



Remote Production System



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# RP1 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](http://www.calrec.com) or contact us for more information.**

Our UK customer support team works 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.

## Product Warranty

A full list of our conditions and warranties relating to goods services is contained in Calrec'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.

**Telephone:**  
(9:00am-5.30pm)

**+44 (0) 1422 842159**

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**+44 (0) 1422 842159**

**Website:**

**[www.calrec.com](http://www.calrec.com)**

For customers outside the UK and Ireland, shipping via the distributor saves customers from dealing with exportation paperwork. If there is a need to send direct to Calrec, contact us beforehand to log the incoming repair and for assistance with exportation documents.

## Standard of Service

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

For feedback specific to this document, please contact [enquiries@calrec.com](mailto: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. RP1 serial numbers can be found on the label on the lid of the chassis as shown below.

## 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 the 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.

## EXAMPLE OF LABEL ON REAR OF CHASSIS SHOWING SERIAL NUMBER



### Installation

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

### Service Personnel

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

### Third Party Equipment

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

Calrec Audio Limited can not be responsible for any nonconformance 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.

### LEAD FREE



All modules and cards should be returned to Calrec Audio Limited in anti-static wrapping. Calrec Audio Limited can supply anti-static wrapping upon request.

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 any Apollo, Artemis, Summa, Brio 36, RP1 or Hydra 2 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 (see below) 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.

### LEAD FREE STICKER



**Lead Free**

### 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 (see below), 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.

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

## Cleaning

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

## Explanation of Warning Symbols

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

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

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

## Earthing

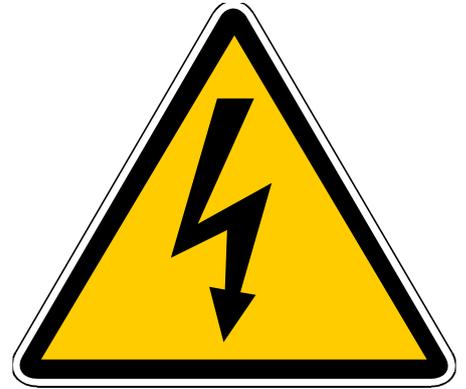
This is a Class I product. An Earth connection **MUST** be provided in each AC power cord.

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

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

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

## DANGEROUS VOLTAGES



## IMPORTANT INSTRUCTIONS



## Other Symbols in Use

For apparatus intended to be used at altitude not exceeding 2000m, a warning label containing the following symbol shown below shall be fixed to the equipment at readily visible place.

## ALTITUDE WARNING SYMBOL



# PACKAGE CONTENTS

## There are a number of options when ordering RP1 systems: connectivity type and I/O options.

Every system includes the 2U unit which contains the processing core. Small format pluggable transceivers (SFPs) are required for Hydra2 I/O box connections with the built-in Hydra 2 module. I/O packages are optional. The following table shows the RP1 options:

Control & Core Pack	
<b>RP1 Assist</b>	<p>RP1 is controlled from the Calrec Assist application which runs on a user supplied PC or Laptop.</p> <p>RP1 has 72 virtual faders arranged as 1-36A and 1-36B. Calrec Assist is used to assign inputs and outputs on to these virtual faders so that they may be remotely controlled. In addition once connected to a Host Console over IP, the inputs and outputs may also be controlled from Remote Faders on the Host Console.</p> <p>In addition on the back of each unit is a Meter Display DVI-D connector which can be connected to a user supplied monitor to display the metering data for the various system paths.</p>
<b>RP1 Core EE6279</b>	<p>Power, Router, Control Processor, and DSP are all self contained within the unit which has 2 x IEC connectors to provide PSU redundancy. The core operates at 48kHz and supports:</p> <p>32 legs as mono, stereo or 5.1 Input channels</p> <p>12 legs as mono or stereo Auxes</p>
<b>Cabling</b>	One Y-Split IEC cable for supplying power to the unit.
I/O packs	
<b>Bundled I/O</b>	<p>RP1 can be bundled with various I/O options in the form of I/O packs</p> <p>An example Bundle might contain:</p> <ul style="list-style-type: none"> <li>1 x Hydra2 I/O Box AD5871-3 containing 24 x Mic/Line Input (XLR) / 8 x Line Output (XLR)</li> <li>2 x SDI Embedder BNC Modules VI5872-2 each containing 2 x SDI Embedder units</li> <li>1 x SDI De-Embedder BNC Module VO5841 containing 2 x SDI De-Embedder units</li> </ul> <p>Another example bundle might contain:</p> <ul style="list-style-type: none"> <li>1 x Fieldbox AD6217-2 containing 8 x Mic/Line Input (XLR) / 8 x Line Output (D25 'TASCAM')</li> <li>1 x SDI Embedder BNC Modules VI5872-2 containing 2 x SDI Embedder units</li> </ul>
<b>Optional I/O</b>	The unit has 3 x single size expansion slots in which any of the Modular I/O range cards can be fitted. In addition there is a built-in Hydra 2 module to allow further I/O to be connected.
SFP Packs	
<b>SFPs</b>	One of the following options may be selected: LX SFP Pack; SX SFP Pack; Bi-Directional SFP Pack; Copper SFP Pack.
<b>LX SFP Pack</b>	4 x Single Mode SFPs
<b>SX SFP Pack</b>	4 x Multimode SFPs
<b>Bi-Directional SFP Pack</b>	2 x Bi-Directional SFPs (type A) and two Bi-Directional SFPs (type B)
<b>Copper SFP Pack</b>	4 x copper SFPs



# RP1

## GETTING STARTED

# REMOTE PRODUCTION CONCEPT

**Remote production offers the ability to capture a broad range of live events, such as sports, news or regional music festivals, and mix them in a remote facility hundreds or thousands of miles away.**

Many of these events might be of restricted interest, and may be broadcast to a narrow demographic. They may be regional news events which require a lot of content generation in a short space of time. They may be temporary infrastructures which are required to be highly portable.

Broadcasters cannot always justify the time or expense of sending a dedicated outside broadcast truck and a team of skilled on-site operators for these niche events, but they must always ensure the same high broadcast standards are met.

This is where remote production technology provides a realistic alternative.

The aim is to produce the program centrally, in a studio-based control room, helping to reduce the financial outlay of a full dedicated on-site team. From an audio point of view this means generating the program sound mix some distance from the venue in a sound control room. This presents the opportunity to improve the quality of monitoring and of sound quality, as well as allowing more efficient utilisation of equipment and highly skilled personnel.

## Problems to overcome

There are three major barriers to effective, reliable and manageable remote broadcasting: speed, control and infrastructure :-

### 1. Speed, or latency

The biggest single issue is latency. Broadcast audio workflows rely on quality monitor mixes with no latency. It's vital - and it's very difficult to achieve when your studio is hundreds or even thousands of miles away.

### 2. Control

Operators need real-time control over mic gains, fader levels and monitor mix levels, especially when they are remote from all the action – it's not always possible to physically check a connection or fix a mic position.

### 3. Infrastructure

Transport is always an issue. How are those bi-directional signals going to be transported and still be in sync with the video? and all in real time? and above all, how can all the control protocols required to mix a production remotely be managed as part of the network?

### RP1 the solution

Broadcasters have been developing the concept of remote productions for some time, but the simple connectivity and control offered by Calrec's True Control technology is revolutionary.

RP1 is the first integrated solution to deliver these very exacting and precise requirements, backed with Calrec's focus on high-quality audio performance and reliability with fully redundant connectivity.

Remote broadcasting using RP1 means fewer resources are needed on site, and controlling audio from a remote console saves money on setup time, crew, logistics, and equipment. It is simple to set up and very easy to use.

In addition, RP1 allows broadcasters to create very low-cost Hydra2 networks for all audio routing requirements. The RP1 unit provides connectivity to any Calrec Hydra2 I/O box, including Calrec's ultra-compact Fieldbox and H2Hub, providing cost-effective ways to adapt to the requirements of any situation. Such connectivity gives broadcasters access to Hydra2's inherent management features.

Fundamentally, it also enables broadcasters to cover a greater number of specialised events, such as regional or college sports and smaller entertainment

events, at significantly reduced cost, making it possible to maintain an increasingly wide range of content.

Calrec's RP1 Remote production core directly addresses all these challenges.

Calrec's RP1 core provides **local** DSP to enable the generation of monitor mixes and IFBs with no latency. It gives an operator in a remote studio direct control over channel functions such as mic gains, aux send/monitor mix levels and fader levels. It also provides a mechanism to embed audio into existing backhaul technologies, such as SDI and new AoIPs based on AES67, protecting your investment against technology developments in the future and it does all of this in a single 2U processing engine.

It is this DSP engine, combined with Calrec's True Control technology, that manages all the IFB routing and remote monitor mix levels at the venue. This makes it simple for remote mix engineers to set up IFB mixes on-site and eradicates any delay for remote listeners or presenters. Local DSP processing means there is no latency for commentary or talkback.

DSP and bus configuration can be carried out on-site with Calrec's web-based configuration tool, 'Calrec Assist' which means that all venue infrastructure, routing and monitor feeds can be checked prior to establishing the link with the remote console at base – and more importantly, prior to transmission.

The RP1 core can embed all the transmission audio into existing video transport mechanisms, and using an established video transport to embed the audio ensures that there are no synchronisation issues.

RP1 seamlessly embeds audio into existing video-transport mechanisms, while its Modular I/O backbone accepts any of Calrec's I/O cards.

This versatility means the RP1 can connect via analogue, AES, MAD1, SDI, and the latest AoIP solutions from AES67, Ravenna and Dante.

On the transmission console, all these remote I/O resources appear like any other local I/O box, so workflows are exactly the same as on any other broadcast which means there is no operator learning curve.

**Example of RP1 in use**

Remote broadcasting provides powerful audio processing with fewer on-site resources. The image to the right shows how the RP1 can be setup to provide this.

Remote production technologies allow more efficient utilisation of equipment and skilled on-site personnel. There is no requirement for a full team of audio engineers on-site at the venue; just a technician to check on-site connections.

Audio connections can be made and tested in advance of a broadcast, and monitor feeds for on-site commentators can also be made in advance.

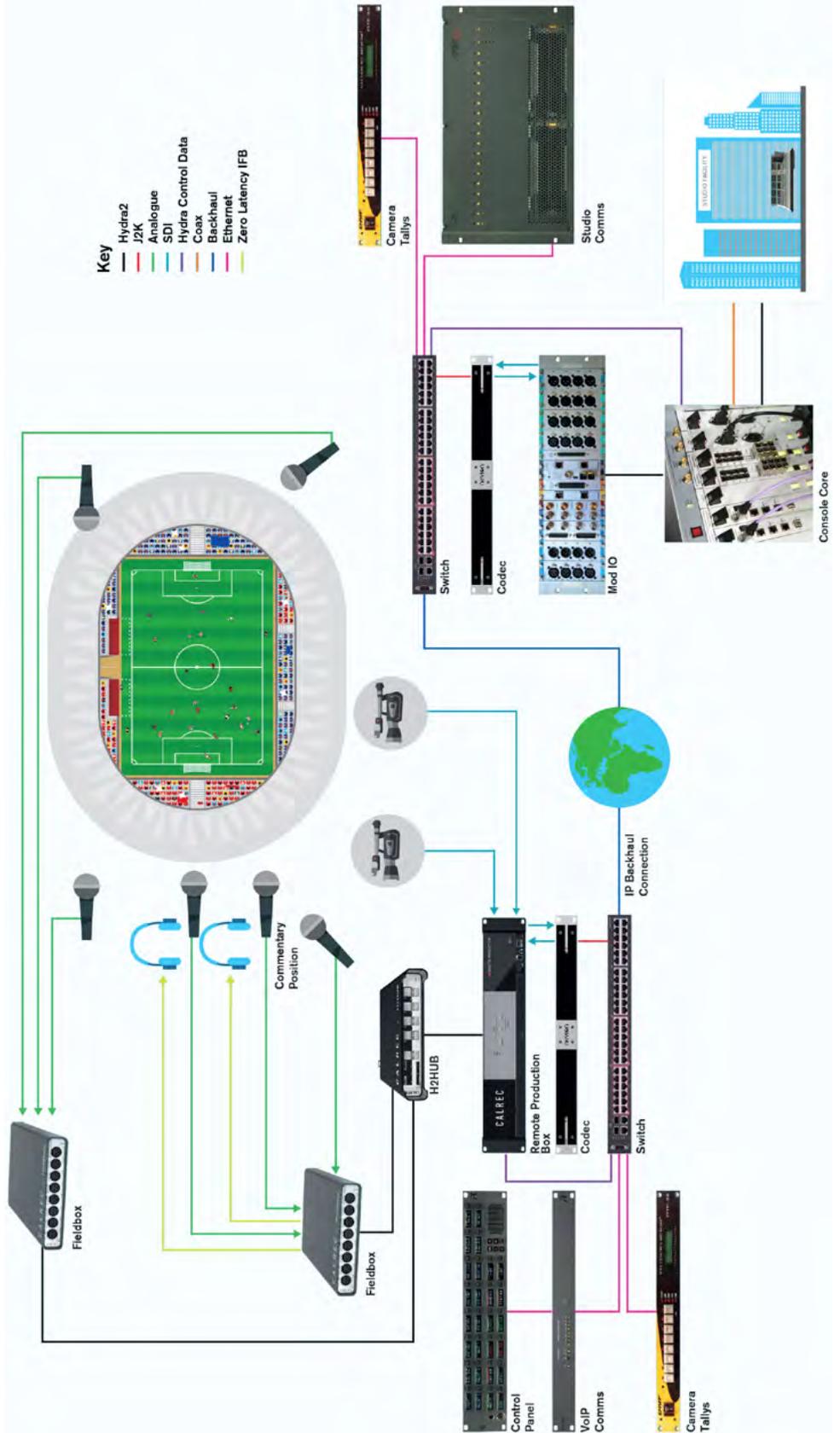
The remote studio mixer can map RP1 controls onto the studio console, and even commit this connectivity to memory to recall the same configuration at a later date. The RP1 core allows the creation of very low-cost Hydra2 networks for all audio routing requirements.

RP1 provides connectivity for any Calrec Hydra2 I/O box, including Calrec's ultra-compact Fieldboxes and H2Hub, providing a cost-effective way to adapt your audio acquisition to any situation.

The audio is then embedded (in this case into SDI) and sent over IP back to the studio facility.

Hydra2 control data is also passed over IP back to the studio allowing host consoles to connect and control RP1 units around the world.

**TYPICAL SPORTS VENUE SHOWING DETAILED SETUP**



# ABOUT THIS MANUAL

**This manual is arranged in 3 main sections:-**

## **1. RP1 Installation**

This section is effectively an installation manual showing how the RP1 is to be connected up and the function of each of the connectors on the unit.

## **2. RP1 Setup via Calrec Assist**

This section is a setup manual with a number of chapters showing how the RP1 is setup on the remote site via 'Calrec Assist' which is Calrec's web-based configuration tool. It includes creating and managing shows, setting up shows in terms of configuring paths, displaying and controlling the fader surface, saving and loading memories and patching inputs and outputs to the channels and buses. There are then various sections about parameter access including:- accessing the processing, accessing the routing, configuring & controlling the buses & outputs and setting up the local monitoring to confirm that the RP1 is set up correctly ready for connection to the host console.

## **3. RP1 Operation via Host Console**

This section is an operator manual showing how the RP1 is connected to and its various parameters and functions controlled via a host console.

## **Whats New in V1.1**

**Access EQ** provides 2 band filter/4 band EQ for all remote faders and auxes  
Control from Calrec Assist only

**Access Expander/Gate** provides Expander and Gate facilities for remote faders and auxes.  
Control from Calrec Assist only

**Access Compressor** provides Compressor and Sidechain EQ facilities and Sidechain listen for remote faders and auxes.  
Control from Calrec Assist only

**Access Direct Output** provides a direct output per remote fader up to 5.1 wide.  
Control from Calrec Assist only

**VCA control of Remote Faders** provides VCA master control from the Host Console on to remote faders and auxes which allows RP1 paths to be controlled as part of a VCA group from the Host.

**Pairing of Transmission and Remote Faders** so that any fader/cut changes are applied to both paths. This links faders and cuts so that any level changes applied to either are applied to the linked pair.

**Blocking RP1 control** to prevent the RP1 unit from affecting the Paired Transmission Faders. This prevents unwanted control changes from the RP1 end affecting the transmission faders.

**Independent mode** so that the RP1 can operate standalone from the Host when required. This allows the RP1 to work independently from the Host when needed as a separate mixer.

**Note this release needs the Host Console either Apollo or Artemis to be running v8.2 or higher to support the Operation via Host Console features.**

# RP1 INSTALLATION

# CONNECTIONS

**The RP1 Remote Production Core is designed to be a self-contained compact mixing console without a control surface. There are a number of external connections that are provided to interface to other equipment such as I/O, IP Networks and Calrec Assist which is used as a remote controller interface.**

Some of these require fibre connections via Singlemode or Multimode usually via LC SFPs. Other elements such as Ethernet connections are interfaced to using regular RJ45 CAT5e cables.

Calrec do not provide interconnecting fibres/cables, as the length, type and quality will vary for each installation.

SFPs can be supplied with your RP1 system if specified at the time of order.

For more information on fibre and different connection types please see [“Small Form-Factor Pluggable \(SFP\) Overview”](#) on page 28.

Looking from left to right across the rear panel, there are:-

Three single expansion I/O slots labelled C, D & E in which any of the Calrec Modular I/O cards may be fitted and the empty spaces filled with single blanking plates. To the right of these is mounted a large, whisper quiet fan.

Further to the right of the fan along the bottom row are 6 x BNC connectors that provide options for external Sync connections, the 2 x Wordclock, 2 AES & 2 Video BNC ports are setup from the System Settings >Synchronisation screen on Calrec Assist.

2 x Hydra2 SFP interface connections are located next to the sync connectors which, allows connections to external I/O on the remote site. The left hand SFP, when viewed from the rear of the surface, is the primary connection and the SFP on the right is the secondary connection.

Next to these are the GUI and meter DVI out connectors. The GUI connector is not currently used in the system. The meter DVI provides up to 4 rows of pre defined metering, to display up to 32 channels and 12 auxiliaries used in the system. It also displays the PFL, AFL and current source metering that is being sent to the monitoring.

Above the DVI-D connectors are placed 2 x 25way D-type connectors for up to 8 GPI and 8 GPO circuits.

Note that GPIO control is not yet available for use. (From Version2 only)

2 x Ethernet connectors labelled 1 & 2 are placed to the right of the DVI outputs and are used to connect to the IP network to pass control data to a host console or a host PC / laptop for use with Calrec Assist and/or Calrec H2O.

2 x IEC power sockets labelled PSU 1 and PSU 2, are placed to the upper right of the fan which provides power to the RP1 unit. Together they provide power redundancy. The IEC inputs should be fed from separate AC sources to protect against external power loss. In the event that only one AC outlet is available, power should be fed via the supplied IEC Y-Split cable to provide redundancy against internal PSU failure.

Metal clips provide retention to further protect the IEC connectors from working loose. These clips fit snug around large IEC connectors with screw in terminals inside for wiring. The clips may not provide adequate retention on their own for some pre-fabricated IEC connector types. If there is concern over the connectors working loose during transit, we recommend that IEC sockets with built in latching are used.

Finally, to the right of the IEC power connectors is placed a USB port which is used to reinstall the operating system in the event of a connection failure.

Note this clears the whole unit back to its factory default settings.

On the front of the RP1 are a third Ethernet connector labelled Setup/LAN3 which is used to connect a PC /laptop running Calrec Assist, and a stereo headphone jack socket, which is used for monitoring.

## RP1 REAR CONNECTIONS



# CONNECTING RP1 TO THE OUTSIDE WORLD

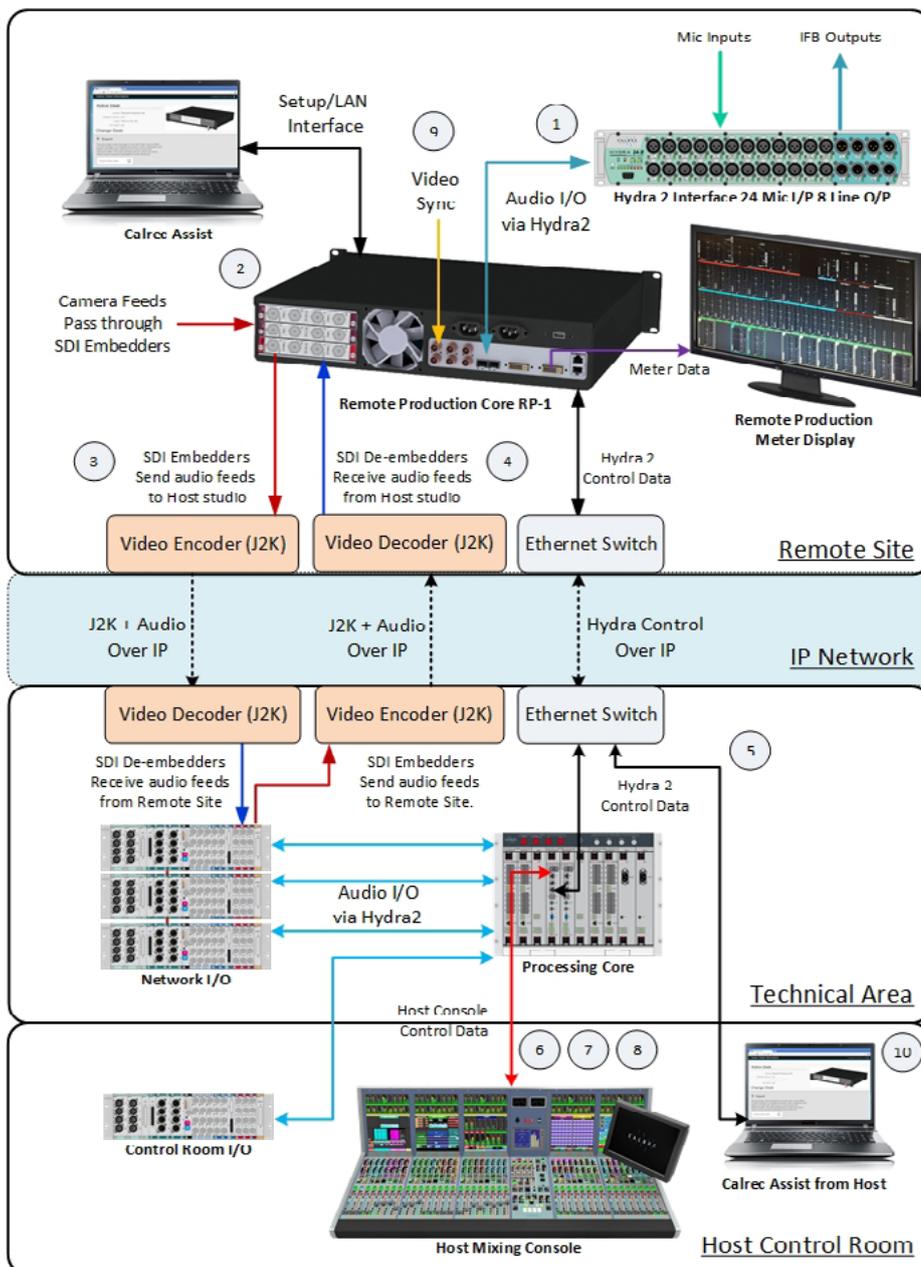
In order for RP1 to connect to Host consoles or remotely to Calrec Assist/H2O they should be connected to either Ethernet/LAN port 1 or 2 or for redundancy both Ethernet/LAN ports using RJ45 CAT5e cables.

See “Connecting a Host Console to RP1 via an IP Network” on page 47 for information on how to do this. For direct control of the RP1 the user can connect into Calrec Assist directly to the front of the RP1 Setup/LAN3 port using a RJ45 CAT5e cable.

This allows the user to configure the RP1 unit in standalone mode i.e. when it isn't connected to the outside world via the IP network service. See “Connecting a Laptop to RP1 for Setup, Calrec Assist & H2O” on page 42.

Notes for Diagram on the left:-

## CONNECTING RP1 TO THE OUTSIDE WORLD



\* The numbers in the diagram are reference points to the notes on the right.

1. Remote Production Unit RP1 connects mic inputs & stereo IFB monitor outputs via Hydra2 I/O boxes on the remote site.
2. RP1 contains SDI embedder and de-embedder modules and Calrec Assist/H2O is used to setup field and commentator microphones & monitor feeds at the remote site.
3. Remote audio is sent to the host using SDI over video codecs, such as J2K+AoIP.
4. Studio programme audio feeds can be returned to the remote site using SDI over video codecs, such as J2K+AoIP.
5. Hydra2 control data is passed between the RP1 core and the host console or Calrec Assist via IP ports.
6. Hydra2 control of remote faders including Mic Inputs is managed from the host console by use of remote faders acting on remote production channels.
7. Hydra2 control of remote auxes allow creation and adjustment of IFB monitor feeds on the remote site (without the round trip IP delay) and are managed from the host console by use of remote auxes acting on remote production buses.
8. Remote production processing and routing can be controlled from the host console surface or Calrec Assist.
9. RP1 may be synchronised to a local video or AES3 DARS source, and the audio optionally sample rate converted for return to the host console.
10. Calrec Assist/H2O can be used at the host console to modify infrequently changed remote production settings.

# AUDIO I/O CONNECTIONS

There are a number of ways to get audio in and out of a RP1 unit. There are 3 single width Modular I/O card slots which can use any of the cards from the Modular I/O box range and it can also connect to Hydra2 networks via the built-in Hydra2 module.

## Expansion Modular I/O card slots

RP1 has 3 x expansion I/O slots accessible from the rear of the unit. The three slots can be fitted with any card from Calrec's Modular I/O range, "single", or "double-wide" cards. Please refer to the Hydra2 installation manual for a complete list of the Modular I/O card types available.

Expansion cards appear in the UI as slots C, D & E. The rear connection image for the expansion shown below contains:-

- 1 x Dual SDI Embedder card,
- 1 x 8 I/P Mic/Line in card and
- 1 x 8 O/P Line out card in slots C, D & E.

To fit these cards, remove blanking plates from the desired slots, and align the card in slot runners, with the "top" of the card to the left. Slide card into place, firmly seating it against the backplane connector and fix it in place using the captive screws on the card. Any empty spaces that remain can be filled with blanking plates as required.

It is important to observe ESD precautions when handling expansion cards - use antistatic bags to store and place cards down on when not fitted in the surface, handle by their edges and use an anti-static wriststrap when fitting.

On booting the system, any expansion cards fitted are automatically detected and made available to the user.

If a card is removed, or changed for one of a different type, the original will remain visible in patching screens but displayed as offline. To stop a card that is no longer present from appearing in the UI, the I/O should be removed, and then re-added to the 'Required I/O' list found under System Settings>Required I/O Boxes in Calrec Assist.

If the order that cards are fitted in the card slots is important in your installation, please discuss this with your supplier prior to delivery. If for any reason the card order needs to be changed post delivery, please contact our Customer Support team or your local distributor for guidance.

Cards of the same type can be interchanged with no configuration change required. Additional cards can be fitted in previously empty slots without further configuration.

## Built-in Hydra2 Module

RP1 has a Hydra2 module inside the unit which allows the user to connect to a variety of Hydra2 audio interfaces. If the RP1 is connected directly to I/O then the following pages show its connection information and setup for the Hydra I/O boxes. This requires the primary and secondary SFP ports to be connected from the RP1 to the primary and secondary SFP ports of the Hydra2 I/O box.

The Hydra2 module can also be used in conjunction with a H2Hub to allow multiple I/O box connections. See "Hydra2 Expansion Options" on page 22.

## Hydra2 Audio Interfaces

Hydra2 I/O units come in a variety of formats and connector types, including MADi and SDI embedders/de-embedders, AES digital and mic/line analogue formats, all with a variety of connector types.

Refer to the Hydra2 installation manual for a complete list of I/O options, and the sample rates they each support.

## ID configuration

Each I/O box in a system needs to be given a unique Hydra2 ID (HID), see "Hydra2 I/O Box IDs" on page 24 for further information.

## Hydra2 connection

The Hydra2 connections on the back of the RP1 and I/O boxes are SFPs and therefore the connection type required (copper/single mode fibre/Multimode fibre) needs to be specified during the ordering process.

Note: SFPs fitted in the RP1 unit should be compatible with those to which they are connecting in an I/O box or H2Hub.

**Note, any fixed RJ45s on the rear of external Hydra2 I/O boxes are not functional, if copper connections are required, copper SFPs should be specified.**

## MODULAR I/O AUDIO CONNECTION AREA AND HYDRA2 INTERFACE



# HEADPHONE CONNECTION

The built-in headphone socket with its volume level control are patched to dedicated internal ports in the RP1 internal expansion I/O list in SLOT M.

They **DO NOT** appear as external audio port connections.

The headphone socket appears as destinations M-01 (left) and M-02 (right) in the internal expansion I/O patching lists as shown below. This can be connected to the console monitor L and R outputs or other path outputs, if required.

## Headphone Socket / Level Control

The RP1 built-in headphone socket together with its volume level control is fixed to the front right of the unit next to the Setup/LAN3 port.

### LOCATION OF HEADPHONE SOCKET AND ITS LEVEL CONTROL ON THE FRONT OF RP1

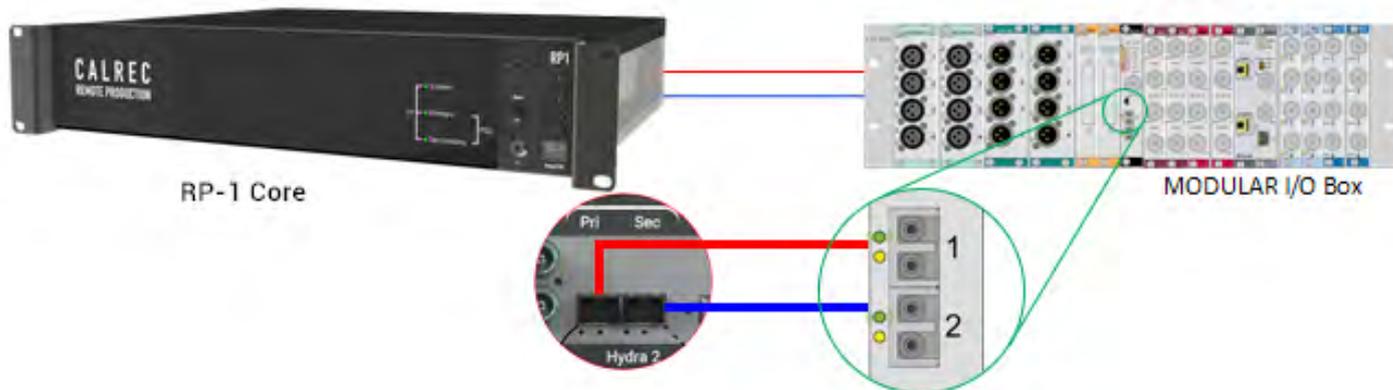


### PATCHING CONSOLE MONITOR OUTPUT TO RP1 INTERNAL HEADPHONE OUTPUT

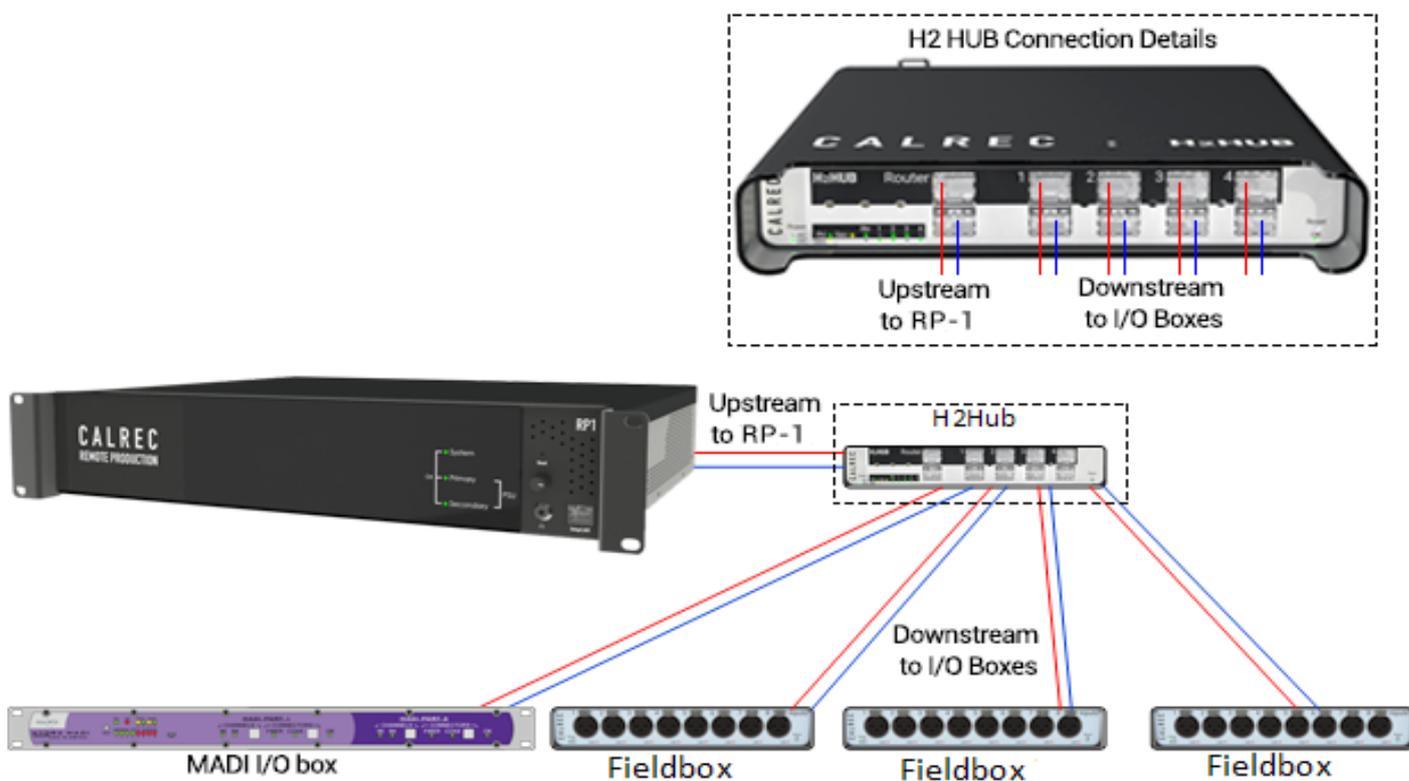
Output	Connected Destination	Desk Inputs	Connected Source	Output #Number
Console Monitor	L 257M-01		257E-43	DANTE 257E-43
	R 257M-02		257E-46	DANTE 257E-46
PFL/RTB LS	L		257E-47	DANTE 257E-47
	R		257E-48	DANTE 257E-48
AFL LS	L		257E-49	DANTE 257E-49
	R		257E-50	DANTE 257E-50
	C		257E-51	DANTE 257E-51
	LFE		257E-52	DANTE 257E-52
	Ls		257E-53	DANTE 257E-53
	Rs		257E-54	DANTE 257E-54
			257E-55	DANTE 257E-55
			257E-56	DANTE 257E-56
			257E-57	DANTE 257E-57
			257E-58	DANTE 257E-58
			257E-59	DANTE 257E-59
			257E-60	DANTE 257E-60
			257E-61	DANTE 257E-61
			257E-62	DANTE 257E-62
		257E-63	DANTE 257E-63	
		257E-64	DANTE 257E-64	
Console Monitor -L	257M-01		257M-01	LINE 257M-01
Console Monitor -R	257M-02		257M-02	LINE 257M-02

# HYDRA2 EXPANSION OPTIONS

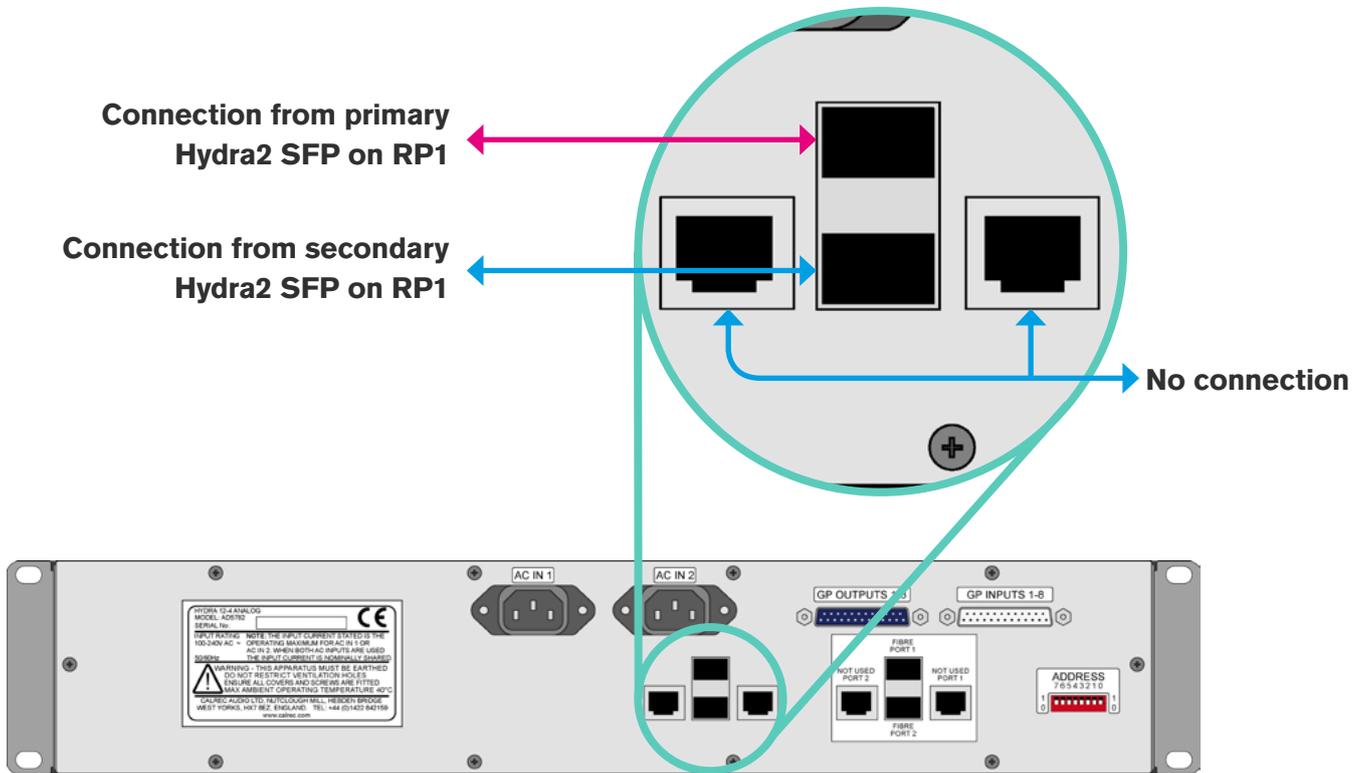
## CONNECTING RP1 TO AN EXTERNAL I/O BOX



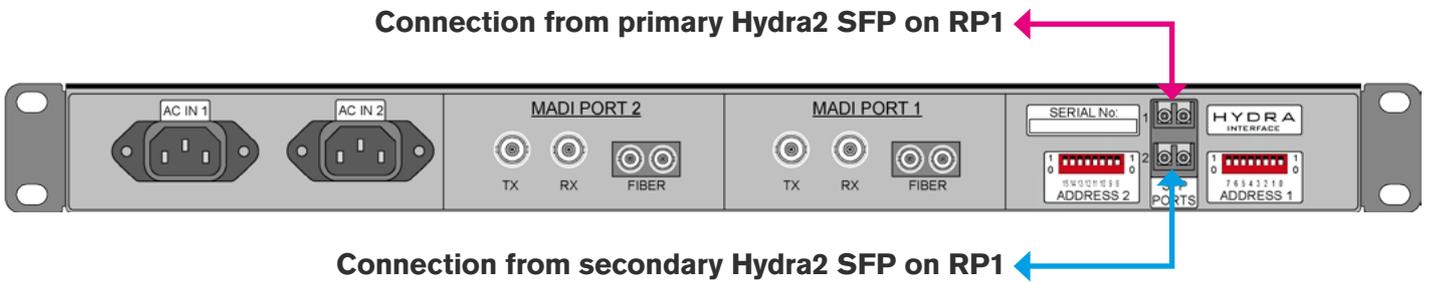
## CONNECTING RP1 TO I/O BOXES VIA H2HUB



**FIXED FORMAT I/O REAR CONNECTIONS**



**FIXED FORMAT MADI HYDRA2 I/O, REAR INTERFACE**



# HYDRA2 I/O BOX IDs

**Hydra2 I/O boxes with valid Hydra IDs (HIDs), are automatically detected and added to the Hydra database when first plugged in to the network. This database entry will remain until it is manually deleted via the network management organiser, H2O. This removes it from H2O, and prevents system status errors on the master router. From a core point of view, you just need to remove it from the required I/O list.**

It is important that careful consideration is given to HID settings prior to connecting any I/O boxes to the network, especially if future networking of standalone systems is a possibility.

As an example, consider two Calrec systems, each with several I/O boxes with HIDs starting at '1' and set in ascending numerical order. If you later decide to network these two systems together you will have multiple I/O boxes with the same HIDs on the network.

In this scenario when a show or memory containing patches is loaded, there is no way of controlling which patches will be made to which I/O box. Instead we recommend using a separate numbering range for each standalone system so no conflicts can arise in the future.

## ID configurations

For RP1's expansion slots, these appear in the I/O box list with a RP1 core icon and its I/O box ID is set automatically based on the System ID to ensure it will not conflict with other I/O on the network. So with a default system ID of 192. 1 the I/O has an ID of **1 + 256 = 257**.

This expansion I/O appears like a Modular I/O box as described in the previous section and its 'box/port labels can be edited from H2O. See ["System ID" on page 53](#).

For Hydra2 boxes each I/O box in a system needs to be given a unique Hydra ID (HID), set using switches accessible from the rear of a fixed format box, or on the side of the controller card within a Modular I/O box.

I/O box IDs are pre-set to '0' at the Calrec factory to effectively set the boxes into an 'off' state to avoid issues in the event of multiple boxes being placed on the network with the same HID.

Before connecting each I/O box to the network ensure you set a unique HID by following the instructions on the following pages.

**Note, Some customers may find that their I/O boxes have been pre-configured with unique HIDs at the Calrec factory, prior to dispatch.**

## Changing an I/O Box's HID

If you have already connected and powered up an I/O box and then wish to change its HID you will need to follow these steps:

1. Power off the I/O box.
2. Change the HID to a new, unique value by following the instructions on the following pages.
3. Remove the I/O box from the core's required list.
4. Remove the I/O box from Hydra database in H2O on the I/O box and Port Labels tab.
5. Remove shows/memories/patches which reference the I/O box.
6. Once the reset has completed, power up the I/O box.

If you plan to reuse the original HID it is important that you follow these steps including removing patches (or entire show/memories) which patch to the original I/O box, otherwise these patches may be made to the 'new' I/O box next time the show/memory containing the patch is loaded.

## Duplicate HIDs

What happens if you connect two I/O boxes with the same HID to your RP1?

Firstly, the system will be unpredictable in terms of its use of the ports across the two boxes. A patch to output port 1 could pick either box's output port to patch to, and each time the patch is made, either port may be chosen.

Secondly, there will be confusion between different I/O types. For example, in the scenario above one I/O box may be analogue and the other digital.

## Spare/Replacement I/O Boxes

Replacement I/O boxes of equivalent type should be set with the same IDs as the units they are replacing to allow them to function as drop-in replacements with existing user memories, requiring no further configuration.

Care should be taken when setting HIDs to avoid accidentally duplicating the same HID on more than one box.

**Do not add extra I/O to the system unless you are confident it will not cause a conflict on the network.**

# SETTING HYDRA2 IDs FOR FIXED FORMAT I/O

The 8-way switch on the rear of all fixed format I/O boxes is set as an 8-bit binary representation of the HID value with the left hand switch used for the most significant bit, and the right hand switch for the least significant bit. A switch in the down/off position represents a binary 0 and a switch set in the up/on position represents a binary 1.

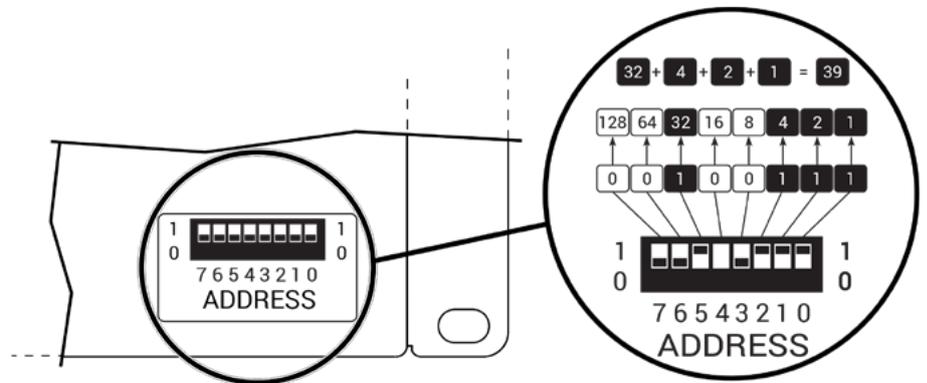
Each switch/binary-bit equates to a decimal value, starting at 1, for the least significant bit. The remaining switches are double the value of their less significant neighbour, making the 8th/most significant bit equate to a decimal value of 128.

All fixed format I/O box ID switches are orientated the same way, though some boxes, such as MADI units, use a different style switch with more pronounced labelling. Ignore any labels on the switch itself and always refer to the Calrec labelling on the surrounding panel which will show the most significant bit switch on the left and the binary 1 position as up.

## Address 2

Some I/O boxes, such as MADI units, are fitted with 2 banks of DIP switches Address 1 and Address 2. please note that Address 2 should all be set to the off '0' position.

## SETTING THE HID ON A FIXED FORMAT I/O BOX



# SETTING HYDRA2 IDs FOR MODULAR I/O

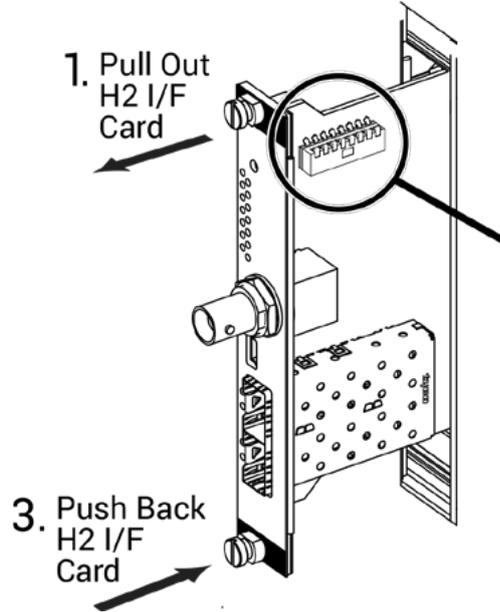
The HID for Modular I/O boxes is set by a switch on the controller card and is only accessible by removing the card. Refer to the Hydra2 installation manual and ensure ESD precautions are observed before removing any Modular I/O box cards.

Ignore any labelling on the DIP switch itself and refer to the Calrec labelling printed on the circuit board around the switch to clarify its orientation.

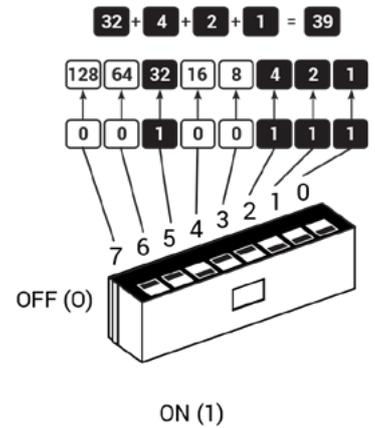
When viewing the card from the side, the most significant bit is on the left and the least significant bit on the right. Pulling a switch towards you sets it as a binary 1, away from you as a binary 0.

The following illustration shows the ID switch on the Modular I/O controller card. A decimal value of 39 is used for the example. These illustrations, along with simple instructions, are displayed on the top of the Modular I/O box itself.

## REMOVING A MOD I/O CONTROLLER CARD AND SETTING ITS HID



### 2. Set Unique ID Address



# SYNCHRONISATION

**The RP1 has 6 BNC connections for external synchronisation:-  
2 x Wordclock inputs, 2 x AES inputs  
and 2 x Video inputs. If no external  
sync is connected and selected, the  
unit will free-run on its own internal  
clock generated by the system.**

General rules of good practise require that all equipment connected to the RP1 digital inputs and outputs are locked to the same referenced sync source as the RP1 to ensure clean audio.

In systems with multiple Calrec processing cores connected together, it is of paramount importance that all connected processing cores are locked to the same referenced sync source.

If one or more cores receives a sync signal that is not locked from the same clock reference as other cores, interruptions to both audio and data carried by routers can be caused. This can lead to false error warnings and I/O boxes going offline. Therefore, it is essential to consider a robust sync distribution design for a facility and to ensure all points in the chain are correctly configured to lock to the appropriate input and no elements, such as sync regenerators, are free-running or making changes to the reference source.

It is also recommended that backup sync sources and paths are considered to maintain full functionality in the event of the loss of any part of the facility's sync distribution system.

External sync sources can be fed to the BNC connectors on the rear of the RP1 unit as shown above right. Two inputs are available for video formats, as well as two inputs for TTL wordclock and two inputs for AES3 digital audio reference.

See the external sources table right and the System Settings>Sync screen in Calrec Assist for information on how to set up synchronisation priority.

The unit will always attempt to boot to the highest priority sync selected, and move down the priority list until it finds a valid sync.

If a valid sync later fails, it will move down the list. If no valid sync present, will always default to internal as this is fixed as the last source in the list. The priority will never automatically move back up the list, even if a higher priority sync becomes available. Press the reset to first button to move back up to the top of the list.

It is important that the required sync source is available before the unit boots up, otherwise it won't be locked to the correct sync, if this occurs press the 'Reset to 1st Source' button after the sync generator is running.

## SYNC INPUTS



## EXTERNAL SOURCES TABLE

Priority	Source
1	Internal
2	Internal
3	Internal
4	Internal
5	Internal
6	Internal

Source
AES (48kHz)
Wordclock (48kHz)
Internal
Video 1
PAL
NTSC
Tri level 720p/30
Tri level 720p/29.97
Tri level 720p/25
Tri level 720p/24
Tri level 720p/23.98
Tri level 1080i/30
Tri level 1080i/29.97
Tri level 1080i/25
Tri level 1080p/30
Tri level 1080p/29.97
Tri level 1080p/25
Tri level 1080p/24
Tri level 1080p/23.98
Tri level 1080p/50

# SMALL FORM-FACTOR PLUGGABLE (SFP) OVERVIEW

**Connections between the RP1 unit (which includes the processing core) and all Hydra2 network connections between I/O boxes are all made via SFP modules.**

SFPs can be provided for RJ45 copper connections, as well as Singlemode or Multimode fibre on LC connectors. This allows for each port's connection type to be chosen to suit cable-run distances and the existing infrastructure. SFPs can be changed easily on a port by port basis, as and when required.

If Calrec are supplying SFPs for your installation, the correct quantity of SFPs are supplied pre-fitted. The type of each connection copper, Singlemode fibre or Multimode fibre should be specified at the time of order to ensure the correct SFP types are supplied. Additional SFP modules can be ordered if required. If a system is to be connected to an existing Hydra2 network, please discuss this with your Calrec project leader, sales person or local distributor to ensure that SFPs are provided and ports provisioned for the additional router to router connections.

## SFP Slot Orientation

### SFP MODULES

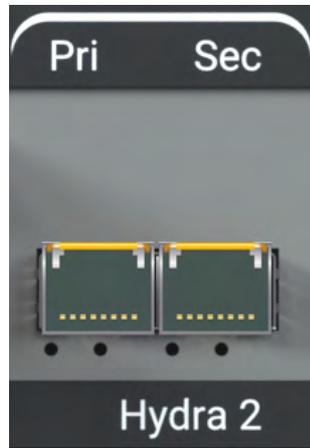


- Both SFP types above have a handle latching mechanism, shown in the locked position. The unit on the left is a Singlemode duplex LC fibre module. The unit on the right is a copper RJ45 module type which must support LOS detection.

SFP modules plug into rear panel slots on RP1 & Fixed Format I/O boxes, and into front panel slots on router and Modular I/O controller cards. The modules can be fitted or removed whilst the system is powered up and without removing or opening any card or box casings.

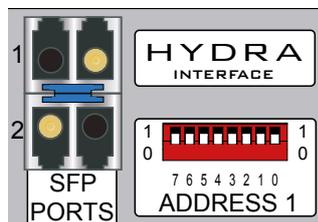
Note the orientation of the SFP modules as shown in the illustrations on this page.

### RP1 SFP CONNECTIONS



- RP1 Hydra2 interface on rear shown with copper SFPs fitted. SFP modules fitted in RP1 are orientated so that the RJ45 connector catch and the Fibre LC connect key are at the top.

### FIXED FORMAT I/O BOX SFPS



- I/O box shown with Singlemode fibre SFPs (button release) fitted.

Likewise for Fixed Format I/O boxes, the primary SFP module is the opposite way around to the secondary SFP module.

The modules are orientated so that the release catch for the RJ45/LC connector plugs, once inserted, are on the outside edge.

### MODULAR I/O BOX SFP CONNECTIONS



- Modular I/O controller card SFPs are both orientated the same way around (Button release Singlemode fibre SFPs shown).

For Modular I/O box controller cards, both SFP slots are orientated so that the release catch on the cable/fibre connector is on the right-hand side.

### SFP Latching and Extraction

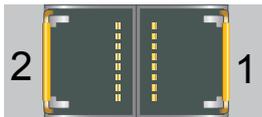
Calrec source SFP modules from various manufacturers. All types used conform to the same specification, however the latching mechanisms can vary slightly.

The standard copper SFP and some fibre SFPs, as shown in the photograph on the previous page, have latch/extraction handles. On insertion, the handles should be set against the outer edge (the same side as the release catch on the RJ45/LC connector plug that fits into the SFP) to lock it into place and prevent accidental removal if cables are pulled.

To remove this style of SFP, remove the cable/fibre and slide the handle (copper) or lift the handle out (fibre) to the inside edge, as shown in the diagram to the right. The module can then be removed by pulling on the handle.

Other SFPs automatically latch into place when they are inserted fully and they have a release button on their inside edge. The fibre SFPs shown in the orientation diagrams and on this page are of this type

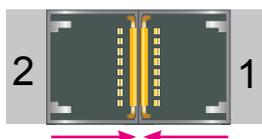
### SFP WITH HANDLES - LATCHED



- Both SFPs shown are locked in place - latch / extraction handles in outer position (or 'down' position for fibre).

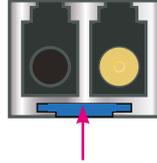


### SFP WITH HANDLES - UNLATCHED



- Both SFPs free to remove - latch / extraction handles in inner (or 'lifted' for fibre) position.

### AUTO-LATCHING SFP CONNECTORS



- Depress the release button to remove.

and have blue release buttons. To remove, depress the button using a small flat blade, screwdriver or similar tool. The SFP module will then be free to be removed.

### SFP Slot Covers

Dust covers should be fitted to all SFP slots that do not have SFP modules fitted in them in order to maintain connection reliability.

### Loose SFP Storage

SFP modules are small, yet reasonably expensive devices. When removing or changing SFPs, take care to keep track of them and store loose modules in a clean, dry, and anti-static environment. Fibre SFPs should always have a dust cover fitted into their optical transceiver end when no fibre is connected to them.

**Calrec will not be liable for lost or missing SFP modules, or damage due to poor storage.** SFP design varies depending on the manufacturer, please ensure that SFPs are correctly latched in place after fitting them. In the event that a connection is not automatically established after hot-plugging an SFP, please reset the unit the SFP is plugged in to.

# COPPER SFP CONNECTIVITY

**Hydra2 network connections can be made via copper SFP modules. Copper connections require shielded F/UTP Category 5e or Category 6 cables with shielded RJ45 mating connectors. Core connections should only be made using optical/fibre SFP modules.**

**It is important to note that Copper SFPs must support LOS (Loss of Signal) detection - these are not standard for copper SFPs, but are commonly available, Calrec supplied copper SFPs do support LOS.**

Calrec do not supply copper cables as it is often preferable to terminate them after they have been run through cable ducting to avoid damaging the terminations, and to be able to cut them to the precise length required.

## Shielded Cables and Connectors

Shielded cabling and connectors are required in order to meet EMC (electromagnetic compatibility) standards to comply with the radiated emission limits set in the latest EMC (Electro-Magnetic Compatibility) standard, as well as to guarantee performance in electrically noisy environments.

F/UTP Cat5e/Cat6 cable has an overall foil shield around the conductor cores. Shielded RJ45 connector plugs have a metallic shield around them which should be clamped/bonded to the shield within the cable. The connector shield connects with the chassis of the RJ45 socket that

## SHIELDED RJ45 CONNECTOR



Conductive connector mating screen clamped / bonded to cable shield

it is plugged into, providing an earth to the cable shield.

The method of attaching the connector shield to the cable shield can vary. Please refer to the connector manufacturer's information for further guidance.

## Maximum Cable Length

The maximum length of Cat5e/Cat6 cables is 90 m/295 ft. This is the absolute maximum and needs to include any patch points and cables that may be in the path. Hydra2 cable runs can NOT be extended using Ethernet switches, hubs or repeaters. If a run between Hydra2 hardware exceeds the maximum recommended distance for copper cabling, fibre and optical SFPs should be used instead.

## Cable Routing Considerations

The layout and twist rate of the data cores within Cat5e/Cat6 cables are integral to their performance at high speed over distance. Poor practise during installation can seriously impact upon this. The following are general rules of good practise but please refer to the cable manufacturer's information for comprehensive installation rules:

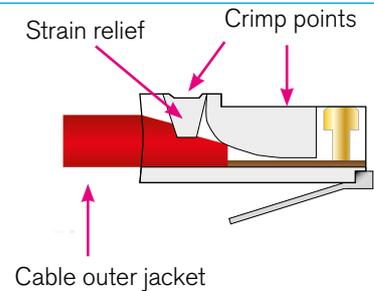
- When running Cat5e/Cat6 network cabling, it is important to avoid kinking the cable. Kinks can seriously impair performance. Cable manufacturers advise that kinked cables should be discarded and replaced as the damage caused cannot be addressed simply by straightening them out.
- Cables should not be bent in tight angles, this too can seriously impair performance. Please refer to the cable manufacturer's specification on minimum bend radii.
- Excessive pulling force when routing cables can deform the twist rate of the cable cores, causing irreparable damage. Cable manufacturers specify a maximum pulling tension.

- Cable ties should not be over-tightened as this deforms the internal structure of the cable.
- Cable ties should be tight enough to support the cable weight but not so tight as to cause any visible deformation to the cable's outer jacket. Large, heavy bundles of cables can be difficult to support using cable ties without causing damage. 'Velcro' style hook-and-loop cable straps can be a good alternative to plastic cable ties.
- Whilst neatly bundled parallel cable runs are tidy and aesthetically pleasing, they can increase cross-talk, which can impact on performance. Avoid neat bundling of network cables over any kind of distance the majority of a cable length is normally unseen, running under floor or through ducting where they should be loosely laid rather than neatly bundled.

## Termination - Strain Relief

Poor termination and lack of strain relief is one of the most common causes of high speed network cable problems. To properly relieve strain on the data cores, the outer jacket of the cable should be inserted into the RJ45 housing and held in place once crimped at the strain-relief point, as shown in the diagram above. This also maintains the integrity of the twist rate and shield into the termination, ensuring the full length of the cable conforms to its specification.

## STRAIN RELIEVED RJ45 TERMINATION



- Note, this is a simplified diagram that does not include the shield.

Slide-on outer boots offer additional strain relief protection but are not sufficient on their own.

In order to be able to crimp the cable jacket inside the RJ45 and land the data cores on the terminals, the amount that the jacket is stripped back in relation to the cores needs to be accurate. Cables with exposed data cores should not be used as they will be unreliable.

**Termination - Pin-Out**

Hydra2 network cables use the standard gigabit Ethernet pin-out. Performance relies on the positive and negative leg of each signal pair using cores that are twisted together. Calrec recommends that 'straight-through' or 'pin-for-pin' cables are used. 'Cross-over' style cables can be used, however they must be gigabit standard cross-over. Older pin-outs, designed for use with slower Ethernet standards only use two of the four pairs, even though all four pairs are terminated. Cross-over variants of this style only cross the pairs that are used (A & B). Gigabit cross-over cables require that the blue (C) pair is crossed with the brown (D) pair as well as the orange (A) pair being crossed with the blue (B) pair.

**Testing/certification**

Calrec strongly recommend that all Hydra2 network cabling is properly tested or certified prior to on-site commissioning of the system. Simple test devices that only check the pin-out of the terminations are not sufficient to prove the performance and reliability of high speed data cabling. Certification level test equipment can give a simple pass/fail response but in doing so will test various important factors as well as pin-out. Certification type tests include determining cable length, measuring skew (timing differences between pairings due to variations in length caused by intentional differences in twist rate), measuring for loss, signal to noise ratio and BERT error checking on data.

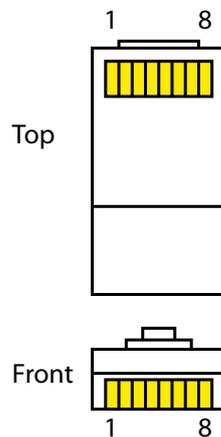
Cables that fail certification tests or fail to perform, may appear to function fine

in other applications, such as a PC LAN connection where errors leading to retries and therefore delays are acceptable and often unnoticed.

**Temporary / Reusable Cables**

Cabling that is not part of a permanent infrastructure, such as temporary runs used for outside broadcasts, should be carefully coiled and uncoiled to avoid kinking and they should be regularly tested. Cables showing any sign of damage should be replaced.

**RJ45 PIN NUMBERING**



**STANDARD HYDRA2 RJ45 PIN-OUT**

Pin	Colour	Signal
1	Orange-White	A+
2	Orange	A -
3	Green-White	B+
4	Blue	C+
5	Blue-White	C -
6	Green	B -
7	Brown-White	D+
8	Brown	D -

- For standard wiring, both ends of the cable should be terminated as above

# FIBRE SFP CONNECTIVITY

## Optical SFP modules for fibre connectivity can be used for console to processing core, router to router, and router to I/O connections.

Fibre connectivity is required when the cable run between units exceeds the 90 m maximum permissible length for Cat5e/Cat6 copper cabling. Fibre can also be used for shorter runs if it is simply the preferred medium.

Note, this section only concerns fibre connections made via SFPs. Like all I/O boxes, MADI units have pluggable SFPs for their Hydra2 connections to routers, but they may also have fibre connectors that pass the actual MADI audio format in and out of the system. The MADI I/O format fibre connectors are of a fixed type such as FDDI. Various MADI I/O boxes are available to provide different types of MADI fibre interface. Please refer to the Hydra2 installation manual for more details on MADI I/O options.

### Singlemode vs Multimode

The core within Multimode fibre is relatively thick when compared to Singlemode. Light travels through Multimode fibre at multiple angles, 'bouncing' off the sides of the core as it travels, taking multiple paths or 'modes' of varying length from one end to the other, resulting in pulses being lengthened as they travel. Singlemode fibre has a very fine core and light travels in a single, direct path from one end to the other without affecting pulse length. The result is that

Singlemode fibre has a higher bandwidth capacity and, importantly, low signal loss allowing much greater distances to be achieved. Light can be transmitted into Multimode fibre using LEDs or low powered lasers whilst Singlemode requires a higher powered laser.

Calrec recommend the use of Singlemode fibre whenever possible in order to maximise the flexibility in the location of hardware and maintain uniformity across the system by using a single type. If a Multimode infrastructure is in place, fibre length, the number of inter-connects and equipment location become more important.

SFP modules are available for both Singlemode and Multimode fibre types. It is important to select the correct SFP for the type of fibre being used in the installation. If using a mixture of Singlemode and Multimode fibre, it is important to ensure the correct SFPs are matched to the correct fibre type.

### Identification

The release button/handles of fibre SFPs are colour coded - blue for Singlemode, black for Multimode. Blue LC connectors, as shown here, should be used to terminate Singlemode fibre and beige coloured connectors for Multimode.

### Duplex Connectors / Terminations

Standard Calrec fibre SFPs, both Multimode and Singlemode, use duplex LC connectors.

The duplex termination requires two fibres per connection, one is a send path, the other is a receive path. When terminating the fibre, the send from one end should connect to the receive of the other and therefore they 'cross-over', terminated A to B and B to A.

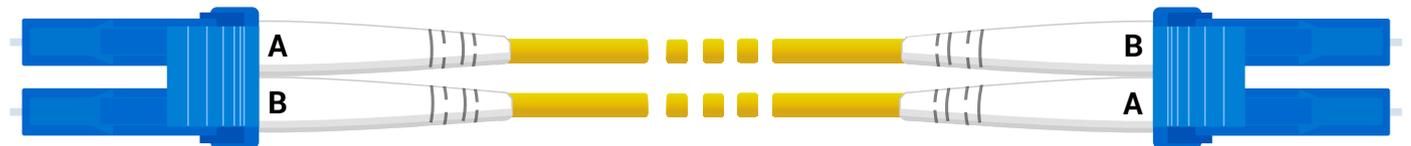
### Single Strand, Bi-Directional SFPs

To reduce the amount of fibre, Calrec can supply Singlemode SFPs that send and receive over a single, or simplex LC connector. In order to be able to pass data in both directions over a single strand, the light travelling in one direction needs to be of a different wavelength to the light travelling in the other direction. Therefore, bi-directional SFPs come as either type A or type B (as indicated by an A or B at the end of the model number) and they need to be paired up; a fibre should connect between a type A and a type B, and not between two Bi-Directional SFPs of the same type/wavelength. The units are colour coded to aid identification between A types & B types.

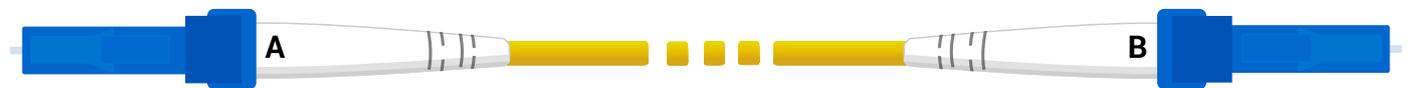
### SFP Fibre Specifications

Specifications are shown in the table to the right. The maximum distances shown here assume a single point-to-point connection with no intermediary interconnections. Losses should be measured across the total signal path including interconnects between points of SFP transceiver connection. Losses need to be less than the optical power budget of the SFP transceivers being used.

## DUPLEX LC FIBRES CORRECTLY TERMINATED A TO B & B TO A



## BI-DIRECTIONAL LC FIBRE CORRECTLY CONNECTED, TYPE A TO TYPE B



## SFP/FIBRE SPECIFICATIONS

SFP Type	Connector	Power Budget	Fibre Type	Max Distance
SX Multimode	LC Duplex	7.5 dB	62.5/125 µm	275 m
			50/125 µm	550 m
LX Singlemode	LC Duplex	8 dB	8/125 µm	10 km
LX Singlemode bi-dir	LC Simplex	11.5 dB	9/125 µm	10 km
LH Singlemode	LC Duplex	23 dB	8/125 µm	70 km

# FIBRE – GENERAL RULES

## Testing / Certification

Calrec strongly recommends that all fibres are properly tested or certified prior to on-site commissioning of the system. A certain amount of signal loss occurs over the length of a fibre path. If the total loss of a path exceeds the optical power budget of the SFPs in use, the system will be unreliable.

## Areas of Loss

Signal loss occurs in various areas. Splice loss occurs in terminations at the point where the fibre meets the connector. Typically splice loss should be <0.3 dB per termination. Poor termination results in higher loss.

Connector loss occurs at the point where the connector meets the SFP/optical transceiver, or other connectors, such as extension interconnects or patch-points. Connector loss should typically be <0.5 dB per interconnect. Dust or other contamination between interconnects or scratches on the end surface contact point of the fibre will substantially increase the amount of loss. As such, dust covers should always be fitted to optical SFPs when no fibre is connected, and to fibre connectors that are not landed.

As well as splice and connector loss, the fibre itself has inherent loss over distance, typically fibre loss will vary from 3.5 dB per km for Multimode down to 0.4 dB per km for Singlemode. Poor installation practise and lack of care can damage the fibre and result in substantially increased losses.

## Fibre Handling Practise

It is important to follow the fibre manufacturer's guidelines when handling fibre and installing fibre runs. Some of the main points of concern are:

- Minimum bend radii—fibre should not be bent through too tight an angle. Tight angles can cause significant losses and permanent damage to the fibre. Fibres may pass initial installation testing but can fail at a later date due to stresses on the core of the fibre caused by tight bends.
- Twists, snags and kinks—Twists in fibre runs add stresses to the core which can cause damage over time. Avoid snagging on other cables or conduit which will cause excessive tensions when pulling and can cause kinks and excessive bends in the fibre. When routing through angled conduit, provide enough clearance around corners to avoid the fibres being pulled sharply around the inside of the angle.
- Pulling—observe the manufacturers maximum pulling tension specification. Use pulling tools and lubrication where appropriate. Never pull on the connector.
- Strain relief—fibres should have adequate strain relief to prevent tension on terminations, however use of plastic cable ties can crush the internal construction of the cable. Hook-and-loop 'Velcro' straps are harder to over-tighten and offer more gentle support and a greater surface area to dissipate the pressure.
- Crushing—never place heavy items on top of unprotected fibre.

## Ruggedised Fibre

Temporary/re-usable fibre runs, or runs unprotected by conduit and likely to be exposed to the elements, snagging or to being stood on, should always be of a ruggedised/armoured type to protect the internal construction of the core.

## Cleaning and Preventative Maintenance

Contamination of transceiver and fibre mating contact points causes signal loss and can cause permanent damage by scratching.

Dust covers should be fitted to all fibre connectors and SFP optical transceivers when they are not mated. It is also important to ensure that dust covers themselves are kept clean.

When handling fibres without dust covers, do not allow the ends to come into contact with any surface.

Specialist materials should be used for the cleaning of mating contact points to avoid further contamination or scratching. The following items are low cost and readily available from camera shops and laboratory suppliers:

- Canned compressed air—it is important to use specialist filtered, clean, dry air, free of contaminants and moisture.
- Isopropyl alcohol—Use with cotton swabs or lint-free wipes to ensure no residue is left.
- Lint free wipes/long fibre, low ash lens paper—needs to be free from chemical additives.
- Ensure wipes and swabs are stored in a clean environment and are not reused.

### **Cleaning Fibre Optic Cables and Connectors**

There are multiple ways to clean fibre-optic cables and connectors. Included below are some helpful tips:

- Do not allow the end of the fibre optic cable to make contact with any surface.
- Do not excessively bend the fibre cable as this may cause internal breaks along the fibre resulting in poor performance or instability.
- Optics and optic coatings are easily chipped and/or scratched. Use of finger cots or powder free surgical gloves while handling fibre optic cables, will help ensure cleanliness.
- Only fresh (dry) spectroscopic grade isopropyl alcohol should be used as a cleaning solvent.
- Ensure that the module power is off and that other light sources are disabled.

### **Cleaning Procedure**

1. Blow the fibre surface with a stream of clean dry air, this will dislodge larger loose particles.
2. Place 1-3 drops of spectroscopic grade isopropyl alcohol in the centre of a lens tissue.
3. Hold the fibre by the connector or cable, place the wet portion of the lens tissue on the optical surface and slowly drag it across.
4. Examine the surface of the fibre end under high intensity light using a direct magnifying inspection microscope or an indirect video inspection tool if available. If streaks or contaminants still remain, repeat the process using a fresh lens tissue.
5. Immediately install a protective cover over the end of the cable to avoid re-contamination or insert the fibre back into the previously cleaned receptacle for immediate use.

### **Additional Notes**

- Do not tip the can of clean dry air whilst aerosol spraying as liquid may be released contaminating the surface of the fibre.
- Do not use dry lens paper as it is extremely abrasive.
- Do not use acetone as a cleaning solvent on the fibre optical surfaces.
- To ensure the purity of the isopropyl alcohol, do not insert the lens tissue, swabs, etc into the liquid, instead, drip the liquid on to the material.

### **Cleaning Optical Transceivers**

The best way to clean a transceiver port is to remove particles using a stream of clean dry air. Included below are some helpful tips to properly clean fibre optic modules:

- Always handle optical SFP modules in an ESD safe manner using the proper safety precautions.
- Ensure that the module is powered off and handle the modules with care.
- Always use clean dry air or an approved canned compressed air supply.
- Always hold the can of compressed air upright. Tipping may release liquids into the air stream.
- Do not touch the inner surfaces of the module including the Optical Sub-Assemblies (OSA), or insert any foreign objects into the ports.
- Use of finger cots or powder free surgical gloves are not required but may be used for cleanliness.



**WARNING**

**Never look into the end of an optical transceiver or fibre when in use. Laser radiation can be harmful to the human eye and should be avoided.**

**Remember that when disconnecting a fibre, the transmitting device at the other end may still be active.**

### **Cleaning Procedure**

With the clean dry air, blow the inner barrel of the transmitter and receiver Optical Sub-Assemblies (OSA). This will dislodge loose particles.

Examine the surface of the OSA lens under high intensity light using an inspection microscope. If contaminants still remain, repeat the process.

Following these guidelines should provide a successful installation and ensure optimum reliability and system performance.

For further information or advice please feel free to contact Calrec.

# POWER SUPPLY UNITS

**RP1's power supply unit (PSU) contains two power supply units which are supplied with AC power by two independent male IEC inlets. These dual power supplies provide full power redundancy, a feature of all Calrec products.**

Although RP1 will run with only one PSU powered on, it is recommended that, to ensure power redundancy, these two IEC inlets should be supplied by separate AC power supplies.

A PSU failure or a loss of AC power input will generate a system status error message.

**The two PSUs employ load sharing, if one PSU fails, the other will automatically take over the full load with no loss of audio or operation.**

## Disconnecting the PSUs

RP1 does not contain a separate mains power switch. To safely disconnect the mains power both IEC connectors need to be removed from the rear of the console, as shown below.

## Power Distribution

The power supply module connects to an internal power distribution board providing 12v DC & 48v DC power to RP1's internal components.

## RP1 REAR VIEW SHOWING PSU MAINS CONNECTIONS



# GPIO CONNECTIONS

**GPIO cards provide logic inputs and outputs, which can be assigned to various functions from the RP1 interface. (From Version 2 Only)**

**GPIO allows console functions to trigger external devices e.g. fader starts for playback devices, and for external devices to trigger console functions.**

## Internal GPIO interfaces

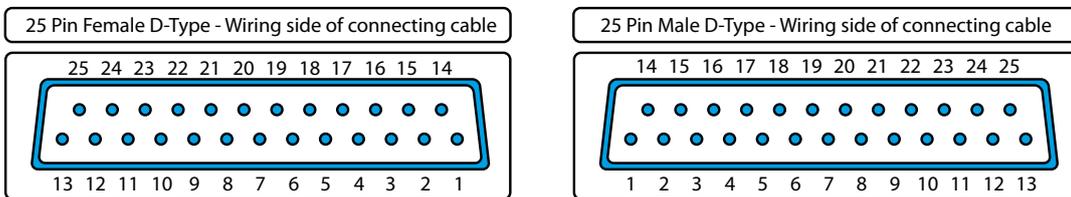
There are 2 x 25-pin connectors on the back of the RP1 unit arranged as 8 x GPI and 8 x GPO, the pinouts and connectors arrangements are shown right.

RP1 GPIO uses exactly the same arrangement as a fixed I/O Box.

If additional GPIO is required, please discuss this with your supplier.

Optional GPIO cards can be fitted in one of the 3 expansion slots on the back of the RP1 unit or in Modular Hydra2 I/O frames, or any Fixed Format Hydra2 box with a height of 2U or greater.

## RP1 GPIO CONNECTIONS - 8 IN, 8 OUT



Function		Pin	Function		Pin
Relay 1	Common	1	Opto 1	+	1
	Normally Open	14		Opto 2	-
	Normally Made	2	Opto 3		+
Relay 2	Common	15		Opto 4	-
	Normally Open	3	Opto 5		+
	Normally Made	16		Opto 6	-
Relay 3	Common	4	Opto 7		+
	Normally Open	17		Opto 8	-
	Normally Made	5	+5V		+
Relay 4	Common	18		Opto 1	-
	Normally Open	6	Opto 2		+
	Normally Made	19		Opto 3	-
Relay 5	Common	7	Opto 4		+
	Normally Open	20		Opto 5	-
	Normally Made	8	Opto 6		+
Relay 6	Common	21		Opto 7	-
	Normally Open	9	+5V		+
	Normally Made	22		Opto 8	-
Relay 7	Common	10	+5V		+
	Normally Open	23		Opto 1	-
	Normally Made	11	Opto 2		+
Relay 8	Common	24		Opto 3	-
	Normally Open	12	+5V		+
	Normally Made	25		Opto 4	-
Ground		13	+5V		+
				Ground	-

- Calrec connector is male, requiring female terminated cable
- Calrec connector is female, requiring male terminated cable



# RP1 SYSTEM SOFTWARE UPDATES

# UPDATING SYSTEM SOFTWARE

**Users can carry out software updates on RP1 systems, running version 1.0 or higher via a web browser on a laptop/PC connected to the RP1 unit.**

For guidance on carrying out a software upgrade to a RP1 system, please refer to the updating software instructions shown on the right. Users will need to connect a laptop/PC to the unit and understand how to set a static IP address on their device.

See “Connecting a Laptop to RP1 for Setup, Calrec Assist & H2O” on page 42 and “Configuring RP1 LAN Ports” on page 44 for information on how to connect to RP1.

Users should avoid hot-plugging or removing hardware whilst system software is being reprogrammed. Do not disconnect, reset or power down during this process.

On every boot up, the system checks its hardware is all on compatible software, any mismatches detected are automatically reprogrammed - this makes swapping out of hardware and moving I/O boxes between consoles running different versions simpler.

Take care to notice on-screen warnings and reprogramming notifications in the application and on the external meter display screen during the update process.

I/O boxes connected via the optional Hydra2 module, require user confirmation before reprogramming in order to avoid them being accidentally disconnected or powered down during the process. If an I/O box is repeatedly flagged as needing an update, even after the system has been updated, a manual reset of the box should resolve the issue.

The main processor board within the console is the reference for the rest of the system. Should the processor board need to be replaced for any reason, the system must be powered down so that the controller card can be replaced.

## UPDATING SOFTWARE INSTRUCTIONS

**Update Software**

- 1 Download or Request Software**  
Download Software  
Download software updates from: [www.calrec.com/support](http://www.calrec.com/support)
- 2 Connect**  
Connect Ethernet  
Connect a network cable from a laptop or computer to the Ethernet sockets on the front or rear of the console.
- 3 Configure**  
Configure Static IP on PC  
Your computer needs a static address on the same subnet as the Ethernet port1 to which it is connected  

Ethernet 1	Address: not set	Subnet Mask: 255.255.255.0
Ethernet 2	Address: not set	Subnet Mask: 255.255.255.0
Ethernet 3	Address: 192.168.1.1	Subnet Mask: 255.255.255.0

*If the Ethernet port you need to use is marked as 'not set', configure it on the LAN Configuration screen then return here.*
- 4 Access Software Updater**  
 Open Web Browser (Chrome browser only)  
On the PC, open Chrome browser and enter the address for the relevant Ethernet socket, followed by the port number 8090  
 Update Software  
Follow the instructions in the Software Updater application in your browser

For example:  
192.168.1.1:8090

The software version and user data may be unknown on the replacement and so will require reprogramming and user data restoring from a previous backup.

On power up and boot, the replacement will also need to be configured to match the original from the user data backup.

Before carrying out software upgrades, users should choose to back-up the user data as a precaution via the software updater application. Should a system lose user data, it can be restored by the

software updater in order to recover a system back to its previous identity.

Note that choosing a software file to upload will start system reprogramming and various progress bars appear to confirm as elements are updated.

The image below shows a web browser accessing the 'Software Updater Application' which has successfully updated its router module and is advising on the compatibility of an I/O box connected to the RP1 which needs to be reprogrammed for it to work with RP1.

## SOFTWARE UPDATER APPLICATION SCREEN.

One or more Hydra devices have been detected that are not running compatible software. Please ensure that the device will remain connected and powered before confirming each for reprogramming from the list below.

Note that some Hydra devices can take a long time to reprogram, and success may appear to stall. DO NOT disconnect, power down, or reset during the process. Success or failure will be notified.

Software Components	
Primary Router Module	100%
Fixed Format I/O Box ID 102	0%

Reprogram Ignore

**RP1**

# **CONFIGURING LAN PORTS & CONNECTIVITY**

# CONNECTING A LAPTOP TO RP1 FOR SETUP, CALREC ASSIST & H2O

**The Setup/LAN 3 port on the front of RP1 is intended to be used for setup purposes on site where a laptop or PC is connected in as shown below, so that Calrec Assist or H2O can be accessed to setup the system ready for when the host console comes 'on line' with the host console accessing the system via the LAN ports on the rear of the RP1 unit.**

Before the host console can be connected to RP1 the LAN ports of the RP1 that are used to connect to the host console must be set up. In order to do this the user must first connect to the RP1 unit via the LAN 3 port on the front of the unit to a PC or laptop connection.

**A laptop can be used with RP1 to access Calrec Assist in order to setup or remotely control the RP1 core or to access H2O for I/O port management and labelling, and to carry out software updates.**

The laptop will need to have at least one ethernet port (or USB LAN connector) which should be directly connected to the Setup/LAN3 port on the front of the unit.

Note the Default IP address for the front Setup/LAN3 port is 192.168.1.1 with a subnet mask of 255.255.255.0 and we would recommend that the user leaves this as the default address for LAN3 so that unfamiliar users can always access the system as required.

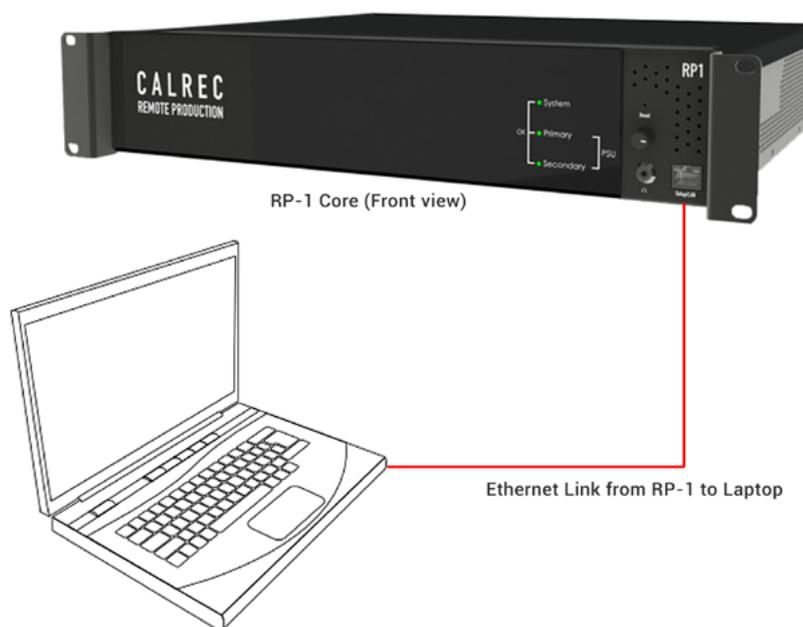
Once the PC/Laptop is connected to RP1 via a Cat5e cable it will need to be configured to use a TCP/IPv4 address for its LAN connection. See ["Configuring the Ethernet adapter in the PC/Laptop"](#) on [page 43](#) to see how this is done.

Once the user has access to Calrec Assist, the other RP1 LAN ports can be configured in System Settings>LAN Configuration, allowing the user to view and alter the console's LAN ports IP addresses. See ["Configuring RP1 LAN Ports"](#) on [page 44](#).

## CONTROL PROCESSOR SETUP/LAN PORT 3 ON THE FRONT OF RP1



## CONNECTING A LAPTOP DIRECTLY TO RP1

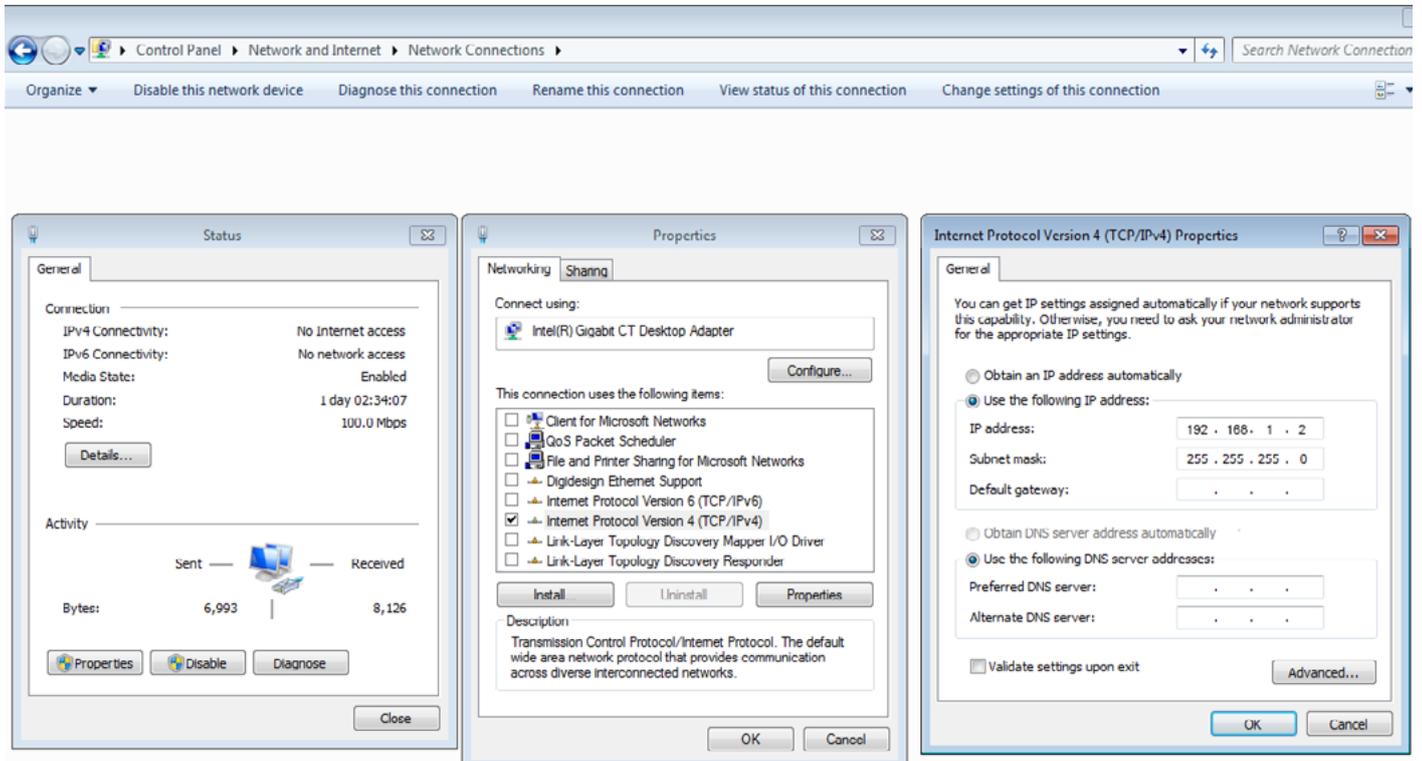


Note that H2O for RP1 can be accessed via port :8080 and the Software Updater via port :8090. In this example the user would enter 192.168.1.1:8080 for H2O and 192.168.1.1:8090 for the software updater application.

# CONFIGURING THE ETHERNET ADAPTER IN THE PC/LAPTOP

## Configuring Ethernet adapters

The Ethernet adapter card in the Laptop or PC need to be configured to the same Subnet to connect to the RP1 unit.



On the PC/Laptop go to Control Panel> Network and Sharing Center, click on the change adapter settings and click on the connection called CalrecDeskConnection. This opens the CalrecDeskConnection Status window (shown above left).

Clicking on the Properties button in that window accesses the CalrecDeskConnection Properties window (shown above middle). In this window only the Internet Protocol Version 4 (TCP/IPv4) box should be ticked all the rest should be unticked.

Clicking on this option to highlight it and then on the Properties button accesses the Internet Protocol Version 4 (TCP/IPv4) Properties window (shown above right).

Click on 'Use the following IP address:' radio button and enter an IP address in the same subnet of the system being connected to e.g. **192.168.1.2**

The other field that needs changing is the 'Subnet Mask' which should be set to **255.255.255.0** this completes the Ethernet adapter configuration.

The IP address entered should be compatible with the address of the port on the RP1 unit it is being connected to, for instance, entering an IP address of 192.168.1.2 with a subnet mask of 255.255.255.0 will allow the user to connect to the RP1 unit via Calrec Assist by simply typing in the IP address of the RP1 LAN3 port 192.168.1.1 into a web browser.

Currently we use Chrome for this purpose. Note, once the IP address is entered, the Calrec Assist home page will be shown . See ["Starting Calrec Assist" on page 43.](#)

# CONFIGURING RP1 LAN PORTS

The RP1 unit has two 1GB ports labelled LAN (or Ethernet) 1 and 2, on the rear of the unit and a 3rd Setup/LAN3 port on the front which is generally used to directly connect a computer to RP1 to setup and control Calrec Assist.

The rear ports can be used to connect the RP1 unit to one of the three ethernet ports labelled either MAC3, MAC4, MAC5 for older ETX processors or for COMe processors LAN1, LAN2, LAN3 ports on the Host console controller cards via the IP network. The ports can alternatively be used to connect to a Calrec Assist/H2O web browser running on a PC/Laptop away from the RP1 site.

To provide full redundancy two COMe control processors with two available ethernet ports each are required at the host to connect to the RP1 unit. Note the connection from the RP1 units have to be made to each console core controller cards not to the master router of the host network. This requires the user to run a separate cable from the IP network switch at the host end into each console that will be connected to the RP1 Units.

The proprietary control data from/to RP1 or the host console is converted into TCP/IP format and transferred over the IP network by whichever IP service is used..

For long distance communication we recommend the use of dedicated fibre connections with fast ethernet switches to minimise the control data lag.

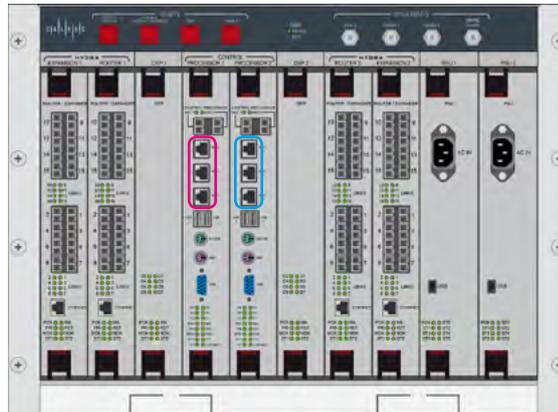
To configure the RP1 Ethernet/LAN ports, go to **SYSTEM SETTINGS** area in the menu and select **LAN CONFIG** from the menu. In the LAN configuration window you can define the adaptor settings for each port and create multiple static routes for each port as required. See below right.

To configure the host console Ethernet/LAN ports see ["Configuring Apollo/Artemis LAN Ports"](#) on page 45 and see ["Connecting a Host Console to RP1 via an IP Network"](#) on page 47.

## CONTROL PROCESSOR ETHERNET/LAN PORTS 1 & 2 ON THE REAR OF RP1



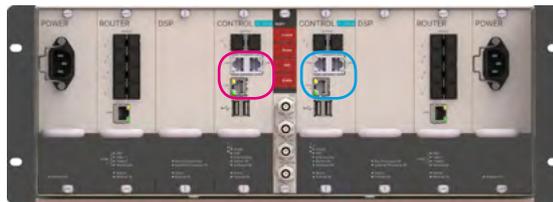
## PORTS AVAILABLE FOR IP ETHERNET CONNECTIONS ON APOLLO/ARTEMIS



- Primary Calrec Controller Ports
- Secondary Calrec Controller Ports

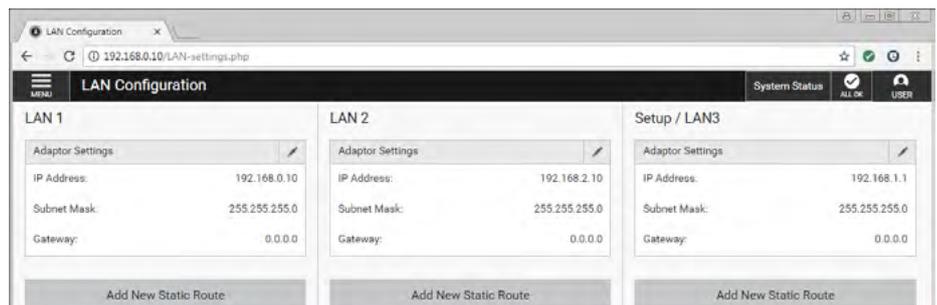
- Standard 8U processing core

## PORTS AVAILABLE FOR IP ETHERNET CONNECTIONS ON ARTEMIS LIGHT



- Light 4U processing core

## LAN CONFIGURATION SCREEN IN CALREC ASSIST



# CONFIGURING APOLLO/ARTEMIS LAN PORTS

## COMe LAN Adapter Configuration

All newer generation control processors (COMe) have three external ethernet ports labelled LAN1, LAN2 and LAN3. These are three separate network adapters that can be configured independently with IP address, subnet mask, gateway and static routes.

Each LAN port on every individual control processor has a unique MAC address.

Summa and Brio have a UI to configure the LAN ports, however Apollo and Artemis do not yet have a user facing UI.

For COMe processors, LAN ports are no longer configured in the internal StudioSetup file (as these are dedicated adapters and as such do not require alias IP addresses). As such, it is currently necessary to configure these network adapters manually.

See ["Connecting a Host Console to RP1 via an IP Network"](#) on page 47 for an example connection.

Please contact your regional distributor, or Calrec customer support for further guidance on configuring the COMe LAN ports for Apollo and Artemis to the required addresses for interfacing to RP1 units.

The connection diagrams at the bottom of this page show the various levels of redundancy available for COMe processor cards.

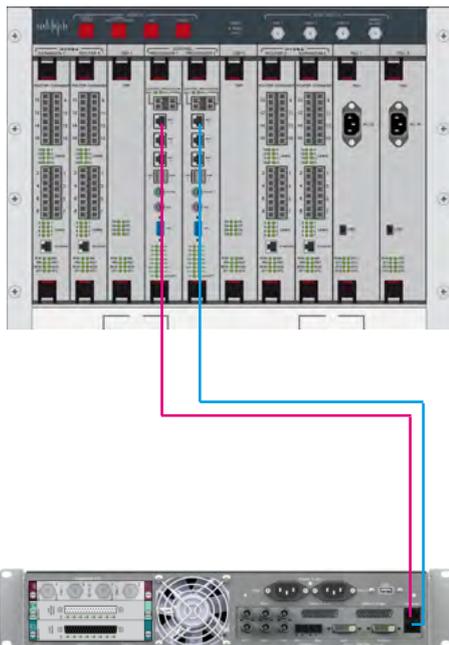
## Redundancy and Hot-Swap Resilience

Each network adapter (LAN port) can be individually configured based on the control processor position (primary/secondary) and the adapter number (LAN1, LAN2, LAN3). It is not necessary to connect to the secondary control processor in order to configure the secondary control processor's LAN ports.

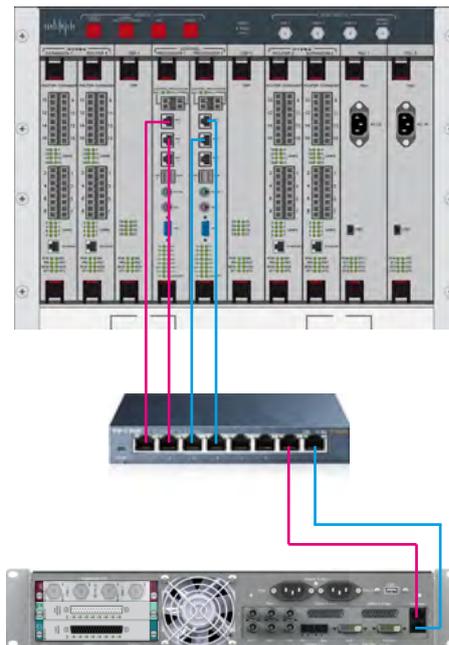
All LAN information is written to the home/MasterControl/Options/LanSettings.pb file, however this is a system file that is not in a readable format. As such, this file cannot be edited directly.

This file is replicated from the active control processor to the inactive processor in order to maintain functionality in the event of a hot-swap. Likewise, if the two control processors are physically swapped from primary position to secondary position and vice-versa, the configured LAN settings will remain consistent with the primary and secondary positions and will not follow the card.

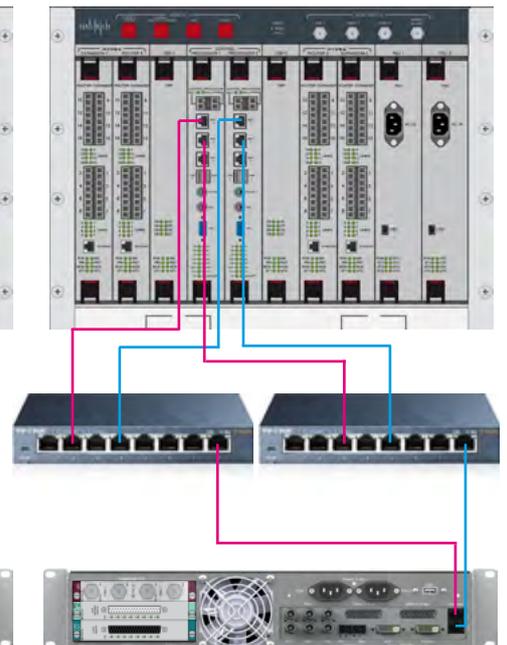
COMe PROCESSOR  
REDUNDANCY



COMe PROCESSOR & CABLE  
REDUNDANCY



COMe PROCESSOR, CABLE & IP SWITCH  
REDUNDANCY



### Older Generation ETX Control Processor LAN Configuration

Older control processor cards can easily be identified as the three ports on the front of the card are labelled MAC3, MAC4 and MAC5. These are additional access points to a single network adapter and so share the same physical MAC address. In order to use these cards with RP1, aliased IP address need to be configured to allow custom IP addresses to be used for external communications. The procedure for this is outside the scope of this manual and requires a support engineer to set up these aliases.

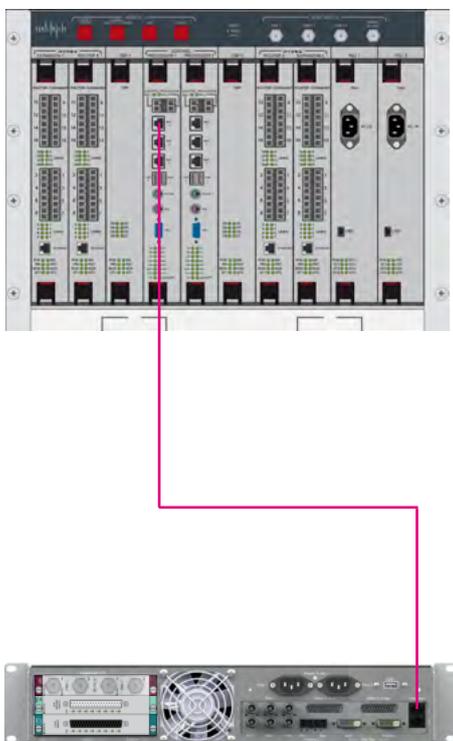
It should be noted that the older ETX processors only have a single network adapter they do not offer the same level of redundancy for the LAN ports that the COME processors provide.

As an alternative additional ethernet ports can be connected to the ETX cards by using the USB ports on the front of the processor cards and fitting USB to Ethernet adapters to provide full redundancy. Note that USB to Ethernet drivers have to be installed on the ETX cards to use this approach.

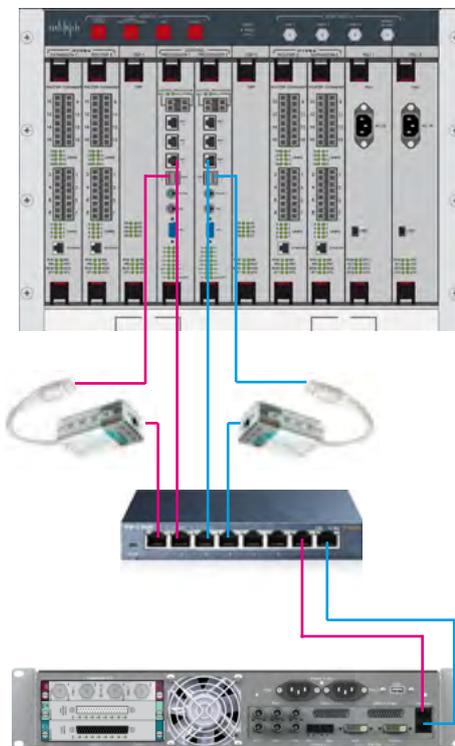
Please contact your regional distributor, or Calrec customer support for further guidance on configuring the ETX MAC ports or the optional USB to Ethernet ports for Apollo and Artemis to the required addresses for interfacing to RP1 units.

The connection diagrams at the bottom of this page show the various levels of redundancy available for ETX processor cards.

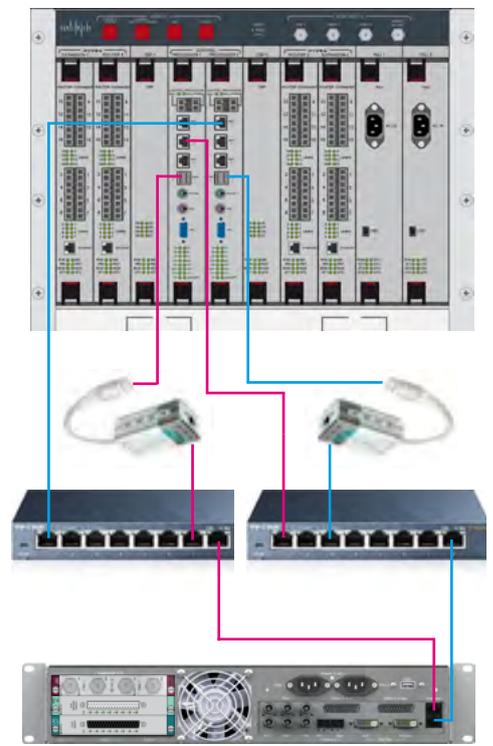
**ETX PROCESSOR WITHOUT REDUNDANCY**



**ETX PROCESSOR & CABLE REDUNDANCY**



**ETX PROCESSOR, CABLE & IP SWITCH REDUNDANCY**



# CONNECTING A HOST CONSOLE TO RP1 VIA AN IP NETWORK

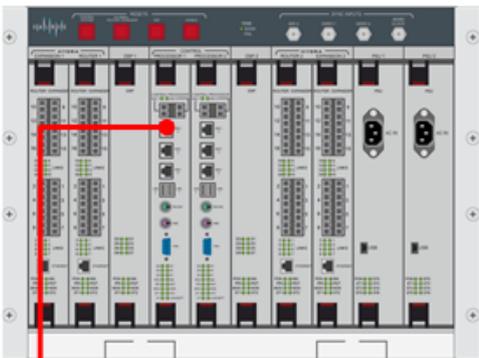
## Setting up the LAN ports to connect a Host Console to RP1

The IP addresses of the LAN connections on the MCS control processor cards have to be setup before the host console can communicate with the RP1 using the LAN addresses which have been setup. The image below shows a fairly typical example connection using a host console and a RP1 unit over an IP network with Router between them.

It should be noted that every network configuration is different and the IP addresses, subnet masks, static routes and gateways will all be determined by the user's network administrator.

## CONNECTING A HOST CONSOLE TO RP1 OVER AN IP NETWORK

The primary MCS card LAN1 is set to IP 10.10.10.1 with a Netmask of 255.255.255.0



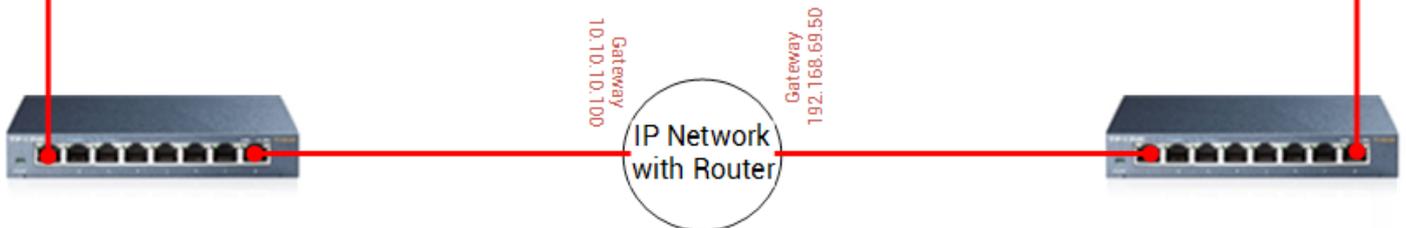
In order to talk to the RP1 a static route is setup as 192.168.69.0 with a Netmask of 255.255.255.0 and a Gateway of 10.10.10.100  
On sending a message to RP1 the MCS uses the gateway address to route the RP1 message.

On setting up the RP1 unit to work with the host the user enters the RP1 LAN1 address as the Primary IP Address when adding a Remote Network to the Host in H20  
i.e 192.168.69.1

The primary RP1 LAN1 is set to IP 192.168.69.1 with a Netmask of 255.255.255.0



In order to talk to the Host a static route is setup as 10.10.10.0 with a Netmask of 255.255.255.0 and a Gateway of 192.168.69.50  
On sending a message to the Host the RP1 uses the gateway address to route the Host message.

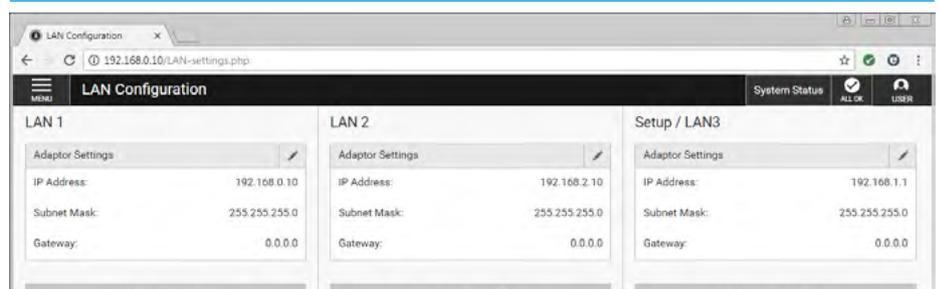


In this example, on the primary MCS card the IP address for LAN1 is are defined as:-

**'lansettings 0 0 ip 10.10.10.1 255.255.255.0 static route 192.168.69.0 255.255.255.0 10.10.10.100'**

This configuration is currently entered using the various commands as described in the COME LAN adaptor configuration document, and for the RP1 unit the IP address for LAN1 is set using the LAN configuration screen in Calrec Assist as shown right.

## LAN CONFIGURATION SCREEN IN CALREC ASSIST



**IP Address 192.168.69.1**  
**Subnet Mask 255.255.255.0**  
**Gateway 0.0.0.0**

the user then adds the static route  
**IP Address 10.10.10.0**  
**Subnet Mask 255.255.255.0**  
**Gateway 192.168.69.50**

Once the information is entered at the host and the RP1, the IP configuration is ready for connection and use. The user can then add the RP1 IP connection ( e.g 192.168.69.1 from above) to the host. See ["Adding and Deleting Remote Networks in H20"](#) on page 94. Once this is done the user can connect the RP1 unit from the host. See ["Connecting to RP1 from the Host Console"](#) on page 101.



# RP1 SETUP VIA CALREC ASSIST

# CALREC ASSIST FOR RP1

**Calrec Assist for RP1 is an application which runs in a Web browser on Mac, Windows, and Linux devices, giving you a virtual on-line desk running on a laptop.**

Once connected to the RP1 unit either locally via the Setup/LAN3 port on the front of the unit, or remotely via the other two LAN ports on the rear, a web browser is used to connect to Calrec Assist's HTML UI. See ["Connecting a Laptop to RP1 for Setup, Calrec Assist & H2O"](#) on page 42 for instructions on how to connect to RP1.

This allows the user to set up shows, memories, fader layout, patching, bus setup, labelling, set input and output levels on a virtual fader bed, control input channel parameters including mic gains, routing to aux outputs and more, all on their own device, anywhere in the world. After setup is complete the user can export a show from assist via a USB memory stick for later use and import it back onto this or other RP1 units to quickly setup a remote production.

Below is stated the minimum computer requirements when using a Windows 7 platform to run Calrec Assist.

## Minimum Computer Specification.

**Recommended Processor:** PC or laptop with a 1.7 GHz dual-core Intel Core i7 (Turbo Boost up to 3.3GHz) or 3.47 GHz dual-core Intel Core i5 or A10 AMD processor

**Minimum RAM:** 4GB

**Minimum display resolution:** 1366 px x 768 px.

**Minimum Storage Required:** 3.5 GB free disk space is required for the Calrec Assist installation.

## Starting Calrec Assist

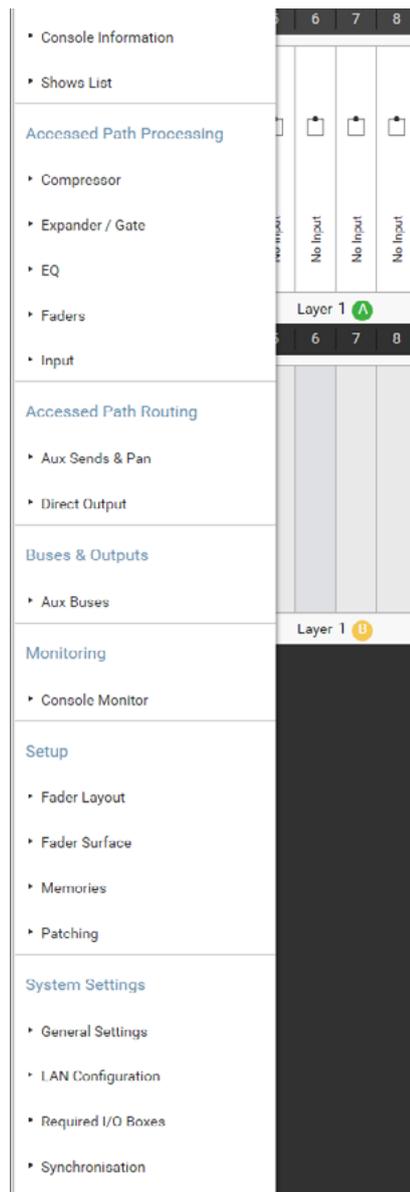
Open your Web browser e.g. Chrome and browse to the address of the LAN port you are connected to e.g. Setup/LAN3 on the front of the unit by default is 192.168.1.1. This will then launch Calrec Assist. Once Calrec Assist is launched, the system opens the Calrec Assist home screen as shown above right.

## CONSOLE INFORMATION HOME PAGE



The home screen provides information about the RP1 system and software version. The top left of the Calrec Desk Information Banner shows a menu button which opens a menu list allowing the user access to all the various functions of the RP1, see below.

## MENU



The Menu is arranged in functional areas:-

**Console Information-** as described above.

**The Shows List** - allows the user to create, load and save shows for user with RP1.

**Access Path Processing** - is the area dealing with path processing such as Signal Compression, Expander/Gate, Equalisation, Fader and Input control.

**Access Path Routing** - Aux Send and Pan as well as Direct Outputs are setup, routed and controlled from here.

**Buses and Outputs** - Aux Buses are setup from here.

**Monitoring** - Console LS monitoring source and control is applied from here.

**Setup** - Fader Layout and Fader Surface displays, Memories and Patching is controlled from here.

**System Settings** - Allows the user to configure various RP1 general functions, LAN configuration, the Required I/O Box list management and synchronisation is applied from here.

# SYSTEM SETTINGS

The System settings area is accessed from the menu as shown on the previous page, and is arranged into General Settings, LAN Configuration, Synchronisation and Required I/O Box screens as shown in the drop down menu.

## General Settings

This provides operational setting adjustment for audio levels such as analogue level, reference level, mic line impedance changeover, mic input headroom, default meter style and the mode of the mute buttons acting as either CUT when lit or ON when lit.

## Surround Label Suffixes

These can be entered to be automatically displayed at the end of the individual legs of 5.1 surround path port labels within the I/O Patching screen. Suggested suffixes are L, R, C, LFE, Ls and Rs. These suffixes help to keep the surround legs together and in the correct order when sorting tables in the I/O patching screen.

## RP Unit Settings

When used in conjunction with a host console these three settings enable the RP1 to operate in different modes.

### RP Unit independent from Host

**Settings:-** allows the user to disconnect from the host and operate independently.

### Fader & Cut Control for Paired Faders on Host:-

Is a control from the host that can be used to Allow or Block control of paired faders & cuts from the RP1.

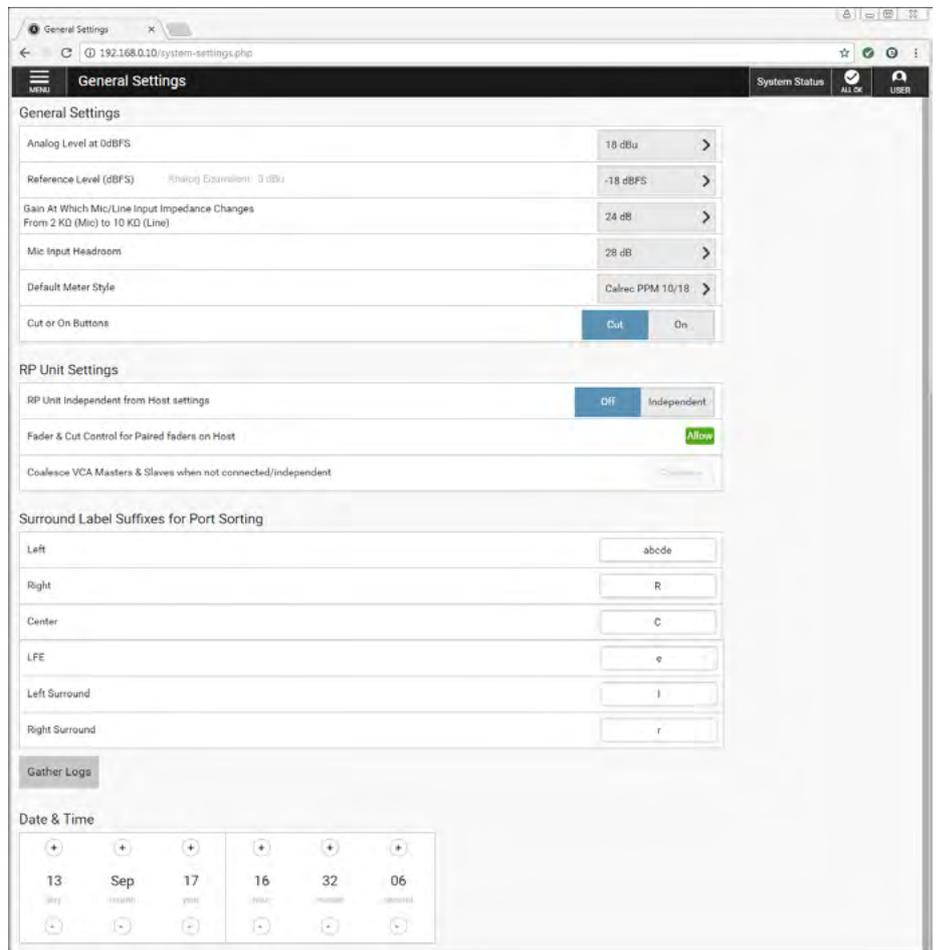
### Coalesce VCA Masters & Slaves when not connected/independent:-

VCA control of RP1 faders is allowed from version 1.1, if the host is disconnected this allows the user to add the VCA Master value to the Remote fader value so that the remote fader can continue to be controlled at the same level.

## Gather Logs

Various log files are maintained by different parts of the system. These log files can be collected and transferred to

## GENERAL SETTINGS



USB memory for forwarding the files to Calrec Support in the event that detailed troubleshooting is required:

**Gather Logs Procedure:** Insert a USB memory device into one of the USB ports on the attached PC/Laptop.

Then Navigate to the System Settings >General settings screen and click the "Gather Log" 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 & time, e.g. ID\_date\_time\_logs.tar.gz.

## Date and Time

Shows and memories and log files are time-stamped, making them easier to identify. When you first start up your RP1 system it is important to set the current date and time.

To do this:

Click on **GENERAL SETTINGS** in the Menu. This then takes the user to the General Settings screen.

At the bottom of this screen is the Date and Time entry fields.

Click on the + and - buttons to set the current date and time.

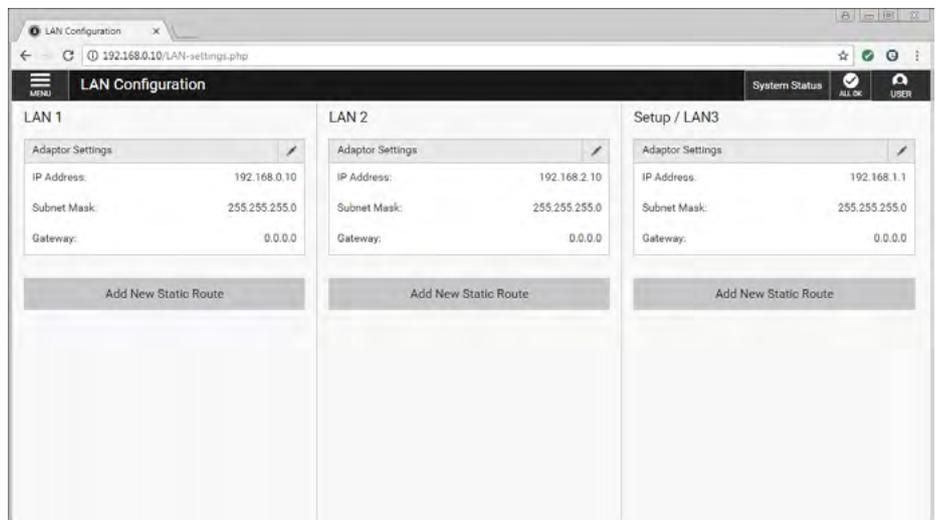
Note these only take effect once the RP1 unit is reset.

## LAN Configuration

This screen lets the user set the 3 LAN ports on the RP1 unit. Ethernet/LAN1 and Ethernet/LAN2 on the back of the box are mainly used to connect the RP1 to a host console's primary and secondary MCS cards on Apollo and Artemis, usually over networks using a combination of Switches and Codecs. They can also be accessed using Calrec Assist from a distance and setup to match the commercial requirements of the user.

Setup/LAN3 is configured and used by Calrec Assist to setup the RP1 unit on the remote site and defaults to IP address 192.168.1.1 which can be altered by the user if required, but it is recommended to write down the new IP address if changed. See ["Configuring RP1 LAN Ports"](#) on page 44 for further information.

## LAN CONFIGURATION



## Synchronisation

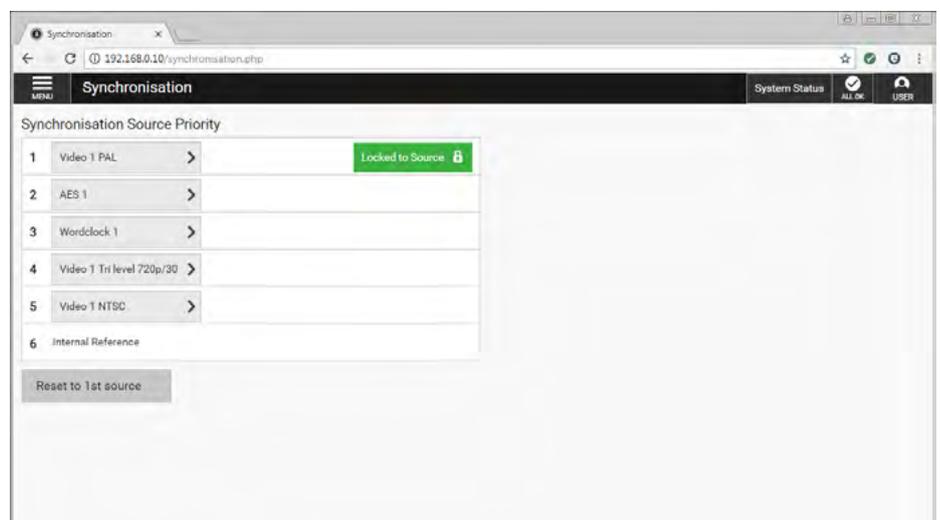
This screen lets the user set the sources used to synchronise to.

It is recommended that backup sync sources and paths are considered to maintain full functionality in the event of the loss of any part of the facility's sync distribution system.

External sync sources can be fed to the BNC connectors on the rear of the console as shown above right. Two inputs are available for video formats, as well as two inputs for TTL Wordclock and two inputs for AES3 digital audio reference.

See Synchronisation Source Priority table, right and ["Synchronisation"](#) on page 27 for information on how to set up synchronisation priority.

## SYNCHRONISATION



## Required I/O Boxes

RP1 has 3 x expansion I/O slots accessible from the rear of the surface.

The three slots can be fitted with any card from Calrec's Modular I/O range, "single", or "double-wide" cards. Please refer to the Hydra2 installation manual for a complete list of the Modular I/O card types available.

These Expansion cards appear in the UI as slots C, D & E. This and all other I/O resources connected to RP1 on a Hydra2 network can be used, as long as they have been granted access from the network administration tool, H2O, and the resources have been added to the RP1 'Required I/O boxes' list as shown right.

Due to the scalable nature of the Hydra2 network the user may have access to a large amount of I/O resources, some of which you won't always need. The 'Required I/O Box' list provides a way to narrow the scope for individual consoles, speeding up work-flow and making port identification easier.

Only I/O resources in the 'Required I/O Box' list shown on the right hand side of the screen (see above right), will be available for patching to and from the RP1. If not connected to the Hydra2 network, only the Expansion I/O box will be shown in the required list. RP1's internal I/O is identifiable as a RP1 image as shown below and on the Required I/O Boxes screen (above right).

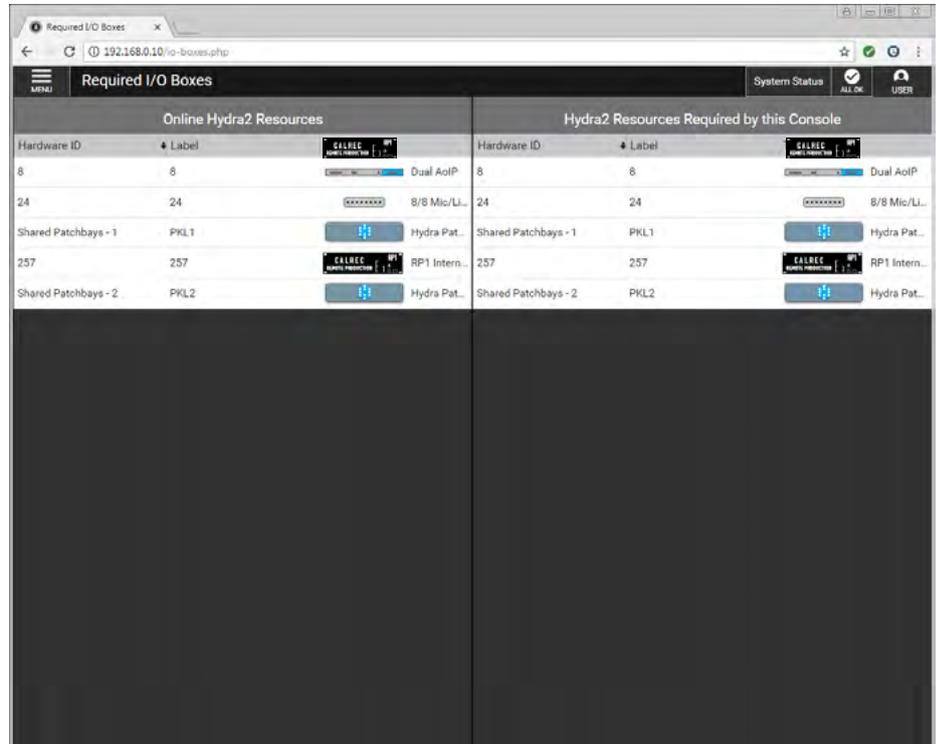
### RP1 EXPANSION I/O ICON



### System ID

The HID OR Hydra2 ID for internal I/O is automatically generated, based on the consoles 'System ID' which is currently set to a fixed value of 192.1 the HID number is based on the second byte of the System ID + 256 so that it sits above the normal Hydra2 HID addresses i.e. 1 +

## REQUIRED I/O BOXES



256=257 in order to prevent conflict with other I/O on the network.

### Viewing Resources

Click on **SYSTEM SETTINGS** in the top right of the Home screen, then select 'Required I/O Boxes'. The user 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 three columns: Hardware ID, Label and Type.

It may help to sort these tables by clicking on column headers. Multiple clicks 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" on page 20" in the Installation part of this manual for more information).

Hydra2 patchbay IDs are taken from H2O and are related to folder names.

### Adding and Removing Resources

Click to select a single online resource on the left (hold and drag or drag handles to select multiple resources) then click on **ADD TO REQUIRED LIST** at the bottom left of the online resources screen.

The resources will then appear in the Required List on the right. If any of the resources in the Required List go offline, they will be shaded red with an 'offline' tag attached.

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

Note that the Expansion RP1 I/O is always present and is shown at the top of the list.



# RP1 SHOWS

# SHOWS LIST IN CALREC ASSIST

## Accessing the Shows List

Once Calrec Assist has opened on the Home Screen, the user can access the Shows List via the Menu in the top left of the Calrec Desk Information screen.

See "Starting Calrec Assist" on page 50.

If this is the first usage then there won't be any shows on the system and the 'Shows List' screen will appear as shown above right.

Along the footer of this screen are shown the various actions that the user can perform:- create a New show, Edit the show label and show description, Load the show, make a Duplicate of the show, Delete the show, Import a show typically from a USB memory stick plugged into the PC/laptop or Export a show again typically from a USB memory stick plugged into the PC/laptop. When no shows are available in the Shows List only the New and Import actions are possible.

## New Show

As part of the system a Templates folder containing default shows can be made for this desk type and can be used to create any number of new shows as required.

Note there is always at least 1 Default Template which cannot be deleted available for use to create a Show.

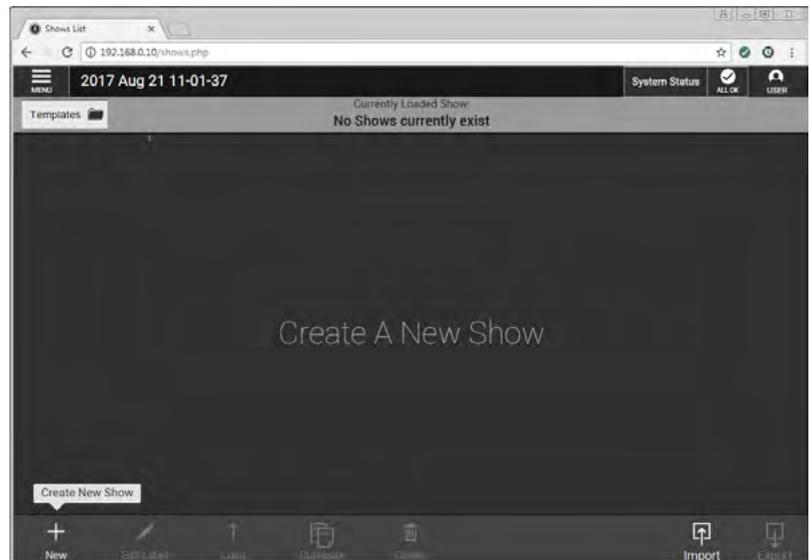
Clicking on '+ New' icon in the footer of the Shows List above right opens the create new show dialogue as shown right.

The user selects the default show to be used as the template in step 1 by clicking on it as shown right and then proceeds to step 2 by clicking on the 'Next' button.

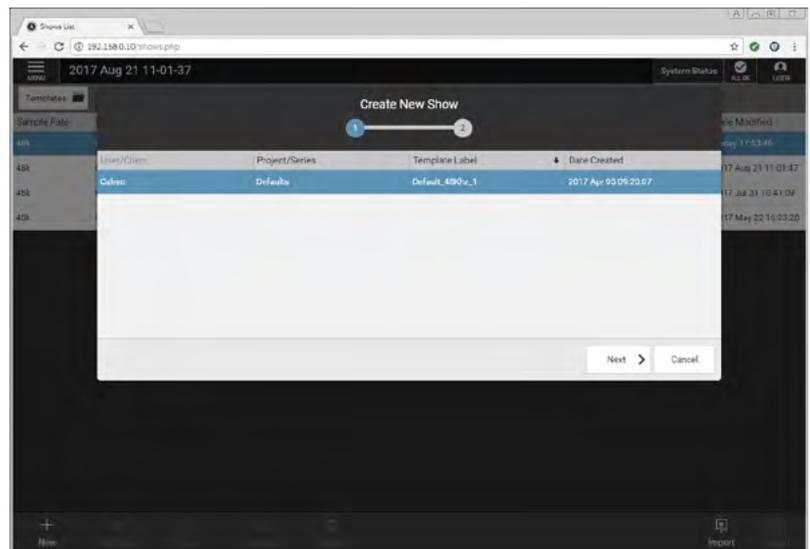
Step 2 shown below right, allows the user to change the Client, Series, Show Label & Show Description fields as required.

Once these fields have been entered the user then clicks the 'Create New Show' button and this new show is automatically loaded into Calrec Assist which then changes to the Setup> Fader Layout screen.

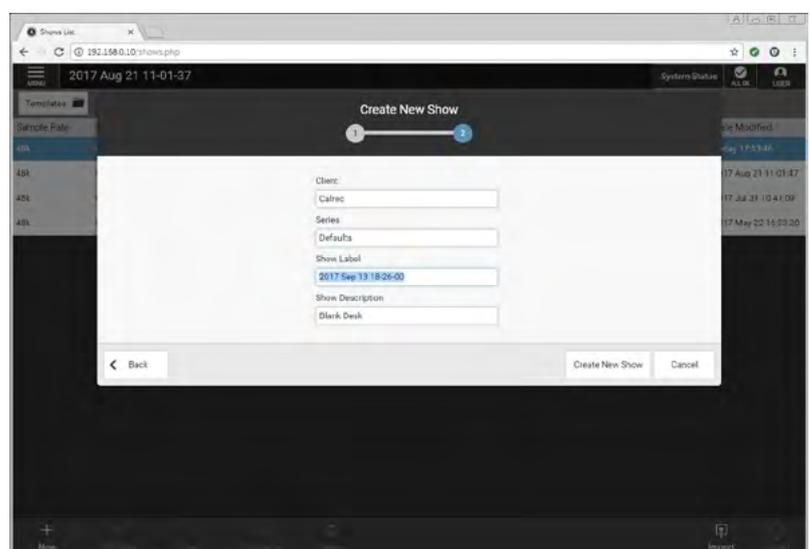
## SHOWS LIST EMPTY



## CREATE NEW SHOW STEP 1



## CREATE NEW SHOW STEP 2



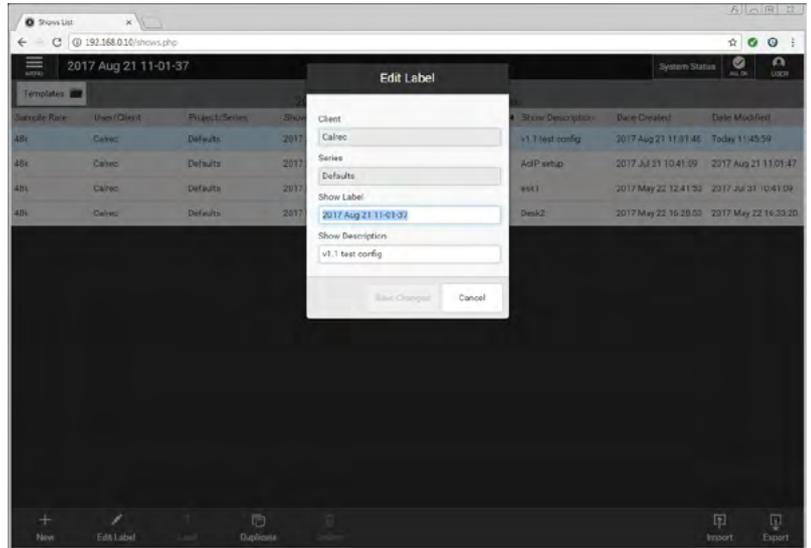
### Edit Show Label

Once a show exists in the Shows List the user can Edit its Show Label and Show Description to make it more meaningful. This is done by selecting the show by clicking on it and then clicking the 'Edit Label' icon in the Shows list footer.

This opens the Edit Label pop-up and the user edits the Show Label and Show Description field as required. See above right.

Note: In order to 'Save Changes' the Show Label must be edited and not just the Show Description.

### EDIT LABEL



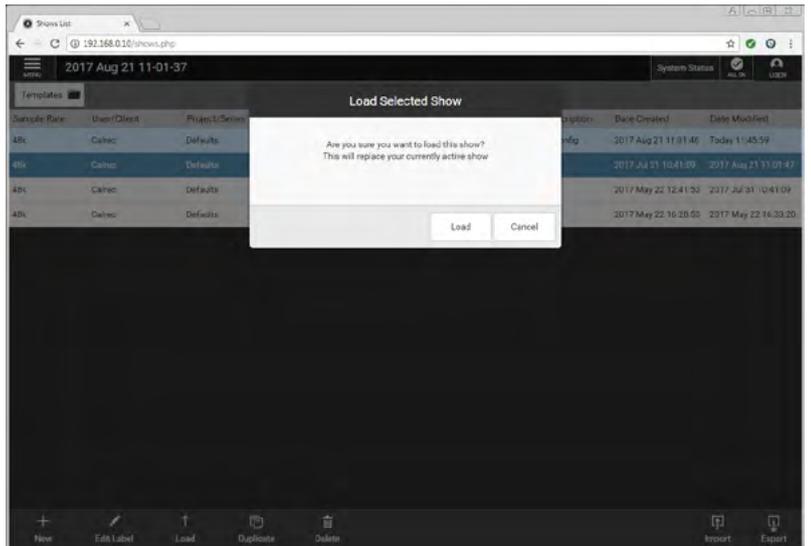
### Load Show

In order to Load a Show the user selects the show to be loaded by clicking on it and then clicking on the 'Load' icon in the footer.

This opens the Load Selected Show pop-up and the user clicks the 'Load' button as shown right.

This loads the show into Calrec Assist which then changes to the Setup> Fader Layout screen.

### LOAD SHOW



### Duplicate Show

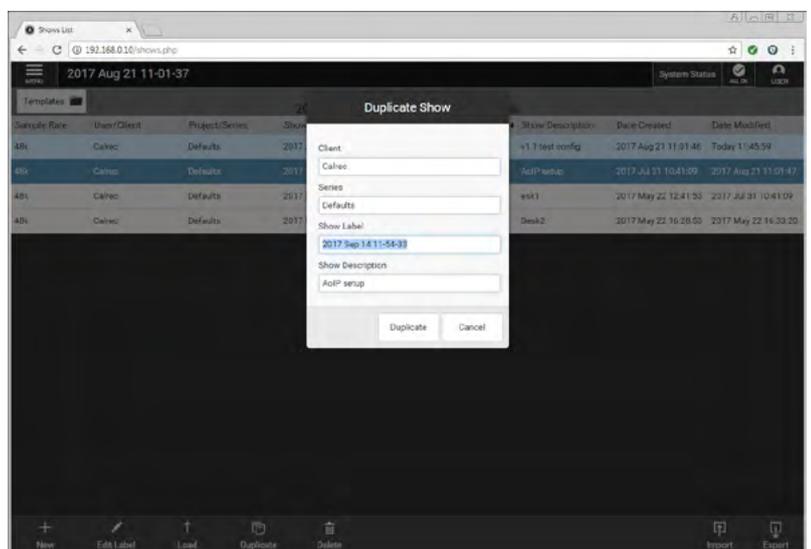
Sometimes it is useful to have an unedited or different copy or duplicate of a show.

In order to Duplicate a Show the user selects the show to be duplicated by clicking on it and then clicking on the 'Duplicate' icon in the footer.

This opens the Duplicate Show pop-up which allows the user to change the Client, Series, Show Label & Show Description fields as required.

Once these fields have been edited the user clicks on the 'Duplicate' button and this creates a Duplicate Copy of the show, as shown below right.

### DUPLICATE SHOW



## Delete Show

When shows are no longer required the user can select and delete them. In order to delete shows the user selects a show to be deleted by clicking on it and then clicking on the **'Delete'** icon in the footer. This opens the delete dialogue which provides information about deleting multiple shows by Ctrl-clicking on all the shows to be deleted. **Note: The loaded active show cannot be deleted.** Once the shows to be deleted have been selected the user clicks on the **'Delete'** button and this deletes those shows, as shown above right.

## Import Show

In order to Import a Show the user clicks on the **'Import'** icon in the footer. This opens the explorer to find the shows directory on for example, a USB memory stick plugged into the PC/laptop on which shows have previously been exported from the RP1 via Calrec Assist.

The show files display the File Name of the show and also have the suffix **'CalrecShow'** the user clicks the **'Open'** button as shown right. This imports the show into the shows list ready to be loaded and edited as required.

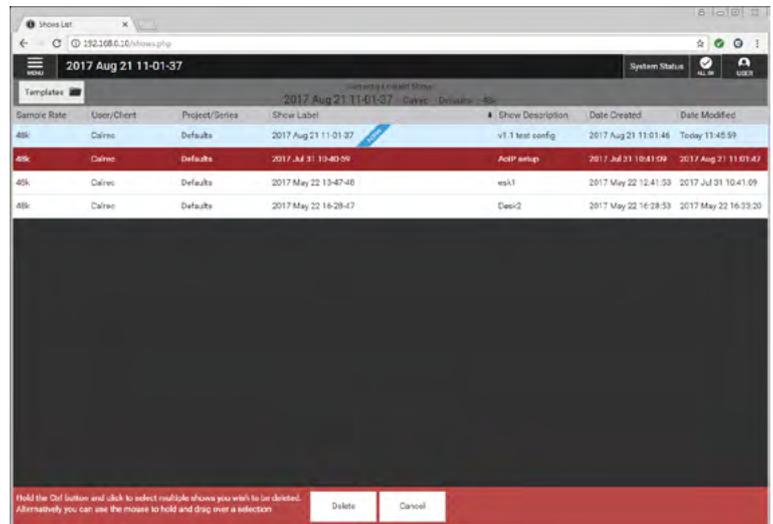
## Export Show

In order to export shows the user selects a show to be exported by clicking on it and then clicking on the **'Export'** icon in the footer. This opens the export dialogue which provides information about exporting multiple shows by Ctrl-clicking on all the shows to be exported.

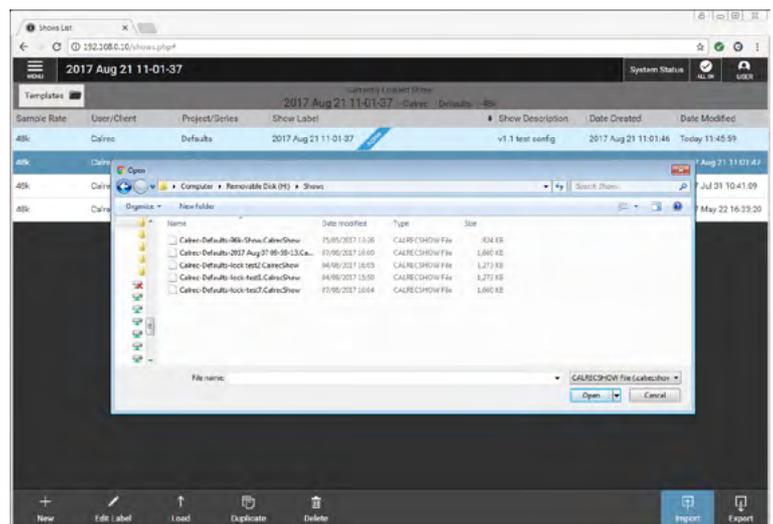
Once the shows to be exported have been selected the user clicks on the **'Export'** button and this opens the explorer to find the shows directory on for example, a USB memory stick plugged into the PC/laptop. The show files display the file name of the show and also have the suffix **'CalrecShow'** the user clicks the **'Save'** button as shown below right. This exports the selected shows.

**Note:** If exporting multiple templates is blocked by the web browser, then resetting the browser settings and restarting the web browser is required. We would also advise setting the **'Ask where to save each file before downloading'** option in the **Chrome://settings> show advanced settings> downloads** section, so that the exports are saved to the users preferred destination e.g. a USB memory stick rather than the default destination on the PC/laptop.

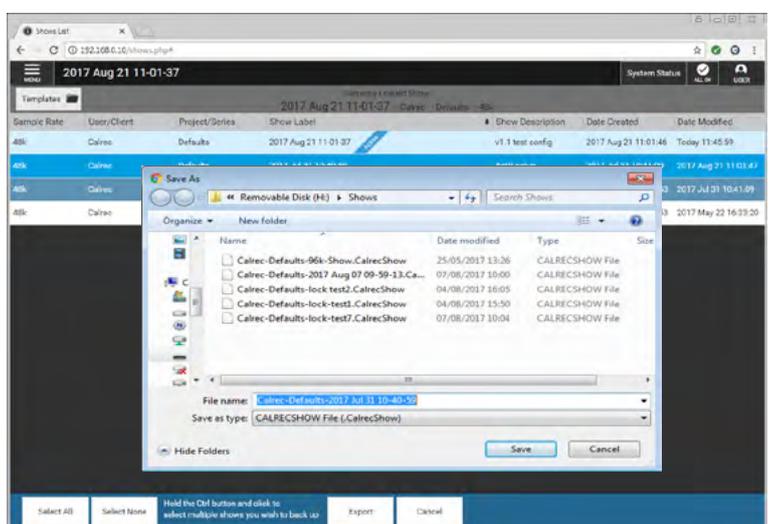
## DELETE SHOW



## IMPORT SHOW



## EXPORT SHOW



### Templates

Once a show exists in the shows list it can be used as a template. This is done by loading the selected show to the RP1 then clicking on the templates button at the top left of the shows screen. This opens a templates window as shown above right.

### New Template

The User clicks on 'New' and is prompted to add Client, Series and Template Label as shown right. Once the 'Create Template' button is clicked the currently loaded 'Active Show' becomes a new template and the show is now saved as a .CalrecShowTemplate file.

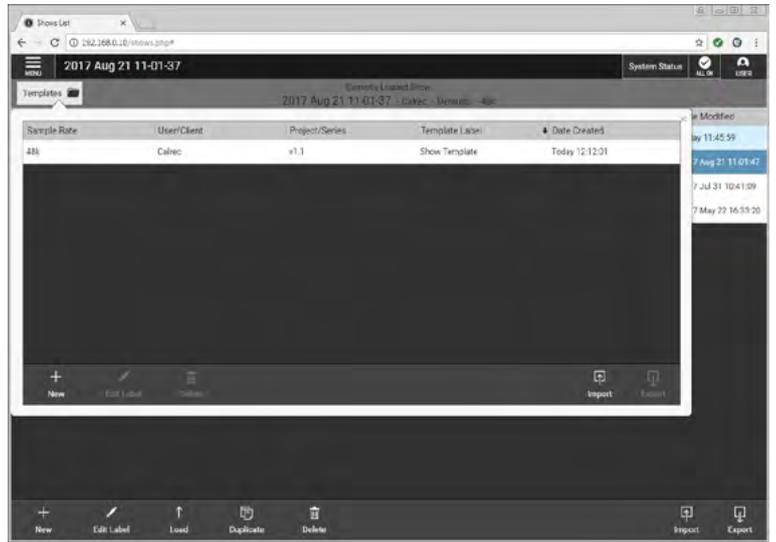
### Edit Template Label

Once a template exists in the templates list the user can edit its template label and make it more meaningful. This is done by selecting the template by clicking on it and then clicking the 'Edit Label' icon in the template list footer.

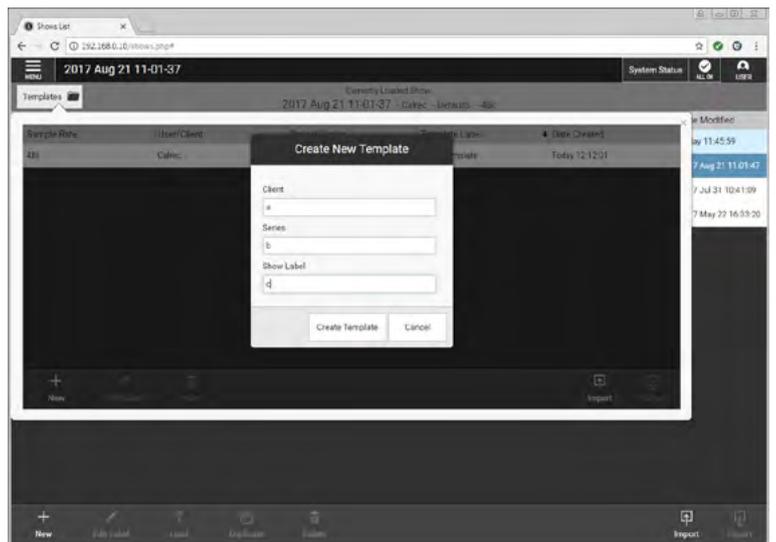
This opens the edit label pop-up and the user edits the 'Client', 'Series' and 'Show Label' as required as shown below right.

Note: In order to 'Save Changes' the template show label must be edited.

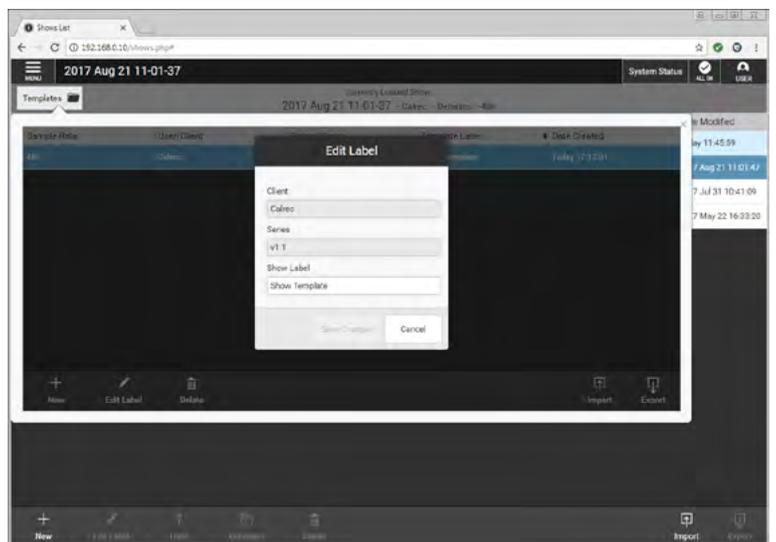
## SHOW TEMPLATES



## NEW TEMPLATE



## EDIT TEMPLATE LABEL



## Delete Template

When templates are no longer required the user can select and delete them. In order to delete templates the user selects a template to be deleted by clicking on it and then clicking on the **'Delete'** icon in the footer. This opens the delete dialogue which provides information about deleting multiple shows by Ctrl-clicking on all the shows to be deleted.

**N.B. The Calrec default template cannot be deleted.** Once the templates to be deleted have been selected the user clicks on the **'Delete'** button and this deletes those templates, as shown above right.

## Import Template

In order to Import a template the user clicks on the **'Import'** icon in the footer. This opens the explorer to find the shows directory on for example a USB memory stick plugged into the PC/laptop which have previously been exported from the RP1.

The show files display the file name of the template and also have the suffix **'CalrecShowTemplate'** the user clicks the **'Open'** button as shown right. This imports the template into the templates list ready to be used and edited as required as shown right.

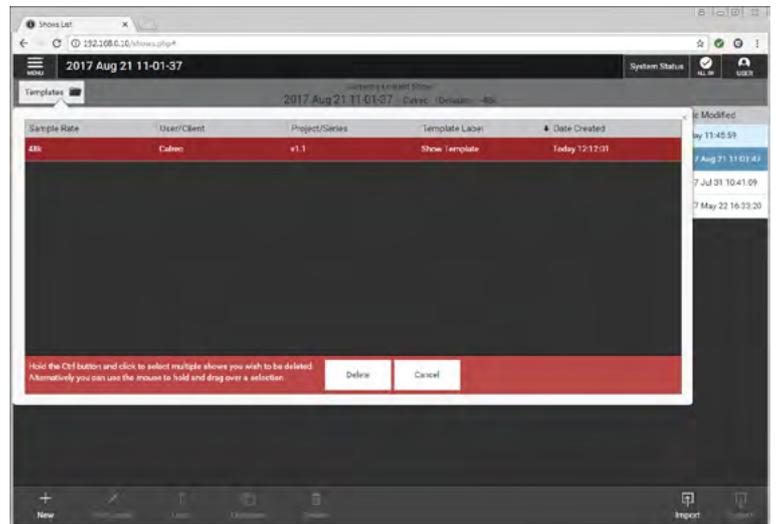
## Export Template

In order to export templates the user selects a template to be exported by clicking on it and then clicking on the **'Export'** icon in the footer. This opens the export dialogue which provides information about exporting multiple templates by Ctrl-clicking on all the templates to be exported.

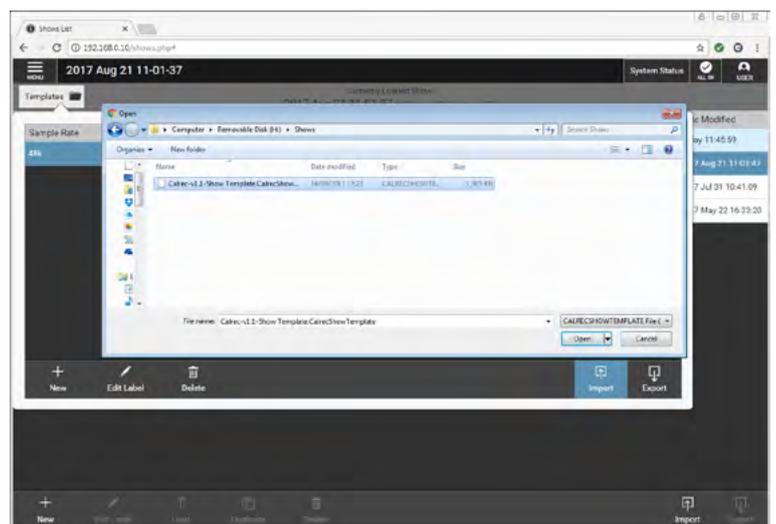
Once the templates to be exported have been selected the user clicks on the **'Export'** button and this opens the explorer to find the Shows directory. The show files display the file name of the show and also have the suffix **'CalrecShowTemplate'** the user clicks the **'Save'** button as shown below right. This exports the templates for example on to a USB memory stick plugged into the PC/laptop.

Note: If exporting multiple templates is blocked by the web browser then resetting the browser settings and restarting the web browser is required. We would also advise setting the **'Ask where to save each file before downloading'** option in the **Chrome://settings> show advanced settings> downloads** section, so that the exports are saved to the users preferred destination e.g. a USB memory stick rather than the default destination on the PC/laptop.

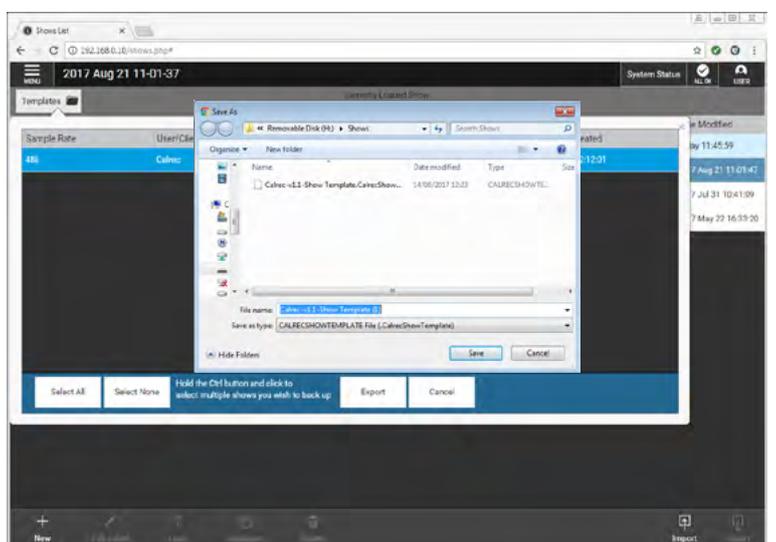
## DELETE TEMPLATE



## IMPORT TEMPLATE



## EXPORT TEMPLATE



# RP1

## SETUP PATHS FOR ACTIVE SHOW

# FADER LAYOUT

## Configuring the RP1 Path Layout

When a show is loaded the fader layout screen is automatically accessed when it becomes the active show.

On the far left of all the assist screens is a 3-line symbol indicating that there is a menu of screens available for access. Clicking on that symbol shows the drop down menu shown above right.

To access this screen once the show is loaded the user clicks on the Setup> Fader Layout screen from the Menu.

The first stage of passing audio into the RP1 system is to attach a channel to a fader. Audio feeds to input ports must then be attached to channels in order to be processed and routed; channels must be attached to faders to exist. Faders can also be assigned to control aux outputs.

The Fader layout screen for RP1 has up to 72 virtual faders arranged as Faders 1A-36A on Layer 1A and Faders 1B-36B on Layer 1B. The faders are further divided into blocks of 12 faders to emulate a physical console such as Brio 36.

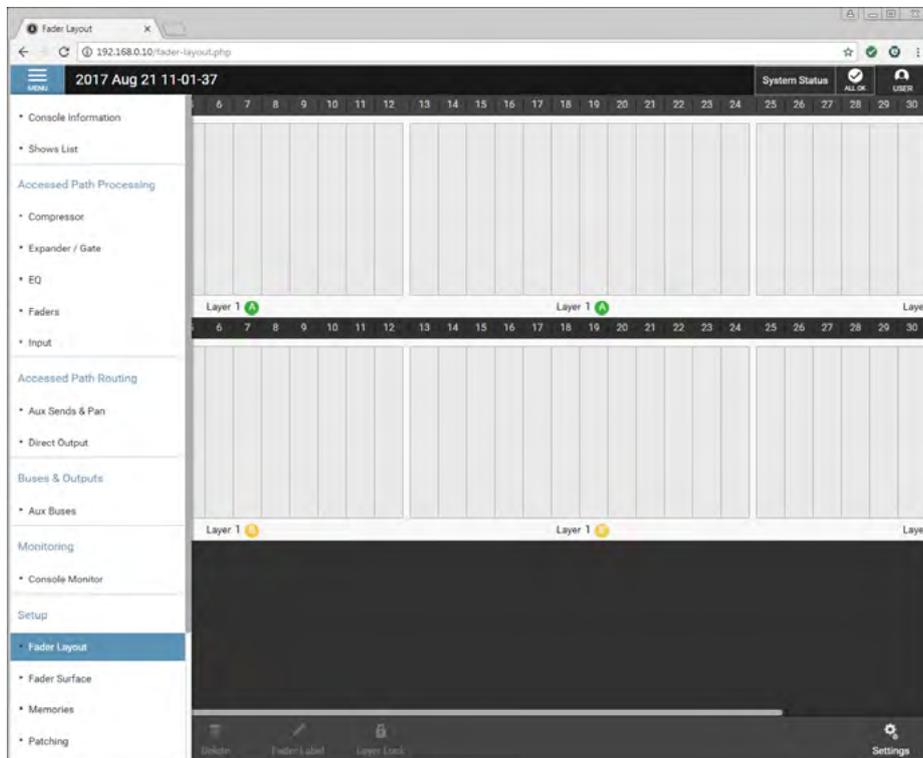
## Attaching a Path to a Fader

To attach a path to a single fader:

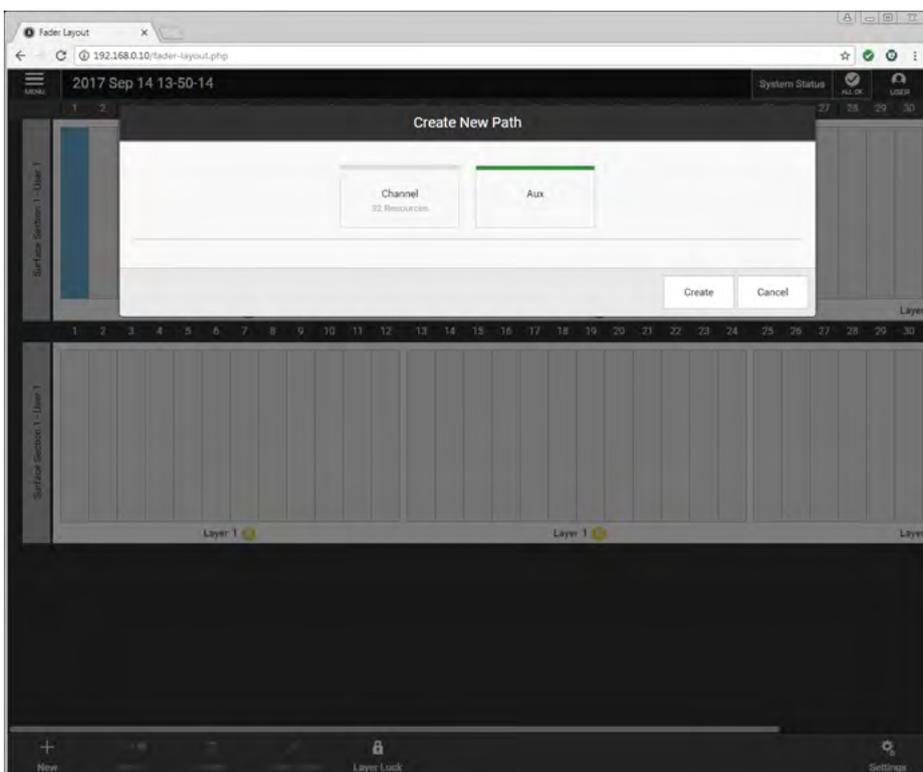
Click on an empty fader space to select it, then click on **NEW** in the control screen footer. A pop-up opens to show all path options, for different widths of channels and auxes as shown below right.

Click to select the desired width/type and click on **CREATE** then the pop-up closes, or click on **CANCEL** to return to the fader layout screen without making any changes.

## EMPTY FADER LAYOUT SHOWING MENU OF SCREENS



## CREATE NEW PATH



To attach paths to multiple faders:

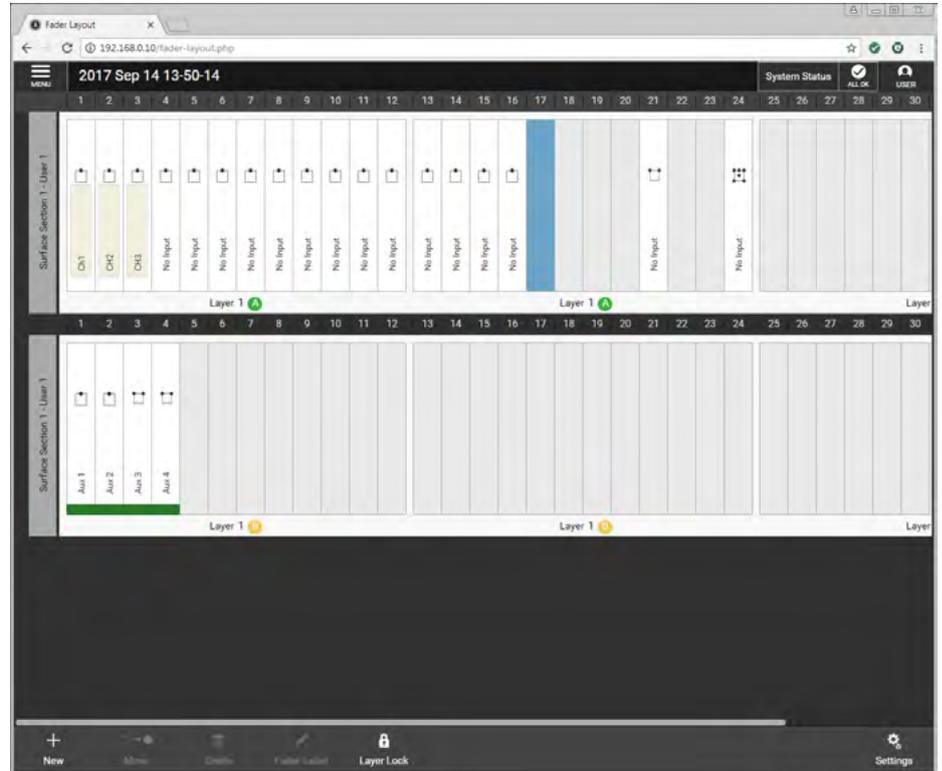
Either hold and drag or click and drag selection handles to select the desired range of faders. Click on **NEW** and select your path/width choice from the pop-up.

All selected faders will then be populated with the chosen path type/width. If an aux 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 1, the faders will be populated with aux masters 1. 2. 3 & 4.

The image above right shows the fader layout screen populated in this case with 16 mono channels, 1 stereo channel and 1 surround channel placed on Layer 1A and 2 mono and 2 stereo aux outputs that have just been placed on faders 1-4 on Layer 1B.

## POPULATED FADER LAYOUT



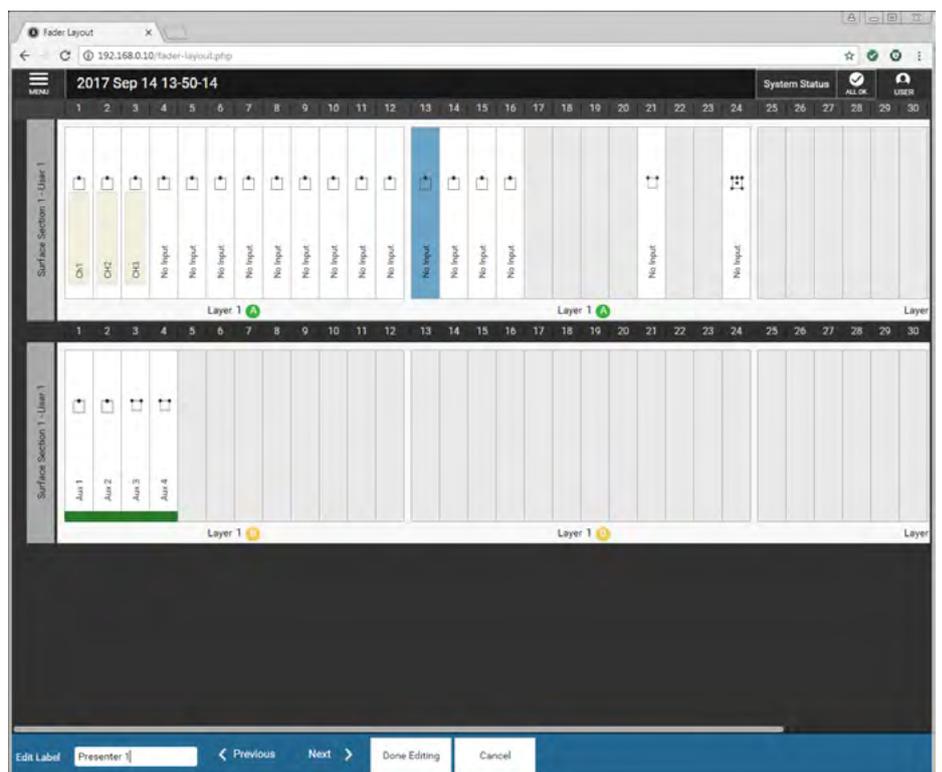
## Editing Fader Labels

Once a path has been created, the user can edit its fader label and make it more meaningful.

To edit a fader label:

1. Select one or more faders and click on **FADER LABEL**. The footer changes to display a text entry field and four buttons, **PREVIOUS**, **NEXT**, **DONE**, **CANCEL** as shown below right.
2. Enter fader labels using the keyboard
3. Scroll through the fader label fields by clicking on them, or by clicking on **PREVIOUS** and **NEXT**.
4. Once you are happy with your changes, click on **DONE**.

## FADER LABEL EDITING



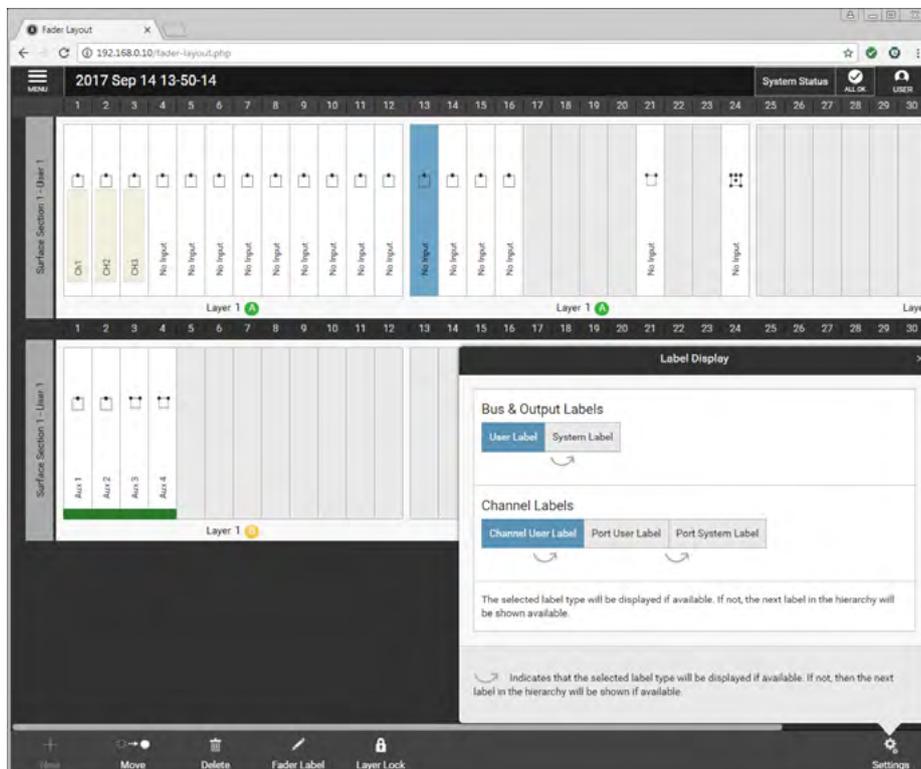
## Label Display Settings

This is accessed from the Settings icon at the right hand side of the footer. This allows the user to change the label display for the Paths for Buses & Outputs and Channels.

The Bus & Output labels change between a User Label such as **Presenter H/P** to the System Label e.g. **Aux 1**.

The Channel labels can change between a Channel User Label such as **Commentator** to a Port User Label such as **IOBox4 Mic5** set in H2O to the Port System Label ID e.g. **24-02** which is the Box ID and the port number in that box.

## LABEL DISPLAY



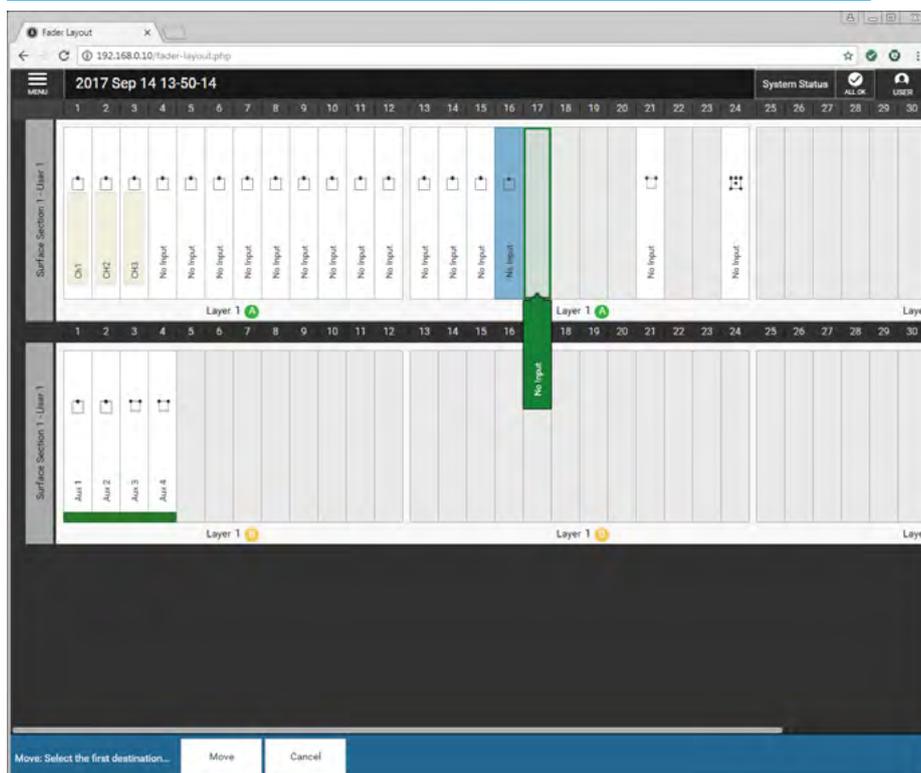
## Moving Paths

This allows the user to move paths to different faders as follows:

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

If the user has selected a move destination that has existing paths on it you are presented with three options: **CANCEL**; **SWAP** - which swaps the original paths with those on the chosen destination faders; and **OVERWRITE** - which replaces the destination path with the 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 there is an attempt to overwrite a channel, asking for confirmation.

## MOVE PATHS

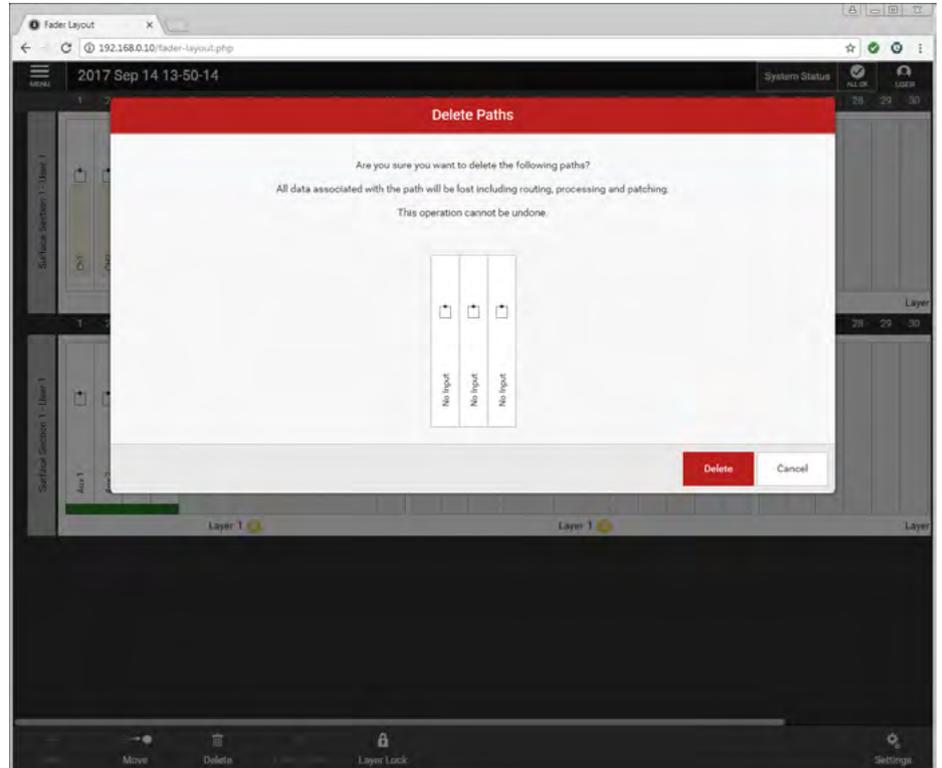


### Deleting Paths

To remove a path from a fader:

1. Select one or more faders, at least one of which must have a path attached.
2. Click on **DELETE** in the screen footer.
3. A pop-up appears asking for confirmation that the selected paths are to be deleted and advising that this operation cannot be undone.
4. Click on **DELETE** in the pop-up to remove the path from the fader or click on **CANCEL** to return to the fader layout screen without making any changes.

### DELETE PATHS



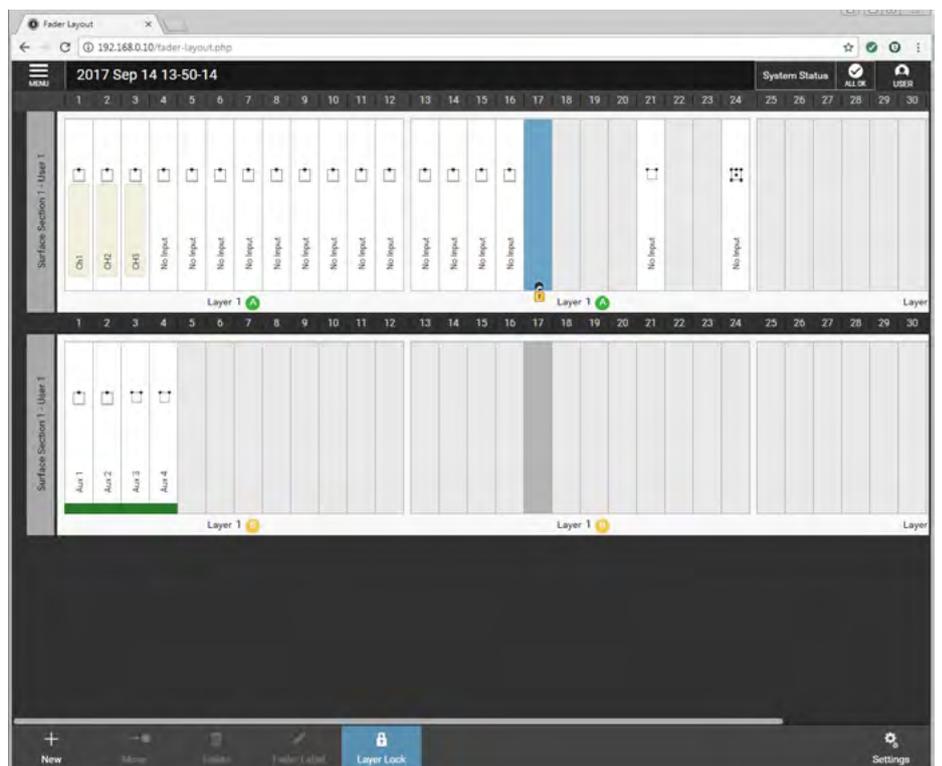
### Layer Lock

This allows the user to ensure that some faders are always present on the fader surface, regardless of which layer A or B is selected as follows:

1. Select one or more faders (with or without paths attached).
2. Click on **LAYER LOCK** in the screen footer.

A padlock symbol appears on the locked paths see below right on fader 17A.

### LAYER LOCK



# FADERS SURFACE

**The purpose of this screen is to provide the user with a fader bed on which they can control the fader and cut parameters of all the paths that are set up on the fader layout screen.**

The screen is arranged as a fader bed showing at least 8 faders at a time on a 1280x1024 monitor or 12 faders at a time on a 1920x1080 monitor. In order to see the rest of the faders the user can scroll across.

There are 36 virtual faders on an RP1 arranged as a single layer 1, with two sub layers A & B. By clicking on the individual A or B assign buttons on the screen, the user can view and control a mixture of paths as required.

In addition there is an ALL A button and an ALL B button which changes the display to show all the faders on Sub layer A or B.

As shown later in the Access sections the nudge buttons shown at the top follow the A/B selections made here on the Fader Surface page.

Each A/B fader path consists from bottom to top:-

CUT button to mute the path

FADER level which can be clicked and dragged up and down to change its level

Numerical level indicator to give a more accurate value

PFL button to change the monitoring listen (locally) to the Pre Fader position of the selected path(s).

AFL button to change the monitoring listen (locally) to the After Fader position of the selected path(s).

## FADERS SURFACE



Above these is the assign path block which consists of the two Sub layer A or B buttons each of which have a user label field next to them to identify the path which is the same label used in the fader layout screen.

As the A or B buttons are pressed they become the currently accessed selection highlighted in (Blue). The other paths on the A sublayer highlight in (Green) or on the B sublayer highlight in (Yellow) and show, further information about those selected A/B paths.

In between the A and B sub layer buttons is shown a status area which provides further information about the path being displayed this includes its port name see above example fader 2, or if unpatched it displays 'No input' see above examples faders 5-8.

The black inset window shows, path width, fader open, layer locked and other icons as required.

To the right of the fader status window is shown a small signal presence meter which is used to display the audio signals on that path. This mono meter shows the highest signal level shown if the path is stereo or surround.

Note: This signal presence meter is not meant to replace the more detailed metering information that appears on the external metering display attached to the RP1 unit.

# MEMORIES

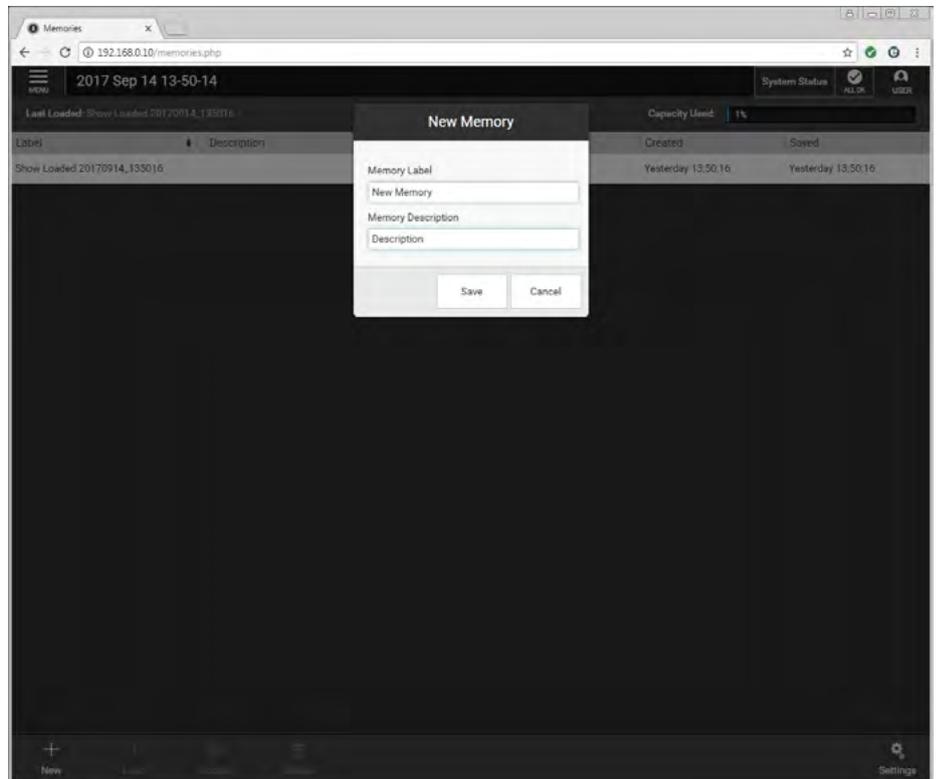
**User memories are files which store processing, routing and patching information which can be recalled at any time.**

## Creating a new User Memory

To create a new user memory with current surface settings:

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

## NEW USER MEMORY

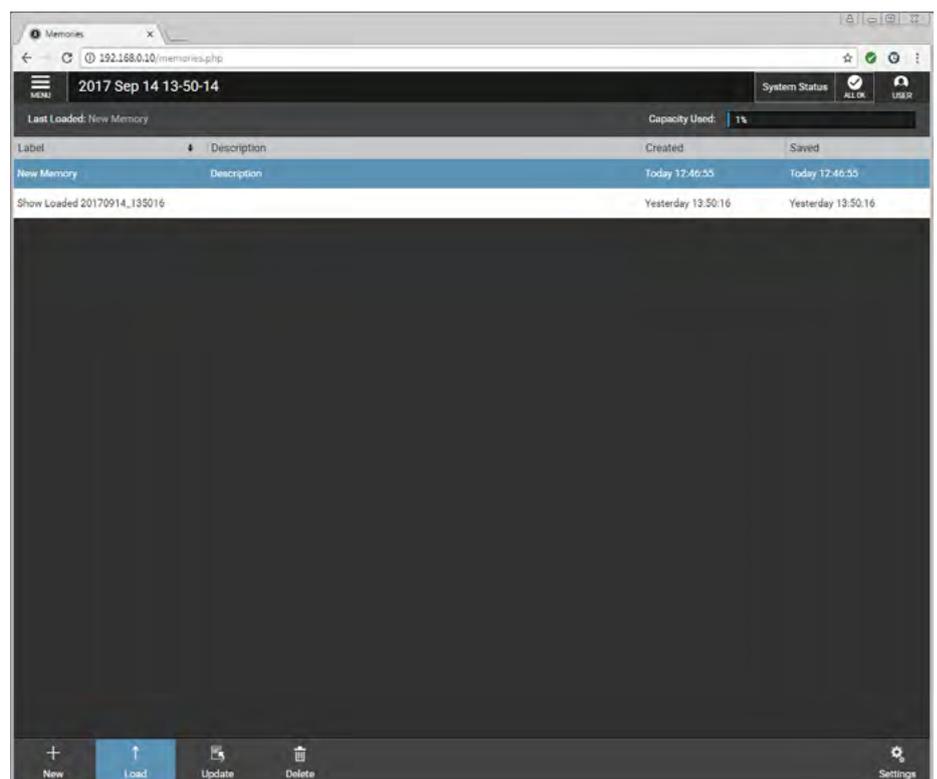


## Loading a User Memory

To load an existing user memory:

1. Click on **MEMORIES** in the active show menu and a list of all user memories that are available within the current show will be displayed.
2. Click to select the user memory required and click on **LOAD** .
3. The loading symbol appears in the background and the name of the show loaded appears in the banner above.

## LOAD USER MEMORY



### Updating a User Memory

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

1. Select the user memory that is to be updated and click on **UPDATE** in the memories screen footer.
2. A prompt will appear for the user to confirm by clicking on either **UPDATE** or **CANCEL**, as shown above right.

### Deleting a User Memory

To delete a previously saved user memory that is not the current loaded memory:

1. Click to select the user memory to be removed and click on **DELETE**.
2. This opens the delete dialogue which provides information about deleting multiple shows by Ctrl-clicking on all the shows to be deleted.

Note: The currently loaded memory cannot be deleted.

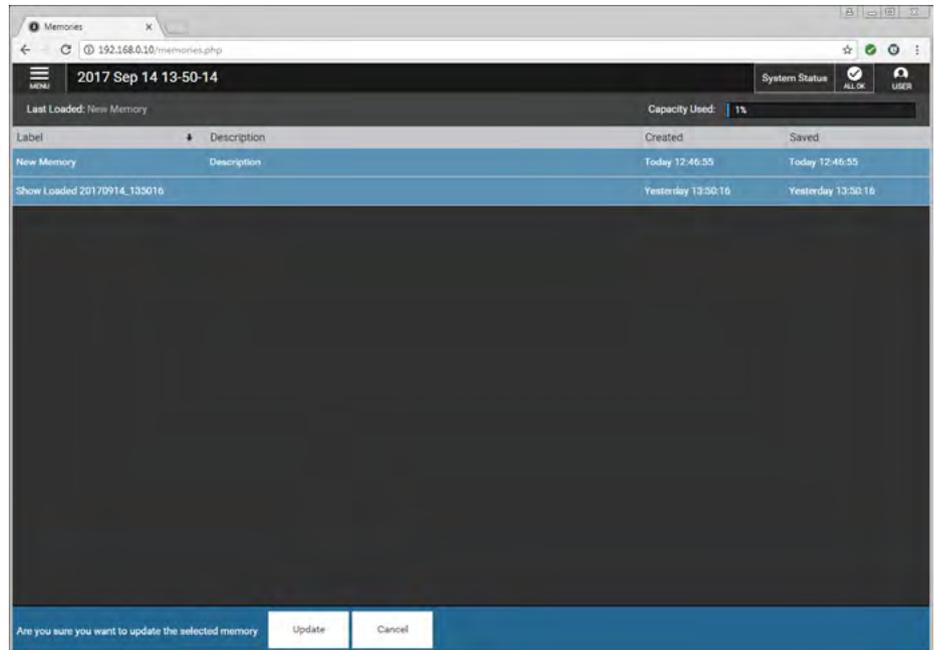
3. Once the templates to be deleted have been selected the user clicks on the '**DELETE**' button and this deletes those memories as shown below right

### Creating Multiple User Memories

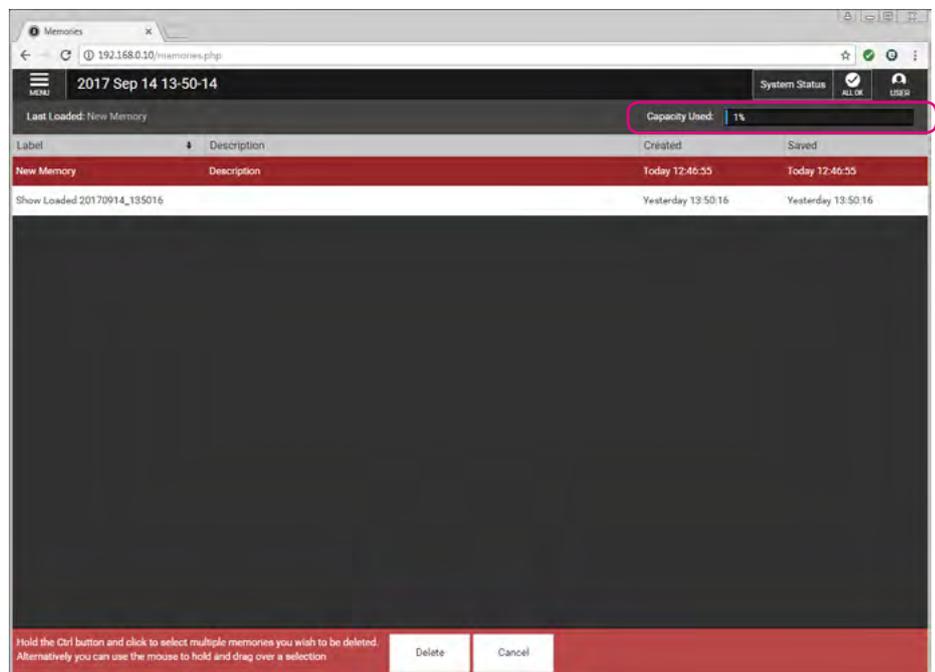
Best practice is to create one 'default' user memory, test it, make any necessary changes, and then use this as the basis for all other user memories within the show. This speeds up the process by reducing the need to make the same changes to many different user memories.

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

### UPDATE USER MEMORY



### DELETE USER MEMORY



### Storage Capacity

There is a capacity indicator highlighted at the top right of the memories screen which shows the available storage space. If more space is required, 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.

# INPUT AND OUTPUT PATCHING

**RP1 inputs and outputs can be patched to physical I/O ports or virtual Hydra patchbay ports, or to each other. To enter the I/O patching screen, click on 'I/O patching' in the Active Show menu.**

Patches are made between sources and destinations.

- A destination can be an I/O output port, Hydra2 patchbay input, or console DSP input such as a Channel or Talkback input from the RP1.
- A source can be an I/O input port, Hydra2 patchbay output, or console DSP output such as an Aux or Monitor output from the RP1.

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 (48V), 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.

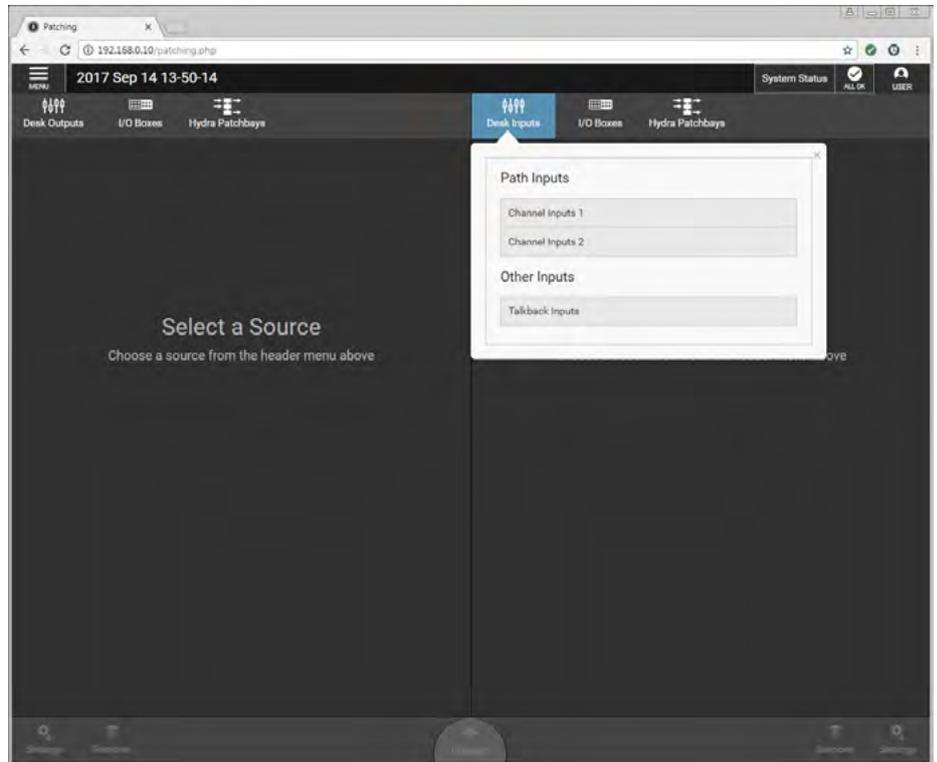
## The I/O Patching Screen

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

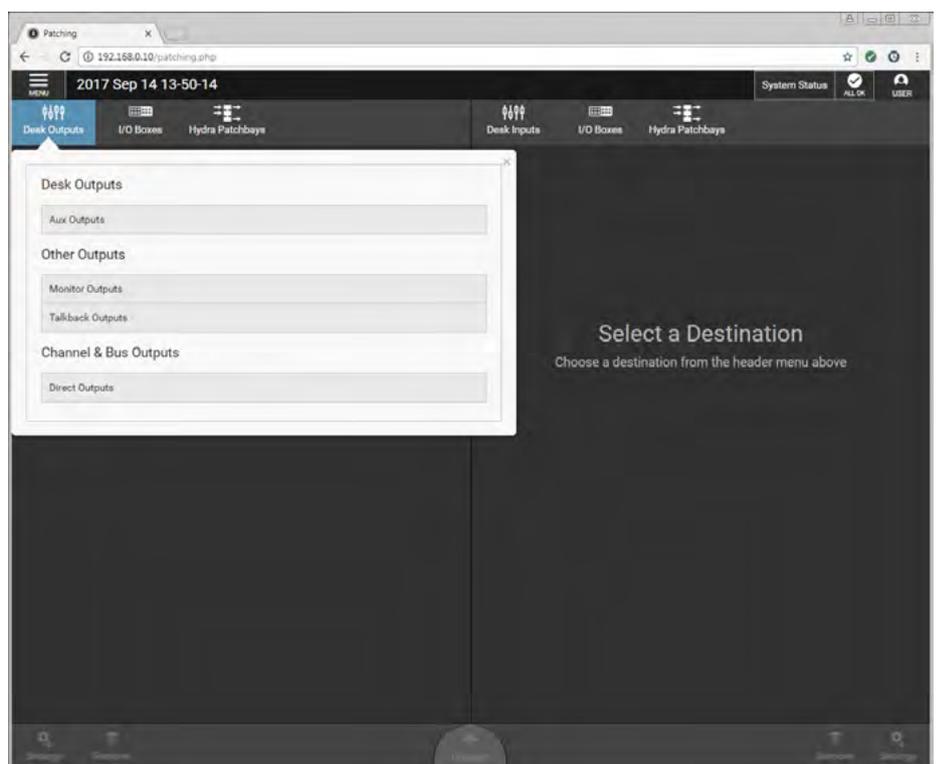
## Selecting Sources and Destinations

Click on 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. The image above right shows the desk input types available. The image below right shows the desk output types available, clicking to select one of these options, i.e. 'Aux Outputs', populates the source/destination screen with the associated ports.

## I/O PATCHING SELECTING DESK INPUTS AS DESTINATIONS



## I/O PATCHING SELECTING DESK OUTPUTS AS SOURCES



## Understanding Ports

The images to the right show how different sources and destinations are displayed within the I/O Patching screen.

The upper image shows the patching of Dante, Microphones and AoIP sources from **I/O Boxes** being patched to **Desk Inputs** on Channel Inputs attached to Fader paths in RP1.

The lower image shows the Aux Bus **Desk Outputs** being patched to **I/O Boxes** on line output ports.

Port groupings are displayed within sortable tables under the following headings on that screen.

## Port 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

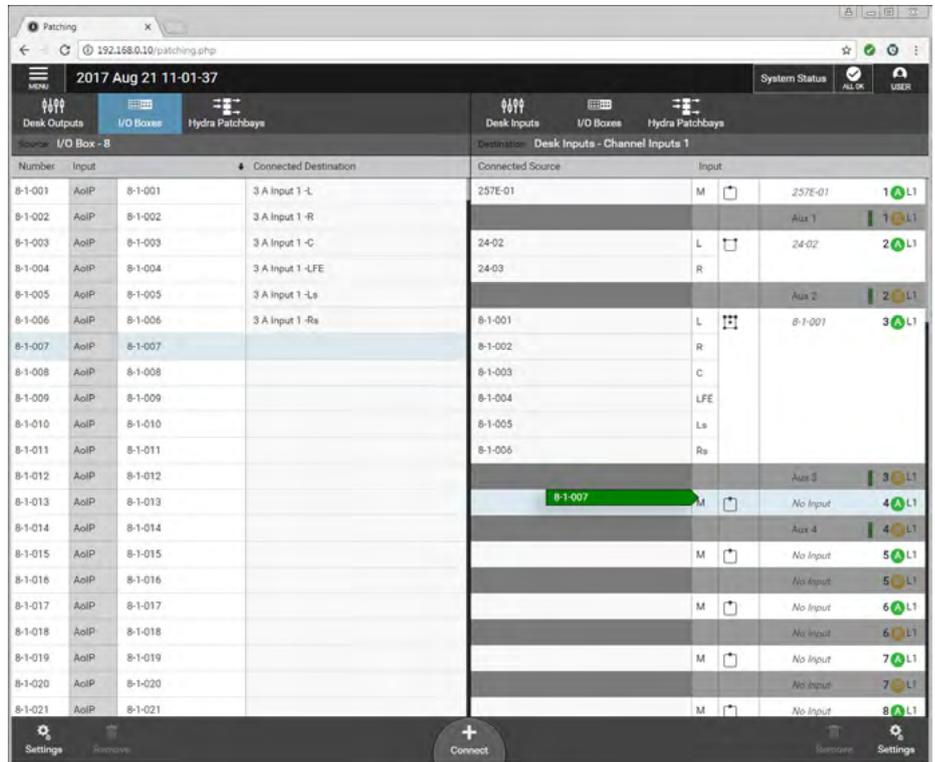
The input and output port labels can be either the port user label or the system label.

## Connected Source/Destination

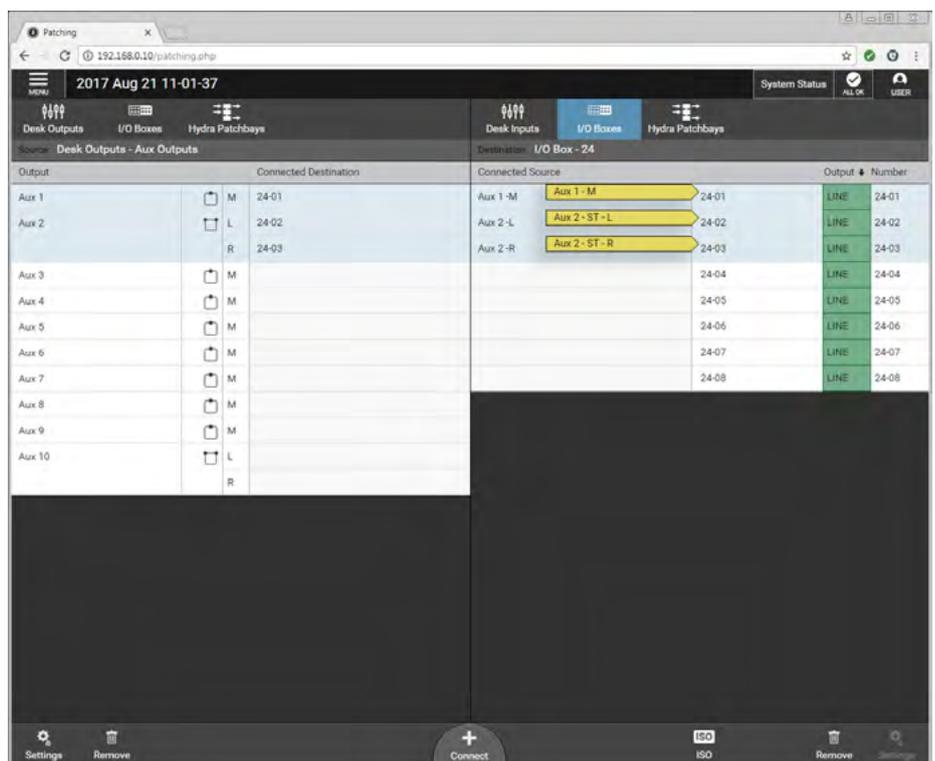
The label of the source/destination that is connected to the port is displayed.

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

## INPUT PATCHING TO CHANNEL INPUTS



## AUX BUS PATCHING TO LINE OUTPUTS



### Source Settings

If more than one destination is connected to a source there is a settings button on the bottom left hand side of the footer which allows the user to compact or expand the view of the connected destinations as required. This is shown above right.

### Destination Settings

When viewing fader specific paths, such as channel inputs, layer view options will be available. There is a settings button on the bottom right hand side of the footer which allows the user to select layers A and B or only view faders on layer A or B. This is shown below right.

### Connected Destination

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

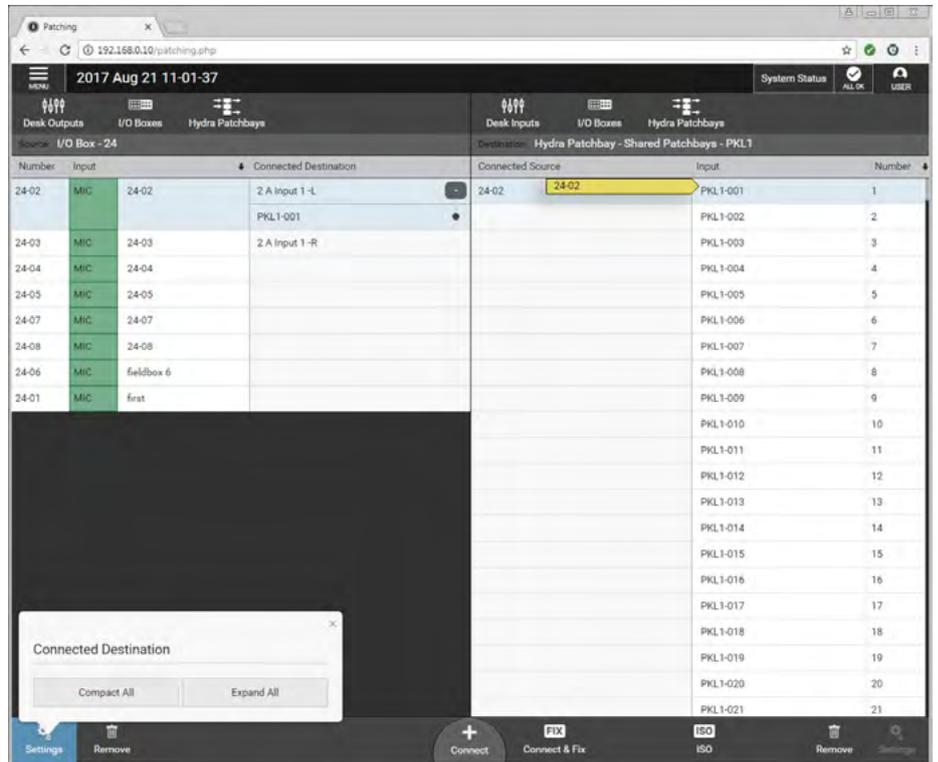
### Hydra2 Patchbays

In the images to the right you can see the use of Hydra2 patchbays. The upper one shows inputs mics connected to Hydra2 patchbay inputs and the lower image shows Hydra2 patchbay outputs being connected to desk inputs.

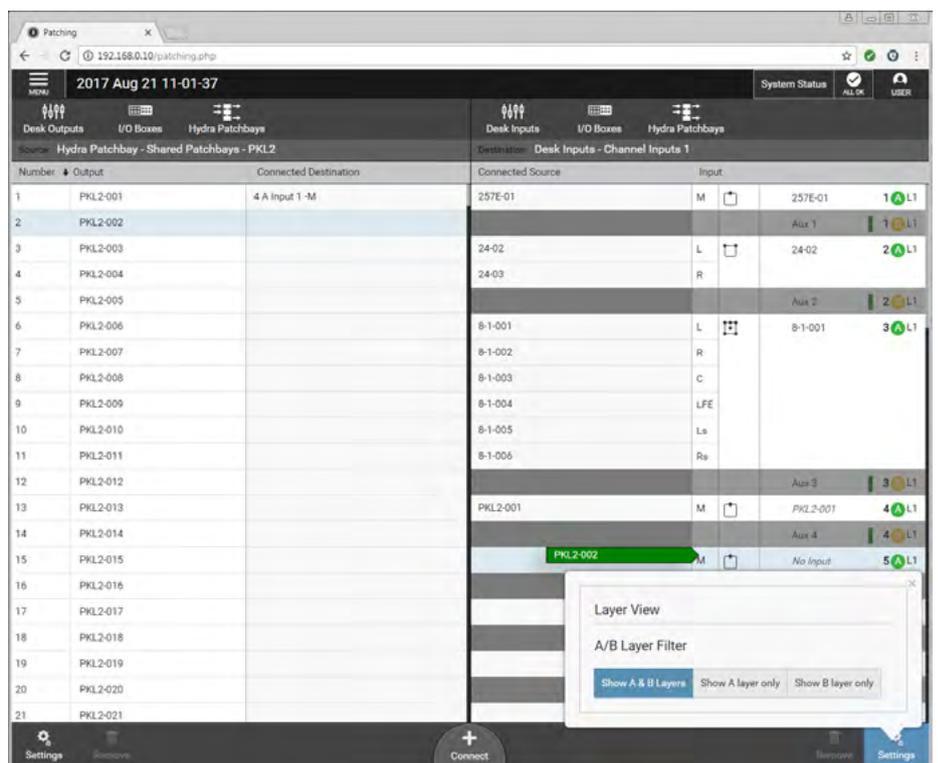
HPBs are virtual patchbays within the Hydra2 domain. Like physical patchbays, HPBs have a number of input ports which are 'hard wired' to output ports. For port patching purposes, Hydra2 patchbay inputs are destinations and Hydra2 patchbay outputs are sources.

Hydra2 patchbays allow the user to patch console inputs and outputs (which have been patched to Hydra2 patchbay ports) to physical I/O ports. H2O users can choose physical input ports to connect to RP1's Hydra2 patchbay inputs, and physical output ports to connect to RP1's Hydra2 patchbay outputs allowing them to choose and change RP1 feeds and output destinations.

## INPUT TO HPB PATCHING & SOURCE SETTINGS



## HPB TO DESK INPUTS PATCHING AND DESTINATION SETTINGS



## 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. Aux 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 "[Surround Label Suffixes](#)" on page 51 for more information.

## Making a Patch

To patch a source to a destination:

1. Select a source type from the source screen header.
2. Select a destination type from the destination screen header.
3. Click to select a source.
4. Click to select a destination.
5. Click on **CONNECT**.

## Moving a Destination

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

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

## Protect a Patch from Memory Loads

Patches can be 'fixed', isolating them from memory load changes. Fixed patches are also protected under the port protection system in the same way as ports which are in use by multiple Hydra2 network users.

To Fix a patch:

1. Select one or more patched destinations.
2. Click **FIX** in the screen footer.
3. To un-fix the patch, click on **FIX** again.

## Isolating a Patch

Isolating a patch protects it from changes due to memory loads, but it differs from patch fixing in that patch isolation only relates to actions performed on the local RP1 Unit.

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. Click on **ISO** in the screen footer.
3. To de-isolate the patch, click on **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. Click on **REMOVE** in the screen 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 RP1 channel has two inputs, labelled Input 1 and Input 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 screen and **DESK INPUTS** in the destinations screen and patch as normal.

# RP1 ACCESS PROCESSING

# ACCESS OVERVIEW

**The Access items in the Assist Menu, all use the Banner and Access Headers to provide the user with information and control of path selection.**

The image above right shows an Access screen. The Banner header at the top shows the Menu Selector icon, see "Calrec Assist for RP1" on page 50.

To the right of the menu is shown the name of the current show, followed by the various warning flags to inform the user that TB (Talkback), APFL (either AFL or PFL) and/or Tone is active on the system. Clicking on those icons cancels those functions. Next to these is the System Status area which is described elsewhere, see "System Status" on page 90.

The row below the banner header is the Access Header this contains nudge keys which follow the fader surface selection.

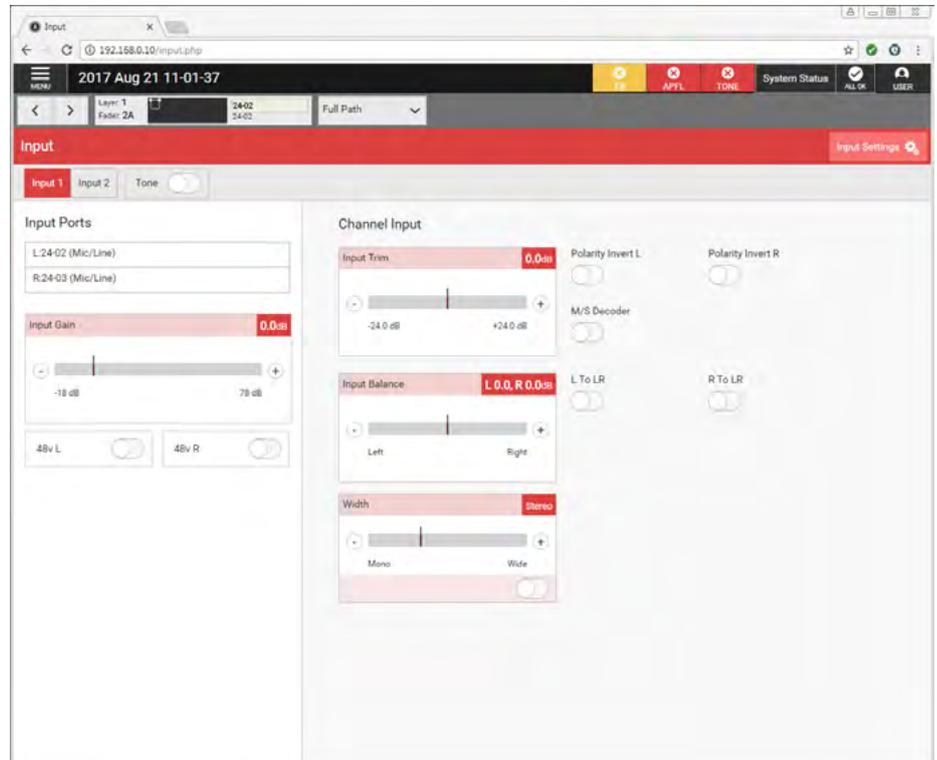
Next to this is the Fader Information block which shows the Layer/Fader Number, User Label & User Port of the currently selected path. Inset in the block is a status window showing the width and various other status symbols such as such as path width, layer lock and fader open as required.

If the path is wider than Mono then a drop down button is shown labelled Full Path. Accessing this allows the user to select the legs that make up a stereo or 5.1 path for independent operation.

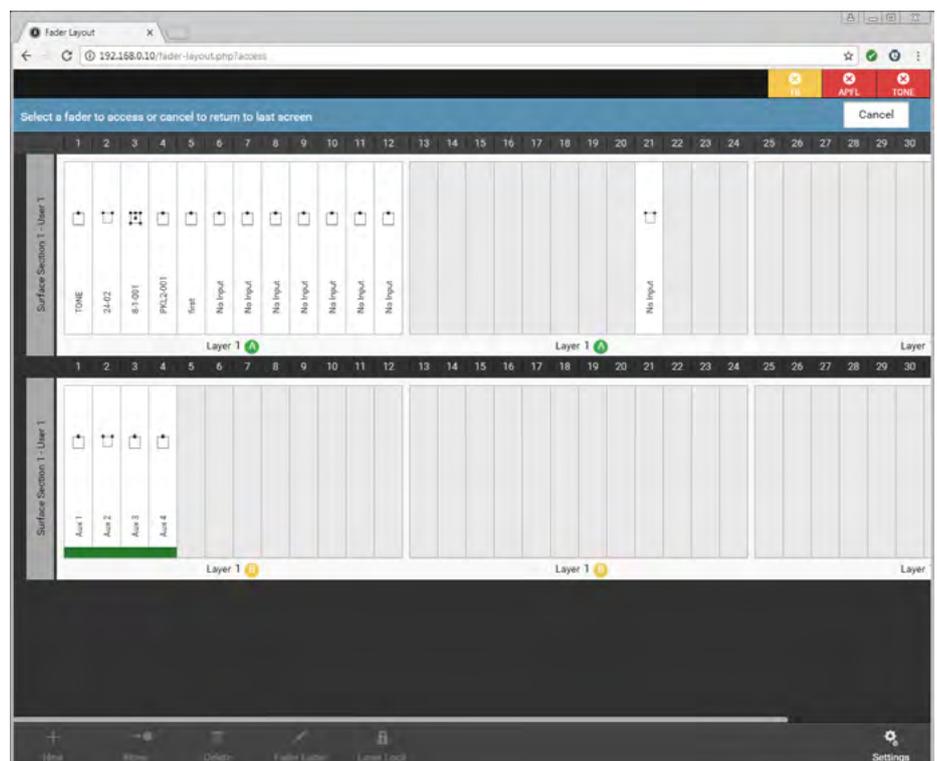
Below the Access Header Row is shown the Function Header such as 'Input' as shown above right.

Clicking on the Fader Information block allows the user to select a different path as shown below right. After clicking on the fader information block a copy of the fader layout screen appears allowing the user to select any of the existing Layer/Fader paths to become the currently accessed path or the user can cancel if they decide to return to the existing path access selection.

## ACCESS INPUT SHOWING BANNER AND ACCESS FUNCTIONS



## SELECT FADERS TO ACCESS



# ACCESS COMPRESSOR

Every RP1 channel input and auxiliary bus output has two dynamics modules available to it: **Module 1 is a Compressor/Limiter processor which has an associated 2 band sidechain equaliser with sidechain listen. Module 2 is an Expander/Gate processor. Either of these processors can be placed Pre EQ/Pre Fader or Post Fader and either run standalone or be linked to the four Gain Reduction buses available.**

## 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.

When looking at a dynamics module, any control situated within the function header affects the whole module if not independent.

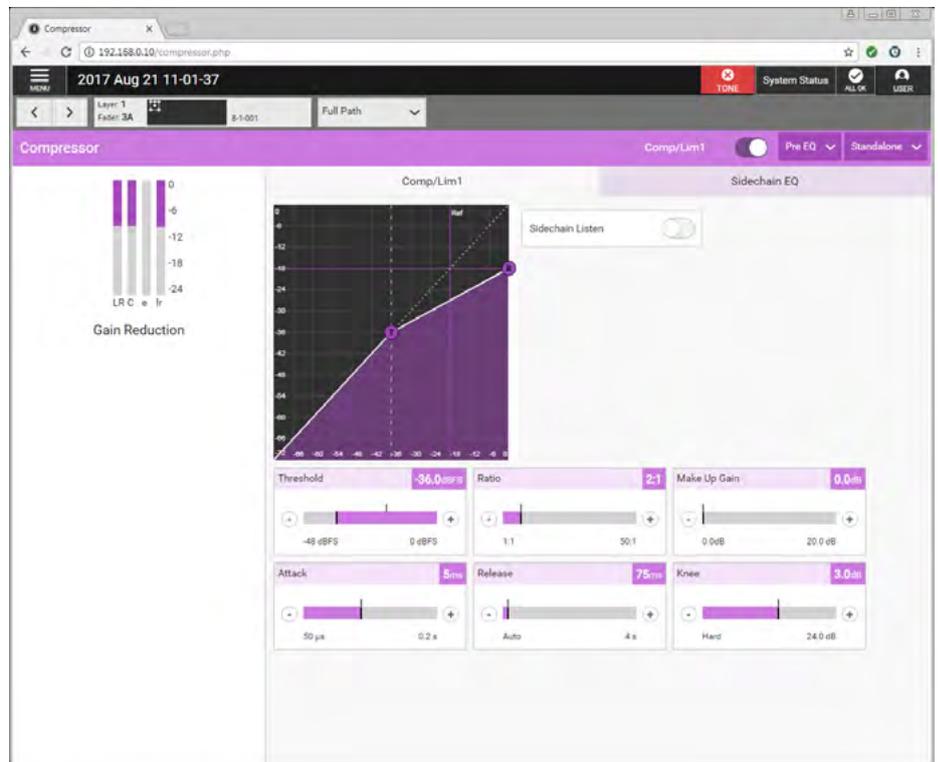
The Gain reduction bargraphs are shown on the left of the process window and show the amount of gain reduction being applied to the signal, note that in the case of 5.1 paths the Lfe (e) leg is made independent by default, so no reduction is applied as shown above right as the Lfe has its own independent dynamics controls.

## Compressor/Limiter Controls

After pressing Compressor from the Accessed Path Processing section of the Menu, the controls can be adjusted in a number of ways:-

- Dragging the sliders left and right
- Using the + and - buttons at the end of the sliders.
- Dragging the threshold and ratio control circles on the graph.

## ACCESS COMPRESSOR



The resultant numerical values are shown in the top right hand corner of each control and also reflected on the graph.

### The following controls are available:-

- **Comp/Lim1 In/Out switch:** This is shown in the function banner it switches the Compressor in or out of circuit.
- **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.
- **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.

**Make Up Gain:** Allows the gain of the whole compressed signal to be increased by up to 20 dB.

**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.

## Dynamics Position in Path

Each Dynamics module can be inserted either pre EQ, pre fader or post fader. Click on the dynamics position button in the function header and select an option.

## Gain Reduction Links

By default, dynamics modules operate as standalone units. The right hand button in the function header allows the module to be put into one of four Gain Reduction Links. Gain Reduction Links allow multiple audio feeds to have the same dynamics processing applied.

When multiple paths' dynamics modules are set to be part of a Gain Reduction 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 Gain Reduction 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 Gain Reduction 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.

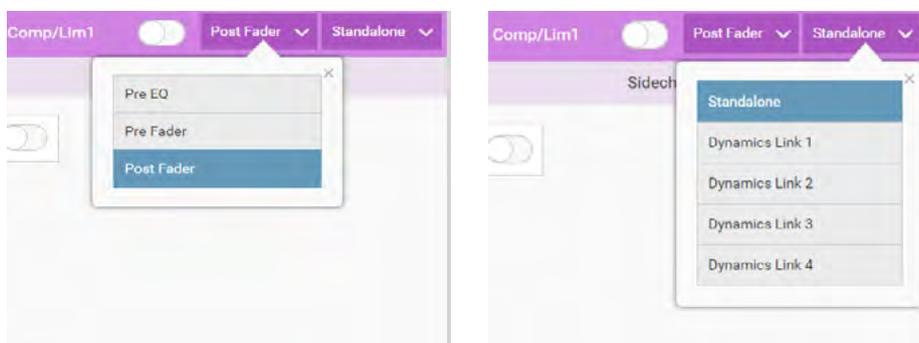
## Sidechain EQ (SCEQ)

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

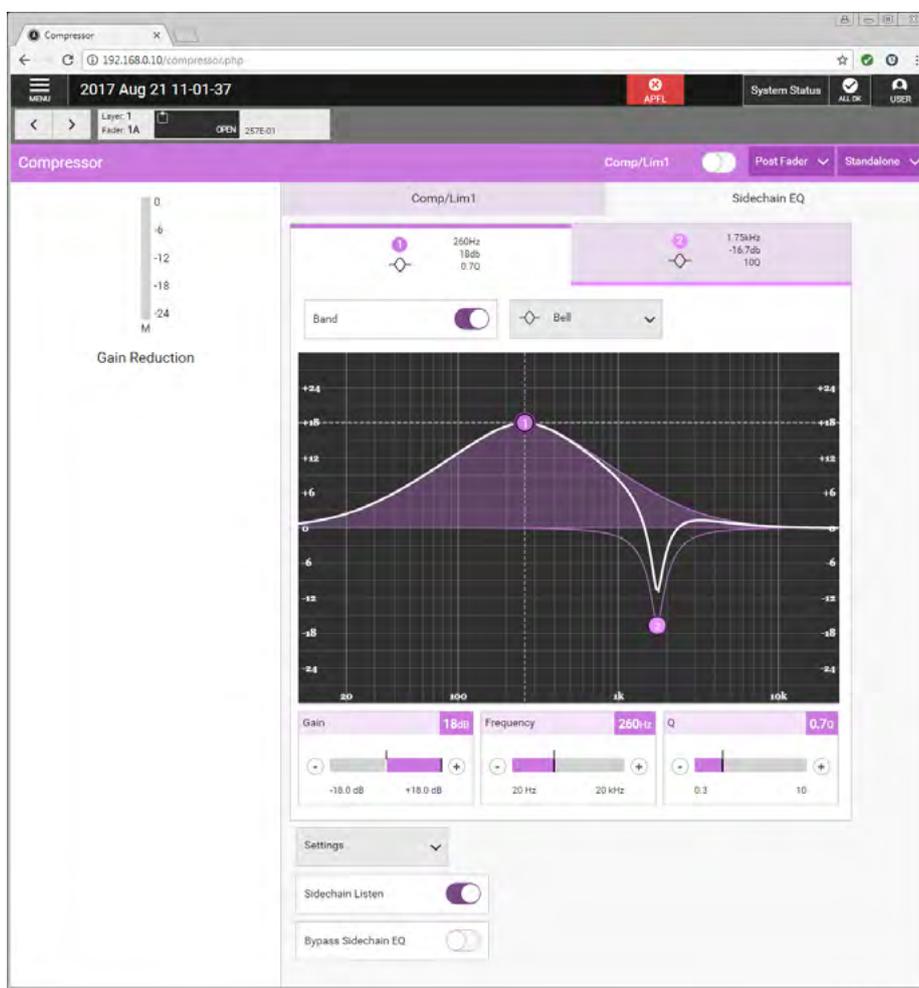
With Comp/Lim 1 processing selected, click on the Sidechain EQ tab within the control screen to see the SCEQ controls.

**Sidechain Listen:** this slider switch allows the user to listen to the sidechain signal whilst altering SCEQ parameters.

## GLOBAL DYNAMICS CONTROLS FOR POSITION AND GAIN REDUCTION LINKS



## ACCESS SIDECCHAIN EQUALISER



**Bypass Sidechain EQ:** allows the user to switch the SCEQ controls in and out for both SCEQ bands, allowing the user to hear the difference SCEQ processing makes. The Settings drop down button allows the user to reset the parameters of the SCEQ to their default values.

The other SCEQ parameter controls, i.e. **Response, Band, Frequency, Gain & Q** are the same as the EQ controls and are explained in more detail in the EQ section, see [“Access Equaliser” on page 78](#). Note that the SCEQ function is currently only available to the Compressor/Limiter of each path.

# ACCESS EXPANDER

## 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's expander/gate processing has 6dB of built-in hysteresis to avoid unwanted 'chatter' (constant on/off switching) resulting from an input signal residing on or around the threshold.

The Gain reduction bargraphs are again shown on the left of the process window.

## Expander/Gate Controls

After pressing Expander/Gate from the Accessed Path Processing section of the Menu, the controls can be adjusted in a number of ways:-

- Dragging the sliders left and right
- Using the + and - buttons at the end of the sliders.
- Dragging the threshold control circle on the graph.

The resultant numerical values are shown in the top right hand corner of each control and also reflected on the graph.

## The following controls are available:-

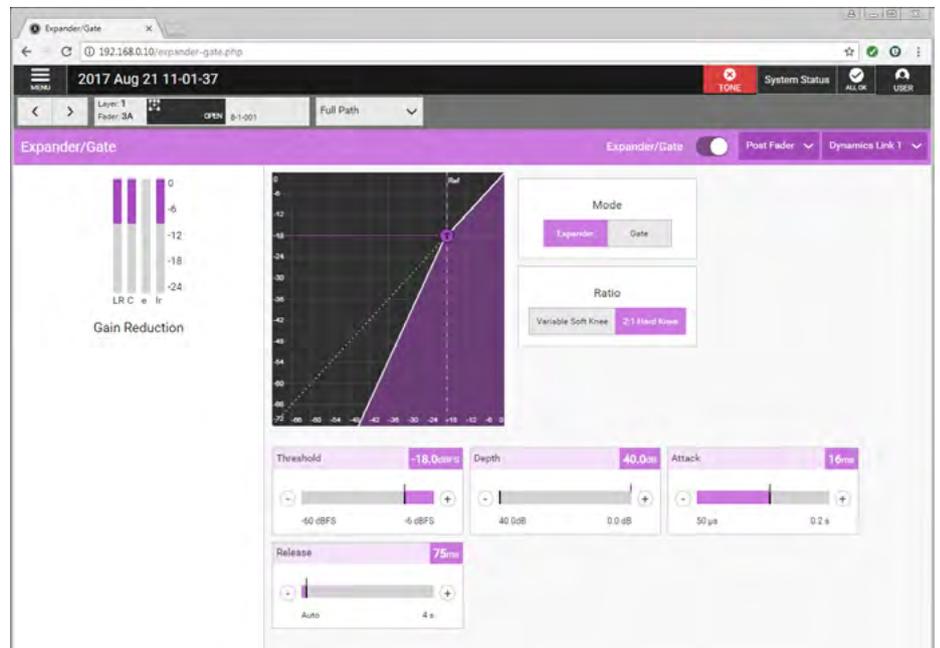
**Expander/Gate In/Out switch:** This is shown in the function banner it switches the Expander/Gate in or out of circuit.

**Mode:** The expander/gate module has a dual mode button for switching between expander and gate functionality.

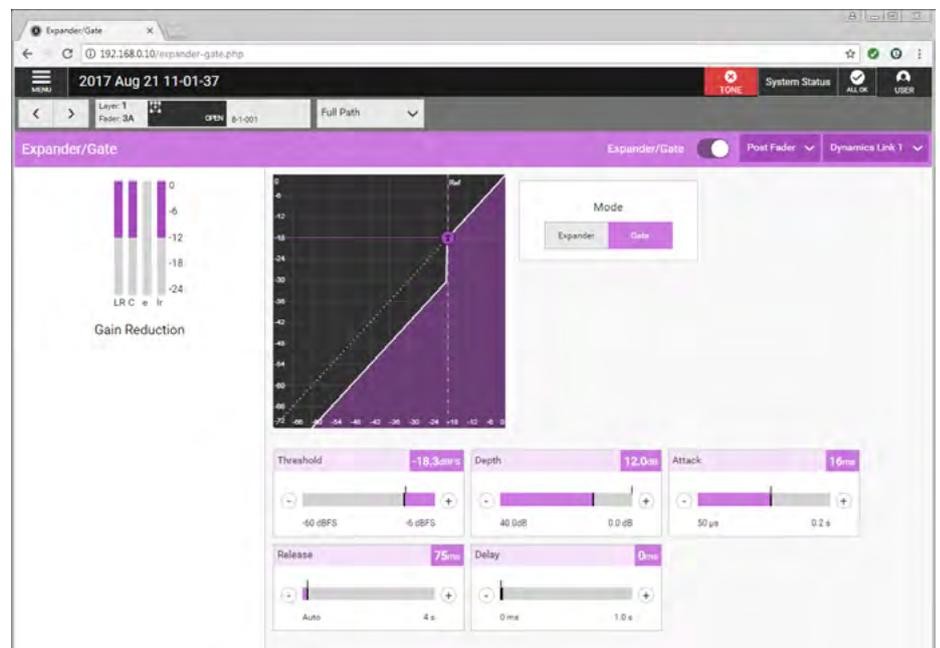
**Threshold:** The level (dBFS) at which the signal will begin to have its gain affected.

**Ratio (expander only):** Controls the amount of gain reduction applied to the input signal level. 2:1 Hard knee uses a fixed ratio of 2:1, meaning 1 dB of gain reduction is applied for every 1 dB that the

## ACCESS EXPANDER



## ACCESS GATE



signal falls below the threshold. Variable Soft knee uses a variable ratio dependent on the input signal level with the final ratio of 3:1 being applied when the signal drops to 20 dB below the threshold.

**Depth:** Controls the maximum amount of attenuation which can be applied to signals below the threshold.

**Delay (Gate Only):** The minimum time the gate will be held open before closing once the threshold is reached.

**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.

# ACCESS EQUALISER

## A four band parametric Equaliser + LF & HF filters module is available on every channel and auxiliary.

The frequency range for all bands is 20Hz to 20kHz, the gain range is -18dB to +18dB. 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.

When looking at an equaliser module, any control situated within the function header affects the whole module if not independent. Note that in the case of 5.1 paths the Lfe (e) leg is made independent by default and has its own independent equaliser controls.

### Equaliser and Filter Controls

After pressing EQ from the Accessed Path Processing section of the Menu, controls can be adjusted in a number of ways:-

- Dragging the sliders left and right
- Using the + and - buttons at the end of the sliders.
- Dragging the numbered bands with their control circles on the graph.

The resultant numerical values are shown in the top right hand corner of each control and also reflected on the graph.

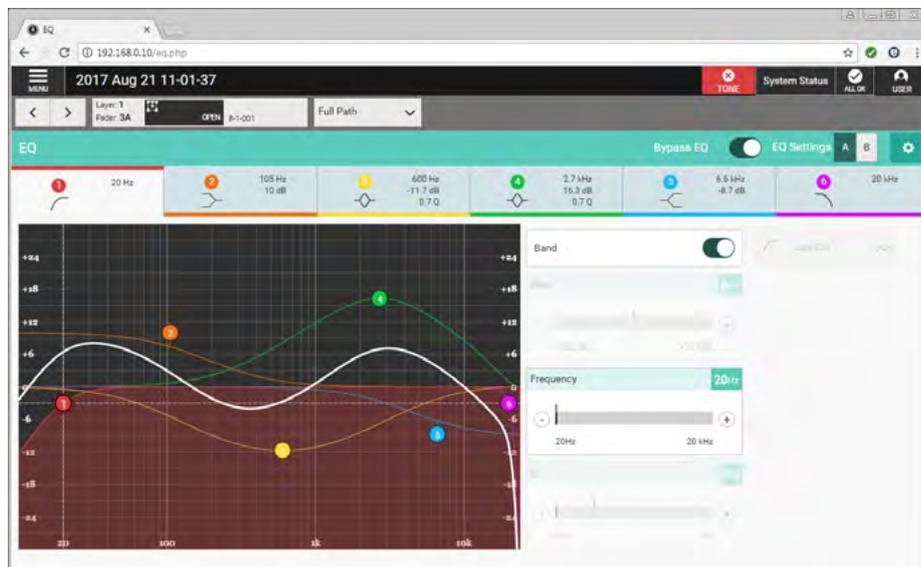
### The following controls are available:-

Clicking on any of the 6 EQ band tabs along the top of the EQ control screen 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 EQ parameter changes. See band 1 selected above right. EQ bands 2-5 can be set to any response type but good practice is to set them in a logical, frequency-based order. Bands 1 & 6 are fixed as filters.

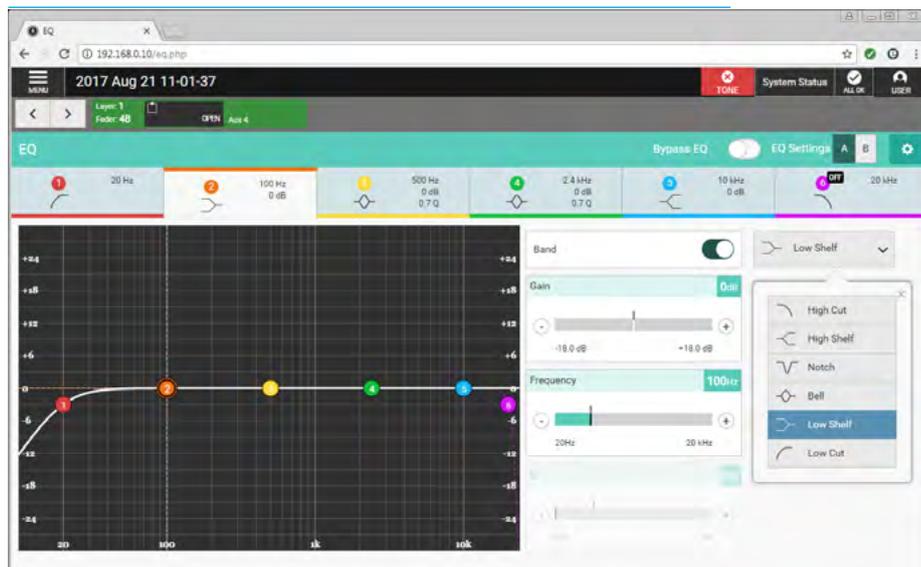
**Bypass EQ switch:** This is shown in the function banner and switches all the EQ bands in or out of circuit.

**Response:** Select the desired EQ response curve for the selected band, from high cut filter, high shelf, notch, bell, low shelf, low cut filter. See Access Response type below right.

## ACCESS EQUALISER



## ACCESS RESPONSE TYPE



**Band:** This switches the selected EQ band in/out of circuit.

**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.

**EQ Settings:** Allows the user to compare two EQ set-ups, simply click to switch between EQ A and EQ B and change the parameters within each. Then click to switch between the two to compare.

**Setup:** Clicking on the cog icon in the top right of the EQ screen header displays three EQ settings options:

**Reset EQ A & Reset EQ B** returns all EQ settings to their defaults.

**Copy EQ A To EQ B** and **Copy EQ B To EQ A** allows the user to duplicate EQ settings which can be useful in auditioning 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 screen header to quickly switch between the two.

# ACCESS FADER

This provides the user with a set of faders related to the currently accessed path on which they can control the Fader, Cut, PFL and AFL parameters of all the legs of the accessed path and its downmix levels.

## Fader Controls

After pressing Faders from the Accessed Path Processing section of the Menu, the image above right is displayed.

The following controls are available:-

**Fader Levels:** The user can click and drag in the fader columns to modify the levels of each of the faders. The current value of the fader level is shown in the area just above the fader.

**PFL & AFL:** The user can listen to the individually to the PFL (pre-fader listen) or AFL (after fader listen) using the PFL or AFL buttons.

**Cut:** The user can Cut the output of the path by pressing this button if the master path is cut on a stereo or 5.1 path all its legs are also cut.

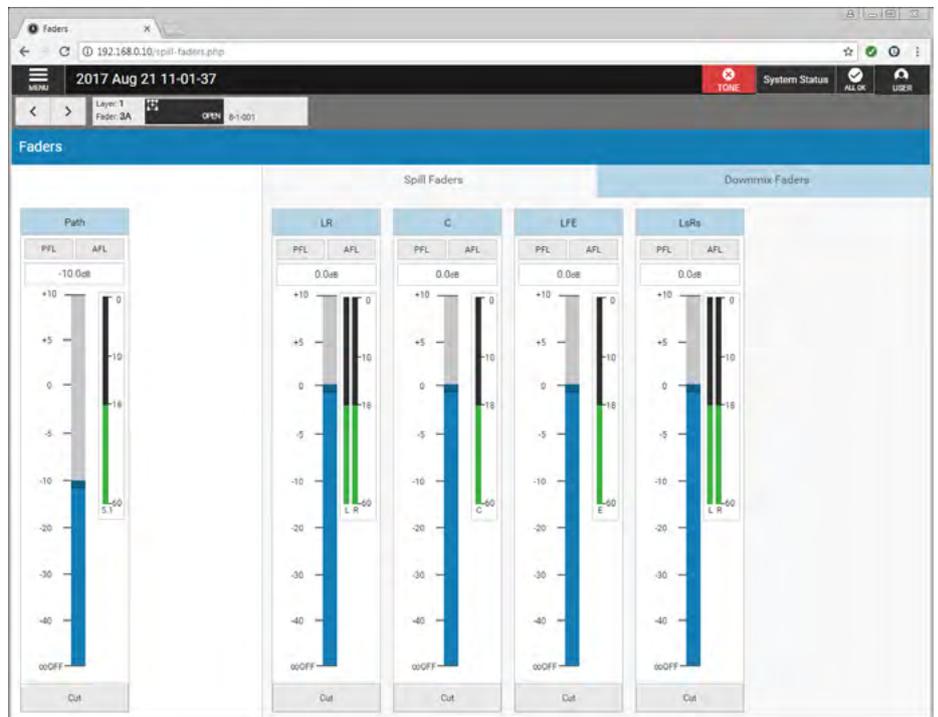
Note: Alongside each fader is shown an associated audio level meter.

The image below right shows the downmix faders page for the currently assigned path. The user can click and drag in the fader columns to modify the levels of each of those faders including the separate LoRo overall stereo mixdown fader level. Note that downmix faders do not have AFL,PFL or Cut functions

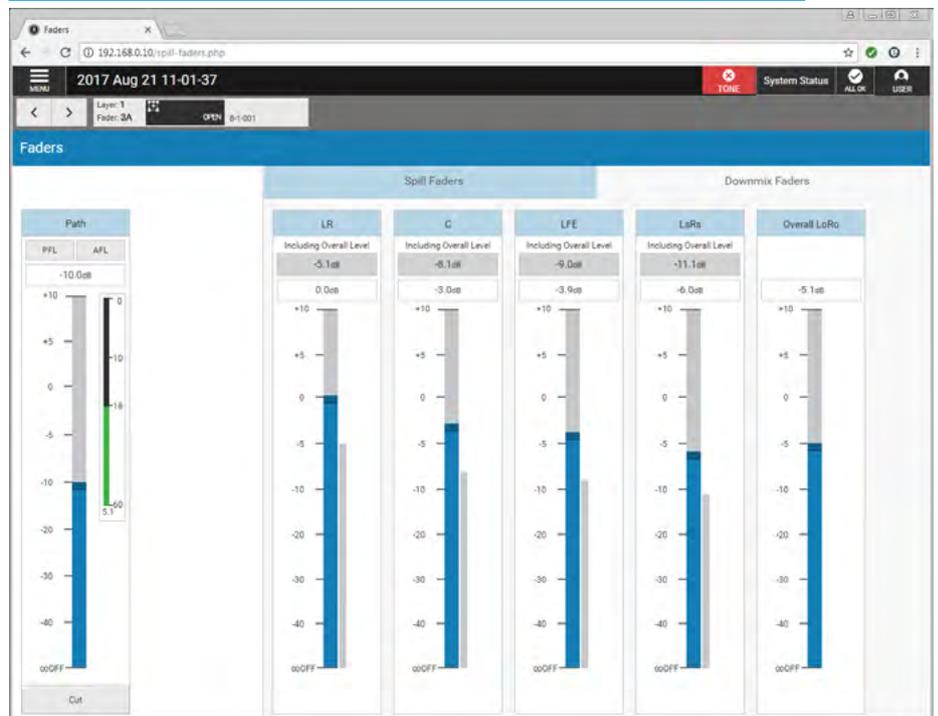
Along the top, above the faders function banner, is shown the usual set of nudge buttons which lets the user select a different access path and to the right of that is shown the fader information block showing the currently accessed path along with further information such as path width, layer locked and fader open as well as its label shown further to the right.

The Full path drop down box usually associated with Stereo and 5.1 paths is not required here as the user has full access to all the legs of the chosen path.

## ACCESS FADERS SHOWING SURROUND LEG FADERS



## ACCESS FADERS SHOWING DOWNMIX FADERS



Note that once RP1 is connected to a host console other displays appear on the access fader and fader surface screens, these are described in the 'Operation via Host Console' section of this manual.

See "Blocking Control From RP1 at the Host Console" on page 103 also see "VCA Control of RP1 Paths from the Host Console" on page 105 for more detailed information.

# ACCESS INPUT

This provides the user with a set of controls related to the currently accessed path on which they can control the input port settings such as mic gain and phantom power and also control the channel input settings.

## Input Controls

After pressing Input from the Accessed Path Processing section of the Menu, the image above right is displayed, which in this case is a stereo input channel that has mic/line ports attached to it on input 1.

The following controls are available:-

**Input 1 / Input 2:** This select which of the input sources will be used by this path.

**Tone:** Select to inject tone into the path, replacing the input source with the correct tone for the path width.

**Input Ports:** Shows the ports in use for this path.

**Input Gain & 48v:** If the source is a Mic input then a gain control & 48v power controls are made available.

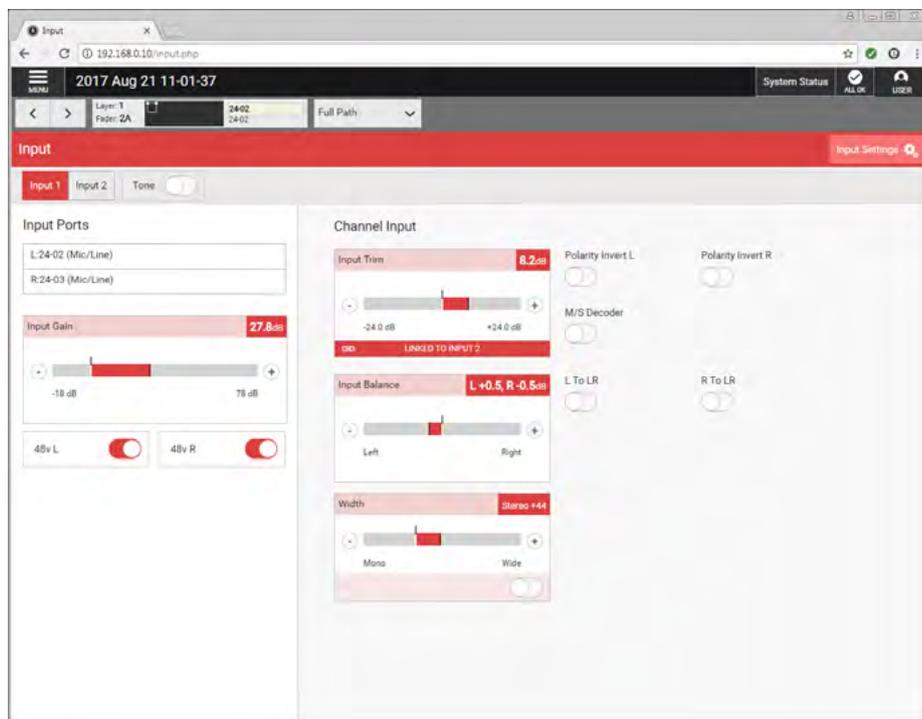
**Input Trim:** A gain offset of +/- 24 dB can be applied to the incoming signal as required and if the linked to the other input source is switched on the trim is applied to both sources.

**Input Balance & Width:** If the source is a stereo signal then additional controls to alter the left-right balance of the sources and a width control allows the sources to be reduced to a mono source or made wider if required.

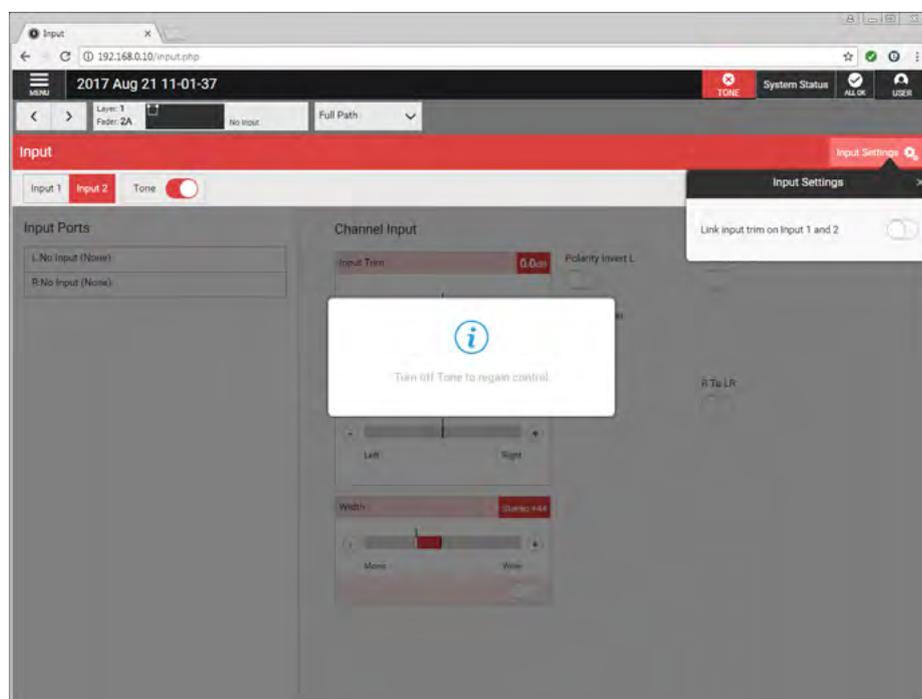
**Various Input Switches:** To the right of the Trim, Balance and Width controls is a set of channel input switches which include, polarity invert switch(es) and if stereo:- MS decoder and L to LR and R to LR switches.

The image below right shows the Access Input screen for Input 2 which, in this case has not yet been ported. In addition, the tone switch has been turned on, which greys out the page and a 'Turn off Tone to regain Control' pop-up appears. Also shown is the input settings pop-up which allows the user to link input 1 & 2 trims. This is commonly used where a backup mic is put on input 2, so that the trims can

## ACCESS INPUT 1 OF A STEREO PATH



## ACCESS INPUT 2 SHOWING TONE AND INPUT SETTINGS POP-UP



track each other. Note, that if the path is wider than mono a drop-down box labelled 'Full Path' opens as shown which allows the user to access each legs' control parameters.

For Stereo paths the legs are arranged as Left Only & Right Only. For 5.1 paths the legs are arranged as LR Only, C Only, LFE Only & LsRs Only.

# RP1 ACCESS ROUTING

# ACCESS AUX SENDS & PAN

**Auxes are generally used to feed external signal processing devices or to create interruptible foldback feeds. For each path, auxes have individual level controls and send position switches for each of the 12 aux feeds, allowing a high level of control over up to 12 separate mixes. Mono or Stereo Auxes can be created. Auxes also have an additional level of logic control, allowing you to set conditions under which each pre fader aux send should be cut.**

## Aux Send & Pan Controls

After pressing Aux Sends & Pan from the Accessed Path Routing section of the Menu, the image above right is displayed.

### The following controls are available:-

**Routing:** Slide the large switch in the box on the left for each Aux to make a route.

**Quick Routing:** Just below the Aux Sends & Pan function header is a 'clickable' routing display which quickly allows the user to route to each aux send from the currently accessed path. Note that Aux 1 and part of Aux 2 are shown routed. Using the full path drop down box it is possible to select the individual legs of a stereo or 5.1 path and route just those legs to the aux. This partial routing is shown by the corner 'cut off' on the routing display and the routing boxes underneath each Aux Row, see Aux2 in the image above.

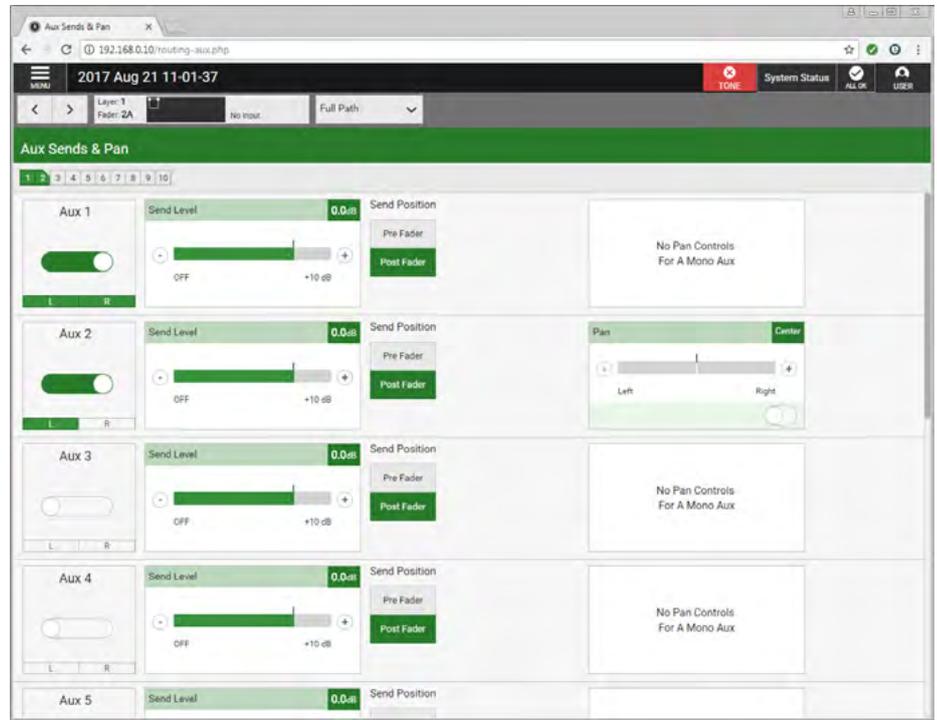
**Send Level:** Slide the level control or click on the + or - icons to alter the level of the Aux Send between 'off' and +10 dB. The send level value is shown in the top right corner of each Send level.

**Send Position:** Aux Sends can be taken at different points in the associated path's signal flow, pre fader or post fader.

**Pan Position:** For stereo aux sends an additional pan control is available which allows the user to adjust the position of the source to the left or right of centre.

Note: If there are more aux sends than can be fitted on the screen a scrollbar appears on the right hand side allowing the user to traverse to their required bus.

## ACCESS AUXILIARIES FOR ROUTING, SENDS AND PANNING



# ACCESS DIRECT OUTPUT

**Direct outputs are path specific desk outputs, available to Channels which are available for patching. RP1 has a pool of 32 resources, which is shared between direct outputs and mix minus outputs.**

## Direct Output Controls

After pressing Direct Output from the Accessed Path Routing section of the Menu, the image above right is displayed, ready for a Direct Output to be created. Note that the number of available outputs is shown on the page once the pool is empty no further Direct Outputs can be created. Once a Direct Output has been created it appears as the image below, which in this case is a 5.1 direct output from a 5.1 channel attached to Fader 3A. Note: only 1 direct output is available per path on RP1.

### The following controls are available:-

**Tone:** Select to inject tone into the direct output, replacing the direct output feed with the correct tone for the path width.

**Path Width Box:** Clicking on the path width drop-down menu to the right allows the user to change the width of the direct output or select 'no output' to remove it.

**Direct Output Patching:** The direct output's patch destination is displayed.

**Level:** Slide the level control or click on the + or - icons to alter the level of the direct output between 'off' and +10 dB.

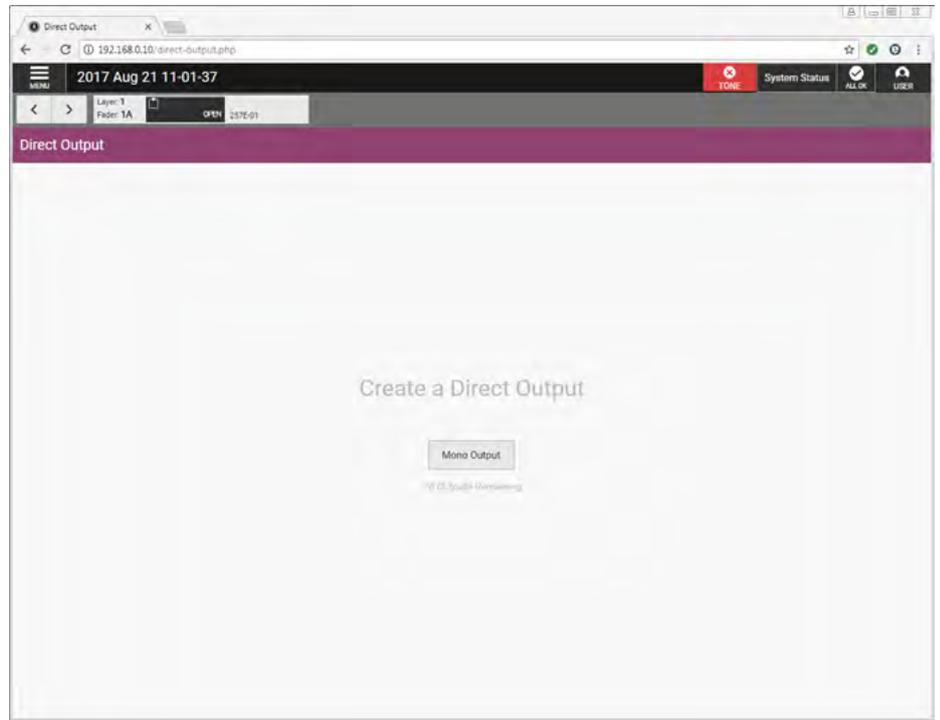
**Send Position:** Direct outputs can be taken at different points in the associated path's signal flow, pre EQ, pre fader or post fader.

**Bypass Downmix Faders:** If the direct output's associated path is 5.1 and the direct output is stereo or mono the user can choose whether or not to use the downmix fader levels during the downmixing process.

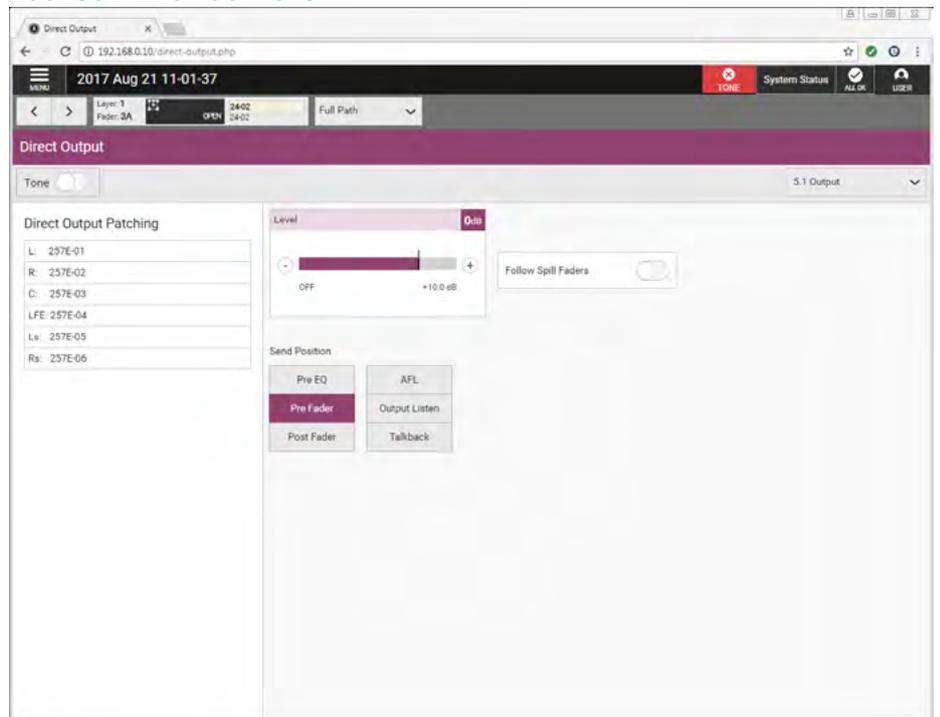
**Follow Spill Faders:** If the direct output's is 5.1 or Stereo and its send position is Pre Eq or Pre Fader, the user can choose whether or not to follow the levels of the Spill faders.

**AFL:** Clicking on AFL replaces the console monitor source with the direct output feed, post level control, providing a non-destructive solo for the direct output.

## ACCESS DIRECT OUTPUTS CREATE



## ACCESS DIRECT OUTPUTS



**Output Listen:** Similar to AFL but the feed is taken post output delay. Note: RP1 does not yet provide delay processing.

**Talkback:** Replaces the direct output feed with whatever is routed to the talkback input.



# RP1

## BUSES & OUTPUTS

# AUX BUSES

The purpose of this screen is to configure and control the auxiliary buses. It provides the user with a page of controls related to up to 12 configurable aux buses. On which they can control the name, width, output level, cut, various listen outputs, talkback and tone switches and Pre-fader aux send cut options.

## Aux Bus Output Controls

After pressing Aux Buses from the Buses & Outputs section of the Menu, the image above right is displayed, for each aux:

### The following controls are available:-

**Label window:** Allowing the aux to be renamed with a user label.

**Width drop down box:** Lets the user change the width of the auxiliary to either none (to remove it), mono or stereo. Note, that there is a pool of up to 12 aux legs which can be arranged to provide 12 mono auxes or 6 stereo auxes or any combination thereof. The green banner at the top left of the screen shows the aux bus resources available.

**Access button:** Lets the user call the aux to the access screens.

**Aux Output Level:** Slide the level control or click on the + or - icons to alter the output level between 'off' and +10 dB.

**Aux Cut:** The user can Cut/Mute the output of the path by pressing this button.

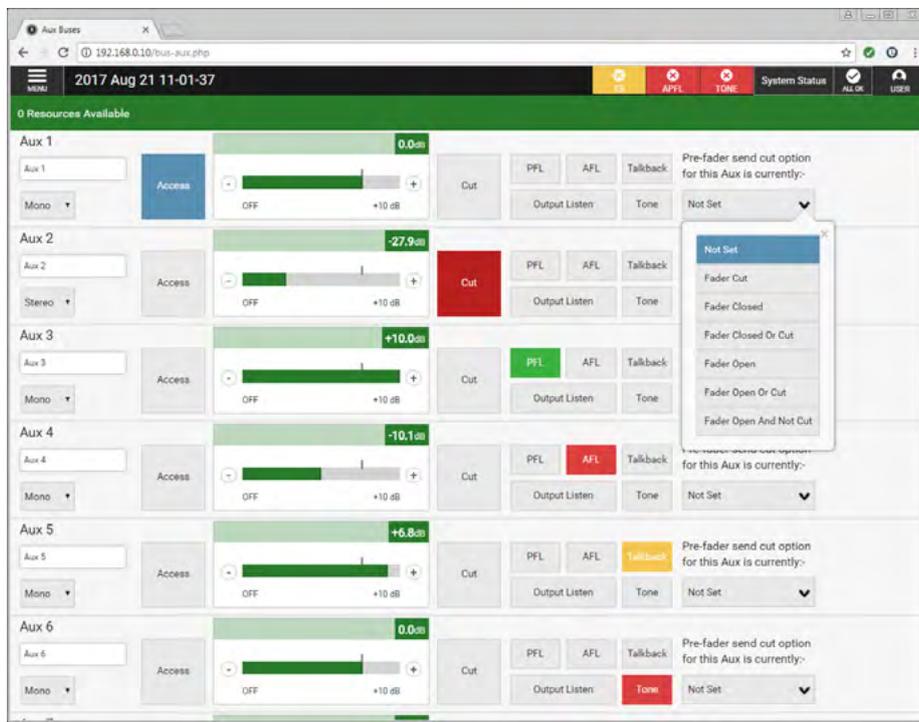
**PFL & AFL:** The user can listen to the individually to the PFL (pre-fader listen) or AFL (after fader listen) using the PFL or AFL buttons.

**Output Listen:** Similar to AFL but the feed is taken post output delay. Note: RP1 does not yet provide delay processing.

**Talkback:** Replaces the aux output feed with whatever is routed to the talkback input. A talkback button allows the user to talk to that output. Note that a Talkback input should be setup in the I/O patching for this to work.

**Tone:** Select to inject tone into the direct output, replacing the direct output feed with the correct tone for the path width. A tone button applies a tone signal to that output.

## AUXILIARY BUSES



### Pre-fader send cut options

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

These options are set from the drop down menu as shown on the right hand side of the image above right.

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

For example, if pre-fader send cut when 'Fader Closed' is selected for aux output 1, the pre-fader sends from each path routed to Aux1 will be muted whilst their fader is closed.

As soon as the fader is opened, the path will send audio to the aux at pre-fader level. Pre-fader sends whose faders are open, as well as any paths feeding post fader will still be passing audio to Aux1.

The available options for Pre-fader send cut to each aux output are:-

- 'Not Set'
- When 'Fader Cut' (or not 'on' if fader have path On buttons rather than cuts).
- When 'Fader Closed'
- When 'Fader Closed or Cut'
- When 'Fader Open'
- When 'Fader Open or Cut'
- 'Bird-Beater' - When 'Fader Open And Not Cut'. The send is active only if fader closed, or path cut (or not 'on' if on buttons fitted rather than cuts).

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

Note: If there are more aux sends than can be fitted on the screen a scrollbar appears on the right hand side allowing the user to traverse to their required bus.

# RP1 MONITORING

# CONSOLE MONITORING

The purpose of this screen is to configure and control the console monitor. It provides the user with a page of up to 12 configurable aux buses as monitor sources and also allows the console monitor settings to be altered. This is primarily intended for on site use, during setup.

## Console Monitoring Controls

After pressing Console Monitor from the Monitoring section of the Menu, controls can be adjusted in a number of ways:-

- Dragging the sliders left and right
- Using the + and - buttons at the end of the sliders.

The resultant numerical values are shown in the top right hand corner of each control:-

## The following controls are available:-

**Monitor Level:** Controls the level of the monitor outputs between 'off' and +10 dB.

**Cut and Dim buttons:** Cuts or Dims the monitor output.

**Dim Adjust Level:** Alters how much the Dim button changes the monitor level between '-30dB' and 0 dB.

**AFL Trim:** Adjusts the monitor level when an AFL button is pressed.

**PFL Trim:** Adjusts the monitor level when a PFL button is pressed.

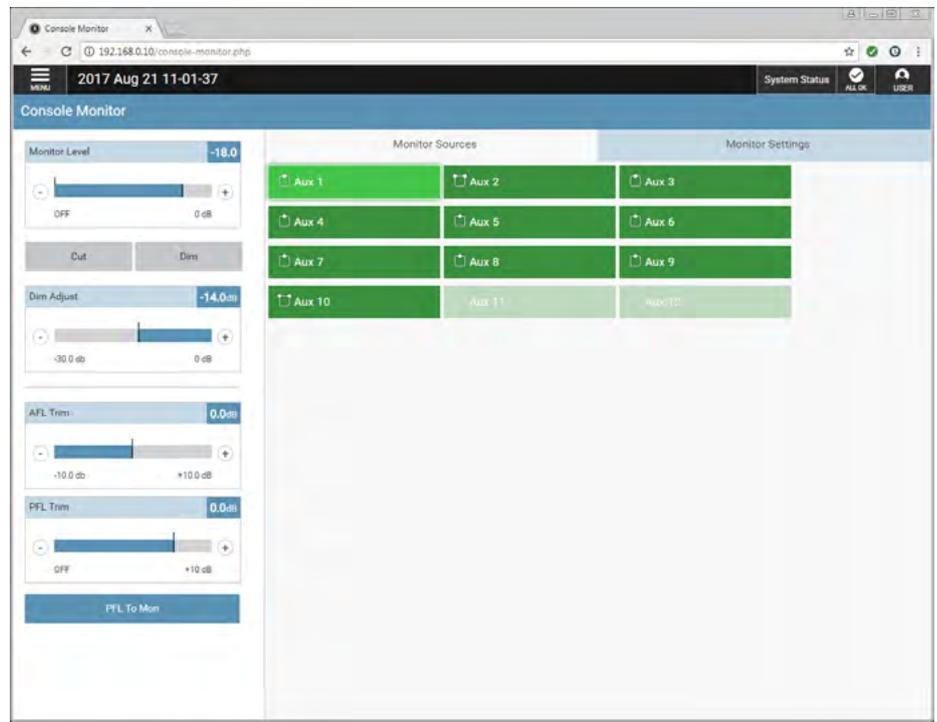
**PFL to Mon button:** When pressed sends the PFL signal to the console monitor rather than to a dedicated PFL speaker.

The remaining screen area is split into two pages the first labelled 'Monitor Sources' lets the user select which Aux is being monitored as shown above right. The second page shown below right shows the console 'Monitor Settings' arranged as:-

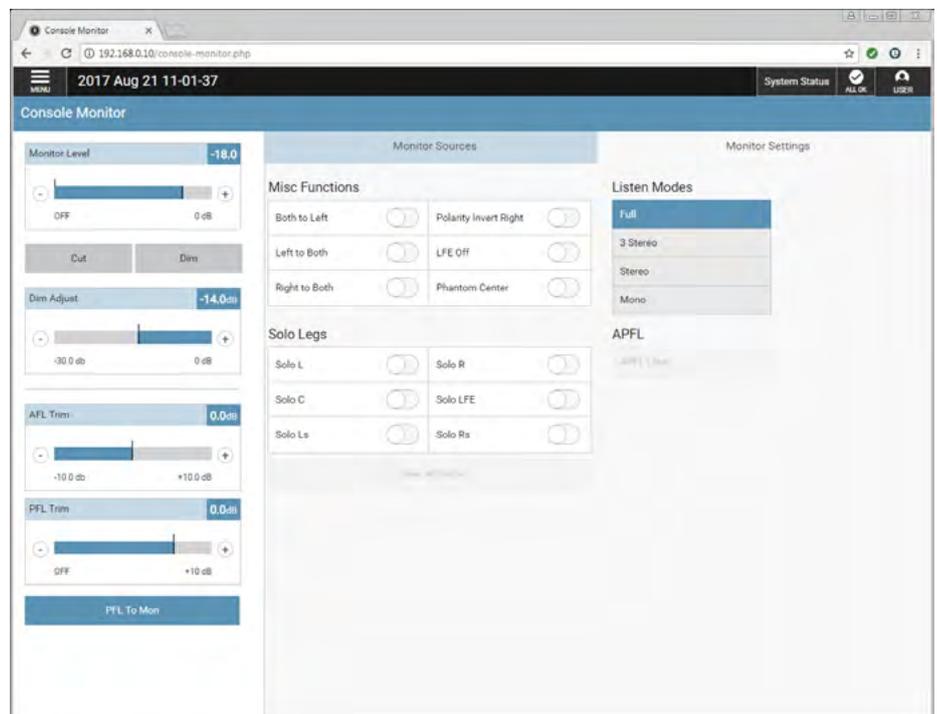
**Misc Functions:** Leg routing options L+R>L L>L+R & R>L+R, Polarity Invert Right (which allows monitoring of stereo only content of the source by cancelling out the mono content), LFE on/off and Phantom Centre (which routes the C monitor feed to both left and right speakers).

**Solo Legs:** Each leg of the monitor source has its own solo check-box, checking any of these disables all other legs, so each leg can be auditioned individually.

## CONSOLE MONITOR SOURCES SCREEN



## CONSOLE MONITOR SETTINGS



**Listen Modes:** Allow the user to monitor the source at either its current path width (full), use the left, right and centre speakers for (3 stereo), or listen in stereo or in mono.

**APFL Settings:** There is an 'APFL clear' button to clear all the active AFLs & PFLs. Note: The APFL clear function also appears in the Header Banner Row next to the System Status block.

# RP1 SYSTEM STATUS

# SYSTEM STATUS

## RP1 features System Status which reports warnings, faults and system information via Calrec Assist.

System status monitors all system components and connections.

### System status notifications

Under normal operating circumstances, the system status notifications area to the right of the banner containing the menu bar will show 'Everything is OK'.

In the event that a message needs to be displayed, the notifications area will display the relevant colour depending on the message type. Information (blue), a warning (amber) or an error (red) message.

Clicking on this notification area will bring up the system status screen as shown above right. The most serious notification will be shown as a priority i.e. error messages then warning messages then information.

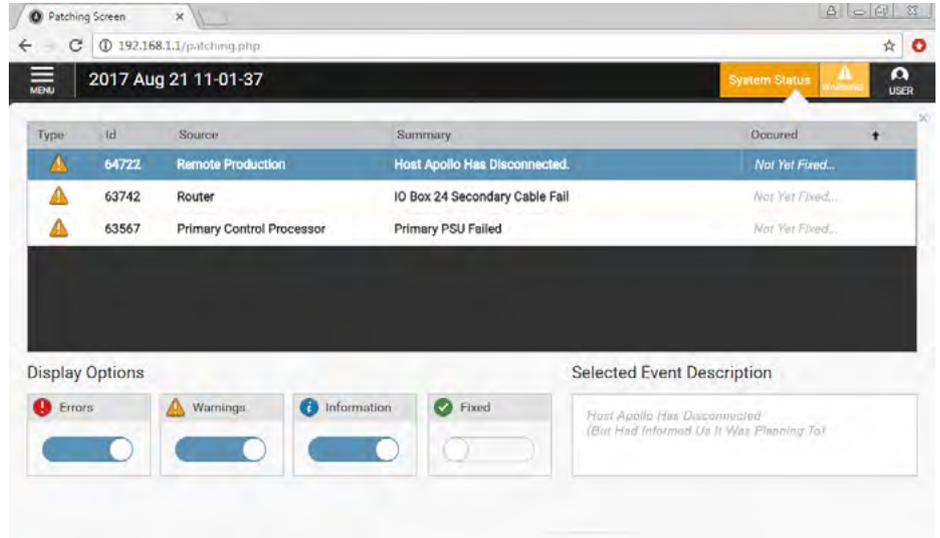
Note, the screen to the right is showing amongst other things that the host console known as Apollo has manually disconnected.

### Message types

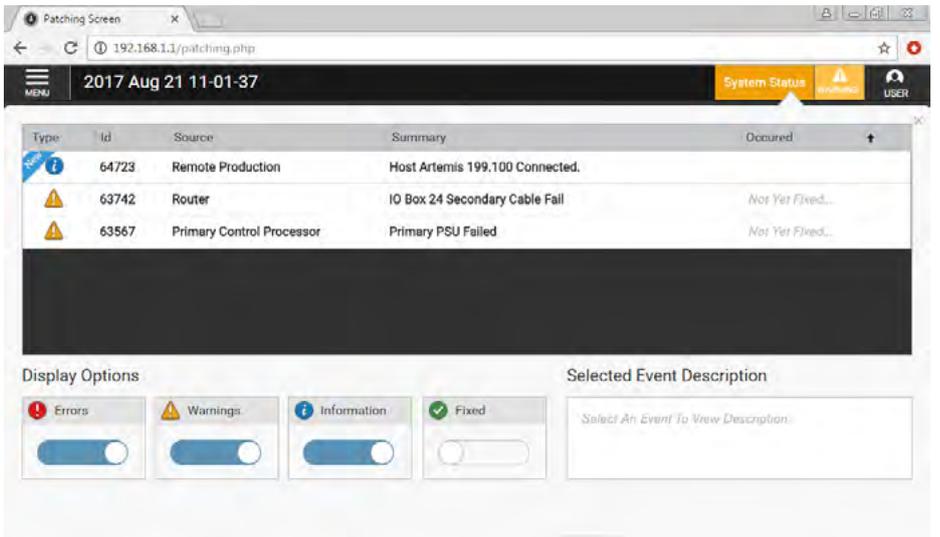
Three types of message are reported by system status:

- **Error Messages** - Report a serious error that could cause, or has caused the system to fail. Normally requires user intervention to correct the problem before operation can continue.
- **Warning Messages** - Indicate where the system has located a fault or failure, but will still operate without intervention from the user. The message should be checked as the system may be running on its secondary components.
- **Information Messages** - Inform the user when certain actions take place. They do not report errors, and no action needs to be taken to respond to them. The image to the right shows the information message that host Artemis 199.100 has connected.

## SYSTEM STATUS SCREEN SHOWING HOST APOLLO DISCONNECTION.



## SYSTEM STATUS SCREEN SHOWING HOST ARTEMIS CONNECTION.



The messages are reported in a list, as shown. Each message in the list has an associated icon shown in the left column. This identifies the type of message to the user. Message types can be filtered using the buttons above the list.

In addition items that have been "Fixed" can be included or excluded from the status display using the "Fixed" filter.

Selecting a message in the list will update the 'Selected Event Description' window on the bottom right of the display to show the message in greater detail.

### Clearing messages

Information messages can be cleared by selecting them and then leaving the system status screen. Warning and Error messages can only be cleared by correcting the error and restoring the system to its normal operational state.

### Intermittent Cable Failures

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

# RP1

## EXTERNAL METERING DISPLAY

# EXTERNAL METERING DISPLAY ON RP1

## RP1 provides a high resolution metering display output which displays the metering of up to 32 channels and 12 aux bus masters.

This is an off the shelf 1920 x 1080 DVI monitor which connects via the DVI-D Out connector on the back of the RP1 unit marked as 'Meters'.

As the channels are assigned to faders the RP1 places those faders onto the display with the appropriate scales as required this includes dynamics in circuit indications and Gain Reduction meters for Compressor-Limiter and Expander/Gate processes.

Up to 32 meter displays can be created for the 32 channels available on RP1.

The example display shows a number of channels assigned to faders and the first three have been defined as mono, stereo and 5.1 paths respectively. Note that the 'No Input' text is replaced by the port number when ported or by the user label to aid path identification.

The 12 aux bus master meters are always present on the right hand side of the display and change bus widths between: **Not assigned** (e.g. Auxes 10,11 & 12), **Mono** (Auxes 1,3,5,6,7 & 8) marked as 'M' **Stereo** (Auxes 2 & 9) marked as 'LR' as shown below right.

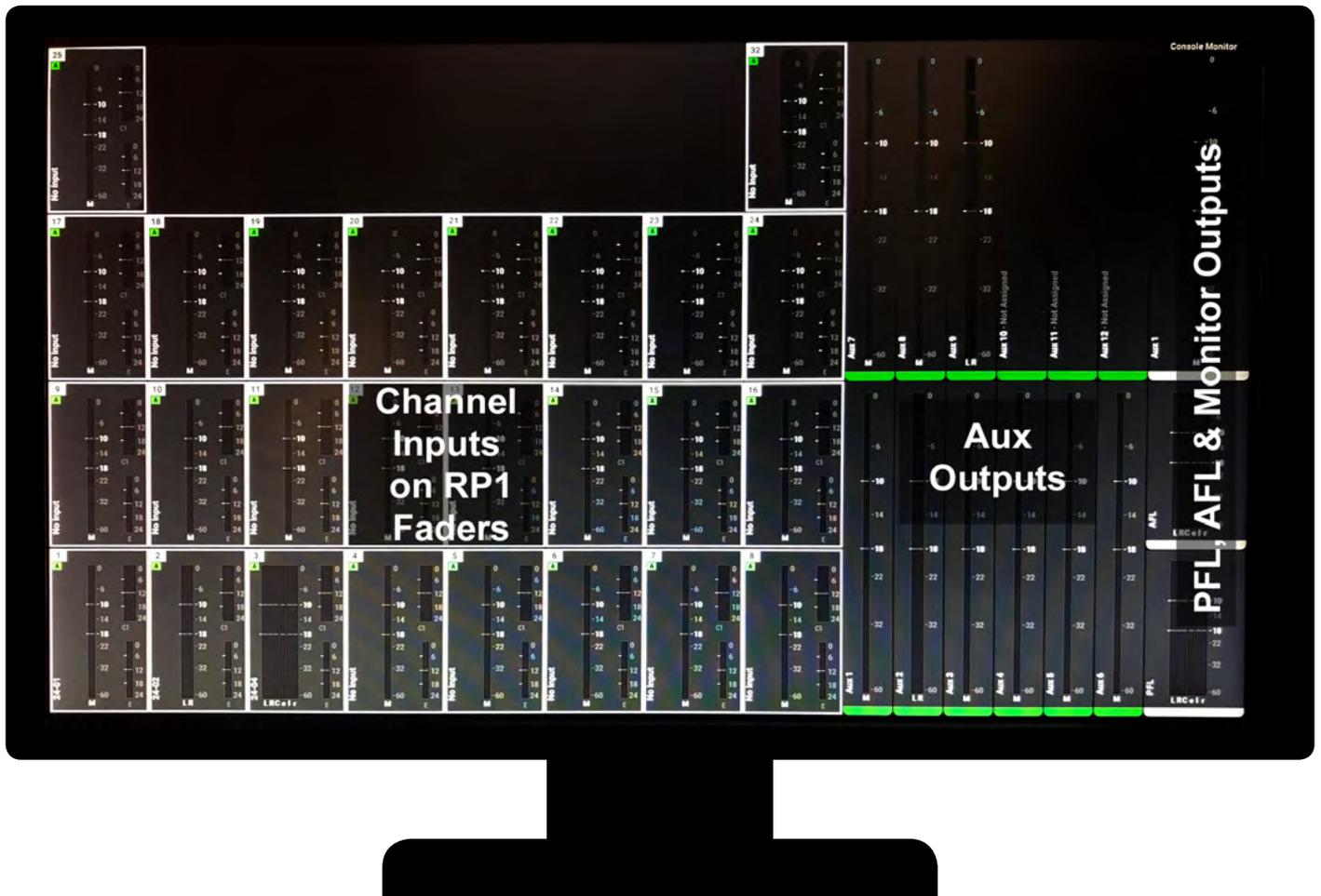
On the far right hand side of the meter display are three system meters related to the monitor path.

The bottom meter shows the PFL bus which when any PFL button is activated on the RP1 shows the pre-fader level of that path or sum of paths.

The middle meter shows the AFL bus which when any AFL button is activated on the RP1 shows the after-fader level of that path or sum of paths.

The top meter is the RP1 Console Monitor output which can from the monitoring page be set to display any of the Auxiliary buses or the PFL bus if 'PFL to Mon' if set on the monitoring page. This is the equivalent of the control room monitor output and displays what is being sent to the monitoring output of the RP1 unit.

## EXTERNAL METERING DISPLAY EXAMPLE ON 1920x1080 TFT MONITOR



**RP1**

# **SETUP REMOTE NETWORKS ON HOST H20**

# ADDING AND DELETING REMOTE NETWORKS IN H2O

Once the RP1 unit has been setup at the remote site it can be accessed and controlled from the surface of an Apollo or Artemis console at the host studio either as a standalone system or as part of a Hydra2 network, but first it has to be connected to a host console with an IP address set for its LAN ports that will be compatible with the LAN port of the Remote Network and then added into the host networks H2O.

## Connecting RP1 physically to the Host

In order for the host console to control an RP1 unit, the RP1 primary and secondary (for redundancy) LAN connections on the back of the unit, need to be connected to the Apollo/Artemis primary and secondary LAN connectors on the front of the MCS processor cards on the front of the Core via the IP network between them, see [“Connecting a Host Console to RP1 via an IP Network”](#) on page 47.

## Sorting out the Host & RP1 LAN addresses

Prior to adding in the remote network into H2O the user needs to ensure that the LAN port addresses to be used are compatible, for instance using the same Subnet. That information can be taken from the console PC in the System Settings>Calrec Assist UI page, (see above right) which shows the current settings for the 3 LAN ports used on the console and this information can be used to ensure that the LAN ports on the RP1 (which can be altered in the System Settings>LAN Configuration page on RP1) will be compatible with the host LAN addresses.

## Accessing H2O for Remote Network Setup

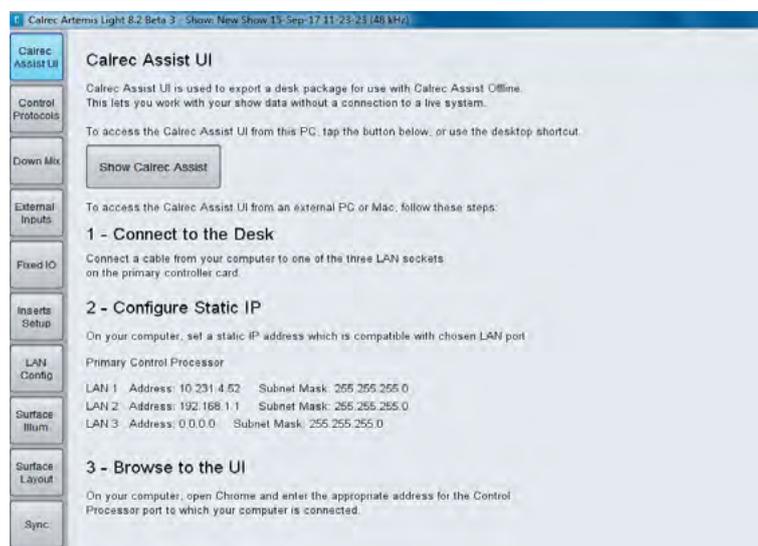
RP1 can then be added as a remote network via the host networks H2O which manages all Hydra2 network usage. The administrator/user accesses H2O in the usual way and from Version 8.0 onwards will see a new button in the H2O banner called ‘Remote Networks’.

Clicking this button opens the Remote Networks page in H2O as shown right, if no remote networks are in the system. At the bottom of the page are shown the ‘+’, ‘-’ & ‘edit’ buttons used to add, delete and edit the remote network entries.

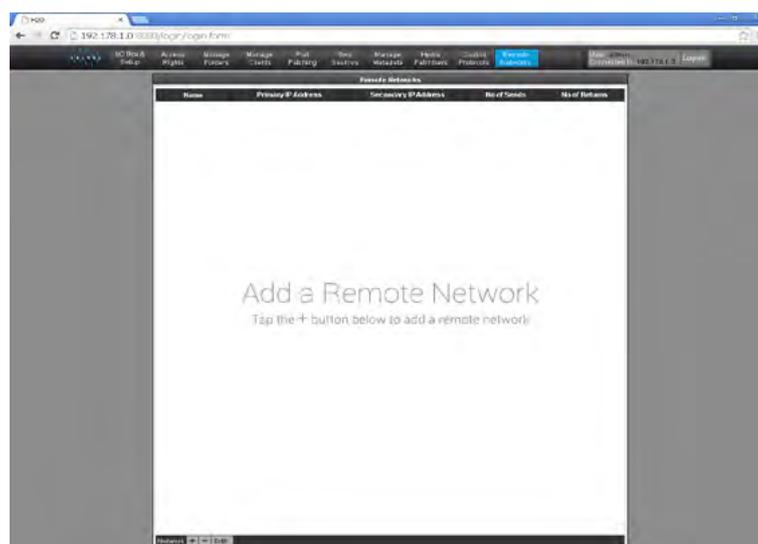
## Adding a Remote Network to the Host

Clicking on the ‘+’ button opens the add remote network pop-up as shown below right.

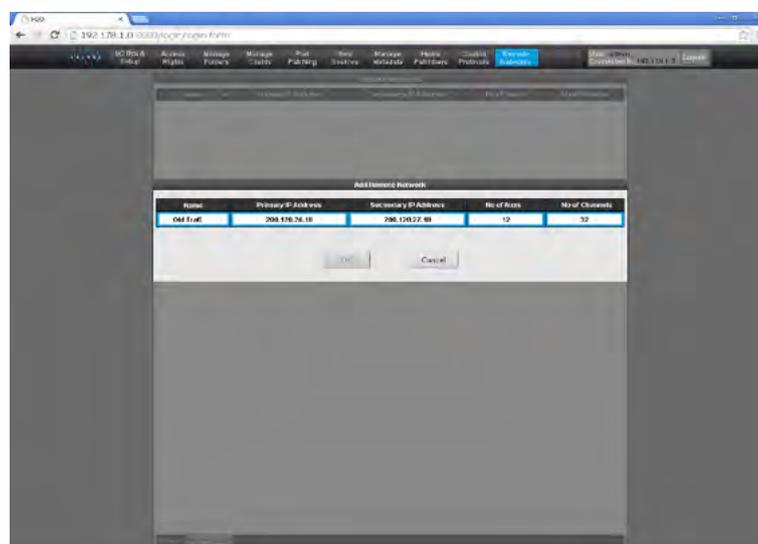
## CALREC ASSIST INFORMATION PAGE



## EMPTY REMOTE NETWORKS PAGE



## ADD REMOTE NETWORK POP-UP



## REMOTE NETWORKS PAGE

The user then fills out the following fields which are used to set up communication between the host console and the RP1 unit:-

- User enters the Name of the RP1 unit with H2O checking for duplicates.
- User enters the IP address of the primary connection on the RP1 unit.
- User enters the IP address of the secondary connection on the RP1 unit.
- User enters the number of Remote Auxes (mono equivalent) to the RP1 unit.
- User enters the number of Remote Channels (mono equivalent) from the RP1 unit.

Note, that validation will be required as each field is edited, the IP addresses must be entered in the correct numeric format, the remote aux buses and remote channel inputs are numeric fields that can be set to a maximum of 12 and 32 respectively for the initial release of RP1.

- User presses Ok to accept or Cancel to reject. If Cancel pressed pop-up closes.
- The Pop-up closes and the remote networks page shows the new remote network entry as shown above right. Note that the name column may be used to change the sort order A-Z / Z-A if required.

### Deleting a Remote Network from the Host

Opening the Remote Networks page in the host networks H2O as shown above right displays all the networks that are associated with the host.

Clicking on the '-' button opens the delete remote network pop-up as shown right, then :-

- User is asked to confirm that they wish to delete this remote network entry.
- User presses Ok to accept or Cancel to reject. If Cancel pressed pop-up closes returning the user to the remote networks page as shown above right.
- If Ok pressed the Pop-up closes and the remote networks page shows the updated remote network entries to confirm that the delete remote network(s) have been removed, as shown below right.

Name	Primary IP Address	Secondary IP Address	No. of Auxes	No. of Channels
Auxible	208.178.26.19	208.178.27.19	12	32
Encoder	208.178.26.20	208.178.27.20	12	32
Old Encoder	208.178.26.18	208.178.27.18	12	32
Standard Encoder	208.178.26.21	208.178.27.21	12	32
Studio A	208.178.26.22	208.178.27.22	12	32

## DELETE REMOTE NETWORK POP-UP

Name	Primary IP Address	Secondary IP Address	No. of Auxes	No. of Channels
Auxible	208.178.26.19	208.178.27.19	12	32
Encoder	208.178.26.20	208.178.27.20	12	32
Old Encoder	208.178.26.18	208.178.27.18	12	32
Standard Encoder	208.178.26.21	208.178.27.21	12	32
Studio A	208.178.26.22	208.178.27.22	12	32

Are you sure you want to delete this remote network?

Ok Cancel

## UPDATED REMOTE NETWORKS PAGE

Name	Primary IP Address	Secondary IP Address	No. of Auxes	No. of Channels
Auxible	208.178.26.19	208.178.27.19	12	32
Encoder	208.178.26.20	208.178.27.20	12	32
Old Encoder	208.178.26.18	208.178.27.18	12	32
Standard Encoder	208.178.26.21	208.178.27.21	12	32

# EDITING A REMOTE NETWORK IN H2O

## Editing a Remote Network from the Host

Opening the Remote Networks page in the host networks H2O as shown above right displays all the networks that are associated with the host.

Clicking on the 'Edit' button opens the edit remote network pop-up as shown right, then the following rules apply.

- User may **NOT** edit the Name of the RP1 unit as this is used as the reference for the unit.
- User may edit the IP address of the primary connection on the RP1 unit.
- User may edit the IP address of the secondary connection on the RP1 unit.
- User may edit the number of remote auxes (mono equivalent) to the RP1 unit.
- Use may edit the number of remote channels (mono equivalent) from the RP1 unit.

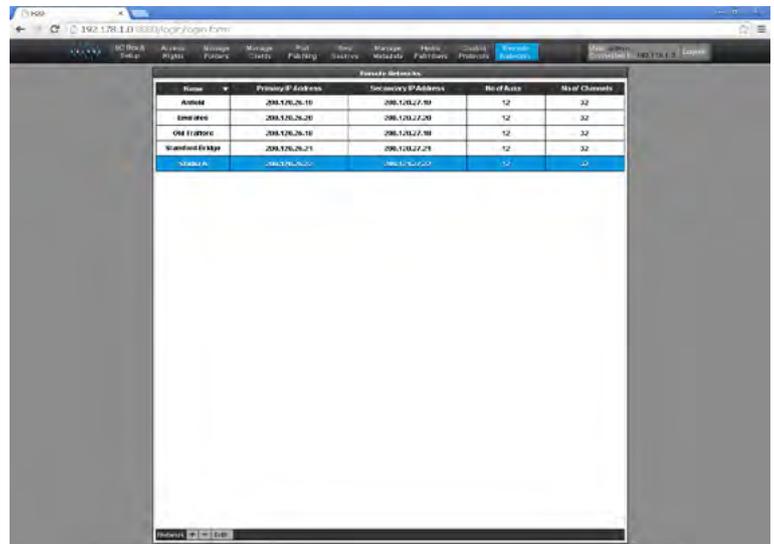
Note, that validation will be required as each field is edited, the IP addresses must be entered in the correct numeric format, the remote aux buses and remote channel inputs are numeric fields that can be set to a maximum of 12 and 32 respectively for the initial release of RP1.

- User presses Ok to accept or Cancel to reject. If Cancel pressed pop-up closes without update.
- If Ok the Pop-up closes and the remote networks page shows the edited remote network entry as shown below right.

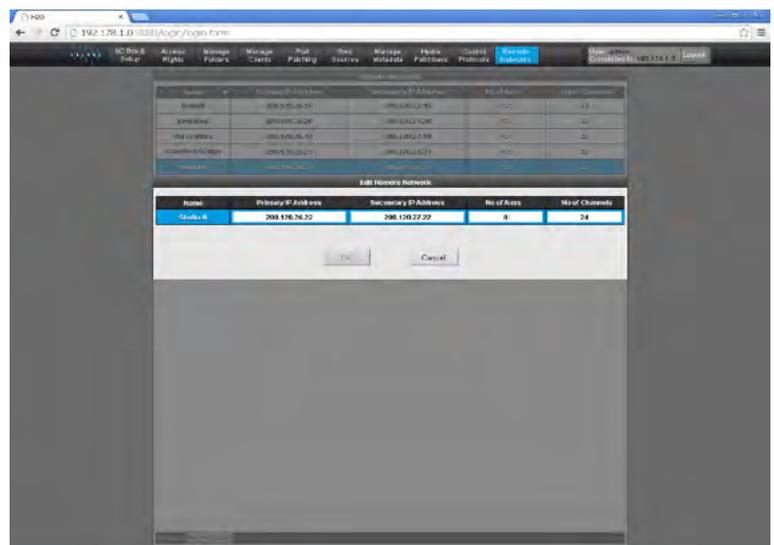
Note that this alters the entries on the Apollo/Artemis PC application in the Hydra2 Settings>Remote Networks page.

Also note, that if the number of aux buses/channel inputs are reduced it should be noted that any paths using those removed aux buses/channel inputs will have their related connections removed.

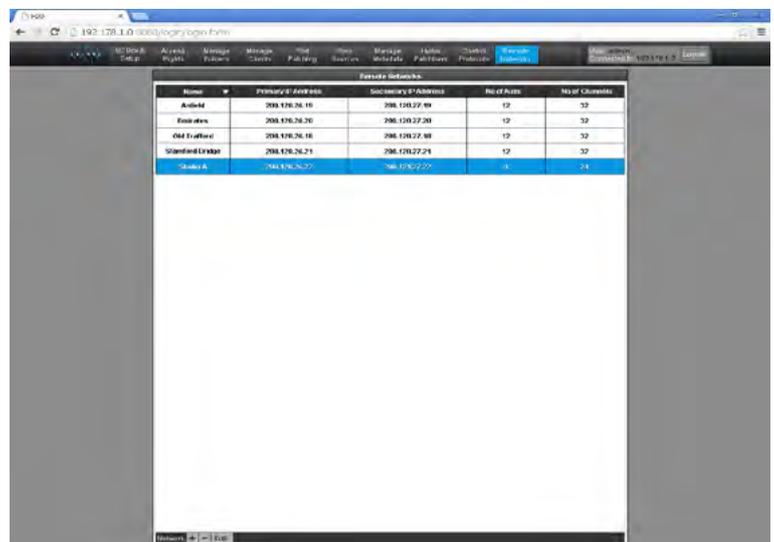
## REMOTE NETWORKS SETUP PAGE



## EDIT REMOTE NETWORK POP-UP



## EDITED REMOTE NETWORKS PAGE



# RP1 OPERATION VIA HOST CONSOLE

# PLACING RP1 PATHS ON THE HOST CONSOLE

**In order to remotely control audio paths on the remote production unit RP1, the user must first place those paths on the fader surface of the host console using the Operate>Fader Setup Screen on the Console PC application.**

There are 2 types of path that can be placed on the surface of the host console 'Remote Faders'- which control mono, stereo or 5.1 input channel parameters usually from microphones at the remote location on the various RP1 units and 'Remote Aux Masters' which control mono or stereo auxiliary output buses typically used as IFB outputs to in ears commentary monitoring out of the various RP1 units.

The user selects which layer/fader the remote fader or remote aux master' will be placed by first selecting a new path placement on the Operate>Fader Setup screen on the host console as shown above right. This will open the new path pop-up showing a selection of new path types and the user selects the 'Remotes' option which for each RP1 unit displays two columns with the remote faders selection appearing in the left column and the remote aux masters in the right column, shown right.

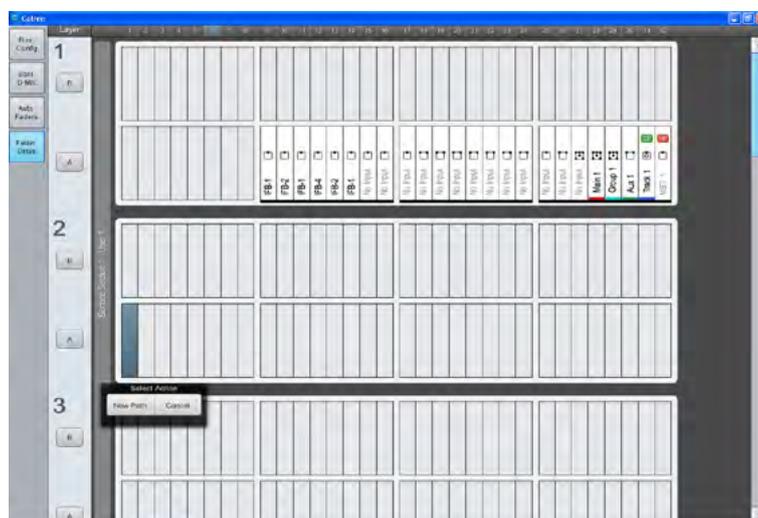
## Selecting Remote Faders

Once the user selects the remote faders block for the required RP1 from the left hand column, a further pop-up showing a list of remote faders appears. The user then selects which remote fader(s) are to be placed at the selected layer/fader on the host console shown below right.

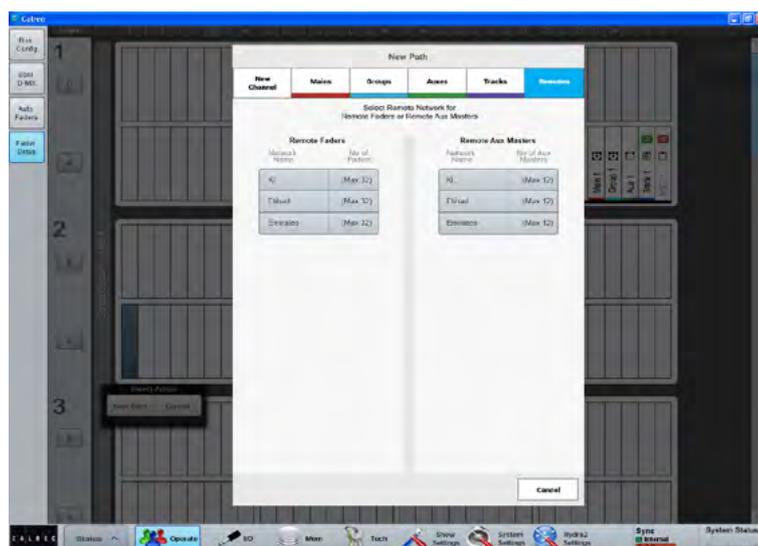
It should be noted that these remote fader assignments are placeholders for whatever input paths are placed on the RP1 fader layout screen and that this process can be carried out prior to RP1 unit connection. For instance if in the Fader1A position on the RP1 is placed a particular stereo input channel path then on connection this path will appear in the selected layer/fader location on the host console.

The maximum number of remote faders that can be controlled from the host is currently fixed at 32 and these need to be placed on any of the 36 Layer A faders of the RP1 unit so that they can be mapped. Layer B faders of the RP1 unit are used for remote faders that are not required to be controlled from the host, but can still be controlled via Calrec Assist. Note if stereo or 5.1 channels are used this will reduce the number of available channels from the pool of 32.

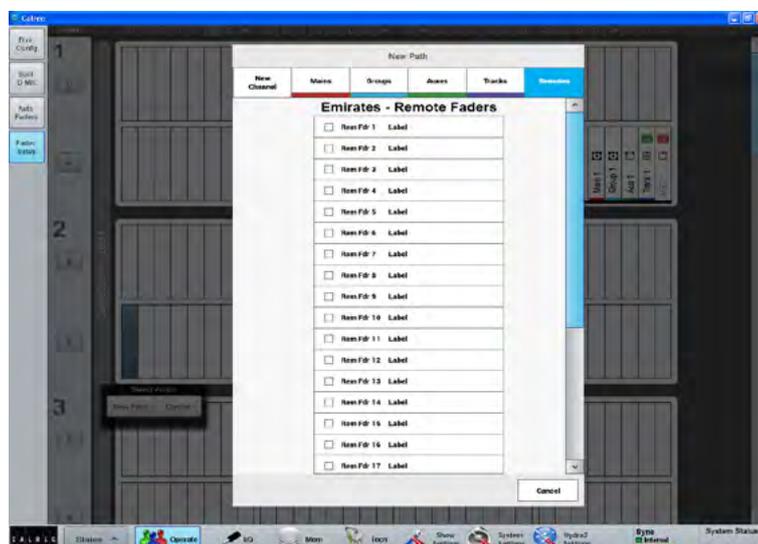
## FADER SETUP SCREEN NEW PATH



## FADER SETUP REMOTE NETWORK POP-UP



## FADER SETUP REMOTE FADERS POP-UP



## FADER SETUP REMOTE AUX MASTERS POP-UP

### Selecting Remote Aux Masters

If the user selects the remote aux masters block for the required RP1 from the right hand column, a further pop-up showing a list of remote aux masters appears. The user then selects which remote aux masters are to be placed at the selected layer/fader on the host console shown right.

It should be noted that these remote aux master assignments are not dependent on their placement on the RP1 unit fader layout screen and don't need to be mapped on to RP1 unit faders.

If remote aux 1 master is placed on a particular layer/fader on the host console that is what will appear in the patching screen and the console surface of the host. However for ease of control from the RP1 unit they are generally placed on the B Layer of the RP1 unit using Calrec Assist.

The maximum number of remote aux masters that can be controlled from the host is currently fixed at 12 and as the 36 Layer A faders of the RP1 unit are generally used to place input paths for remote fader usage, it is recommended that output aux masters are not placed on Layer A. If control of the aux masters is required from the RP1 unit they should be placed on any of the 36 Layer B faders. Note if stereo aux masters are used this will reduce the number of available auxes from the pool of 12.

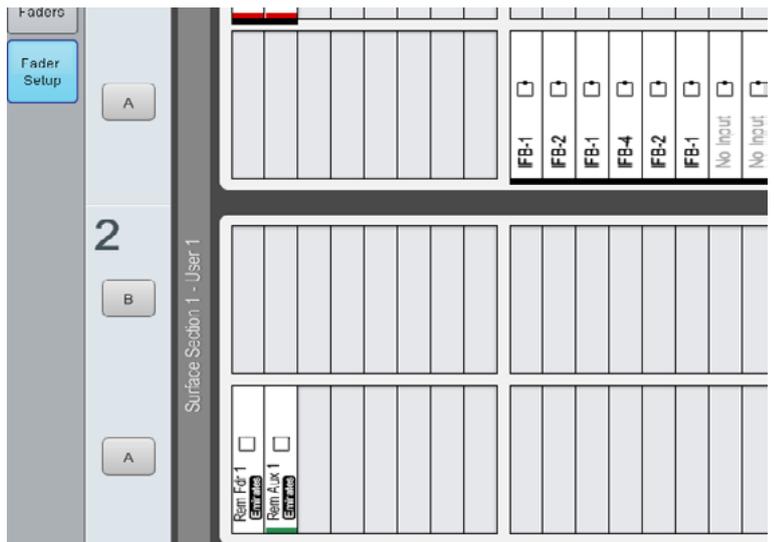
Once the required remote faders and remote aux masters have been assigned they appear on the fader setup screen of the host console as shown right with the network name of the RP1 unit shown for identification.

Note the remote fader and remote aux labels will be replaced by their path names defined in the RP1 unit when connected until then the paths appear on the host console surface and I/O Patch screens as shown below right.

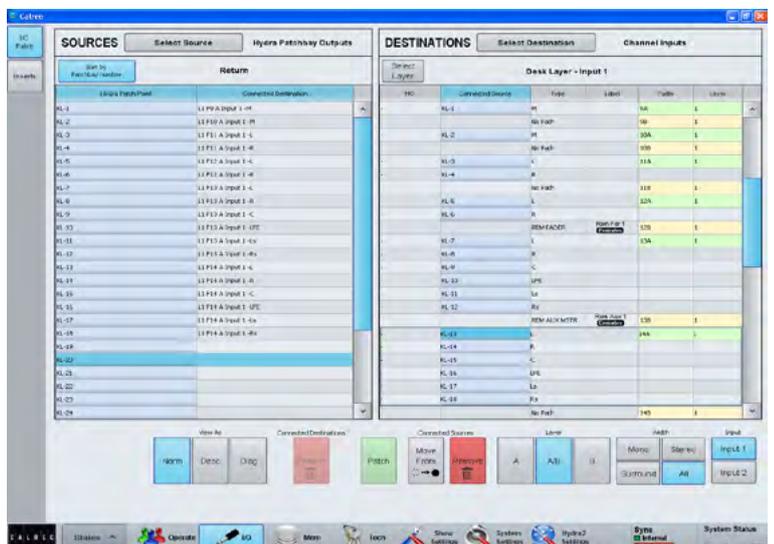
The remote faders and remote aux masters label field can be modified in the IO Patch page when shown on the DESTINATIONS>Channel Inputs page. Note that the Type field shows either REM FADER or REM AUX MSTR and the Label field shows the existing label together with its network name on those entries.



FADER SETUP SCREEN WITH REMOTE FADER & AUX ASSIGNED



I/O PATCH SCREEN SHOWING REMOTE FADER & AUX ASSIGNED



## Deleting Remote Faders & Aux Masters

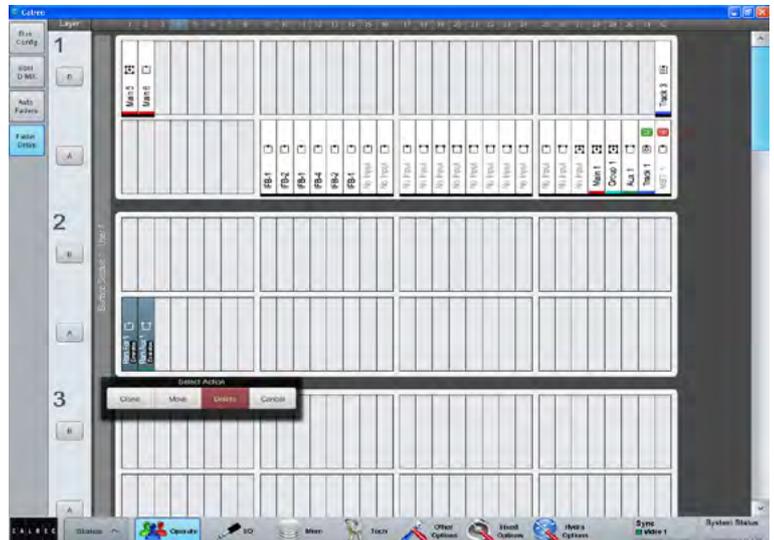
The user selects the remote fader and/or remote aux masters that they wish to delete from the host console via the fader setup screen which opens up the select action pop-up window. See above right.

Clicking on the delete button opens a further pop-up showing the selection of remote faders and/or remote aux masters ready to be deleted as shown below right..

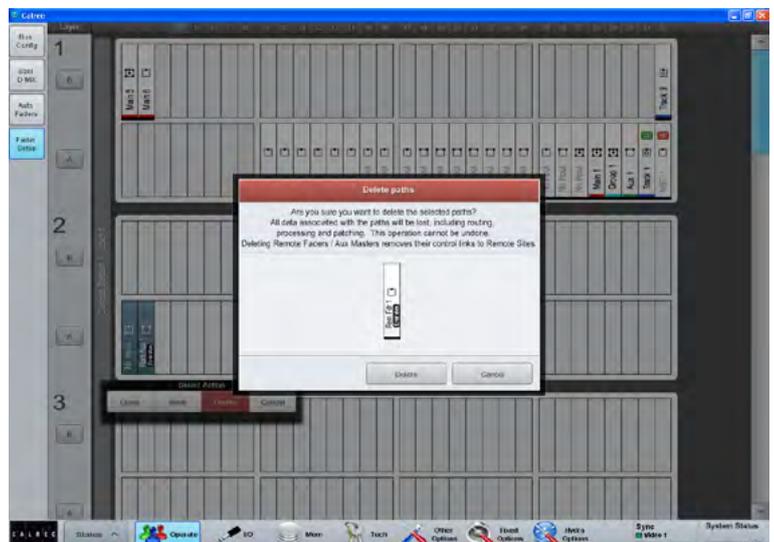
This will remove them from the fader setup screen and the host console removing the control links to those faders on the associated RP1 unit .

On deletion the freed up resources are made available for other usage.

## FADER SETUP SCREEN WITH REMOTE FADER & AUX SELECTED



## FADER SETUP SCREEN WITH DELETE PATHS POP-UP



# CONNECTING TO RP1 FROM THE HOST CONSOLE

## Managing Remote Networks Access

In order to determine and/or alter the connected status of remotely networked RP1 units, the user selects the Hydra2 Settings>Remote Networks screen.

The list of remote networks as shown right are identified by the RP1 unit name and its primary /secondary IP addresses as entered in H20 see "[Remote Networks Setup Page](#)" on page 96.

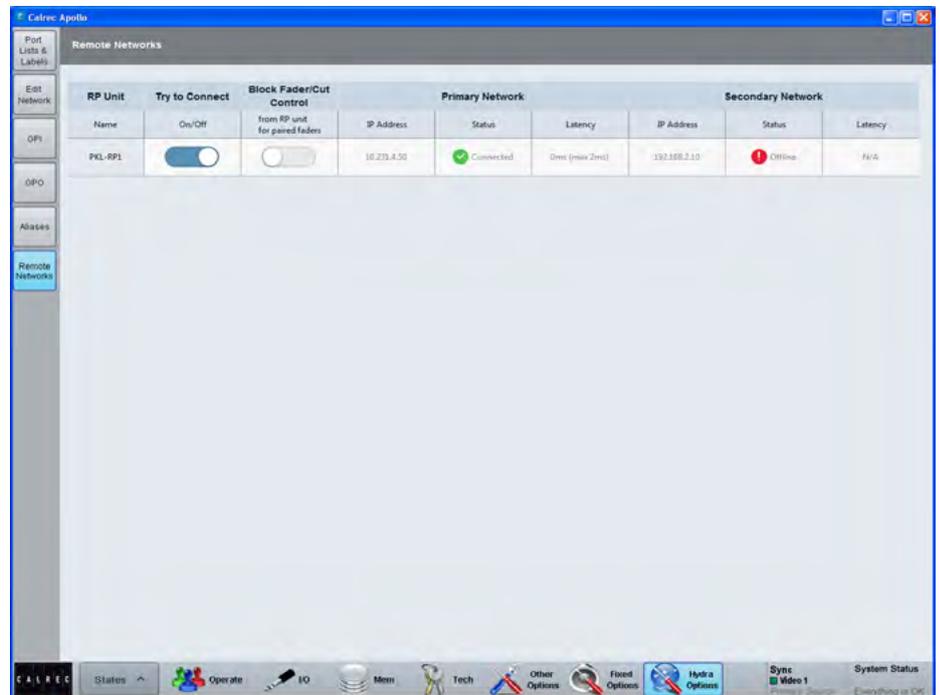
Everything other than the 'Try to Connect' field and the 'Block Fader/Cut Control' field from RP1 is read only and the 'Status' and 'Latency' fields for the primary and secondary IP addresses are updated by occasional polling of each of the remote networks but no connection is established by the host until the 'Try to Connect' switch is selected. The latency fields represent the current time taken to send commands from the console and get an acknowledgement (Ping). The status fields have one of 5 states:- 'Offline', 'Available', 'Connected', 'In Use' or 'Incompatible'.

Clicking the 'Try to Connect' field into the on state sends a request to connect to that remote network. If 'Available', the remote network responds with a connect message which changes the status to 'Connected'. If the request to connect is sent to a remote network which is 'Offline' or 'In Use' or 'Incompatible' then the system continues to poll that remote network at a higher frequency rate until a connected message is received.

Note that 'In Use' means that someone else is using the selected RP1 unit and 'Incompatible' means that there is a mismatch between the RP1 unit and the host preventing correct operation.

Once connected, the RP1 fader and aux master fader parameters and the routing between them is established and sent either from the remote network to setup the remote faders and remote aux master parameters and the routing between them on the host console.

## REMOTE NETWORKS SCREEN SHOWING CONNECTIVITY STATUS



If the 'Block Fader/Cut Control' switch is OFF which is the case during setup, the RP1 parameters are sent to the host console. If the 'Block Fader/Cut Control' switch is ON, which is usually the case during a transmission, the RP1 parameters are sent from the host console. A further description of the 'Block Fader/Cut Control' function is described later in this manual. See "[Blocking Control From RP1 at the Host Console](#)" on page 103

Clicking the 'Try to Connect' field into the OFF state sends a request to disconnect to that remote network. As it was 'Connected', the remote network responds with a disconnect message which changes its status to 'Available'. At this point the host releases the remote network which can then respond to other requests to connect from other hosts.

If a remote network that was 'Connected' goes 'Offline' then its status is reflected in the display and the latency value becomes indeterminate as shown for the Secondary Network in the image above.

If the 'Try to Connect' field is still in the ON state then it will poll that remote network again at a higher frequency rate until a connected message is received.

If a remote network has its 'Try to Connect' field set to the OFF state there will be no attempt to connect made although the system will continue to poll it at a low frequency rate to establish its status.

The status of the 'Try to Connect' field is stored in the system settings of the host and as such is not affected by show or memory loading.

### Reserving Connectivity between an RP1 unit and a Host console

The current design allows any host to connect to any RP1 unit in its H20 list. If a connection is lost to a RP1 unit and another host has its 'Try to Connect' switch set for the same RP1 unit the other host could steal the connection (unintentionally). To avoid this each user is expected to manually disconnect from an RP1 unit when finished with it, so that it is available for another host console.

# LINKING OF HOST TRANSMISSION FADERS AND REMOTE FADERS

## Pairing TX and Remote Faders

In order to keep the transmission fader and the remote fader in step, the transmission fader that is controlling the broadcast channel (the host TX fader) can be paired to control a corresponding fader on a RP1 unit (the RP1 fader) via the 'Remote fader'. This is configured from the host.

The three faders are then considered as being the same fader. This is to ensure that the RP1 fader follows the setting of the host TX fader via the remote fader.

Using the fader setup screen, the user can 'Pair' a Remote fader and host fader together. (It is up to the user to choose a host fader that is a TX fader). These will then operate like a Link, where moving either fader moves them both by the same amount, but note it only pairs the faders and cut/on switches.

## Pairing and Unpairing Procedures:

Go to **Operate>Fader Setup** and click on the required TX fader, the 'Select Action' pop-up appears as shown in the start pairing image above right.

Click on 'Pair' then select the remote fader that the TX fader is to be paired with as shown in the Complete the Pairing image right. Click on 'Pair' again to complete the pairing.

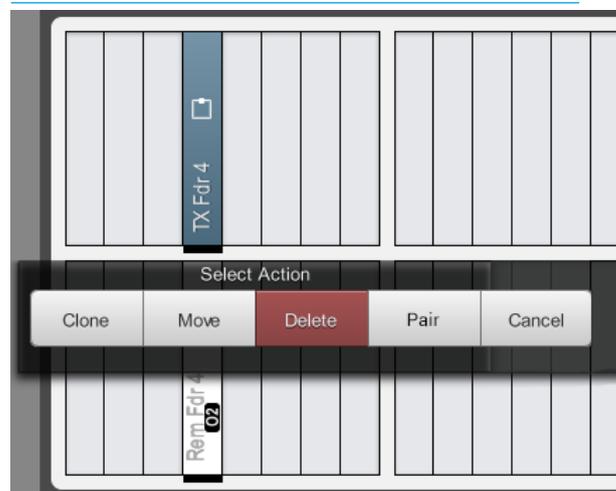
Note that once the pairing has been made the pair symbol is shown on both faders.

To Unpair a TX Fader and a Remote fader click on either fader (with the pair symbol on it), the 'Select Action' Pop-up appears.

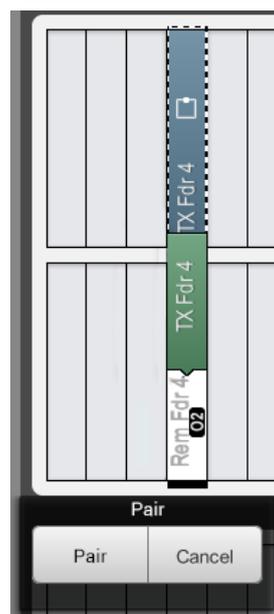
Clicking on the 'Unpair' button will separate them again.

Note that when pairing the controls, if the 'Block Fader/Cut Control' is off the Remote Fader will copy its Fader and Cut values to the TX Fader but if the 'Block Fader/Cut Control' is on then the TX Fader will copy its Fader and Cut values to the Remote Fader.

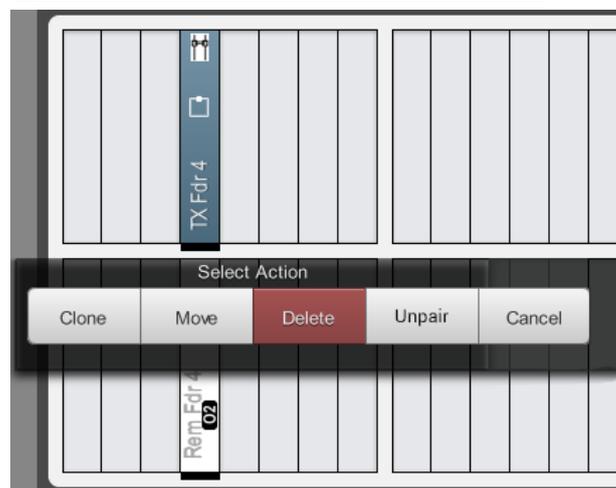
## START PAIRING TX FADER WITH REMOTE FADER



## COMPLETE THE PAIRING



## UNPAIRING TX FADER FROM REMOTE FADER



# BLOCKING CONTROL FROM RP1 AT THE HOST CONSOLE

## Blocking RP1 Control Access

During Transmission or Rehearsal it may be necessary to prevent the RP1 console from altering the control values of 'Paired' faders. Moving an RP1 fader which is paired with a TX fader accidentally could cause problems with the transmission/recording. This is configured from the host.

**Blocking Procedure:** In order to prevent this each host console has a switch on the **Hydra Options>Remote Networks** page to 'Block Fader/Cut control' from the RP1 unit (Red switch) shown above right.

This switch has 2 functions:-

1. It is used to determine the data direction of the RP1 settings during setup and during normal operation as described in the previous section.

2. It is used once Setup is complete to effectively make the host console the Master and prevent the RP1 controlling paired faders from the remote end.

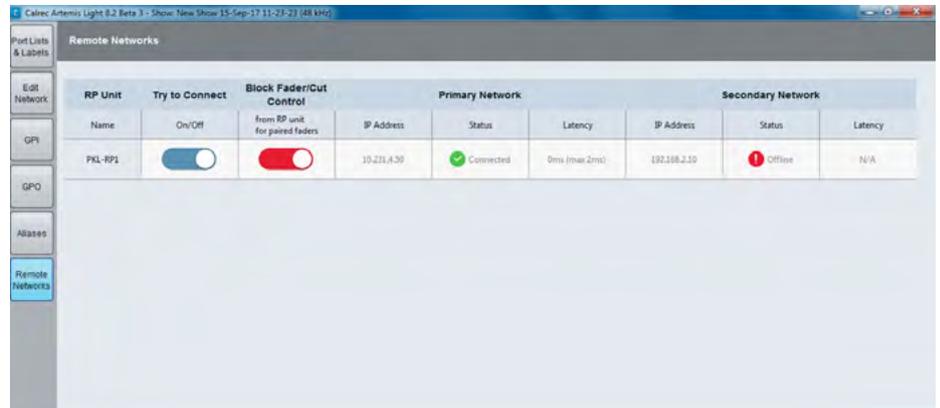
The images right for the Accessed Path Processing> Faders and below right for the Fader Surface pages of RP1 shows the result when a paired Fader & Cut has been blocked by the host.

It can be seen that both the Fader and Cut for paired faders are greyed out and cannot be controlled from the RP1 when the Blocking switch is applied.

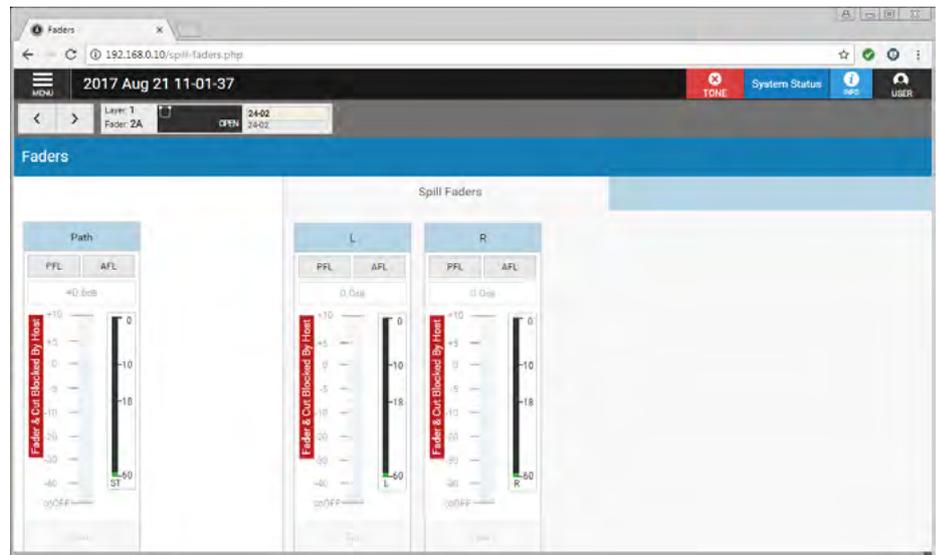
The fact that the RP1 has been 'Blocked by Host' rather than 'Allowed' is also shown in the RP1 System Settings>General Settings>RP Unit Settings with a status flag for Fader & Cut Control for Paired faders on host. See ["RP Unit Settings"](#) on page 51.

Note: Although RP1 is blocked it still responds and displays all changes made to those blocked controls from the host console. The RP1 user is prevented from altering those controls, but can alter all the other parameters as required.

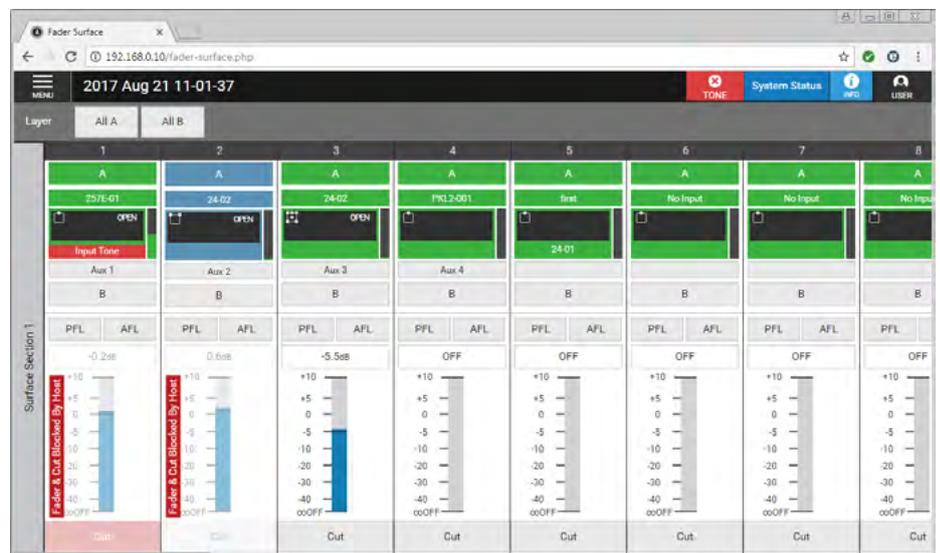
## REMOTE NETWORKS SCREEN SHOWING BLOCK FADER/CUT CONTROL ON



## RP1 ACCESS FADERS SCREEN SHOWING BLOCKING CONTROL ON



## RP1 FADER SURFACE SHOWING BLOCKING CONTROL ON FADERS 1 & 2



# INDEPENDENT OPERATION OF RP1 FROM THE HOST CONSOLE

## Setting the RP1 to be independent

Under certain operational conditions it is desirable to allow the RP1 unit to become temporarily 'Independent' of the host. This is configured from the RP1 unit.

### Set RP1 Independent Procedure:

Go to **Menu>System Settings>General Settings>RP Unit Settings** and click on the 'Independent' button which makes the RP1 unit independent of the host settings and control. Note: once independence is established the 'Independent' status flag is shown in the System status area in the header so that the user can see this on every page as shown above right.

The host console is also informed that the RP1 is connected but 'Independent' in **Hydra Options>Remote Networks** underneath the name of the RP1 Unit that has become independent as shown right.

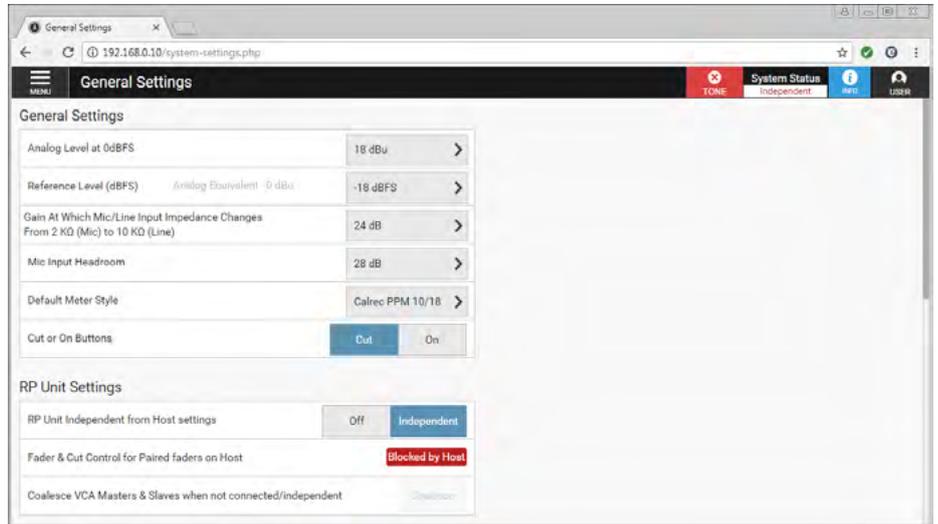
When the RP1 unit independence is ON:

The host can alter the settings for the Remote Fader but the RP1 unit ignores them. In addition, the RP1 unit will ignore the 'Block Fader/Cut Control' status and hence control will not be blocked at the RP1 unit from making changes. If the RP1 unit is set to be 'Independent' no settings are transferred in either direction irrespective of the 'Block Fader/Cut Control' setting.

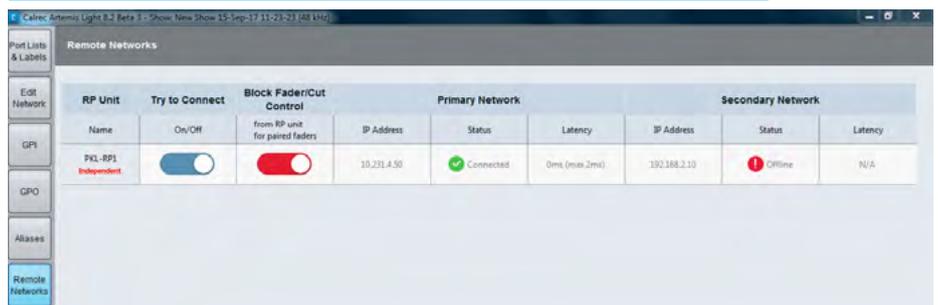
It is only when the Independence is turned OFF that the setting of the 'Block Fader/Cut Control' switch becomes relevant.

With Independence is turned ON, the RP1 unit will continue with the current settings, including any host VCA Master settings as described in the next section. It will save these settings in its hidden memory in case of power loss. The 'Independent' switch setting is also stored at system level on the RP1 unit.

## RP1 GENERAL SETTINGS SHOWING INDEPENDENCE SET



## RP1 SHOWN AS INDEPENDENT ON HOST CONSOLE



When the RP1 unit 'Independent' switch is OFF: the effect that any host VCA group Master settings have on Remote Faders prevail over the settings on the RP1 unit.

If the 'Block Fader/Cut Control' switch is ON, the host settings for the Fader and Cut data for any paired Remote Faders prevail over the settings on the RP1 unit.

If the 'Block Fader/Cut Control' is OFF, the RP1 unit settings for the Fader & Cut data (except for any VCA Master settings) for any paired Rem Faders prevail over the settings on the host.

Irrespective of the 'Block Fader/Cut Control' setting, all the other RP1 unit settings (except for any VCA Master settings) prevail over the settings on the host.

See "[Loading Shows / Memories on the Host Console / RP unit](#)" on page 107 for a detailed description of what happens with memory loads from the host or from the RP1 unit which is determined by the various flags such as 'Try to Connect', 'Independence' and the 'Block Fader/Cut Control' status flags

# VCA CONTROL OF RP1 PATHS FROM THE HOST CONSOLE

## Remote Fader Control using VCAs

There is a requirement to be able to control Remote faders on an RP1 unit from the host console as part of a VCA group.

The existing mechanism for creating VCA groups has been extended to allow VCA control of Remote Faders on an RP1 unit by selecting a path or blank fader on the host console as the VCA Master, pressing and holding down its Assign button on the console surface and then pressing the assign buttons of those Remote Fader paths that are to be VCA slaves to that VCA master.

There are rules about connecting TX and Remote faders that differ from the normal VCA system and various cases have to be handled on Connection and Disconnection between the host console and the RP1 unit and how to handle the combination of faders under Paired and VCA control:

If the Remote fader isn't paired with a TX fader it just behaves as a normal VCA slave following the VCA master.

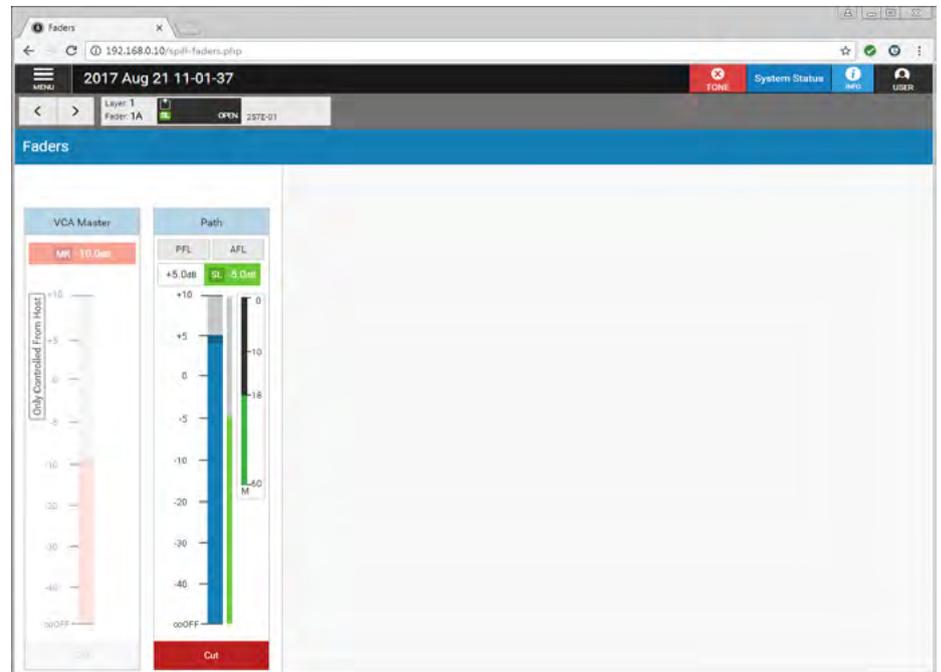
If just the TX fader is made a slave of a VCA group, the Remote fader will not follow the VCA master but it will still be paired and follow the TX fader with may include an offset.

If just the Remote fader is made a slave of a VCA group, the TX fader will not follow the VCA master but it will still be paired and follow the Remote fader which may include an offset.

If both the TX fader and the Remote fader are made slaves of a VCA group they both follow the VCA master and also follow each other as paired.

Note: Remote faders on the host console cannot be made VCA Masters.

## ACCESS FADERS SCREEN ON RP1 SHOWING VCA MASTER FROM HOST



The image above shows the access faders screen with the fader now being controlled by a VCA master from the host.

Additional scales appear on the display to show the resultant Slave Level (SL) that results when adding the VCA master level of -10dB to the Remote Fader level of +5dB to produce a resultant (SL) audio level of -5dB.

There are issues relating to what happens when the RP1 unit and host console become disconnected: if the VCA Master was down at the bottom and a disconnection happens there is no way that the channel can be opened from the RP1 unit. This is because the fader software (in the RP1 unit) will not allow a slave to be opened if the master is off. Similarly, if the VCA master is Cut, the channel on the RP1 unit cannot be uncut.

When the connection between the RP1 unit and the host console is broken

(for any reason) or when the RP1 unit is 'Independent', these RP1 faders will have a fader value (SL value) and a MR value (possibly incorporating a Primary MR value). These need to persist to cater for intermittent connections.

The MR and SL levels are saved in RP1 unit Shows and Memories. This means they can be saved when the RP1 unit goes Independent and recalled when Independence is turned off. Although they will be immediately overwritten by the host if it is connected, the RP1 unit will at least be able to be returned to the same state as it was in before it went Independent.

The VCA master MR fader and VCA slave SL fader displays are shown, with the relevant MR & SL levels, for as long as the RP1 unit thinks these faders are slaves, including when it is not connected or is Independent.

With the RP1 unit disconnected or made Independent, the control of VCA masters is taken over by the RP1 unit to allow the user to adjust the resultant audio fader and cut controls for this RP1 path.

There is also a global option to remove the effect of the VCA masters by coalescing or adding the value of the VCA Masters to the Remote Faders and removing the VCA masters to provide single fader control.

This is done by pressing the Coalesce button in the RP1 units System Settings> General Settings>RP unit settings as shown in the image above right.

The result is shown in the 2 images below right, the first showing the Pre-coalesce state and the second showing what the control becomes post the coalesce.

Note: once the RP1 unit is reconnected or no longer independent the VCA master and VCA slave are restored depending on the 'Block Fader/Cut Control' switch and the current settings of the host console.

For instance whilst the RP1 unit has been disconnected the host operator might have changed the VCA group structure or levels which will affect the RP1 display and if not blocked the fader settings would be transferred, with the exception of the VCA master, from RP1 unit to host.

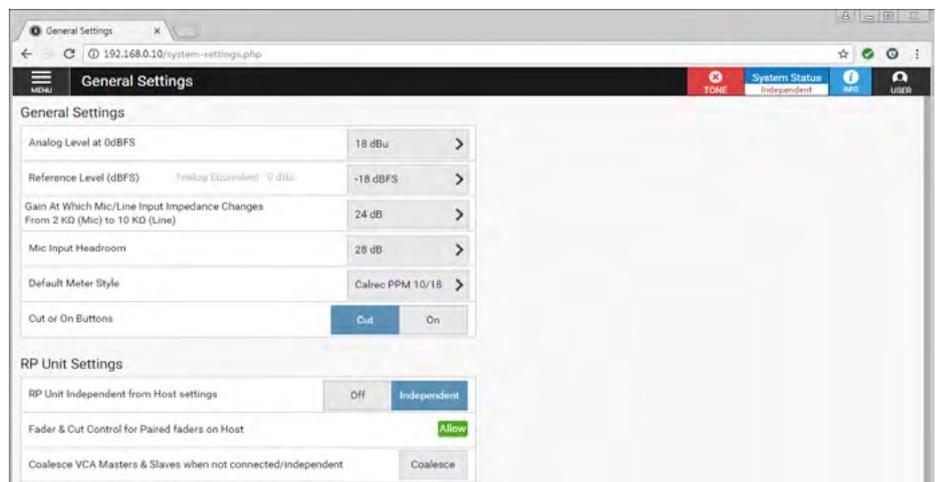
**When the connection is re-made, or the Independence is turned off:**

If the 'Block Fader/Cut Control' switch is ON (the usual case during transmission) the SL & MR values will be applied from the host for the paired faders.

If the 'Block Fader/Cut Control' switch is OFF, the RP1 fader value (SL value) will be applied to the remote fader for paired faders (and this will alter any Paired host fader by the same offset).

However, any MR values on the host will be applied to the MR values on the RP1. This may result in the RP1 audio jumping if the MR faders have been moved since the connection was lost.

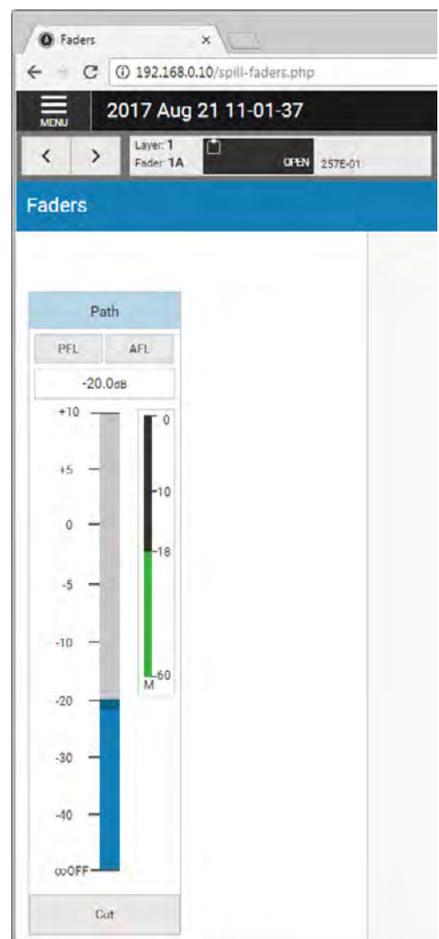
**VCA COALESCE OPTION WHEN REMOTE FADER SLAVE DISCONNECTED**



**VCA PRE-COALESCE**



**POST COALESCE**



The MR values from RP1 can never be applied to the MR values on the host. Other than VCA MR, all settings for non-paired Remote faders are always sent and never blocked from the RP1 unit.

Other settings (Aux sends, Mic gain, etc) for paired faders are always sent from the RP1 unit and never blocked on the RP1 unit because these settings are not paired.

# LOADING SHOWS / MEMORIES ON THE HOST CONSOLE / RP UNIT

## Loading a Show from the Memories Screen, Cue List or Ember from the Host Console

For each RP1 unit, the user of the host console can review and alter the state of the 'Try to Connect', and 'Block Fader/Cut Control' switches before loading, as the state of these switches determines what happens during a show load.

Once happy with these, the user can proceed to the Mem page to load the show. If the show uses a RP1 unit and that is set to 'Try to Connect', the show will be loaded and the appropriate RP1 unit data transferred in the appropriate direction from host to RP1 unit if the 'Block Fader/Cut Control' is set or from RP1 unit to host if it isn't.

Note that if the RP1 unit is set to be independent, settings are not transferred.

If the show is not using a RP1 unit that is set to 'Try to Connect', the show will be loaded and the RP1 unit setting unaffected.

## What happens when the Host Console boots up or is reset?

This loads the show that was active the last time the console was running. This must occur without hindrance to cater for brown-outs etc.

As the 'Try to Connect', and 'Block Fader/Cut Control' switch settings are stored at System level, these will come up as they were before the console was turned off (or reset), which is exactly what the user would want.

After the console has been off for a period, a new user may not know the settings of these switches, or which show is going to be loaded.

**Therefore, users should clear down (turn off) all 'Try to Connect' switches after they have finished a Remote Production session.** This will avoid the console inadvertently connecting to a RP1 unit that another console is going to use, overwriting some of its settings.

## Loading a Memory from the Memories Screen, Cue List or Ember from the Host Console

For each RP1 unit, the user of the host console can review and alter the state of the 'Try to Connect', and 'Block Fader/Cut Control' switches before loading, as the state of these switches determines what happens during a memory load.

Once they are happy with these, the user can proceed to the Mem page to load the memory. If the memory is using an RP1 unit and that is set to 'Try to Connect', the show will be loaded and the appropriate RP1 unit data transferred in the appropriate direction from host to RP1 unit if the 'Block Fader/Cut Control' is set or from RP1 unit to host if it isn't.

Note that if the RP1 unit is set to be independent, settings are not transferred.

If the memory is not using a RP1 unit that is set to 'Try to Connect', the memory will be loaded and the RP1 unit setting unaffected.

Because the memory is being loaded on the host, and this does not have any audio where the settings are not meant to prevail, there should be no instance where audio could change to the settings from the memory, and then change again to the settings that are meant to prevail. The exception would be anything that has been Isolated on the host, but this will be dealt with by the existing Isolate system.

## Loading a Show/Memory from the RP1 Unit

If NOT connected to the host then the RP1 unit loads its Show/Memory ready for subsequent connection to the host.

If connected to the host console, the RP1 unit 'Independent' flag is tested. If independence is ON, then the RP1 unit loads its Show/Memory ready for independence to be turned OFF. No settings are transferred in either direction irrespective of the 'Block Fader/Cut Control' setting.

It is only when the Independence is turned off that the setting of the 'Block Fader/Cut Control' switch becomes relevant.

## What happens when Independence is turned OFF on the RP1 unit?

If connected to the host console, and not independent, the status of the 'Block Fader/Cut Control' switch is tested.

The effect that any host VCA master settings have on Remote Faders prevail over the settings on the RP1 unit.

If the 'Block Fader/Cut Control' switch is ON, the host settings for the Fader & Cut data for any paired Remote Faders prevail over the settings on the RP1 unit.

If the 'Block Fader/Cut Control' switch is OFF, the RP1 unit settings for the Fader & Cut data (except for any VCA master settings) for any paired Remote Faders prevail over the settings on the host.

Irrespective of the 'Block Fader/Cut Control' setting, all other RP1 unit settings (except for any VCA master settings) prevail over the settings on the host.

When the 'Independent' switch is turned OFF on the RP1 unit, the host's Remote Networks page updates and removes the 'Independent' status flag.

Note the RP1 unit will again obey the 'Block Fader/Cut Control' status and if ON, not be able to control any paired TX/Remote faders.

If NOT connected to the host then the RP1 unit continues with its existing settings, waiting for connection.

## What happens when the Host Console 'Hot-Swaps'?

No action occurs if the connected state of the RP1 units is unaffected. If they are affected, then the RP1 unit continues with its existing settings, waiting for connection.

# VIEWING PATHS ON THE HOST CONSOLE SURFACE

## Remote Faders & Remote Auxes on Assign Displays

Prior to connecting to the RP1 unit, the remote faders/remote aux masters appear as shown in the Fader Assign displays (above right). The remote network name appears in the centre of the display in Red showing that the RP1 unit is not currently connected. Note the path widths may be unknown at this time and shown as '?'

If the RP1 unit is connected but it's I/O is not available the label is as shown right and a red '!' symbol appears.

The image to the lower right shows the same displays but now connected with the I/O online. The width display M, ST or 5.1 of the remote faders and M or ST of the remote auxes will show correctly once connected to the host.

## Remote Faders & Remote Auxes on Meter Displays

As the metering information for remote faders and remote auxes is not available at the host the meter displays appear as shown below right. It does show the network name for the RP1 unit and the path fader label or port label depending on the label selection. As an example 'Rem Fdr26' on the RP1 unit named 'Rasputin' is highlighted as the current assign.

## Remote Faders & Remote Auxes Host Console control limits.

The console faders and cuts for the remote paths that have been placed on the host console surface behave the same as any of the host consoles own paths with a few exceptions. The AFL, PFL, ISO and DIR TB buttons currently have no function. Stereo and 5.1 remote paths can however be spilled out to allow routing and individual level & cut control of their L & R legs in the stereo case and LR, C, Lfe & LsRs legs in the 5.1 case.

Note that for the remote aux masters, the only controls available from the host are the bus fader and cut controls whereas the remote faders also have other controls available from the host console which are shown on the following pages:-

FADER ASSIGN DISPLAYS SHOWING RP1 DISCONNECTED



FADER ASSIGN DISPLAYS SHOWING RP1 I/O PORTS DISCONNECTED



FADER ASSIGN DISPLAYS SHOWING RP1 PATHS CONNECTED



METER DISPLAYS SHOWING RP1 PATHS ON TFT PANEL



### Remote Fader Input Controls on Fader/Wild Assign Panels

When a stereo RP1 path is accessed as shown here for 'Rem Fdr26' selecting Processing mode for the current assign displays the input parameters that can be controlled from the host.

An important point to note here is that the mic gain and phantom power parameters are 'Protected' from change using the normal protection scheme as applied to Apollo and Artemis.

In order to change these protected parameters the user is required to hold down the path's current assign button.

The image to the right shows the display with the assign button held down.

CURRENT ASSIGN DISPLAY SHOWING RP1 INPUT CONTROLS FROM HOST



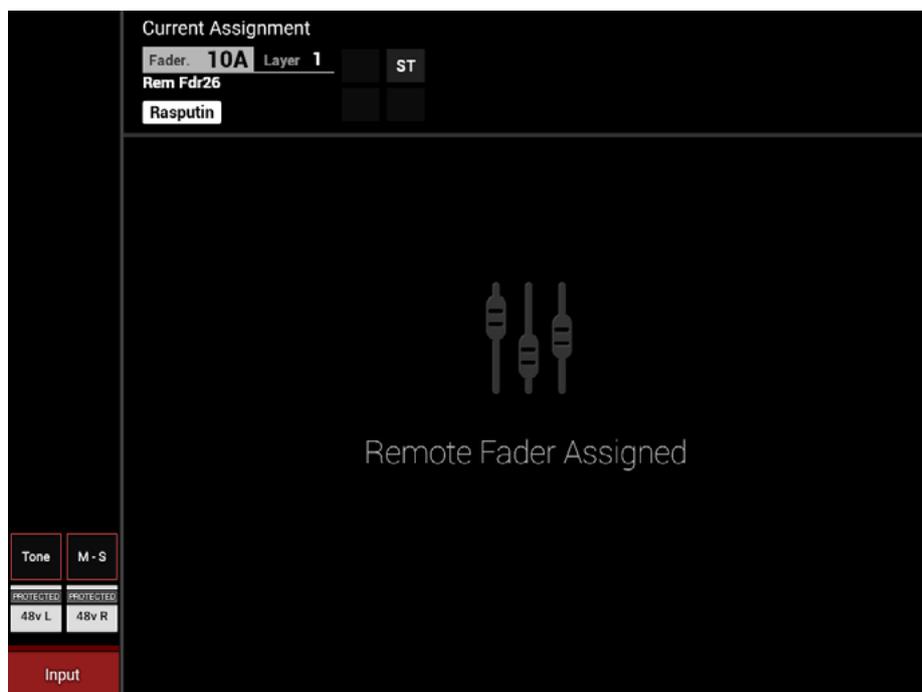
### Remote Fader Input Controls on Fader/Wild Assign TFT Displays

The TFT processing display in the Wild Assign of Apollo or Fader panel of Artemis appears as shown right for remote faders at the host.

As an example 'Rem Fdr26' on the RP1 unit named 'Rasputin' is the current assign, it is a stereo path and has microphones ported to it, which is why it is showing not only the Tone and M-S decoder buttons but also the 48v L and 48v R buttons. Note that these phantom power buttons are shown as 'Protected'.

The centre of the TFT shows either 'Remote Aux Master Assigned' if a remote aux is selected as the current assigned path or 'Remote Fader Assigned' if a remote channel is selected as the current assigned path.

CURRENT ASSIGN TFT DISPLAY SHOWING RP1 INPUT CONTROLS FROM HOST



### Remote Fader Aux Send Controls on Fader/Wild Assign Panels

When a stereo RP1 path is accessed as shown here for 'Rem Fdr26' pressing 'Sends & Routes' for the current assign displays aux send parameters that can be controlled from the host.

Up to 12 remote aux sends can be set for this remote fader. The image to the right shows that 9 remote auxes are available and that aux 2 is switched on for this remote fader. In this mode the panel allows control of the send level, its on/off state and its pre/post fader position in the remote fader path. If the remote aux is stereo like aux 2 shown, a pan control with On/Off is also provided. Pressing the switch down on any aux rotary control changes the focus window below to that aux as required. Note the focus window also shows the network name of the RP1 unit being controlled.

CURRENT ASSIGN DISPLAY SHOWING RP1 AUX SEND CONTROLS FROM HOST



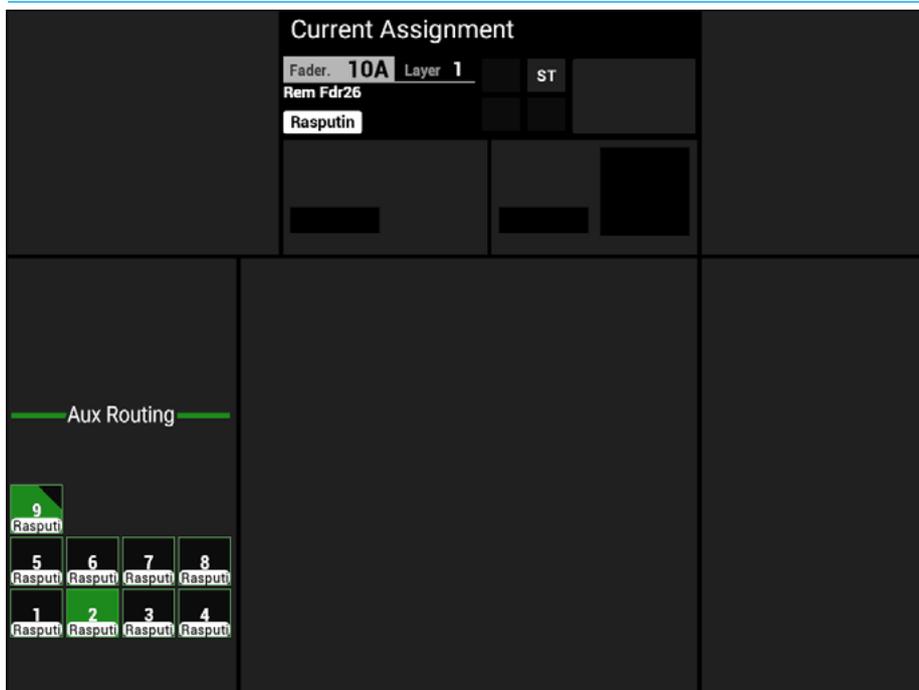
### Remote Fader Aux Route Controls on Fader/Wild Assign TFT Displays

The TFT routing display in the Wild Assign of Apollo or Fader panel of Artemis appears as shown right for remote faders at the host.

As an example 'Rem Fdr26' on the RP1 unit named 'Rasputin' is the current assign, and is a stereo path. This page allows the user to display and route the remote fader to remote auxes.

Note for stereo and 5.1 remote channels the existing mechanism for showing partial routing applies, i.e. the corner of the routing box is cut off as shown right for aux 9 which only has the left leg of the stereo pair routed. Otherwise it appears as shown for aux 2.

CURRENT ASSIGN DISPLAY SHOWING RP1 AUX ROUTING CONTROL FROM HOST



### Remote Fader Input Strip Controls on Fader/Wild Assign Panels

When a surface panel is placed into strips mode, and the 'Input-Pan' strip button is selected the display appears as shown right. The button cell display at the bottom of the panel shown right displays either the IP2 selector button on an Apollo or the IP2 selector button and a 'More IP' button on an Artemis.

The strips shown are for mono, stereo and 5.1 remote faders respectively from left to right. The stereo strip offers more controls than the others including an ST WIDE control and an IP 1/2 Balance control which appears either on the top row of the Apollo or as an alternate display on Artemis when the 'More IP' button is active.

Also note that the stereo path mic gain control (in column 2) is shown with its values as the image was captured with the Assign button held down to by-pass the protection system.

CURRENT ASSIGN DISPLAY SHOWING RP1 INPUT STRIP CONTROLS FROM HOST



### Remote Fader Aux Send Strip Controls on Fader/Wild Assign Panels

When a surface panel is placed into strips mode and the 'Aux 1-12' strip button selected, the display appears as shown right. The button cell display at the bottom of the panel shown right displays either two selector buttons 1-6 & 7-12 for Apollo or three selector buttons 1-4, 5-8 & 9-12 for Artemis.

The top right of the button cell shows that this strip is controlling 'Remote RP1' Aux sends, rather than the host consoles Aux sends.

Selecting one of the selector buttons displays a block of either 6 Aux sends for Apollo or 4 Aux sends for Artemis.

CURRENT ASSIGN DISPLAY SHOWING RP1 AUX STRIPS CONTROLS FROM HOST



## Remote Fader Wild Controls on Fader/Wild Assign Panels

The ability to put wild controls on the vertical strip above each fader has been extended to allow wild controls on RP1 paths. The panel image to the right shows a collection of controls as an example.

Note that not all the controls that are 'Wildable' on Apollo and Artemis can be applied to RP1 paths, however in subsequent releases, the host interface will have functions added to it allowing greater control of RP1 as various controls are added to the wildable controls list.

The following controls can be assigned as wild controls of RP1 on the host console:-

### Wild Input Controls for RP1 remote faders

Trim, mic gain, 48v (phantom power), polarity invert, +/- 6dB gain steps, input balance for stereo, stereo width, left to both, right to both and input 1/input 2 changeover with trim linking.

### Wild Aux Send Controls for RP1 remote faders

Level with on/cut for each of the 12 aux sends and pan with on/off for stereo auxes.

Note that Apollo has an extra set of wild controls in the fader panel consisting of a button cell and a rotary control cell and these may also be used for RP1 wilds if required.

### Remote Fader & Remote Aux:- Equaliser, Dynamics & Direct Output Controls on Host

It should be noted that although RP1 version 1.1 now has the ability to apply Equaliser, Compressor-Limiter with 2 band Sidechain Equaliser and Sidechain Listen, Expander/Gate processing and have control of Direct Outputs, this added functionality has not yet been brought under the control of the host console.

## CURRENT ASSIGN DISPLAY SHOWING RP1 WILD CONTROLS FROM HOST



# STEREO/SURROUND SPILL OF REMOTE PATHS

**Just as with local paths on the host console, remote paths can also use the surface controls for accessing and controlling individual legs of stereo/surround signals using the Spill faders on Apollo & Artemis.**

Whether controlling remote mono, stereo or surround signals, only one master fader is required on the surface for global manipulation and application of signal processing to the complete collection of paths that make up that signal.

For remote stereo signals, two mono paths are required and controlled simultaneously by a single master fader. For remote surround signals, six or more mono paths are required and controlled simultaneously by a single master fader.

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

## Accessing the Spill Faders

On the dedicated Spill/Monitor panel, shown right (or on the Spill/Joystick panel on Apollo which has the exact same upper section as highlighted right) or on an Artemis Monitor panel press the SPILL LEVELS button. This upper section will now allow access and control of the individual legs of a remote stereo or surround path via the spill faders.

## Spill Control Layout

The spill controls follow the currently assigned path. When a remote fader which controls a stereo or surround signal is selected as the currently assigned fader, the spill panel updates to reflect the status of the component signals.

If the assigned remote fader controls a mono path, the spill panel will become unavailable until a fader controlling a stereo or surround path is assigned.

## SPILL CONTROLS FOR REMOTE PATHS



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

They have the same assign buttons above and below the fader label display and the same cut buttons. It should be noted however that the fader level meters and the PFL & AFL controls are not currently brought back to the host from the RP1 unit.

The Spill legs can be selected as the currently assigned path in the same way as any other fader and by doing so, individual control of the input processing of a specific component path is possible.

Depending on the width of the signal present on the assigned fader, the component signals will be arranged differently on the spill faders. Stereo components of a surround signal such as L-R and Ls-Rs are normally grouped together and controlled by a single spill fader, whereas mono components such as C & LFE are present on their own fader.

In spill mode with a stereo path selected, the first two faders control the left and right channels. The fader label displays above each fader list the available component paths which may be split between the A and B paths. These are accessed and behave in the same way as all other A and B paths on the surface.

## Current Spill Panel Assignment

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

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

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

# REMOTE PATH PARAMETER CONTROL FROM THE HOST CONSOLE

## REMOTE PATH PARAMETER CONTROLS FROM HOST

### Function Table for Parameter Control of Remote Paths

Once the RP1 unit is connected, the Apollo/Artemis surface currently allows the host console to control the following functions for the Remote Faders and Remote Aux Masters as shown right:-

The table is arranged as mono, stereo & 5.1 remote fader types and mono & stereo remote aux master types arranged in columns.

Each of the rows across the table represent a different parameter that can be controlled from the host console.

It is split into the various modes that can be selected.

The top section relates to the fader and cut controls. This is followed by the displays in processing mode overview for the current assignment, then the sends and routes mode for the current assignment followed by the strips mode which is an in-line representation of controls per path.

The ability to put parameter controls for remote paths in Wilds mode on the host console is shown separately. All the main controls that are relevant to the RP1 remote faders have been made available.

See ["Remote Fader Wild Controls on Fader/Wild Assign Panels"](#) on page 112 for a sample layout and list of RP1 wilds.

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

# RP1 SPECIFICATIONS

# GENERAL SPECIFICATIONS

## SIGNAL PROCESSING

	RP1
Input Channels	Up to 32 (mono, stereo or 5.1) from a pool of 32 legs
Aux Outputs	Up to 12 (mono or stereo) from a pool of 12 legs
Direct Outputs (from v1.1 onwards)	1 assignable per mono/stereo/5.1 Channel from a pool of 32 legs
EQ (from v1.1 onwards)	4 band full Parametric EQ + LF & HF filters with 12 dB/octave slopes on every Channel*
Dynamics Processing (from v1.1 onwards)	Compressor/Limiter with Sidechain EQ +Listen Expander or Gate both with Gain Reduction Linking

## CONTROL INTERFACE

	RP1
Virtual Faders	72
Headphone Output	Stereo, 1/4' TRS Jack
Weight ( excl Expansion Cards )	7.5kG

## ROUTER

	RP1
Integral Router	768 <sup>2</sup>
Hydra2 Connections	1 + 1 redundant connection for connecting I/O boxes via the built-in Hydra2 Module
Audio Channels Per Port	Up to 512

# POWER/ENVIRONMENTAL SPECIFICATIONS

The console has two IEC AC power inlets feeding two sets of internal power distribution. Although the console will operate with one inlet supply we recommend both inlets are powered. This will ensure continued operation should a PSU or AC source fail. The operating AC supply voltage is 100 V - 240 V +/-10%.

The average half-cycle r.m.s inrush current per inlet:

- On initial switch-on <5 A
- After 5 s interruption <10 A

## CONTROL UNIT

RP1	240V Operation	115V Operation	100V Operation
Supply Current	0.48 A	0.86 A	0.98 A
Power Factor	0.68	0.79	0.80
Power Dissipation (Heat) -	78.3 W	78.4 W	78.4 W
Cooling	The RP1 is cooled by a quiet outtake fan on the rear of the unit. The air intake is on the side vents of the unit. At least 50mm (2") clearance should be maintained for these vents.		
Operating Ambient Air Temperature	0°C - 40°C		

Note that RP1 is a self contained unit and the processing core is built into the unit.

## HYDRA2 FIXED FORMAT I/O

	Fixed Format I/O
<b>Power</b>	<p>All fixed format Hydra2 I/O units have two IEC AC power inlets and are fitted with dual power supplies. Units will be fully functional on one PSU, however both should be fed where possible from separate sources to provide redundancy against both PSU failure and external power loss.</p> <p>The operating AC supply voltage is 100 V - 240 V +/-10%.</p> <p>The peak inrush current is limited (cold start). Figures are available for all units. This reduces the chance of a nuisance trip or fuse blow from power up. The RMS quiescent current figures are specified on the rating label for all types of I/O box and are available within the individual data sheets in the Hydra2 installation manual.</p>
<b>Power Factor</b>	<p>All fixed format Hydra2 I/O units require less than 75W of input power. The internal power supplies fitted have passive filtering (as opposed to active power factor correction) to reduce the harmonics to within the limits of the standard EN61000-3-2. At the time of writing the standard does not apply to equipment &lt;75W. If the lower limit is ever reduced the units will be compliant and as such are future proof.</p>
<b>Heat Output and Efficiency</b>	<p>The heat output from Fixed Format Hydra2 I/O units depends on the supply voltage and loading. Typically it is 0.55 times the RMS VA (Volts x Amperes) at 230V and 0.7 times the RMS VA at 115V. Heat output figures are available for all types of I/O box.</p> <p>The low power PSU efficiency is again dependant on supply voltage and loading, generally &gt;70%.</p>
<b>Cooling</b>	<p>All fixed format Hydra2 I/O units of 2U or greater are cooled under control with fan assistance. Operation is not dependant on the fan; it is there to extend the operating life of the unit. There is an 80mm low power, low speed and low noise fan mounted to the right hand side panel of each unit venting air. Fan speed is monitored and system status warnings are generated if fans slow or fail. Air is drawn in through the left hand side panel.</p> <p>1U Hydra2 I/O boxes do not require fan assistance having sufficient surface area to radiate heat adequately.</p> <p>The side panels of all Fixed Format Hydra2 I/O units should be unobstructed with at least 50mm (2") clearance to allow airflow. No clearance is required above or below the unit.</p> <p>I/O units may be mounted in an open bay providing the ambient air temperature is within limits (see below). The units may also be housed in any air conditioned bay.</p>
<b>Acoustic Noise</b>	<27 dB SPL (A-weighted, 1m from front).
<b>Operating Ambient Air Temperature</b>	0°C - 40°C
<b>Relative Humidity</b>	5% - 80% Non-Condensing

**HYDRA2 MODULAR I/O**

Hydra2 Modular I/O	
<b>Power</b>	<p>Modular Hydra2 I/O frames are fitted with dual power supplies and have 2 IEC AC power input connectors. Units will be fully functional on one PSU, however both should be fed where possible from separate sources to provide redundancy against both PSU failure and external power loss.</p> <p>The operating AC supply voltage is 100 V - 240 V +/-10%.</p> <p>The peak inrush current is limited (cold start). This reduces the chance of a nuisance trip or fuse blow from power up. The RMS quiescent and peak inrush current figures are dependant upon the quantity and type of I/O cards fitted. Please refer to the Hydra2 installation manual for more details on Modular I/O.</p> <p>Note: the 3 card slots in the rear of RP1 are designed to fit I/O cards from the Modular I/O range and the relevant audio specifications stated below also apply when used in RP1.</p>
<b>Heat Output and Efficiency</b>	<p>The Heat output from Modular Hydra2 I/O units depends upon the quantity and card types fitted, please refer to the Hydra2 installation manual for more detail on Modular I/O.</p>
<b>Cooling</b>	<p>Fans mounted to the PSUs at the back of the core draw air through the PSUs and the core itself. Air is drawn up through the base of the core which is recessed to allow air to enter through the side, and for the units to be mounted with no clearance above or below. The bottom of the sides of the Modular I/O box should be unobstructed with at least 50mm (2') clearance to allow airflow.</p> <p>Modular I/O units may be mounted in an open bay providing the ambient air temperature is within limits (see below). The units may also be housed in air conditioned bays.</p>
<b>Acoustic Noise</b>	<p>&lt;27 dB SPL (A-weighted, 1m from front).</p>
<b>Operating Ambient Air Temperature</b>	<p>0°C - 35°C</p>
<b>Relative Humidity</b>	<p>5% - 80% Non-Condensing</p>

# AUDIO PERFORMANCE SPECIFICATION

## HYDRA2 AES3ID UNBALANCED DIGITAL INPUTS

Format	AES/EBU (AES3) 24-bit. Also suitable for use with SPDIF (IEC958 type 2) signals
Interface	75 Ohm unbalanced (BNC), 0.3V-1.2V Pk-Pk
Sample Rate Conversion	24-Bit switchable on all AES inputs
SRC THD+N	-117dB @ 1kHz, 0.00014%

## HYDRA2 AES3ID UNBALANCED DIGITAL OUTPUTS

Format	AES/EBU (AES3) 24-bit
Interface	75 Ohm unbalanced 1V Pk-Pk (nominal) into 75 Ohm load (BNC)
Jitter	<0.015UI (2.5ns) peak

## HYDRA2 AES3 BALANCED DIGITAL INPUTS (MODULAR I/O ONLY)

Format	AES/EBU (AES3) 24-bit.
Interface	110 Ohm balanced (XLR or D-Type).
Sample Rate Conversion	24-Bit switchable on all AES inputs
SRC THD+N	-117dB @ 1kHz, 0.00014%

## HYDRA2 AES3 BALANCED DIGITAL OUTPUTS (MODULAR I/O ONLY)

Format	AES/EBU (AES3) 24-bit
Interface	110 Ohm balanced (XLR or D-Type)
Jitter	<0.015UI (2.5ns) peak

## HYDRA2 ANALOGUE INPUT SPECS

Analogue - Digital Conversion	24 Bit
Input	Electronically balanced
Input Impedance	2k Ohms at mic level gain settings 10k Ohms at line level gain settings
Sensitivity	+18 / -78dB for mic/line Inputs
Equivalent Input Noise	-127dB (150 Ohm source)
Distortion	-1dBFS @ 1kHz - Better than 0.003% -20dBFS @ 1kHz - Better than 0.006% -60 dBFS @ 1kHz - Better than 0.3%
Frequency Response	20Hz to 20kHz +/- 0.5dB on mic/line Inputs
Input CMR (Common Mode Rejection)	>75dB (Typical 85dB) on mic/line inputs
Notes	Analogue input for 0dBFS can be pre-set globally to +28, +24, +22, +20, +18 or +15dBU Pre-fader headroom on mic inputs is adjustable globally from +24 to +36dB in 2dB steps For analogue inputs/outputs the system can handle analogue levels of up to +27 dBU from analogue input to analogue output at line up These levels must be attenuated in the system before they are fed to digital outputs

## HYDRA2 ANALOGUE OUTPUT SPECS

Digital - Analogue Conversion	24 Bit
Output Balance	Electronically balanced. 20Hz to 20KHz, better than -35dB, typically -45dB
Output Impedance	<40 Ohms
Distortion	-1dBFS @ 1kHz - Better than 0.006% -20dBFS @ 1kHz - Better than 0.003% -60 dBFS @ 1kHz - Better than 0.3%
Frequency Response	20Hz to 20kHz +/- 0.25dB
Notes	Analogue output for 0dBFS matches input setting into >1kOhms (+24dBu max into 600 Ohms)

## AUDIO PERFORMANCE DATA

Digital to Digital (AES3) Distortion	-1dBFS, 20Hz to 10kHz - Better than 0.0001%
Digital to Digital (AES3 with SRC) Distortion	-1dBFS, 20Hz to 10kHz - Better than 0.0002%
Frequency Response (Analogue Input to Output)	20Hz to 20kHz +/- 0.5dB

## SYNCHRONISATION INPUTS

48KHz Synchronisation	NTSC/PAL Video Tri-Level Internal Crystal Reference TTL Wordclock (48kHz) AES/EBU (AES3) Digital Input (48kHz)
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## LATENCY @ 48KHZ SAMPLE RATE \*

From	To	Via	Samples	=ms
AES3 inputs (SRC off)	AES3 Outputs	Port to port	18	0.375
	AES3 Outputs	channel, group, and aux, track or main output	30	0.625
	Analogue Outputs	Port to port	65	1.354
	Analogue Outputs	channel, group, and aux, track or main output	77	1.604
		Turning SRC on adds to the above:		+ 39
Mic/Line inputs	AES3 Outputs	Port to port	43	0.896
	AES3 Outputs	channel, group, and aux, track or main output	55	1.146
	Analogue Outputs	Port to port	90	1.875
	Analogue Outputs	channel, group, and aux, track or main output	102	2.125

\* Note: These latency figures are for a system with a single Router/DSP core rack. Add 2 samples for each input, and 2 samples for each output, for each additional core rack in the relevant part of the signal path.

#### DYNAMIC RANGE FOR HYDRA 2 ANALOGUE AND AES3 (INPUTS)

<b>HYDRA2 Analogue INPUTS</b>	system set for				
<b>to Digital Outputs with 0 dB gain</b>	+18 dBu = 0 dBFS		110 dB		
	+24 dBu = 0 dBFS		116 dB		
<b>to Analogue Outputs with 0 dB gain *</b>	N/A		118 dB		
<b>HYDRA2 AES3 UNBALANCED DIGITAL INPUTS</b>	system set for	SRC on I/P		SRC on I/P	
<b>to Digital Outputs with 0 dB gain</b>	N/A	off	138 dB	on	130 dB
<b>to Analogue Outputs with 0 dB gain</b>	+18 dBu = 0 dBFS	off	111 dB	on	111 dB
	+24 dBu = 0 dBFS	off	117 dB	on	117 dB
<b>HYDRA2 AES3 BALANCED DIGITAL INPUTS (Modular I/O ONLY)</b>	system set for	SRC on I/P		SRC on I/P	
<b>to Digital Outputs with 0 dB gain</b>	N/A	off	138 dB	on	130 dB
<b>to Analogue Outputs with 0 dB gain</b>	+18 dBu = 0 dBFS	off	111 dB	on	111 dB
	+24 dBu = 0 dBFS	off	117 dB	on	117 dB

\* The analogue to analogue dynamic range is achieved because the system can accept analogue signals of up to +28 dBu from input to output at 0 dB gain. Obviously, an analogue input of up to +28 dBu must be attenuated to output this digitally, but this attenuation will maintain the dynamic range of the input, as the analogue input noise will be attenuated by the same amount as the signal, and the analogue input noise will still be dominant above the noise floor of the digital system.

### DYNAMIC RANGE FOR HYDRA 2 ANALOGUE AND AES3 (OUTPUTS)

HYDRA2 Analogue OUTPUTS	system set for	SRC on I/P		SRC on I/P	
from Digital Inputs with 0 dB gain	+18 dBu = 0 dBFS	off	111 dB	on	111 dB
	+24 dBu = 0 dBFS	off	117 dB	on	117 dB
from Analogue Inputs with 0 dB gain *	N/A	N/A	118 dB		

HYDRA2 AES3 UNBALANCED DIGITAL OUTPUTS	system set for	SRC on I/P		SRC on I/P	
from Digital Inputs with 0 dB gain	N/A	off	138 dB	on	130 dB
from Analogue Inputs with 0 dB gain	+18 dBu = 0 dBFS	N/A	110 dB	N/A	
	+24 dBu = 0 dBFS	N/A	116 dB	N/A	

HYDRA2 AES3 BALANCED DIGITAL OUTPUTS (Modular I/O ONLY)	system set for	SRC on I/P		SRC on I/P	
from Digital Inputs with 0 dB gain	N/A	off	138 dB	on	130 dB
from Analogue Inputs with 0 dB gain	+18 dBu = 0 dBFS	N/A	110 dB	N/A	
	+24 dBu = 0 dBFS	N/A	116 dB	N/A	

\* The analogue to analogue dynamic range is achieved because the system can accept analogue signals of up to +28 dBu from input to output at 0 dB gain. Obviously, an analogue input of up to +28 dBu must be attenuated to output this digitally, but this attenuation will maintain the dynamic range of the input, as the analogue input noise will be attenuated by the same amount as the signal, and the analogue input noise will still be dominant above the noise floor of the digital system.

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(926-222 Iss.2)