics Links allow multiple audio feeds to have the same dynamics processing applied. When multiple paths' dynamics modules are set to be part of a Dynamics Link, the amount of gain reduction applied across the link will always equal that for the signal which is being affected the most. For example, within a Dynamics Link, if one path's signal is causing 5 dB of gain reduction and another is causing a reduction of 10 dB, all signals within the Dynamics Link will have a gain reduction of 10 dB applied. When expander/gate units are used within 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 audio levels of their feeds.

Compressor/Limiter Controls

- **Threshold:** The level (dBFS) at which the signal will begin to have its gain reduced.
- **Ratio:** Controls gain reduction once a signal has exceeded the threshold, for example, if the ratio is set at 2:1 and the signal exceeds the threshold by 4 dBFS, the gain will be reduced so it exceeds the threshold by only 2 dBFS. When set to 50:1, the compressor is acting as a limiter.
- **Make Up Gain:** Allows the gain of the whole compressed signal to be increased by up to 20 dB.
- **Attack:** Time taken to reduce the gain to reach the new compressed level. Short attack times enable the compressor to catch transients in the audio feed, whereas increasing the attack time will focus the compressor on more long term level issues, such as level differences across various sections of a program.
- **Release:** Time taken to remove gain reduction once the signal falls back below the threshold. Short release times can lead to a 'pulsing' effect, with only audio peaks being compressed. A longer release time will lead to a smoother effect at the expense of some lower level audio components being compressed.

- **Knee:** Controls the dB range over which the threshold is active on the incoming signal. With knee set to 'hard', a signal which exceeds the threshold will instantly have the full gain reduction applied, which leads to a very noticeable compression. Setting a softer knee 'smooths' the point at which the threshold acts, for example, a 6 dB knee setting means that the threshold is active over a 6 dB spread leading to a less noticeable compression effect.

FIGURE 3 - COMPRESSOR/LIMITER CONTROLS



Expander/Gate Controls

- **Mode:** The expander/gate module has a dual mode button for switching between expander and gate functionality.
- **Ratio (expander only):** Controls the amount of gain reduction applied to the signal. Hard uses a ratio of 2:1, meaning 1 dB of gain reduction is applied for every 1 dB that the signal falls below the threshold, for example, a signal 10 dB below the threshold will have 10 dB of gain reduction applied. Soft ratio is a variable ratio dependent on the level of the input signal, the final ratio of 3:1 being applied when the signal drops to 20 dB below the threshold.
- **Threshold:** The level (dBFS) at which the signal will begin to have its gain affected.
- **Depth:** Controls the maximum amount of attenuation which can be applied to signals below the threshold.
- **Attack:** Time taken for the expander/gate takes to open. Short attack times help to preserve natural transient attack but can result in a 'clicking' sound due to the rapid transition. A long attack time ensures a smoother transition but some of the transient information will be lost.
- **Release:** Time taken for the expander/gate to close. Longer release times create a smoother more natural transition.
- **Delay (Gate Only):** The minimum time the gate will be held open before closing once the threshold is reached.

FIGURE 4 - EXPANDER CONTROLS

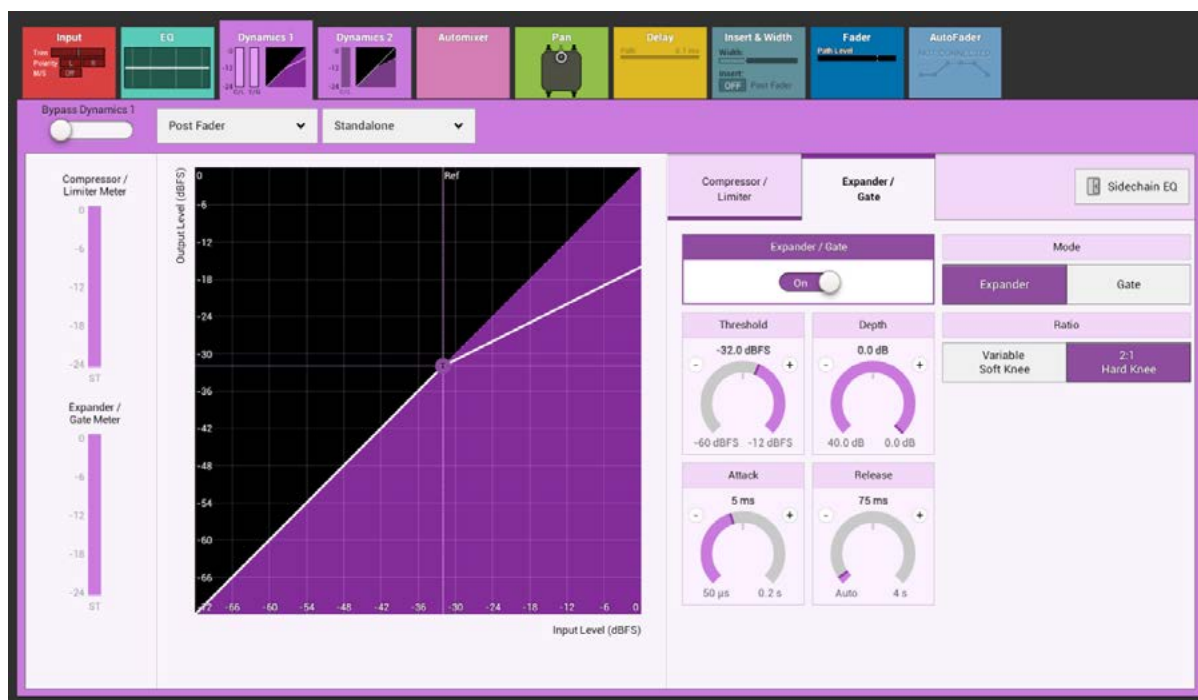
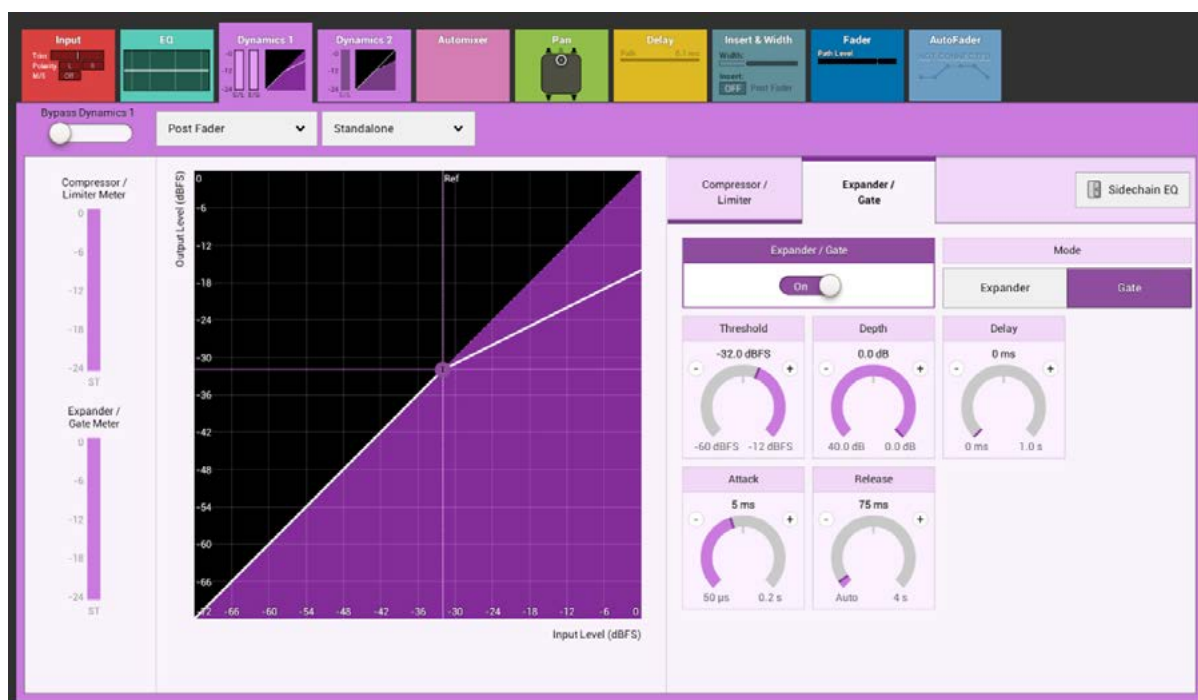


FIGURE 5 - GATE CONTROLS



Sidechain EQ

Dynamics units take copies of their input signals, analyse them, and work out how best to process the originals. These copies are called sidechains. Sidechain EQ controls are used to process frequency components of the sidechain signal in order to control which components of the input signal the dynamics unit will respond to.

With the Dynamics 1 processing tab selected, tap **SIDECHAIN EQ** within the control window to see the sidechain EQ controls. The **SC LISTEN** toggle button towards the bottom right of this window allows you to listen to the sidechain signal whilst you alter the EQ parameters. The sidechain **BYPASS** button in the window header allows you to switch the sidechain EQ controls in and out, allowing you to hear the difference the EQ processing makes. The rest of the controls are explained in more detail here: [“EQ” on page 132](#)

FIGURE 6 - SIDE CHAIN OPERATION

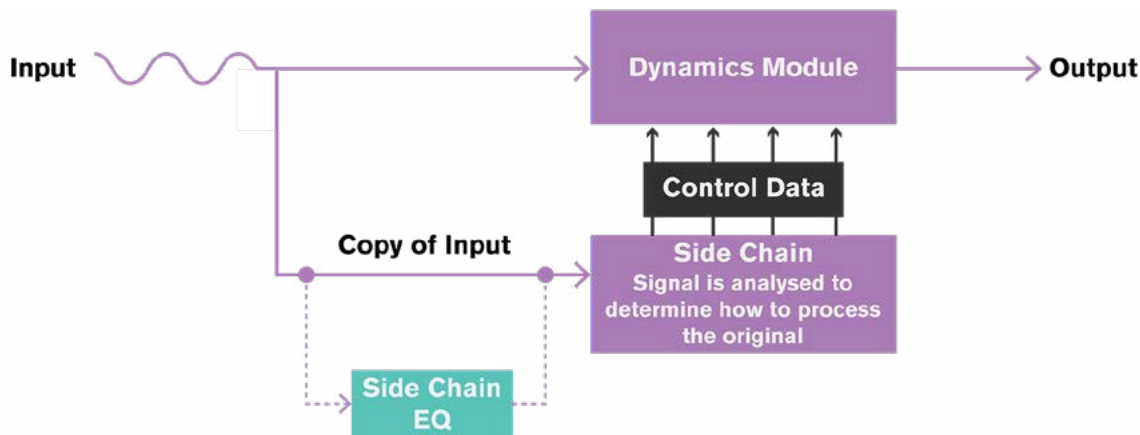
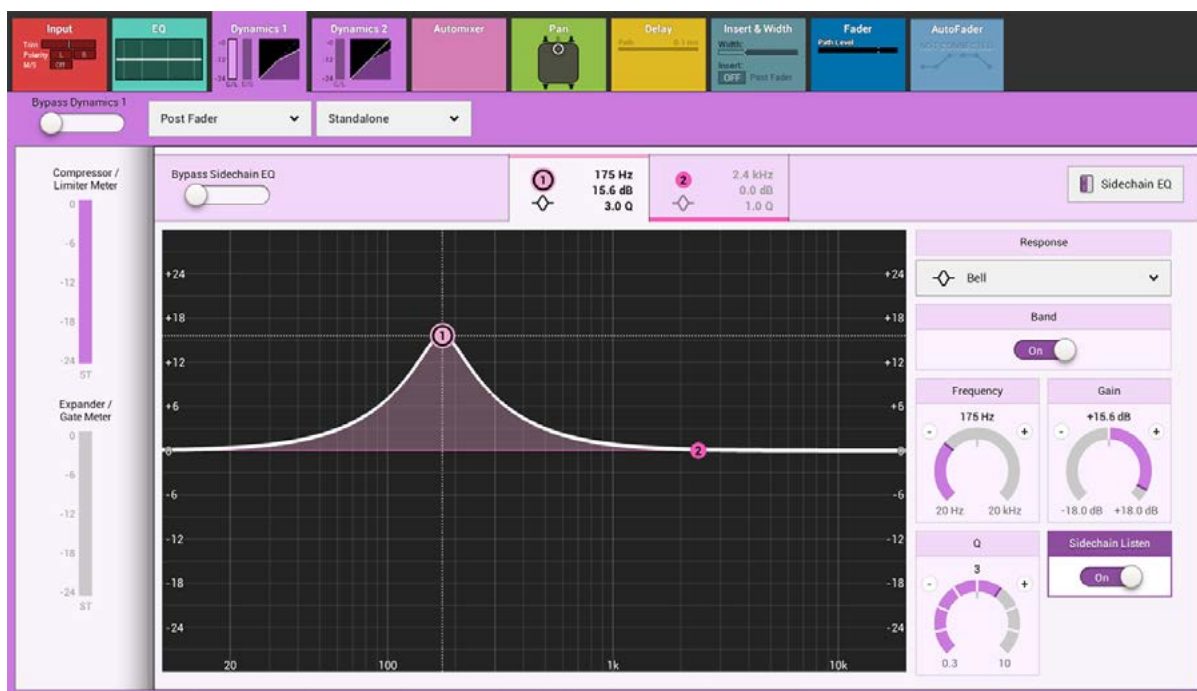


FIGURE 7 - SIDECHAIN EQ



AUTOMIXERS

Summa has four AutoMixers which can be used to automatically mix the levels of a selection of mono channels and mono groups, keeping the overall level of the mix constant.

AutoMixers have the effect of boosting paths with higher signal levels relative to other paths in the grouping, whilst lowering those with lower signal levels. In reality, AutoMixers only ever apply attenuation, signals are never actually boosted. For example, in a 'talkshow' situation, with one presenter and three guests, if all four microphones are assigned to an AutoMixer and only the presenter is speaking, the three guests' microphones will be attenuated more than the presenter's microphone, giving the effect of a boost to the presenter's voice and keeping the level of the overall program constant.

This method of automixing—using attenuation adjustment—results in a mix in which the total ambient/background noise level remains fairly constant.

Applying AutoMixers to Paths

1. Access the mono channel or group by pushing its **ACCESS** button.
2. Tap the AutoMixer processing tab.
3. Tap to select one of the AutoMixers: 1–4.
4. Tap to **APPLY AUTOMIXER TO CURRENT PATH**.

Note, AutoMixers use Dynamics 2 modules to function, so when an AutoMixer is applied to a path, its Dynamics 2 module is disabled.

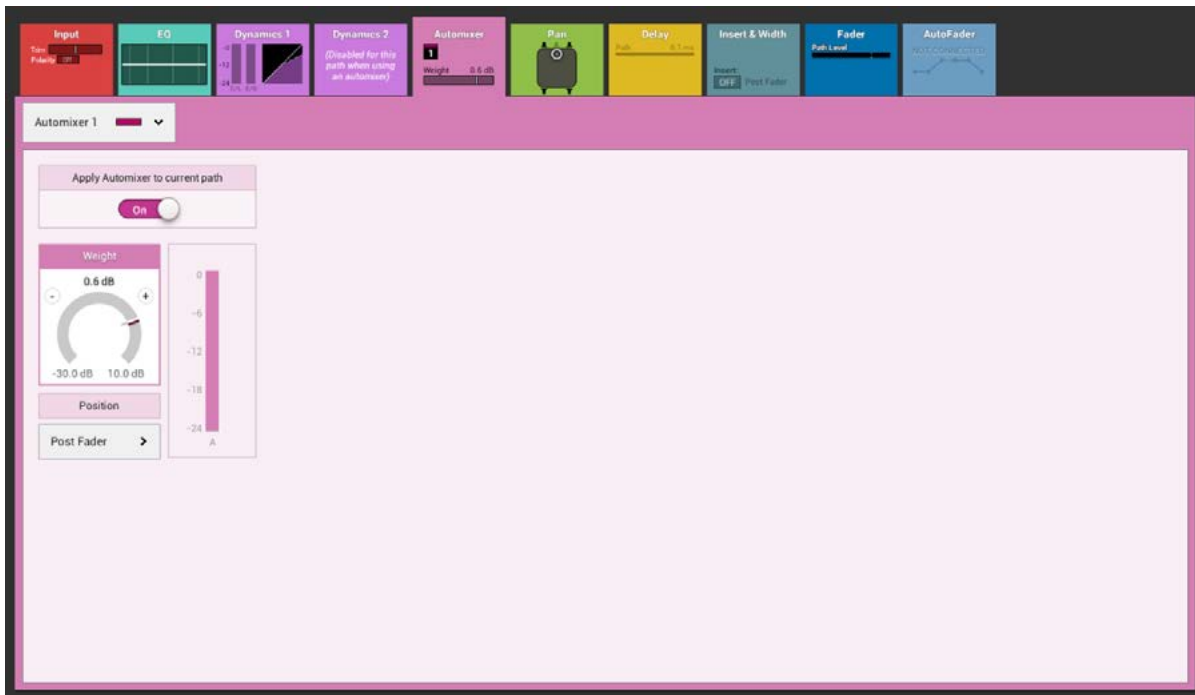
Setting Individual Path Weightings

AutoMixers calculate the ratios of path audio levels to the sum of all path levels to which the AutoMixer has been applied. Weightings can be applied individually to each path—the higher the weighting, the more prominence is given to that path in the ratio calculation, giving it more prominence within the mix. For example, in the 'talkshow' setting described above, if all contributors talk at the same time you may wish to give a higher weighting to the presenter's microphone so that their voice cuts through during the debate.

AutoMixer Controls

- **Weight:** Used to calculate the level of attenuation applied to the path. The higher the weight the more prominent the path will be in the resulting mix.
- **Position:** Set the order of processing. The AutoMixer can be applied pre EQ, pre fader or post fader.
- A gain reduction meter is provided so you can quickly see how much gain reduction is currently being applied to the path.

FIGURE 1 - AUTOMIXER PATH CONTROLS

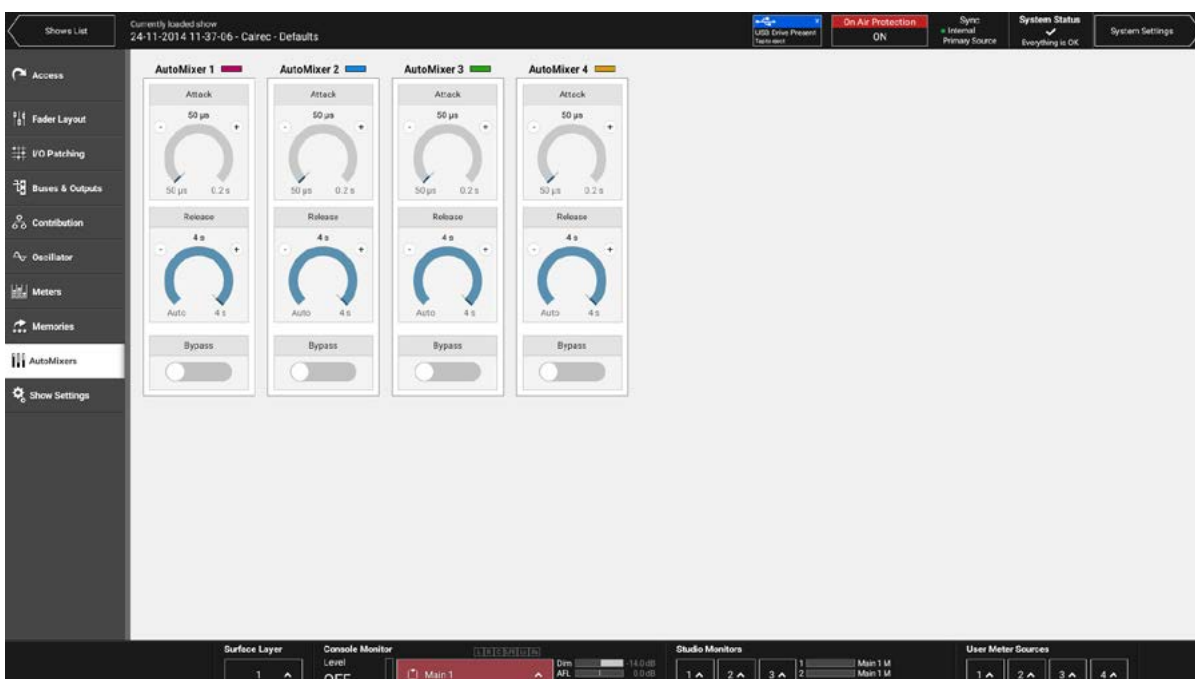


AutoMixer Global Controls

Each of Summa's four AutoMixers have their own attack, release and bypass controls. Attack and release are used to smooth out the signals prior to the level ratio calculation being made. A compromise must be made between fast attack and release, which leads to a more erratic but fast-acting functioning and slow attack and release times, which leads to a slower acting but smoother functioning.

Tapping **BYPASS** disables the AutoMixer for all assigned paths. If you want to momentarily take a path out of the AutoMixer assignment, the **APPLY AUTOMIXER TO CURRENT PATH** switches should be used on the individual path's processing tabs, as shown above.

FIGURE 2 - AUTOMIXER GLOBAL CONTROLS



CONTROL LINKING

Paths can be linked, meaning that if a parameter is altered for one linked path it will also be altered for all other linked paths for which the parameter is relevant. Memory isolation is also included in the control link.

Link buttons are available for all Summa faders, positioned between the talkback and access buttons. To add a path to the link, simply push **LINK**. To add a fader on a different surface layer to the link group, use the layer select buttons 1–6 to access the desired layer, then push the path's **LINK** button.

To link a group of sequential paths, simultaneously push the **LINK** buttons at each end of the group, e.g. simultaneously pushing **LINK** buttons for fader one and four adds faders one, two, three and four to the link.

Identifying Linked Faders

All linked paths can be identified by their illuminated fader **LINK** buttons. If link is active on a layer other than the current accessed layer, the **LINK CLEAR** button will pulse to indicate that the link is still active.

Link Features

- Parameter changes across linked paths are made relatively, for example, if the gain of one linked path is increased from 0 dB to 5 dB, a linked path with an original gain of 5 dB will be increased to 10 dB.
- Frequency controls are altered 'musically', for example, if one EQ frequency control is increased from 5kHz to 10 kHz, i.e. one octave, the corresponding frequency control for a linked path starting at 7 kHz will also be increased by one octave to 14 kHz.
- If a path is cloned and then added to the link group, all its clones will also be linked.

For reasons of safety and usability some features are not included in linking:

- Port patching
- PFL/AFL
- Phantom power
- VCA masters can not be linked

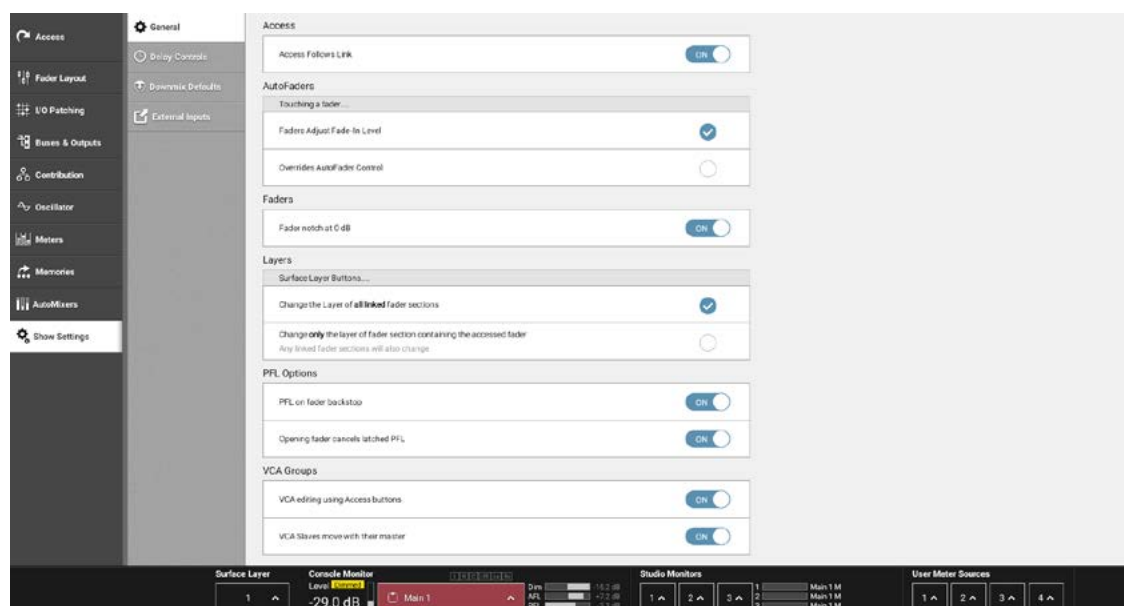
FIGURE 1 - FADER LINK BUTTON



Access Follows Link

Active Show>Show Settings>General now contains an option for path access to follow the creation of a control link see Figure 2 Below.

FIGURE 2- ACCESS FOLLOWS LINK OPTION



When this option is on, then when the user creates a link across a range of faders by simultaneously pressing two link buttons, the left-most path in the link will be accessed. Using this option eliminates the worry about accessing the right path after the link is created.

The user can now also link faders that do not contain paths. This makes it very quick to select a range of faders and assign paths from the Access screen.

PAN CONTROLS

The pan processing tab provides individual pan controls for each channel or group. Separate pan controls are available for panning to mains and groups, to auxs and to tracks and you can switch between the three using the drop-down menu in the window header.

Surround Mains and Groups

Surround panning controls are available when feeding mains and groups. There are several ways to manipulate these controls:

- On the touch display there is a visual representation of the surround space to the left hand side of the panning screen. Tap a new location or drag the white disk to place the audio within the space. Alternatively, there are rotary controls on the right of the panning window available for left/right and front/back panning.
- Push the **PAN** control mode button to populate each pair of control cells on the surface with 'Main & Group' pan controls for the currently accessed path. Use the top control cell to set the left right pan and the bottom control cell to set the front back pan. The buttons switch each pan control on/off individually.

FIGURE 1 - CONTROL CELLS—PAN



Pan to Tracks

Tracks can be stereo or mono. When **PAN TO: TRACKS** is selected in the window header a single left/right panning rotary is provided which sets panning for the accessed path to all stereo tracks.

Pan to Auxs

Auxs can be stereo or mono. When **PAN TO: AUX** is selected in the window header 16 panning rotaries are provided for setting individual panning for each of the 16 Auxs. There are also individual **ON/OFF** switches to switch on and off the panning for each Aux send.

Pan Controls

- Bypass M&G Pan: Allows you to quickly disable panning to mains and groups without having to navigate to the correct pan window. Individual in/out statuses of each pan control are preserved when bypass is used.
- Switch between viewing panning controls for mains and groups, auxs or tracks.
- Centre Only: Allows you to quickly centre all panning for the currently accessed path.
- Front Format: Allows you to switch between LR, LCR and LCR with divergence when panning to 5.1 destinations.
- LFE and non-LFE Level: Separate level controls are available for the LFE and non-LFE portions of the signal so that the overall level can be balanced.
- Front Divergence: An extra control over the ratio between the amount of signal routed to the centre and LR speakers in a 5.1 situation.

FIGURE 2 - PAN CONTROLS



DELAY

Summa has three types of delay available:

- Input delay: up to 2.73 s available per path from a pool of 256 mono legs, for example, when assigning input delay to a 5.1 path, six of the 256 mono legs are used.
- Path delay: up to 2.73 s available for every path.
- Output delay: up to 2.73 s available per path from a pool of 256 mono legs, as above.

Input, path and output delay can be used individually or in combination.

Accessing Delay Controls

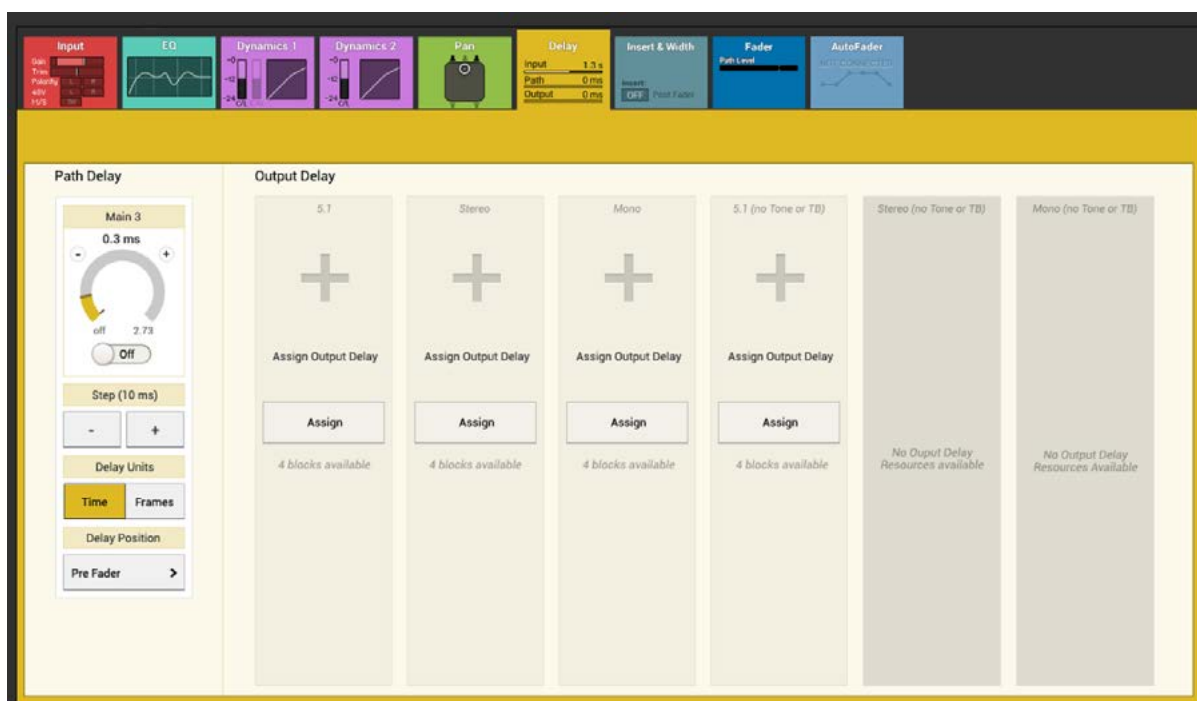
Tapping the delay processing tab brings up the delay window for the currently accessed path. If the path is a channel, both input and path delay are displayed. If the path is an output, path and output delay controls are available.

Up to 2.73s of path delay is always available for all paths. Input and output delay modules can be added to paths by tapping the relevant ASSIGN buttons.

Multiple input and output delay modules can be added to paths. If all available input or output delay modules are in-use and more are needed, modules must be removed from paths by tapping the **REMOVE** buttons at the bottom of the modules to add them back into the delay pools.

- Use the rotary control to set the delay length.
- Alternatively, use the step up [+] and step down [-] buttons to increase and decrease the delay time in steps of 10 ms.
- Delay Units: Switch between displaying delay in either time or frames.
- Delay Position: Path delay can be inserted into the path either pre EQ, pre fader or post fader.
- Tap ASSIGN buttons to insert input or output delay modules into the path.

FIGURE 1 - DELAY CONTROLS



Surface Delay Controls

Push the **DELAY** control mode button to populate each pair of control cells on the surface with delay controls for each path. Use the bottom control cell to control path delay, the button turns path delay ON/OFF and the rotary sets the delay time. The top control cell only becomes active when input or output delay are assigned to the associated path.

FIGURE 2 - DELAY CONTROL CELLS



Global Delay Controls

Tap 'show settings' in the Show menu and then select 'delay units'. Three global delay settings are available:

- Delay can be viewed in either time or frames across the surface, select **TIME** or **FRAMES** and all new delay modules will be displayed according to your choice. If you wish to extend this selection to all existing delay assignments tap **APPLY TO EXISTING DELAYS**.
- If delays are displayed and controlled in frames rather than time, a frame-rate must be set. Changing the frame-rate from this screen changes is for all delays assigned on the surface which are in frames.
- When setting delays with a rotary control or an up/down stepper can be used. If the stepper is used, the step size can be set at either 1 frame or 0.5 frames.

FIGURE 3 - SHOW SETTINGS—DELAY CONTROLS

Delay	
Delay Units	Apply to existing Delays TimeFrames
Frame Rate <i>This will change all delays currently set to frames</i>	29.97 fps (NTSC) >
Frame Step Size <i>This will change all controls but not affect delay times</i>	0.51

INSERTS

Inserts provide a quick way to insert signal processing equipment into the system. Faders, groups, mains and the console monitor output all have an insert.

Each insert has a send and a return, providing a convenient break in the signal chain. Sends and returns all appear in the I/O patching screen where they can be patched to I/O box ports for connection to external devices.

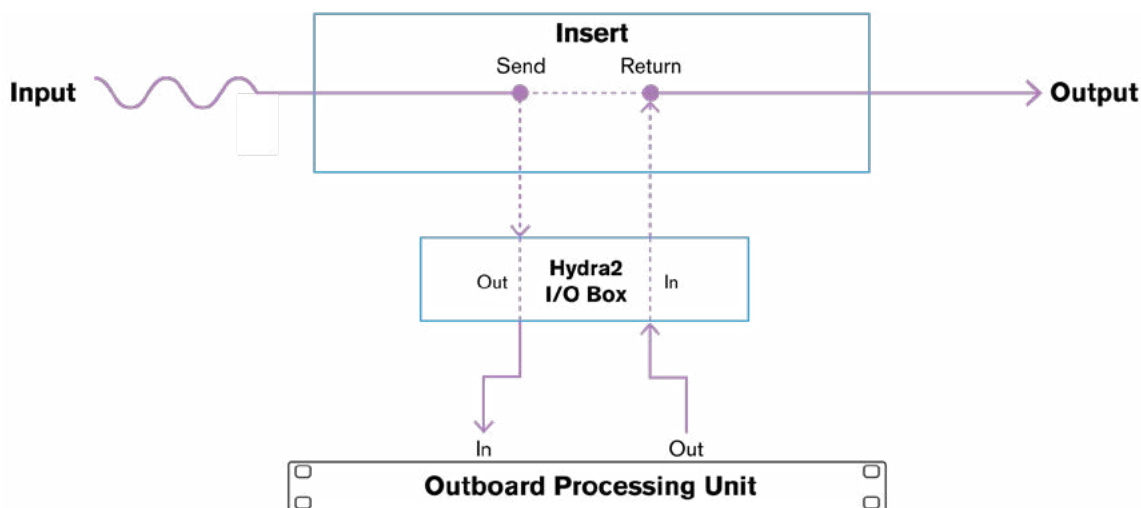
Fader Inserts

Fader inserts are associated to the attached path. If, for example, a channel is attached to fader three and fader three's insert is patched to an I/O box, if channel three is moved to a different fader, fader 10 for example, the insert patching will move along with it to fader 10's insert send and return.

Patching Inserts

From the Summa surface, insert sends should be connected to outboard inputs and Insert returns should be connected to outboard outputs. Outboard devices should have their inputs connected to I/O box output ports and their outputs connected to I/O box input ports, as shown below.

FIGURE 1 - INSERT

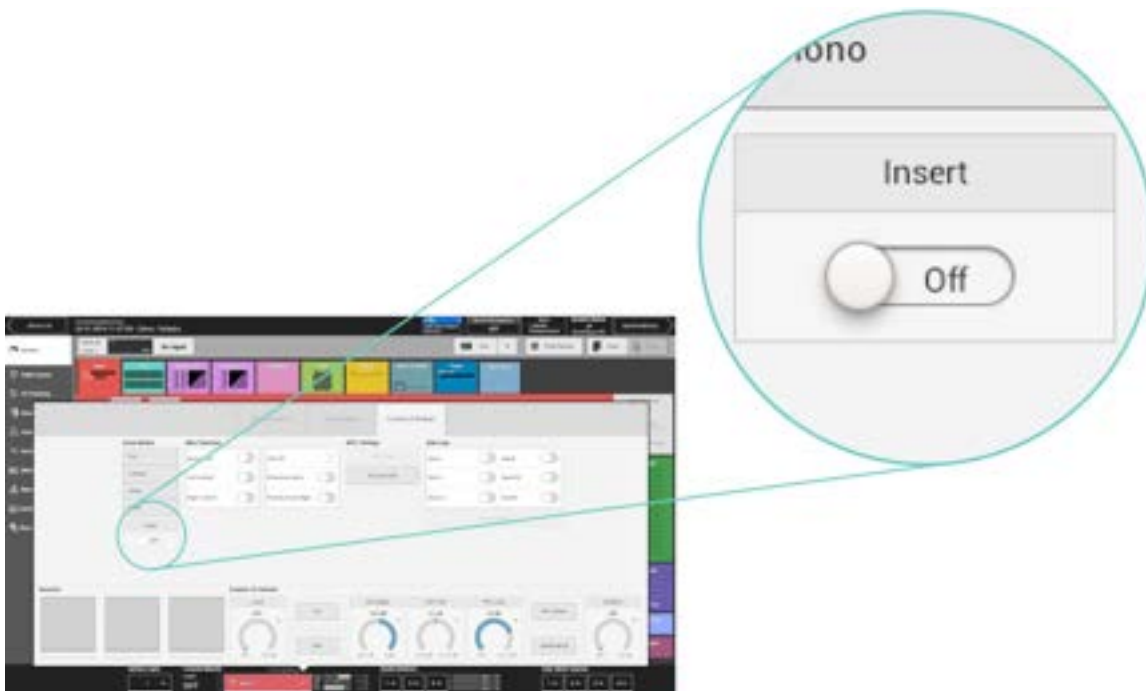


In/Out

Each insert has its own activation in/out button which, for faders, groups and mains can be found in the insert & width processing tab. The console monitor insert in/out button is accessible from the settings tab within the console monitor pop-up.

In/out buttons are useful for quickly comparing processed and unprocessed signals.

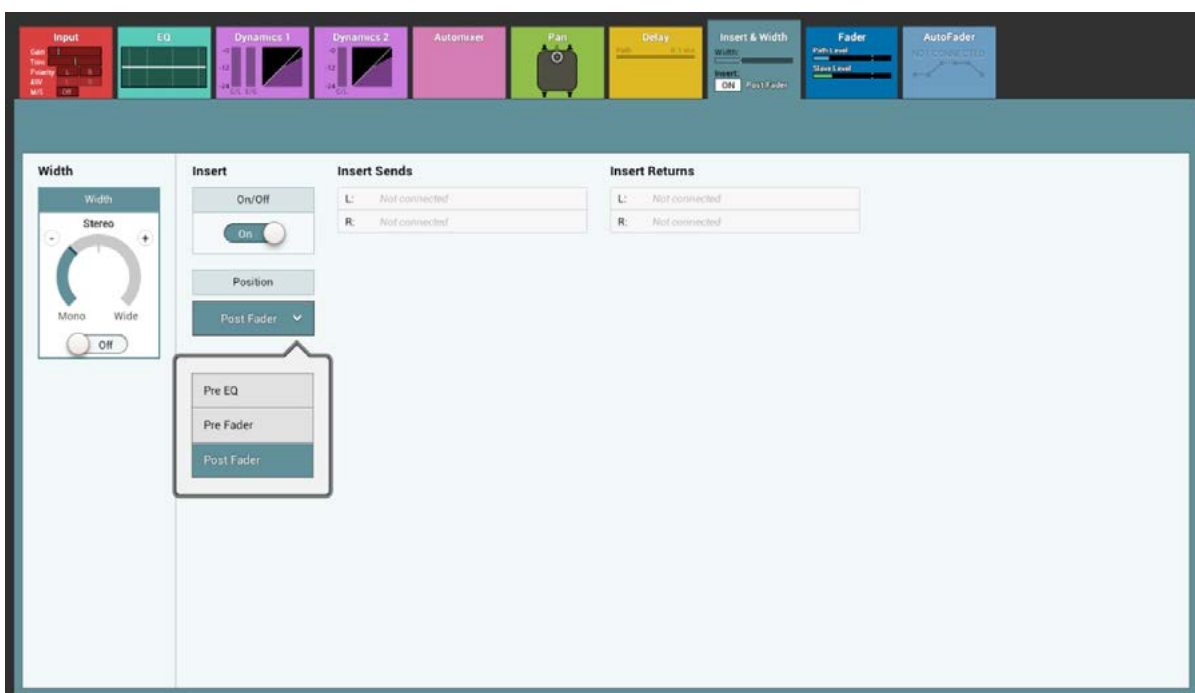
FIGURE 2 - CONSOLE MONITOR INSERT ON/OFF TOGGLE SWITCH



Insert and Width Tab Controls

- Width: A width rotary control is available for all stereo paths and is used to control the width of the stereo width ranging from mono, through stereo to wide. Wide creates the impression of an extended image past the usual left/right limits. Pressing the **WIDTH** control mode button populates the bottom row of control cells with width controls for any stereo paths.
- Insert: Inserts can be switched on or off individually.
- Position: Inserts can be placed either pre EQ, pre fader or post fader.
- Insert patching sources and destinations are clearly displayed.

FIGURE 3 - FADER STRIP



VCA GROUPS

Summa's VCA group system allows you to control the level, CUT, AFL and PFL statuses of a group of faders from a 'master' fader.

Creating and dissolving VCA Groups

To create a VCA group:

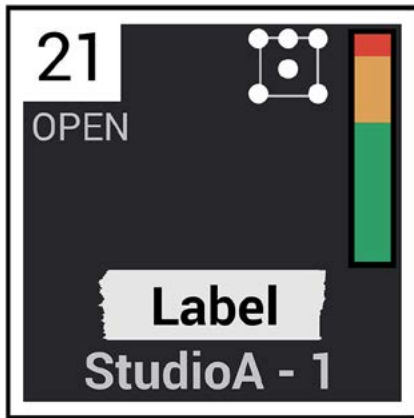
1. Select the fader that you wish to be the group's master by pushing and holding its **ACCESS** button.
2. Push **ACCESS** for the faders that you wish to be slaves to the master.

To remove slaves or undo the process:

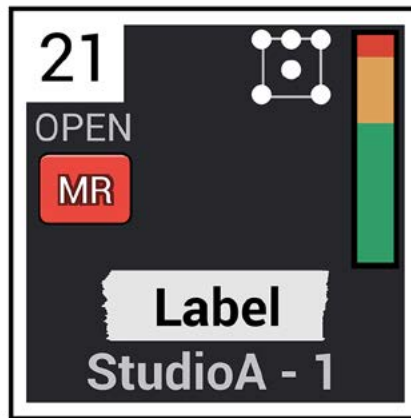
1. Push and hold the master's **ACCESS** button.
2. Push the **ACCESS** buttons for the slaves that you wish to remove from the group.

By default, slave faders move along with their master faders to show the relative levels. This feature can be switched off within Summa's general settings, as shown at the bottom of this page.

FIGURE 1 - VCA STATUS—FADER DISPLAY



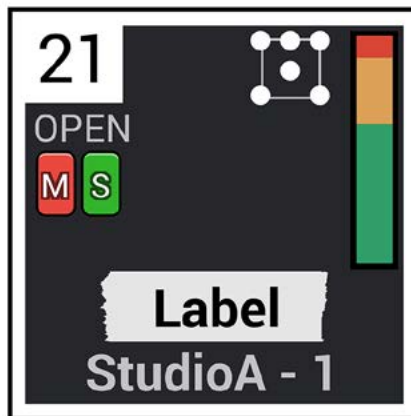
This fader is neither master nor slave. If a path is attached, the level of this fader is the level of the path.



This fader is a primary master. If a path is attached, the path is a direct slave to this master. Push ACCESS to see and alter the level of the slave path.



This fader is a slave. If a path is attached, the level of the fader controls the level of the path.

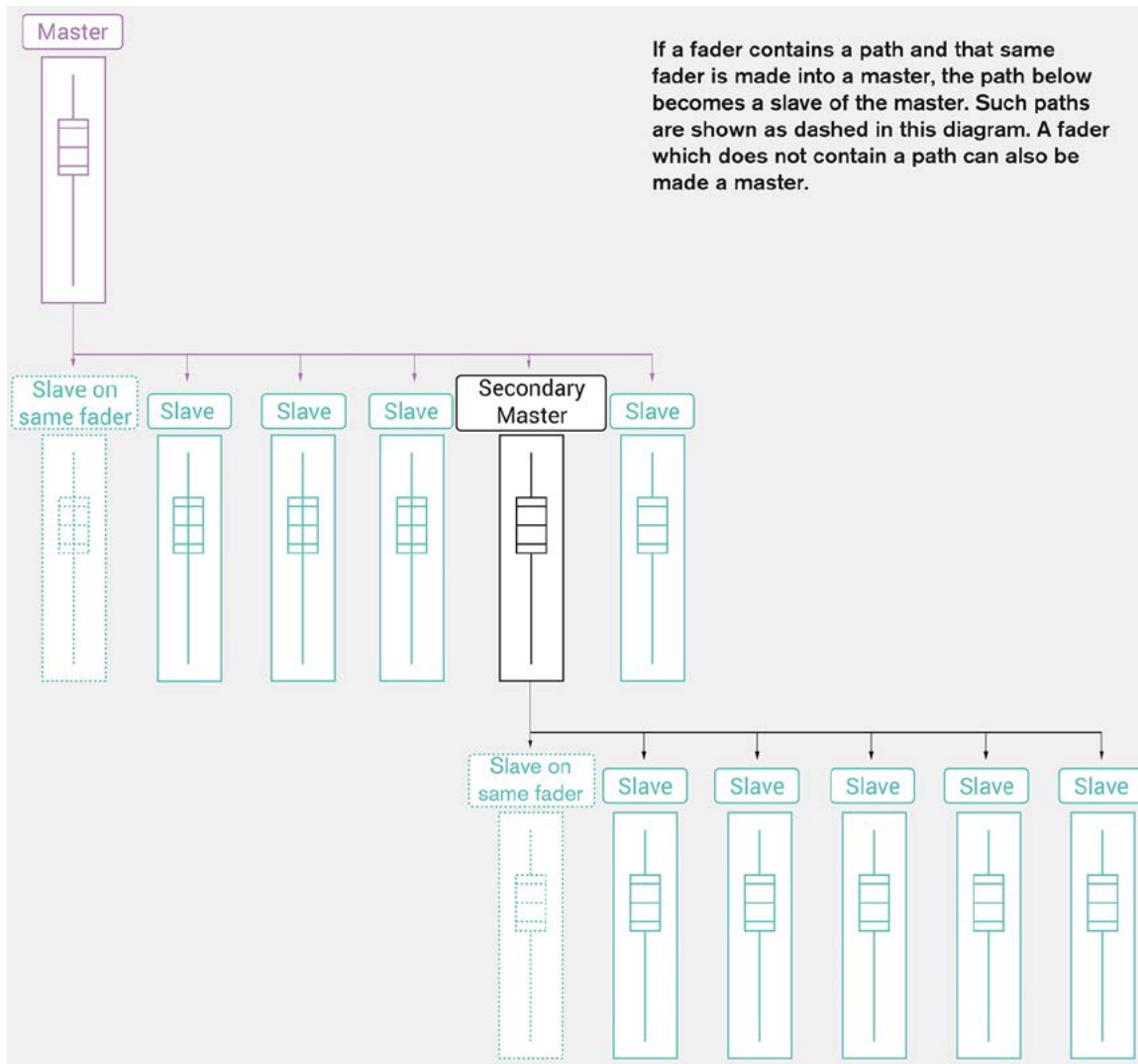


This fader is a secondary master. If a path is attached it is a slave to this secondary master. Push ACCESS to see/alter the level of the slave path.

Secondary Master

There is a three tiered hierarchy within Summa's VCA group system: primary Master, secondary master and slave. Altering the level of a primary master affects the levels of its direct slaves, its secondary master and the secondary master's slaves, all by the same degree. Pushing the primary master's CUT, AFL or PFL buttons applies the same settings to direct slaves, any secondary masters and their slaves. The diagram on this page illustrates the hierarchy.

FIGURE 2 - VCA HIERARCHY



Masters and Paths

When a fader becomes a master and it has a path attached, that path becomes a slave of the master fader. The level of the slave path can be altered separately to the master fader level:

1. Push the master fader's **ACCESS** button to see the fader jump to the position of the slave path.
2. With the **ACCESS** button held, move the fader to change the level of the slave path.
3. Release the **ACCESS** button to see the fader jump back to the master position.

Nulling Indicators

Nulling indicators appear within fader displays and are used for the following:

- To indicate when the combined level of a slave fader and its master are off the scale of the physical fader. The 'down' nulling indicator lights when the combined level is below -99.9 dB and the 'up' nulling indicator lights when the combined level is above +10 dB.
- To indicate when the actual level of a VCA slave fader is higher or lower than the actual level of the fader, when VCA slaves are prevented from moving along with their master faders.
- If both nulling indicators show at the same time, this indicates that the master fader is below -50 dB and so the level of the slave cannot be altered. This has been put in place for safety as making alterations at such low levels would be likely to produce inaudible results.

FIGURE 3 - NULLING INDICATORS

Both nulling indicators are lit indicating that the master fader is below -50dB



5.1 Surround Paths

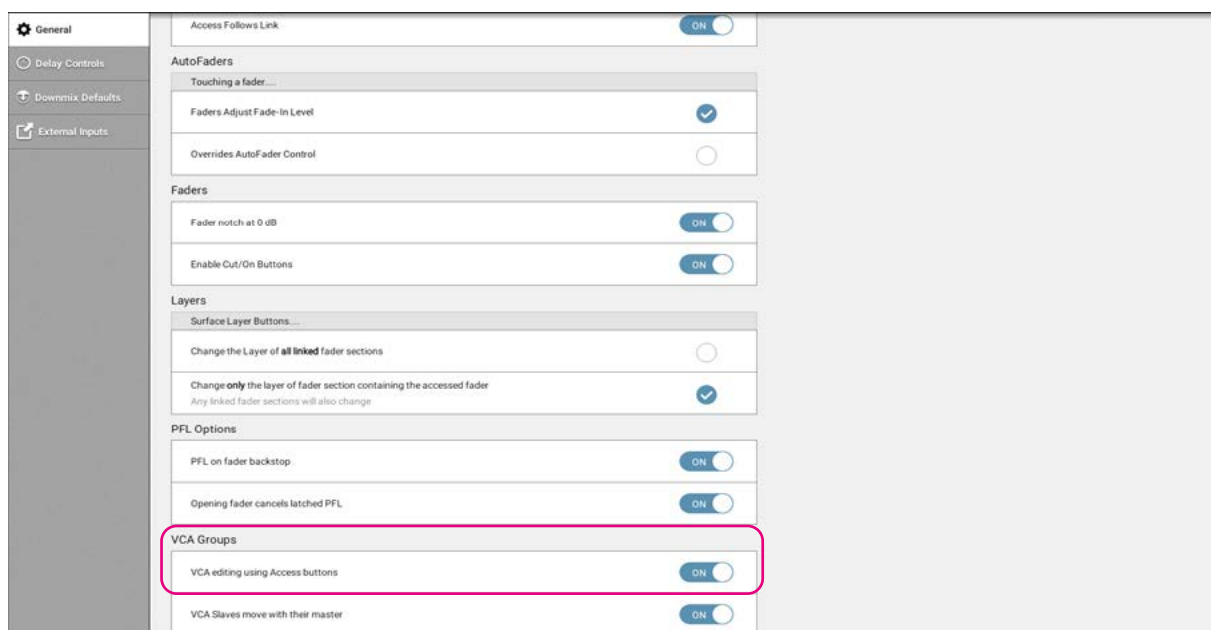
If a surround path is part of a VCA group, the primary and secondary masters' level, PFL, AFL and CUT settings will affect all legs of the surround path. A surround path leg cannot be a VCA master or slave.

VCA Group Protection

VCA groups can be protected from being changed:

1. Tap **SHOW SETTINGS** at the bottom of the Show menu.
2. Select **GENERAL** from the left hand menu.
3. Switch **VCA EDITING USING ACCESS BUTTONS** 'off'—all existing VCA groups carry on operating normally but no changes can be made and no new groups can be created. See highlight in Figure 4.

FIGURE 4 - VCA GROUP SETTINGS

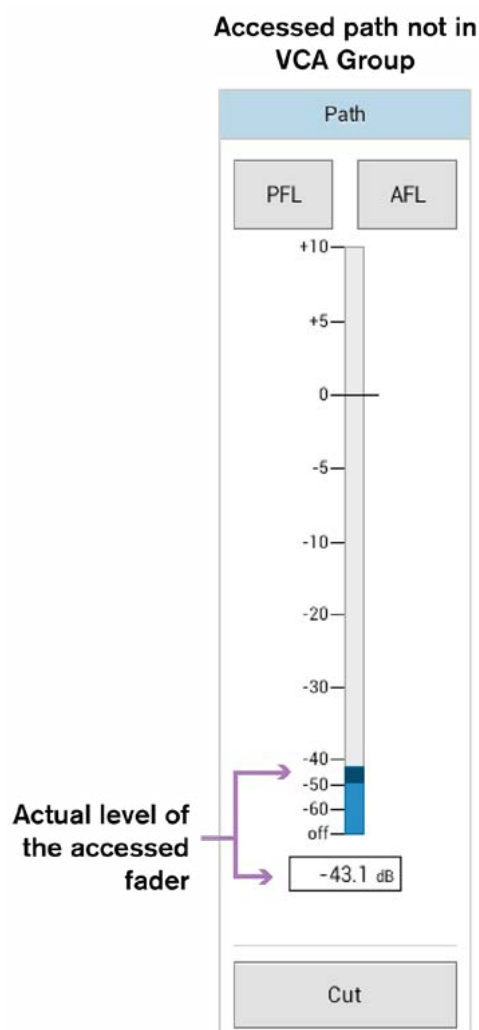


THE FADER WINDOW

The fader window displays an overview of the currently accessed fader. All level information relates to the fader level, not the actual level of the attached audio path.

A virtual version of the accessed fader is provided within the fader window including PFL, AFL and CUT buttons which can be used as an alternative to the surface buttons. The image below shows how a fader that is not in a VCA group is displayed within the fader window.

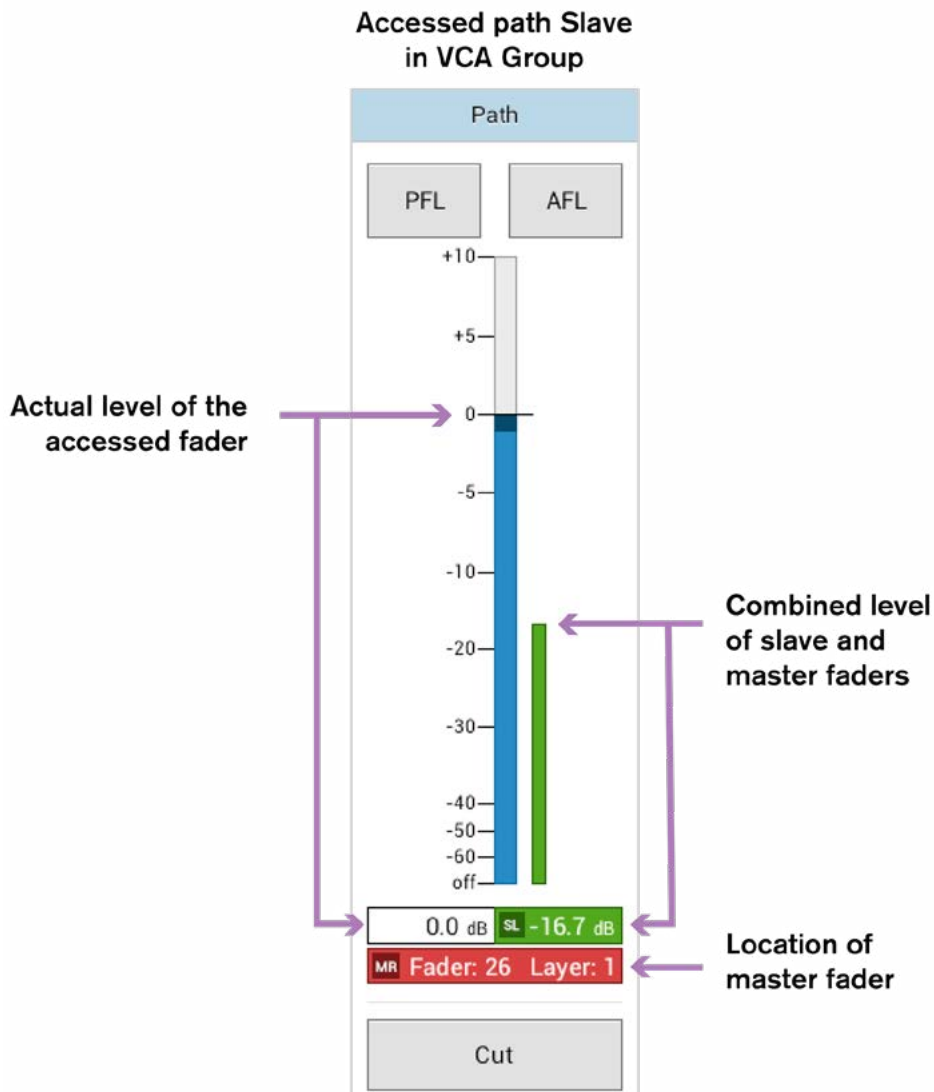
FIGURE 1 - FADER—NOT IN VCA GROUP



VCA Slave

If the accessed fader is a slave within a VCA group a green slave level is displayed to the right of the blue fader level indicator showing the combined level of the accessed fader and its master fader. Beneath this is a red strip which displays the location (fader number and layer) of its master fader.

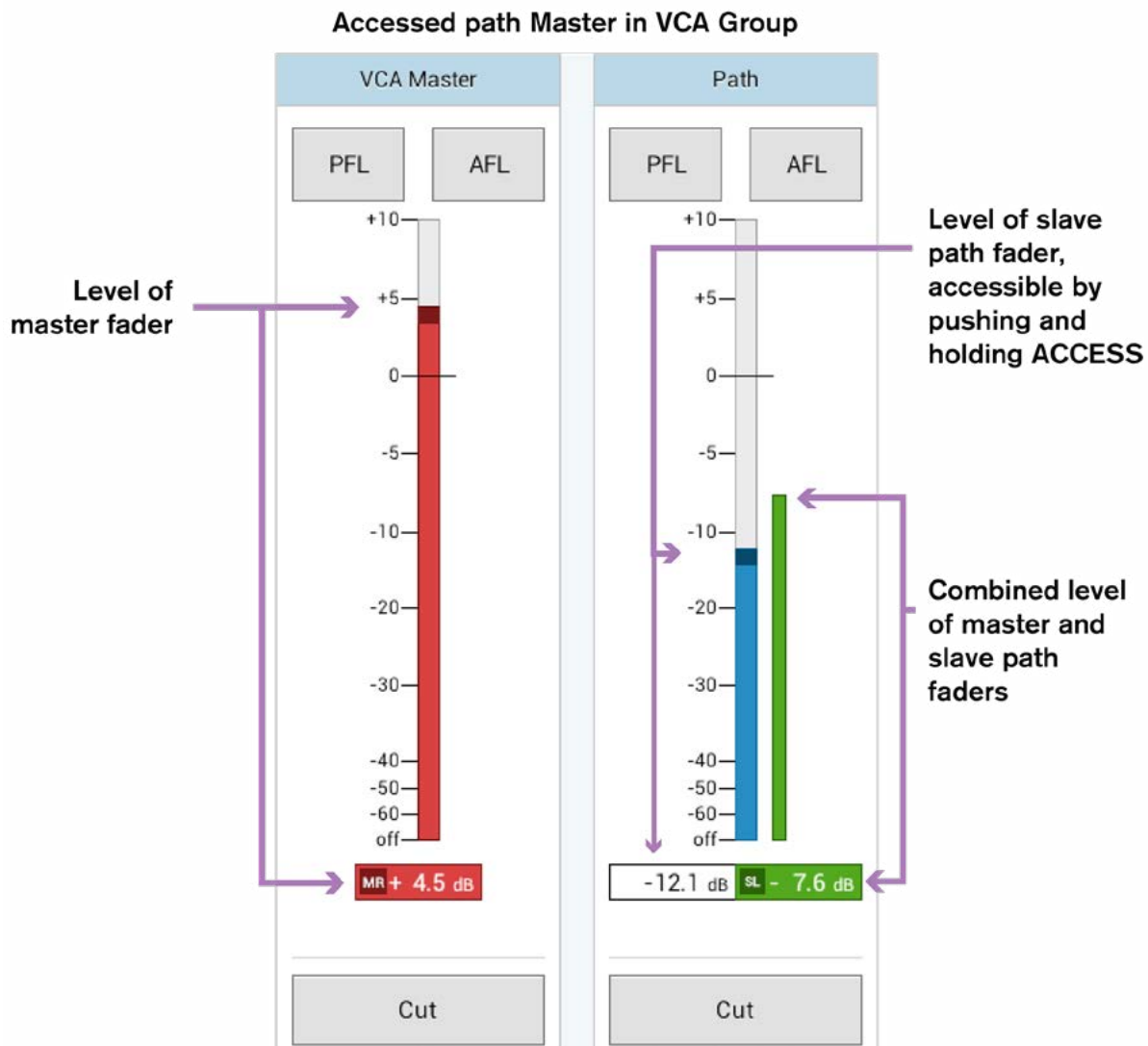
FIGURE 2 - FADER—SLAVE IN VCA GROUP



VCA Master

If the accessed fader is a primary or secondary master within a VCA group and a path is attached to the fader, two faders are displayed, one for the VCA master and one for the slave path beneath (see “VCA Groups” on page 142 for more information)

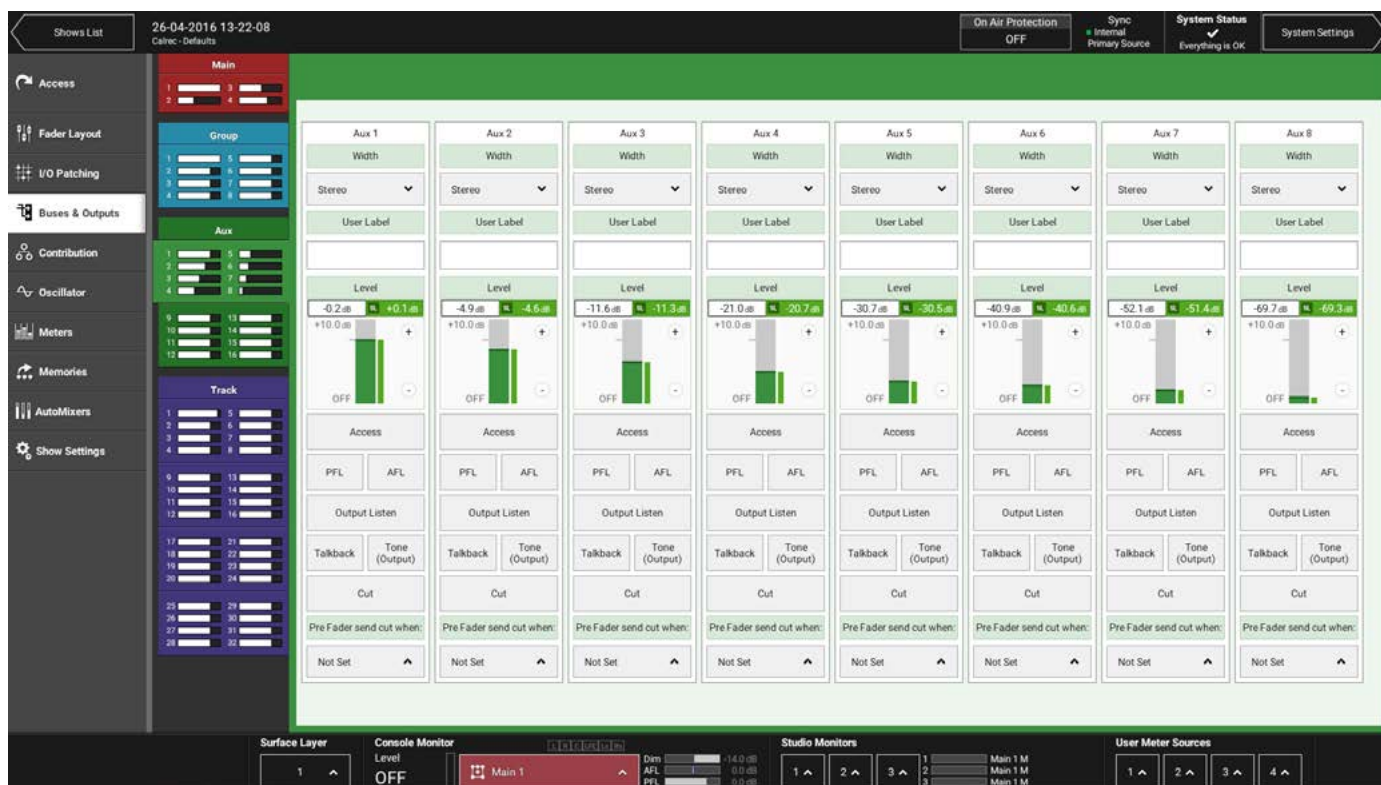
FIGURE 3 - FADER—MASTER IN VCA GROUP



VCA Slaves on Buses and Outputs Page

The Buses and Outputs page now shows VCA Slave levels as well as the bus path level, if a bus is controlled by a VCA Master. This applies to Main, Group, Aux and Track bus outputs. See Figure 4 below which shows Aux bus outputs display when set as VCA slaves to a VCA Master.

FIGURE 4 - AUX BUS OUTPUT FADERS—SLAVES IN VCA GROUP



Surround Paths

If the accessed fader has a surround path attached, two additional tabs appear within the fader window: 'surround leg faders' and 'downmix faders'.

Surround Leg Faders

The surround leg faders window allows you to set the relative levels for the separate surround component legs:

- Left and right (LR)
- Centre (C)
- Low frequency enhancement (LFE)
- Left surround and right surround (LsRs)

The individual surround legs can be monitored and cut individually using the CUT, AFL and PFL buttons.

Downmix Faders

The downmix faders tab allows you to make individual alterations to the LR, C, LFE and LsRs levels which will be used for downmixing the surround feed to stereo and mono outputs. Each Show has default downmix levels which are defined within the setup area. Making changes within the fader window offsets the downmix levels from these defaults. See ["Downmixing" on page 167](#) for more information.

CSCP control

Calrec serial control protocol (CSCP) enables control of the following using various third party devices:

- Fader positions
- Path CUT/ON status
- PFL/AFL Status
- Routing to Auxs and Mains
- Setting Aux output levels
- Main output level
- Left to both and right to both switching

Each fader has a CSCP Control on/off switch in the fader window header. Setting this switch to the on or off positions enables/disables CSCP for that path.

FIGURE 4 - CSCP CONTROL FROM THE FADER WINDOW

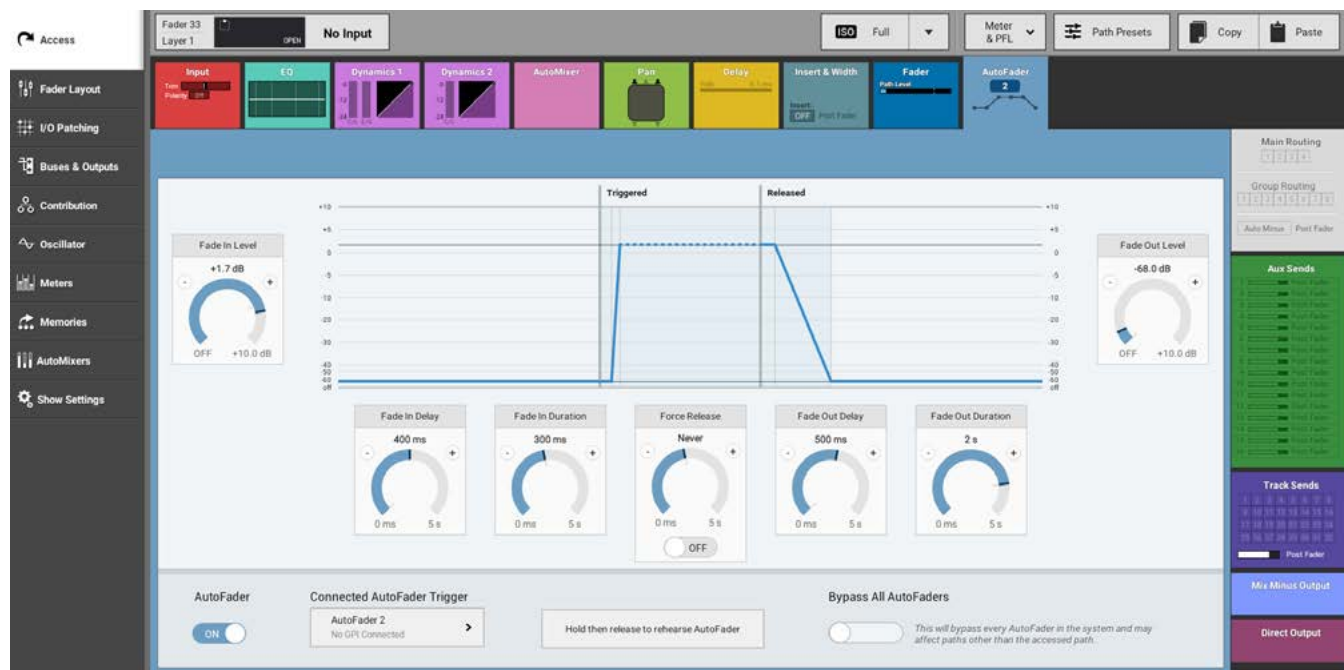


AUTOFADERS

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

To control an assignable AutoFader, select the Access>Autofader page. and press the appropriate access button for the channel whose Autofader is to be accessed. See Figure 1 below.

FIGURE 1 - AUTOFADER SCREEN



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.

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

AutoFader Controls

- **AUTOFADER 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 labelled ' Hold then release to rehearse AutoFader' 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.
- **FADE IN LEVEL** - This is the level that the fader goes to when the GPI is triggered shown as an 'IN' line.
- **FADE 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.
- **FADE 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.

Note that if the control is set to 'Never' the Autofader will remain 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
- **FADE 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 Access mode is on a different control page.

- **CONNECTED AUTOFADER TRIGGER** - Pressing this button allows the user to select the AutoFader trigger.

Setting Up Autofaders for use

There are 99 autofaders in the Summa 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.

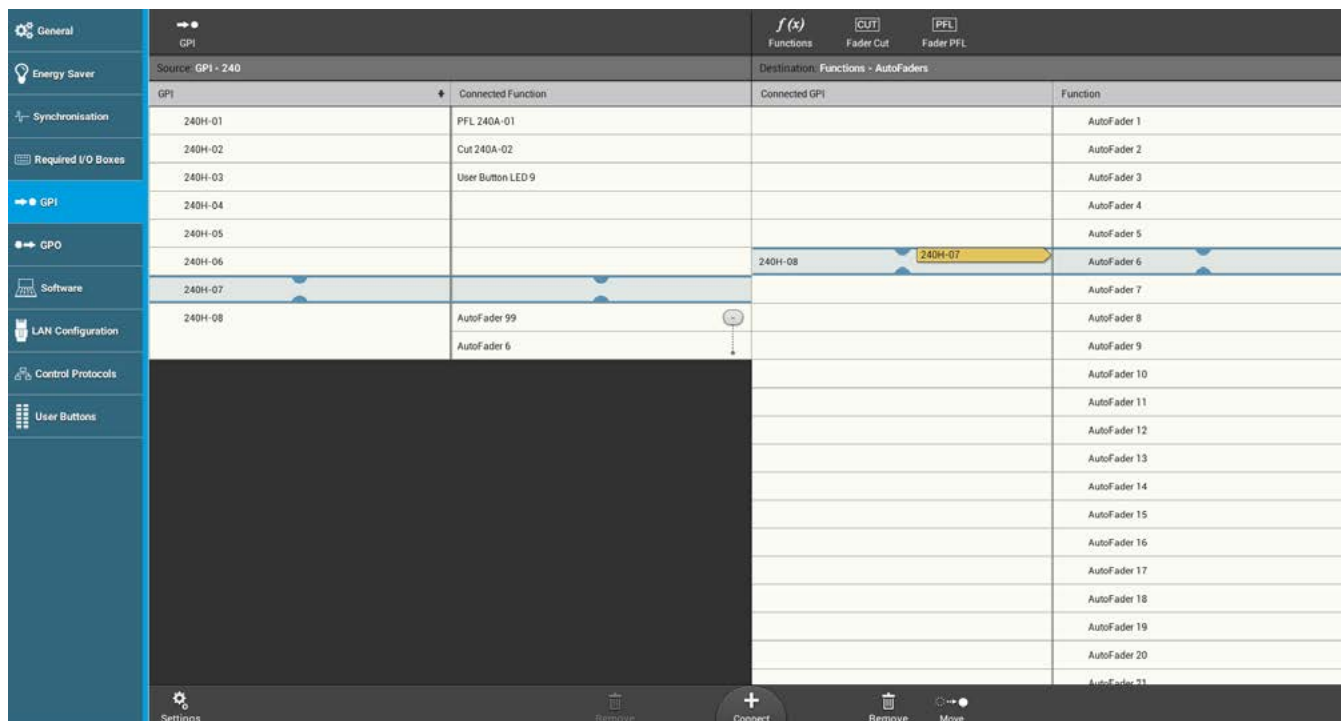
Assigning GPI's to autofaders

GPIs are assigned to autofaders in the GPI screen in System Settings>GPI as shown in Figure 2.

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.

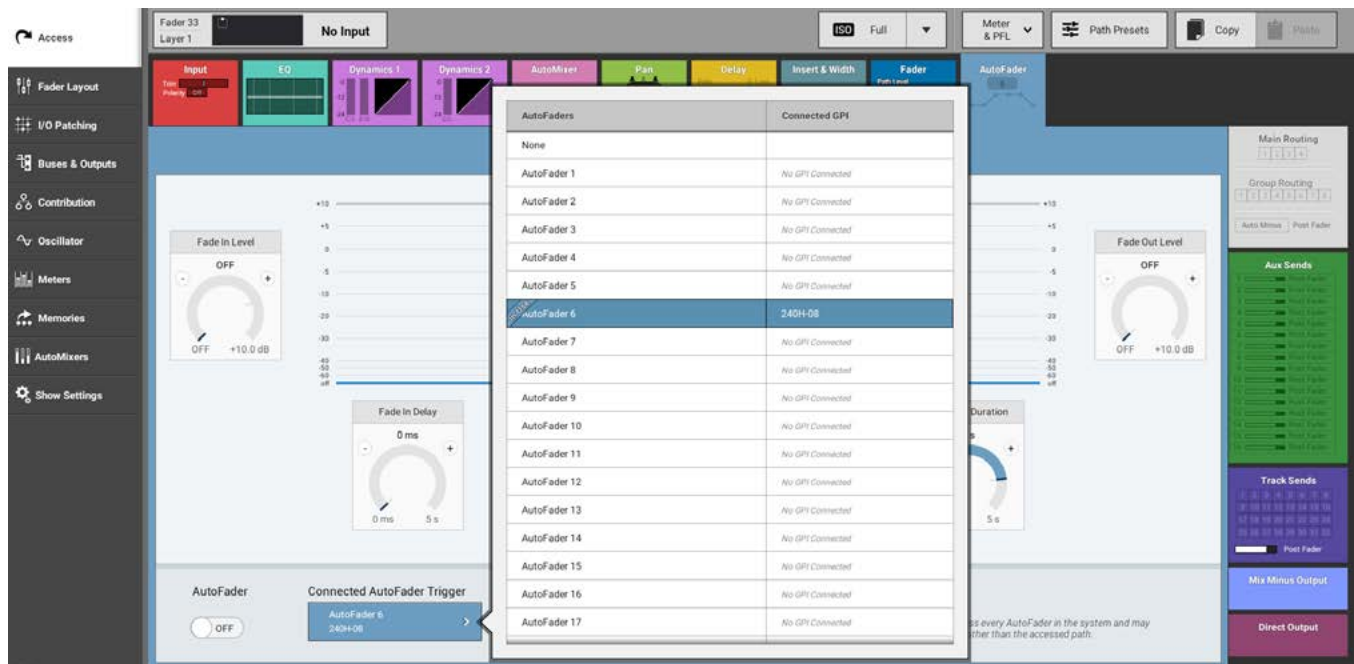
FIGURE 2 - ASSIGNING GPIs TO AUTOFADERS



Assigning autofaders to faders

Once the relevant GPIs have been assigned to autofaders, the autofaders can be assigned to control faders on the surface. This is done on the Access>AutoFader screen as shown in Figure 3.

FIGURE 3 - ASSIGNING AUTOFADERS TO FADERS



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 Access>AutoFader screen.

Autofader parameter settings

The AUTOFADER 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.

Global Autofader Bypass

At the bottom of the AutoFader screen 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 display will show the AutoFader Number and the Meter display shows when the AutoFader is active.

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 which 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 AutoFader 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.

SUMMA COMMUNICATIONS

TALKBACK AND REVERSE TALKBACK

Talkback is the process of routing a microphone to an output for the purpose of communication. Usually, talkback routes a microphone signal to headphones or a loudspeaker so that people in a control room can talk to those on the studio floor, and vice versa.

The talkback feed can be routed to any bus or output using either the touch display talkback buttons or the physical surface talkback buttons. All talkback buttons are momentary, meaning they are only operational when held.

When talkback is routed to an output, the output's normal feed is entirely replaced by the talkback microphone feed.

Touch Display Talkback Buttons

There are talkback buttons for individual bus outputs in the Buses & Outputs window and for outputs in the mix minus and direct output routing windows. Holding any of the touch display talkback buttons routes the talkback feed to the corresponding output.

Surface Talkback Buttons

Each fader on the Summa surface has a talkback button at the top of the fader strip. Pushing and holding these surface talkback buttons routes the talkback feed to the relevant output.

Note, pushing a group or channel input's talkback button routes talkback to the corresponding mix minus output.

Patching to Talkback

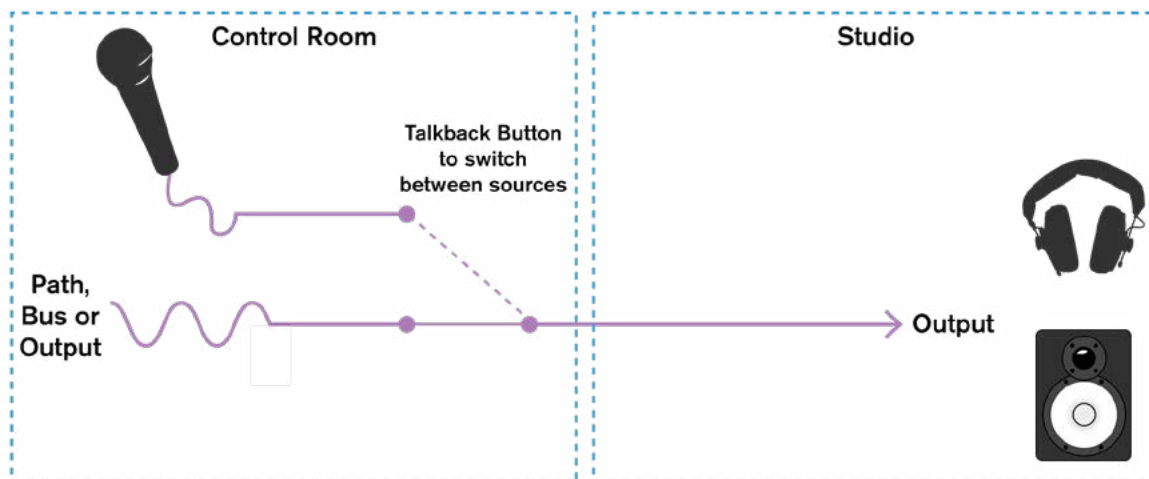
There is one talkback input to the system which is available as a patching destination within the I/O Patching screen. Summa has a built-in talkback microphone situated close to the Summa logo on the surface, which is connected directly to an XLR output on the rear of the surface. To use the built-in talkback microphone, first connect its output to any Hydra2 I/O box input.

Any Hydra2 input port can be patched to the talkback input:

1. Tap **I/O PATCHING** in the Show menu.
2. Select **I/O BOXES** in the sources window and select the I/O box to which your talkback microphone is connected.
3. Select **DESK CONNECTIONS** within the destinations window and select talkback Inputs.
4. Tap to select the input port to which you have connected your talkback microphone.
5. Tap to select the talkback input.
6. Tap **CONNECT**.

The input settings, gain and 48 V, can be setup by the network administrator via H2O (see 'Source Settings' in the H2O user guide for more information).

FIGURE 1 - TALKBACK BUTTON SENDS THE TALKBACK MICROPHONE FEED TO THE OUTPUT



On-Air / Rehearse Settings

The talkback system can be inhibited when the console is in on-air mode. By default, when in on-air mode, talkback cannot be routed to a main. See [“On Air Protection” on page 180](#) for more information on setting up the on-air/rehearse settings.

Reverse Talkback

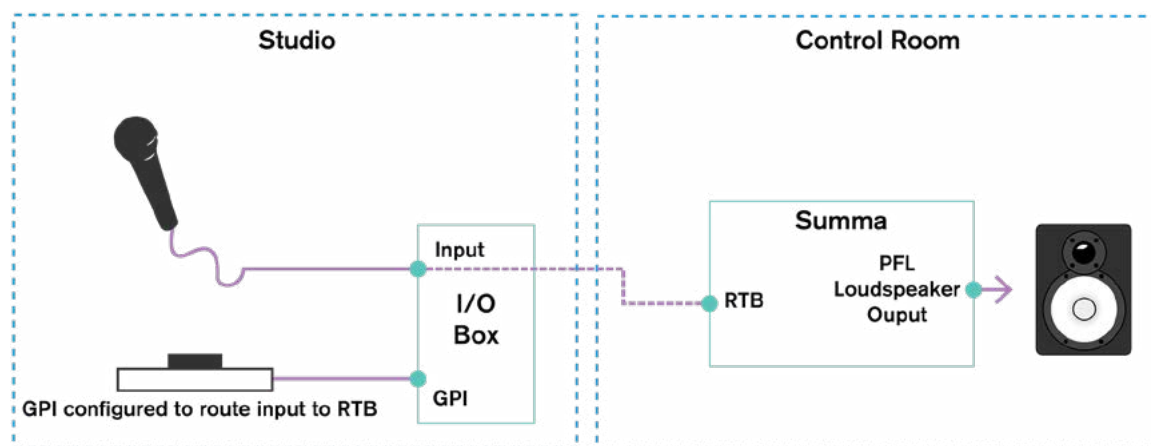
Reverse talkback is a process which allows a performer/presenter to push a button to automatically route their microphone signal to Summa's PFL loudspeaker output. Summa has three reverse talkback inputs.

Microphones should be patched to reverse talkback inputs using the method described about for patching to talkback inputs. Reverse talkback inputs are also available as destinations for GPIO patching. A switch should be patched to the reverse talkback GPI so that when the performer/presenter wishes to be heard they simply push the switch to route their microphone to the PFL loudspeaker in the control room.

To patch a switch to a reverse talkback GPI:

1. Select **GPI** from the menu buttons down the left hand side of the screen.
2. Select **FILTER INPUTS** in the General Purpose Inputs window and select the I/O box to which your GPI switch is connected.
3. Select **FILTER INPUTS** in the GPI functions window and select 'reverse talkback' from the list.
4. Select the port to which your switch is connected.
5. Select the reverse talkback input you wish to use.
6. Select **PATCH**.

FIGURE 2 - REVERSE TALKBACK SWITCH SENDS THE MICROPHONE FEED TO THE PFL LS OUTPUT



MIX MINUS

Summa's mix minus system allows a comprehensive foldback mix to be sent to multiple listeners. Using the auto minus bus along with mix minus outputs allows you to provide to listeners a complete mix with their own input automatically removed.

Foldback is a term used to refer to audio mixes used to feed communications systems, usually from control rooms into studios, to allow presenters and performers to hear all audio content which is relevant to them.

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

Scenario one: Field reporters or presenters communicating via long distance systems e.g. satellite links.

Field reporters need to hear a live mix of the program to which they are contributing in order to hear cues and communicate with other presenters. The inherent delay in the system means that it may be a number of seconds before the live audio stream reaches the reporter.

It can be very difficult to speak whilst hearing your own voice even with only a slight delay. Using an auto minus feed for the reporter solves this problem as their own contribution to the audio mix is removed before it is fed to their headphones or monitoring system.

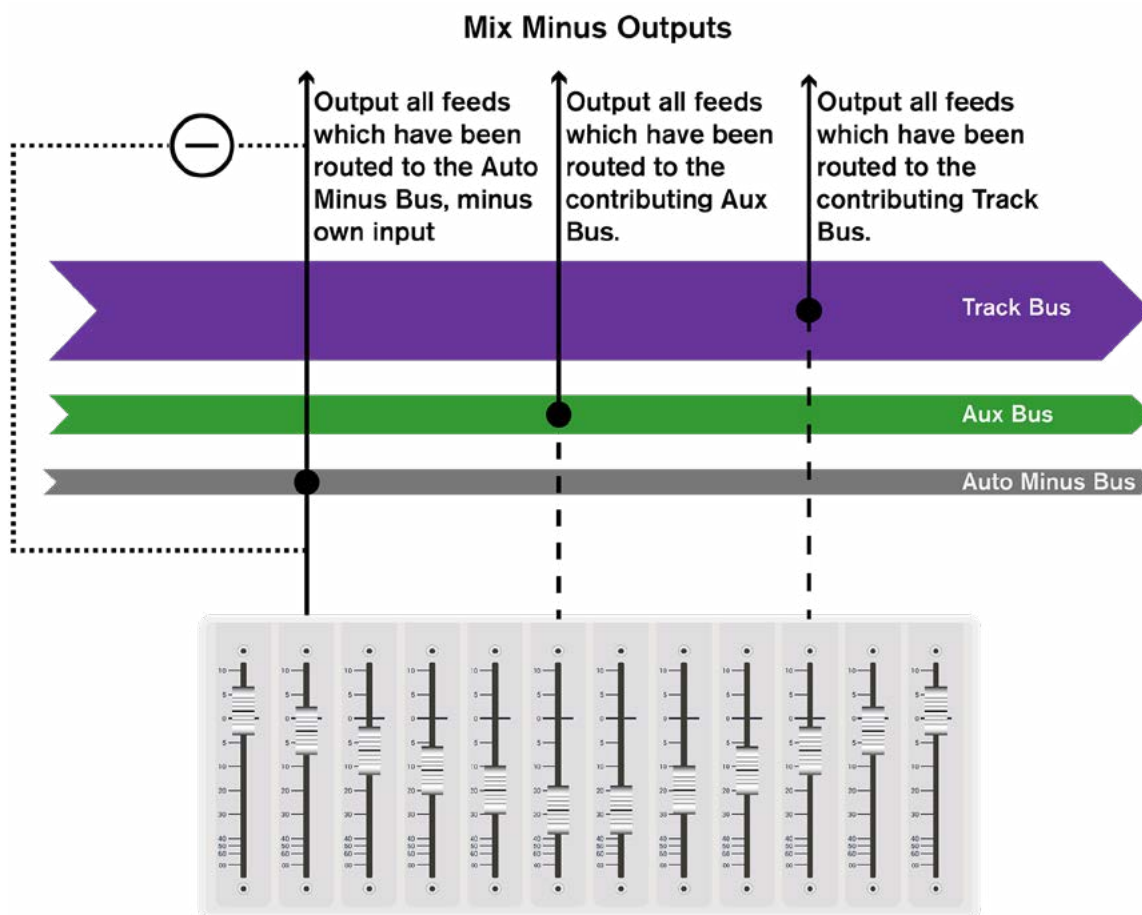
Scenario Two: Eliminating feedback when using loudspeakers for communication.

If a presenter is monitoring their foldback feed using a loudspeaker, the sound from the loudspeaker signal may be picked up by the presenter's microphone, thus creating a feedback loop. By using the auto minus bus to remove the presenter's own contribution to the foldback bus, this feedback loop is broken.

Mix Minus Output

Each channel and group has a dedicated mix minus output available for patching to external communications devices to create foldback feeds. Each mix minus output can be fed by either the auto minus bus, an aux or a track bus.

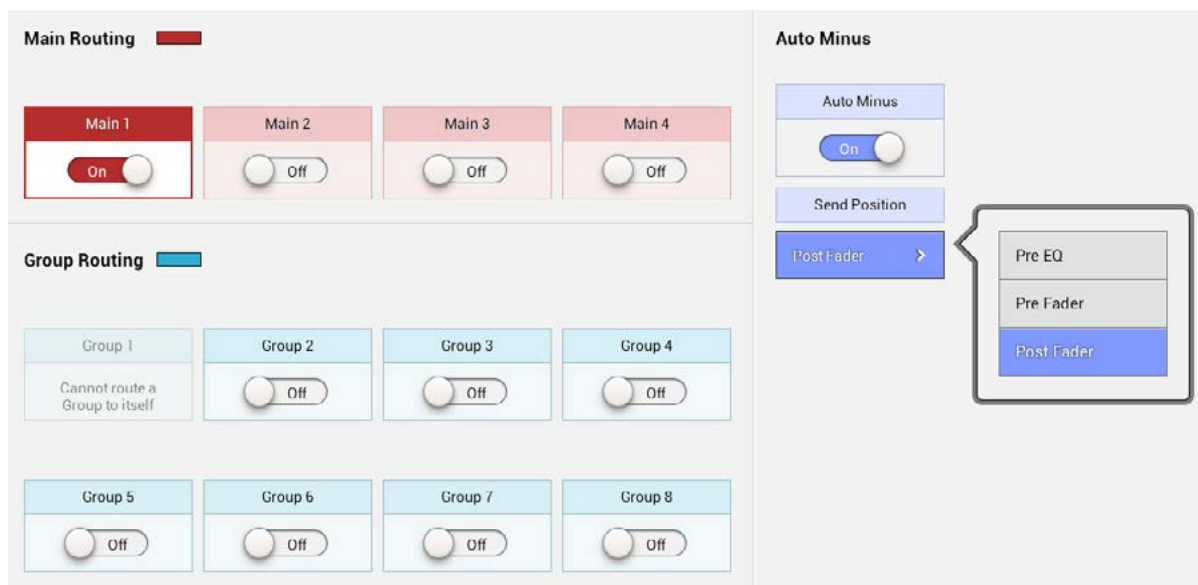
FIGURE 1 - MIX MINUS OUTPUT CONTRIBUTION SYSTEM



Mix Minus using the Auto Minus bus

The auto minus bus is a summing bus, which automatically subtracts the associated channel/group feed from the bus prior to feeding the channel/group's mix minus output. Paths can be routed to the auto minus bus, either using the contribution pop-up within the mix minus window, or from the Mains and Groups routing window.

FIGURE 2 - AUTO MINUS ROUTING



Mix Minus using Auxs or Tracks

When using an aux or track to feed a mix minus output you should make sure that the associated channel/group is not routed to the contributing aux or track as it will not automatically be subtracted. The source channel/group is only automatically subtracted when using the auto minus bus.

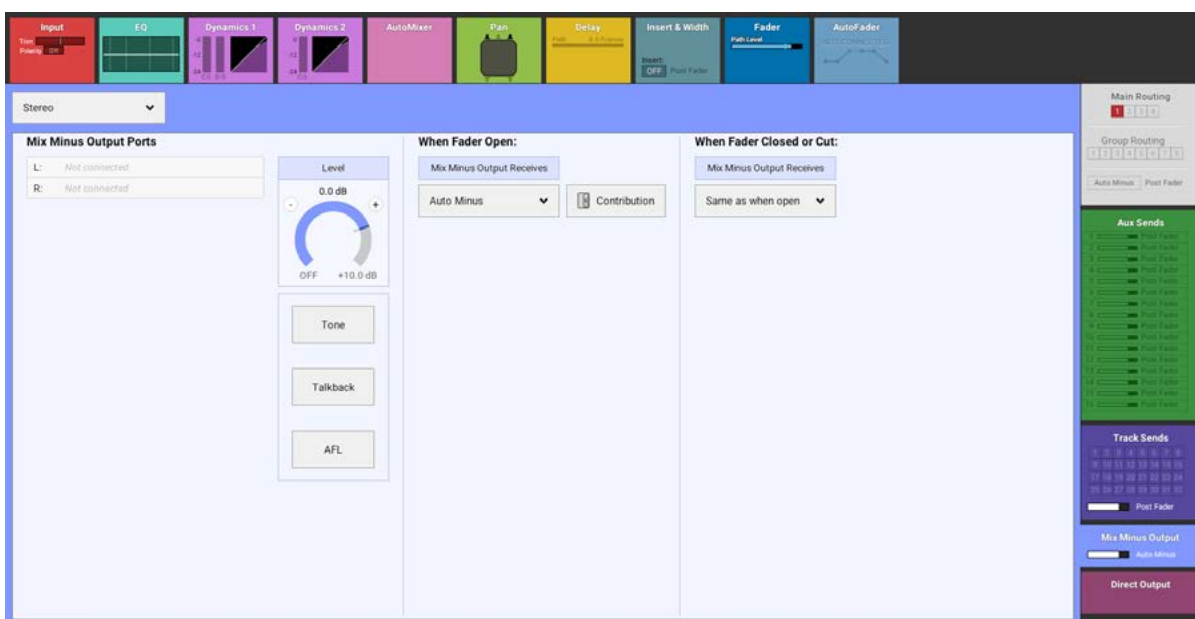
Setting up a Mix Minus output

1. Access a channel or group by pressing its **ACCESS** button (either above the fader or in the 'Buses & Outputs' screen).
2. Make sure the touch display is in 'active Show' view by exiting either the shows list or System Settings area and select **ACCESS** from the Show menu.
3. Select the mix minus output routing tab.
4. Create a mix minus output by tapping either **MONO** or **STEREO**.

Mix Minus Controls

- Level: Control the level of the mix minus output.
- Tone: Send tone to the mix minus output.
- Talkback: Route the talkback microphone feed to the mix minus output.
- AFL: Route the AFL of the mix minus output to the console monitors.
- When Fader Open: Tap to select a source to feed the mix minus output when the accessed path's fader is open.
- When Fader Closed or Cut: Tap to select a source to feed the mix minus output when the accessed path's fader is closed.

FIGURE 3 - MIX MINUS OUTPUT WINDOW



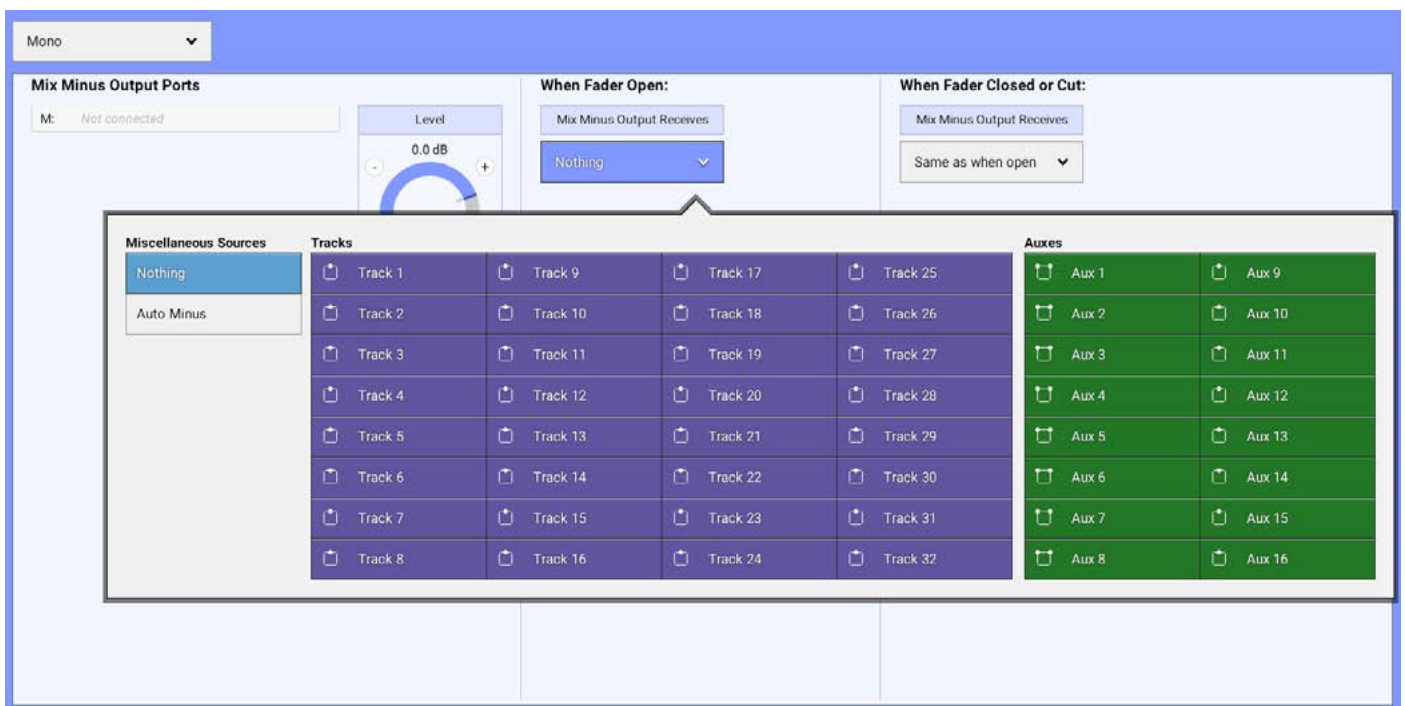
Once the mix minus output has been created you have the option to set different feeds depending on whether the channel/group fader is open or closed.

Tap to select **WHEN FADER OPEN** and the mix minus output feed pop-up appears as shown in figure 4. Within the pop-up, select one of the following feed options:

- Nothing
- Auto minus
- Any of the 16 auxs
- Any of the 32 tracks.

Next, tap the contribution button to the right. This brings up the contribution pop-up which replicates the fader setup screen, allowing you to route any path to the contributing bus. For example, if you selected aux 3 to feed the mix minus output, selecting any path from the contribution window immediately routes that path to aux 3.

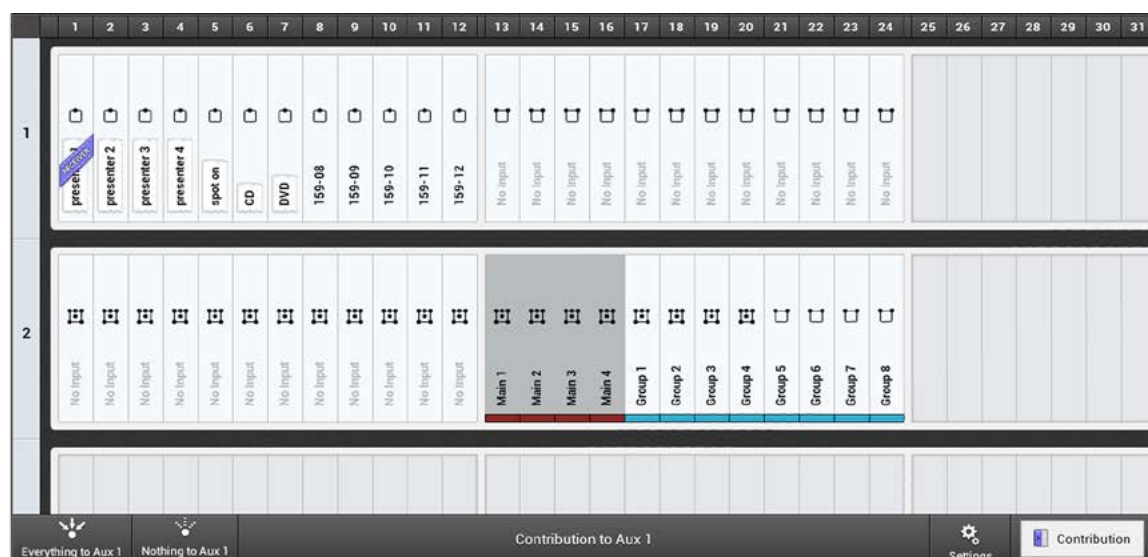
FIGURE 4 - MIX MINUS OUTPUT FEED OPTIONS POP-UP



The path for which the mix minus was created can easily be identified within the contribution screen as it displays the 'receiver' tab.

It is important to be sure of any changes you make within the contribution pop-up as you can directly change routing for all paths.

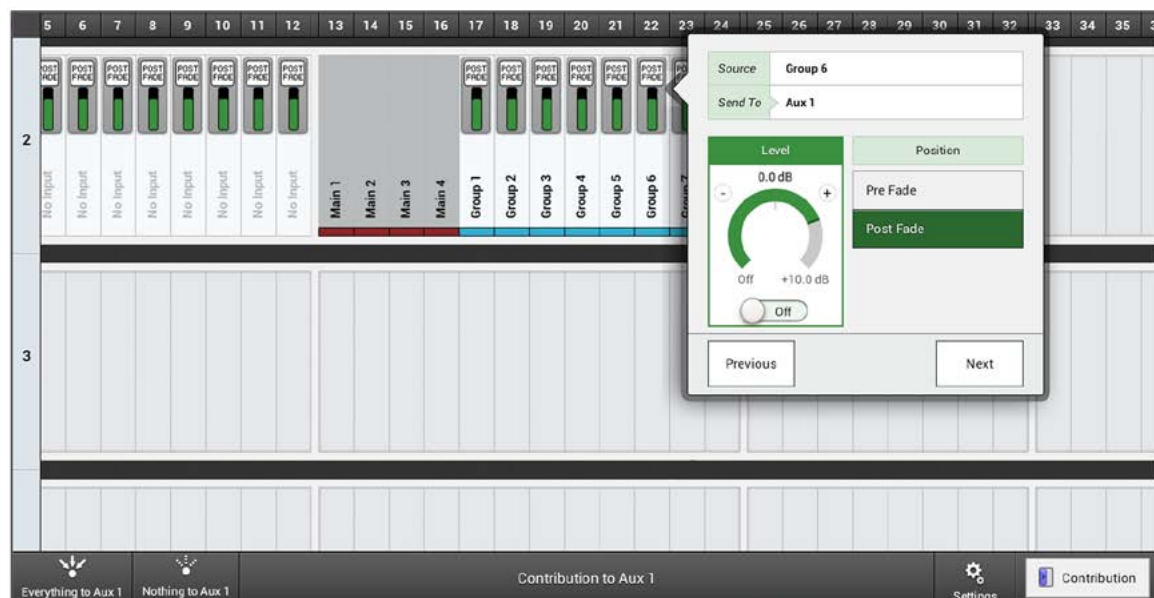
FIGURE 5 - MIX MINUS CONTRIBUTION POP-UP



Tap to route all available paths to the Mix Minus output source

Tap remove all routing to the Mix Minus output source

Contribution settings allow you choose between viewing path information (above) or send information (below)



Off Air Conference Bus

The same process can be followed for **WHEN FADER CLOSED OR CUT** for which the following options are available:

- Same as 'when fader open'
- Nothing
- Auto Minus
- Off Air Conference
- Any of the 16 Auxs
- Any of the 32 Tracks

The 'off air conference bus' provides a way for all contributors to talk to each other when their faders are closed. Selecting **OFF AIR CONFERENCE** routes the pre fader feed of the accessed path to the off air conference bus when its fader is closed, which is then used to feed the associated mix minus output.

Surface Controls

Push the PATH OUTPUTS control modes button to populate each pair of surface control cells with path output controls for the faders below. If a mix minus output has been assigned to the accessed path, mix minus output controls are available in the bottom control cell, pushing the button AFLs the mix minus output and the rotary control sets the level. Direct output controls are displayed in the top control cell if assigned.

FIGURE 6 - CONTROL CELLS—PATH OUTPUTS



SUMMA ROUTING

BUSES AND OUTPUTS

Summa has 4 mains, 8 groups, 16 auxs and 32 tracks. Direct outputs and mix minus outputs can be assigned per path from a pool of 188 mono resources.

All outputs and buses are available for the currently accessed path via the routing tabs to the right of the control window with the touch display in 'active Show' view.

Direct Outputs and Mix Minus

Direct outputs and mix minus outputs are created on a per-path basis from the shared pool of 188 resources. Creating a 5.1 direct output uses six of these shared resources, and for stereo direct output or mix minus output, two resources are used. For information on using mix minus outputs see ["Mix Minus" on page 155](#) and for direct outputs see ["Direct Outputs" on page 96](#).

Configuring Buses

Tap **BUSES & OUTPUTS** in the Show menu to access bus configuration controls. The image below shows an example of each bus/output type. Each bus has a combination of the controls described here:

- **Width:** The width drop-down menu allows you to change the width of each bus at any time to mono, stereo or 5.1.
- **User Label:** You can enter a user label for each bus.
- **Level:** Control the individual output level of each bus.
- **Access:** acts in the same way as the physical access buttons above each fader on the surface. When a path is accessed and the surface/touch display are in access mode, all control cells and parameters apply to that path.
- **AFL:** Replace the current feed to the console monitors with the bus feed. AFL provides a non-destructive solo, allowing you to quickly check individual paths whilst maintaining all mixes-only the monitor output is affected, no paths are cut and the mix to all other buses is preserved.
- **PFL:** Route the pre-fade feed to the dedicated PFL speaker output. If PFL to MON is selected, the PFL feed will replace the console monitor feed.
- **Output Listen:** Like AFL, Output Listen provides a non-destructive solo, but in this case the feed is taken post-output delay, directly before the feed leaves the console.
- **Talkback:** Route the feed from the talkback microphone directly to the bus or associated output
- **Tone:** For groups, tapping **TONE** routes the tone source to the input of the group, similarly to routing tone to a channel. For mains, auxs and tracks, tapping **TONE** routes the tone directly to the bus output, prior to the point where it is patched out of the system.
- **Downmix Type:** Switch between using the LoRo or LtRt downmixing for 5.1 mains. LoRo maximises compatibility at the expense of losing the front-rear separation that a Dolby Pro-Logic decoder could recover when using an LtRt downmix.
- **Cut:** Cut the bus output.
- **Pre-Fader send cut if...:** Cut the feed to the aux if the conditions selected in the drop-down menu are met.

FIGURE 1 - CONFIGURING BUSES AND OUTPUTS



ROUTING A SIGNAL

Routing a signal in Summa is quick and simple:

1. Access the path you wish to route, either using the **ACCESS** buttons situated above faders.
2. Next, tap to select the routing tab for the bus or output that you wish to route the path to and the relevant controls are displayed within the control window.
3. If you are routing to a bus, tap to slide the on/off switch for the individual bus that you wish to route to.

FIGURE 1 - BUS ROUTING SWITCHES



4. If you are routing to an output (direct or mix minus), tap either **MONO** or **STEREO** to create the desired output for the accessed path.

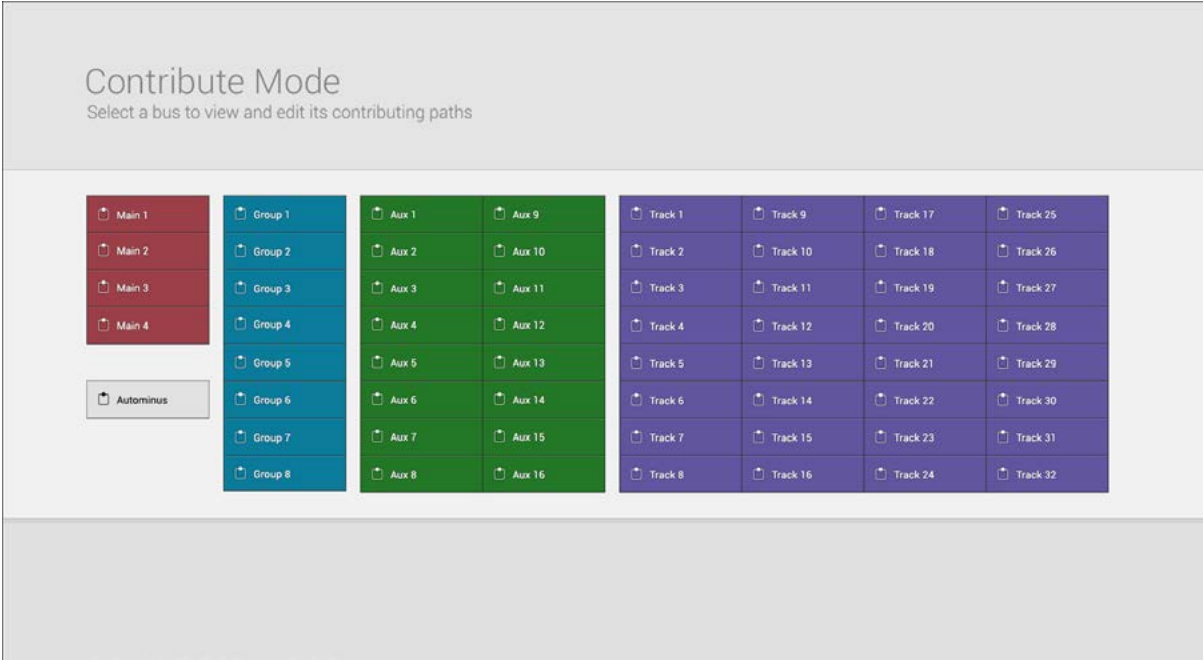
FIGURE 2 - ASSIGNING AN OUTPUT



CONTRIBUTION

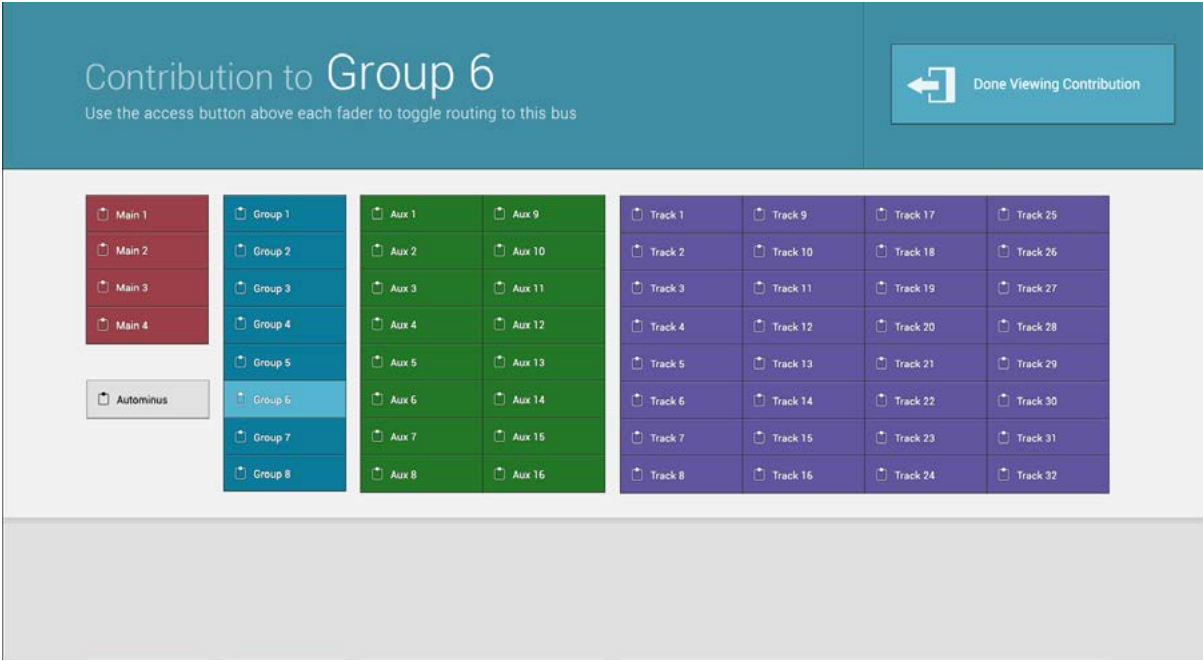
The Contribution window allows you to see which paths are routed to a selected bus quickly and easily. To enter the Contribution window, tap CONTRIBUTION in the Show menu and the following screen will be displayed:

FIGURE 1 - CONTRIBUTION WINDOW



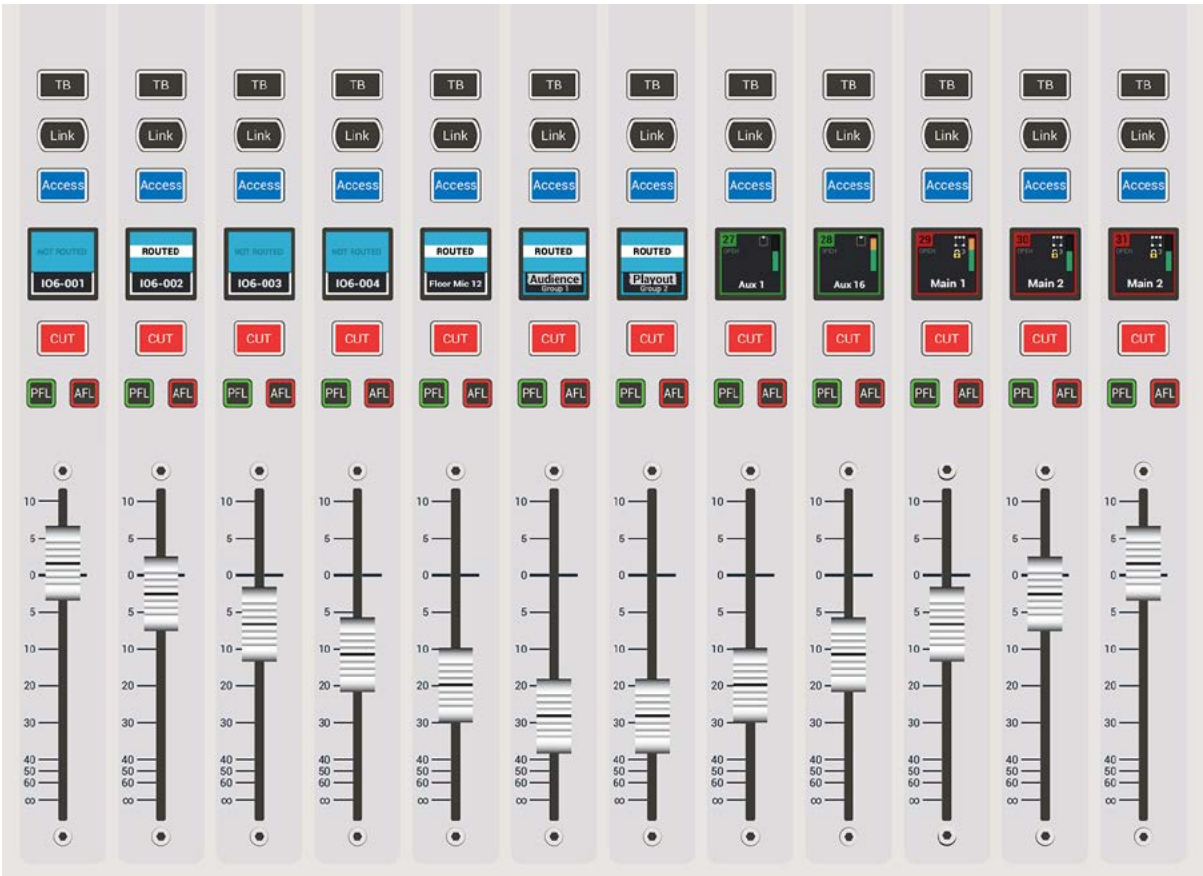
Tap to select any of the bus selectors (mains, groups, track, auxs or auto minus) in the contribution window and the fader **ACCESS** buttons for any paths that are currently routed to the selected bus will strobe. If any paths on surface layers other than the visible layer are routed to the bus, the relevant layer button will strobe. In the following image Group 6 has been accessed in contribution mode:

FIGURE 2 - CONTRIBUTION MODE—GROUP 6



At this point you can toggle on/off the routing of any path to the selected bus by pressing its fader **ACCESS** button. Paths on layers other than the currently visible layer can also be routed by using the layer buttons to access their fader controls. The following image shows how the fader displays will change to indicate routing. Once you have finished viewing contribution for the chosen bus, tap **DONE VIEWING CONTRIBUTION** on the touch screen.

FIGURE 3 - CONTRIBUTION—FADER DISPLAYS



DOWNMIXING

When a surround audio feed is routed to a mono or stereo destination, its component legs are combined using predefined level settings to ensure the resultant mono or stereo feed is accurate and appropriate. This process is referred to as downmixing.

Downmixing happens automatically whenever a surround feed is routed to a non-surround destination. All internal downmixing uses LoRo values.

LoRo and LtRt

When configuring a 5.1 main there are two sets of downmix options available: LoRo and LtRt. LoRo is simply the surround channels summed together as follows:

- $L + Ls + C = Lo$
- $R + Rs + C = Ro$

LoRo takes away all front to rear sound separation and leaves a stereo mix which is also compatible with mono systems.

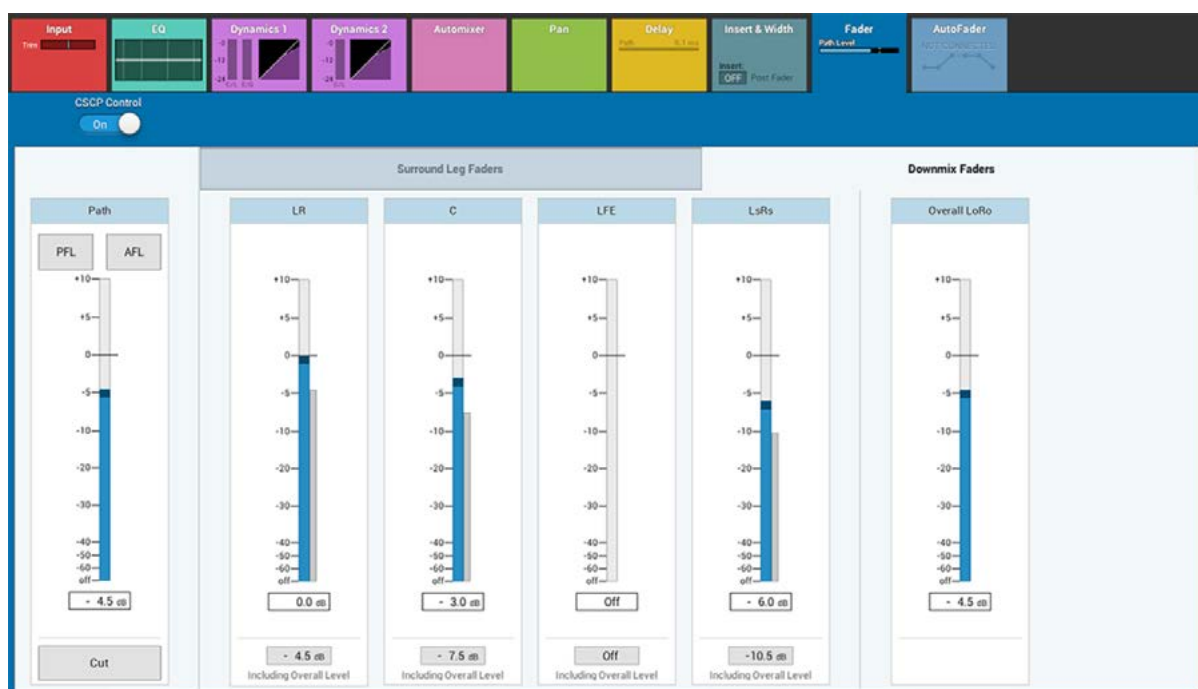
LtRt uses phase processing prior to summing channels together to provide a stereo mix which is compatible with Dolby Pro Logic systems and can be decoded to recreate the original 5.1 mix. LtRt feeds are not mono-compatible.

Note: When a 5.1 main is set for Lt/Rt, only the downmix audio that is patched out of the Summa system is phase encoded. All internal routing of the 5.1 main to stereo destinations remains as LoRo.

Downmix Settings

Individual LoRo downmix settings are available for each surround path from the fader control window. Five level controls are available: Left and right front (LR), centre (C), low frequency effects (LFE), left and right rear (LsRs) and an overall level control (overall LoRo). Altering the overall LoRo level increases and decreases the overall level of the path. Individual, path-specific downmix level controls are not available for LtRt, instead the default values set within the Show settings are used.

FIGURE 1 - DOWNMIX FADERS



Downmix Defaults

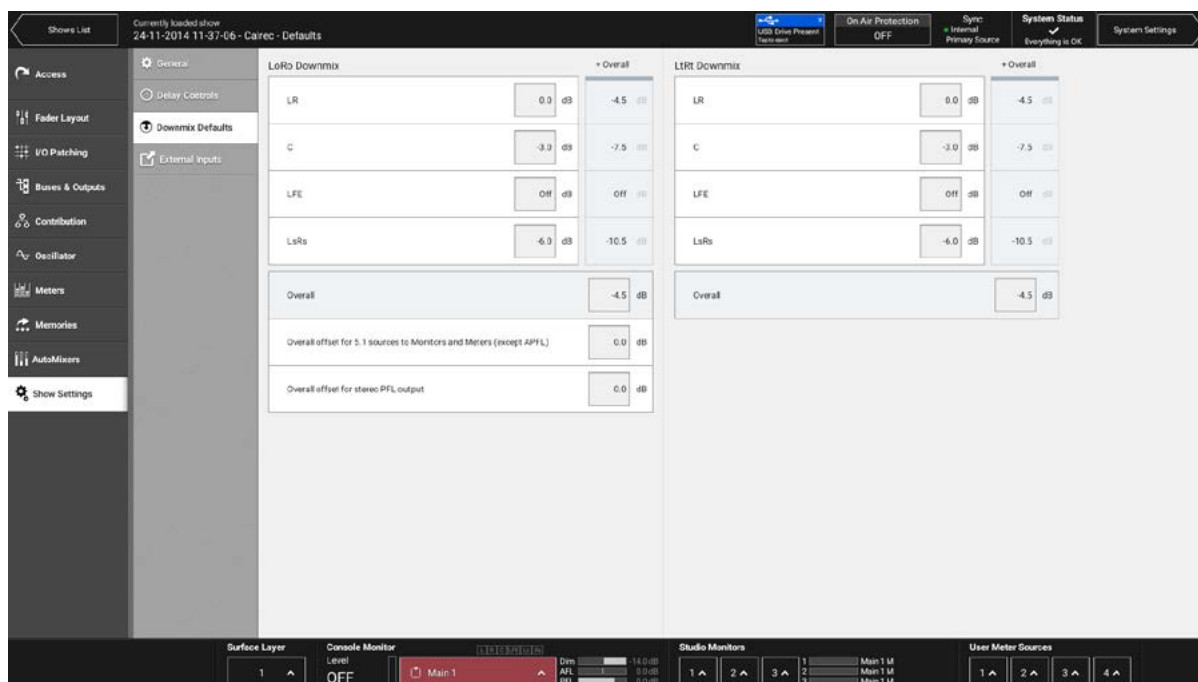
Every Show has default downmix settings which can be located by tapping **SHOW SETTINGS** at the bottom of the Show menu on the touch display and then selecting 'downmix defaults' from the menu.

These defaults can be edited by tapping the individual text fields and entering new values. All new and existing paths will be updated to the new level settings but any offsets which were previously specified for existing paths will be retained.

Offsets

A level offset can be specified for all paths that are routed to monitors and meters (except APFL) which allows you to increase the level of 5.1 sources for monitoring purposes without having an effect on your mix. A separate offset can be specified for APFL levels.

FIGURE 2 - DOWNMIX DEFAULTS



SUMMA

EXTERNAL INTERFACING

GENERAL PURPOSE INPUTS AND OUTPUTS

Opto-isolated general purpose inputs (GPIs) can be configured to allow Summa to respond to external control signals. Summa can also output control signals via general purpose output relays (GPOs) to control external equipment.

To access the GPI setup screen, tap **SYSTEM SETTINGS** in the top right hand corner of the touch display and select **GPI** from the left hand menu.

GPI Functions

GPI functions listed within the 'Functions' pop-up, are all specific to console functions. The 'Fader Cut' and 'Fader PFL' functions are I/O port specific, for example, if you connect a GPI to a port's 'Fader Cut', that GPI will stay connected to that port's fader cut even if the port is moved to a different fader.

GPI functions are listed below:

AutoFaders	Trigger any number of the 99 independent AutoFaders via a GPI input signal
General	Dark Mode—Energy saving mode
	External 'On Air' Signal—Use an external signal to switch the console into 'On Air' mode
	External 'Rehearse' Signal—Use an external signal to switch the console into 'Rehearse' mode
	Tracks Omni Talkback—Route talkback to all Tracks
	Tracks Omni Tone—Route tone to all Tracks
Group CUT	Apply CUT to any of the 8 Group Buses
Group PFL	Apply PFL to any of the 8 Group Buses
Monitoring	Apply CUT or DIM to the Console Monitor or any of the 3 Studio Monitors
Aux Talkback	Route talkback to any of Summa's 16 Auxes
Group Talkback	Route talkback to any of Summa's 8 Groups
Main Talkback	Route talkback to any of Summa's 4 Mains
Main Tone	Route tone to any of Summa's 4 Mains
User Buttons	User Buttons 1-12 LED illumination
Fader CUT	Apply CUT to the fader to which a specific port is patched
Fader PFL	Apply PFL to the fader to which a specific port is attached

Assigning GPIs

To assign a GPI to a function:

1. Tap **GPI** in the window header and select the box in which the GPI port is installed.
2. Tap **FUNCTIONS** in the window header and select the function type that you would like the GPI to control.
Alternatively, tap **FADER CUT** or **FADER PFL** and select the relevant I/O box for the port that you wish to control.
3. Select a GPI on the left, select a destination on the right and tap **CONNECT**.

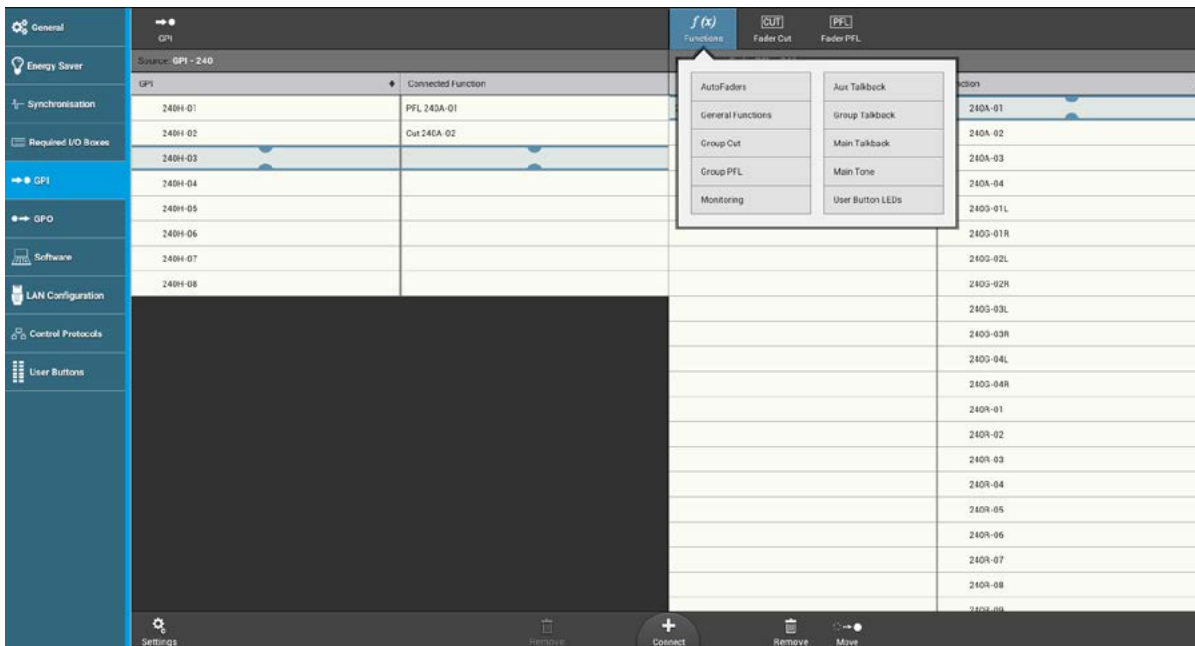
Moving a GPI destination

1. Tap a destination and tap **MOVE** in the window footer.
2. Select a new destination and tap **MOVE** again, or tap **CANCEL** to discard any changes.

Removing a Destination

1. Tap one or more destinations and tap **REMOVE** in the window footer.
2. Tap **REMOVE** again to confirm or tap **CANCEL** to discard any changes.

FIGURE 1 - GPI



User Buttons

The 12 User Buttons in Summa's eight-fader section each have white LED indicators. They can be assigned to directly control a range of functions previously only available through the touch screen UI.

FIGURE 2 - USER BUTTONS

These buttons can be set up to change monitor sources, change monitor settings talk to internal buses, start and stop loudness meters, bypass AutoMixers and interact with the On-Air protection system. User buttons controlling any of these functions can also be connected to GPOs to simultaneously trigger external equipment. For example a user button that is set up to switch a monitor source, could also connect to a GPO to trigger a vision switcher to switch to an appropriate video feed. The indicators within the User buttons can be used as Tallies to indicate that a corresponding GPI has been activated. This can also be used as a method for checking the correct operation of a GPIO circuit.

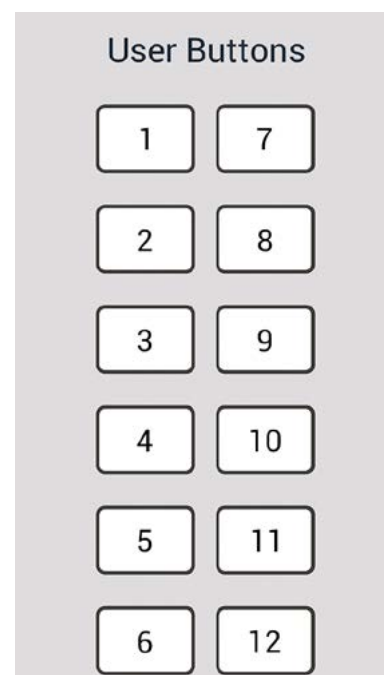
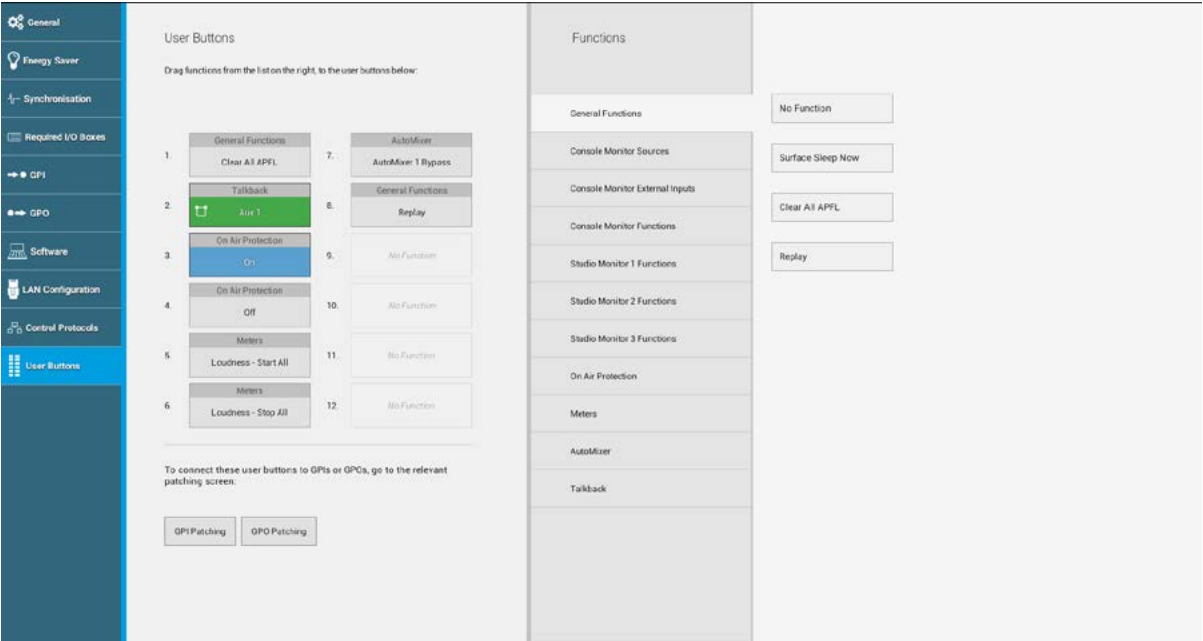


FIGURE 3 - USER BUTTONS SET UP SCREEN



User buttons are setup by dragging and dropping the function onto the required button. Note that at the bottom of the page there are links to GPI and GPO patching, GPIs can be connected to the User Button indicators to show that a particular GPI has been activated and GPOs can be triggered from the User Button switches to control external or internal functions.

GPO Functions

To access the GPO setup screen, tap **SYSTEM SETTINGS** in the top right hand corner of the touch display and select **GPO** from the left hand menu.

GPO functions listed within the 'Functions' pop-up, are all specific to console functions. 'Fader Open' functions are I/O port specific, i.e if you connect a GPO to a port's 'Fader Open', that GPO will stay connected to that port's Fader Open even if the port is moved to a different fader.

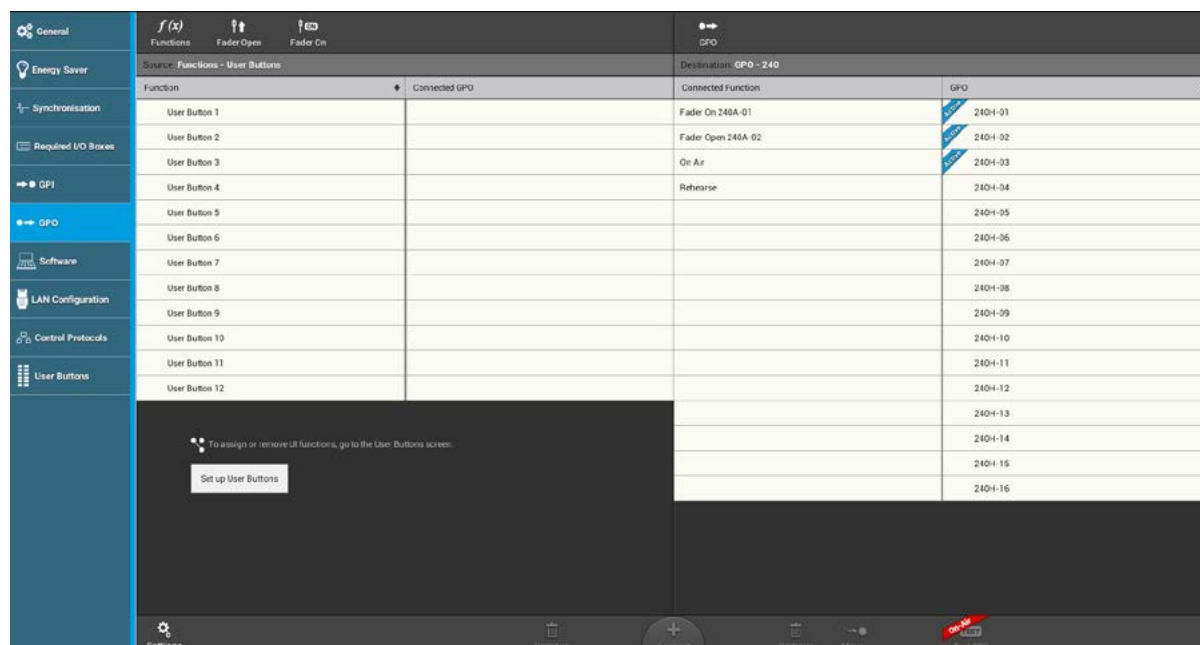
GPO functions are listed below:

General	AFL Active—If an AFL is activated a GPO can be activated
	PFL Active—If a PFL is activated a GPO can be activated
	Error Warning—If an error warning occurs a GPO can be activated
	On Air—if the console is put into On Air mode a GPO can be activated
	Rehearse—If the console is put into Rehearse mode a GPO can be activated
User Buttons	Assign any User Button to activate a GPO
Fader Open	Fader open activates GPO for any port on the network
Fader On	Fader open and on (not cut) activates GPO for any port on the network

Assigning GPOs

1. Tap **GPO** in the window header and select the box in which the GPO port is installed.
2. Tap **FUNCTIONS** in the window header and choose a function type from the list. Alternatively, tap **FADER OPEN** or **FADER ON** and select the relevant I/O box for the port that you wish to control.
3. Tap to select a function or port on the left, tap to select a GPO port on the right and tap **CONNECT**.

FIGURE 4 - GPO



Moving a GPO Function

1. Tap a destination and tap **MOVE** in the window footer.
2. Select a new destination and tap **MOVE** again, or tap **CANCEL** to discard any changes.

Removing a Destination

1. Tap one or more destinations and tap **REMOVE** in the window footer.
2. Tap **REMOVE** again to confirm or tap **CANCEL** to discard any changes.

GPO signal type

In most cases, GPO signals are latching, causing relays to remain active for as long as the control is active. For example, a relay controlled by a fader open function will remain active the entire time that fader is open. Assigning GPOs to be controlled from the User Buttons changes their mode from latching to momentary so the relay is only activated as long as the button is pressed.

Testing GPO Functioning

A **TEST GPO** button is available in the window footer to quickly manually trigger GPO signals for testing purposes. To use this you must be logged in as an administrator.

REMOTE CONTROL – CSCP

In addition to GPI activated controls, the Hydra2 product range supports several protocols to allow 3rd party equipment to remotely control various features. CSCP (Calrec Serial Control Protocol) can be used to remotely automate various Summa features.

CSCP

Calrec Serial Control Protocol (CSCP) allows remote control, using third party equipment, of the following:

- Fader positions (including VCA master faders)
- Path cut/on status
- PFL status
- Routing to auxs and mains
- Aux output levels
- Main output Level
- 'Left to both' and 'right to both' switching

CSCP can be enabled and disabled per fader:

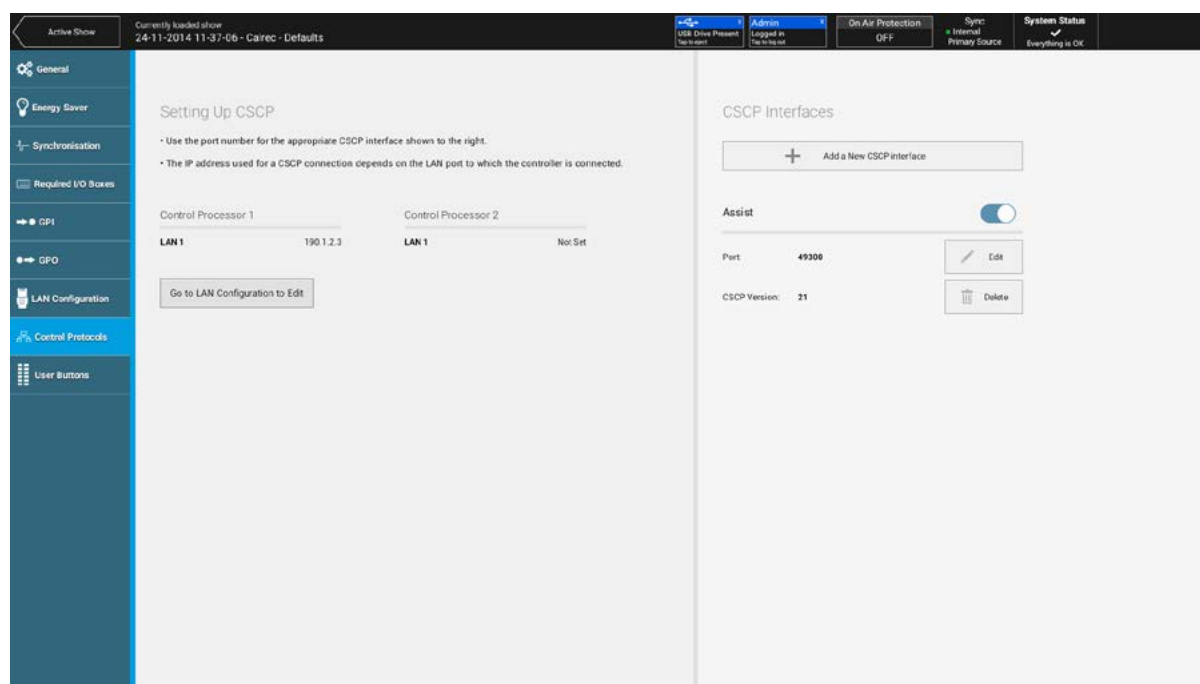
1. Press a fader's **ACCESS** button.
2. Tap the fader processing tab.
3. Tap **CSCP ENABLE** in the window header to switch on or off.

When a fader is under CSCP control, this can be overridden by touching and dragging the fader to the desired level.

Setting Up CSCP

Tap **SYSTEM SETTINGS** in the top right of the screen and select **CONTROL PROTOCOLS** from the left hand menu. In this window you can configure each CSCP controller device that you wish to connect to your network. On the left of the screen the LAN port IP address information is displayed (see [“Configuring LAN Ports” on page 176](#) for more information) so that you have it available for configuring your CSCP controller. On the right of the screen you can add your CSCP interface, **EDIT** the settings, switch on the connection or **DELETE** the controller from the system. By default, the Assist CSCP interface will already be defined. Use CSCP version 21 unless you have been advised otherwise by a Calrec engineer.

FIGURE 1 - CONTROL PROTOCOLS SETUP

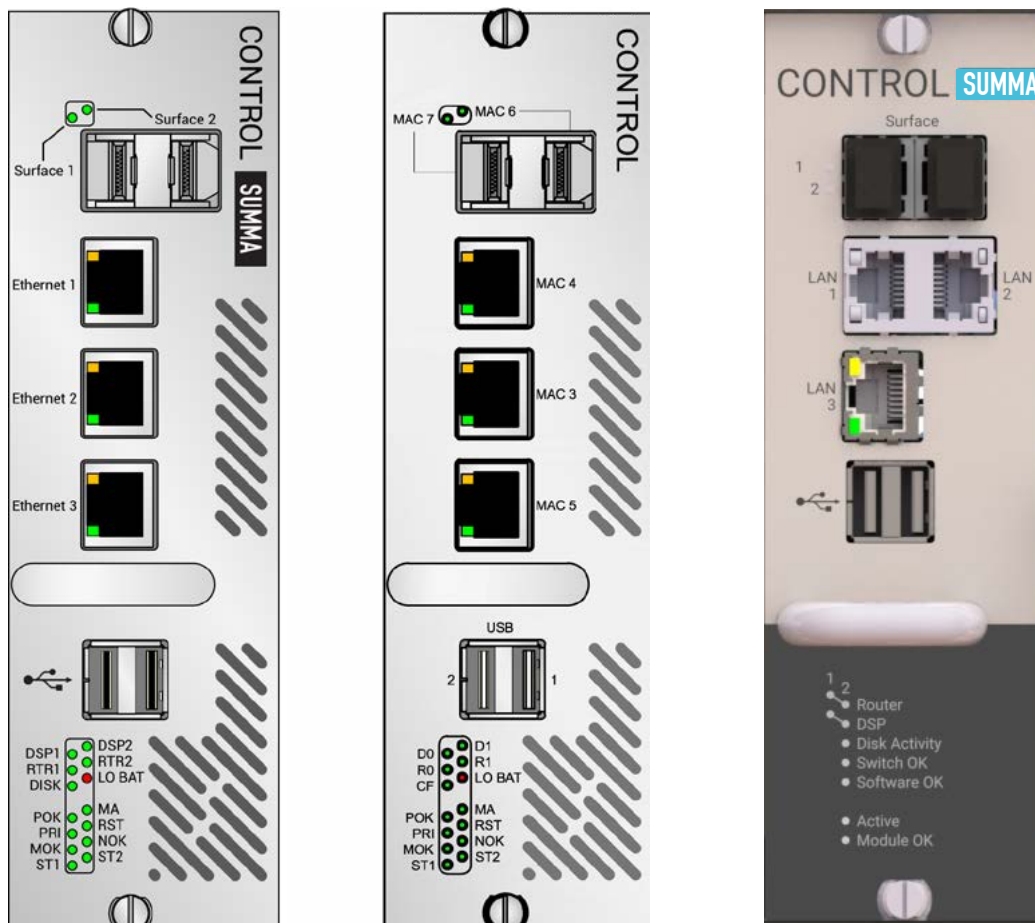


For more information on CSCP, including a list of supported 3rd party devices, see “Remote Control–Calrec Serial Control Protocol” in the Summa installation manual.

CONFIGURING LAN PORTS

If your Summa core control processors have three ports labelled Ethernet 1, 2 and 3, these ports can be used to connect the Summa system to other corporate networks. If your Summa core has ports labelled MAC 3, 4 and 5 an Ethernet to USB adapter can be connected to one of the USB ports on the front of the control processor to serve the same purpose. The new 2015 Processor Rack has an updated Control processor and the three ports are labelled, LAN 1, LAN2 & LAN3 as shown on the right

FIGURE 1 - CONTROL PROCESSORS INCLUDING 2015 VERSION



Tap **SYSTEM SETTINGS** in the top right of the screen and select **LAN CONFIGURATION** from the left hand menu. In the LAN configuration window you can define the adaptor settings for each port and create multiple static routes for each port as required.

If you have a non-redundant system there will only be one tab in the LAN configuration window as there is only one control processor installed.

FIGURE 2 - LAN CONFIGURATION WINDOW

Shows List

Currently Loaded Show Label
User - Project - 453412

On Air Protection
ON

Sync
Video 1
Primary Source

System Status
Everything is ok

Console Settings

General

Energy Saver

Synchronization

Required I/O Boxes

GPI

GPO

Software & Features

LAN Configuration

Control Protocols

User Buttons

Control Processor 1

Control Processor 2

LAN 1

Adaptor Settings

IP Address194.70.149.66Edit

Subnet Mask255.255.255.0

Gateway191.178.20.5

+ Add a New Static Route

Static Route - Soccer Assist

IP Address194.70.149.66Edit

Subnet Mask255.255.255.0Delete

Gateway191.178.20.5

LAN 2

Adaptor Settings

IP Address194.70.149.66Edit

Subnet Mask255.255.255.0

Gateway191.178.20.5

+ Add a New Static Route

LAN 3

Adaptor Settings

IP Address194.70.149.66Edit

Subnet Mask255.255.255.0

Gateway191.178.20.5

+ Add a New Static Route

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 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 and 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.

Note: those group faders must also be open and not cut.

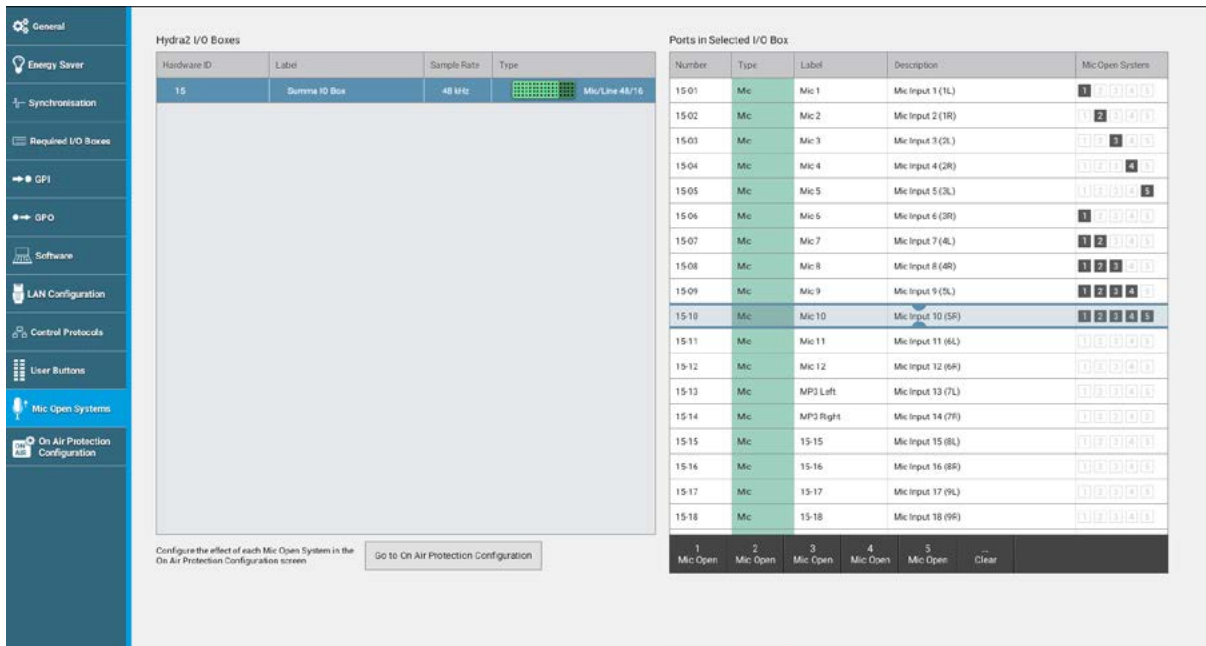
The fader open trigger happens at -90dB and the fader close trigger happens at -95dB.

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.

Assigning Mic Open Systems to Input Ports

To allocate any of the 5 mic open systems to an input port, select: >System Settings>Mic Open Systems as shown in Fig 1.

FIG 1 - ASSIGNING A MIC OPEN SYSTEM TO AN INPUT PORT



There are 6 buttons at the bottom of the input ports selected I/O Box as shown above, for associating input ports with any of the 5 mic open systems. Select a Hydra 2 I/O box from the list in the left hand window, then select an input port from the list and press one or more of the 5 mic open system buttons - note that the corresponding graphic will illuminate as required, selecting the Clear button will remove all the Mic Open Bus selections for the highlighted input ports.

Ports can be assigned to any number of mic open systems, allowing one microphone to control more than one process.

Assigning Mic Open Systems to CUT/DIM Loudspeakers or Inhibit Talkback

Mic open systems can be assigned to CUT or DIM the Console Monitor loudspeakers and/or Cut any of the three Studio Monitors. In addition the Mic Open System can be used to inhibit talkback routing to any of three Studio Monitors.

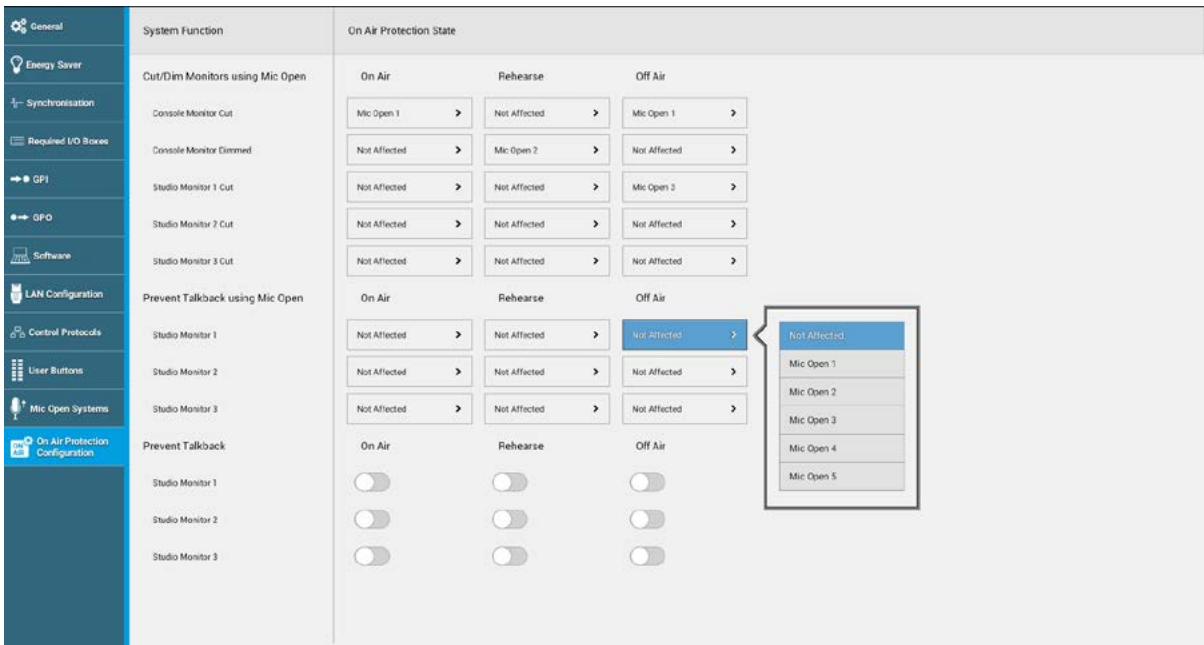
These settings can be different for the different console modes:

On Air (TX Mode), Rehearse (REH mode) and Off Air (neither mode selected).

Select >System Settings>On Air Protection Configuration. 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. Tapping on any of the State boxes (such as the Studio Monitor 1 Off-Air State box shown in Fig 2) opens a dropdown selection allowing the user to select one of the Mic Open systems or "Not Affected" to remove the Mic Open system from that selection.

FIG 2 - MIC OPEN SYSTEM MONITOR AND TALKBACK CONTROLS



Mic open systems and multi-leg paths

Individual legs of stereo and 5.1 paths can be associated with different mic open systems. In this case, when the path is considered on air, all associated mic open systems will be activated.

A 5.1 path will be considered on air with only one of its legs routed, as long as all other conditions are met. An 'On Air' 5.1 path will remain on air even if all its spill legs are closed/CUT as long as the surround master is open and not CUT.

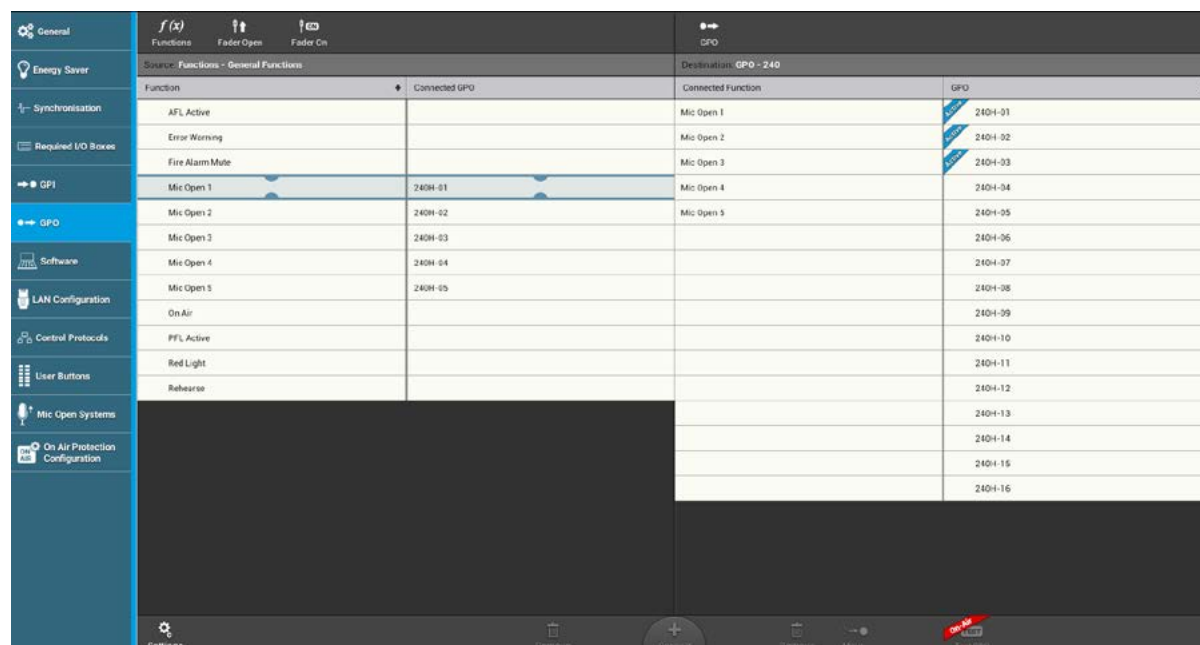
Assigning Mic Open Systems to GPOs

Mic open systems can be set to control relays by assigning them to GPOs.

Select: >System Settings>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 as shown in Fig 3. Click Connect in the footer to Assign the GPO port.

FIG 3 - ASSIGNING A GPO PORT TO A MIC OPEN SYSTEM



SUMMA **CONSOLE FACILITIES**

ON AIR PROTECTION

Summa's 'on air protection system' provides three modes of operation:

- On
- Rehearse
- Off

When 'on air protection' is switched on or into rehearse , certain talkback and tone options are disabled to help to avoid unwanted broadcast of tone and talkback feeds. The tone and talkback settings associated with the three operation modes are shown in the table below.

Changing Modes

With the touch display interface in 'active Show' view , the 'on air' mode selection button is in notifications area along the top of the screen. Tap the 'on air' button to and select one of the three mode options from the pop-up.

On Air Mode via GPI

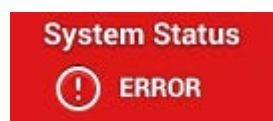
Two GPIO options are available relating to the 'on air protection' system: 'On air protection - on' and 'on-air protection - rehearse'. Applying a signal to either of these GPIs puts the console into the on or rehearse mode.

If mode selections are made both by GPI and from the touch display interface, the highest setting will be used: On being the highest and Off the lowest.

General Functions	On	Rehearse	Off
Red Light GPO	Active		
Fire Alarm Mute	Active		
On Air GPO	Active		
Rehearse GPO		Active	
Talkback	On	Rehearse	Off
Mains (1-4)	Deactivated		
Tone	On	Rehearse	Off
Mains (1-4)	Deactivated		
Groups (1-4)	Deactivated		
Talkback Dims Console Monitors	On	Rehearse	Off
Mains (1-4)	Active	Active	Active
Groups (1-4)	Active	Active	Active
Auxes (1-16)	Active	Active	Active
External Talkback	Active	Active	Active
Talkback Groups	Active	Active	Active
Tracks (1-32)	Active	Active	Active
Studio Monitors (1-3)	Active	Active	Active
Channel Direct Outputs	Active	Active	Active
Channel Mix Minus Outputs	Active	Active	Active
Group Direct Outputs	Active	Active	Active
Group Mix Minus Outputs	Active	Active	Active

SYSTEM STATUS MONITORING

Summa constantly monitors the functioning of all system components and connections and reports warnings, faults and information to the user. There are three types of system status message which appear in the top right of the header on the main TFT screen:



Error messages report a serious error message that could cause, or has caused the system to fail. Errors normally require user intervention to correct the problem before operation can continue.



Warning messages indicate where the system has located a fault or a failure, but will still operate without intervention. Warnings indicate that the system should be checked as it may be running on secondary components.



Information messages inform users when certain actions take place. They do not report errors and no action needs to be taken in response to them.



The system status notification button is situated within the notifications area to the top right of the touch display when in 'active Show' view. Under normal operating circumstances the system status button will look like this.

Notifications

Tap the system status button to display the pop-up which lists all messages in a sortable table. Tap the table headers to sort the messages. There are four view selection buttons along the bottom of the pop-up which allow you to filter out messages by type, for example, if you do not want to see any messages which have already been fixed, tap to switch off the **FIXED** view button. Selecting any of the messages populates the 'message description' field with a description of the message. Note: If an I/O module fails, it will generate a system status error message. Previously, only a failure of the complete modular I/O box generated a system status error message.

FIGURE 1 - SYSTEM STATUS POP-UP

Type	ID	Source	Summary	Occurred	Fixed
	668	Primary Control Processor	Secondary DSP Card is Missing	Today 13:29:50	Not Yet Fixed...
	667	Wild Assign Panel	Wild assign Panel in fader section 2 on surface "thesurface" has failed	Yesterday 12:11:32	Not Yet Fixed...
	663	Primary Router Card	Sync Error	15 Jan 2013 18:01:59	16 Jan 2013 05:55:09

Display Options

Errors
 Warnings
 Information
 Fixed

☐ Show
 ☐ Show
 ☐ Show
 ☐ Show

Selected Event Description

Select an event to view description...

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. This allows Summa to see which of the I/O Boxes it used previously is now at a different sample rate and then the studio administrator can change the sample rate of those boxes back to 48kHz for use with Summa.

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.

Intermittent Cable Failures

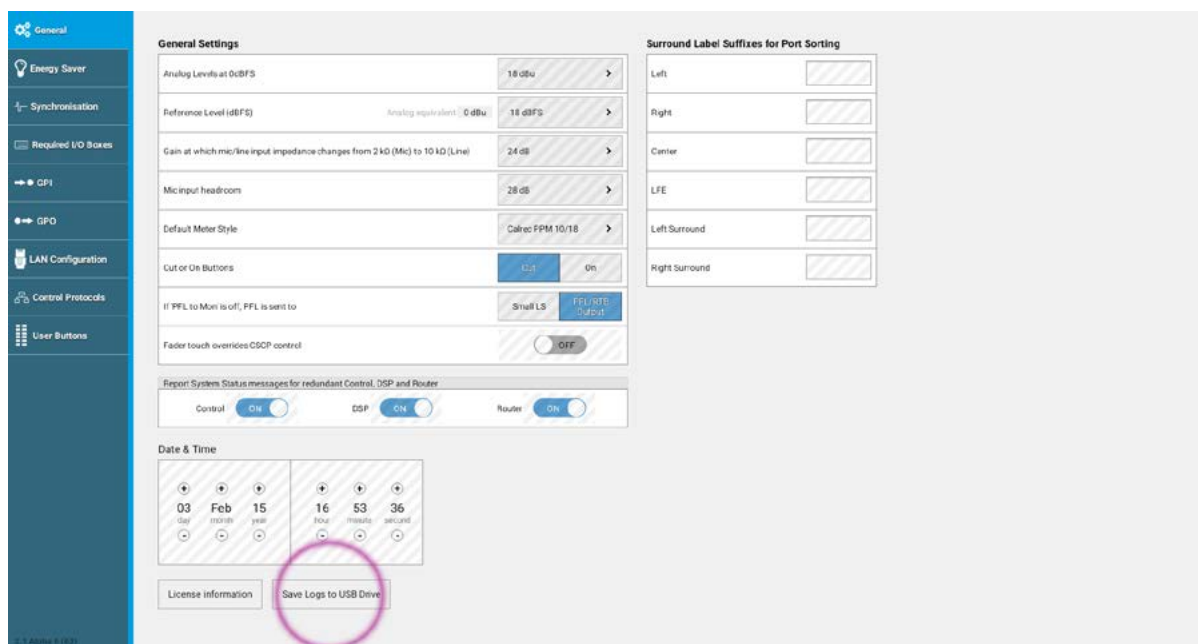
If intermittent cable failures exist on the system, the System Status screen now displays these as new messages and when the user clicks on the message, a 30 second timer starts which automatically clears the intermittent error from the message list.

COLLECTING SYSTEM LOGS

Various log files are maintained by different parts of the system. These log files can be collected and transferred to USB memory for forwarding to Calrec Support in the event that detailed troubleshooting is required:

- Insert a USB memory device into one of the USB ports on the control surface
- Navigate to the System Settings>General screen and click the “Save Logs to USB Drive” button
- All log files from around the system will be collated into a zip file written to the chosen location on the USB memory device
- Note the system may be unresponsive for a moment while logs are gathered
- The log files will be compressed as a gzip tar archive and given a default filename that starts with the system's ID, followed by date and time e.g. ID_date_time_logs.tar.gz

FIGURE 1 - COLLECTING LOGS



NETWORK SYSTEM RESILIENCY

Summa now supports the ability to continue to function if it loses connection to the master core in a Hydra 2 network.

AutoPromotion

A network must have a core dedicated as a master, which holds the state of the entire network. This state is replicated around all the other slave systems in the network. If a slave system becomes disconnected from the master it can promote itself to a master, and continue to operate within the remaining cores and I/O that it can still access.

When the original master becomes available again, the original network configuration can be restored. The method and order in which slave systems promote themselves to become masters is configurable and should be defined during commissioning.

The figure below shows the AutoPromotes file that is held on the routers, this allows each router on the network a wait period so that the order of AutoPromotion can be controlled.

FIGURE 1 - SEQUENCING AUTOPROMOTION OF CONSOLES ON A NETWORK

```
<?xml version="1.0"?>
<Calrec>
<AutoPromotes>
<AutoPromote Id="1" Rack="54.20" WaitSecs="60" Level="1" />
<AutoPromote Id="1" Rack="54.2" WaitSecs="300" Level="1" />
<AutoPromote Id="1" Rack="54.6" WaitSecs="90" Level="2" />
<AutoPromote Id="1" Rack="54.8" WaitSecs="300" Level="1" />
<AutoPromote Id="1" Rack="54.22" WaitSecs="300" Level="1" />
<AutoPromote Id="1" Rack="54.16" WaitSecs="300" Level="1" />
<AutoPromote Id="1" Rack="54.10" WaitSecs="300" Level="1" />
</AutoPromotes>
</Calrec>
```


SUMMA **TERMINOLOGY**

A

Access Mode

An operating mode of the surface. When a fader or path is accessed (by pressing its ACCESS button) all control cells correspond to the accessed path, rather than the faders below them.

Accessed Path

When a path is accessed (by pressing its ACCESS button) certain functionality routing processing etc. - becomes available to it, from both the touch screen and the surface control cell

Active Show View

With the Touch Display in Active Show view all operational screens, controls and settings are available from I/O patching to processing and routing.

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 dependant on the wordlength (e.g. 24bit).

AFL

After-Fade Listen. Allows the user to hear only the selected channels after they have been affected by fader position, pan position and channel processing. Multiple AFL signals can be sent to the AFL bus. AFL does not affect the main outputs, so can be seen as being similar to 'safe solo'.

APFL

A bus that combines both AFL and PFL signals. This removes the need to have separate loud- speakers and meters for monitoring AFL and PFL signals.

Auto 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 Auto Minus bus, minus their own contribution. The Auto Minus bus can be used to feed individual channel/group's Mix Minus outputs.

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.

B

Bluefin2

The current generation of Calrec's High Density Signal Processing (HDSP) system. Capable of over 1000 input channel paths from just a single card.

Bus

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.

C

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 Cell

A collection of controls consisting of a display, a button and a rotary control.

Control Modes

The surface can be put in to one of several control modes. Access mode provides dynamics and EQ controls for the currently accessed path across the surface control cells. There are also several 'strip' control modes which place controls for each path within the two control cells above the associated fader.

Control Processor Module

The control processor module acts as the main controller of the Summa system, passing messages between all modules. The surface communicates with the rack via the control processor module.

Core

Processing rack for a mixing console.

CSCP (Calrec Serial Control Protocol)

CSCP allows for remote control over mixing console operational functions by 3rd party systems such as video switchers and production automation systems.

D

DAC (Digital to Analogue Conversion)

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

Direct Output

Output from a channel or group path with level control and pre EQ / pre fader / post fader selection.

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 Summa core which performs all the DSP functions of the system.

E

Ember

The Ember protocol is a sophisticated data exchange mechanism that has potential for remote control of many functions across varied equipment types.

F

Fader

Faders are located on surface fader panels. Channels, Mains, Groups, Auxs and Tracks can all be attached to faders allowing for control over level and access. Faders are also used to control VCA groups.

Foldback

An audio mix sent to a presenter or artist. Applications include enabling them to hear their own input or communications.

G

Gigabit Ethernet

A family of network technologies used for connecting equipment and efficiently passing large amounts information over copper or fibre links.

GPIO

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 for Hydra2 I/O boxes

Group

A bus to which many audio signals can be routed, summed and controlled simultaneously with a single fader. Groups have full EQ and dynamics processing. For example, all audience microphones may be sent to the same group bus for easy access. Groups must be routed to output buses in order to be patched out of the system.

H

Hydra2

An audio networking system which links I/O boxes to one or many consoles over Gigabit Ethernet. Summa is based around a Hydra 2 system.

Hydra2 Router Module

All Hydra2 I/O boxes connect to the network via a router. The router module contains 16 SFP sockets that can accept either copper or a range of fibre connections by using the appropriate adaptor.

I

IFB Interruptable Fold Back

IFB is a foldback mix which can be interrupted by tone or talkback. This function is normally handled by the track buses.

L

Layers

Layers allow the surface faders to change the paths they are controlling. In each layer a different path can be attached to and controlled by a given fader. There are 6 layers on the Summa.

M

MADI

Multichannel Audio Digital Interface: A coaxial or optical transmission medium providing a 56 or 64 channel capacity. The MADI standard (AES10) allows simple high density connectivity between different manufacturer's equipment. MADI is interfaced with an Artemis system via a Hydra 2 MADI I/O unit.

Main

An output bus. A final point at which signals are mixed and affected before they leave the console. Two versions of each Main are available for patching out of the system - Main and Main (Pre Tone and Talkback). Main (Pre Tone and Talkback) can be used to avoid the possibility of broadcasting tone and talkback feeds.

Memory Isolation

Memory Isolation is a system whereby paths or individual path parameters can be protected from being updated when a user memory is loaded.

Meter Display

Large TFT display used to display metering information.

Mic Input Headroom

Input headroom is the level in dBs above 0dB available in the system before distortion ('clipping') occurs. The headroom can be set within Summa's Console Settings. A high headroom offers greater safety at the expense of slightly more noise.

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.

O

On Air Mode

On Air mode allows certain operational functions to be activated or inhibited when the system is switched in to it.

P

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.

Port

A port refers to any physical audio input or output in a Hydra 2 I/O box. Ports can be of any form of 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.

Preset

A preset is a complete copy of a path from which you can choose elements to load onto another path. Using presets can speed up workflow when several paths with similar settings are required.

PSU Module

PSU module is a term used to describe a stand alone unit which is connected to a device in order to provide power inlets.

R

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.

Rotary Controller

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 a rotary controller.

Route

A route is a connection made from one path to another within the system. For example a Group may be routed to a Main, or a Channel may be routed to an Aux via an Aux send.

Router Core

Processing rack without DSP mix engine, and therefore no control surface connected. Used to expand network capacity.

S

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)

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 a Summa system make use of SFP sockets.

Show

A recallable collection settings as well as a way of organising User Memories which pertain to a specific program type.

Shows List

Shows can be loaded, saved and edited with the Touch Display in the Shows List view, which can be entered by tapping the SHOWS LIST button in the top left of the Touch Display when in Active Show view.

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.

Strip (Channel Strip)

Strip refers a vertical arrangement of controls on the surface. When the surface is in one of the strip modes (input/pan/delay etc.) each pair of control cells becomes part of this strip arrangement.

Strip Mode

An operating mode of the surface. When one of the control modes (other than access) is selected, the control cells above each fader are populated with mode specific controls for that fader.

Surface

The surface is the physical control surface for a Summa system containing the collection of faders, rotary controllers, buttons, displays and touchscreen, allowing hands-on control of the audio signals. Also referred to as Console or Desk.

System

The term 'system' encompasses the core, surface and connected I/O boxes. 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 Logs

Various log files are maintained by different parts of the system. These log files can be collected and transferred to USB memory for forwarding to Calrec Support in the event that detailed troubleshooting is required.

System Status Monitoring

Calrec's system for providing information and logs of any developing or occurring faults in the system.

T

Touch Display

Large TFT touchscreen used to operate the Summa surface, including patching, routing, processing and accessing detailed system settings.

Tracks

Multi-function buses that can be patched to physical outputs. Used for such purposes as generating multiple interruptible foldback feeds (IFB) or sending audio to multitrack recording devices.

U

User Memory

Recallable collection of settings which relate to a specific program type. Collections of user memories are collected within Shows.

V

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.

SUMMA

FEATURES BY SOFTWARE VERSION

FEATURES

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 that you are running, please contact Calrec Customer Support or your local Calrec distributor to discuss upgrade options.

V1.1

- View and edit contribution to buses using the Access and layer buttons
- Fader levels and memory isolate selections are now part of the control link
- Oscillator now has a frequency sweep option and individual legs can be cut
- Fader touch overrides CSCP control for a path

V2.0

- Support for 128 channel Summa
- Support for non-redundant core
- Copy & Paste
- Path Presets
- Back-up and restore shows, show templates and presets to USB devices from the surface
- GPIO patching from the surface
- Surface user buttons can trigger GPOs and indicate GPI state
- Layer switching of individual fader sections
- Loudness meters on all the mains in the fixed meter layout
- Easy UI configuration of LAN ports on the Control Processor
- Easy UI configuration of CSCP interfaces
- Simplified updater application to lead the way to user installed software updates

V2.1

- Save logs to USB stick from the surface UI
- EMBER control of input settings
- Software upgrade now handled by a simple web-application (see installation manual for details)
- Support for non-redundant Summa on a redundant network
- Auto-promotion of cores if master fails
- If the gain of any connected mic/line input is not the same on all legs, the gain display shows the highest and lowest value

V3.0

- Custom Meter Layouts with Layout Presets
- AutoFaders
- User Buttons
- Replay
- Flexible PFL and Meter Positions
- Link Input 1 and Input 2 Trims
- Access Follows Link
- Supports Moving Show between Summa systems with 180 and 128 Channels
- Improved Resiliency for Networked Systems
- Improved status messaging now generated for individual I/O Module errors

- Support for Dante (see Hydra 2 Installation Manual for details)
- Extra meter scale PPM 12dB / 20dB
- Added DPP Live and DPP Non-Live options for Loudness Meters
- Added new GPI functions for Monitoring, Group Cut, and Group PFL
- Added new GPO functions for Fader On = open not cut
- Added Tone/Talkback active notifications in Main Header on Touchscreen
- Allows Path move on Isolated paths
- Buses and Outputs screen now shows VCA Slave levels as well as Bus path level when in a VCA group
- Numerous Bug Fixes

V3.1

- Fieldbox Support (see Hydra 2 Installation Manual for details)
- Bug Fixes

V3.1.1

- MADi SRC I/O Module support (see Hydra 2 Installation Manual for details)

V3.2

- DiGiCo OrangeBox support (see Hydra 2 Installation Manual for details)
- All Track buses are now Mono rather than Stereo by default in the Calrec Default Show Template
- Improvements to the reliability of the SNMP service
- Bug Fixes

V7.0

- 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. 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
- Support for New Products
AoIP I/O box, for direct integration with a range of IP networks
H2Hub, allowing multiple remote I/O boxes to be consolidated onto a single, larger Hydra2 link
- Restricted H2O User Account
H2O previously only provided an “Admin” account. Logging in with this Admin account allowed full access to all H2O functionality. Now, there is also a “User” account which provides limited access to a small range of H2O functions

The following functions are available to the 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
 - The password for User account is initially set to “user1”
 - The password for Admin account is set by the studio administrator
 - These passwords can be changed at any time

- General Improvements
 - Support for SW-P-08 Extended tally dump
 - Fader displays indicate when the connected source is offline. (CAL-10592)
 - Long fader labels are no longer truncated with an ellipsis in the fader displays, allowing for 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
 - The I/O patching screens now feature a scroll bar, for quick scrolling through long port or patchbay lists
- Bug Fixes

V8.1

- Support for BR.IO and the Transformer-Balanced Mic Input Module

Summa now supports BR.IO, and the new transformer-balanced microphone input module (AD6365). For more information on these products, see the Calrec Product Catalogue, available on the Calrec downloads page: <http://calrec.com/downloads/>
- 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.
- General Improvements

Brio consoles running v1.1 can now be part of a Hydra2 network, with Summa as an alternative Master Core. Summa can participate in Hydra2 networks that are carrying audio at 96 kHz, although Summa itself cannot run at 96 kHz.
- Bug Fixes

V8.2

- Mic Open Setup.

Under the System Settings area there is a new option to allow users to assign input sources to Mic Open logic groups. Five logic groups are available and each source may be assigned to one or multiple Mic Open logic groups. Mic Open Setup settings are stored as part of the System Settings.
- On Air Protection.

Under the System Settings area a new option to allow users to configure Monitor and Talkback inhibits for the console On Air, Rehearse or Off Air states.

The system Monitor and Talkback facilities can be configured so that they are either active or inhibited for each of the console On Air states (On Air, Rehearse or Off Air).

An option to allow Mic Open logic groups to inhibit the Monitor and Talkback facilities for each of the console On Air States is provided. On Air Protection set up is stored as part of the System Settings.
- Mic Open functionality has now been added to the GPO General Functions patching screens.
- Bug Fixes

V8.3

- Support for RY7557-2 Router Module.

The RY6557-2 is a new router module with the faster Celeron processor as used in the 4U processing core. The updater software refers to this as the RY6433 which is the equivalent Celeron processor router module used in 8U processing cores for Apollo and Artemis Shine/Ray & Beam.

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