3Mb to 3Gb Digital Video Routing

User Manual

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IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of un-insulated “Dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.
	The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (Servicing) instructions in the literature accompanying the product.

- Read these instructions
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water
- Clean only with a dry cloth.
- 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.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

WARNING
TO REDUCE THE RISK OF FIRE OR ELECTRIC – SHOCK, DO NOT EXPOSE THIS APPARATUS TO RAIN OR MOISTURE

WARNING
DO NOT EXPOSE THIS EQUIPMENT TO DRIPPING OR SPLASHING AND ENSURE THAT NO OBJECTS FILLED WITH LIQUIDS ARE PLACED ON THE EQUIPMENT

WARNING
TO COMPLETELY DISCONNECT THIS EQUIPMENT FROM THE AC MAINS, DISCONNECT THE POWER SUPPLY CORD PLUG FROM THE AC RECEPTACLE

WARNING
THE MAINS PLUG OF THE POWER SUPPLY CORD SHALL REMAIN READILY OPERABLE

INFORMATION TO USERS IN EUROPE

NOTE

This equipment with the CE marking complies with both the EMC Directive (2004/108/EC) and the Low Voltage Directive (2006/95/EC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European standards:

- EN60950 Product Safety
- EN55103-1 Electromagnetic Interference Class A (Emission)
- EN55103-2 Electromagnetic Susceptibility (Immunity)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to the European Union EMC directive. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE	EN60950	Safety
	EN55103-1: 1996	Emission
	EN55103-2: 1996	Immunity

	EN504192 2005 Waste electrical products should not be disposed of with household waste. Contact your Local Authority for recycling advice

INFORMATION TO USERS IN THE U.S.A.

NOTE

FCC CLASS A DIGITAL DEVICE OR PERIPHERAL

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

WARNING

Changes or Modifications not expressly approved by Evertz Microsystems Ltd. could void the user's authority to operate the equipment.

Use of unshielded plugs or cables may cause radiation interference. Properly shielded interface cables with the shield connected to the chassis ground of the device must be used.

Evertz Microsystems Ltd FC For Home or Office Use	Tested to comply with FCC Standards	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: This device may cause harmful interference, and This device must accept any interference received, including interference that may cause undesired operation.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary	Feb 2007
0.2	Reformatted sections, added specifications	May 2007
0.3	Updated information on setting the IP address Added information on EQX communication ports	May 2007
0.4	Added Safety instructions into installation section	Jul 2007
0.5	Updated module IP addresses and LED functions	Sep 2007
1.0	Released Version. Added setup instructions (section 2.2). Added instructions on setting the frame controller IP address (section 8.1)	Nov 2007
1.1	Updated Safety warnings in Installation instructions and drawings	Feb 2008
1.2	Added Optical Input, Output, SFP, performance information	Jan 2009
1.3	Updates to monitoring connections, LEDs, menus, etc. Added information on connections to DC power sources	Feb 2009
1.4	Added rear plate information (sections 4.4.3 to 4.4.6)	Feb 2009
2.0	Major updates throughout manual	Feb 2011
2.1	Major updates throughout manual. Added VISTALINK® Remote Monitoring/Control (section 12)	Jan 2014
2.2	Added information on X-Link Covers	Jan 2015
3.0	Major updates throughout manual. Added EQX10 information	Mar 2015
3.1	Updates throughout	Feb 2017
4.0	Updated to reflect RPC4net, EQX-S and EQX-H support only	Nov 2024

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1. OVERVIEW

Thank you for selecting the Quartz brand of Evertz products for use in your video/audio system. The EQX router offers outstanding quality and value, and will provide a long and cost effective working life with minimal maintenance.

In order to offer the best in customer support, Evertz supplies the EQX router with a full one-year manufacturing warranty.

Figure 1-1: EQX Router (26RU, 16RU and 10RU)

1.1 SIGNAL FLOW OVERVIEW

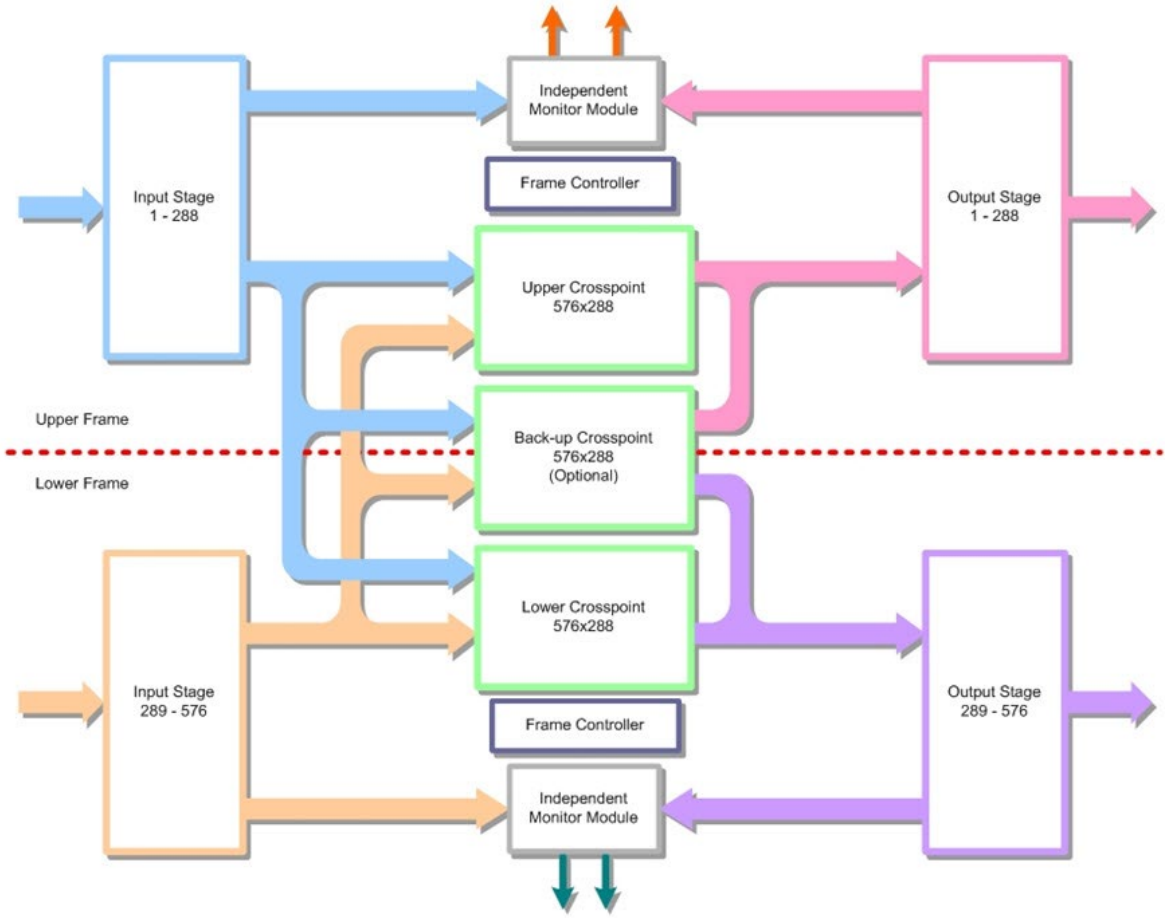

Figure 1-2: EQX Signal Flow Diagram

The simple design and signal flow of the EQX-26FR is shown in Figure 1-2. There are four main active module types:

- **Input Module** (x32)
- **Crosspoint Module** (x2 main and x1 back-up)
- **Output Module** (x32)
- **Frame Controller Module** (x1 main and x1 redundant)

All of the active modules are accessible from the front of the EQX frame providing easy access during maintenance.

The Back-up crosspoint module provides full protection in the case of a failed route. The switch over to the back-up crosspoint can be performed manually or automatically. In the event of a failure, only the faulty route needs to be switched over to the back-up crosspoint. The new route is checked before it is switched through the back-up crosspoint by the EQX monitoring facility.

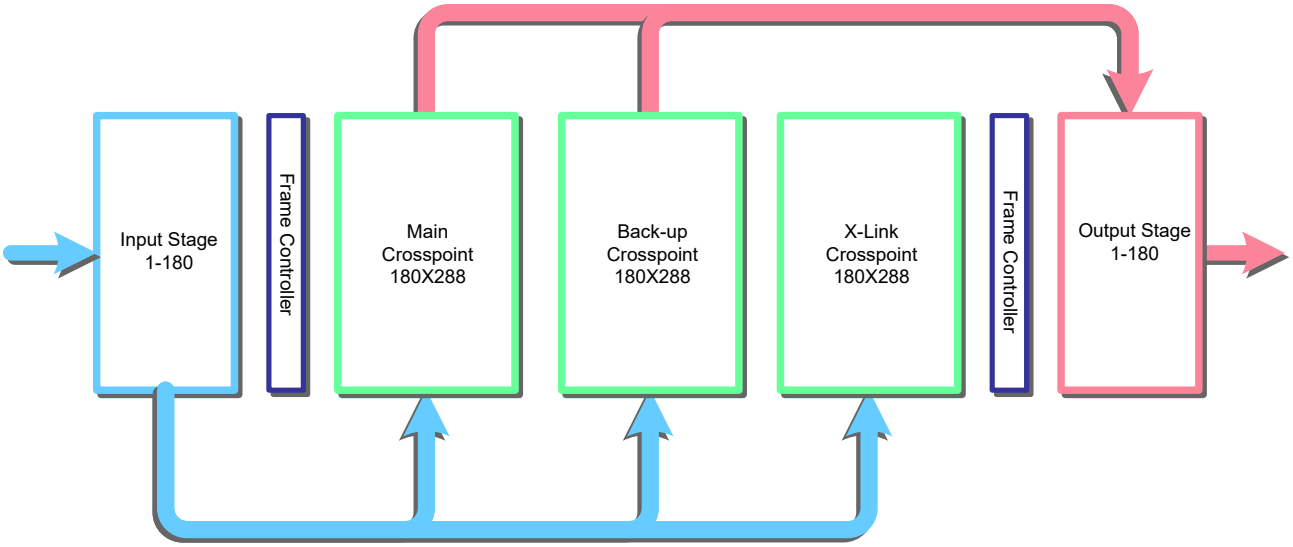

Figure 1-3: EQX10 Signal Flow Diagram

The simple design and signal flow of the EQX10-FR is shown in Figure 1-3. There are four main active module types:

- **Input Module** (x10)
- **Crosspoint Module** (x1 main, x1 back-up and Xlink)
- **Output Module** (x10)
- **Frame Controller Module** (x1 main and x1 redundant)

All of the active modules are accessible from the front of the EQX10 frame providing easy access during maintenance.

The Back-up crosspoint module provides full protection in the case of a failed route. The switch over to the back-up crosspoint can be performed manually or automatically. In the event of a failure, only the faulty route needs to be switched over to the back-up crosspoint. The new route is checked before it is switched.

1.2 SIGNAL AND SYSTEM MONITORING

The EQX supports full signal monitoring of both inputs and outputs. It also incorporates comprehensive system monitoring, including power supply voltages, interior temperatures and fan speeds. Monitored data is available through SNMP for facility-wide monitoring systems such as VLPRO. System status may also be monitored remotely by a network based remote connection over TCP/IP. User configurable closing contacts are also provided for connection to an external alarm system.

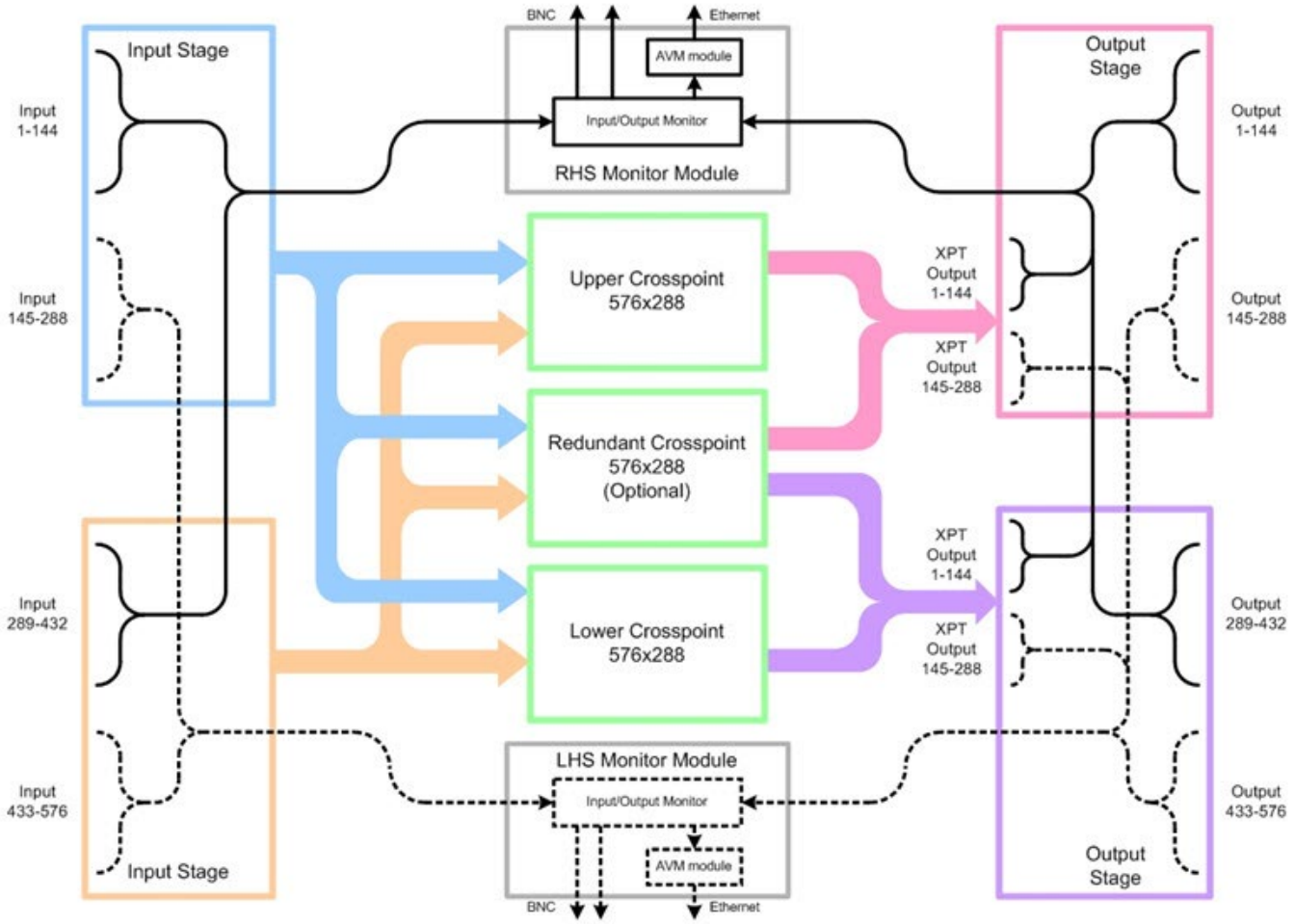

Figure 1-4 : EQX Signal Monitoring Path

2. INSTALLATION

2.1 PHYSICAL INSTALLATION

2.1.1 EQX Packaging Materials

The instructions provided in this section outline the EQX unpacking procedure. Please review the following instructions before opening and moving the shipping container. Once the EQX is unpacked, please refer to section 2.1.3 for instructions on installing the router.

The Evertz EQX packaging consists of the following components:

- Wooden shipping container (consists of two wooden side panels, one front panel, one back panel and a wooden top cap)
- Pallet
- Foam packaging materials
- Protective Bags
- Unpacking Instructions and EQX User manual

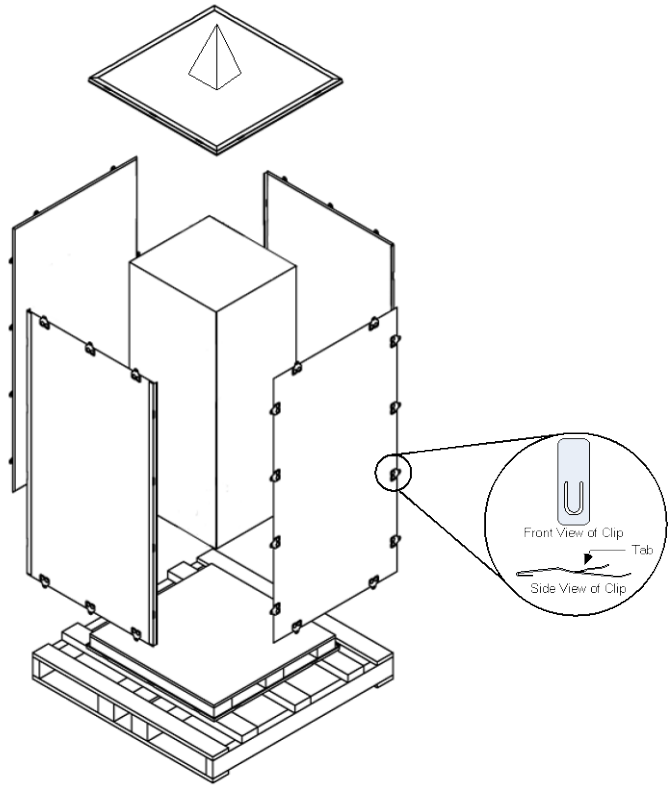

Figure 2-1: EQX Shipping Container

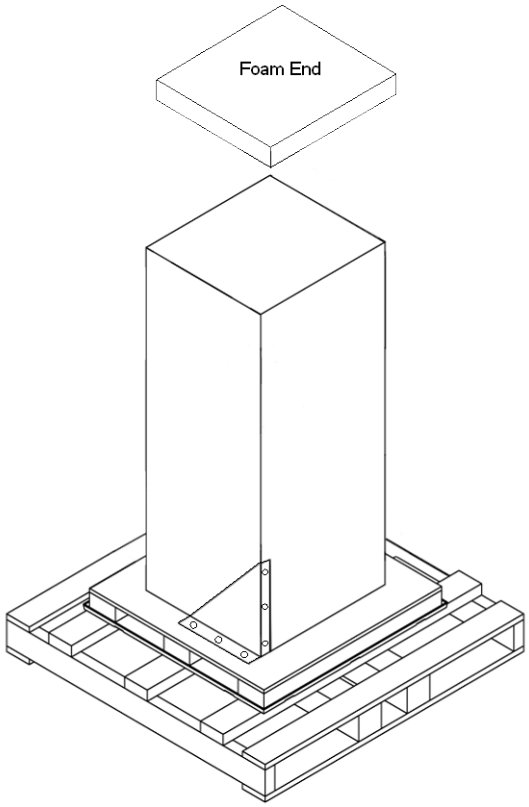

Figure 2-2: EQX with Shipping Panels Removed

2.1.2 Dismantling the Wooden Shipping Container

Please read and follow the instructions outlined below in order to safely dismantle the wooden shipping container:

Use caution when handling the packaging components. The wooden side panels, wooden cap and the pallet may have sharp metal edges.

There is a cone attached to the top of the EQX shipping container to prevent people from stacking objects on the container. If the cone has been removed or crushed, this may indicate that objects were stacked on the unit.

To dismantle the wooden shipping container, please follow the steps outlined below:

1. Three people are required in order to safely dismantle the shipping container. When moving the system to a different location, it is essential that a handcart, pallet jack, or forklift be used. Care should be taken to avoid jarring the EQX frame.

CAUTION – Do not attempt to lift or move the fully assembled EQX from the pallet. Please note that the weight of the EQX can range from 400 lbs (181.44 kg) to 500 lbs (226.8 kg) depending on the type of unit shipped (16RU or 26RU).

2. The dimensions of the EQX shipping container are: 40-inches (101.6 cm) wide, 40-inches (101.6 cm) long, and 56 inches (142.2 cm) high (66 inches including the cardboard shipping cone). Before moving the shipping container, take note of the dimensions to ensure that there is sufficient clearance space when transporting it through doors and passageways. Move the EQX shipping container as close to the installation location by transporting it via a handcart, pallet jacket or forklift. Ensure that there is an adequate amount of space to comfortably unpack and assemble the system.
3. It is imperative that at least two people are securing the box while another person removes the clips and panels to ensure that the panels do not fall and cause personal injury or damage to the EQX unit.
4. There are 8 clips securing each wooden side panel to the front and back panels. Remove each clip by pressing the tab on the clip and pushing the clip out from under the metal clasp. Repeat this step for all 8 clips. At this time, DO NOT remove the clips securing the panels to the top cap or bottom pallet.
5. Repeat step 4 to unhinge the other side panel.

6. All 16 side clips should now be removed from the side, front and back panels. Depending on the shipping container size there may be 8, 10 or 14 clips securing the cap to the top of the wooden packaging unit. Remove each clip by pressing the tab on the clip and pushing the clip out from under the metal clasp.
7. Once all the clips are removed from the top cap, ensure at least two people are securing the side panels while another person carefully lifts and removes the top cap.
8. Ensure at least two people are safely securing the side, front and back panels before removing the bottom clips. Remove the 2, 3 or 4 clips that are securing the front panel to the pallet. Carefully lift and remove the panel. Set the panel aside. Repeat this procedure for the remaining panels.

It is important to retain the shipping container, shipping container materials and accessories for future shipping use.

9. Once all the panels are removed, set them aside. Remove the foam cap ends from the top and bottom of the EQX.
10. Remove the protective packaging bag that is covering the EQX.
11. Open the EQX door and remove the protective packaging bag(s) from inside the unit.
12. Remove the bolts from the side and bottom ears of the triangle rack mount. The accessory box that was shipped with your EQX contains the two wrenches needed to loosen the bolts. Use the 7/16” size wrench to remove the side bolts, and the 9/16” size wrench to remove the bottom bolts.
13. Once the bolts are removed, the EQX can be moved from the pallet and installed in the desired location. Please refer to the EQX user manual for installation and operation instructions.

2.1.3 EQX Router Frames

All units are designed for mounting in standard 19" equipment racks. The depth of the frame is 460mm (18”) plus connectors. In addition, allowance must be made to accommodate the large number of cables to be installed at the rear of the frame.

In order to prevent unauthorized access to the power connections, the EQX must be installed in an equipment rack that provides restricted access to the rear of the frame.

The EQX frame must be securely fastened to the equipment rack to prevent tipping.

Power dissipation in all units is low, and cooling is achieved by fan-assisted convection. The I/O modules in the upper and lower section of the EQX frame are independently cooled. Air is drawn into the front of the frame and expelled as hot air from the rear, top, and bottom of the frame. The crosspoint modules are also independently cooled with cool air being drawn from the front of the frame and hot air being expelled from the side of the frame. (For further information refer to section 7).

When installed in the equipment rack, ensure that the air flow from the rear, and side vents is not blocked or restricted. For frames with dual fan modules such as QT or HBX, please ensure the top and bottom of the frame has a 1RU space gap for venting.

Once installed, ensure that the EQX frame is connected correctly to Earth/Ground using the Ground terminal on the rear of the EQX frame.

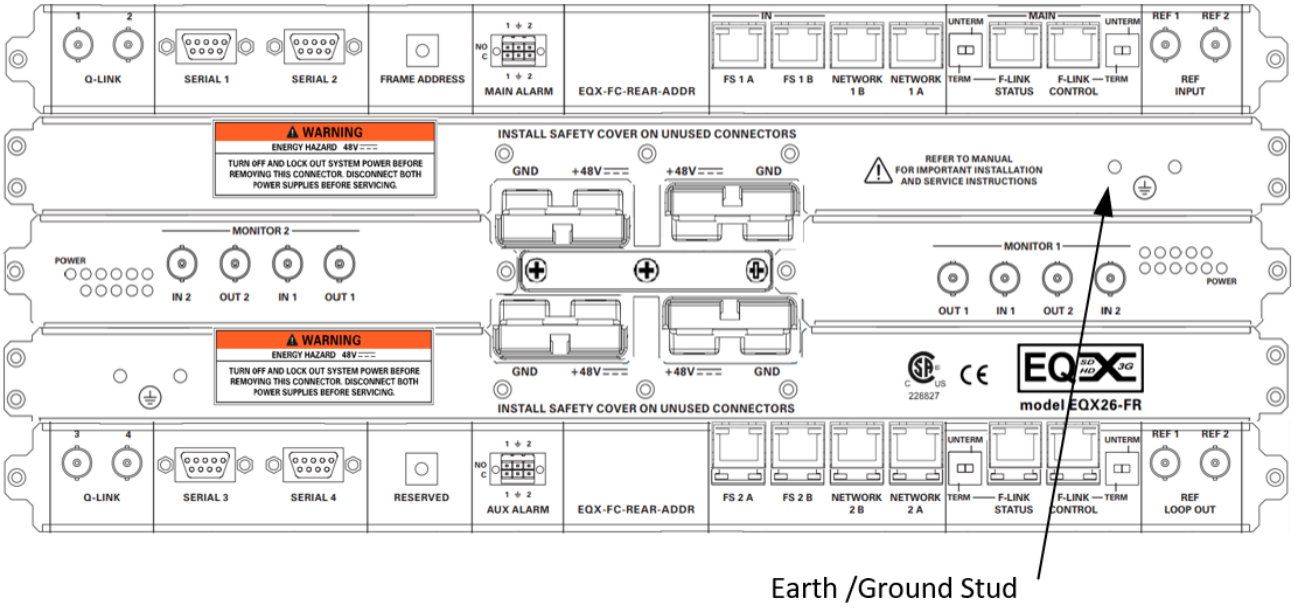

Figure 2-3: EQX Frame Control Rear Plate with GND Connection

2.2 ELECTRICAL CONNECTIONS

Figure 2-4 below shows a rear panel view of the EQX's connections.

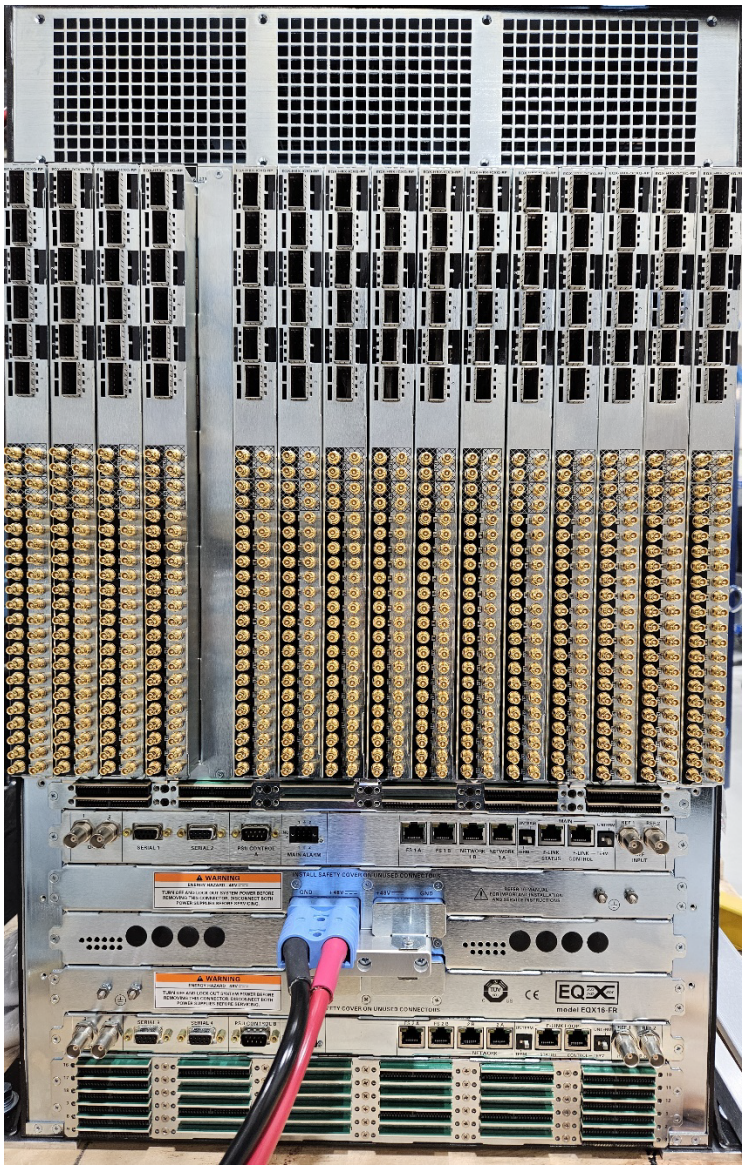

Figure 2-4: EQX Rear View (16RU-XLINK3 EQX)

2.2.1 Video Inputs and Outputs

The video input and output connections for the EQX are made using one of the standard connectors such as 75Ω BNC, DIN 1.0/2.3, HD-BNC, Fiber and X-Link. A high quality coax cable, such as PSF1/3 (TF3304) for SDI video, Belden 8281 or 1694 for HD SDI video or suitable equivalents, should be used for optimum signal performance. **The default connectors in use as shown above are HD-BNC for SDI inputs.**

Note: It is both important and good practice that cables are properly supported and not hanging on the connectors as this can put unnecessary stress on the connectors and possibly reduces their working life.

2.2.2 Video Sync (Reference Input)

Standard Definition and High Definition Video routers have a separate reference input that takes in both PAL and NTSC references.

- **REF 1** = 1x 525i 59.94 **or** 1x 625i 50 Bi-Level reference
- **REF 2** = 1x 525i 59.94 **or** 1x 625i 50 Bi-Level reference

It does not matter which reference port is used for NTSC or PAL however, **only one of each reference type can be present**. Applying two NTSC or two PAL reference will result in an error on the EQX-FC. If loop outs are not used, please terminate the chain with a 75Ω termination.

2.2.3 Manual Remote Control - Using Q-Link

All EQX routers can be connected to remote control panels by a single coaxial link called Q-link. This link uses standard 75Ω video cables daisy-chained from frame to frame and from panel to panel over a maximum cable length of **500m**. Each end of the link must be terminated in 75Ω.

This daisy-chain method ensures the best transmission quality of the control signals down the cable. Shortcuts that may save cable, such as running stubs to some panels is not recommended as this may, under certain circumstances, cause data errors.

The system can support up to 8 devices, with each unit connected to the Q-Link having its own address switch that is configured as part of the system setup. Additionally, the Q-Link signal itself can support up to 32 devices connected in a daisy chain configuration.

Note: The installer must fit a 75Ω terminator at each end of the cable.

Note: The EQX router system does NOT natively support ethernet control panels via UDP protocol.

2.3 PREPARING POWER SUPPLY AND POWERING UP

The EQX frame is powered from an external 48V DC source. In applications where you need to power the frame from 100 to 240 VAC sources, you will need to use the EQX external AC to DC power supply.

The EQX-PS-FR-C is a 1RU power supply that supplies 48VDC to the EQX router. The 1RU tray consists of 5 equal size slots that are used to house 1 LAN module with 4 EQX-PS-C brick modules. LAN module can be placed in any of the 5 slots but for simplicity is defaulted to the first.

The EQX-PS-FR-C is built with a blue Anderson power connector to mate correctly with current EQX routers. If this is for an older frame with a connector other than the blue one seen in the picture, please inquire about other ordering options.

For further details on setting up the EQX-PS-FR-C power supply, please inquire about an operations APP note AN125.

Figure 2-5: EQX-PS-C External Power Supply

The external power supply for the EQX is a single rail, load-sharing design. It is housed within a single 1RU rack-mounting tray (EQX-PS-FR-C), which carries four power supply modules (EQX-PS-C), each with their own AC inlet. Power supply modules operate on either 100-115 or 220-240 volts AC at 50 or 60 Hz and automatically sense the input voltage.

The power supply modules can be hot-swapped while the EQX is operational, should one fail.

Figure 2-6: EQX-PS-FR-C External Power Supply – Tray Holding 4 Modules

Up to 4 power supply tray containing 4 power supply modules each can be attached (via its own dedicated connector) to the EQX frame to provide full redundant protection. The power supply modules in all the other power supply trays must be powered from a different AC mains source to the primary power supply modules, to achieve complete AC supply redundancy.

Note: Some applications require more power supplies. See project designs.

RISK OF ELECTRIC SHOCK: If only one power supply is connected to the EQX frame, the second power supply connector on the rear of the EQX must be fitted with the safety cover to prevent electric shock as shown.

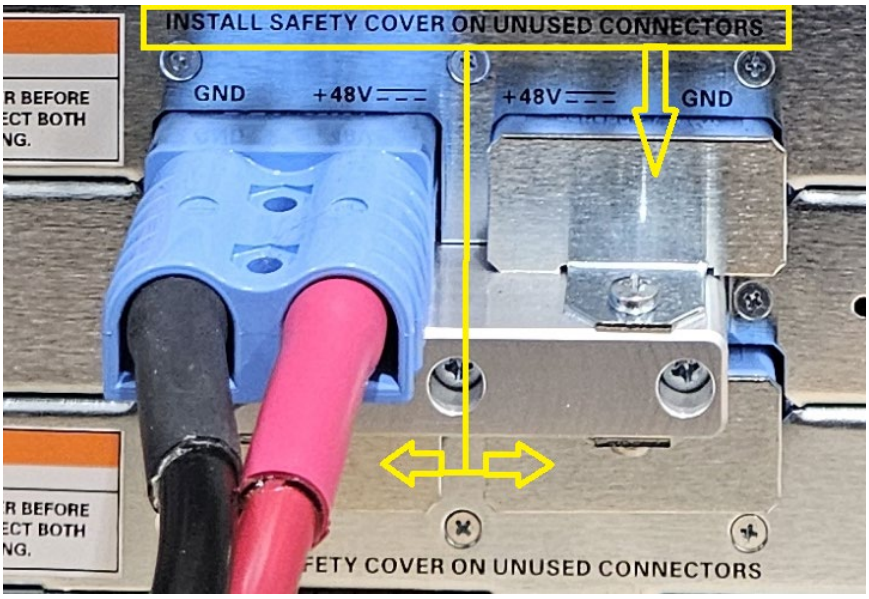

Figure 2-7: EQX16/26 Power Supply Frame Connection Safety Covers

Each power supply module delivers up to 1400 watts (48V @ 29A) of power to the EQX. Care must be taken when designing the AC distribution to the power supply so that sufficient AC circuits are available to power each module. When the EQX is operating from a single power supply tray, each module in that tray will draw approximately 13 amperes maximum when connected to an 110VAC source, and approximately 7 amperes maximum when connected to a 220 VAC source.

Power should be applied by connecting a 3-wire grounding type power supply cord to the IEC320 AC inlets on the rear of the power supply tray. The power cord should be minimum 16 AWG wire size; type SVT marked VW-1, maximum 12 feet in length.

To completely disconnect this equipment from the AC mains, unplug the power supply cord from the AC receptacle. This equipment may have more than one power supply cord. To reduce the risk of electric shock, disconnect all power supply cords before servicing.

All AC cords need to be removed at the same time to avoid underpowering the EQX system. Using a system that can turn them all off simultaneously, such as a breaker panel, is preferred.

The EQX-PS-FR-C power supply frame does NOT come with a hardware ON/OFF switch. It is recommended to gang some breakers together and turn the router ON/OFF using the breakers.

2.3.1 Setting up the Hardware and Preparing AC Connections

Before powering up the EQX frame with the trays, please ensure proper configuration of the hardware. There are 5 equal size slots in each tray as well as 5 AC input connections on the rear, however only 4 AC connections are used. Each tray will house 1 LAN module and 4 power supply bricks. (EQX-PS-C)

Figure 2-8: EQX-PS-FR-C – Front View (Fully Populated Tray)

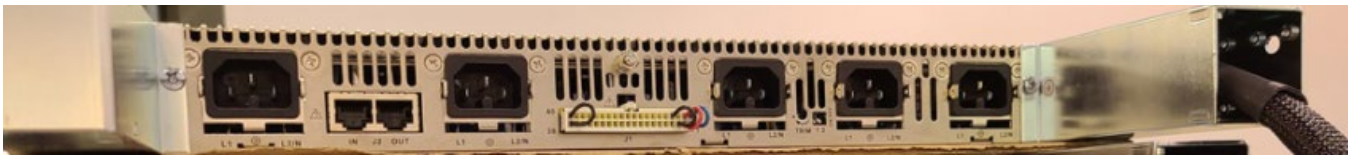

Figure 2-9: EQX-PS-FR-C – Rear View

EQX-PS-FR-C power supplies are NOT compatible with older EQX-PS-FR-B hardware. It is NOT permitted to operate an EQX system with two different power supply variants.

2.3.2 Not Fully Populated Trays

If the unit you have purchased is not fully populated with power modules, ensure blank panels are present and covering any empty slots to ensure proper air flow. It is recommended to space the power modules and blanks every other one wherever possible if not fully loaded.

Figure 2-10: EQX-PS-FR-C Front View Partially Loaded with Blanks

2.3.3 Connecting AC power supply

The power supply module (EQX-PS-C) operates on either 100-115 or 220-240 volts AC at 50 or 60Hz and automatically sense the input voltage. The modules are hot-swappable while the EQX is operational, should one fail.

Each power supply module delivers up to a maximum of 1400 watts of power to the EQX. Care must be taken when designing the AC distribution to the power supply so that sufficient AC circuits are available to power each module.

Please calculate or obtain the minimum load the router requires based on cards present in the frame PRIOR to powering up the EQX.

In some advance configurations, more than 1 EQX-PS-FR-C tray may be required for operation. Please inquire about this if information was not already provided.

Four (4) AC cords with C15 connections on one end and the appropriate wall connections on the other end are required for each fully populated power tray. The fifth connection port, located behind the LAN module at the rear of the tray, does not need to be plugged in. Existing cables from the previous EQX-PS-FR-B power supply cannot be reused, as they do not have the necessary notch cutout.

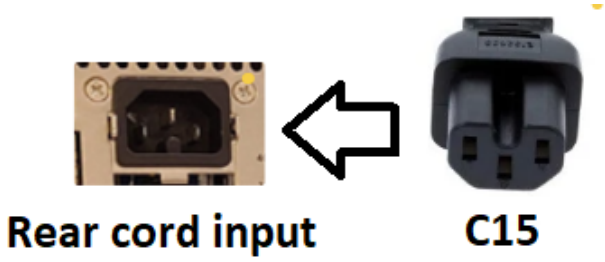

Figure 2-11: EQX-PS-FR-C AC Socket & AC Power Cord

Each EQX-PS-FR-C power tray should come with 4 default AC cords according to the region. If a different cord is needed, please obtained these externally prior to setting up the system.

2.3.4 Mounting

2.3.4.1 Rail Extension Bracket Supports

The power supply tray comes with extension rails that can be attached to provide rear weight support when mounting to a tower rack. Included are 3 pieces per side.

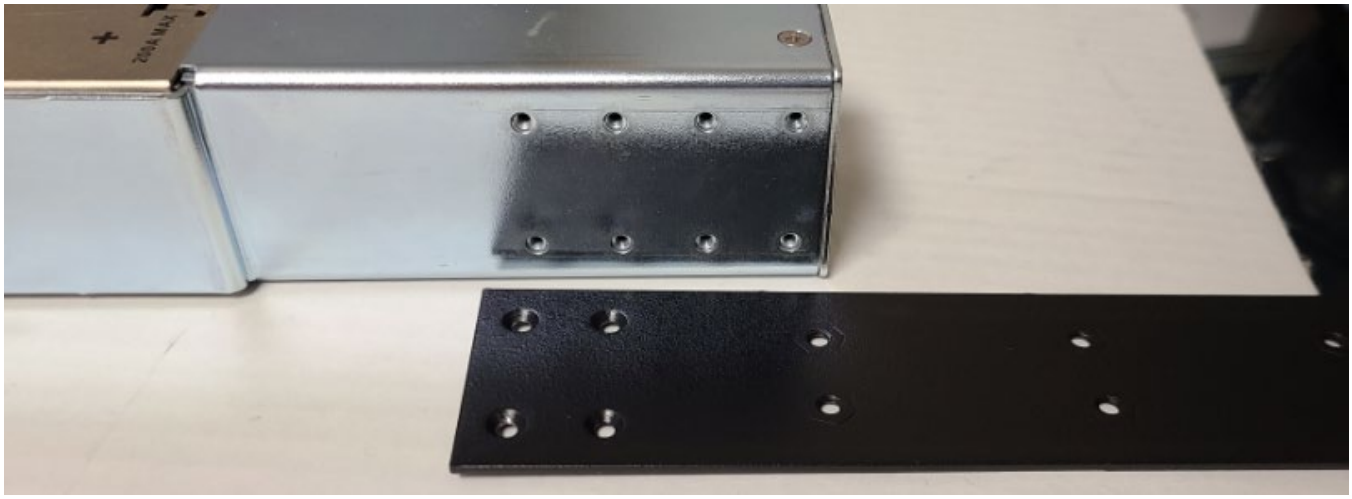

Figure 2-12: EQX-PS-FR-C – Extension Rail Main Mount

This component is necessary for all configurations when using the rail support. Attach it to both sides of the tray using the 4 provided screws. The set of holes to use will depend on the combination of pieces and the required length to connect to the rear supports of each tower rack.

2.3.4.2 Short Rail

When using the short rail. Use the inner set of screw holes on the main mounting hardware as seen on picture below. Place the rail using any of the 4 set of inner holes.

Figure 2-13: EQX-PS-FR-C – Extension Rail - Short

2.3.4.3 Long Rail

The very last set of screw holes on the main mounting hardware is used for the longer extension rail. Attach as seen in Figure 2-14 if using the longer one.

Figure 2-14: EQX-PS-FR-C – Extension Rail - Long

2.3.5 Rear Hardware Setup

Each of the 5 slots is assigned a slot index value to control each brick separately. The LAN module can be placed in any of the 5 slots, but for simplicity, we ship each tray with it in slot 1 by default.

Before we begin, please ensure that the centre control plug is present and plugged in at all times. The four jumper cables should be present and should look like Figure 2-15 below.

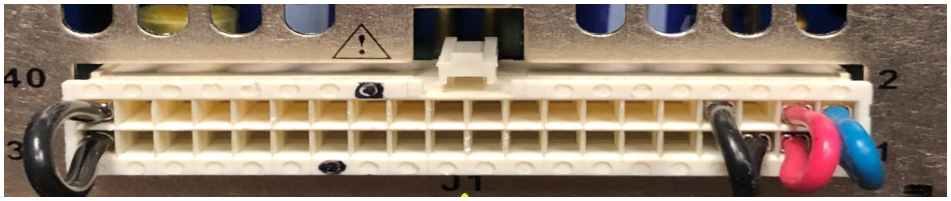

Figure 2-15: J1 Control Plug Jumper Setup

2.3.5.1 Address Selection Switch

To the right of J1 is an address selector switch. If there is only one tray in the setup, both DIP switches should be in the DOWN position. In this configuration (set to ON), the slot addresses will be 0, 1, 2, 3, and 4. With the LAN module in the first slot, the remaining power modules will be indexed as 1, 2, 3, and 4. If a second tray is present, toggle BOTH switches to the UP position. This will index the second tray as 8, 9, 10, 11, and 12.

DIP 1 up, DIP 2 down and DIP 1 down, DIP 2 up are not used and neither tray should ever be in this configuration.

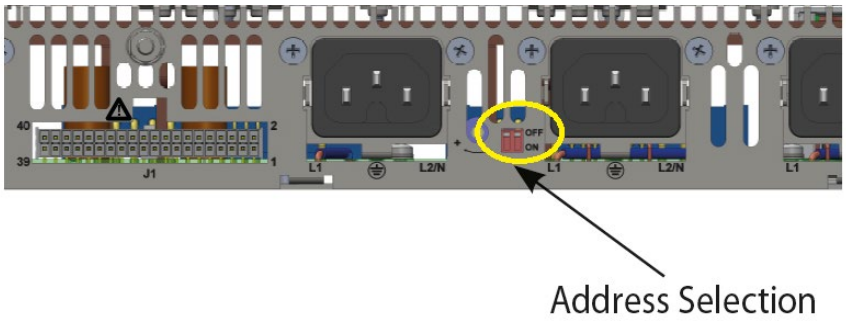

Figure 2-16: EQX-PS-FR-C Rear Panel Address Selection Switches

For systems with more than two power supply trays, treat each setup as dual pairs.

Pair 1: Tray 1, DIP1 Down, DIP2 down. Tray 2, DIP1 UP, DIP2 UP.

Pair 2: Tray 3, DIP1 Down, DIP2 down. Tray 4, DIP1 UP, DIP2 UP.

Pair one and Pair two do not get connected physically.

2.3.5.2 Slot Indexing vs. Physical Connections

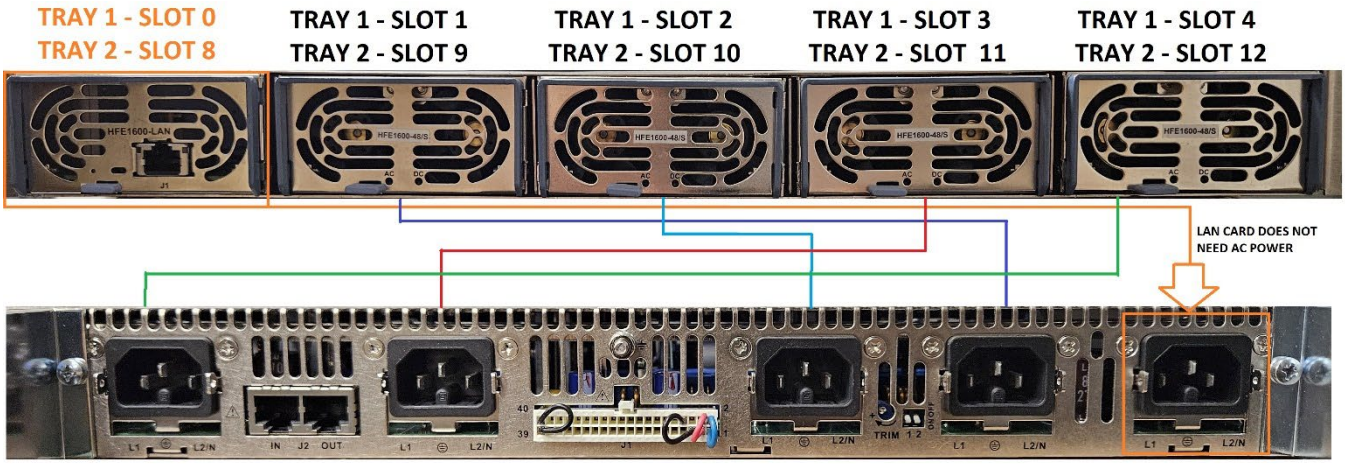

Figure 2-17: Slot Index & Rear AC Inlet

2.3.5.3 Current Sharing Between Trays

Ensure the supplied white jumper cable is connected between the two trays. Only 1 cable is needed between the two trays. For consistency, take the OUT from the tray indexed as 0,1,2,3,4 to the IN of the other tray.

Caution not to plug in a NIC or a laptop into this connection as 48V is present on pin 1.

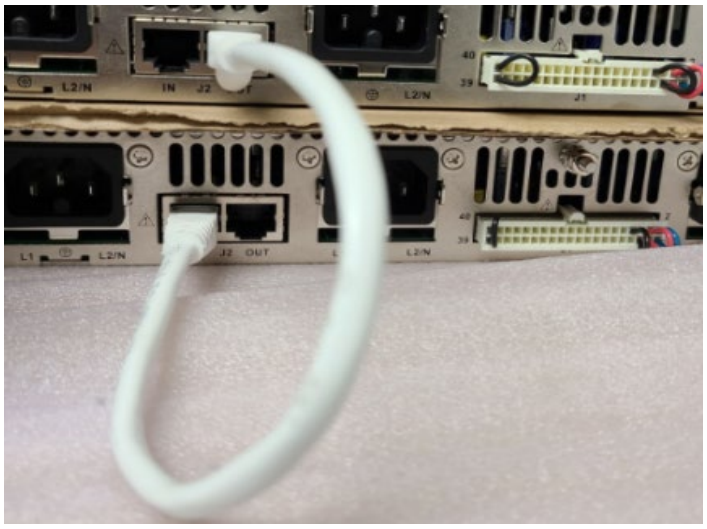

Figure 2-18: Current Sharing Jumper Cable

If connecting 3 or 4 trays to the same EQX system. This needs to be done in 2 isolated sets of 2. The following needs to be done.

SET A = 2 trays connected with current share setup above. Tray 1 with both DIPS down. Tray 2 with both DIPS UP.

SET B = If only 1 additional tray present, set both DIPS down and no current share connected to this tray. If 2 more are present, then configure like in SET A for this set of 2.

Inserting and removing modules:

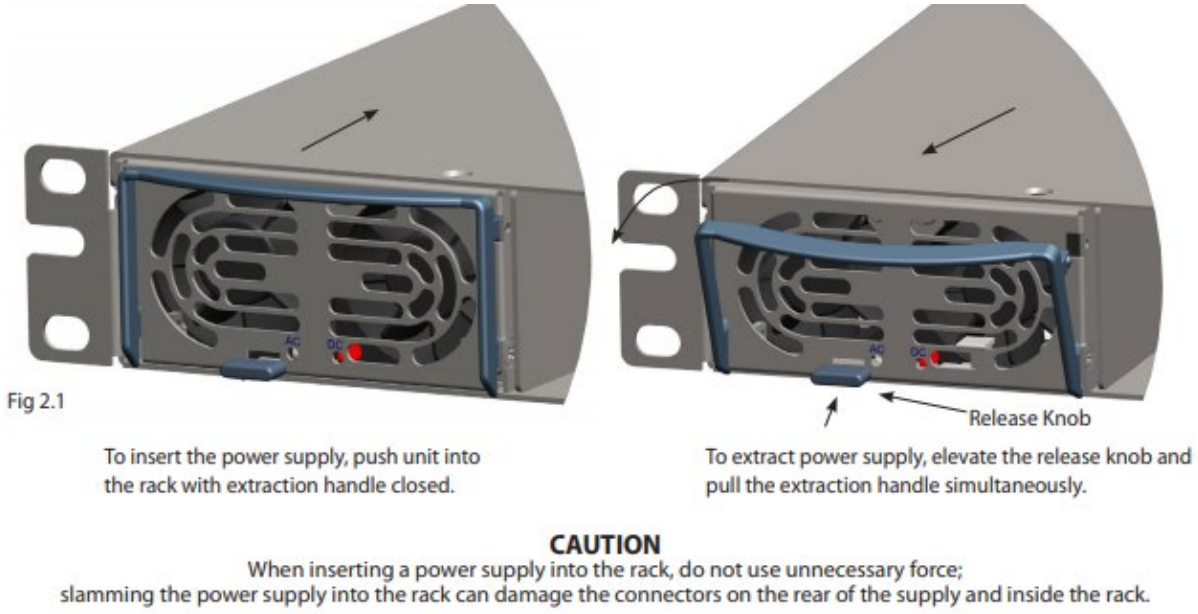

Figure 2-19: EQX HFE1600-S1U Power Supply Module

2.3.6 Proper Powering Up Procedure

Caution: RISK OF ELECTRIC SHOCK: If only one power supply is connected to the EQX frame, the second power supply connector on the rear end of the router must be fitted with the safety cover to prevent shock (shown below).

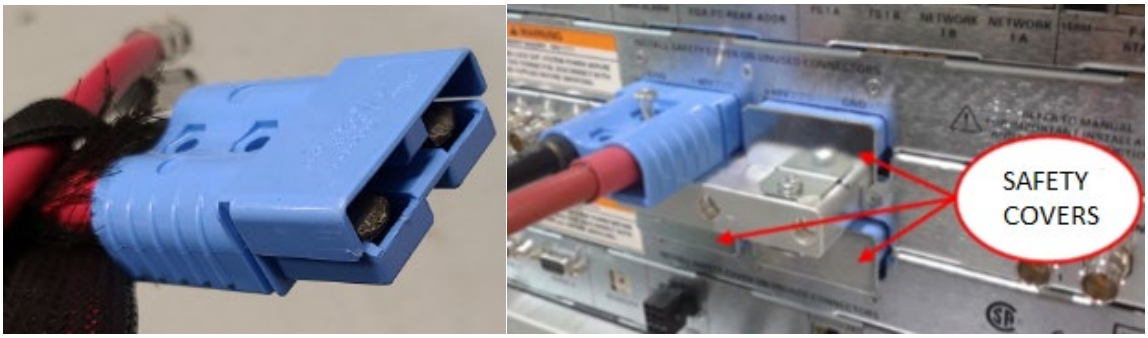

Figure 2-20: EQX Blue Anderson Connector

1. Gang the breakers intended for the EQX together to ensure all required breakers are turned on at the same time. This is to ensure the frame is not left in an under powered state which may cause damage to some cards.
2. Place all breakers needed in the OFF position.
3. You do not need to eject the power modules as there is no AC power live on the lines.
4. Connect all the blue Anderson connector from the power supply to the EQX.
5. Connect all necessary AC power cords to the connectors located directly behind the power modules to ensure the system operates properly.
6. Once everything is plugged in, turn the frame on by flipping the breakers to the ON position. Each power supply module delivers up to 1400 watts of power to the frame. It is important to carefully design the AC distribution to the power supply to ensure that sufficient AC circuits are available to power each module.

Note: Monitoring and additional PSU information can be found in APP note 125

Alternative power on method:

This method is less preferred over the above as it could put the system into an under powered state depending on the operated performing this.

Once all the AC connections are ready to turn the frame on, perform either one of the following methods.

Eject the power modules:

- Eject all EQX-PS-C modules from the tray. Leave them in the tray but not connected to the rear so they do not get power.
- Connect the blue Anderson connectors from the power supply to the EQX.
- With all power modules disconnected, attach all AC cords to the rear of the power supply trays. The EQX frame should not turn on.
- When ready, return to the front of the power supply trays. v. Press in all the loose EQX-PS-C modules in rapid succession to turn the frame on.

Note: This method is NOT recommended for turning off the frame. It is neither fast nor efficient to eject the modules one by one while the system is active, and it will likely put the frame into a bad state.

AC cord plug in

- Start with no AC cords plugged into the power trays.
- Connect the blue Anderson connectors from the power supply to the EQX. The EQX should remain off since no AC power is connected.
- When ready, gather all the required AC input cords. In rapid succession, insert each AC cord end into the corresponding AC inlet on the rear of the power supply tray to turn the frame on.

Note: To turn off the frame, you can remove the AC cords from the rear in rapid succession, ensuring the frame turns off as quickly as possible. This can be challenging, especially with setups that use AC cord retention mechanisms.

2.4 GETTING STARTED: SETUP INSTRUCTIONS

The following list outlines the steps that must be taken **before** operating the EQX. Please ensure that you have setup the system according to the guidelines listed below.

1. The correct standard of reference should be wired into the REF1 and REF2 reference inputs. If loop outs are not used, please terminate these ports with 75Ω termination.
2. Ensure that your PC is running the current version of the Evertz/Quartz WinSetup application meant for the EQX-FC firmware in operation.
3. Prepare 4 dedicated subnets and IP addresses that will be in use on the EQX RPC4net system. Please reserve 1 IP address for each EQX-FC on subnets A, B, & C.
    - Subnet A. (Control port
    - Subnet B. (SNMP port)
    - Subnet C. (Inter FC communication)
    - Subnet D. Card access port
        i. EQX26RU = Reserve 74 IP addresses
        ii. EQX16RU = Reserve 42 IP addresses
        iii. EQX10RU = 28 IP addresses

Note: All subnets must be enabled (even if not in use) and must be unique. Do not expose or loop the subnet between each other.

D subnet of one EQX cannot be on the same subnet range as another EQX system.

4. Wire the Ethernet inputs (at least 1B and 2B) into a network switch and make sure they are accessible to your PC.
5. Ensure that a standard "straight-through" serial cable and Evertz Rainbow ribbon cable (WA-S76) are accessible.
6. Properly wire the router to a patch bay with valid "known-good" test signals and a "known-good" test station or WFM, which is used for monitoring the signals.

2.5 CABLING OF SOURCES AND DESTINATIONS

When it comes to cabling the sources and destinations, the setup remains the same. Regardless of the orientation of the card, it is always wired from top to bottom.

2.5.1 Standard Orientation

Standard orientation refers to the cards in an EQX10, EQX16, and the top section of an EQX26. Typically, these sources and destinations are channels numbered between 1 and 288.

SOURCES OR DESTINATIONS MAPPING																HBX REAR SCREEN
271	253	235	217	199	181	163	145		127	109	91	73	55	37	19	1	1
272	254	236	218	200	182	164	146		128	110	92	74	56	38	20	2	2
273	255	237	219	201	183	165	147		129	111	93	75	57	39	21	3	3
274	256	238	220	202	184	166	148		130	112	94	76	58	40	22	4	4
275	257	239	221	203	185	167	149		131	113	95	77	59	41	23	5	5
276	258	240	222	204	186	168	150		132	114	96	78	60	42	24	6	6
277	259	241	223	205	187	169	151		133	115	97	79	61	43	25	7	7
278	260	242	224	206	188	170	152		134	116	98	80	62	44	26	8	8
279	261	243	225	207	189	171	153		135	117	99	81	63	45	27	9	9
280	262	244	226	208	190	172	154		136	118	100	82	64	46	28	10	10
281	263	245	227	209	191	173	155		137	119	101	83	65	47	29	11	11
282	264	246	228	210	192	174	156		138	120	102	84	66	48	30	12	12
283	265	247	229	211	193	175	157		139	121	103	85	67	49	31	13	13
284	266	248	230	212	194	176	158		140	122	104	86	68	50	32	14	14
285	267	249	231	213	195	177	159		141	123	105	87	69	51	33	15	15
286	268	250	232	214	196	178	160		142	124	106	88	70	52	34	16	16
287	269	251	233	215	197	179	161		143	125	107	89	71	53	35	17	17
288	270	252	234	216	198	180	162		144	126	108	90	72	54	36	18	18

Figure 2-21: EQX-S and EQX-H Rear Plate Mapping Standard

2.5.1 Inverted Orientation (26RU Lower Slots)

When dealing with an inverted orientation in the 26RU lower slots, the cabling setup remains consistent. Regardless of the card's orientation, always wire the sources and destinations from top to bottom. This ensures a standardized and organized approach to cabling, making maintenance and troubleshooting more straightforward.

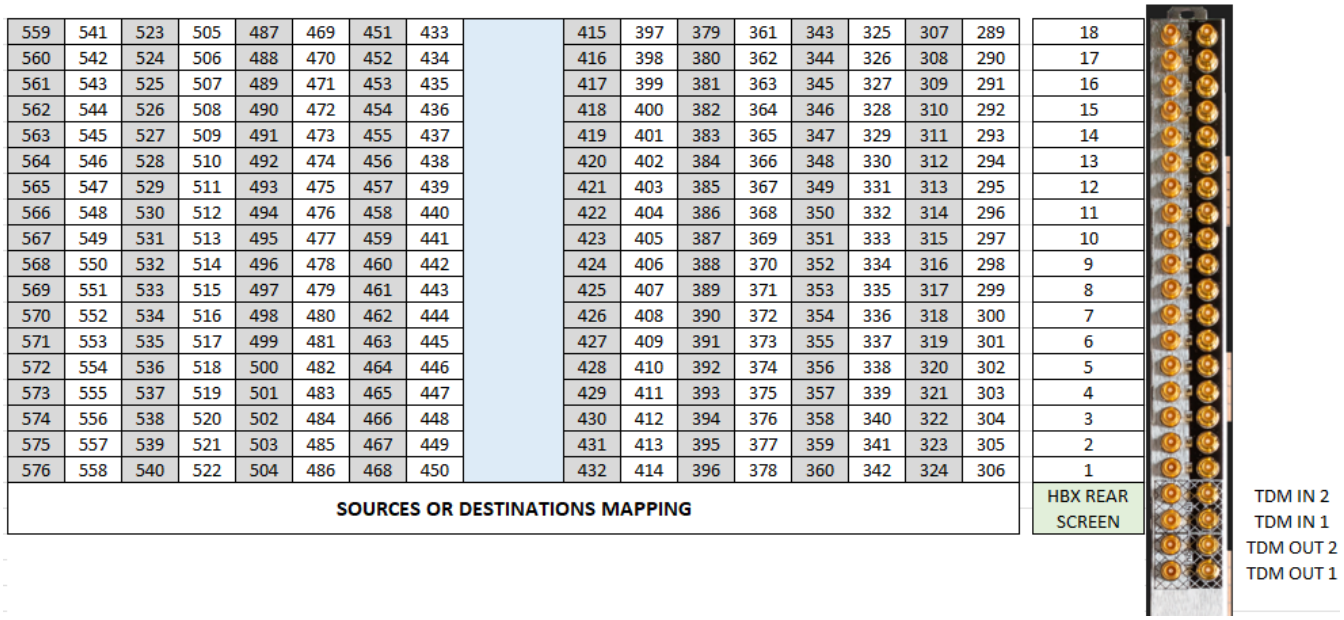

Figure 2-22: EQX-S and EQX-H Rear Plate Mapping Inverted

Note: The screening on the HBX rear plate labels channels 1 to 18. Please ignore the inverted 18 to 1 labelling when in the bottom half. These channel associations are used to link the channels to the controls on the web interface. They do NOT affect the mapping for cabling.

3. FRAME TYPES

A standard EQX platform can route up to 576x576 signals within a 26RU frame, up to 288x288 signals in a 16RU frame, and up to 180x180 signals in a 10RU frame. The routing capacity of the EQX platform can be further increased by incorporating X-Link expansions into the frame. The available frame types are as follows:

- EQX26-FRHBX-XL2
- EQX16-FRHBX-XL3
- EQX10-FRQT2
- EQX10-FRQT2-AX

Note: The frames mentioned above come with the maximum number of X-Link connectors pre-installed. However, to activate these output ports, the appropriate crosspoint cards must be installed.

This design facilitates future expansion of the frame without requiring a complete frame replacement. Only a crosspoint card and some software configurations are needed.

3.1 FRAME AIR FLOW VENTING

The EQX frames are equipped with multiple fan modules to cool the input and output cards, with each module containing two fans. One fan directs airflow upwards, while the other directs it towards the rear. To ensure proper ventilation, please maintain a 1RU airflow gap above and below the frame.

Figure 3-1: EQX16RU and EQX26RU Top 1RU Airflow

Figure 3-2: EQX26RU Bottom 1RU Airflow

Figure 3-3: EQX10 & EQXUHD Frame Both Fans Vent Upwards

A shallow-depth panel or device can be used instead of a blank panel, as long as it does not obstruct any of the venting holes.

Figure 3-4: Shallow Panel not Blocking Venting Holes

3.2 EQX26-FRHBX-XL2 (26RU WITH TWO XLINK EXPANSION OUTPUTS)

This frame, equipped with X-Link expansions, has a capacity of 576 sources x1152 outputs. The first 1-576 are the main BNC outputs, while the remaining 577-1152 are X-Link outputs.

The frame is equipped with 10x EQX-FAN-HBX. EQX-FC firmware 4.30 vlan-Build-319 is required to properly recognize and support these fan modules.

Note: A 576x576 squared crosspoint card is required in slots 1(top) & 3(bottom) to enable the extra XLINK outputs.

The location of the X-link connectors is shown in the picture below. If a fault is found on the X-Link boards, they can be serviced by a qualified service personnel member.

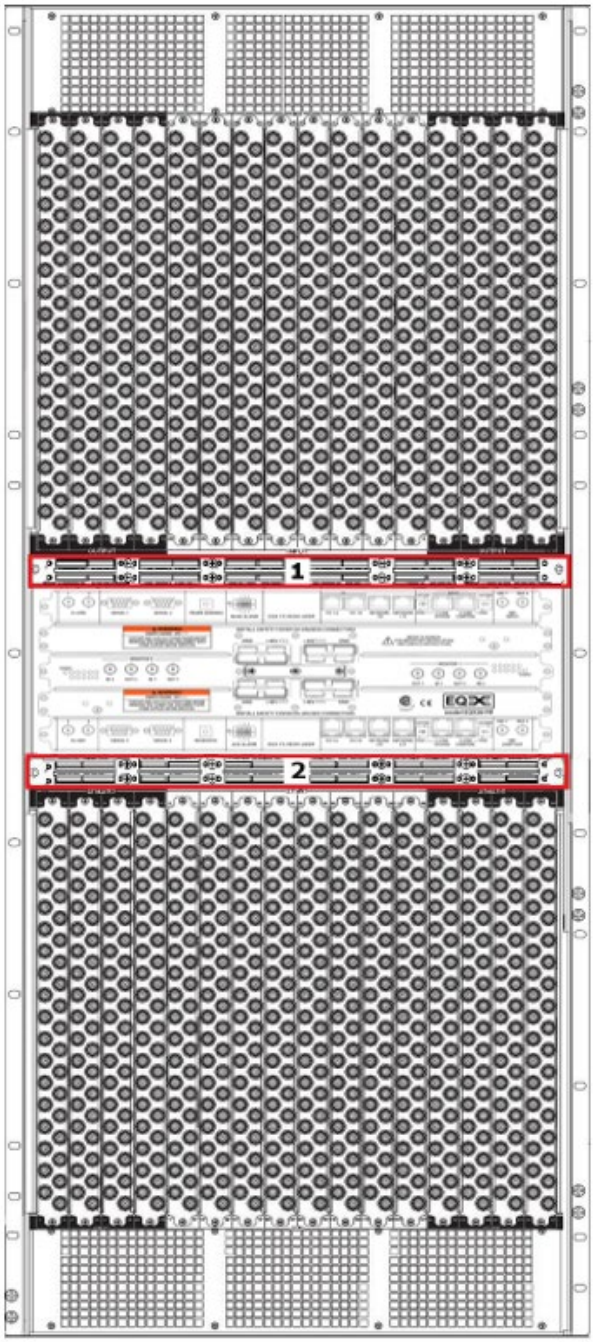

Figure 3-5: Placement of XLINK Connectors on 26RU

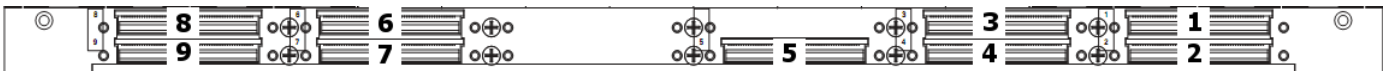

Figure 3-6: 26RU Top X-Link Connectors

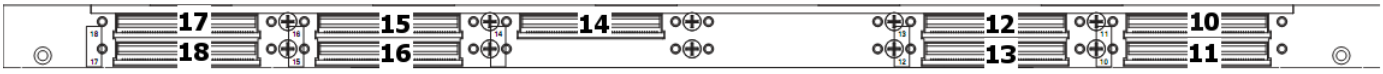

Figure 3-7: 26RU Bottom X-Link Connectors

Note: Xlink outputs are recommended for monitoring purposes only.

Sequential XLINK Mapping

Mapping of these X-Link destination channels are like such for most of the 26RU frame setups. Hardware mapping of each channel is always sequentially in order when broken out to a break-out panel.

ROUTE DESTINATIONS 1153-1440 (XLINK DESTINATIONS 1-288)(TOP XPT)

	XLINK 9		XLINK 8		XLINK 7		XLINK 6		XLINK 5		XLINK 4		XLINK 3		XLINK 2		XLINK 1	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	1409	257	1377	225	1345	193	1313	161	1281	129	1249	97	1217	65	1185	33	1153	1
2	1410	258	1378	226	1346	194	1314	162	1282	130	1250	98	1218	66	1186	34	1154	2
3	1411	259	1379	227	1347	195	1315	163	1283	131	1251	99	1219	67	1187	35	1155	3
4	1412	260	1380	228	1348	196	1316	164	1284	132	1252	100	1220	68	1188	36	1156	4
5	1413	261	1381	229	1349	197	1317	165	1285	133	1253	101	1221	69	1189	37	1157	5
6	1414	262	1382	230	1350	198	1318	166	1286	134	1254	102	1222	70	1190	38	1158	6
7	1415	263	1383	231	1351	199	1319	167	1287	135	1255	103	1223	71	1191	39	1159	7
8	1416	264	1384	232	1352	200	1320	168	1288	136	1256	104	1224	72	1192	40	1160	8
9	1417	265	1385	233	1353	201	1321	169	1289	137	1257	105	1225	73	1193	41	1161	9
10	1418	266	1386	234	1354	202	1322	170	1290	138	1258	106	1226	74	1194	42	1162	10
11	1419	267	1387	235	1355	203	1323	171	1291	139	1259	107	1227	75	1195	43	1163	11
12	1420	268	1388	236	1356	204	1324	172	1292	140	1260	108	1228	76	1196	44	1164	12
13	1421	269	1389	237	1357	205	1325	173	1293	141	1261	109	1229	77	1197	45	1165	13
14	1422	270	1390	238	1358	206	1326	174	1294	142	1262	110	1230	78	1198	46	1166	14
15	1423	271	1391	239	1359	207	1327	175	1295	143	1263	111	1231	79	1199	47	1167	15
16	1424	272	1392	240	1360	208	1328	176	1296	144	1264	112	1232	80	1200	48	1168	16
17	1425	273	1393	241	1361	209	1329	177	1297	145	1265	113	1233	81	1201	49	1169	17
18	1426	274	1394	242	1362	210	1330	178	1298	146	1266	114	1234	82	1202	50	1170	18
19	1427	275	1395	243	1363	211	1331	179	1299	147	1267	115	1235	83	1203	51	1171	19
20	1428	276	1396	244	1364	212	1332	180	1300	148	1268	116	1236	84	1204	52	1172	20
21	1429	277	1397	245	1365	213	1333	181	1301	149	1269	117	1237	85	1205	53	1173	21
22	1430	278	1398	246	1366	214	1334	182	1302	150	1270	118	1238	86	1206	54	1174	22
23	1431	279	1399	247	1367	215	1335	183	1303	151	1271	119	1239	87	1207	55	1175	23
24	1432	280	1400	248	1368	216	1336	184	1304	152	1272	120	1240	88	1208	56	1176	24
25	1433	281	1401	249	1369	217	1337	185	1305	153	1273	121	1241	89	1209	57	1177	25
26	1434	282	1402	250	1370	218	1338	186	1306	154	1274	122	1242	90	1210	58	1178	26
27	1435	283	1403	251	1371	219	1339	187	1307	155	1275	123	1243	91	1211	59	1179	27
28	1436	284	1404	252	1372	220	1340	188	1308	156	1276	124	1244	92	1212	60	1180	28
29	1437	285	1405	253	1373	221	1341	189	1309	157	1277	125	1245	93	1213	61	1181	29
30	1438	286	1406	254	1374	222	1342	190	1310	158	1278	126	1246	94	1214	62	1182	30
31	1439	287	1407	255	1375	223	1343	191	1311	159	1279	127	1247	95	1215	63	1183	31
32	1440	288	1408	256	1376	224	1344	192	1312	160	1280	128	1248	96	1216	64	1184	32

Figure 3-8: 26RU TOP X-Link Connectors – Mapping

ROUTE DESTINATIONS 1441-1728 (XLINK DESTINATIONS 289-576)(BOTTOM XPT)

	XLINK 18		XLINK 17		XLINK 16		XLINK 15		XLINK 14		XLINK 13		XLINK 12		XLINK 11		XLINK 10	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	1697	545	1665	513	1633	481	1601	449	1569	417	1537	385	1505	353	1473	321	1441	289
2	1698	546	1666	514	1634	482	1602	450	1570	418	1538	386	1506	354	1474	322	1442	290
3	1699	547	1667	515	1635	483	1603	451	1571	419	1539	387	1507	355	1475	323	1443	291
4	1700	548	1668	516	1636	484	1604	452	1572	420	1540	388	1508	356	1476	324	1444	292
5	1701	549	1669	517	1637	485	1605	453	1573	421	1541	389	1509	357	1477	325	1445	293
6	1702	550	1670	518	1638	486	1606	454	1574	422	1542	390	1510	358	1478	326	1446	294
7	1703	551	1671	519	1639	487	1607	455	1575	423	1543	391	1511	359	1479	327	1447	295
8	1704	552	1672	520	1640	488	1608	456	1576	424	1544	392	1512	360	1480	328	1448	296
9	1705	553	1673	521	1641	489	1609	457	1577	425	1545	393	1513	361	1481	329	1449	297
10	1706	554	1674	522	1642	490	1610	458	1578	426	1546	394	1514	362	1482	330	1450	298
11	1707	555	1675	523	1643	491	1611	459	1579	427	1547	395	1515	363	1483	331	1451	299
12	1708	556	1676	524	1644	492	1612	460	1580	428	1548	396	1516	364	1484	332	1452	300
13	1709	557	1677	525	1645	493	1613	461	1581	429	1549	397	1517	365	1485	333	1453	301
14	1710	558	1678	526	1646	494	1614	462	1582	430	1550	398	1518	366	1486	334	1454	302
15	1711	559	1679	527	1647	495	1615	463	1583	431	1551	399	1519	367	1487	335	1455	303
16	1712	560	1680	528	1648	496	1616	464	1584	432	1552	400	1520	368	1488	336	1456	304
17	1713	561	1681	529	1649	497	1617	465	1585	433	1553	401	1521	369	1489	337	1457	305
18	1714	562	1682	530	1650	498	1618	466	1586	434	1554	402	1522	370	1490	338	1458	306
19	1715	563	1683	531	1651	499	1619	467	1587	435	1555	403	1523	371	1491	339	1459	307
20	1716	564	1684	532	1652	500	1620	468	1588	436	1556	404	1524	372	1492	340	1460	308
21	1717	565	1685	533	1653	501	1621	469	1589	437	1557	405	1525	373	1493	341	1461	309
22	1718	566	1686	534	1654	502	1622	470	1590	438	1558	406	1526	374	1494	342	1462	310
23	1719	567	1687	535	1655	503	1623	471	1591	439	1559	407	1527	375	1495	343	1463	311
24	1720	568	1688	536	1656	504	1624	472	1592	440	1560	408	1528	376	1496	344	1464	312
25	1721	569	1689	537	1657	505	1625	473	1593	441	1561	409	1529	377	1497	345	1465	313
26	1722	570	1690	538	1658	506	1626	474	1594	442	1562	410	1530	378	1498	346	1466	314
27	1723	571	1691	539	1659	507	1627	475	1595	443	1563	411	1531	379	1499	347	1467	315
28	1724	572	1692	540	1660	508	1628	476	1596	444	1564	412	1532	380	1500	348	1468	316
29	1725	573	1693	541	1661	509	1629	477	1597	445	1565	413	1533	381	1501	349	1469	317
30	1726	574	1694	542	1662	510	1630	478	1598	446	1566	414	1534	382	1502	350	1470	318
31	1727	575	1695	543	1663	511	1631	479	1599	447	1567	415	1535	383	1503	351	1471	319
32	1728	576	1696	544	1664	512	1632	480	1600	448	1568	416	1536	384	1504	352	1472	320

Figure 3-9: 26RU Bottom X-Link Connectors - Mapping

Note: Provided mappings here do not correlate with Magnum mapping. These mapping channels are to be used if a Quartz route was executed.

3.3 EQX16-FRHBX-XL3 (16RU WITH THREE XLINK EXPANSIONS)

This frame with three Xlink expansions has the capacity for 288X1152 IO. Outputs 1-288 are the main BNC outputs and the remaining 289-1152 are the Xlink outputs.

The frame is equipped with 5x EQX-FAN-HBX. EQX-FC firmware 4.30 vlan-Build-319 is required to properly recognize and support these fan modules.

Note: This frame option allows for extensive customization of outputs. To utilize all the X-Link outputs, the necessary crosspoint card and configuration adjustments are required.

The location of the X-link connectors is shown in the picture below. If a fault is found on the X-Link boards, they can be serviced by a qualified service personnel member.

Please take note of the indexing of these X-Link connectors. The first connector is on bank # 1 located at the bottom of the frame.

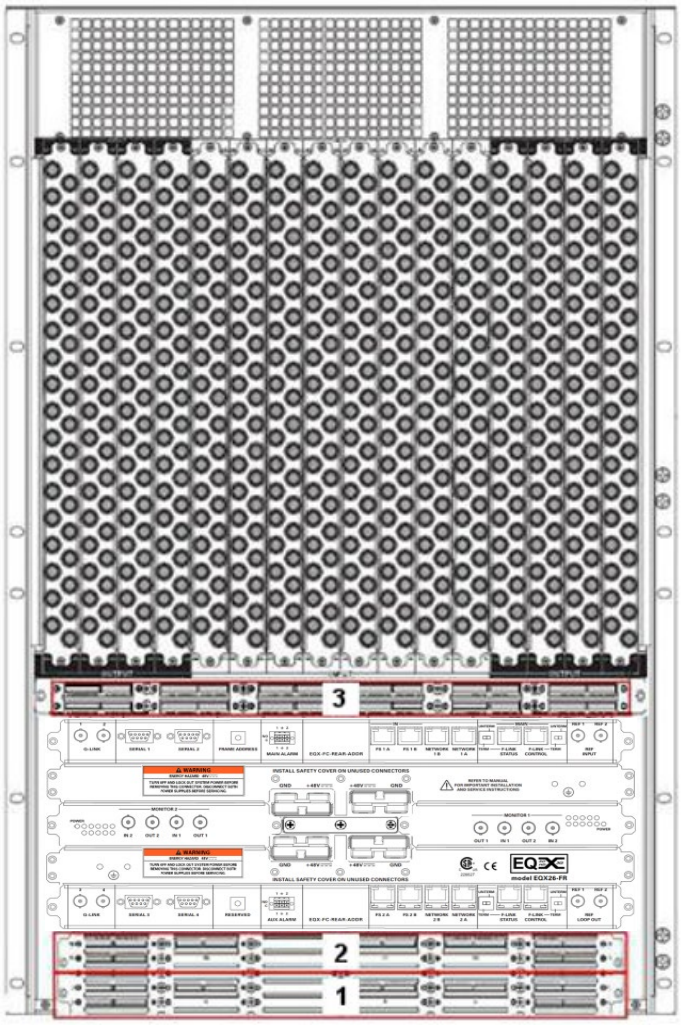

Figure 3-10: 16RU Frame with Three Xlink Expansions

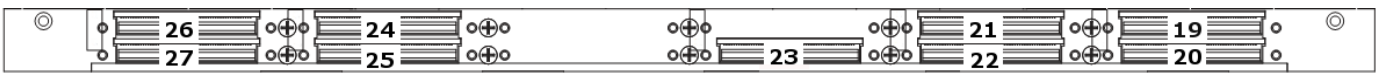

Figure 3-11: 16RU X-Link Expansion 3

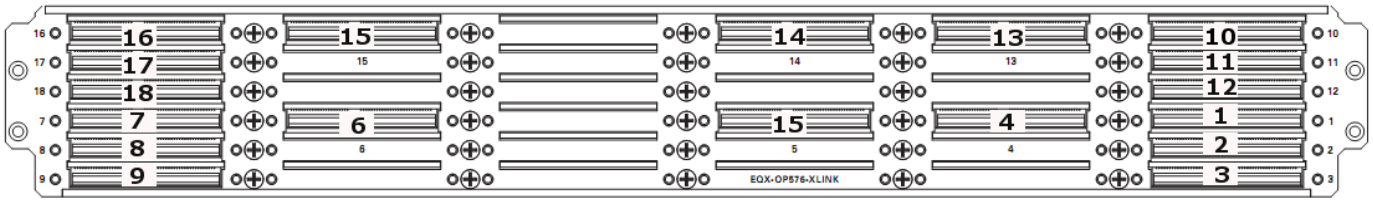

Figure 3-12: 16RU X-Link Expansions 1 and 2

3.3.1 X-Link Mixed Mapping

Depending on the crosspoint present when the frame was configured, a mixed mapping of the X-Link path may be present. Please consult with a qualified service personnel member about the system mapping prior to making any upgrades or changes to the crosspoint cards.

In general, systems that were configured with the crosspoint cards as shown below will likely be operating on a mixed mapping.

- TOP – 288x288 squared
- MIDDLE – 288x288 squared
- BOTTOM – 288x288 squared

Figure 3-13 below is a mapping of the bottom X-Link channels if the system is on mixed mapping.

Note: Provided mappings here do not correlate with Magnum mapping. These mapping channels are to be used if a Quartz route was executed.

	ROUTER DESTINATIONS 289-576 (XLINK DESTINATIONS 1-288)																	
	XLINK 9		XLINK 8		XLINK 7		XLINK 6		XLINK 5		XLINK 4		XLINK 3		XLINK 2		XLINK 1	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	474	257	499	225	483	193	445	161	399	129	367	97	295	65	319	33	322	1
2	473	258	517	226	484	194	446	162	397	130	373	98	293	66	303	34	321	2
3	470	259	480	227	495	195	441	163	407	131	362	99	291	67	315	35	333	3
4	469	260	479	228	513	196	442	164	405	132	361	100	289	68	299	36	317	4
5	476	261	510	229	492	197	437	165	403	133	371	101	296	69	314	37	330	5
6	475	262	511	230	509	198	438	166	401	134	366	102	294	70	312	38	329	6
7	472	263	507	231	505	199	433	167	411	135	370	103	292	71	309	39	326	7
8	471	264	488	232	506	200	434	168	409	136	365	104	290	72	307	40	325	8
9	482	265	520	233	518	201	447	169	400	137	375	105	302	73	320	41	338	9
10	481	266	535	234	519	202	448	170	398	138	374	106	301	74	304	42	337	10
11	478	267	516	235	514	203	443	171	408	139	363	107	298	75	316	43	334	11
12	477	268	531	236	515	204	444	172	406	140	369	108	297	76	300	44	318	12
13	491	269	527	237	512	205	439	173	404	141	415	109	311	77	323	45	332	13
14	485	270	528	238	521	206	440	174	402	142	414	110	305	78	313	46	331	14
15	487	271	522	239	523	207	449	175	412	143	417	111	308	79	324	47	328	15
16	486	272	508	240	524	208	455	176	410	144	416	112	306	80	310	48	327	16
17	558	273	542	241	525	209	435	177	463	145	419	113	346	81	344	49	343	17
18	560	274	543	242	526	210	436	178	464	146	413	114	360	82	345	50	342	18
19	563	275	546	243	529	211	450	179	456	147	421	115	383	83	347	51	349	19
20	566	276	548	244	530	212	451	180	458	148	420	116	386	84	341	52	348	20
21	561	277	550	245	532	213	489	181	459	149	424	117	381	85	336	53	352	21
22	568	278	551	246	533	214	498	182	461	150	423	118	389	86	335	54	351	22
23	564	279	554	247	536	215	500	183	452	151	428	119	384	87	340	55	356	23
24	573	280	556	248	537	216	501	184	454	152	427	120	393	88	339	56	355	24
25	562	281	544	249	540	217	497	185	465	153	432	121	382	89	379	57	364	25
26	576	282	559	250	541	218	503	186	466	154	418	122	396	90	380	58	378	26
27	565	283	547	251	539	219	496	187	457	155	431	123	385	91	359	59	377	27
28	575	284	557	252	545	220	494	188	467	156	422	124	395	92	350	60	368	28
29	569	285	552	253	534	221	490	189	460	157	426	125	388	93	353	61	372	29
30	570	286	567	254	549	222	504	190	462	158	425	126	390	94	387	62	354	30
31	572	287	555	255	538	223	493	191	453	159	430	127	392	95	358	63	391	31
32	574	288	571	256	553	224	502	192	468	160	429	128	394	96	357	64	376	32

Figure 3-13: 16RU X-Link1 Mixed Mapping

There are some 16RU frame setups that utilize two banks of X-link connectors: the Middle and the Bottom. The bottom bank follows the previous mapping in XLINK1. The second bank of X-Links handled by the middle crosspoint card can be seen below.

- TOP – 288x288 squared
- **MIDDLE – 288x288 squared or 576x576 squared**
- BOTTOM - – 288x288 squared

Figure 3-14 below is only for illustration if the system was setup for mixed mapping with two Xlink banks. Please do not assume the system is configured this way.

	OUTPUTS 865-1152 IF CONTROLLED INDIVIDUALLY (XLINK DESTINATIONS 289-576)																	
	XLINK 18		XLINK 17		XLINK 16		XLINK 15		XLINK 14		XLINK 13		XLINK 12		XLINK 11		XLINK 10	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	1051	545	1075	513	1095	481	1013	449	973	417	941	385	872	353	895	321	913	289
2	1049	546	1059	514	1094	482	1009	450	977	418	937	386	869	354	879	322	897	290
3	1062	547	1071	515	1091	483	1021	451	985	419	949	387	882	355	900	323	904	291
4	1047	548	1081	516	1090	484	1017	452	981	420	945	388	867	356	885	324	893	292
5	1052	549	1086	517	1097	485	1014	453	974	421	942	389	881	357	890	325	907	293
6	1050	550	1068	518	1088	486	1010	454	978	422	938	390	870	358	888	326	905	294
7	1053	551	1082	519	1098	487	1022	455	986	423	950	391	874	359	891	327	909	295
8	1046	552	1064	520	1084	488	1018	456	982	424	946	392	866	360	884	328	902	296
9	1058	553	1093	521	1111	489	1015	457	975	425	943	393	878	361	896	329	914	297
10	1057	554	1060	522	1096	490	1011	458	979	426	939	394	877	362	880	330	898	298
11	1055	555	1089	523	1107	491	1023	459	987	427	951	395	875	363	892	331	910	299
12	1054	556	1056	524	1092	492	1019	460	983	428	947	396	873	364	876	332	894	300
13	1067	557	1087	525	1104	493	1016	461	976	429	989	397	887	365	899	333	908	301
14	1061	558	1085	526	1103	494	1012	462	980	430	990	398	871	366	889	334	906	302
15	1048	559	1083	527	1100	495	1024	463	988	431	995	399	868	367	886	335	903	303
16	1045	560	1063	528	1099	496	1020	464	984	432	991	400	865	368	883	336	901	304
17	1148	561	1130	529	1112	497	1025	465	1043	433	996	401	959	369	933	337	915	305
18	1149	562	1132	530	1114	498	1026	466	1044	434	992	402	969	370	952	338	931	306
19	1144	563	1126	531	1108	499	1039	467	1034	435	1003	403	964	371	929	339	911	307
20	1146	564	1128	532	1110	500	1035	468	1030	436	999	404	966	372	948	340	927	308
21	1139	565	1122	533	1105	501	1069	469	1038	437	997	405	960	373	926	341	917	309
22	1142	566	1124	534	1115	502	1065	470	1042	438	993	406	962	374	944	342	924	310
23	1136	567	1119	535	1102	503	1076	471	1033	439	1004	407	956	375	936	343	919	311
24	1152	568	1134	536	1117	504	1072	472	1029	440	1000	408	972	376	954	344	921	312
25	1140	569	1131	537	1113	505	1070	473	1037	441	998	409	968	377	934	345	916	313
26	1150	570	1147	538	1129	506	1066	474	1041	442	994	410	970	378	967	346	932	314
27	1145	571	1127	539	1109	507	1077	475	1028	443	1005	411	965	379	930	347	912	315
28	1138	572	1143	540	1125	508	1073	476	1032	444	1001	412	958	380	963	348	928	316
29	1141	573	1123	541	1106	509	1079	477	1036	445	1007	413	961	381	935	349	923	317
30	1151	574	1133	542	1121	510	1080	478	1040	446	1008	414	971	382	953	350	925	318
31	1135	575	1118	543	1101	511	1078	479	1027	447	1006	415	955	383	922	351	918	319
32	1137	576	1120	544	1116	512	1074	480	1031	448	1002	416	957	384	940	352	920	320

Figure 3-14: 16RU X-Link2 Mixed Mapping

3.3.2 X-Link Sequential Mapping

Depending on the crosspoint present when the frame was configured, a sequential mapping of the X-Link path may be present. Please consult with a qualified service personnel member about the system mapping prior to making any upgrades or changes to the crosspoint cards.

If a sequential mapping is in use, the mapping is straightforward, starting from the lower XLINK1, then XLINK2, and finally the top XLINK3.

Note: Please note that these mappings do not correlate with Magnum mapping. These mapping channels are to be used if a Quartz route was executed.

	ROUTER DESTINATIONS 289-576 (XLINK DESTINATIONS 1-288)(BOTTOM XPT)																	
	XLINK 9		XLINK 8		XLINK 7		XLINK 6		XLINK 5		XLINK 4		XLINK 3		XLINK 2		XLINK 1	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	545	257	513	225	481	193	449	161	417	129	385	97	353	65	321	33	289	1
2	546	258	514	226	482	194	450	162	418	130	386	98	354	66	322	34	290	2
3	547	259	515	227	483	195	451	163	419	131	387	99	355	67	323	35	291	3
4	548	260	516	228	484	196	452	164	420	132	388	100	356	68	324	36	292	4
5	549	261	517	229	485	197	453	165	421	133	389	101	357	69	325	37	293	5
6	550	262	518	230	486	198	454	166	422	134	390	102	358	70	326	38	294	6
7	551	263	519	231	487	199	455	167	423	135	391	103	359	71	327	39	295	7
8	552	264	520	232	488	200	456	168	424	136	392	104	360	72	328	40	296	8
9	553	265	521	233	489	201	457	169	425	137	393	105	361	73	329	41	297	9
10	554	266	522	234	490	202	458	170	426	138	394	106	362	74	330	42	298	10
11	555	267	523	235	491	203	459	171	427	139	395	107	363	75	331	43	299	11
12	556	268	524	236	492	204	460	172	428	140	396	108	364	76	332	44	300	12
13	557	269	525	237	493	205	461	173	429	141	397	109	365	77	333	45	301	13
14	558	270	526	238	494	206	462	174	430	142	398	110	366	78	334	46	302	14
15	559	271	527	239	495	207	463	175	431	143	399	111	367	79	335	47	303	15
16	560	272	528	240	496	208	464	176	432	144	400	112	368	80	336	48	304	16
17	561	273	529	241	497	209	465	177	433	145	401	113	369	81	337	49	305	17
18	562	274	530	242	498	210	466	178	434	146	402	114	370	82	338	50	306	18
19	563	275	531	243	499	211	467	179	435	147	403	115	371	83	339	51	307	19
20	564	276	532	244	500	212	468	180	436	148	404	116	372	84	340	52	308	20
21	565	277	533	245	501	213	469	181	437	149	405	117	373	85	341	53	309	21
22	566	278	534	246	502	214	470	182	438	150	406	118	374	86	342	54	310	22
23	567	279	535	247	503	215	471	183	439	151	407	119	375	87	343	55	311	23
24	568	280	536	248	504	216	472	184	440	152	408	120	376	88	344	56	312	24
25	569	281	537	249	505	217	473	185	441	153	409	121	377	89	345	57	313	25
26	570	282	538	250	506	218	474	186	442	154	410	122	378	90	346	58	314	26
27	571	283	539	251	507	219	475	187	443	155	411	123	379	91	347	59	315	27
28	572	284	540	252	508	220	476	188	444	156	412	124	380	92	348	60	316	28
29	573	285	541	253	509	221	477	189	445	157	413	125	381	93	349	61	317	29
30	574	286	542	254	510	222	478	190	446	158	414	126	382	94	350	62	318	30
31	575	287	543	255	511	223	479	191	447	159	415	127	383	95	351	63	319	31
32	576	288	544	256	512	224	480	192	448	160	416	128	384	96	352	64	320	32

Figure 3-15: 16RU X-Link3 – Bank 1 Mapping

	ROUTER DESTINATIONS 865-1152 (XLINK DESTINATIONS 289-576)(MIDDLE XPT)																	
	XLINK 18		XLINK 17		XLINK 16		XLINK 15		XLINK 14		XLINK 13		XLINK 12		XLINK 11		XLINK 10	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	1121	545	1089	513	1057	481	1025	449	993	417	961	385	929	353	897	321	865	289
2	1122	546	1090	514	1058	482	1026	450	994	418	962	386	930	354	898	322	866	290
3	1123	547	1091	515	1059	483	1027	451	995	419	963	387	931	355	899	323	867	291
4	1124	548	1092	516	1060	484	1028	452	996	420	964	388	932	356	900	324	868	292
5	1125	549	1093	517	1061	485	1029	453	997	421	965	389	933	357	901	325	869	293
6	1126	550	1094	518	1062	486	1030	454	998	422	966	390	934	358	902	326	870	294
7	1127	551	1095	519	1063	487	1031	455	999	423	967	391	935	359	903	327	871	295
8	1128	552	1096	520	1064	488	1032	456	1000	424	968	392	936	360	904	328	872	296
9	1129	553	1097	521	1065	489	1033	457	1001	425	969	393	937	361	905	329	873	297
10	1130	554	1098	522	1066	490	1034	458	1002	426	970	394	938	362	906	330	874	298
11	1131	555	1099	523	1067	491	1035	459	1003	427	971	395	939	363	907	331	875	299
12	1132	556	1100	524	1068	492	1036	460	1004	428	972	396	940	364	908	332	876	300
13	1133	557	1101	525	1069	493	1037	461	1005	429	973	397	941	365	909	333	877	301
14	1134	558	1102	526	1070	494	1038	462	1006	430	974	398	942	366	910	334	878	302
15	1135	559	1103	527	1071	495	1039	463	1007	431	975	399	943	367	911	335	879	303
16	1136	560	1104	528	1072	496	1040	464	1008	432	976	400	944	368	912	336	880	304
17	1137	561	1105	529	1073	497	1041	465	1009	433	977	401	945	369	913	337	881	305
18	1138	562	1106	530	1074	498	1042	466	1010	434	978	402	946	370	914	338	882	306
19	1139	563	1107	531	1075	499	1043	467	1011	435	979	403	947	371	915	339	883	307
20	1140	564	1108	532	1076	500	1044	468	1012	436	980	404	948	372	916	340	884	308
21	1141	565	1109	533	1077	501	1045	469	1013	437	981	405	949	373	917	341	885	309
22	1142	566	1110	534	1078	502	1046	470	1014	438	982	406	950	374	918	342	886	310
23	1143	567	1111	535	1079	503	1047	471	1015	439	983	407	951	375	919	343	887	311
24	1144	568	1112	536	1080	504	1048	472	1016	440	984	408	952	376	920	344	888	312
25	1145	569	1113	537	1081	505	1049	473	1017	441	985	409	953	377	921	345	889	313
26	1146	570	1114	538	1082	506	1050	474	1018	442	986	410	954	378	922	346	890	314
27	1147	571	1115	539	1083	507	1051	475	1019	443	987	411	955	379	923	347	891	315
28	1148	572	1116	540	1084	508	1052	476	1020	444	988	412	956	380	924	348	892	316
29	1149	573	1117	541	1085	509	1053	477	1021	445	989	413	957	381	925	349	893	317
30	1150	574	1118	542	1086	510	1054	478	1022	446	990	414	958	382	926	350	894	318
31	1151	575	1119	543	1087	511	1055	479	1023	447	991	415	959	383	927	351	895	319
32	1152	576	1120	544	1088	512	1056	480	1024	448	992	416	960	384	928	352	896	320

Figure 3-16: 16RU X-Link3 – Bank 2 Mapping

	ROUTER DESTINATIONS 1153-1440 (XLINK DESTINATIONS 577-864)(TOP XPT)																	
	XLINK 27		XLINK 26		XLINK 25		XLINK 24		XLINK 23		XLINK 22		XLINK 21		XLINK 20		XLINK 19	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	1409	833	1377	801	1345	769	1313	737	1281	705	1249	673	1217	641	1185	609	1153	577
2	1410	834	1378	802	1346	770	1314	738	1282	706	1250	674	1218	642	1186	610	1154	578
3	1411	835	1379	803	1347	771	1315	739	1283	707	1251	675	1219	643	1187	611	1155	579
4	1412	836	1380	804	1348	772	1316	740	1284	708	1252	676	1220	644	1188	612	1156	580
5	1413	837	1381	805	1349	773	1317	741	1285	709	1253	677	1221	645	1189	613	1157	581
6	1414	838	1382	806	1350	774	1318	742	1286	710	1254	678	1222	646	1190	614	1158	582
7	1415	839	1383	807	1351	775	1319	743	1287	711	1255	679	1223	647	1191	615	1159	583
8	1416	840	1384	808	1352	776	1320	744	1288	712	1256	680	1224	648	1192	616	1160	584
9	1417	841	1385	809	1353	777	1321	745	1289	713	1257	681	1225	649	1193	617	1161	585
10	1418	842	1386	810	1354	778	1322	746	1290	714	1258	682	1226	650	1194	618	1162	586
11	1419	843	1387	811	1355	779	1323	747	1291	715	1259	683	1227	651	1195	619	1163	587
12	1420	844	1388	812	1356	780	1324	748	1292	716	1260	684	1228	652	1196	620	1164	588
13	1421	845	1389	813	1357	781	1325	749	1293	717	1261	685	1229	653	1197	621	1165	589
14	1422	846	1390	814	1358	782	1326	750	1294	718	1262	686	1230	654	1198	622	1166	590
15	1423	847	1391	815	1359	783	1327	751	1295	719	1263	687	1231	655	1199	623	1167	591
16	1424	848	1392	816	1360	784	1328	752	1296	720	1264	688	1232	656	1200	624	1168	592
17	1425	849	1393	817	1361	785	1329	753	1297	721	1265	689	1233	657	1201	625	1169	593
18	1426	850	1394	818	1362	786	1330	754	1298	722	1266	690	1234	658	1202	626	1170	594
19	1427	851	1395	819	1363	787	1331	755	1299	723	1267	691	1235	659	1203	627	1171	595
20	1428	852	1396	820	1364	788	1332	756	1300	724	1268	692	1236	660	1204	628	1172	596
21	1429	853	1397	821	1365	789	1333	757	1301	725	1269	693	1237	661	1205	629	1173	597
22	1430	854	1398	822	1366	790	1334	758	1302	726	1270	694	1238	662	1206	630	1174	598
23	1431	855	1399	823	1367	791	1335	759	1303	727	1271	695	1239	663	1207	631	1175	599
24	1432	856	1400	824	1368	792	1336	760	1304	728	1272	696	1240	664	1208	632	1176	600
25	1433	857	1401	825	1369	793	1337	761	1305	729	1273	697	1241	665	1209	633	1177	601
26	1434	858	1402	826	1370	794	1338	762	1306	730	1274	698	1242	666	1210	634	1178	602
27	1435	859	1403	827	1371	795	1339	763	1307	731	1275	699	1243	667	1211	635	1179	603
28	1436	860	1404	828	1372	796	1340	764	1308	732	1276	700	1244	668	1212	636	1180	604
29	1437	861	1405	829	1373	797	1341	765	1309	733	1277	701	1245	669	1213	637	1181	605
30	1438	862	1406	830	1374	798	1342	766	1310	734	1278	702	1246	670	1214	638	1182	606
31	1439	863	1407	831	1375	799	1343	767	1311	735	1279	703	1247	671	1215	639	1183	607
32	1440	864	1408	832	1376	800	1344	768	1312	736	1280	704	1248	672	1216	640	1184	608

Figure 3-17: 16RU X-Link3 – Bank 3 Mapping

3.4 EQX10-FRQT AND EQX10-FRQT2-AX (10RU WITH 3 XLINK EXPANSION OUTPUTS)

- EQX10-FRQT (Standard XPT/FC Rear Plate that uses EQX10-XPTG-180x288 Crosspoint)
- EQX10-FRQT2-AX (ADMX XPT/FC Rear Plate that uses EQX10-XPTG-ADMX10 Crosspoint)

3.4.1 EQX10-FRQT (STANDARD)

The standard EQX10 frame, when utilizing just 2 standard crosspoint cards paired with EQX10-FCR-R/FCR-L rear plates, will have a capacity of 180x372 I/Os. The first 1-180 are main HD-BNC outputs and the remaining 192 are Xlink outputs.

A 10RU frame with Xlink expansions has the capacity for 180X660 IOs. The first 1-180 are the main HD-BNC outputs and the remaining 480 are Xlink outputs. Both EQX10-FRQT and EQX10-FRQT2-AX have the 3rd crosspoint slot XLINK Rearplate EQX10-XLINK9-RP.

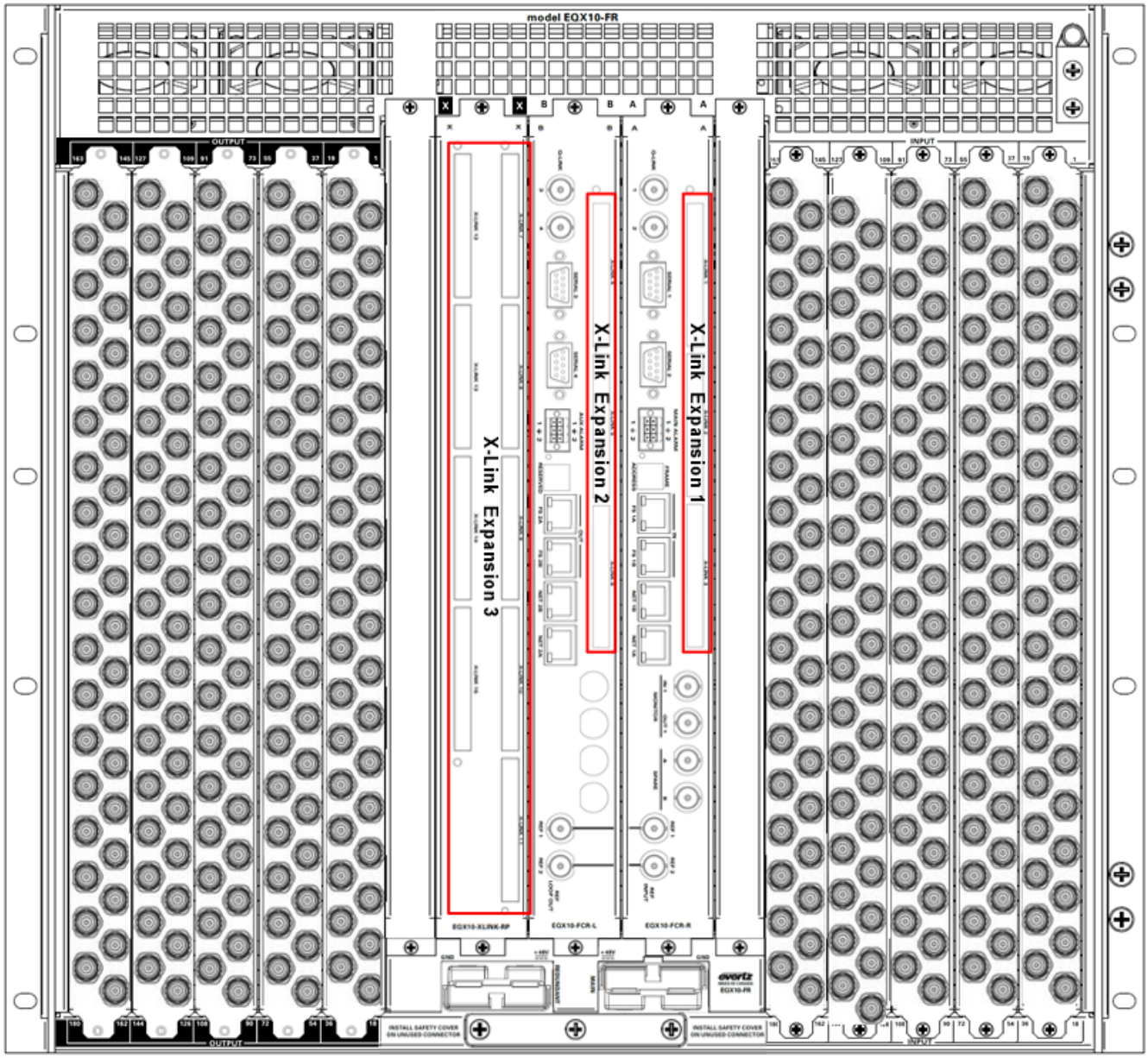

Figure 3-18: 10RU with Default and optional XLINK Expansion Outputs

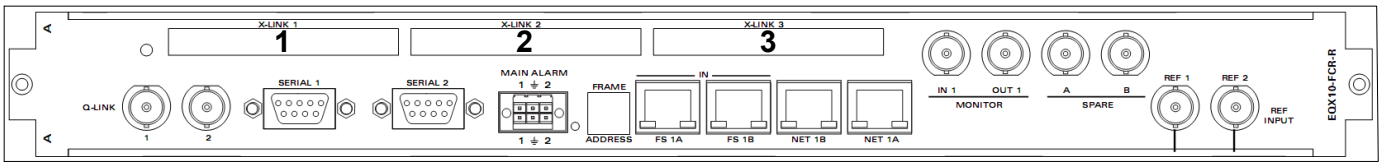

Figure 3-19: EQX10-FCR-R – XLINKS 1-3

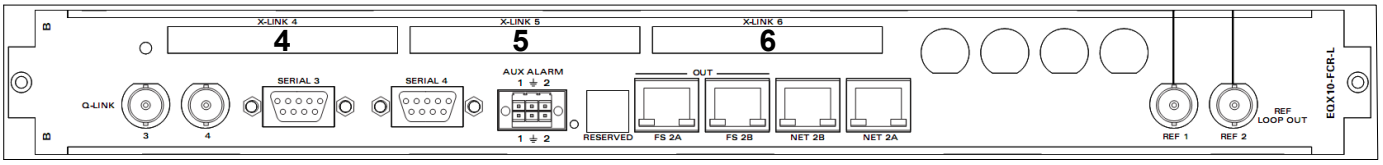

Figure 3-20: EQX10-FCR-L – XLINKS 4-6

Please refer to the table in Figure 3-21 below for the necessary mapping to create a route using the Quartz protocol. The BP# indicates the BNC to connect to if the XLINK cable is taken to a breakout panel.

Note: Please note that these mappings do not correlate with Magnum mapping. These mapping channels are to be used if a Quartz route was executed.

ROUTE DESTINATIONS 577-672 & 865-960 (XLINK DESTINATIONS 1-192)

	XLINK 6		XLINK 5		XLINK 4		XLINK 3		XLINK 2		XLINK 1	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	929	161	897	129	865	97	641	65	609	33	577	1
2	930	162	898	130	866	98	642	66	610	34	578	2
3	931	163	899	131	867	99	643	67	611	35	579	3
4	932	164	900	132	868	100	644	68	612	36	580	4
5	933	165	901	133	869	101	645	69	613	37	581	5
6	934	166	902	134	870	102	646	70	614	38	582	6
7	935	167	903	135	871	103	647	71	615	39	583	7
8	936	168	904	136	872	104	648	72	616	40	584	8
9	937	169	905	137	873	105	649	73	617	41	585	9
10	938	170	906	138	874	106	650	74	618	42	586	10
11	939	171	907	139	875	107	651	75	619	43	587	11
12	940	172	908	140	876	108	652	76	620	44	588	12
13	941	173	909	141	877	109	653	77	621	45	589	13
14	942	174	910	142	878	110	654	78	622	46	590	14
15	943	175	911	143	879	111	655	79	623	47	591	15
16	944	176	912	144	880	112	656	80	624	48	592	16
17	945	177	913	145	881	113	657	81	625	49	593	17
18	946	178	914	146	882	114	658	82	626	50	594	18
19	947	179	915	147	883	115	659	83	627	51	595	19
20	948	180	916	148	884	116	660	84	628	52	596	20
21	949	181	917	149	885	117	661	85	629	53	597	21
22	950	182	918	150	886	118	662	86	630	54	598	22
23	951	183	919	151	887	119	663	87	631	55	599	23
24	952	184	920	152	888	120	664	88	632	56	600	24
25	953	185	921	153	889	121	665	89	633	57	601	25
26	954	186	922	154	890	122	666	90	634	58	602	26
27	955	187	923	155	891	123	667	91	635	59	603	27
28	956	188	924	156	892	124	668	92	636	60	604	28
29	957	189	925	157	893	125	669	93	637	61	605	29
30	958	190	926	158	894	126	670	94	638	62	606	30
31	959	191	927	159	895	127	671	95	639	63	607	31
32	960	192	928	160	896	128	672	96	640	64	608	32

Figure 3-21: EQX10 XLINK MAPPING (1A)

3.4.1 EQX10-FRQT2-AX (with onboard ADMX XPTs)

EQX10-FRQT2-AX frames, when utilizing just 2x EQX10-XPTG-ADMX10 crosspoint cards paired with EQX10-FCRA-R/FCRA-L rear plates, will have a capacity of 180x308 I/Os. The first 1-180 are main HD-BNC outputs and the remaining 128 are Xlink outputs.

A 10RU frame with Xlink expansions has the capacity for 180X596 IOs. The first 1-180 are the main BNC outputs and the remaining 416 are Xlink outputs. Xlink connectors 3 and 6 are reserved for ADMX connections.

Both EQX10-FRQT and EQX10-FRQT2-AX have the 3rd crosspoint slot XLINK Rearplate EQX10-XLINK9-RP.

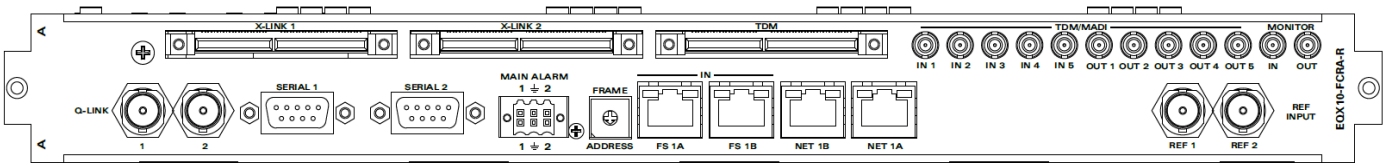

Figure 3-22: EQX10-FCRA-R – XLINKS 1 & 2, TDM MAIN

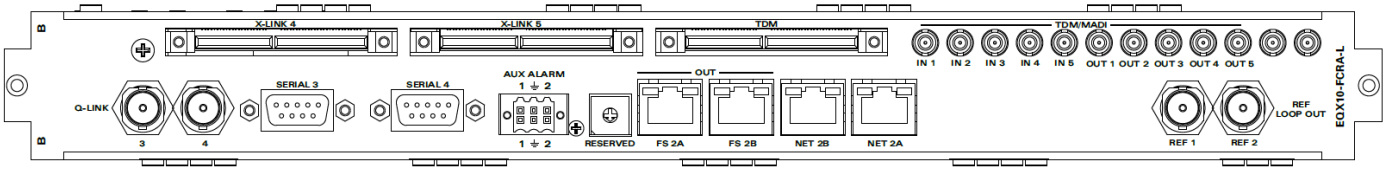

Figure 3-23: EQX-FCRA-L – XLINKS 4 & 5, TDM BACKUP

Please refer to the table in Figure 3-24 below for the necessary mapping to create a route using the Quartz protocol. The BP# indicates the BNC to connect to if the XLINK cable is taken to a breakout panel.

ROUTE DESTINATIONS 577-640 & 865-928 (XLINK DST 1-128) & ADMX

	TDM		XLINK 5		XLINK 4			TDM		XLINK 2		XLINK 1	
BP#	DST	XL	DST	XL	DST	XL		DST	XL	DST	XL	DST	XL
1			897	97	865	65				609	33	577	1
2			898	98	866	66				610	34	578	2
3			899	99	867	67				611	35	579	3
4			900	100	868	68				612	36	580	4
5			901	101	869	69				613	37	581	5
6			902	102	870	70				614	38	582	6
7			903	103	871	71				615	39	583	7
8			904	104	872	72				616	40	584	8
9			905	105	873	73				617	41	585	9
10			906	106	874	74				618	42	586	10
11			907	107	875	75				619	43	587	11
12			908	108	876	76				620	44	588	12
13			909	109	877	77				621	45	589	13
14			910	110	878	78				622	46	590	14
15			911	111	879	79				623	47	591	15
16			912	112	880	80				624	48	592	16
17			913	113	881	81				625	49	593	17
18			914	114	882	82				626	50	594	18
19			915	115	883	83				627	51	595	19
20			916	116	884	84				628	52	596	20
21			917	117	885	85				629	53	597	21
22			918	118	886	86				630	54	598	22
23			919	119	887	87				631	55	599	23
24			920	120	888	88				632	56	600	24
25			921	121	889	89				633	57	601	25
26			922	122	890	90				634	58	602	26
27			923	123	891	91				635	59	603	27
28			924	124	892	92				636	60	604	28
29			925	125	893	93				637	61	605	29
30			926	126	894	94				638	62	606	30
31			927	127	895	95				639	63	607	31
32			928	128	896	96				640	64	608	32

Figure 3-24: EQX10 XLINK MAPPING (1D)

3.4.2 Third Slot (Right most crosspoint card)

When viewing the frame from the front, the rightmost slot (the third slot) is used to expand the router with an additional 288 XLINK destination channels. The frame should be equipped with a rear plate, model EQX10-XLINK-RP, in that slot, which features 9 X-Link connectors.

Adding an EQX10-XPTG-288X288 crosspoint card to that slot will enable the 288 XLINK output paths. A picture of the rear plate is shown in Figure 3-25 below.

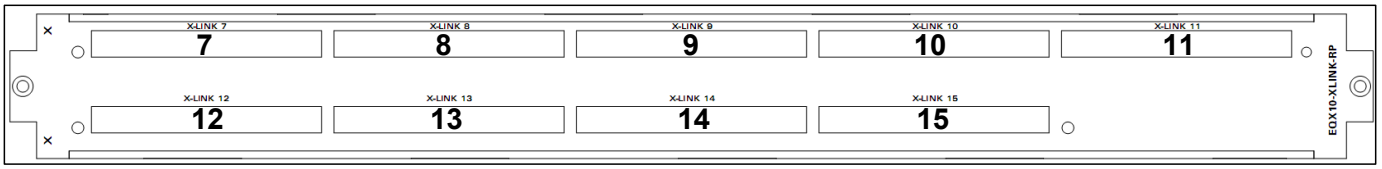

Figure 3-25: XLINK Expansion – EQX10-XLINK-RP

Note: Xlink outputs are recommended for monitoring purposes only.

Regardless of whether you are operating a standard EQX10 or the ADMX version of the router, the destinations in this slot are indexed with the same mapping. When using the Quartz protocol to route to these paths, the mapping follows the table in Figure 3-26 below.

ROUTE DESTINATIONS 1153-1440 (XLINK CONNECTORS 7-15)(EQX10-XLINK-RP SLOT)

	XLINK 15		XLINK 14		XLINK 13		XLINK 12		XLINK 11		XLINK 10		XLINK 9		XLINK 8		XLINK 7	
BP#	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL	DST	XL
1	1409	257	1377	225	1345	193	1313	161	1281	129	1249	97	1217	65	1185	33	1153	1
2	1410	258	1378	226	1346	194	1314	162	1282	130	1250	98	1218	66	1186	34	1154	2
3	1411	259	1379	227	1347	195	1315	163	1283	131	1251	99	1219	67	1187	35	1155	3
4	1412	260	1380	228	1348	196	1316	164	1284	132	1252	100	1220	68	1188	36	1156	4
5	1413	261	1381	229	1349	197	1317	165	1285	133	1253	101	1221	69	1189	37	1157	5
6	1414	262	1382	230	1350	198	1318	166	1286	134	1254	102	1222	70	1190	38	1158	6
7	1415	263	1383	231	1351	199	1319	167	1287	135	1255	103	1223	71	1191	39	1159	7
8	1416	264	1384	232	1352	200	1320	168	1288	136	1256	104	1224	72	1192	40	1160	8
9	1417	265	1385	233	1353	201	1321	169	1289	137	1257	105	1225	73	1193	41	1161	9
10	1418	266	1386	234	1354	202	1322	170	1290	138	1258	106	1226	74	1194	42	1162	10
11	1419	267	1387	235	1355	203	1323	171	1291	139	1259	107	1227	75	1195	43	1163	11
12	1420	268	1388	236	1356	204	1324	172	1292	140	1260	108	1228	76	1196	44	1164	12
13	1421	269	1389	237	1357	205	1325	173	1293	141	1261	109	1229	77	1197	45	1165	13
14	1422	270	1390	238	1358	206	1326	174	1294	142	1262	110	1230	78	1198	46	1166	14
15	1423	271	1391	239	1359	207	1327	175	1295	143	1263	111	1231	79	1199	47	1167	15
16	1424	272	1392	240	1360	208	1328	176	1296	144	1264	112	1232	80	1200	48	1168	16
17	1425	273	1393	241	1361	209	1329	177	1297	145	1265	113	1233	81	1201	49	1169	17
18	1426	274	1394	242	1362	210	1330	178	1298	146	1266	114	1234	82	1202	50	1170	18
19	1427	275	1395	243	1363	211	1331	179	1299	147	1267	115	1235	83	1203	51	1171	19
20	1428	276	1396	244	1364	212	1332	180	1300	148	1268	116	1236	84	1204	52	1172	20
21	1429	277	1397	245	1365	213	1333	181	1301	149	1269	117	1237	85	1205	53	1173	21
22	1430	278	1398	246	1366	214	1334	182	1302	150	1270	118	1238	86	1206	54	1174	22
23	1431	279	1399	247	1367	215	1335	183	1303	151	1271	119	1239	87	1207	55	1175	23
24	1432	280	1400	248	1368	216	1336	184	1304	152	1272	120	1240	88	1208	56	1176	24
25	1433	281	1401	249	1369	217	1337	185	1305	153	1273	121	1241	89	1209	57	1177	25
26	1434	282	1402	250	1370	218	1338	186	1306	154	1274	122	1242	90	1210	58	1178	26
27	1435	283	1403	251	1371	219	1339	187	1307	155	1275	123	1243	91	1211	59	1179	27
28	1436	284	1404	252	1372	220	1340	188	1308	156	1276	124	1244	92	1212	60	1180	28
29	1437	285	1405	253	1373	221	1341	189	1309	157	1277	125	1245	93	1213	61	1181	29
30	1438	286	1406	254	1374	222	1342	190	1310	158	1278	126	1246	94	1214	62	1182	30
31	1439	287	1407	255	1375	223	1343	191	1311	159	1279	127	1247	95	1215	63	1183	31
32	1440	288	1408	256	1376	224	1344	192	1312	160	1280	128	1248	96	1216	64	1184	32

Figure 3-26: EQX10-XLINK-RP - MAPPING

3.4.3 X-Link Cover (16RU and 26RU)

The 16RU and 26RU frames with X-Link expansion outputs are always shipped with X-Link protective covers installed. Once the frames are racked, these covers need to be removed. Please refer to Figure 3-27 and Figure 3-28 below for the location of these covers.

If X-Links are present but not in use, please keep these covers on until they are needed.

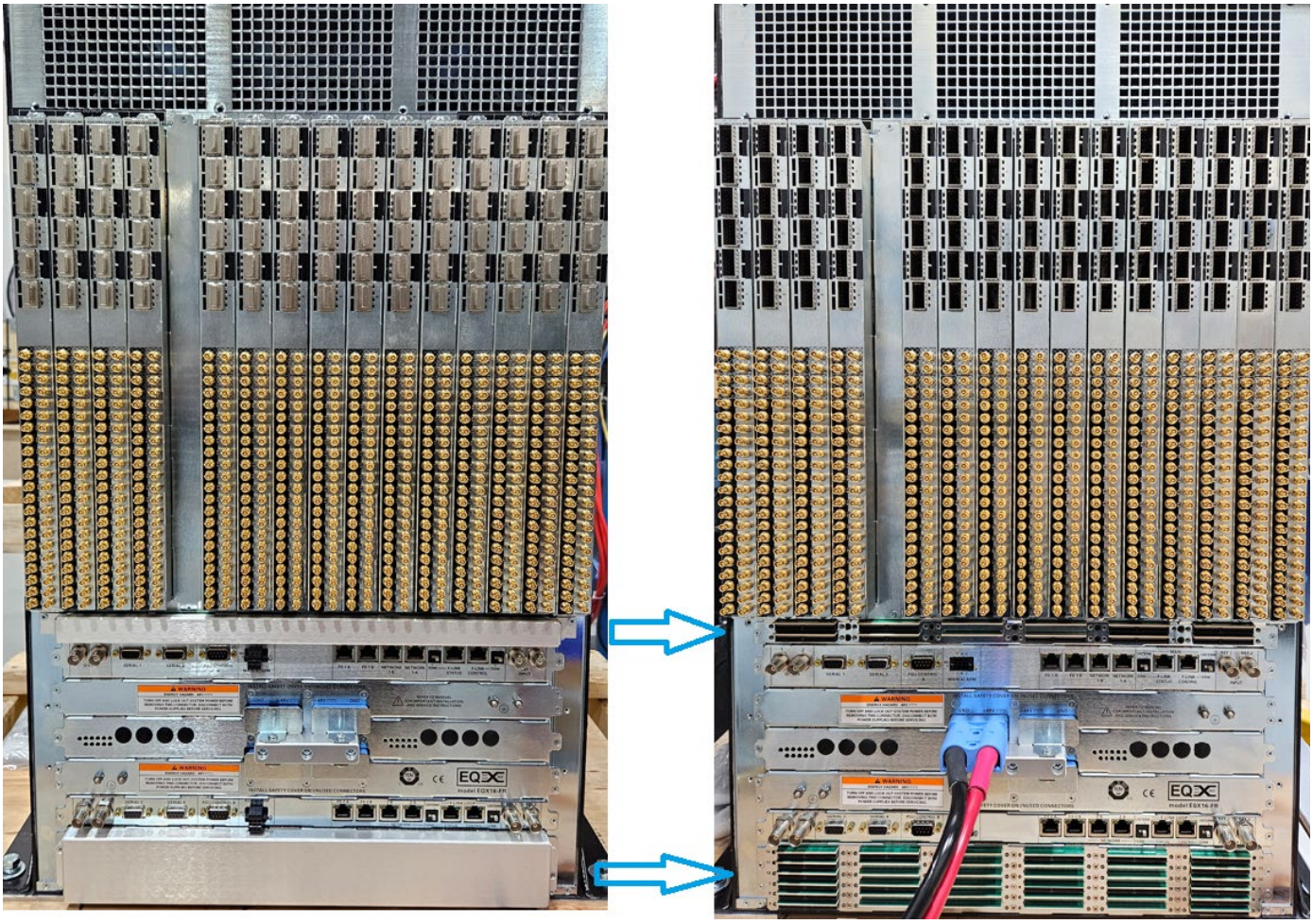

Figure 3-27: EQX16-FR X-Link Cover

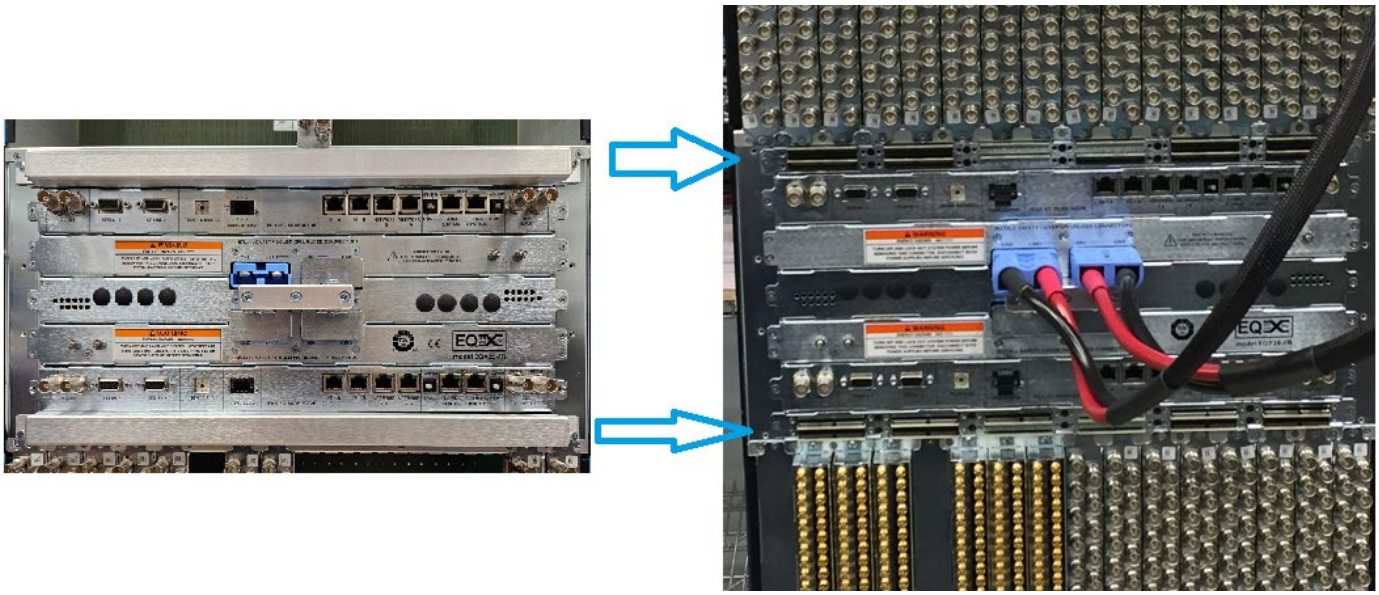

Figure 3-28 : EQX26FR X-Link Cover

4. CONTROL AND MONITORING MODULES

The standard EQX router includes an internal Frame Controller module, which supports the Q-Link ports, F-Link ports, Ethernet ports and Serial ports that are mounted on the rear of the router.

Remote Control Panel: Any of the Quartz remote control panels can be used with the EQX router connected via Q-Link. This is typically used in conjunction with the EQX server or a 3rd party control system, where these panels are strictly used in emergency situations.

Magnum Server: The Magnum Server connects via Ethernet and is responsible for managing all connections, Ethernet panels, panels' source, destination names, etc.

External Third-Party Control: The EQX router can be remotely controlled via an external third-party control device, such as an automation system connected to the router's serial port or Ethernet port.

4.1 EQX FRAME CONTROLLER

The frame controller manages all of the external and internal router communications from the remote control panels and third party devices, such as automation systems.

The standard EQX configuration requires a single frame controller; however, a second frame controller can be fitted to provide full redundancy.

Both the main and redundant controllers will automatically synchronize the router's crosspoint database, allowing the redundant frame controller to instantly take over should the main frame controller fail.

Within the EQX router, the main internal and inter-frame communications are managed via ethernet and F-Link. The frame control will automatically convert all Q-Link, Ethernet (for crosspoint switching) and Serial communications to F-Link where needed.

The Frame Controllers are accessed from the front of the frame and can be replaced one at a time while the EQX router is still operational should one of the modules fail.

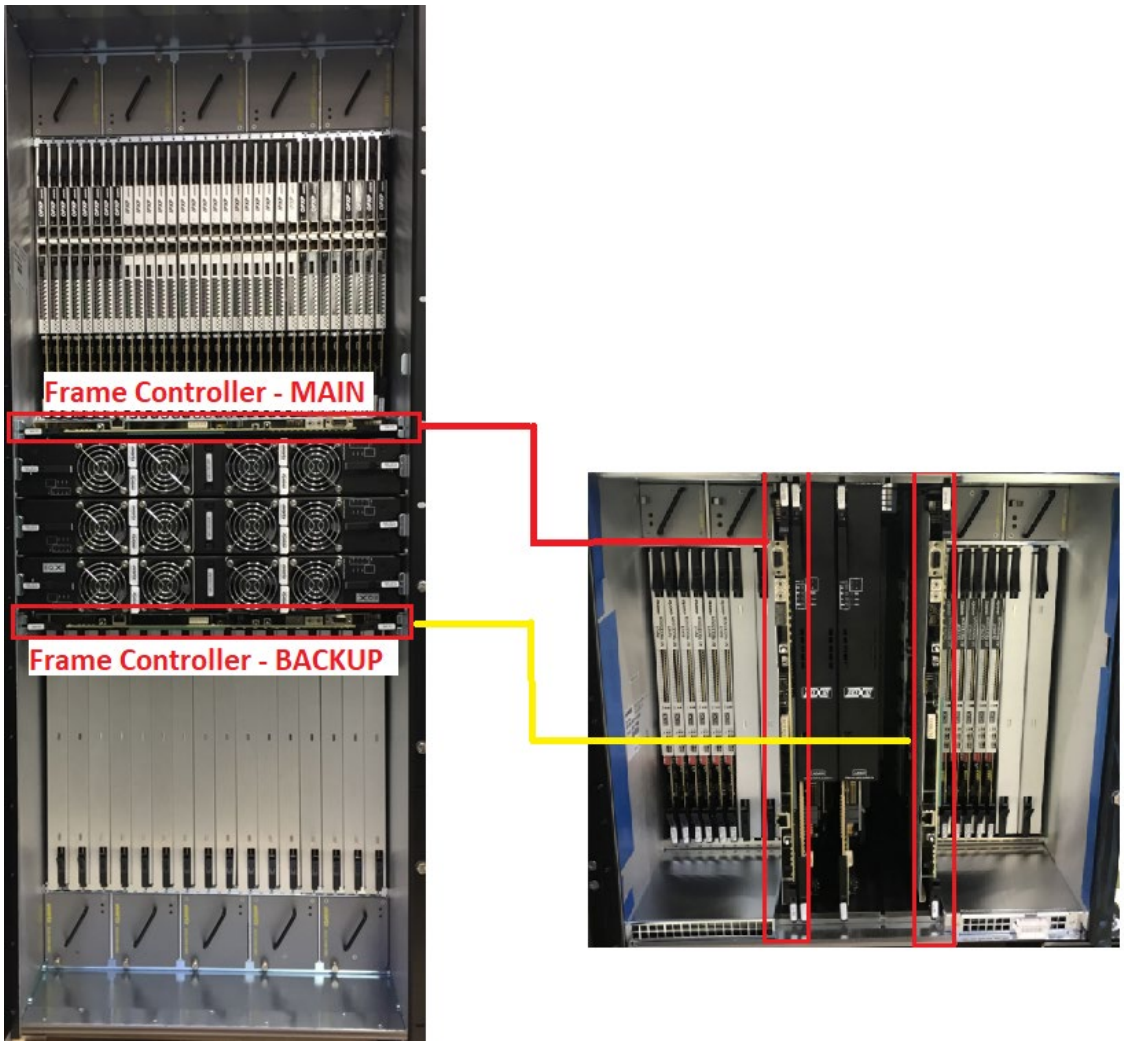

Figure 4-1: FC Modules in 26RU and 10RU

4.1.1 Frame Controller - Key Features

- Manages all internal and external router communications
  - F-Link (Inter-frame communications)
  - Q-Link (Remote Control Panels)
  - Ethernet (Card access, Automation systems and Magnum)
  - Serial RS422/232 (Automation systems)
  - F-Link & Ethernet ports on all active modules
- The redundant frame controller ensures continuous operation (optional)
- Full SNMP enabled via proxy connection

Note: All three frames 26RU, 16RU and 10RU are sharing the same Frame controllers.

4.1.2 Frame Controller – Front Hardware Connections

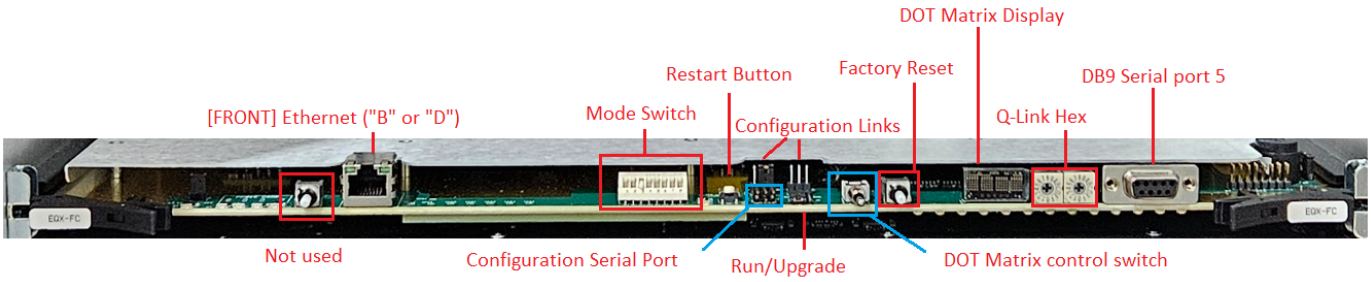

Figure 4-2: Frame Controller Module Card Edge Controls and Connectors

Component	Function
Push button	Disabled. No longer triggers switch between FC control
Front RJ45	Configurable for FC subnet B or D via serial menu controls
Mode Switch	- **DIP1.** Factory use, Always UP. Down may disable FC features. - **DIP2. (FANS) UP =** FC control, **DOWN =** Manual – Full speed - **DIP3 Down and all else up** is normal operational mode - **DIP 4-8** not used, default to **UP** for all 5
Restart (Reset) Button	Tap this button to hardware reboot the EQX-FC.
Configuration Links	- Write protect set to on - Ensure no shunt on MAST/SLAVE jumper
Factory Reset	- **NVRam factory reset.** All configuration settings will be wiped out. To execute, press and hold this button. Then tap the "Reset/Restart" button to reboot the FC. When "CLRF" is seen on DOT Matrix, release this button. - Does NOT erase Winsetup configuration or route table
DOT Matrix Display	- Scrolling display for quick feedback
DOT Matrix Control switch	- Toggle left for name of active winsetup config file loaded - Toggle right for IP address of Ports A & B
Q-Link Hex Dials	Sets the FC Q-Link ID. RPC4net standalone frame defaults below - Top FC always set to 00 - Bottom FC always set to 01
DB9 Serial 5	In EQX-FC ports configuration, this port is Serial 5.
Configuration Serial Port	4 pin serial connection for rainbow serial cable. Used for initial FC configuration and for accessing the serial menu. Menu presented from this port can be accessed via telnet once ethernet configuration is established
Run/Upgrade Jumper	Normal operation mode set to RUN. Set to Upgrade and reboot the card to set unit for serial firmware upgrade.

Table 4-1: EQXFC4net - Frame Controller Card Edge Functions

Note: The Q-Link address for the TOP FC must be set to (00), and for the BOTTOM FC, it must be set to (01).

4.1.3 Frame Controller – Front LEDs

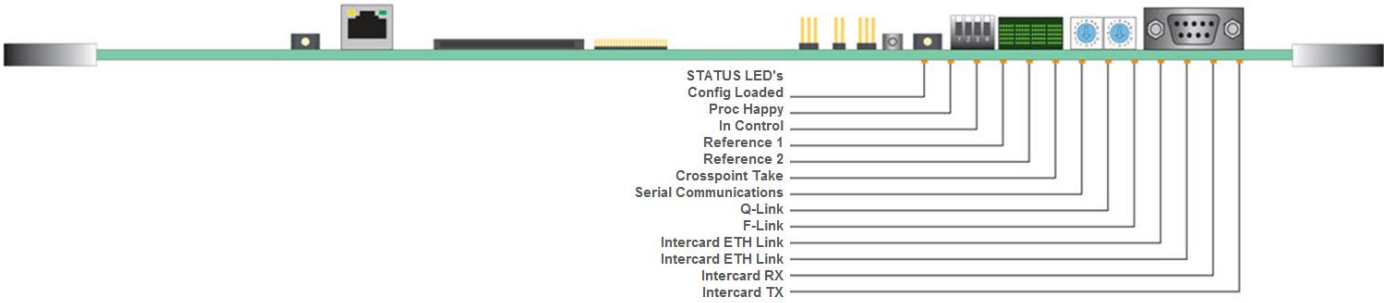

Figure 4-3: Frame Controller Module Status LEDs

LED	Colour	Function
Config Loaded	Green	This LED indicates that a config is loaded.
Proc Happy	Green	Flashes when the frame controller processor is working correctly.
		Turns off when a fault condition has been detected.
In Control	Green	This LED indicates which of the two frame controllers within a redundant system is currently in control.
Reference 1	Green	Indicates that a valid reference signal is present. (Steady for 50.00Hz and flashing for 59.94Hz)
	Red	Indicates that the reference signal is invalid or missing and is required for the current configuration.
Reference 2	Green	Indicates that a valid reference signal is present. (Steady for 50.00Hz and flashing for 59.94Hz)
	Red	Indicates that the reference signal is invalid or missing and is required for the current configuration.
Crosspoint Take	Green	The LED flashes when a crosspoint take command is acted upon.
Serial Communications	Green	TX data. Flashes when the frame controller transmits data.
	Red	RX data. Flashes when the frame controller receives data.
Q-Link	Green	Indicates that the Q-Link is operating correctly.
	Red	Indicates that an error has been detected with the Q-Link.
F-Link	Green	Indicates that the F-Link is operating correctly.
	Red	Indicates that an error has been detected with the F-Link.
Intercard ETH Link	Green	Indicates that there is an intercard Ethernet network link.
Intercard ETH Link	Green	Indicates that there is an intercard Ethernet network link.
Intercard RX	Green	Indicates that there is an intercard network link RX.
Intercard TX	Green	Indicates that there is an Intercard network link TX.

Table 4-2: LED Description of Frame Controller Module

4.2 EQX COMMUNICATION PORTS

- 2x Ethernet Ports (1A and 1B)
- 2x F-Link Ports
- 4x Q-Link Ports
- 4x Serial Ports (RS422/232)
- 2x PSU Comms Ports or HEX dials
- 2x Alarm Ports

The Ethernet and Serial ports are used for automation control, remote control panels, router configuration and SNMP monitoring.

The Q-Link ports are used for the connection of the Quartz remote control panels.

Network A for the EQX-FC is typically designated for controlling the router. Port A does not have access to any of the internal cards or SNMP, in order to prevent traffic from impacting router performance. This port is the default for Magnum access and ADMX proxying for EQX10.

The rear Ethernet 1B & 2B is configurable for subnet B, D, or both via Tagged VLANs in the FC network configuration page.

Ethernet ports A, B, C, D must remain isolated from one another. For B & D VLAN access, please use an external managed switch for gateway control.

4.2.1 Rear Communication Ports (26 & 16RU)

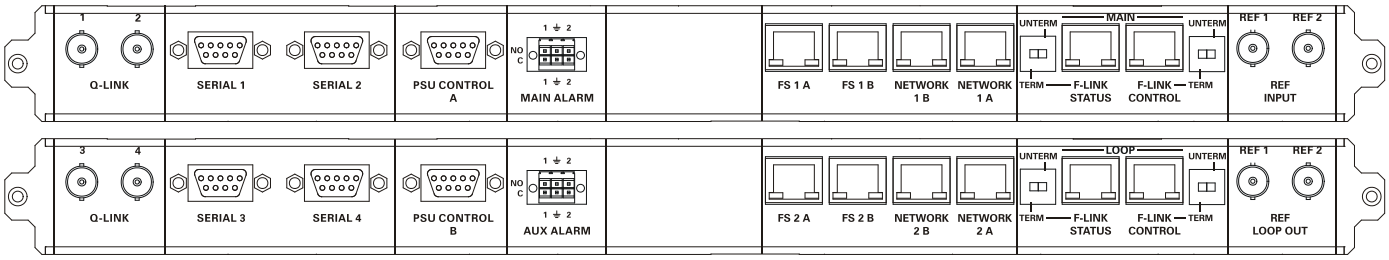

Figure 4-4: EQX 26RU and 16RU Communication Ports

Q-Link 1 - 4: Q-Link serial communication port used to connect remote control panels, external system controllers or slaved Quartz brand routers.

Serial Port 1,3: RS-422/RS-232 serial communication port used to connect WinSetup configuration application (recommended) or 3rd party control devices such as automation systems or devices requiring a UMD feed (for example, an MVP). RS-422 or RS-232 mode is configured by a link on the Frame Controller.

Serial Port 2,4: RS-422/RS-232 serial communication port used to connect 3rd party control devices such as automation systems or devices requiring a UMD feed (for example, an MVP). RS-422 or RS-232 mode is configured by a link on the Frame controller.

PSU Control A & B: Not Used (26RU and 16RU only).

Frame Hex Dials: Not Used (26RU and 16RU only) Default to match front if present. 00, 01

Main Alarm: External alarm connection which is used to indicate a fault condition.

RJ-45 FS 1A, 2A: Not in use.

RJ-45 FS 1B, 2B: Not in use.

Network 1B, 2B: Ethernet ports configurable to subnet B for proxy SNMP, or D for card access.

Network 1A, 2A: 100Mb Ethernet connection used for Ethernet based control systems such as remote-control panels, external system controllers, 3rd party control devices, etc.

Used for router control only.

F-LINK Status: Not in use for standalone.

F-LINK Control: Not in use for standalone.

REF 1 & REF 2: Input ports for Bi-Level Reference 1x NTSC 525i 59.94 and 1x PAL 625i50.

REF 1, 2 Loop out: Reference loop out for REF1 and REF2 reference inputs.

4.2.2 Rear Communication Ports (10RU)

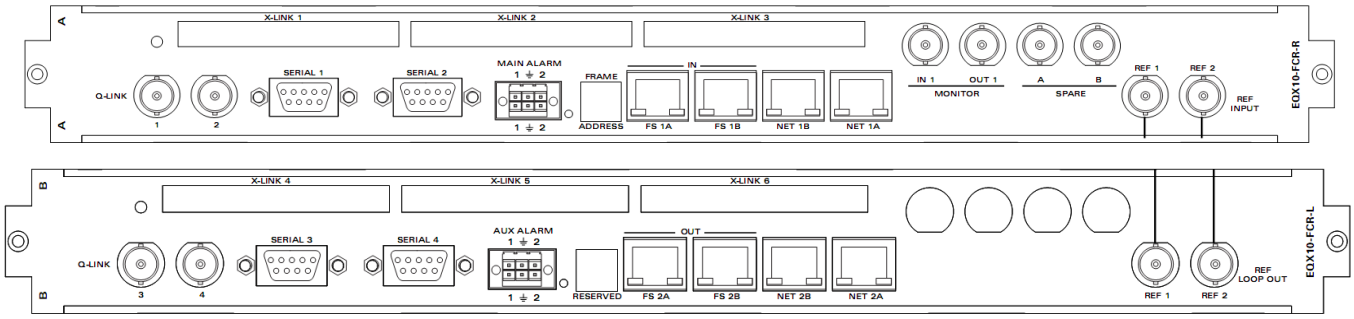

Figure 4-5: EQX10 Communication Ports

Q-Link 1 - 4: Q-Link serial communication port used to connect remote control panels, external system controllers or slaved Quartz brand routers.

Serial Port 1,3: RS-422/RS-232 serial communication port used to connect WinSetup configuration application (recommended) or 3rd party control devices such as automation systems or devices requiring a UMD feed (for example, an MVP). RS-422 or RS-232 mode is configured by a link on the Frame Controller.

Serial Port 2,4: RS-422/RS-232 serial communication port used to connect 3rd party control devices such as automation systems or devices requiring a UMD feed (for example, an MVP). RS-422 or RS-232 mode is configured by a link on the Frame controller.

Main Alarm: External alarm connection which is used to indicate a fault condition.

Frame Hex Dials: Not Used. Default to match front if present. 00, 01

RJ-45 FS 1A, 2A: Not in use.

RJ-45 FS 1B, 2B: Not in use.

Network 1B, 2B: Ethernet ports configurable to subnet B for proxy SNMP, or D for card access.

Network 1A, 2A: 100Mb Ethernet connection used for Ethernet based control systems such as remote-control panels, external system controllers, 3rd party control devices, etc.

Used for router control only.

Monitor IN 1: Source monitoring port. Used to monitor at any source channel.

Monitor OUT 1: Destination monitoring port. Used to monitor any destination channel.

Spare A/B: Not used (EQX10 only).

REF 1 & REF 2: Input ports for Bi-Level Reference 1x NTSC 525i 59.94 and 1x PAL 625i50.

REF 1, 2 Loop out: Reference loop out for REF1 and REF2 reference inputs.

4.3 EQX REFERENCE INPUT

The internal timings and switch points for all three EQX routers are generated from their signal feed to their reference input. The EQX will accept Bi-level syncs, from which it is able to generate the required timing for switching SD and HD digital video signals.

From this single reference signal, the EQX can generate four independent timing levels, which provides SMPTE compliant switching for four different digital video standards within the same frame.

The frame operates on a default timing plane selection. Please configure the default (generally timing plane 1) to match the signal standard most often in use.

The use of timing plane exception is required to match the timing plane selection to the source and destination paths that are different from the default value.

- SD Digital Video:
  - 525, 625
- HD Digital Video (50, 59.94, 60):
  - 720p
  - 1080i
- 3G Digital Video (at 50, 59.94, 60 Hz):
  - 1080p
- 12G Digital Video (at 50, 59.94):
  - 2160p

By supplying a second video reference at a different frequency to the first, the EQX is able to generate timing levels at both frequencies, for example 50Hz and 59.94 Hz. Only Bi-Level reference of 525i59.94 and 625i50 are supported on the REF input ports.

All devices in the frame receives the reference signal from the EQX-FCs REF inputs.

Note: Do not connect two of the same reference type, i.e. two 50Hz references.

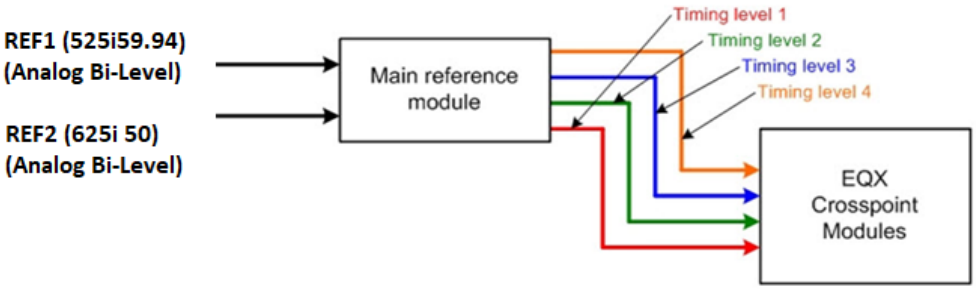

Figure 4-6: EQX Reference Input and Timing Plane

4.3.1 Reference Input - Key Features

- Two bi-level reference inputs only (NTSC 525i59.94 and PAL 625i50).
- Four independent timing levels for SMPTE compliant switching of up to four different digital video signals.
- Supports mixed digital video standards at mixed frequencies.

4.4 EQX 26RU AND 16RU MONITORING OUTPUTS

The EQX router supports signal monitoring of all of the video inputs and outputs via dedicated BNC connectors on the rear of the EQX frame.

The two monitor cards on the rear of the frame has been obsoleted. The cards can still be ordered in limited quantities but are no longer shipping with frames. When ordering the frame, if the monitor cards are still desired, please add in the +MON hardware option.

Figure 4-7: Monitor Cards not Installed

The EQX also incorporates comprehensive system status monitoring, including power supply voltages, interior temperatures and fan speeds. Monitored data is available through SNMP for facility-wide monitoring systems. System status may also be monitored remotely by a network based remote connection over TCP/IP. User configurable closing contacts are also provided for connection to an external alarm system.

5. INPUT / OUTPUT MODULES

5.1 IO MODULE'S LOCATIONS AND INDEXING

All three frames sizes uses a standardize indexing of the input and output card placement. This makes it easier to configure the system using the same Winsetup application.

Slot indexing for Input and Output cards occupies 1-64 in the software configuration. When assigning IP addresses, the placement of the card in that slot will receive the IP address configured for that slot.

The frames assign them as shown in Table 5-1. Please set IP addresses to 0.0.0.0 for slots not present to conserve IP addresses.

Slot index	26RU	16RU	10RU
1-8	Output 1-8 (DST 1-144)	Output 1-8 (DST 1-144)	Output 1-8 (DST 1-144)
9-16	Input 1-8 (SRC 1-144)	Input 1-8 (SRC 1-144)	Input 1-8 (SRC 1-144)
17-24	Input 9-16 (SRC 145-288)	Input 9-16 (SRC 145-288)	Input 9-10 (SRC 145-180)
25-32	Output 9-16 (DST 145-288)	Output 9-16 (DST 145-288)	**Output 9-10** (DST 145-180) (11 to 16, set 0.0.0.0)
33-40	Output 17-24 (DST 289-432)	For these slots, Set IP to 0.0.0.0	For these slots, Set IP to 0.0.0.0
41-48	Input 17-24 (SRC 289-432)	For these slots, Set IP to 0.0.0.0	For these slots, Set IP to 0.0.0.0
49-56	Input 25-32 (SRC 433-576)	For these slots, Set IP to 0.0.0.0	For these slots, Set IP to 0.0.0.0
57-64	Output 25-32 (DST 433-576)	For these slots, Set IP to 0.0.0.0	For these slots, Set IP to 0.0.0.0

Table 5-1: Input and Output Slot Index and Mapping Channel

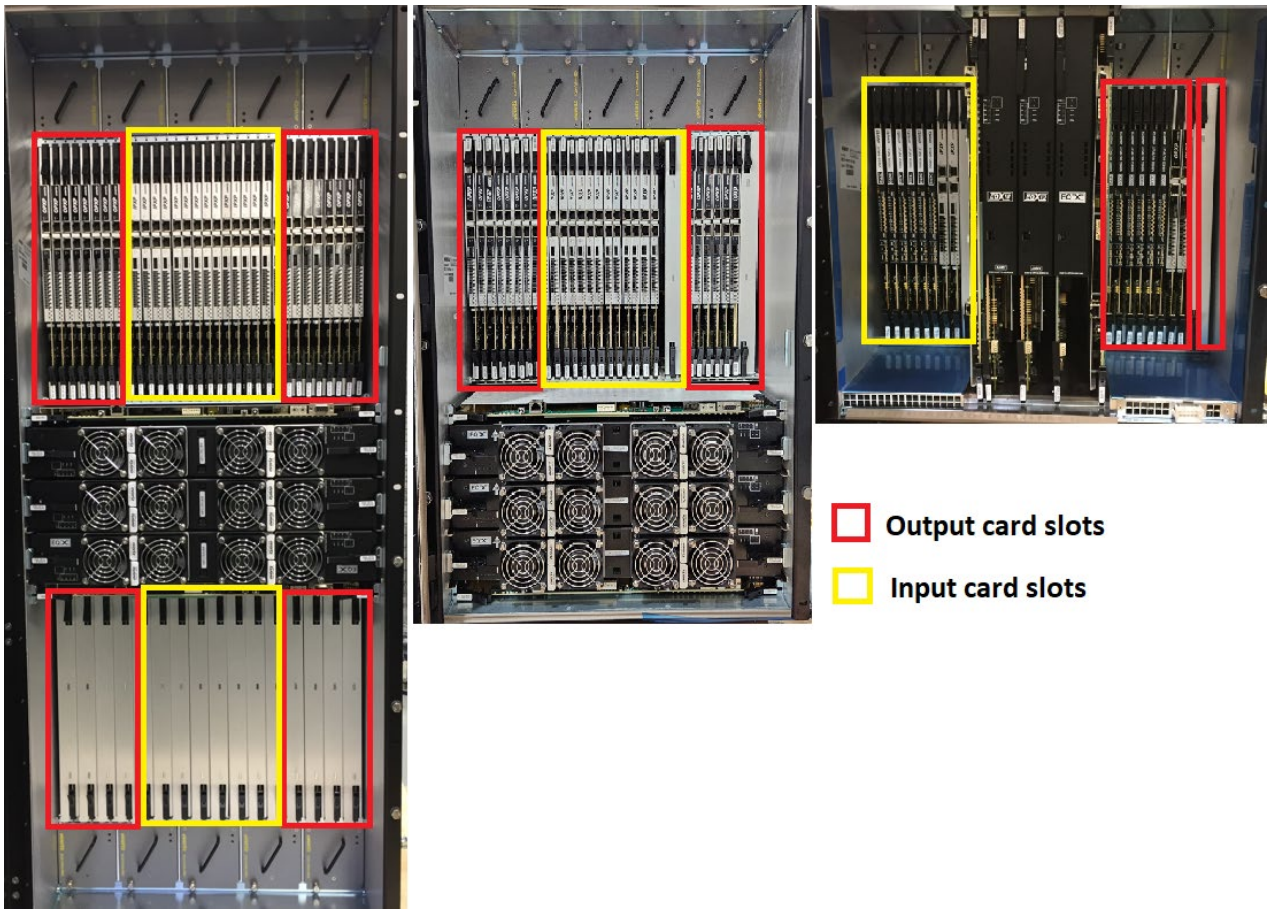

Figure 5-1: Input and Output Card Placement in EQX Frames

5.2 EQX INPUT MODULES

The EQX system currently offers two different options for input modules: the EQX-S series and the EQX-H series. Input cards from both the S and H series can physically share the same rear plate. However, depending on the product in use, some controls may not be applicable.

The available input modules and ordering part numbers are below:

EQX-S Series	REAR PLATE	EQX-H Series
Main board = EQX-ICX	None	**Main board** = EQX-IPXP
EQX-S-IP18 EQX-S-IP18-F	HD-BNC inputs SFP inputs	EQX-H-IP18 EQX-H-IP18-F
EQX-S-IP18-B	BNC inputs	EQX-H-IP18-B (NOT APPLICABLE)
License: +TDM		License: +FSE18, +100GE, +12G

Table 5-2: EQX-S, EQX-H Input Card Package Part Numbers

The next generation baseband-only input card is part of a series called EQX-S input modules. The card features 18 channels of SDI input along with license-enabled support for TDM audio.

The current generation input modules can physically share the dual slot rear fins, coax or SFP, for quick swapping and moving of modules. Each rear plate consists of dual input cards and is meant for two of the same cards. The EQX-ICX module is designed to support existing SDI workflows, where the base module is functionally and cost equivalent to a traditional green input module, but it also allows for a software license key to enable audio de-embedding functionality for all 18 video paths.

To add any other features, the EQX-H input card will need to be ordered.

The EQX-H-IP18, formerly known as EQX-IP18AD, is an 18-input video path module with audio de-embedders and optional software feature keys. These keys enable 18 independent frame sync paths, single link UHD, 100GE IP Gateway, and other additional processing capabilities. This package includes the main module (EQX-IPXP) and the rear plate (EQX-HBX-ICXQ-RP), which has HDBNC video ports, HD-BNC TDM ports, and 100GE capable QSFP modules that are sold separately.

5.3 EQX OUTPUT MODULES

The EQX system currently offers two different options for output modules: the EQX-S series and the EQX-H series. Output cards from both the S and H series can physically share the same rear plate. However, depending on the product in use, some controls may not be applicable.

The available output modules and ordering part numbers are shown in Table 5-3 below.

EQX-S Series	REAR PLATE	EQX-H Series
Main board = EQX-OCX	None	**Main board** = EQX-OPXP
EQX-S-OP18	HD-BNC outputs	EQX-H-OP18
EQX-S-OP18-F	SFP outputs	EQX-H-OP18-F
EQX-S-OP18-B	BNC outputs	EQX-H-OP18-B (NOT APPLICABLE)
License: +TDM		License: +FSE18, +100GE, +12G

Table 5-3: EQX-S, EQX-H Output Card Package Part Numbers

The next generation baseband-only output card is part of a series called EQX-S output modules. The card features 18 channels of SDI output along with license-enabled support for TDM audio.

The current generation output modules can physically share the dual slot rear fins, coax or SFP, for quick swapping and moving of modules. Each rear plate consists of dual output cards and is meant for two of the same cards. The EQX-OCX module is designed to support existing SDI workflows, where the base module is functionally and cost equivalent to a traditional green input module, but it also allows for a software license key to enable audio embedding functionality for all 18 video paths.

To add any other features, the EQX-H output card will need to be ordered.

The EQX-H-OP18, formerly known as EQX-OP18AE, this 18 output video path module with audio embedders. Optional software features keys: 18 independent frame sync paths, Single link UHD, 100GE IP Gateway, and other additional processing capabilities. This is a Package of main module (EQX-OPXP) and rear plate (EQX-HBX-OCXQ-RP) that has HDBNC Video ports, HD-BNC TDM ports and 100GE capable QSFP ports. QSFP modules are sold separately.

5.4 INPUT AND OUTPUT CARD REAR PLATES

Older generation generic rear plates are not compatible with newer cards. The EQX-S and EQX-H cards are physically longer than the older generation cards. Therefore, it is not physically possible to properly insert EQX-S and EQX-H input and output cards into older rear plates.

Do not attempt to insert EQX-S or EQX-H series input and output cards into older generation rear plates. Forcefully doing so will cause hardware damage to the board.

Inserting older cards into slots with EQX-S and EQX-H rear plates will not damage the main card. However, the older cards are not long enough to properly mate with the rear plate.

Each rear plate occupies two slots and is shared between two adjacent cards. The labelling on the rear plate will indicate which ports correspond to each card. Typically, one side of the plate will be bare metal, while the other side will be black.

Figure 5-2: EQX-S and EQX-H rear plate

EQX-S and EQX-H cards do NOT share the same rear plate as previous generation cards.

Input and output cards do NOT share the same rear plate. Please ensure that the correct type of rear plate is installed in the appropriate slot. Often this can be seen in the naming of the rear plate.

For example, use EQX-HBX-**O**CXQ-RP for **output** cards and EQX-HBX-**I**CXQ-RP for **input** cards.

There is a difference between the input and output rear plate, although they visually look the same. At the top of the rear plate, is the name of the rear plate module. Please ensure that “I” modules are inserted into input slots, and “O” modules are placed in output slots. Swapping the two will result in no video.

- Default fin in EQX-S-IP18 or OP18 >> “EQX-HBX-ICXQ-RP” & “EQX-HBX-OCXQ-RP”
- Default fin in EQX-S-IP18-F or OP18-F >> “EQX-HBX-ICS-RP” & “EQX-HBX-OCS-RP”

5.4.1 Rear Plates Installation

Before handling the card, it is important to minimize the potential effects of static electricity. It is therefore recommended that an ESD strap be worn.

Locate a vacant slot on the router chassis. Each rear plate can house up to two modules.

NOTE: The orientation of the rear plate and the EQX–S/H module is different when installing in the top versus the bottom of the EQX26 frame.

Check that rear plate screw HSCREW-M3X6-CH-PD-NLK used is as shown in Figure 5-3 below.

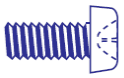

Figure 5-3: HSCREW-M3X6-CH-PD-NLK

Steps to properly install and align the rear plate

- Eject EQX-S or EQX-H card
- Mount rear plate and screw in using correct screws. (Do not use flathead)
- Leave rear plate screws just a little loose
- Insert the EQX card
- Tighten screws on the now properly aligned rear plate

5.4.2 Rear Plates Modules

Below is a visual representation of the available rear plate for the EQX-S series. The EQX-H series uses the same rear plate except for the BNC one. Please ensure input rears are used for input cards as they are dual input (RX). Output cards with output rears as they are dual output (TX).

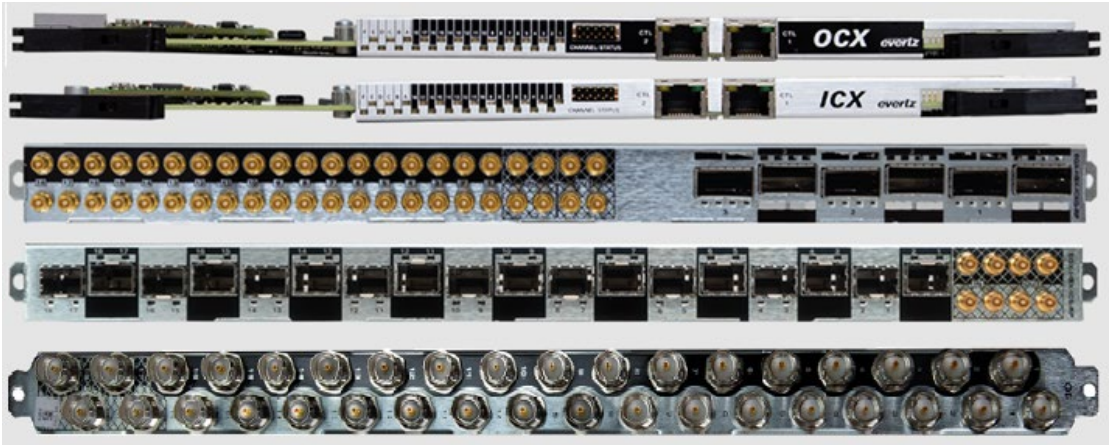

Figure 5-4: Rear Plate Orientation Straight

For S2110 IP signal processing, only the rear plate with QSFPs are supported. The standard SFP rear plate is for standard fiber connections and does not support IP.

The EQX-S card supports 18 channels of SDI video and 2 external TDMv2 audio ports. When choosing the BNC rear plate for EQX-S modules, please note that the rear plate can physically accommodate only 18 BNC connectors. Consequently, with this rear plate, channels 17 and 18 will be software-selectable for either SDI video or TDM audio.

The rear plate is only meant for migrating from older setups and not for new deployments.

5.4.3 System Firmware Requirements

This card only operates on RPC4net which at the time of writing is the default system control protocol in use on EQX routers. Older FLINK control systems are not supported. Please inquire about upgrading to a compatible firmware prior to adding in these cards.

Please also note that these cards do NOT support TDM audio version 1. So, it cannot be used to break-away audio into a the legacy TDMv1 system. Older EMR/ADMX cards must operate on TDMv2 for compatibility.

5.4.4 Front Hardware Connections and LEDs

Below are checks you can look at while card is in operation.

- USB Type C Connection: Used to access the card's serial terminal port for debugging.
- Status LED: Used for quick check of communication between card and FC.
- Carrier LEDs: Displays if signal present and what data rate is currently present. For output card, solid LEDs indicates main video path. A cycle of on and off LEDs indicates it is currently on backup path.

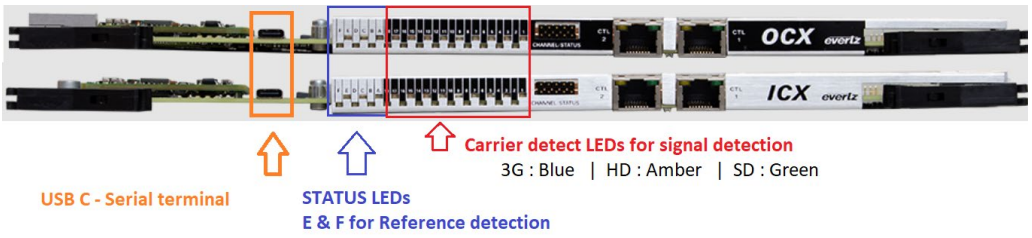

Figure 5-5: EQX-S Front Metal Connections

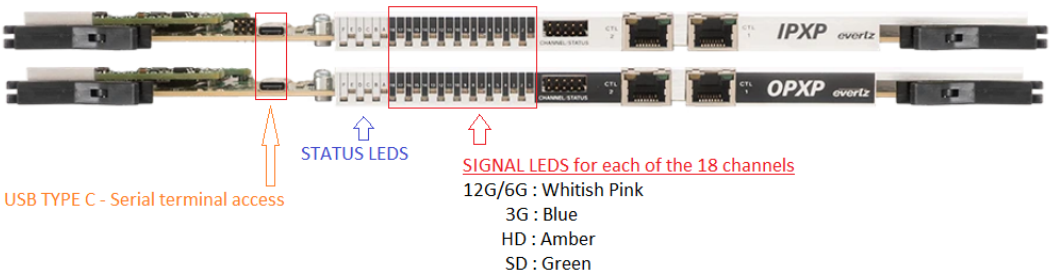

Figure 5-6: EQX-H Front Metal Connections

For more details on how to operate the EQX-S or EQX-H product lines, please refer to the respective product manuals. The EQX-H series includes multiple software applications that enable various features supported by the hardware.

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6. EQX CROSSPOINT MODULE

6.1 26RU AND 16RU EQX CROSSPOINT MODULE

The EQX router has provisions for three different crosspoint modules 576X576, 576x288 and 288X288. The first number indicates how many sources, and second being destinations.

The upper location houses the crosspoint module that provides the switching for outputs 1-288 (the upper section of the frame). The lower location provides the switching for outputs 289-576 (the lower section of the frame). Xlink monitoring outputs have been added to the frame and can be enabled with the correct configuration and hardware.

The Back-up crosspoint module, which is fitted into the middle location, provides full protection in the case of a failed route(s). The switch over to the back-up crosspoint can be performed manually or automatically. In the event of a failure only the faulty route(s) needs to be switched over to the back-up crosspoint. The new route(s) can be checked before the switch is made through the output monitoring facility.

All of the crosspoint modules are accessed from the front of the frame and can be replaced while the EQX router is still operational should one of the modules fail. The back-up crosspoint provides continued full operation while a main crosspoint module is being replaced. Please note that a momentary disturbance to the video is possible when switching between main and redundant paths.

The crosspoint modules are air cooled by the fan modules that are mounted onto the front of the crosspoint assemblies.

NOTE: Physically, all three available crosspoint sizes can fit into any slot. However, each slot requires hardware that matches the configuration. Using a size that does not match the configuration could result in errors or a complete lack of signals.

Figure 6-1: 26RU and 16RU EQX CROSSPOINT PLACEMENT

6.1.1 EQX-XPTG 576X576

This crosspoint module switches 576 inputs through to 576 outputs.

- In the upper location, it will provide switching for 1-288 main outputs and 288 X-Link outputs.
- In the middle location, it will provide full redundancy for outputs 1-576 in a 26RU system. 16RU system could enable another 288 X-Link outputs.
- Fitted in the lower location it will provide switching for 289-576 main output and 288 X-Link outputs.

6.1.2 EQX-XPTG 576X288

This crosspoint module switches 576 inputs through to 288 outputs.

- In the upper location, it will provide switching for 1-288 main outputs.
- In the middle location, it will provide shared redundancy for outputs 1-576.
- In the lower location it will provide switching for 289-576 main output in a 26RU system.

6.1.3 EQX-XPTG 288X288

This crosspoint can only be fitted in a 16RU frame and it switches 288 inputs through to 288 outputs.

- In the upper location, it will provide switching for 1-288 main outputs.
- In the middle location, it will provide either full redundancy for 1-288 or 288 outputs for X-Link.
- In the lower location, it will provide 288 X-Link outputs only.

Note: X-Link outputs depending on the hardware type and Map file loaded.

Note: Crosspoints modules for 26RU and 16RU frames are not compatible with 10RU frame.

6.1.4 Crosspoint - Key Features

- Front access to all crosspoint modules
- All crosspoint modules are hot-swappable
- All crosspoint modules are independently fan cooled

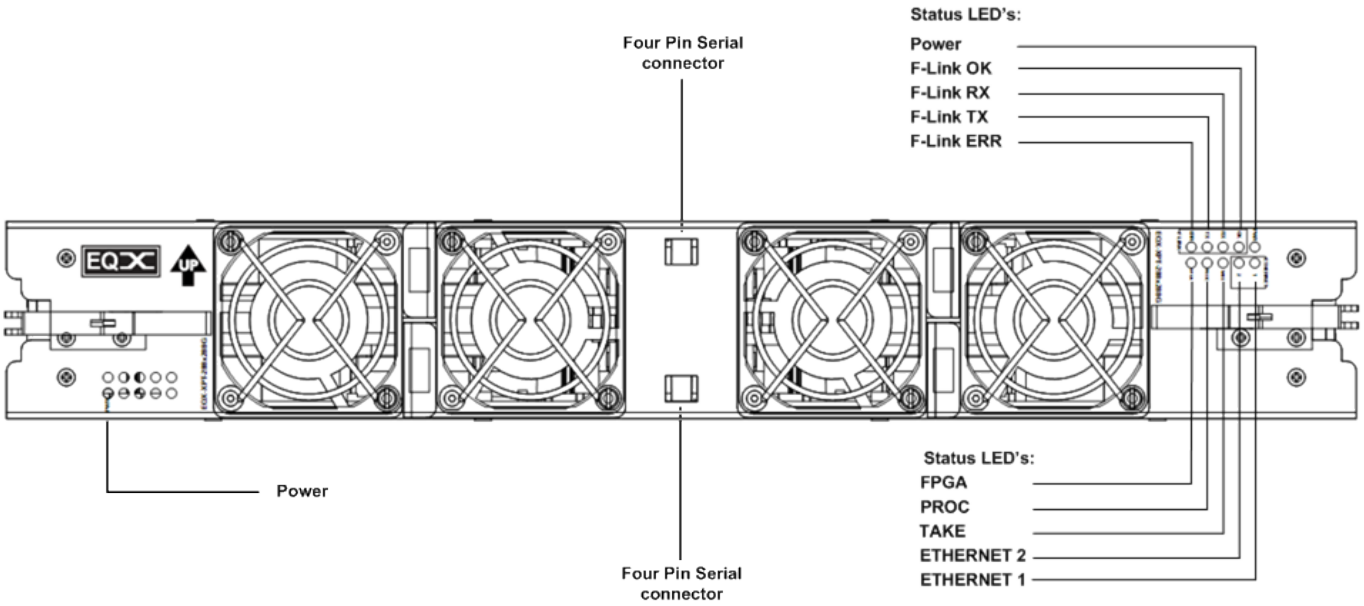

Figure 6-2: EQX-XPTG-288X288

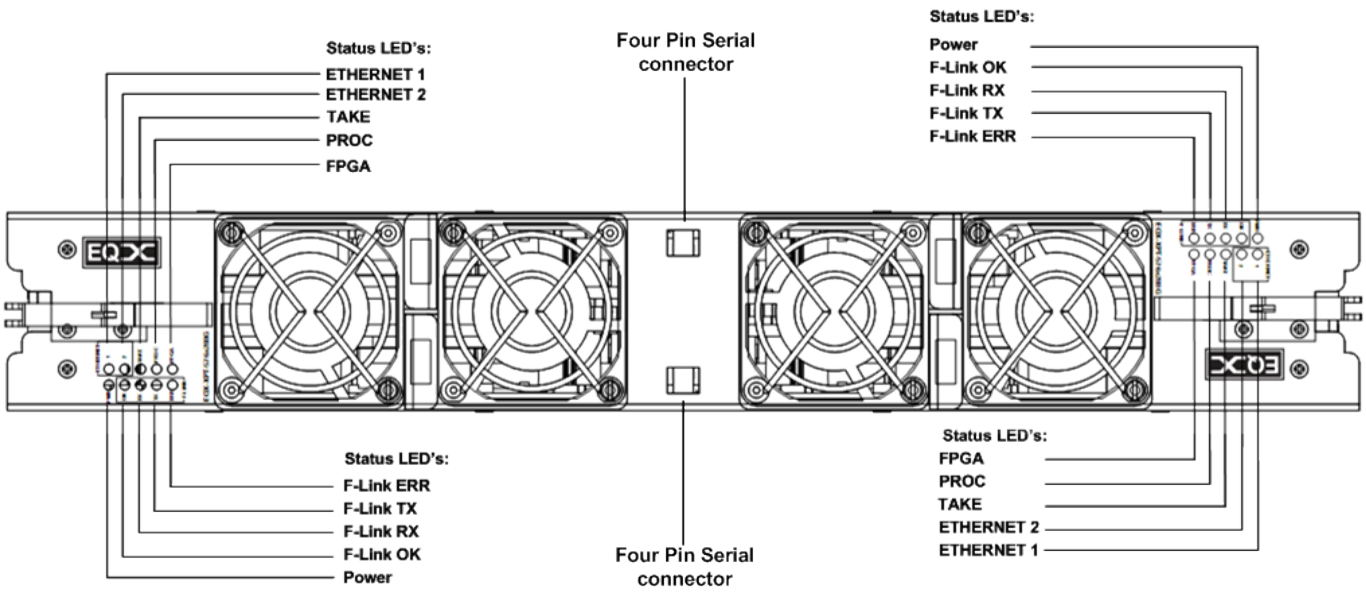

Figure 6-3: EQX-XPTG-576X576/576X288

LED	Function
Power	Power rail present.
F-Link OK	Flashes when there is a valid hit on the module.
F-Link Rx	Flashes when there is any F-Link comms detected.
F-Link Tx	Flashes when the module has transmitted F-Link data.
F-Link Error	Flashes when the module receives F-Link data that was deemed to be erroneous (bad checksum)
Ethernet (1)	Rx - Flashes when Ethernet data is transmitted.
	Tx – Flashes when Ethernet data is received
Ethernet (2)	Rx - Flashes when Ethernet data is transmitted.
	Tx – Flashes when Ethernet data is received
Take	Flashes when the module has performed a “Take”
Proc	Flashes at approximately 1second intervals when the processor is OK. Flashes quickly during FPGA configuration.
FPGA	Illuminates when all the FPGAs have been configured correctly.

Table 6-1: LED Description of Crosspoint Modules

6.2 10RU EQX CROSSPOINT MODULE

The EQX router has provision for one type crosspoint modules 180X288. This crosspoint switches 180 inputs through to 288 outputs.

The Left location houses the crosspoint module that provides the switching for main and Xlink outputs 1-96. The Right location provides the switching for 288 expansion Xlink outputs.

The Redundant crosspoint module, which is fitted into the middle location, provides full protection in the case of a failed route(s). The switch over to the back-up crosspoint can be performed manually or automatically. In the event of a failure only the faulty route(s) needs to be switched over to the back-up crosspoint. The new route(s) can be checked before the switch is made through the output monitoring facility. This crosspoint also provides outputs for Xlink expansion outputs 97-192

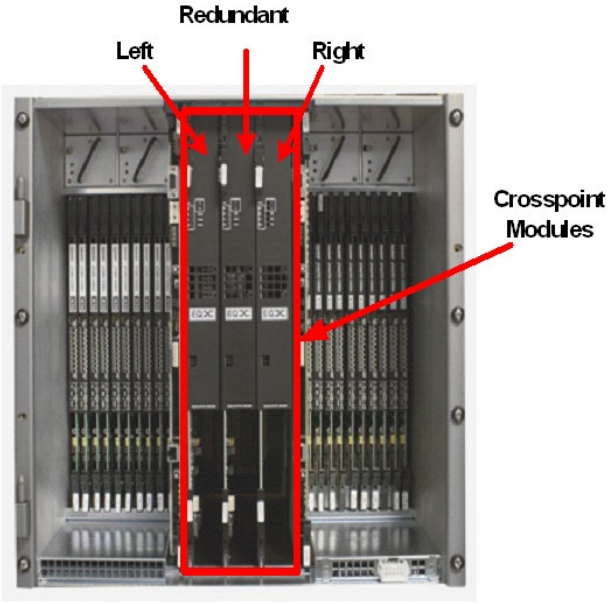

Figure 6-4: Crosspoint Cards in 10RU Frame

All of the crosspoint modules are accessed from the front of the frame and can be replaced while the EQX router is still operational should one of the modules fail. The back-up crosspoint provides continued full operation while a main crosspoint module is being replaced.

The crosspoint modules are air cooled by the fan modules that are mounted onto the front of the crosspoint assemblies.

6.3 EQX10-XPTG 180X288

This crosspoint module switches 180 inputs through to 288 outputs. If the crosspoint is fitted in the Left location, it will provide switching for 1-180 main outputs and 96 X-Link outputs.

If it is fitted in the middle location, it will provide full redundancy for outputs 1-180 and 96 X-Link outputs and if it is fitted in the Right location it will provide 288 X-Link outputs.

6.3.1 Crosspoint - Key Features

- Front access to all crosspoint modules
- All crosspoint modules are hot-swappable
- All crosspoint modules are independently fan cooled

Figure 6-5 below shows the view of a crosspoint and Table 6-2 gives the description of each LED.

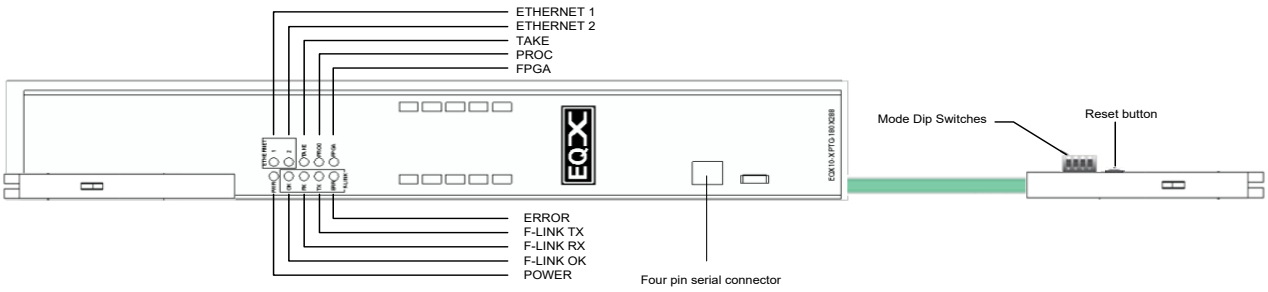

Figure 6-5: EQX10-XPTG-180X288

LED	Function
Power	Power rail present.
F-Link OK	Flashes when there is a valid hit on the module.
F-Link Rx	Flashes when there is any F-Link comms detected.
F-Link Tx	Flashes when the module has transmitted F-Link data.
F-Link Error	Flashes when the module receives F-Link data that was deemed to be erroneous (bad checksum)
Ethernet (1)	Rx - Flashes when Ethernet data is transmitted.
	Tx – Flashes when Ethernet data is received
Ethernet (2)	Rx - Flashes when Ethernet data is transmitted.
	Tx – Flashes when Ethernet data is received
Take	Flashes when the module has performed a “Take”
Proc	Flashes at approximately 1second intervals when the processor is OK. Flashes quickly during FPGA configuration.
FPGA	Illuminates when all the FPGAs have been configured correctly.

Table 6-2: LED Description of EQX10-XPTG-180X288

Note: Crosspoint modules for 10RU frame are not compatible with 26RU and 16RU frames.

6.4 EQX10-XPTG-ADMX10

The EQX10-XPTG-ADMX10 integrates a 10-port ADMX audio TDM crosspoint with a traditional video crosspoint. This module provides 10 internal TDM inputs and 10 internal TDM outputs for AVIP and AVOP, or 10 external TDM inputs and 10 external TDM outputs via the X-Link connector.

Additionally, it switches 180 video inputs to 288 video outputs. When the crosspoint is installed in the left location, it handles switching for 1-180 main outputs and 64 X-Link outputs. If an optional redundant crosspoint is installed in the middle, it offers full redundancy for audio and video, along with an additional 64 X-Link outputs.

Note: This crosspoint module is not meant for use in the right most slot for XLINK outputs. Using it in that slot could result in errors or multiple failed paths due to different mapping of the hardware.

+AX5

+ AX5 is a licensed feature which will provide additional 5 inputs and 5 outputs to be used as external TDM or MADI.

6.4.1 Crosspoint - Key Features

- Front access to all crosspoint modules
- All crosspoint modules are hot-swappable
- All crosspoint modules are independently fan cooled
- Independent Audio and Video routing

Figure 6-6 below shows the view of a crosspoint and Table 6-3 gives the description of each LED.

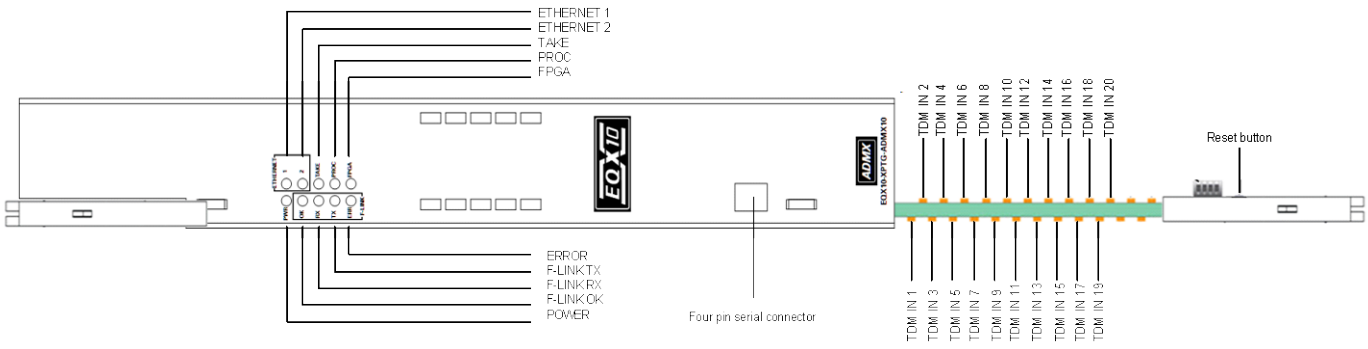

Figure 6-6: EQX10-XPTG-ADMX10

LED	Function
Power	Power rail present.
F-Link OK	Flashes when there is a valid hit on the module.
F-Link Rx	Flashes when there is any F-Link comms detected.
F-Link Tx	Flashes when the module has transmitted F-Link data.
F-Link Error	Flashes when the module receives F-Link data that was deemed to be erroneous (bad checksum)
Ethernet (1)	Rx - Flashes when Ethernet data is transmitted.
	Tx – Flashes when Ethernet data is received
Ethernet (2)	Rx - Flashes when Ethernet data is transmitted.
	Tx – Flashes when Ethernet data is received
Take	Flashes when the module has performed a “Take”
Proc	Flashes at approximately 1second intervals when the processor is OK. Flashes quickly during FPGA configuration.
FPGA	Illuminates when all the FPGAs have been configured correctly.
TDM In 1 -10	Indicat if valid TDN sources are connected to these ports
TDM In 11-20	Reserved

Table 6-3: LED Description of EQX10-XPTG-ADMX10

There are 2 cables that could be used for connecting cards to the onboard ADMX module via the XLINK connector.

Currently to pair correctly with the EQX-S and EQX-H HD-BNC connections, the following cable should be included with the EQX10 with ADMX modules.

XLINK-32HDBNC-2

This is a 2-meter XLINK to HD-BNC breakout cable. The XLINK side connects to the frame at the XLINK 3 and 6 ports labeled TDM. The HD-BNC breakout connects to the TDM IN and TDM OUT ports on the EQX-S and EQX-H rear plates.

Previous frames may have shipped with the **XLINK-32DIN-2**, but this is no longer correct, as the EQX-S and EQX-H now utilize HD-BNC for TDM ports.

Wiring guide for breakout:

INPUT SLOT	1	2	3	4	5	6	7	8	9	10
XLINK	1	5	9	13	17	21	25	29	3	7

OUTPUT SLOT	1	2	3	4	5	6	7	8	9	10
XLINK	2	6	10	14	18	22	26	30	4	8

7. COOLING MODULES FOR 26 AND 16RU FRAMES

7.1 EQX INPUT & OUTPUT MODULE COOLING

The EQX frame is fan-assisted and air-cooled. The input and output modules that are located in the upper and lower section of the EQX frame are independently cooled. Both the upper and lower section of the frame is equipped with a single row of five fans. These fans draw cool air in through the front door of the frame and expel the hot air out of the rear and top of the frame.

Each fan module is held in place by a single thumb screw and can be quickly and simply extracted and replaced from the front of the EQX frame should any one of them fail.

The single row of five fans that are located in both the upper and lower sections of the EQX frame are arranged in a n+1 configuration and provide redundancy, allowing a single fan to fail in either or both of the rows without causing the I/O modules to overheat. The performance of the fans is constantly monitored by the frame controllers. Any faults or failures are immediately reported.

EQX-FAN-HBX: This is a next-generation fan module. There are two cooling fans inside each module for better air flow. The RPMs on each of the fans has doubled from ~6000rpm each to 11000rpm.

The EQX-FAN-HBX cannot be used in older routers that lack upper and lower venting. Additionally, a firmware upgrade to the latest RPC4net is required for proper operation and detection.

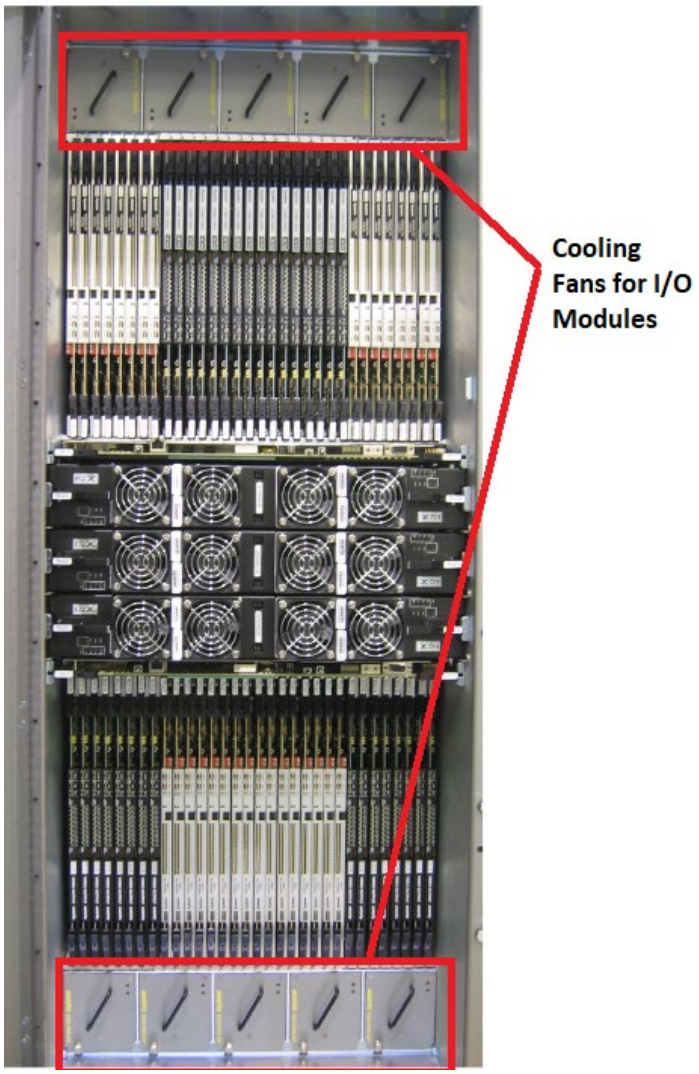

Figure 7-1: Fan Modules on 26RU Frame

Note: Make sure the door vents, upper and lower vent cut outs are always open and nothing restricts the air flow.

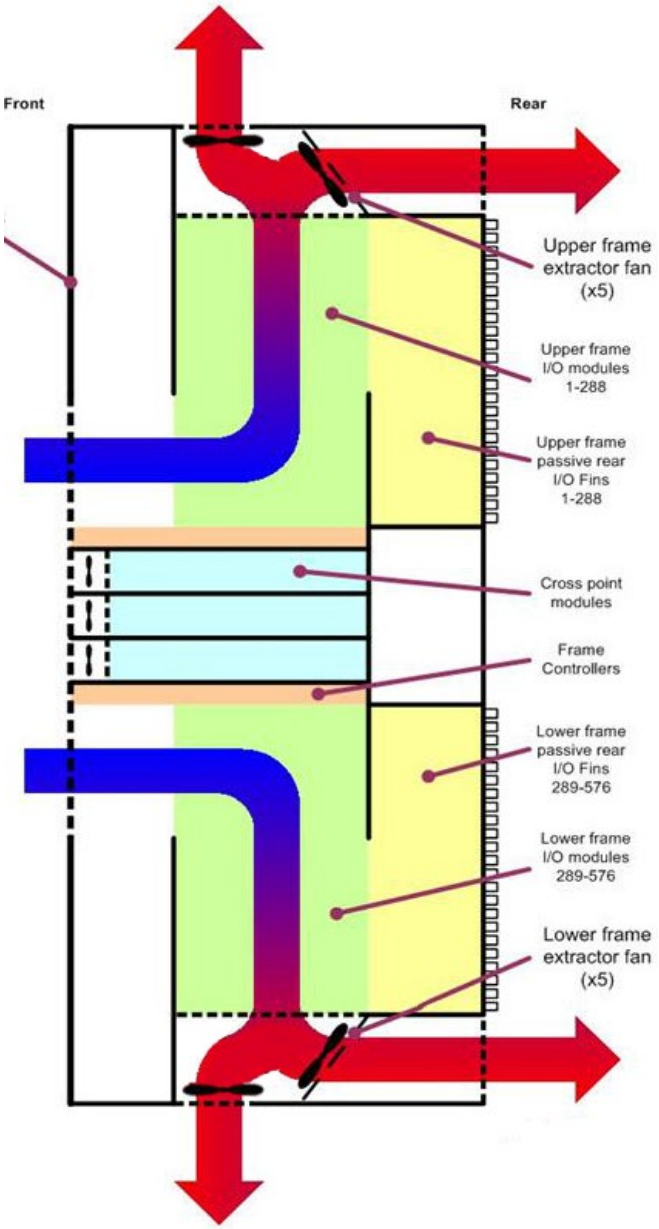

Figure 7-2: EQX Frame Air Flow

7.1.1 I/O Fan Modules - Key Features

- Five fans are installed into the upper & lower sections of the frame providing independent cooling of the Input and Output modules.
- Front access to all of the fan modules.
- Individual fan assemblies can be hot-swapped.
- Redundant configuration ensures continuous cooling should a fan fail.

The EQX I/O fans should be inspected every six months to ensure they are functioning correctly, and the thumb screws are tight. There are no fan filters to change.

7.2 EQX CROSSPOINT FAN MODULES

Each of the crosspoint modules within the EQX frame are independently cooled by a row of four fan modules mounted onto the front of the crosspoint assembly.

The crosspoint fans are arranged in an n+1 configuration providing redundancy, which ensures sufficient cooling should a fan fail at any time. The performances of all of the crosspoint fans are constantly monitored by the frame controller. Any faults or failures are immediately reported.

Each of the crosspoint fan modules can be simply and quickly removed and replaced while the crosspoint module is still in place and operational.

Cool air is drawn into the front of the crosspoint module, passed over the crosspoint circuitry and expelled out of the side of the frame.

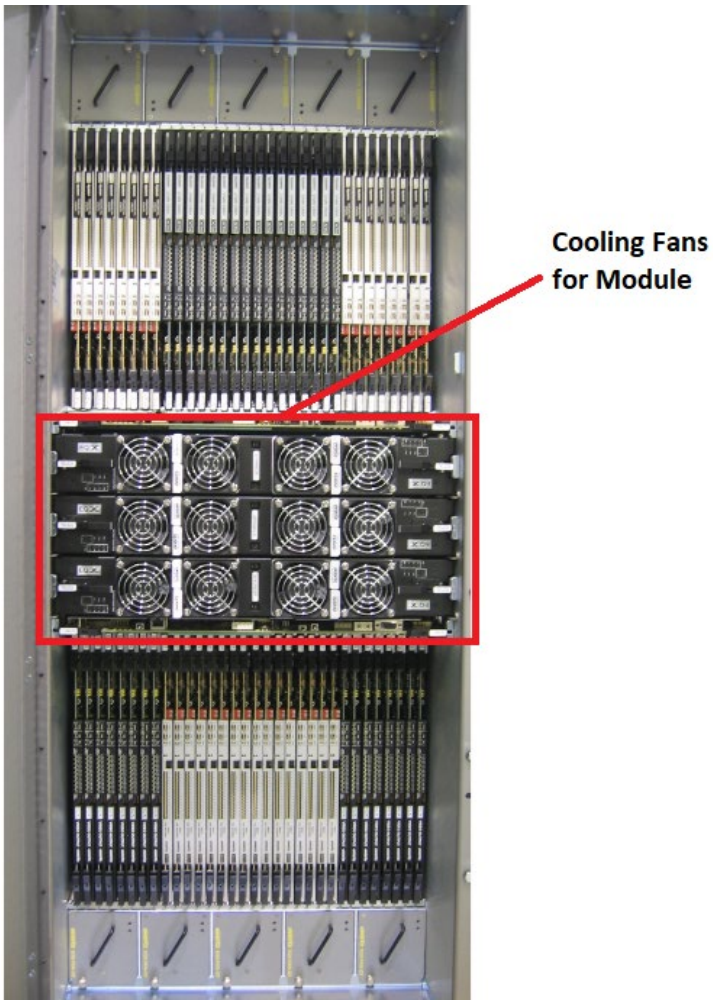

Figure 7-3: Crosspoint Cooling Fan Modules on 26RU Frame

Figure 7-4: EQX-XPTG-576X576 Cooling Fan

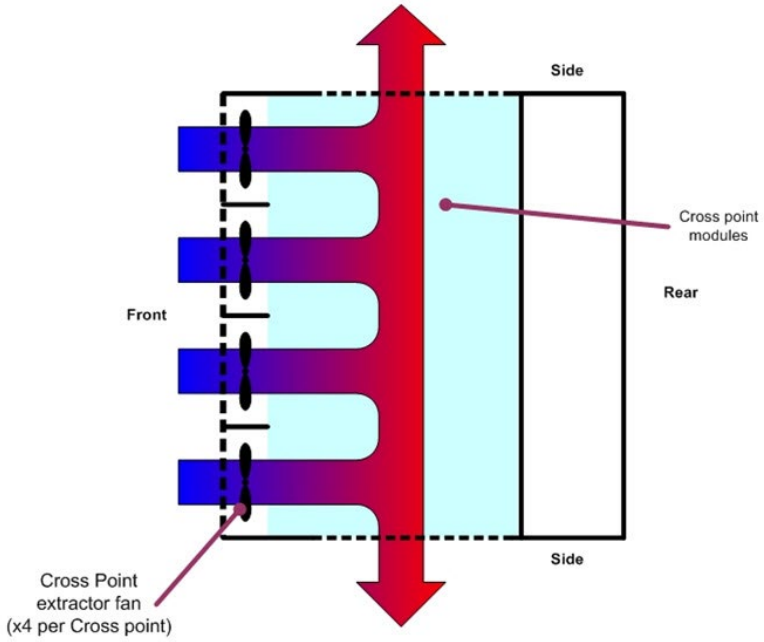

Figure 7-5: EQX Crosspoint Module Air Flow – Top View

7.2.1 Crosspoint Fan Modules - Key Features

- Each crosspoint assembly is independently cooled.
- N+1 configuration ensures continuous cooling should a fan fail.
- Individual fan assemblies can be hot swapped.

The EQX crosspoint fans should be visually inspected every six months to ensure they are functioning correctly, and the thumb screws are tight. There are no fan filters to change.

8. COOLING MODULES FOR EQX10 FRAME

8.1 EQX10 INPUT AND OUTPUT COOLING MODULES

The EQX10 frame is fan-assisted and air-cooled. The input and output modules that are located in the left and right section of the EQX frame, are independently cooled. The upper section of the frame is equipped with four fan modules. These fans draw cool air in through the front door of the frame and expel the hot air out of the rear and top of the frame.

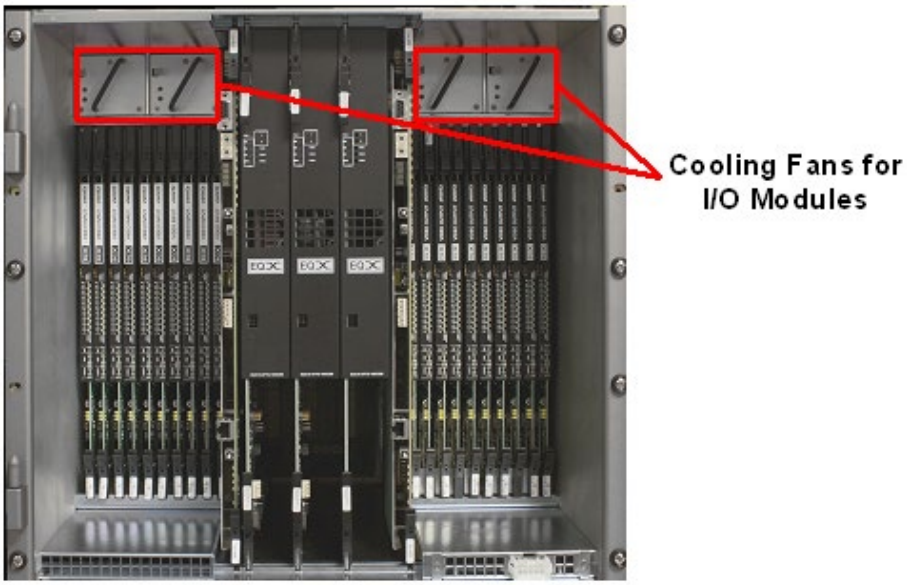

Figure 8-1: Cooling Fan Modules on 10RU Frame

8.1.1 EQX10 Cooling module

Each fan module is held in place by a single thumb latch and can be quickly and simply extracted and replaced from the front of the EQX frame should any one of them fail. The performance of the fans is constantly monitored by the frame controllers. Any faults or failures are immediately reported.

The EQX10 fan modules are physically smaller than the ones found in the EQX26 and 16RU frames. Hence the part number of the fan modules are EQX10-FAN-QT and EQX10-FAN-QT2.

EQX10-FAN-QT2: These modules are called “Quiet” Cooling modules because they are a lot quieter and have two cooling fans for better air flow.

Figure 8-2: EQX10-FAN-QT2

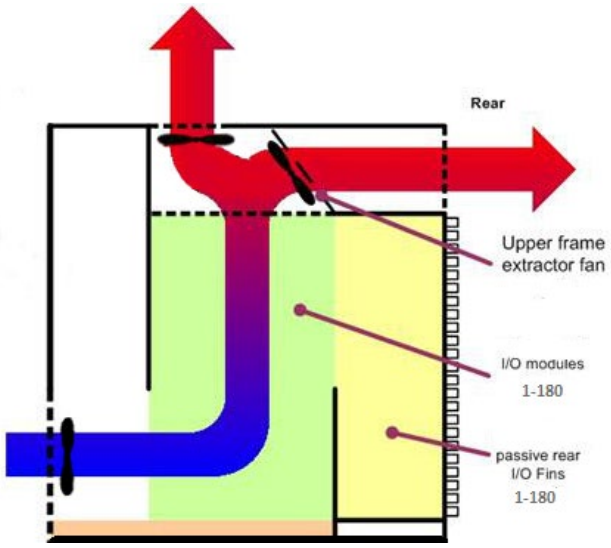

Figure 8-3: EQX10 Frame Air Flow

8.1.2 I/O Fan Modules - Key Features

- Four fans are installed in the upper sections of the frame providing independent cooling of the Input and Output modules.
- Front access to all of the fan modules.
- Individual fan assemblies can be hot swapped.

The EQX I/O fans should be inspected every six months to ensure they are functioning correctly, and they are secured in their place. There are no fan filters to change.

8.2 EQX10 CROSSPOINT FAN MODULES

Each of the crosspoint modules in the EQX10 frame is independently cooled by a single fan module mounted behind the front air-dam.

8.3 EQX10 DOOR FANS

For cards that requires more cooling such as the EQX-H series. Please install the door fan kit (EQX10-FAN-DOOR). The kit needs to be ordered if adding to an older frame.

EQX10-FAN-DOOR (Kit includes)

- 1 fan bridge board to provide power to the door
- 1 Door with 3 extra fans installed

Installation is simple. Just install the fan bridge board first in the lower right corner of the frame. You need to first remove the metal placeholder.

Figure 8-4: EQX10 Fan Bridge Board Location

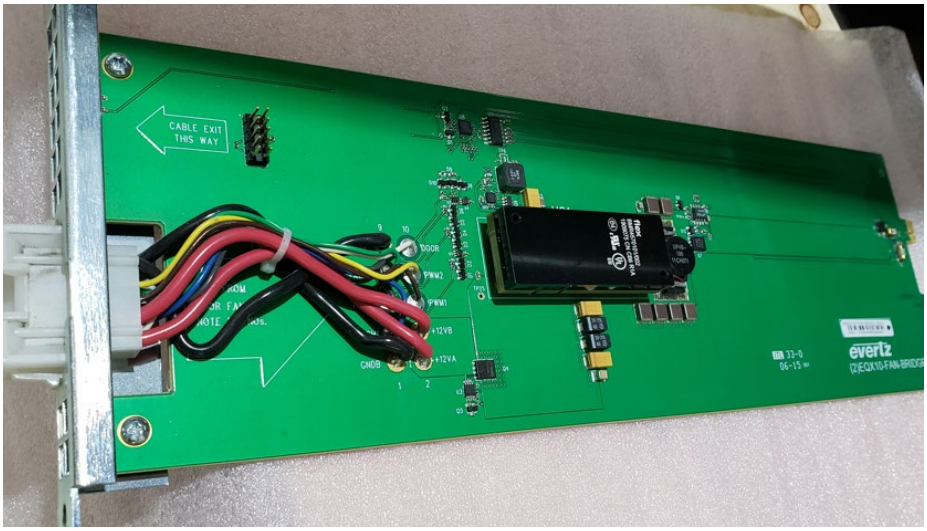

Figure 8-5: EQX10 Frame Air Flow

Figure 8-6: EQX10 Door Fans

9. EQX-FC

9.1 RPC4NET

It is the control protocol currently being used on our default shipments of EQX systems. As the name implies, it is operating on RPC and therefore not compatible with FLINK only devices. The 4NET portion just indicates that there 4 network subnet operations in use that needs to be configured. In previous FLINK system, only 3 subnets were in use. For cards to work correctly, all IO/XPT cards will need to be loaded with SC500e RPC compatible firmware.

The EQX-FC needs to be initially configured in order to gain full control over all the ports. Please ensure that DIP3 is always down on the front piano switch on the front of the card. All other DIPs should be up. The HEX switch values located between the DOT matrix display and the front DB9 serial, needs to be correctly set to 00 for TOP FC, 01 for Bottom FC.

9.2 EQX-FC CONFIGURATION

There are 4 network subnets that need to be configured. Net A, B, C, D. The roles of each are listed below:

Network 1 - B Network = SNMP Proxy (VLPRO)

Network 2 - C Network = Inter FC (Used for the two FCs to share information to remain synced)

Network 3 - A Network = Control Network (Magnum)

Network 4 - D Network = Internal (Direct access to all cards in the frame)

***Inter FC**, although internal to the frame, should still have a unique IP address if multiple frames are present within the same facility. Do not assign the same internal FC IP addresses to multiple EQX systems that are on the same network.

Note: All four network connections MUST be enabled and configured on separate subnets! Even if not in use, they must be enabled and assigned an IP address.

Note: D Network MUST NOT be exposed to another EQX system via an unmanaged switch. D Network should always be access only via a layer 3 connection with Tagged traffic.

Connect a rainbow serial cable to the front connector to configure the IP addresses.

Enable each of the 4 networks and proceed to setting the IP address values for each using the number next to the option you wish to change. Take note of the remote address and the network C values.

Some key points below:

- Enable all networks before assigning an IP. (if NOT enabled, IP values configured will not save)
- All 4 networks are on unique subnets.

- All multicast values are set to 0.0.0.0.
- Remote Address value is NET C IP address of the other FC inside the frame.
- Changes to IP addresses require the settings to be edited, saved, and the system to be rebooted. The new values will not take effect until after a reboot.
- All 4 networks should be functioning correctly once configured, saved, and rebooted. No configuration file on EQX-FC is required to gain access to these ports.
- VLAN IDs should be configured to match VLAN of network if a managed switch is used to segregate into different VLAN IDs.
- Tagged traffic should only be used when VLANs and managed switches are configured for tagged traffic. If used with an unmanaged switch, no traffic is likely to pass, and communication may appear to be non-functional.
- All cards inside the EQX router need to be on the same subnet as the EQX-FC Dnet. If there is a mismatch, communication with the cards will not work. Verify this by checking the EQX-FC IP settings for Dnet and the IP configured in Winsetup for the card slot's auto IP assignment table.

Figure 9-1 is an example of a pair of EQX-FC in the same frame configured to work together in RPC4net.

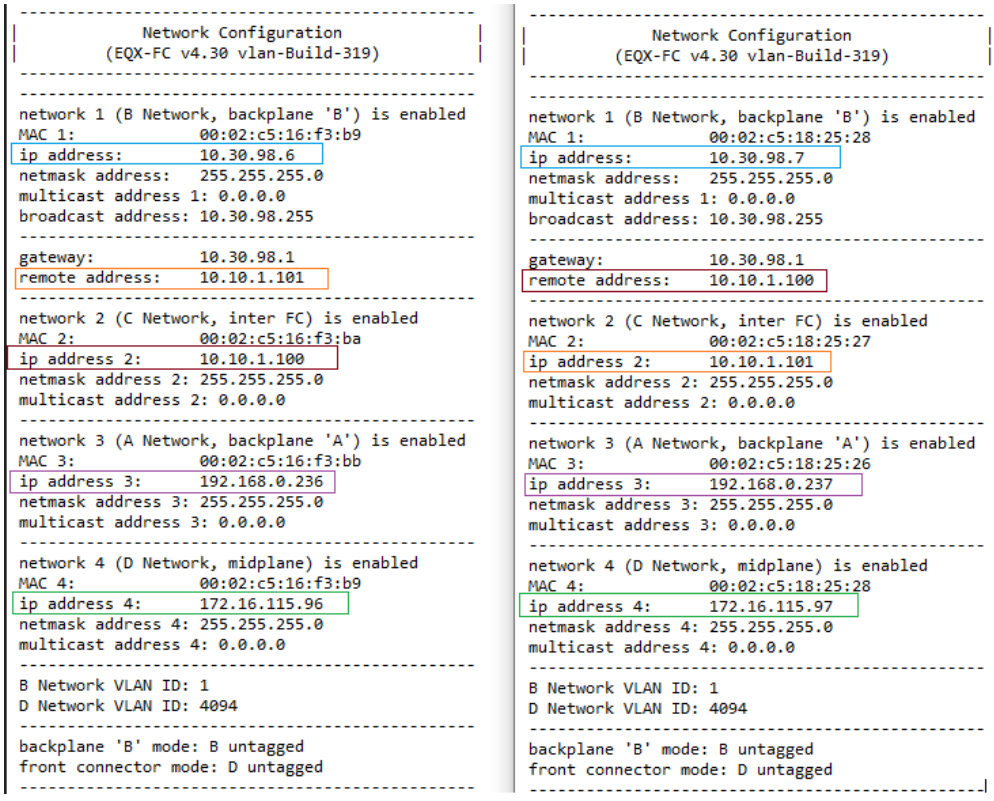

Figure 9-1: EQX-FC RPC4net IP Address Configured on FC Pair

B tagged, D tagged mode can be configured so traffic from both subnets enters and leave the same network port connection. This requires the use of an external managed switch.

10. CONFIGURING EQX USING WINSETUP

The WinSetup program is used to configure the routing functions, including control panel operation. It configures such parameters as the number of signal levels to be defined, which routing frames and panels are connected to the system, and the names of the inputs and outputs.

Note: This WinSetup guide assumes the configuration of an EQX router with full redundancy, including a redundant crosspoint module. It also assumes that the EQX router is being operated as a single level video with embedded audio.

When setting up the system, inquire about which Winsetup version should be used with the EQX-FC4net firmware currently operating on the EQX-FC. The EQX-FC and Winsetup application are often updated together, as bug fixes may be required for one or the other.

The Winsetup application does not need to be installed on the computer. Simply copy the required executables into a folder on the Windows computer. As a best practice, create a directory that matches the software version for those files. The location of the directory on the Windows machine will be needed later when updating some path entries in the application.

The Winsetup application for RPC4net routers consists of two main files. Ensure that both files are present in the same directory. Verify that the "**Winsetup_EQX_SCE.ini**" file is larger than 1KB in size. If the main executable file is run without the .ini file present, it will automatically generate a blank .ini file in the same folder.

See Figure 10-1 below for files and directory structure example.

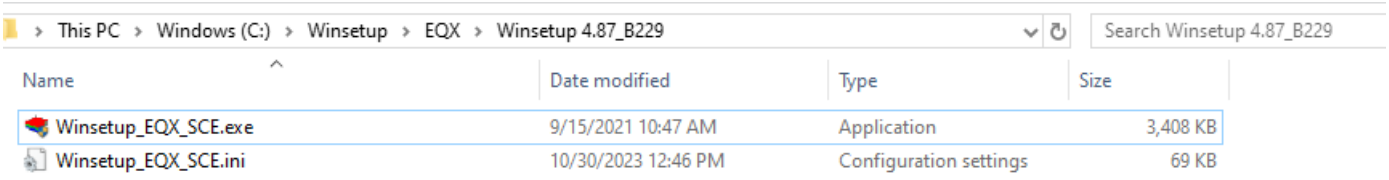

Figure 10-1: Winsetup Program Files for RPC4net EQX Routers

If later attempting to add a frame to the configuration but none are listed, this is likely the issue. Correct the .ini file if this is the case. Figure 10-2 below demonstrates the section which is affected with an incorrect .ini file.

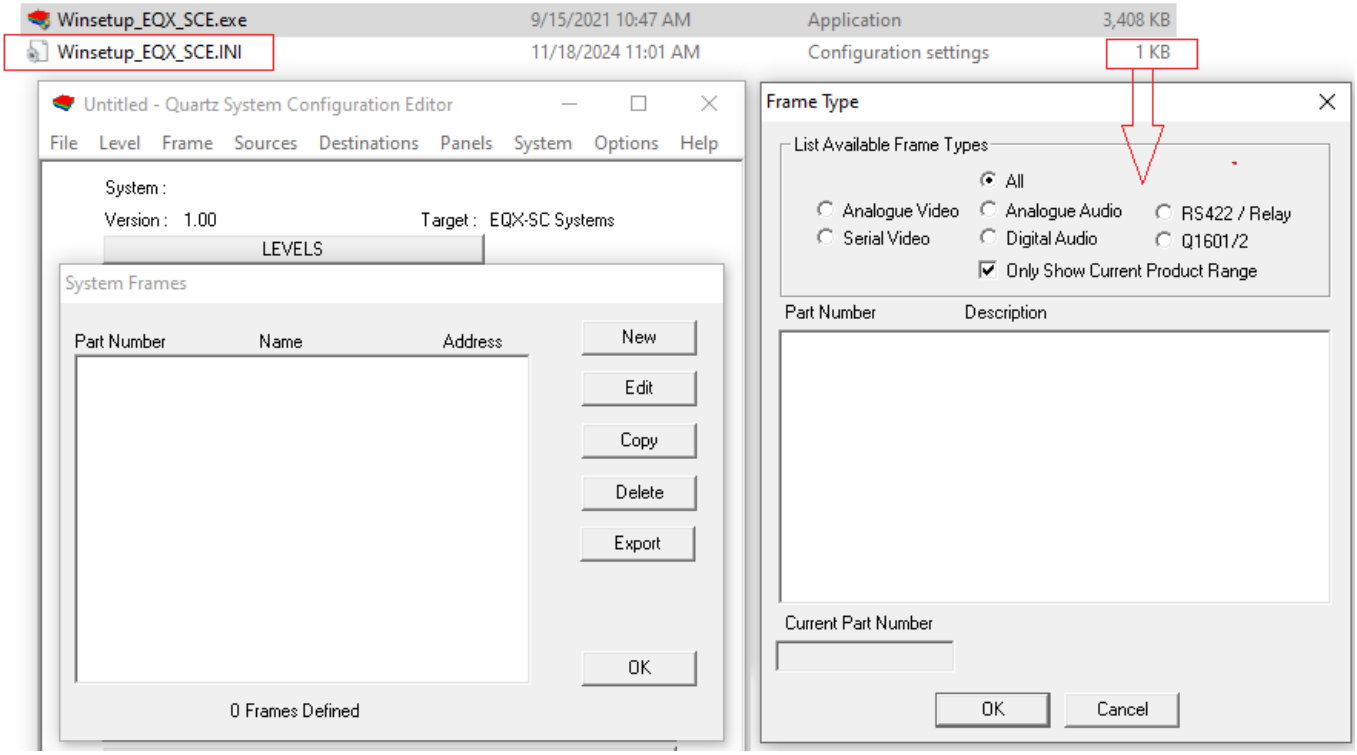

Figure 10-2: Invalid Winsetup_EQX_SCE.ini File

10.1 MAIN WINDOW

If the application was executed previously and a configuration file was saved, the main window will start with the last opened configuration file displayed in the main window.

Below shows the main WinSetup screen when you select “New” from the menu. Any part of the system can be configured from the menu at the top of the screen, or alternatively the grey bars above each main section can be used for quick access to specific items.

If you are generating a new system configuration, then some of the menus and functions will be grayed out (indicating that they are not available), as shown above. This is deliberate in order to ‘lead you through’ the functions that need to be set up.

To configure the EQX router using WinSetup, carry out the following functions described in the sections below.

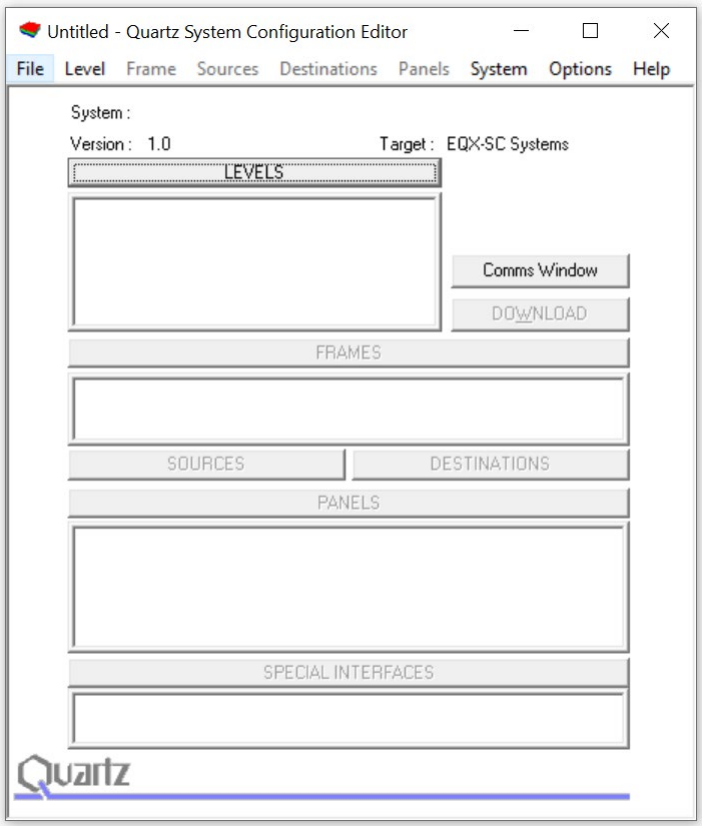

Figure 10-3: Quartz System Configuration Editor Window

10.2 LEVELS

Traditionally, levels are used to define the makeup of a routing system such as video, audio and control data. Each signal type is normally allocated its own level. The EQX router also uses the level system to define the *Routing Level* and the *Redundant Level* in addition to the more traditional signal levels.

To set up the EQX router, enter the *"Levels"* menu by clicking the grey *"Level"* section heading. This action will automatically open the *"System Levels"* window, as shown in Figure 10-4.

The EQX router requires that two (2) Levels are created within this menu if the back-up crosspoint is fitted:

- **Level 1** is used for the main video routes.
- **Level 2** is used for the redundant video routes. (Only required if the optional redundant crosspoint is fitted.)

To create a Level, click the Level to be set, in this example "Level 1". A blue background will highlight the text to confirm the selection.

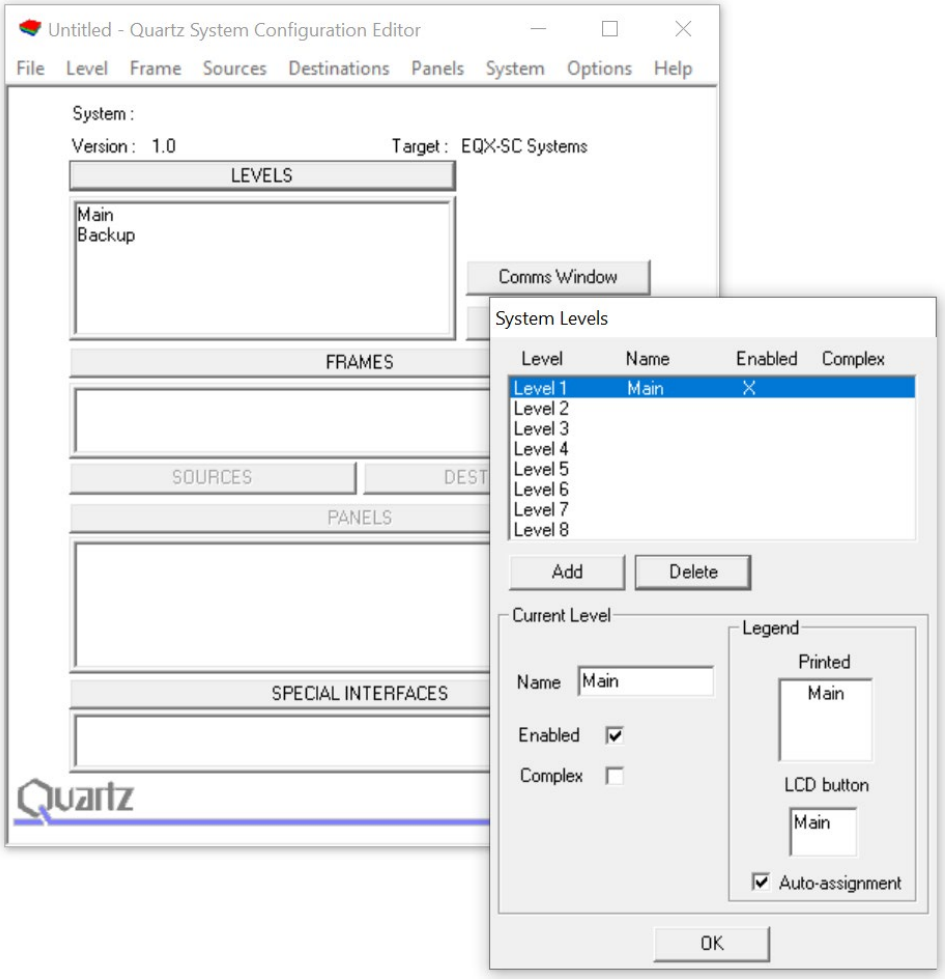

Figure 10-4: Creating the "Main Video Route" Level

Enter the required level name into the *"Name"* field; in this example the name "Main" has been used. Select the *Add* button. This will add Level 1 to the system configuration with the label set to "Main".

Create the second Level by clicking "Level 2". Once again, a blue background will highlight the text to confirm the selection, as shown in Figure 10-5. (Only required if the optional redundant crosspoint is fitted).

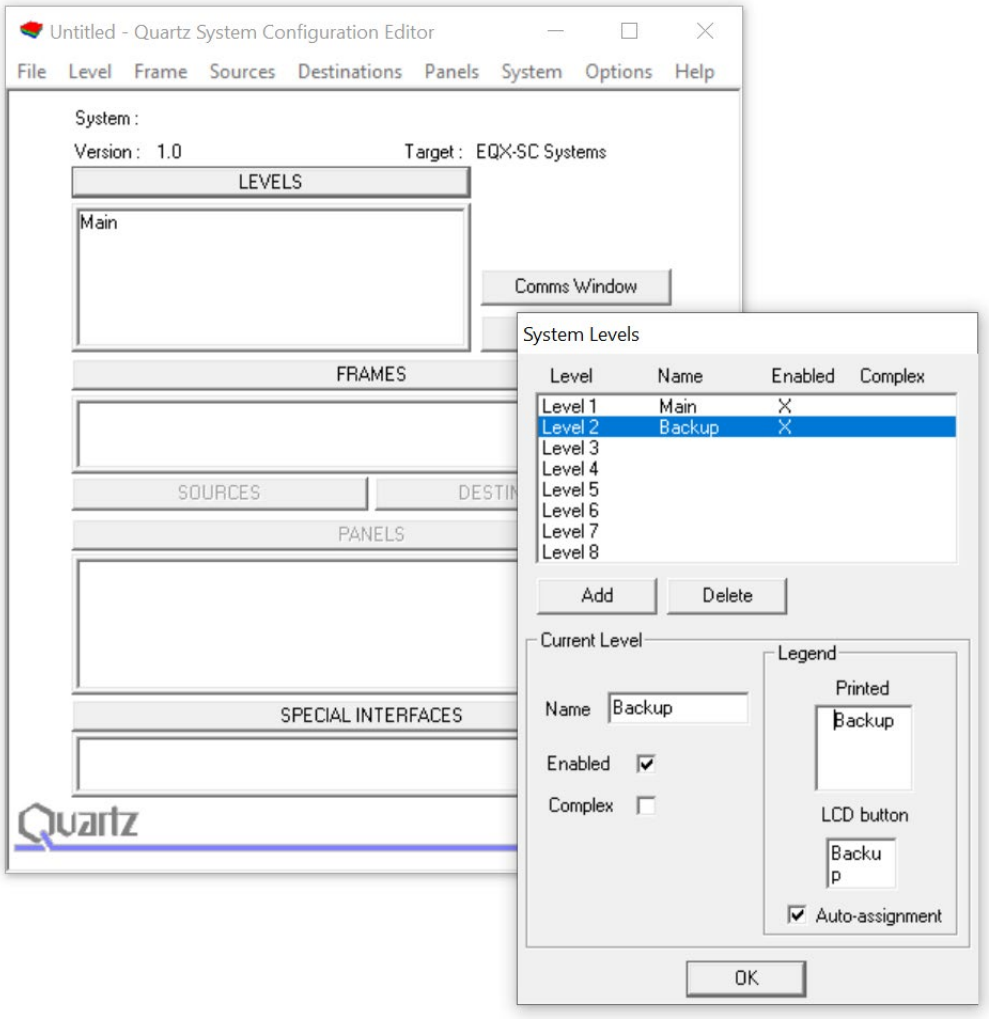

Figure 10-5: Creating the "Backup Video Route" Level

Enter the required level name into the *"Name"* field; in this example the name "Backup" has been used. Select the *Add* button. This will add Level 2 to the system configuration with the label set to "Backup". Then select "OK" to close the window.

Note: Do not check off the "Complex" box.

10.3 FRAMES

Next, enter the *"Frames"* menu by clicking on the grey *"Frames"* section heading. This automatically opens up the *"System Frames"* window as shown in Figure 10-6. From here click the *"New"* button. This will automatically open the *"Frame Type"* window.

The *"Frame Type"* window will display all the different EQX routers sizes. Select the part number that matches the hardware by clicking the corresponding line. Look through the list and select the EQX frame from the description that can encompass your entire matrix.

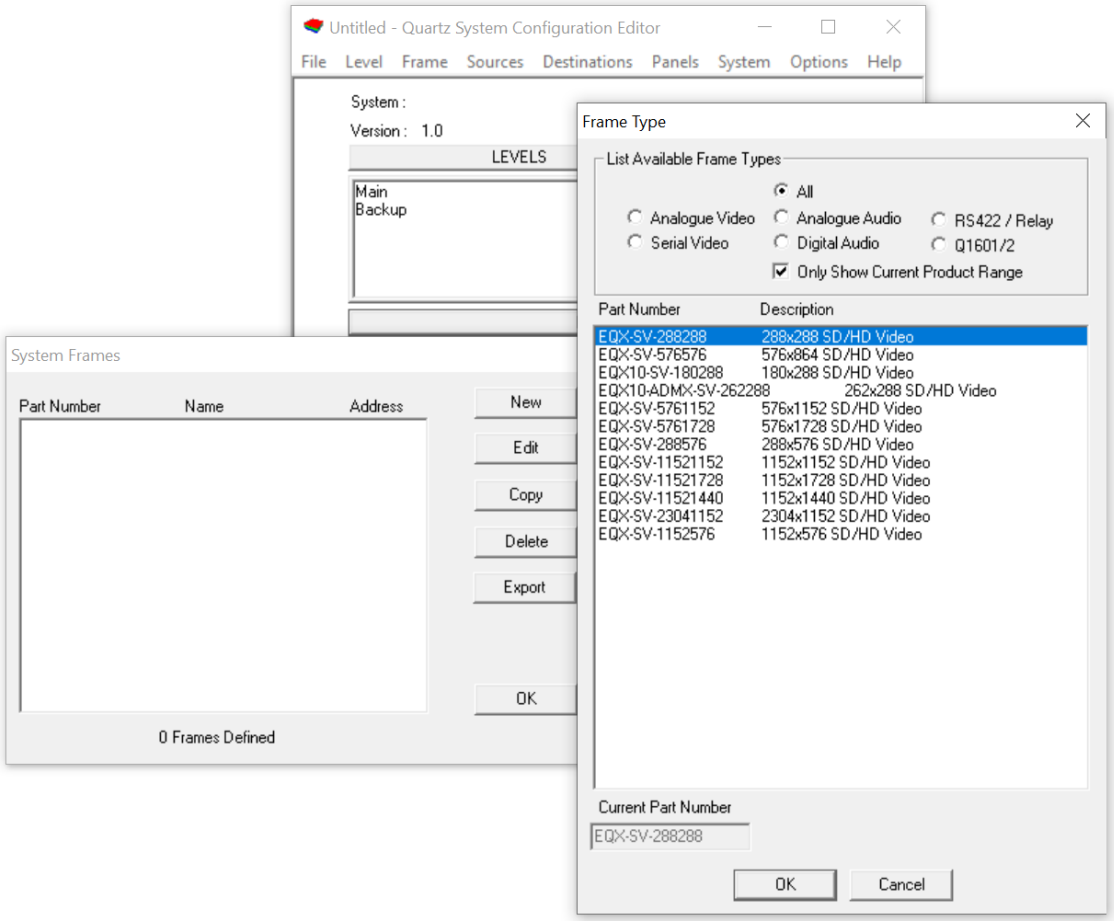

Figure 10-6: Selecting the Frame Type

A blue background will highlight the text to confirm the selection. There are several types of EQX router frames to choose from. Pick a frame that matches the router's physical size and IO range can encompass the maximum number of channels:

1. **EQX-SV-576XXX:** This is the 26RU model
2. **EQX-SV-288XXX:** This is the 16RU model
3. **EQX10-SV180288:** This is the 10RU model
4. **EQXADMXSV-262288:** This is the 10RU model with the ADMX Crosspoint
5. **EQX-SV-1152XXXX:** This is the 2 x 26RU
6. **EQX-SV-2034XXXX:** This is the 4 x 26RU

Click the *"OK"* button to confirm the frame selection. This automatically opens up the *"New Frame"* window.

The *"New Frame"* window allows the physical and control parameters of the inputs and outputs of the EQX router to be configured in more detail.

Note: The *"New Frame"* can also be labelled *"Edit Frame"* window. The functionality of both these windows is the same and the name changes when the window is re-entered from the *"Frame"* menu.

Note: The description and graphics shown here assume the configuration of the 26RUEQX router with redundant crosspoint module fitted.

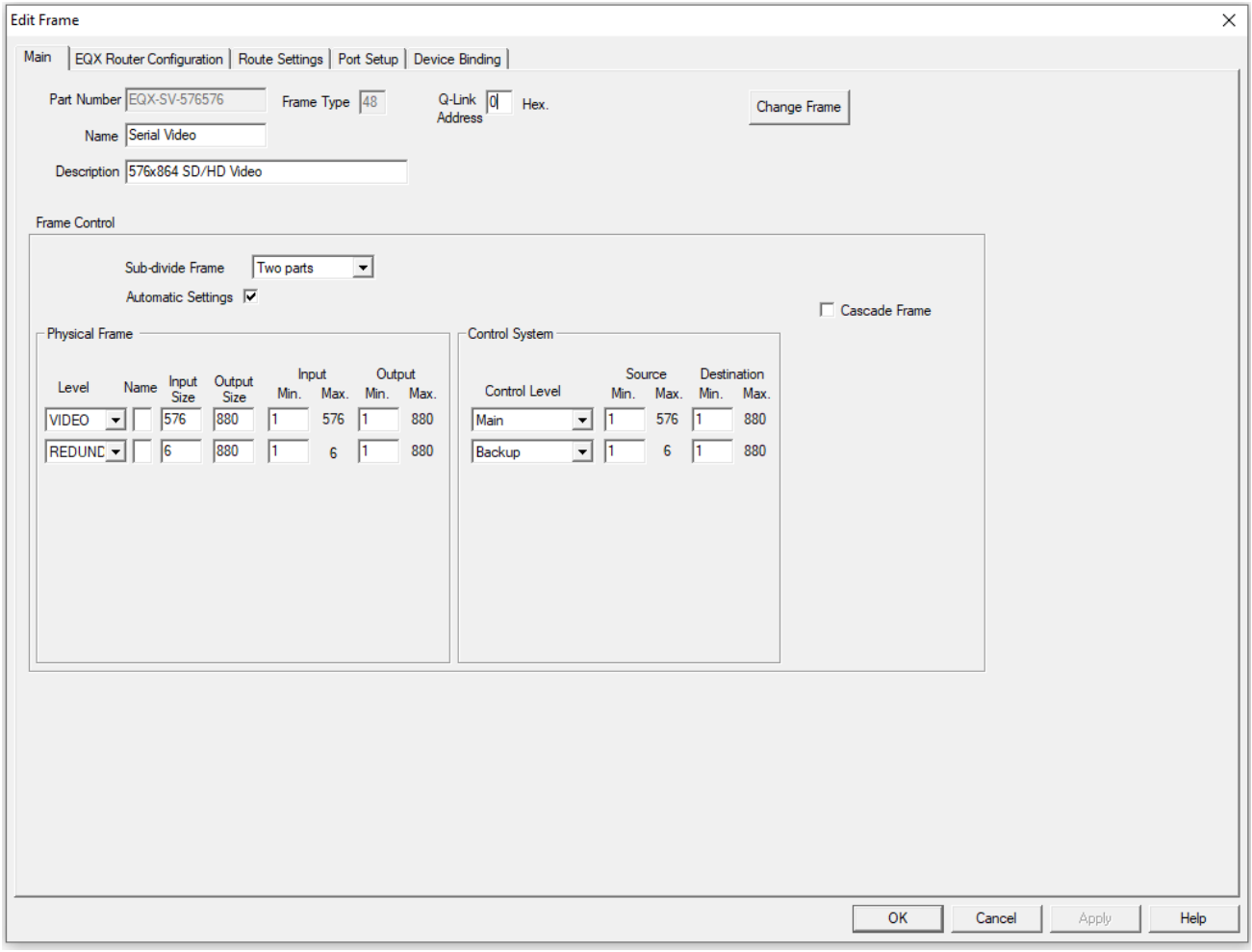

Figure 10-7: New Frame Window – Default Setting when First Opened

When the *"New Frame"* window is opened for the first time after selecting the EQX router, a default graphical view will be seen, as shown in Figure 10-7.

The part number for the selected frame along with its Frame Type number is shown (grayed out) for confirmation. If the wrong frame type has been selected, then it can be changed by clicking on the *"Change Frame"* button.

The EQX frame is automatically given a Q-Link address; the default value is "0" and has to remain "0".

Note: The physical Q-Link address on the top EQX Frame Controller must be set to "0" and Q-Link address on the bottom EQX Frame Controller must be set to "1".

The *"Name"* field is automatically picked up from the "Frame Type" window. It can be changed at any time by entering a new name directly into this field.

The *"Description"* field is also automatically picked up from the "Frame Type" window and will show a fully configured frame. It can be changed at any time to match the size of a sub-loaded frame by entering a new description directly into this field.

The next step is to Sub-divide the EQX frame into two (2) parts if it is not done automatically. This is required for the configuration of the redundant crosspoint.

Click on the "Sub-divide Frame" drop down list and select "Two parts". This will change the window display as shown in Figure 10-8.

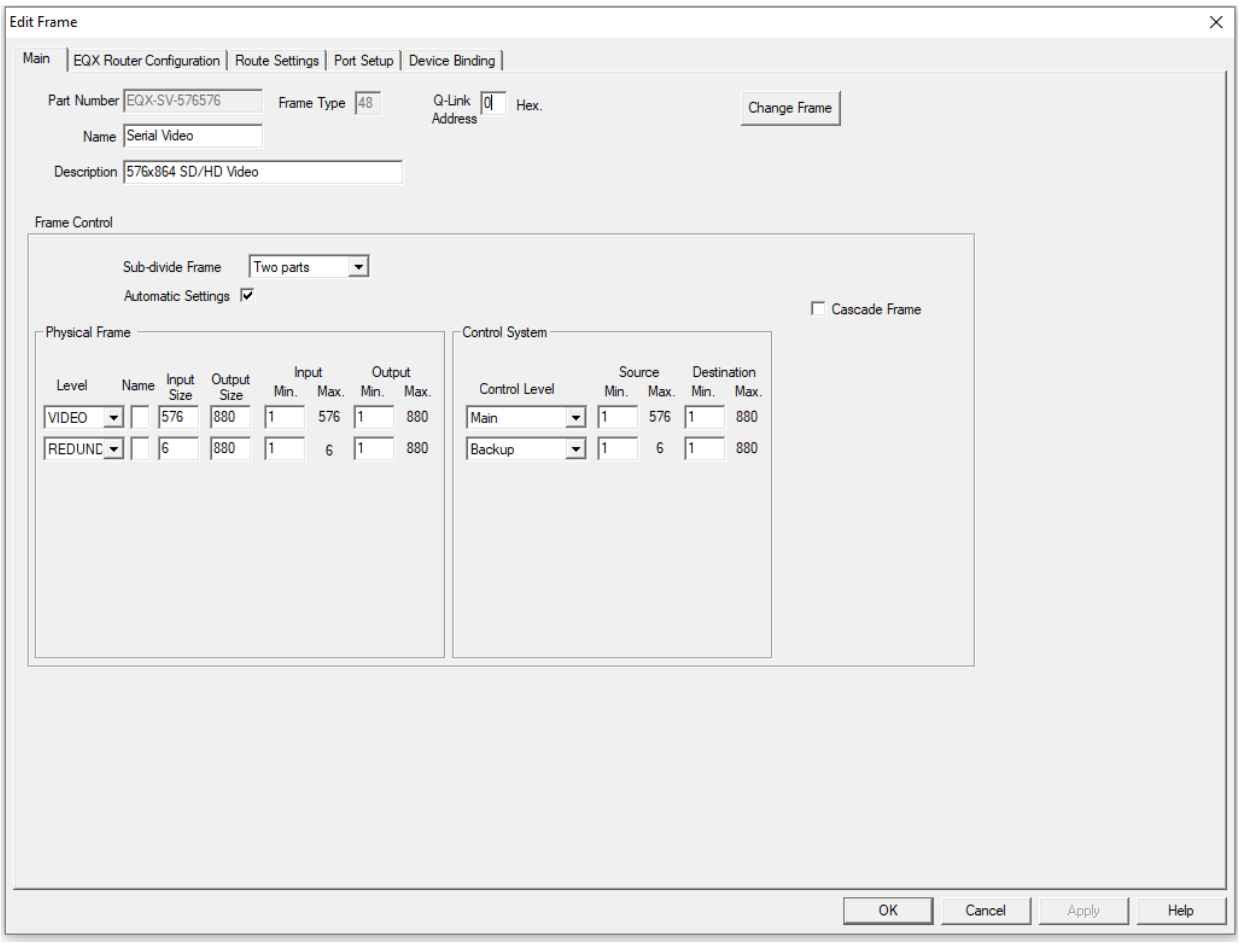

Figure 10-8: New Frame Window – Set for "Two Parts"

In the *"Physical Frame"* area of the window, use the *"Level"* drop down menus to select each one of the two levels, shown in Figure 10-8 by the *"Video"* and *"Redundant"* headings.

The two levels shown in the *"Control System"* area of this window will automatically default to the two control levels created earlier, *"Main"* and *"Backup".* If not, use the relevant drop down menus and select the correct control level.

Note: The numbers that appear in the boxes to the right of the *"Physical Frame"* and *"Control System"* areas are loaded by the WinSetup software as default values based on an equal split of the frame. When configuring the EQX router with a redundant crosspoint configuration these values must be changed. See section 10.4.

Once the two levels have been set, then the next stage is to correctly enter the input and output matrix size as shown in Figure 10-9, assumes an EQX26 frame fully populated with 576x576 I/O's.

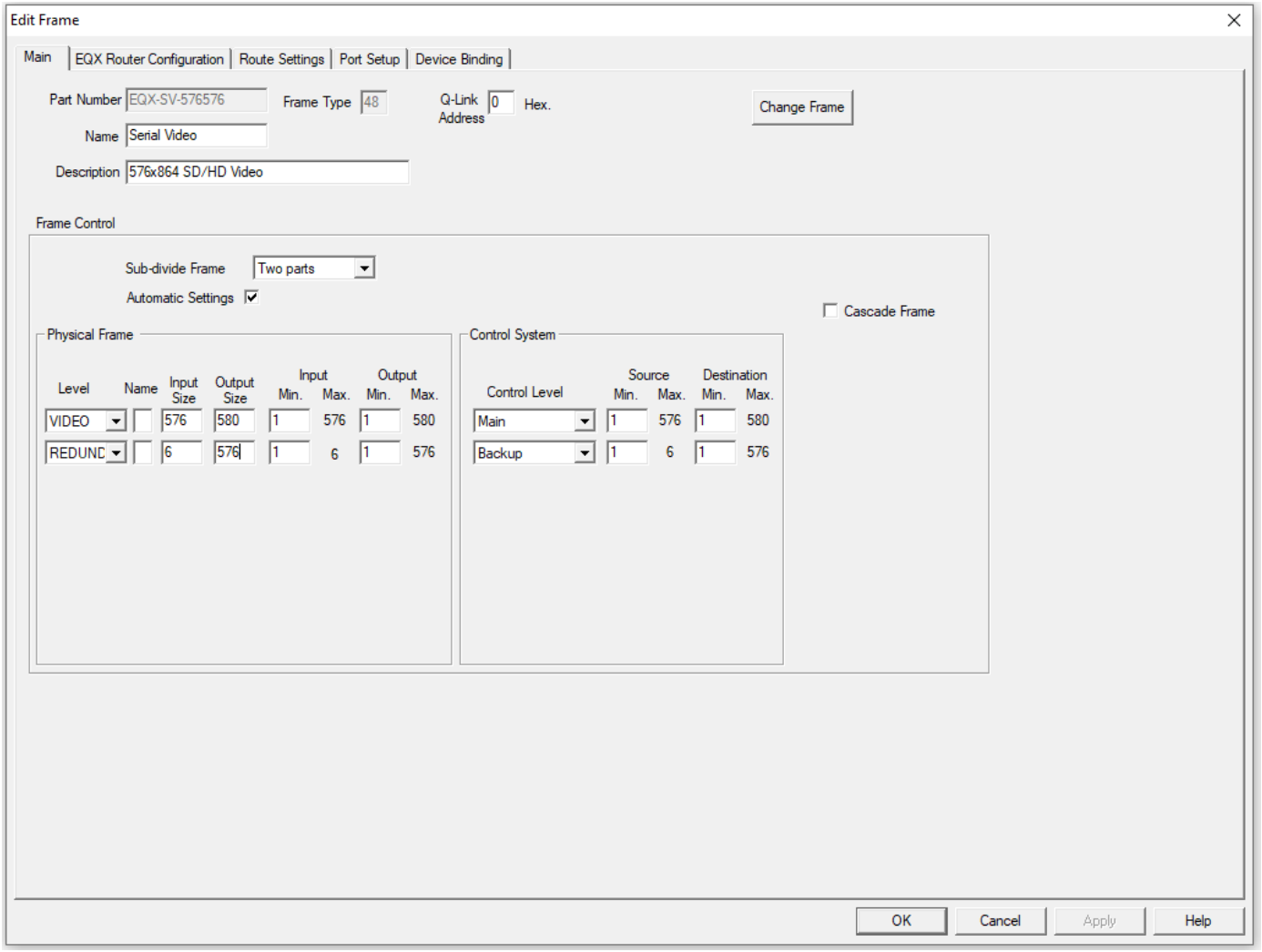

Figure 10-9: New Frame Window – Enter the Required Input and Output Values

Enter the following values for the *"Physical Frame".*

To configure the *"Video Level"* enter these values:

- *"Input Size"* set to 576.
- *"Output Size"* set to 580. The four additional outputs will be used for monitoring outputs.
- *"Input Min"* set to 1.
- *"Output Min"* set to 1.

The "*Control System*" will pick up these new values automatically.

The Redundant level is used to control the crosspoint redundancy. The six inputs assigned to this level are virtual inputs, and allow control to be made on a per-destination basis.

To configure the "*Redundant Level*", enter these values:

- *"Input Size"* set to 6.
- *"Output Size"* set to 576.
- *"Input Min"* set to 1.
- *"Output Min"* set to 1.

The *"Control System"* will pick up these new values automatically.

The above values can differ depending on frame being configured. Ex. Output size can change if X-link outputs are present. What is configured is based on the MAP file being used for that system.

10.4 EQX ROUTER CONFIGURATION

To set up the EQX, click on the "*EQX Router Configuration"* tab. This will provide access to the EQX configuration options, as shown in Figure 10-10. This view is used to set up the EQX Hardware as well as the Source Parameters.

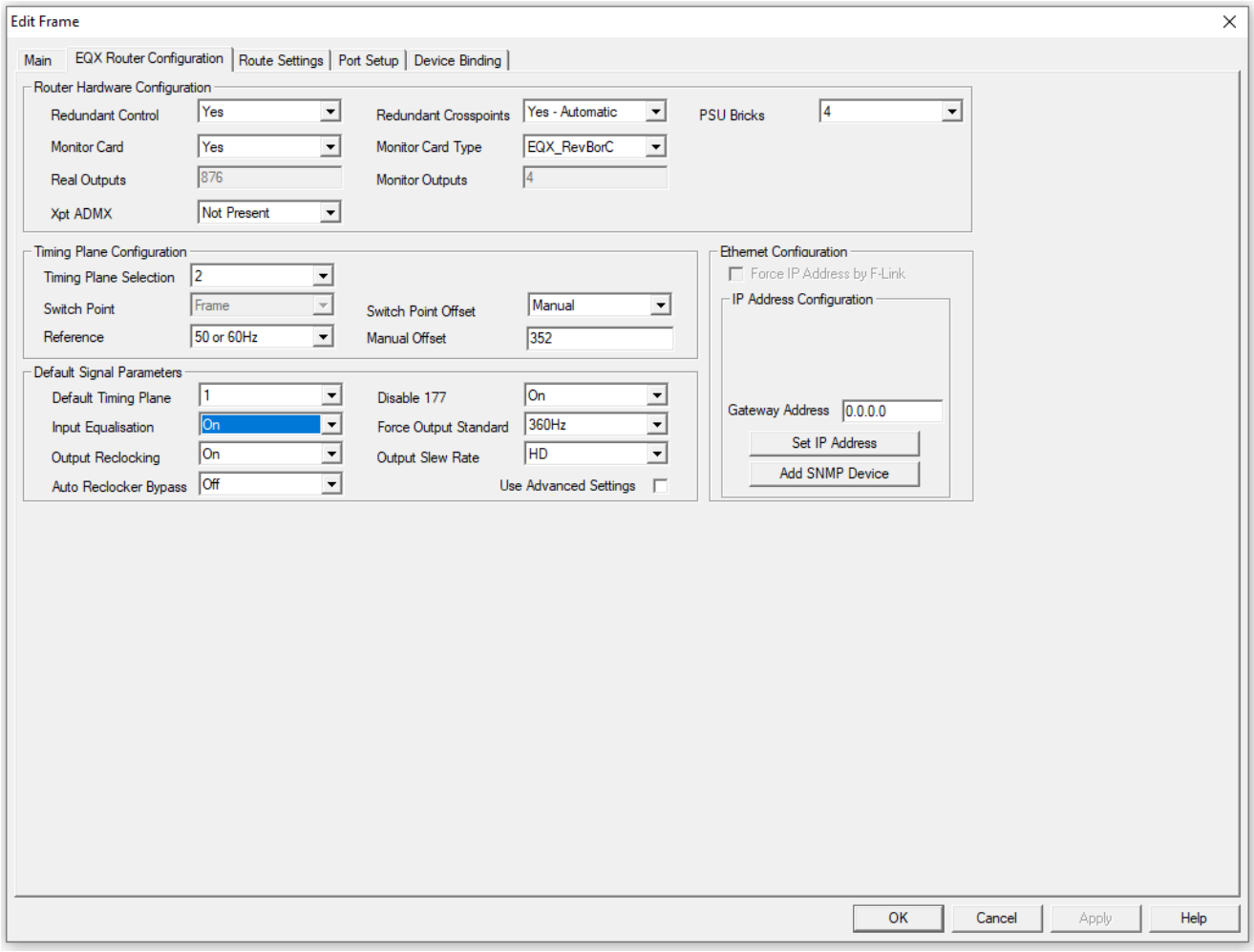

Figure 10-10: EQX Configuration Window (WinSetup Version4.XX)

When opened for the first time this screen will show a default configuration. Use the various drop-down menus to change each or the EQX parameters as required.

The EQX router configuration window is divided into five distinct areas, which are:

a. Router Hardware Configuration
b. Timing Plane Configuration
c. Default Signal Parameters
d. Advanced Signal Parameters
e. Ethernet configuration

10.4.1 Router Hardware Configuration

This section is used to select the hardware options that have been purchased as part of the EQX router. The options are as follows:

Redundant Control: ***Yes***, this confirms that the redundant (second) frame controller module is fitted to the EQX frame.

No, this confirms that only one frame controller module is fitted to the EQX frame.

Redundant Crosspoints: ***No***, this confirms that the redundant crosspoint module is NOT fitted to the EQX frame.

Yes – Manual, this confirms that the redundant crosspoint module is fitted to the EQX frame and that it has been set into manual switch over mode, regardless of the setting made on the redundancy level.

Yes – Automatic, this confirms that the redundant crosspoint module is fitted to the EQX frame and that it has been set into automatic switch over mode. Note that automatic switchover only happens from a main crosspoint to the redundant. The switch back to main crosspoint must always be made manually.

PSU Bricks: ***1 through to 4***, this field has no effect on the current configuration. Please just leave as default max value.

Monitor Card: ***No***, this confirms that the monitor module is not fitted to the EQX Router

Yes, this confirms that the monitor module is fitted to the EQX Router.

Monitor Card Type: **EQX_RevBorC,** this confirms that the monitor modules are RevC with 2 monitoring outputs. Config will know that the last 4 destinations after the last 4 outputs is for monitoring.

EQX10, this applies for EQX10. System will map 2 paths after the last output.

EQX_4MON, this confirms that EQX frame is equipped with special monitor modules which have four monitoring outputs

Xpt ADMX: **Not_Present,** Set to “Not Present” for most of the frames. *The only time this is enabled is on the EQX10 using map 1D.*

Xpt_with_TDM2_(legacy), For older ADMX f/w b95 or earlier select *Xpt with TDM2 (legacy)*

Xpt_with_TDM2/3, For ADMX f/w b156 or newer (with corresponding Xpt f/w 12G b408, 3G b107) select Xpt with TDM2/3.

10.4.2 Timing Plane Configuration

In order for a router to provide a clean SMPTE compliant switch the video sources must be synchronous (correctly timed) with respect to the reference. The crosspoint must also be switched at the correct point within the video signal. However, the switch point for each type of video signal format (for example SD 625, HD 720p and HD 1080i) is different. This means that today's routers must be able to internally generate a number of different timing planes in order to correctly switch multiple video formats. The EQX is able to generate up to four independent timing planes each of which are defined by the values and settings that are selected in the *"Timing Plane Configuration"* window.

The video reference connected for the EQX can be a Bi-level signal, as the EQX will generate the correct timings for SD, HD and 3G video signals from either. A 50Hz or 59.94Hz reference must be used in order to generate 50Hz or 59.94Hz timings. If 50Hz and 59.94Hz video signals are to be switched through the EQX then both a 50Hz and 59.94Hz reference signal must be connected. The EQX has two reference input connectors to accommodate this requirement.

The timing plane configuration options are as follows:

Timing Plane: ***1, 2, 3 or 4***, this selection determines which of the four (4) timing planes is being configured. Any changes to the other parameters within this area will only affect the timing plane that is currently selected.

Note: Each of the timing planes is independent and dedicated to a single video signal format, for example SD 625 @ 50Hz, or HD 720p @ 59.94Hz.

Reference: ***50Hz***, this confirms that the selected timing plane is to use the 50Hz reference signal. This box will be greyed out as this selection is set automatically by the "Switch point Offset".

59.94Hz, this confirms that the selected timing plane is to use the 59.94Hz reference signal. This box will be greyed out as this selection is set automatically by the "Switch point Offset".

Note: The EQX router has two (2) Reference inputs. Both of the reference signals connected to these two inputs must be bi-level 525i59.94 or 625i50. From the reference input(s), the EQX router is able to calculate the correct switch point for up to four independent timing planes. However, a 50Hz and/or 59.94Hz signal must be connected in order for the EQX to generate the correct switch point for a 50Hz and/or 59.94Hz signal.

Switch Point: ***Frame***, this sets the switch point for the signal on the selected timing plane to be frame based. This box will be greyed out as this selection is set automatically by the "Switch point Offset".

Field, this sets the switch point for the signal on the selected timing plane to be field based. This box will be greyed out as this selection is set automatically by the "Switch point Offset".

Switch Point Offset: Manual / 626 / 525 / 1080i 50Hz / 1080i 59.94Hz / 720p 50Hz or 720p 59.94Hz, this sets the switch point offset for the signal on the selected timing plane. Selecting '*Manual'* allows the switch point offset to be manually adjusted.

Manual Offset: Enter a numeric value that represents the required switch point offset for the selected timing plane. The value represents micro-seconds and can be used to compensate for system timing issues. This box is only available when the drop-down list for '*Switch Point Offset'* is set to **manual**.

10.4.3 Default Signal Parameters

This section is used to select the default settings for each timing plane for the additional features provided by the EQX router, such as Reclocking, ASI mode etc.:

Default Timing Plane: ***1, 2, 3 or 4***, this defines which timing plane is used as the default. Unless otherwise specified all the sources will use the parameters that are defined by the default timing plane.

Input Equalization: ***ON***, this turns on the input equalization circuitry for each source.

Off, this turns off the input equalization circuitry for each source.

Output Reclocking: ***ON***, this turns on the output reclocking circuitry for each source.

Off, this turns off the output reclocking circuitry for each source.

Auto Reclocker Bypass: ***ON***, this turns on the auto reclocker bypass circuitry for each source. This setting will automatically bypass the output Reclockers if the Reclockers are unable to lock correctly to the signal.

Off, this turns off the auto reclocker bypass circuitry for each source.

Note: The auto reclocker bypass circuit will attempt to reclock the incoming signal, if it fails to reclock the signal, it will automatically switch the reclocker into bypass mode and bypass the reclocking circuit.

Disable 177 (ASI): ***ON***, this turns on an optional mode within the EQX that prevents the Reclockers from incorrectly identifying the 270Mb/s ASI signal as a 177Mb/s signal.

Off, this turns off this mode.

Force Output Standard: ***143 / 177 / 270 / 360 / 540 or 1485***, this forces the reclocker to lock to the signal format that is selected. It is recommended to be set to 270Mb/s when routing ASI signal.

Off, this turns this feature off – recommended default position when not routing ASI signals.

Note: If the reclocker is unable to lock the source to the selected format then an error message will be generated indicating that the wrong signal type has been switched to this destination. The signal will still pass through but will not be locked.

Output Slew Rate: ***SD***, this sets the slew rate to the slower SD setting.

HD, this sets the slew rate to the faster HD setting.

10.4.4 Advanced Signal Parameters

The advanced signal parameters are used to define the '**Destination Parameters**' (exception rules) and are used to over-rule the Source Parameters when required. This is achieved by defining 'Destination Parameters'. This may be necessary, for example, if the device that is directly fed from destination 576 requires the source to always be reclocked, then output 576 should be configured to reclock the source regardless of the parameters that have been defined by the source.

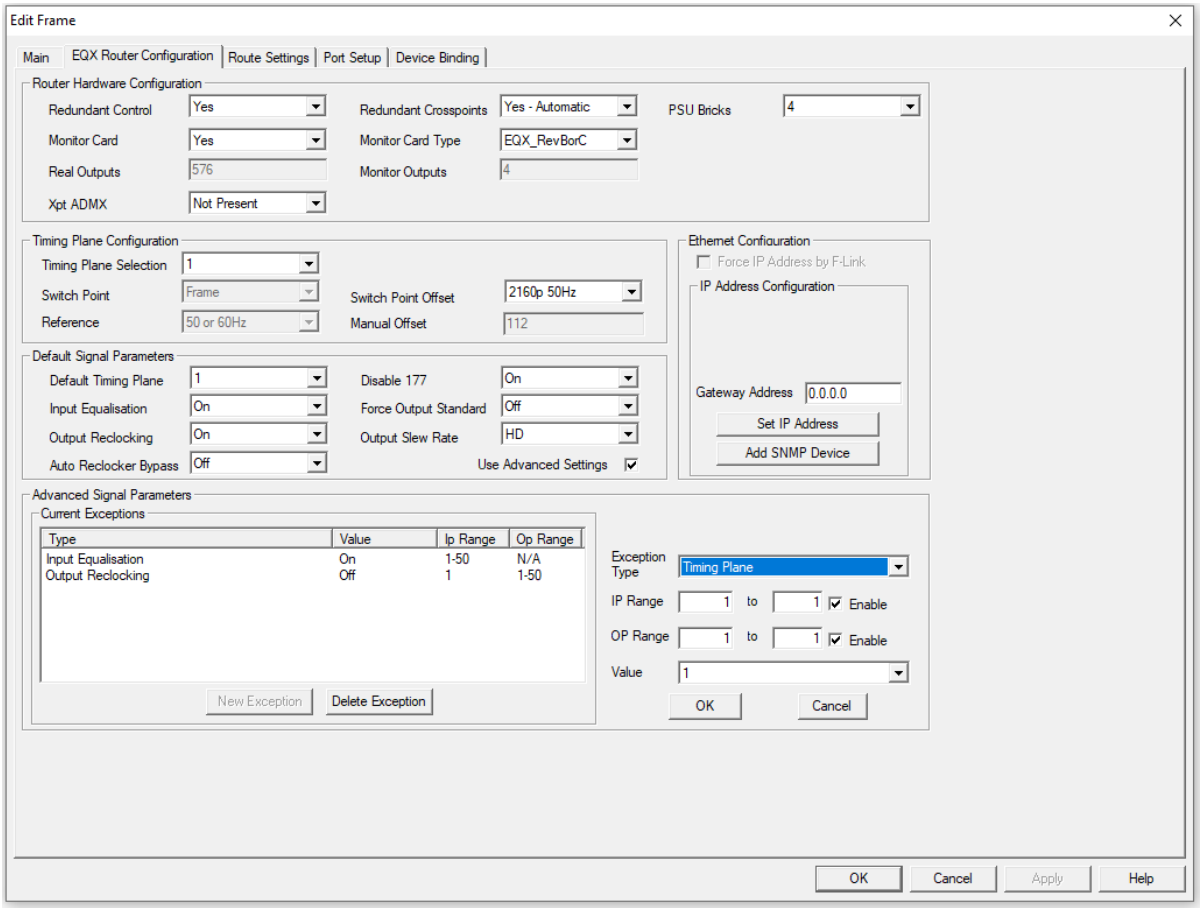

Figure 10-11: EQX Configuration Window – Showing the Advanced Signal Parameters

Note: To gain access to the Advanced Signal Parameters check the box in the Default Timing Plane window called *'Use Advanced Settings'*.

The primary role of the advanced settings is to allow the Source Parameters to be over-ruled by defining a new parameter for a single or range of destinations. However, the advanced setting also allows the Source Parameters to be re-defined on a temporary or permanent base. The change to a Source Parameter can be applied to a single source or range of Sources.

There are a number of exception types:

- ***Timing Plane***
- ***Input Equalization***
- ***Output Reclocking***
- ***Auto Reclocker Bypass***
- ***Disable 177 Mode***
- ***Force Output Standard***
- ***Output Slew Rate***
- ***Force Fixed Output Timing Plane***
- ***Force Fixed Output Reclocking***
- ***Force Fixed Output Auto Bypass***
- ***Force Fixed Output Disable 177***
- ***Force Fixed Output Standard***
- ***Force Fixed Output Slew Rate***
- ***Enable High Drive***
- ***Monitor Card Type***
- ***Frame Monitor Outputs***
- ***Input XLINK DA EQ Gain***
- ***Monitoring Take Options***
- ***Enable EX2 Redundancy Mode***
- ***IO Card Validation On Take***
- ***IP Addr Frame Type***
- ***OP Mux Swing***

The operational functionality of the features listed above are the same as described in section 10.4.2. The drop down menu labeled '*Values'* is used in conjunction with the above features.

10.4.5 Creating an Exception Rule

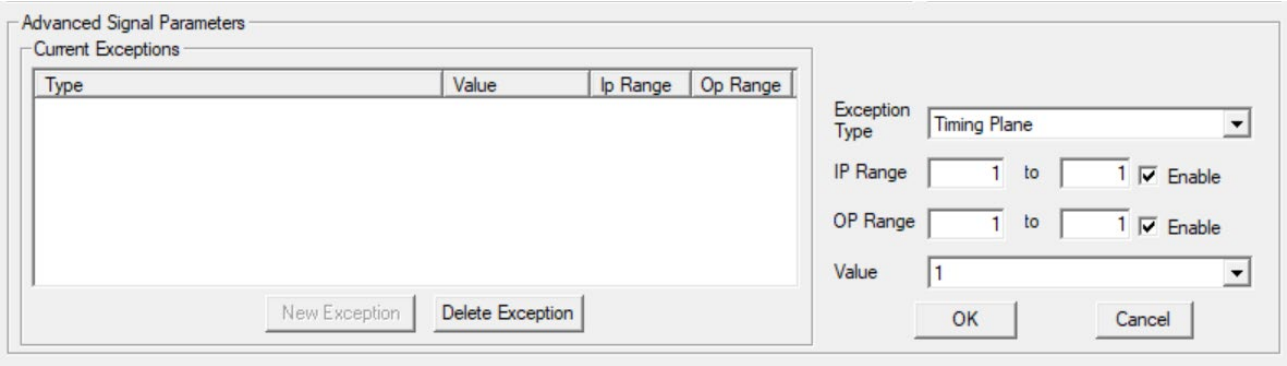

Figure 10-12: Current Exceptions Window

Step 1 – Click the *"New Exception"* button.

Step 2 – Identify if the exception rule needs to be applied to the input and/or output of the EQX router. Enable the relevant section by clicking the *"Enable"* box. The Input Equalization rule can only be applied to an input.

Step 3 – Set the range of inputs and/or outputs that the exception rule is to be applied to, for example 1 to 1 for a single I/O or 24 to 67 for multiple I/O's.

Step 4 – Select the *"Exception type"* from the drop-down list.

Step 5 – Select the *"Value"* from the drop-down list.

Step 6 – Click OK to return to the main menu screen.

Consider the following:

- **If the exception rule is applied to a Source (input) then this change will be carried through to every Destination (output) that the Source is switched to.**
- **If the exception rule is applied to a Destination (output) then this change will only affect that Destination.**

Example Exception Rules

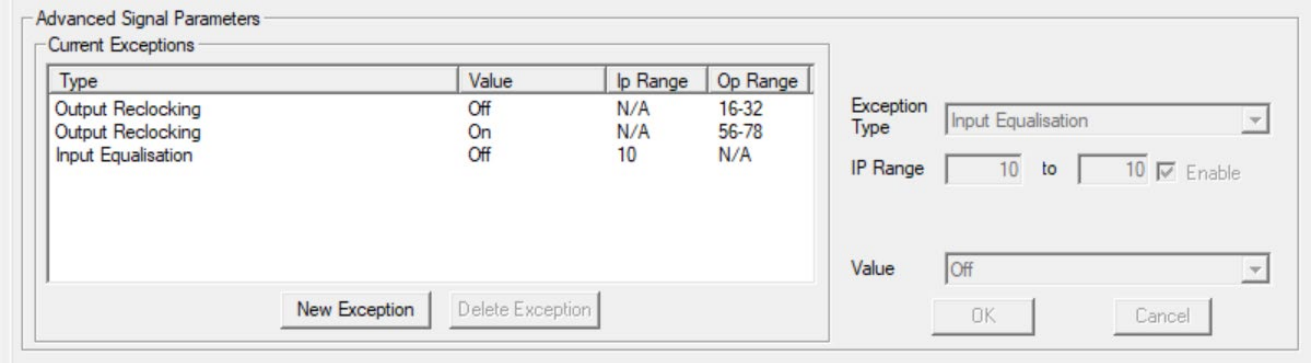

Figure 10-13: Exception Rules

Figure 10-13 provides examples of three exceptions:

- The output reclockers are turned off for outputs 16 through to 32.
- The output reclockers are turned on for outputs 56 through to 78.
- The input equalization circuit is turned off for input 10.

10.4.6 Ethernet Configuration

Ethernet configuration is used to define the Gateway address and the IP address for all the modules in the frame. The subnet of the IP addresses in use for this section must match what is assigned to the EQX-FC D subnet.

The following steps will explain how to set the IP addresses.

Step1 -The first step is to define the gateway address as shown in Figure 10-14. Gateway values must match D subnet.

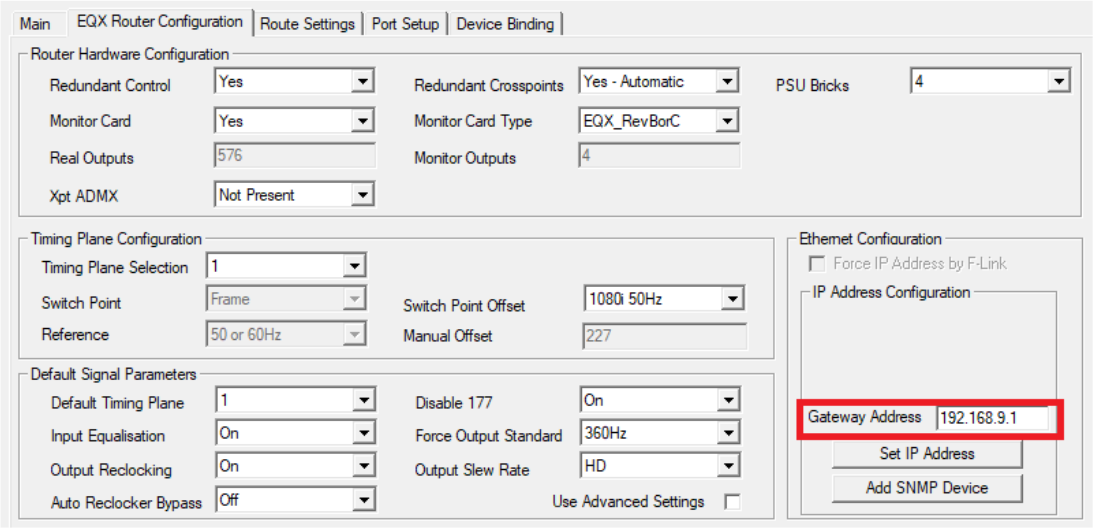

Figure 10-14: Ethernet Configuration Step 1

Step2 -Click on the “Set IP Address” button, a new window “Set IP Address” will open

Step3 -For Frame set “1” and set “1” for “From” and set “74” for “To”

Step4 -Set the base IP address, this IP address will be the IP address of the first Output module.

Step5 -Click on ‘Set’ button, all the IP addresses will be set automatically

Step6 -Press the ‘OK’ button

Step7 - The "Add SNMP Device" button is used to allow an external device to be managed by the FC agent in VLPRO. This is optional. Refer to AN88 - EQXFC-4Net Configurations 1v2.pdf to set up external SNMP device.

Figure 10-15 shows the 'Set IP Address' windows.

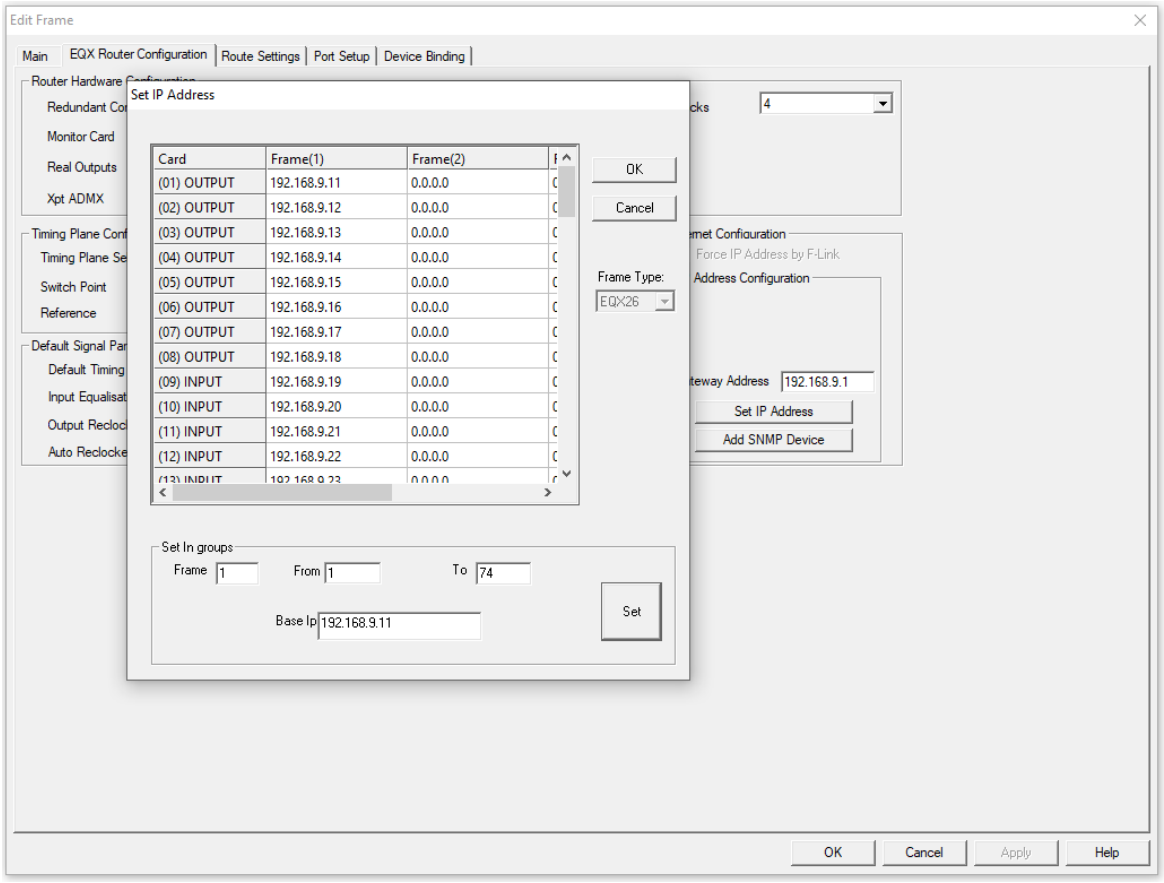

Figure 10-15: Set IP Address Window

Note: The IP addresses of the Frame Controllers have to be set manually, while the IP addresses of the other modules are set automatically based on the range specified in the WinSetup.

Slot	Module	Range	IP addresses
1	Output	1-18	192.168.9.11
2	Output	19-36	192.168.9.12
3	Output	37-54	192.168.9.13
4	Output	55-72	192.168.9.14
5	Output	73-90	192.168.9.15
6	Output	91-108	192.168.9.16
7	Output	109-126	192.168.9.17
8	Output	127-144	192.168.9.18
9	Input	18-Jan	192.168.9.19
10	Input	19-36	192.168.9.20
11	Input	37-54	192.168.9.21
12	Input	55-72	192.168.9.22
13	Input	73-90	192.168.9.23
14	Input	91-108	192.168.9.24

Slot	Module	Range	IP addresses
15	Input	109-126	192.168.9.25
16	Input	127-144	192.168.9.26
17	Input	145-162	192.168.9.27
18	Input	163-180	192.168.9.28
19	Input	181-198	192.168.9.29
20	Input	199-216	192.168.9.30
21	Input	217-234	192.168.9.31
22	Input	235-252	192.168.9.32
23	Input	253-270	192.168.9.33
24	Input	271-288	192.168.9.34
25	Output	145-162	192.168.9.35
26	Output	163-180	192.168.9.36
27	Output	181-198	192.168.9.37
28	Output	199-216	192.168.9.38
29	Output	217-234	192.168.9.39
30	Output	235-252	192.168.9.40
31	Output	253-270	192.168.9.41
32	Output	271-288	192.168.9.42
33	Output	289-306	192.168.9.43
34	Output	307-324	192.168.9.44
35	Output	325-342	192.168.9.45
36	Output	343-360	192.168.9.46
37	Output	361-378	192.168.9.47
38	Output	379-396	192.168.9.48
39	Output	397-414	192.168.9.49
40	Output	415-432	192.168.9.50
41	Input	289-306	192.168.9.51
42	Input	307-324	192.168.9.52
43	Input	325-342	192.168.9.53
44	Input	343-360	192.168.9.54
45	Input	361-378	192.168.9.55
46	Input	379-396	192.168.9.56
47	Input	397-414	192.168.9.57
48	Input	415-432	192.168.9.58
49	Input	433-450	192.168.9.59
50	Input	451-468	192.168.9.60
51	Input	469-486	192.168.9.61
52	Input	487-504	192.168.9.62
53	Input	505-522	192.168.9.63
54	Input	523-540	192.168.9.64
55	Input	541-558	192.168.9.65
56	Input	559-576	192.168.9.66
57	Output	433-450	192.168.9.67
58	Output	451-468	192.168.9.68
59	Output	469-486	192.168.9.69
60	Output	487-504	192.168.9.70
61	Output	505-522	192.168.9.71
62	Output	523-540	192.168.9.72
63	Output	541-558	192.168.9.73
64	Output	559-576	192.168.9.74
65	XPT	Top	192.168.9.75
66	XPT	Top	192.168.9.76
67	XPT	Redundant	192.168.9.77

Slot	Module	Range	IP addresses
68	XPT	Redundant	192.168.9.78
69	XPT	Bottom	192.168.9.79
70	XPT	Bottom	192.168.9.80
71	Monitor	LHS	192.168.9.81
72	Monitor	RHS	192.168.9.82
73	FC	Upper	192.168.9.83
74	FC	Lower	192.168.9.84

Table 10-1: EQX Modules IP Addresses

Note: The IP address for the FC fields must be correct. This value will be auto assigned to all the cards as the SNMP agent IP.

Note: For EQX16 or EQX10 frames, slots that do not exist can be left as 0.0.0.0 to save IP addresses. Each slot can be assigned manually, or ranges can be specified for the IO cards first, followed by the crosspoint section later. This allows you to leave IO slots that do not exist as 0.0.0.0.

10.5 ROUTE SETTINGS (MAP FILE SELECTION)

To configure EQX route mode and type of output modules, click on “Route Settings” tab. Route Settings window is shown in Figure 10-16, which provides a dropdown menu for Map selection and Set Output Priority configuration.

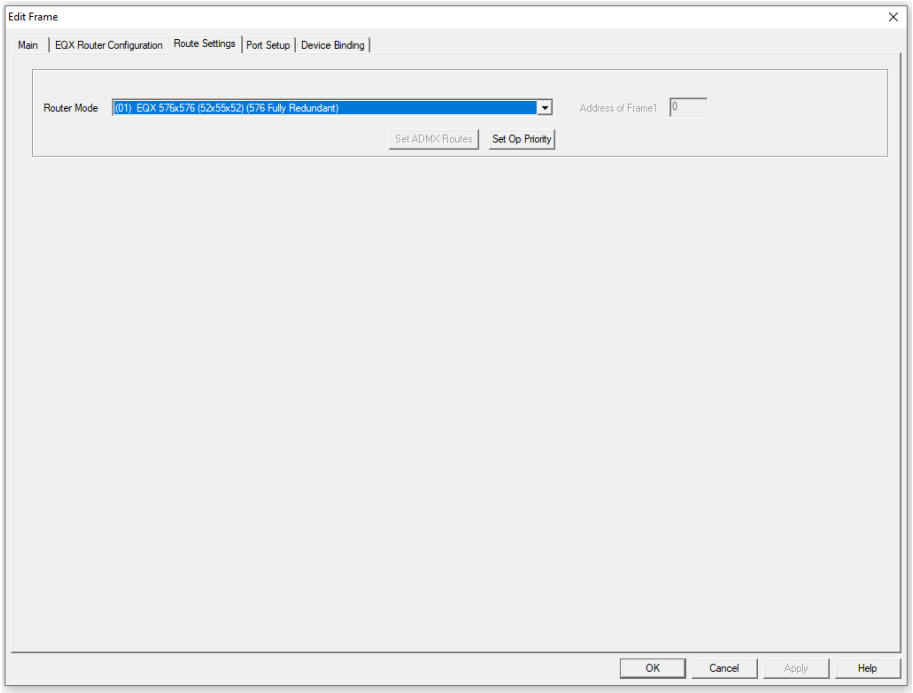

Figure 10-16: Route Settings Window

10.5.1 Router Mode

The Router Mode drop-down menu provides a list of Map files which allows the EQX to operate correctly based on the hardware and system requirements. It is important that the frame is operating on a map file that matches the crosspoint hardware present. The table below displays how different crosspoint combinations can affect the router matrix size while operating in the same chassis.

Map File	Frame Type	Matrix Size	Config File Size	Number of Frames	Input Card	Output Card	XLINK O/P	XLINK ORDER	Top XPT	Middle XPT	Bottom XPT
Map 00	EQX26 +XLINK2	576x576	576x576	1	18	18	0	N/A	52	52	52
Map 01		576x576	576x576	1	18	18	0	N/A	52	55	52
Map 02		576x1152	576x1728	1	18	18 or DD	18	Sequential	55	55	55
Map 03		576x1152	576x1728	1	18	18	18	Sequential	55	52	55
Map 1b		576X864	576X1728	1	18	18	18	SEQ	55	52	52
Map 04	EQX16 +XLINK3	288x1152	288x1728	1	18	18	27	Sequential	55	22	22
Map 06		288x1152	288x1728	1	18	18	27	Sequential	55	55	22
Map 07		288x864	288x1152	1	18	18	18	Sequential	22	22	22
Map 08		288x864	288x1152	1	18	18	18	Mixed	22	55	22
Map 09		288x576	288x576	1	18	18	9	Mixed	22	22	22
Map 1a	EQX10/EQX UHD	180X660	180X1440	1	18	18	15	SEQ	EQX10	EQX10	EQX10
Map 1d	EQX10/EQX UHD	180X660	180X1440	1	18	18	13 Video + 2 Audio	SEQ	ADMX	ADMX	EQX10

Legend	
55	576x576
52	576x288
22	288x288
EQX10	180x180
ADMX	180x180 + 64 XLINK

*INQUIRE: Please inquire on the actual mapping for these setups

Table 10-2: Maps for Router Mode

10.5.2 Set Output Priority

Output priority is used when the EQX needs to decide on a tie-break event for the redundant path. An example when priority settings are required is when a 576x288 square crosspoint is present in the middle slot of a 26RU system. The 288 outputs are shared between the top destinations 1-288 and bottom destinations 289-576.

Output priority works like such.

DST 1 and 289 share the redundant path. Assuming DST 1 is assigned the output priority.

Scenario 1:

- DST 1 fails to redundant path first. DST 1 will recover.
- While DST1 is still on backup path, DST289 fails afterwards. DST1 retains redundancy, DST289 remains as a failed path.

Scenario 2:

- DST 289 fails to redundant path first. DST 289 will recover.
- While DST289 is still on backup path, DST1 fails afterwards. DST289 will lose its signal and appear as a failed path. DST1 will overtake the redundant path and recover its signal.

10.5.3 Set ADMX Routes

"Set ADMX Routes" button should be greyed out for EQX26 and EQX16 systems. This button is only used for EQX10 frames utilizing onboard ADMX modules.

For instructions on setting this up, please refer to the EQX10/EQXUHD manual.

10.6 PORT SETUP

EQX has several communications ports that require additional setup. This section is used to define all of the interfaces that will be connected to EQX. From Port Setup tab, ports can be added for Ethernet or serial control and Q-Link panel hosting.

The EQX itself only has 3 configurable port types

- Serial Ports x5
- Q-Link Ports x4
- TCP Ports x4

10.6.1 Platform

For the platform, leave it as EQX_FC. The only time it is switched to EQX_SC2000 is when the config is being sent to an EQX_SC2000 device. Otherwise, when sending to an EQX-FC, leave it matching the hardware.

10.6.2 Serial Port

The serial port is an interface that is defined to provide external automation control of EQX. The interface is defined as a *Serial#* interface using the *Quartz* protocol. The format of the serial protocol is also defined in this dialog using the options that are provided for *Baud Rate, Parity, Data bits, Stop bits* and *Standard (RS232 or RS422).* A properly configured serial port is shown in Figure 10-17 below.

There are 5 serial ports controls on each FC, 4 are shared. Serial 1 to 4 refers to the 4 DB9 connections on the FC rear plates; 2 on top and 2 on bottom. Serial 5 is the DB9 on the front of the hardware itself.

Click "Add" button. In the window for the General settings, Protocol is set to Quartz. Configure the Baud rate as needed. Parity, Data bits, Stop bits, etc to match requirements of the serial connection.

In Advanced, all are set as default. Once each hardware port is created, it will disappear from the list of interfaces.

Serial 5 defaults to 115200 baud rate in latest firmware.

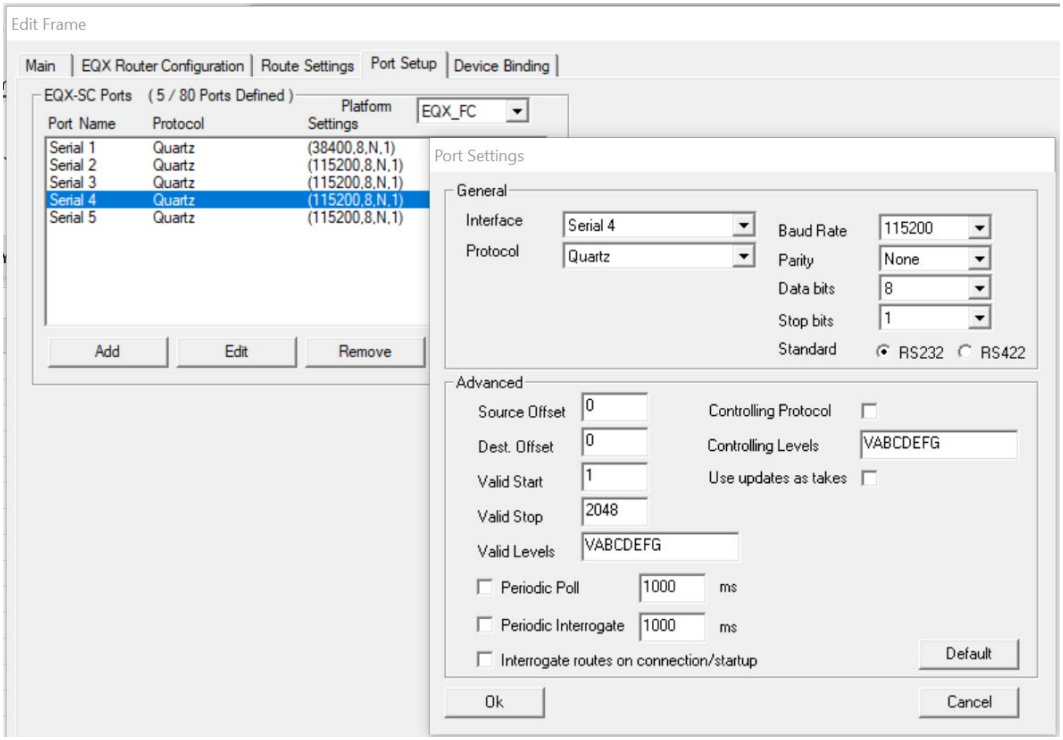

Figure 10-17: Serial Port Configuration

10.6.3 Control Panel Q-Link Port

The control panel Q-Link port is an interface that is defined to allow all properly equipped control panels to connect to EQX via Q-Link. The Q-Link port can be defined as a port to host panels using Q-Link. The interface is defined as a *QLINK#* interface using the *Qlink (Hosted Panels)* protocol. A properly configured setting is shown in Figure 10-18 below.

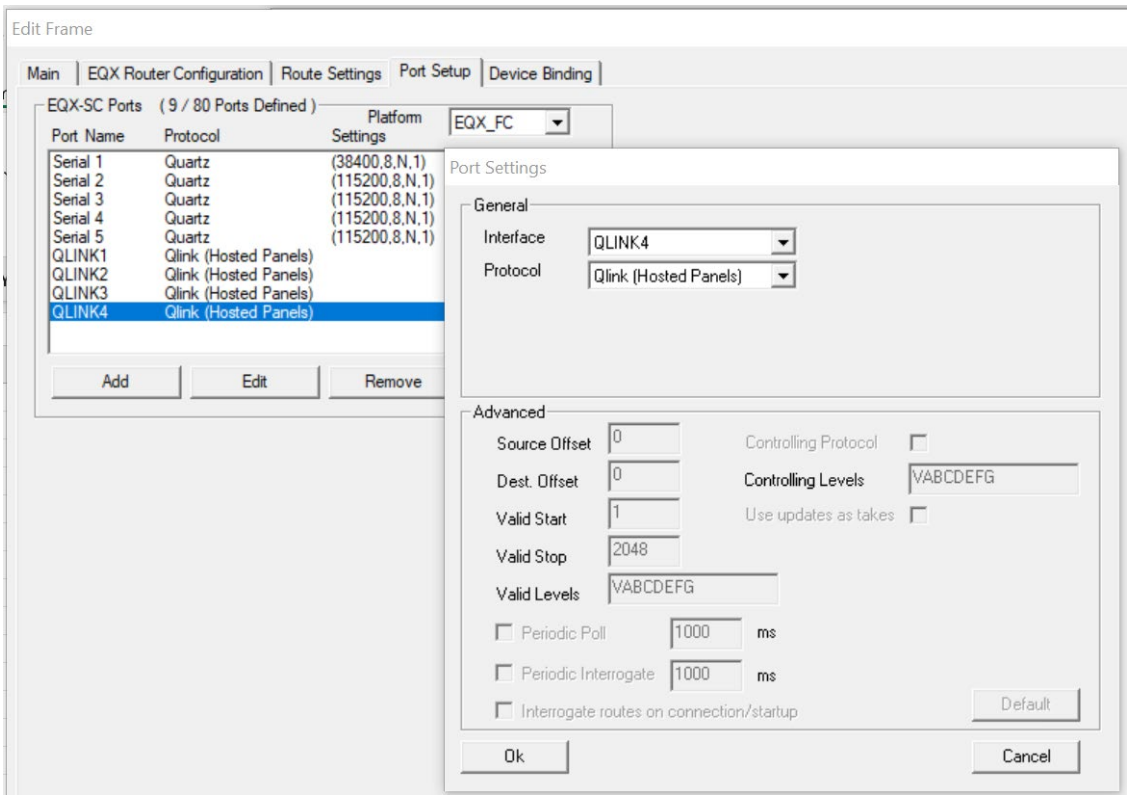

Figure 10-18: Q-Link Port Configuration

10.6.4 TCP Port

The TCP Port is defined to provide access to the EQX so that it can be controlled via Ethernet using the Quartz protocol. Four predefined ports can be opened: 4000, 4001, 4002, and 4003. Current RPC4net firmware B319 also has 4x 3737 opened by default. This allows up to 8 instances if including the 4 configurable ones.

Note: Available TCP ports are 4000, 4001, 4002 and 4003. For redundant Magnum to work properly, Magnum interface port has to be defined twice. Ex. 2x 4000 and 2x 4001.

Note: The total number of defined TCP ports should not exceed 4. The same ports can be defined more than once (e.g. 4000, 4000, 4001, 4001).

Figure 10-19 below is a screenshot of adding the TCP ports in Winsetup.

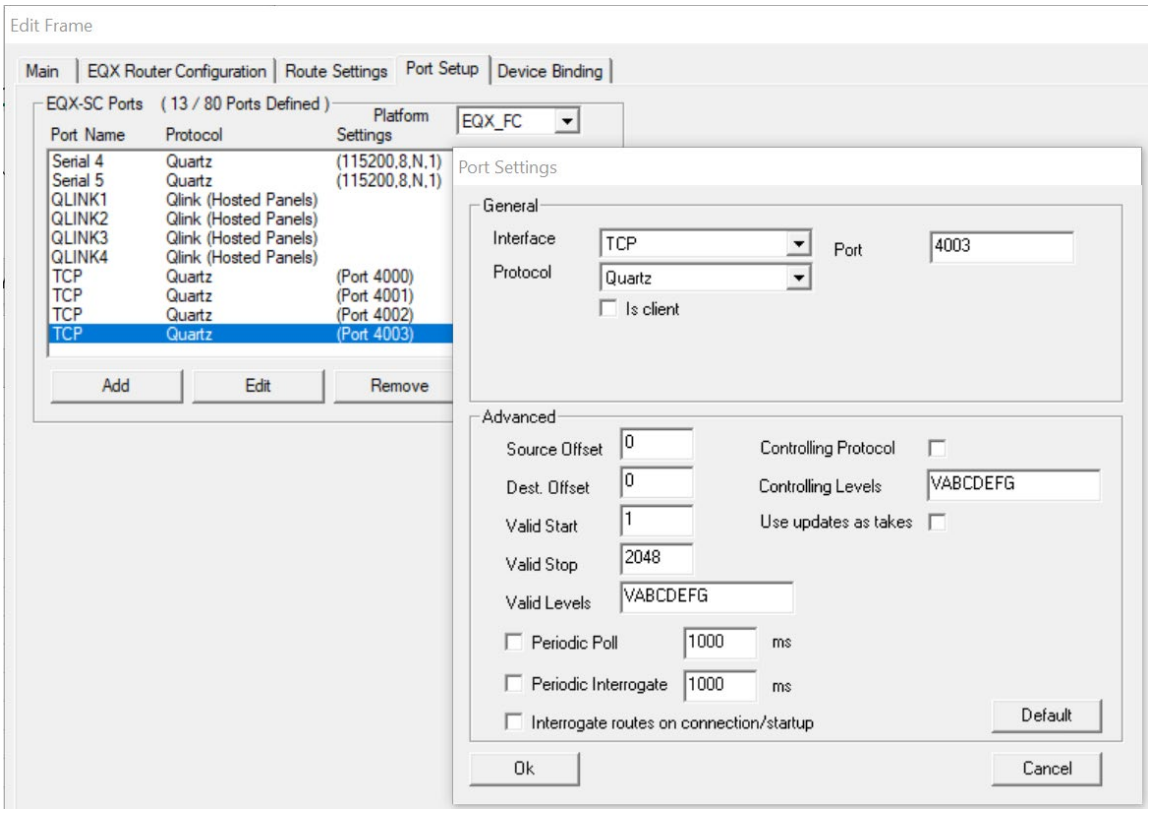

Figure 10-19: TCP Port Configuration

10.6.5 UDP Port

The EQX router system does not natively support UDP ports. Ethernet control panels require Magnum to host the panels.

10.7 DEVICE BINDING

This tab is not used.

10.8 SOURCES

The next stage is to create the *"Source table"*. The source table defines the number and names of the sources connected to the EQX router. Note that the sources were defined in the "Edit Frame" page. There are two levels here. The main set of video channels are on VIDEO level and 6 on the redundant level.

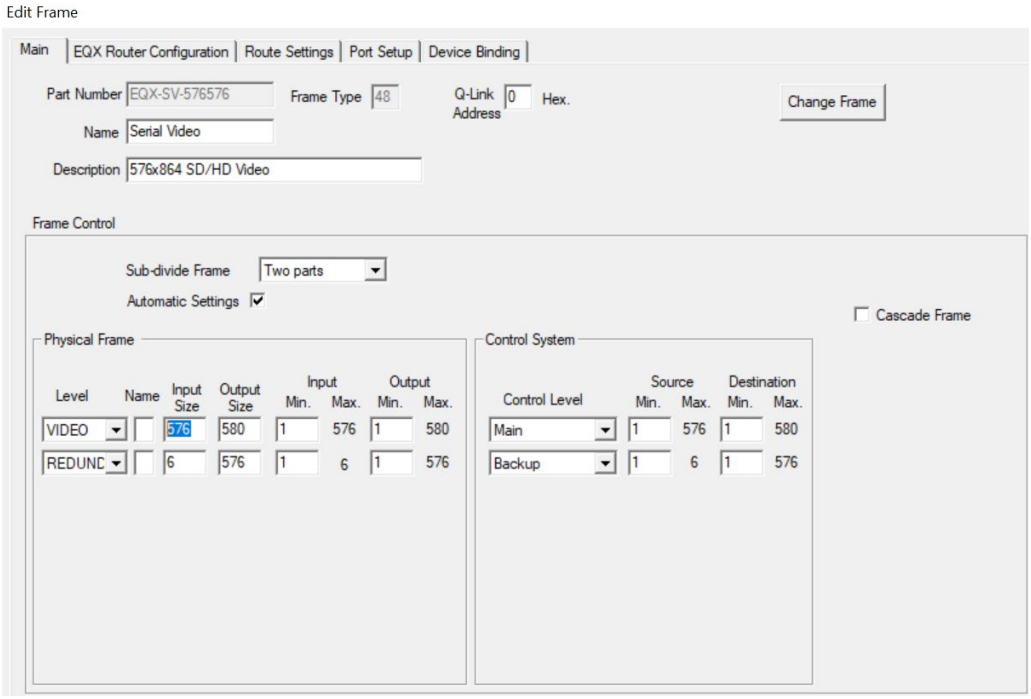

Figure 10-20: Two Levels of Sources

Once the range is allocated, return back to the main window screen.

To enter the “Source Definition” window click on the *“Sources”* button from the main menu. Click on the *“Add”* button and first define the main sources by enabling the “Main” check box and add the relevant number of sources to the ‘Source Definition’ table. By default, it usually populates "Number to create" with the max defined value. The software will prompt the use of default names - SRC-1 to SRC-n. The names can be edited later.

Once the main sources are defined, add the redundant sources by enabling the Backup check box and disabling the Main check box, systems with redundancy always have 6 backup sources. Although the 6 sources on redundant path appears as sources 1-6, the placement in the table is actually the last Video source + this value.

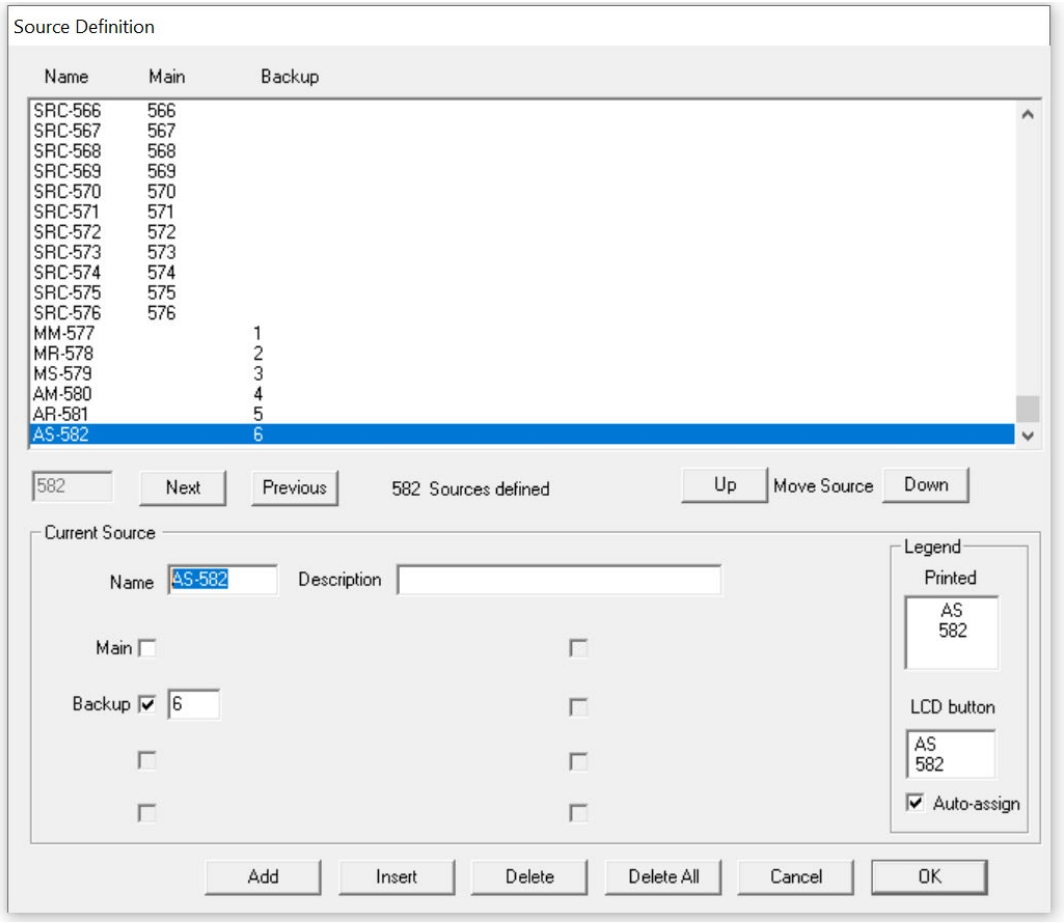

Figure 10-21: Source Definition Window

If you want to edit a name, select the required row from the list of names in the upper part of the screen. The selection will be confirmed by a blue highlight behind the text. The details, such as the name and description of the selection will appear in the lower part of the screen. From here you can edit the name and decide which signal levels that name will control.

The *'Legend'* area allows the printed or electronic (LCD) labels for the Control Panel buttons to be defined. Clicking the *'Auto-assign'* button initiates the software to automatically create the text for the button labels from the names used in the Source list. These labels can be overruled at any time by simply typing a new name directly into the relevant *"Legend"* box.

The last six Sources that are shown in the source list relate to the operation of the redundant crosspoint. The source routed on this level to a particular destination controls its crosspoint redundancy. The meaning of the values is as follows:

1) **Manual Main:** Main crosspoint selected
2) **Manual Redundant:** Redundant crosspoint selected
3) **Manual Shadow:** MS- Is an RnD debug tool. Please do not use unless required for special mapping
4) **Auto Main**: Main crosspoint selected, with auto switchover to redundant in the case of route failure detection.
5) **Auto Redundant**: Redundant crosspoint selected. There is no automatic switch back to main. AR is used to indicate that the path has failed to redundant path while in Automatic mode.
6) **Auto Shadow**: The redundant crosspoint will follow the main crosspoint settings, allowing faster changeover in the case of a failure.

Click OK to return to the main menu.

10.9 DESTINATIONS

Head over to "EDIT FRAME" page and define the range of outputs present in the map file. Output size should encompass the full range of the router including both BNC and Xlink outputs. Note that each output channel gets two signals Main and Redundant hence more outputs are defined on the redundant path versus on the sources path. Also add 4 more destinations in a 16RU and 26RU, and 2 for 10RU systems to account for the monitor path.

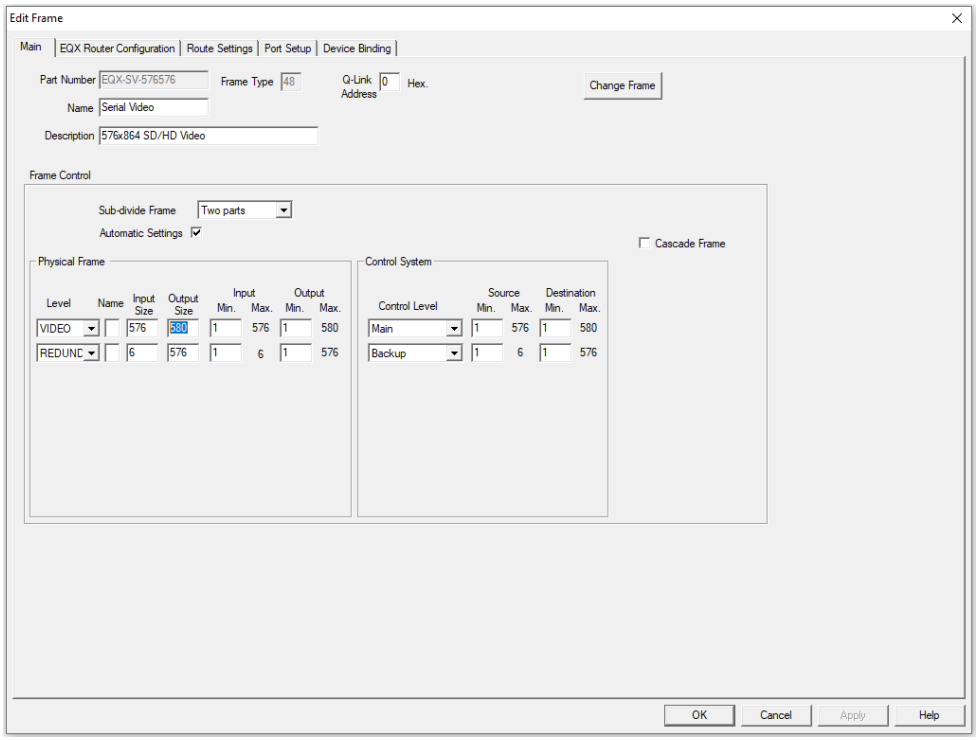

Figure 10-22: Two Levels of Sources

Once the ranges are defined, the main menu will allow access into the 'Destination Definition' window where the 'Destination table' can be created. The destination table defines the number and names of the destinations connected to the EQX router. To enter the 'Destination Definition' window, click on the 'Destination' button from the main menu.

Click on the 'Add' button and make sure both Main and backup check boxes are enabled, add the relevant number of destinations to the 'Destination Definition' table. The software will prompt you to use default names - DST-1 to DST-n. The names can be edited later.

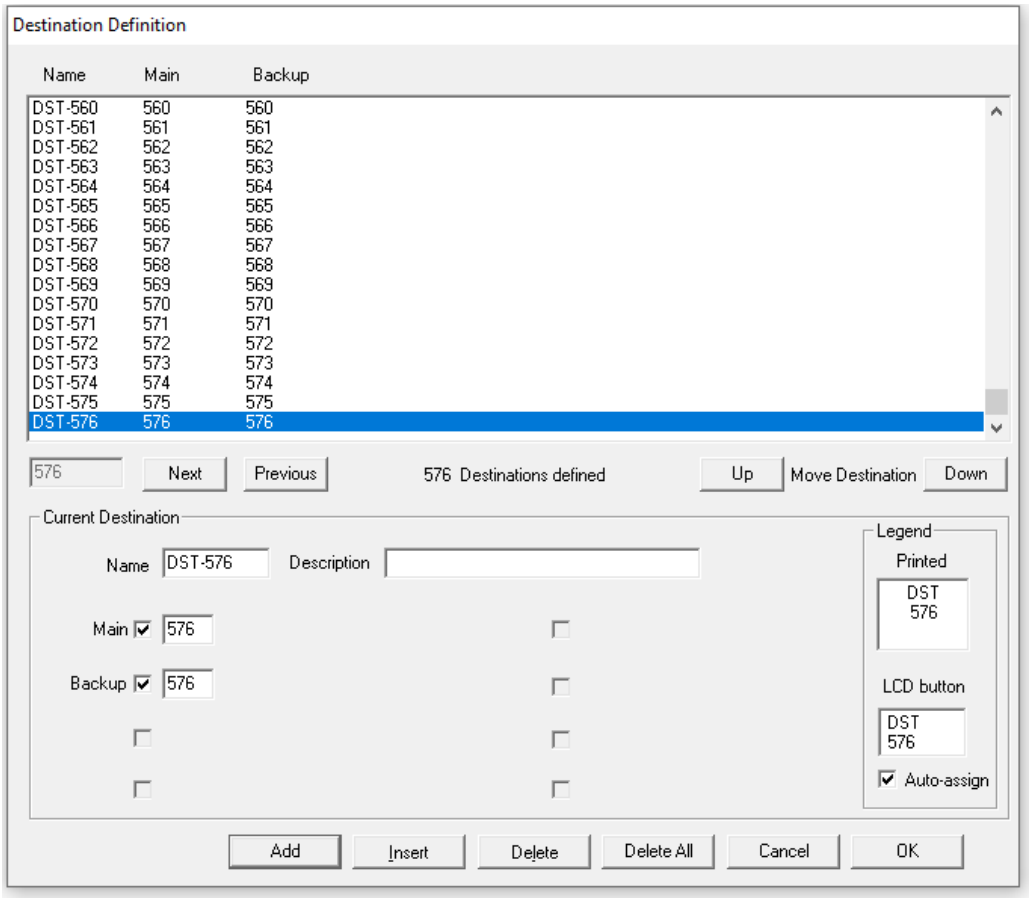

Figure 10-23: Destination Definition Window

If XLINK destinations are present. Click 'Add' again and this time only have Main box checked. Add in the rest of the destinations for the router. If the frame was configured for 1728 outputs, you need to add in 1152+4, since Xlinks on a 26RU frame is indexed as 1153-1728. The last four destinations are for monitoring and they have to be defined in Main level only.

10.10 CONTROL PANELS

Enter the 'Panels' dialog and select the new button. This will show all Quartz panels listed by part number. Select the part number that matches the part number on the panel's serial number label. A new dialog will appear displaying a graphic of the panel. Figure 10-24 shows a CP-1000E panel type.

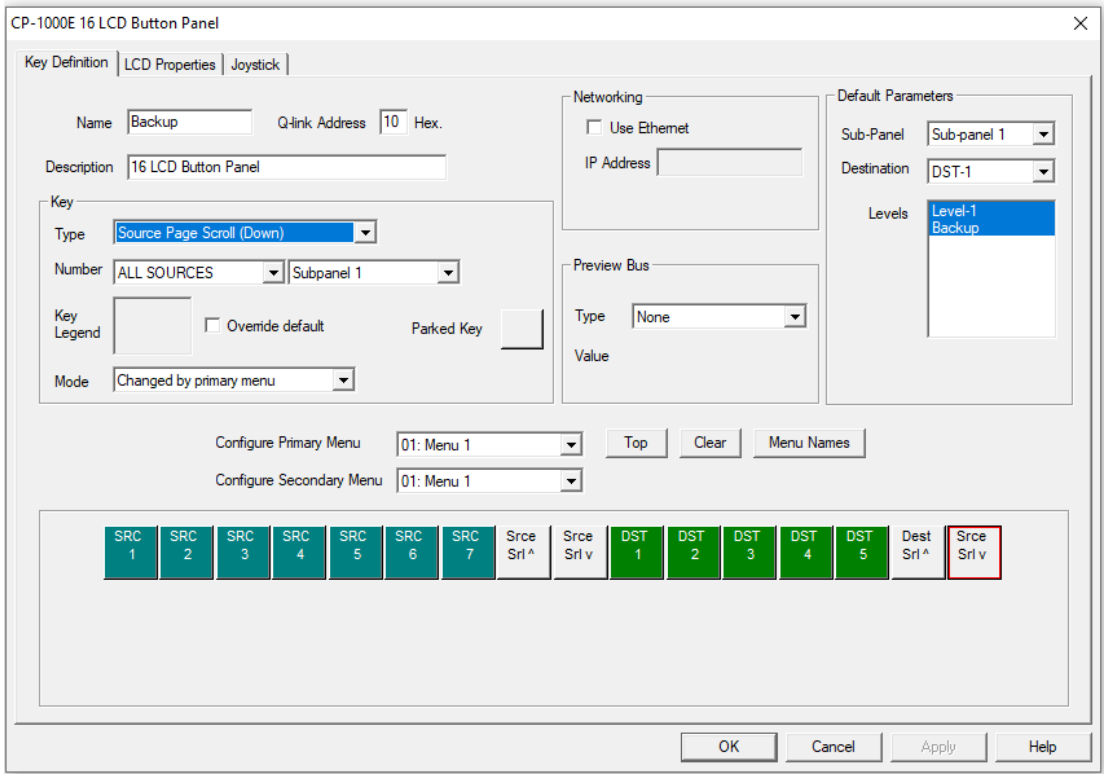

Figure 10-24: Key Definition Window

Each button can be programmed by selecting the button and then editing the functions in the *Key* section of the dialog. It is also recommended that each panel should be given a name for future identification. It is common practice for the name to reflect the panel's location, for example "Backup".

The Q-Link address will be allocated automatically by the program but can be edited and has to match the physical Q-Link address of the panel. The default parameters control how the panel will function at power up. In this example the panel will always control DST-1 to start. Once setup, add any other panels that the system will need.

Note: Each panel will be automatically allocated a Q-Link address (which can be changed).
Note: Ensure that the physical Q-Link address switch on the Control Panel matches the Q-Link address set in your configuration.

10.11 SPECIAL INTERFACES

The system will be connected to an EMC/QMC, please refer to EMC/QMC manual for configuring Special interfaces.

10.12 COMMUNICATION WINDOW

Use the Communication Window to check for correct setup and working communication between the PC and the router. Click on “Options” then communications. Set target 1 & 2 IP addresses to the two EQX-FC in the system. Set port value to 25 for initial setup.

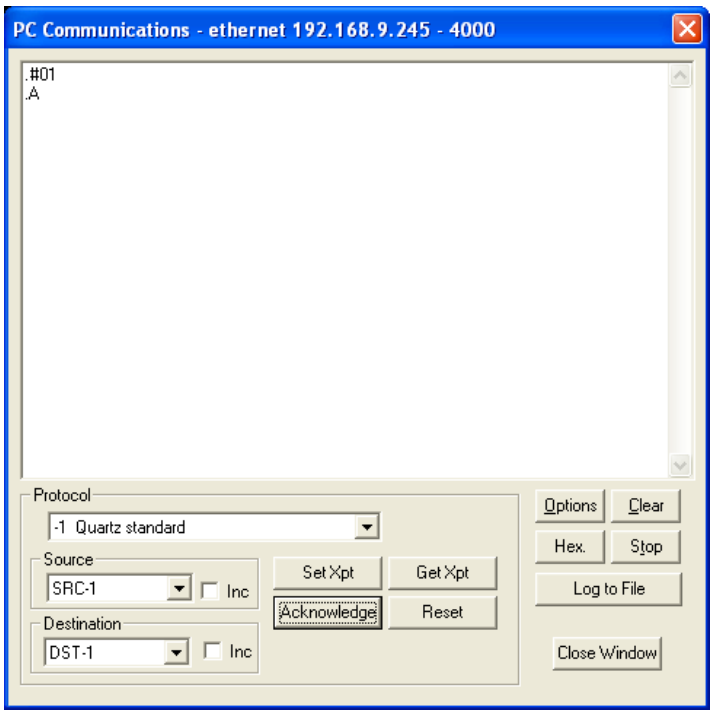

Figure 10-25: COM1 Window

Click the ‘Comm Window’ tab and the window shown in Figure 10-25 will open automatically. From the Protocol drop down list select *-1 Quartz Standard*. Click the *“Acknowledge”* button and WinSetup will send “.#01”. Look for a response to the send command in the window. This response should be “.A”. If a response is not seen, check the settings under the options button. A response confirms the communication is OK between the PC and the Router.

Note: Use the Comm Window to check the communication between the router and the PC.

This comms window can also be used as a real time tool for sending route commands in Quartz to a device supporting quartz control.

10.13 DOWNLOAD

Once the communication between the router and PC is established via Ethernet, close the Comms.

Before a download could occur, update the directory paths required by Winsetup for temporary files. Click on “Options”, then “General”. Update the first 4 fields to match the location where you executed the winsetup application from. Click OK when completed.

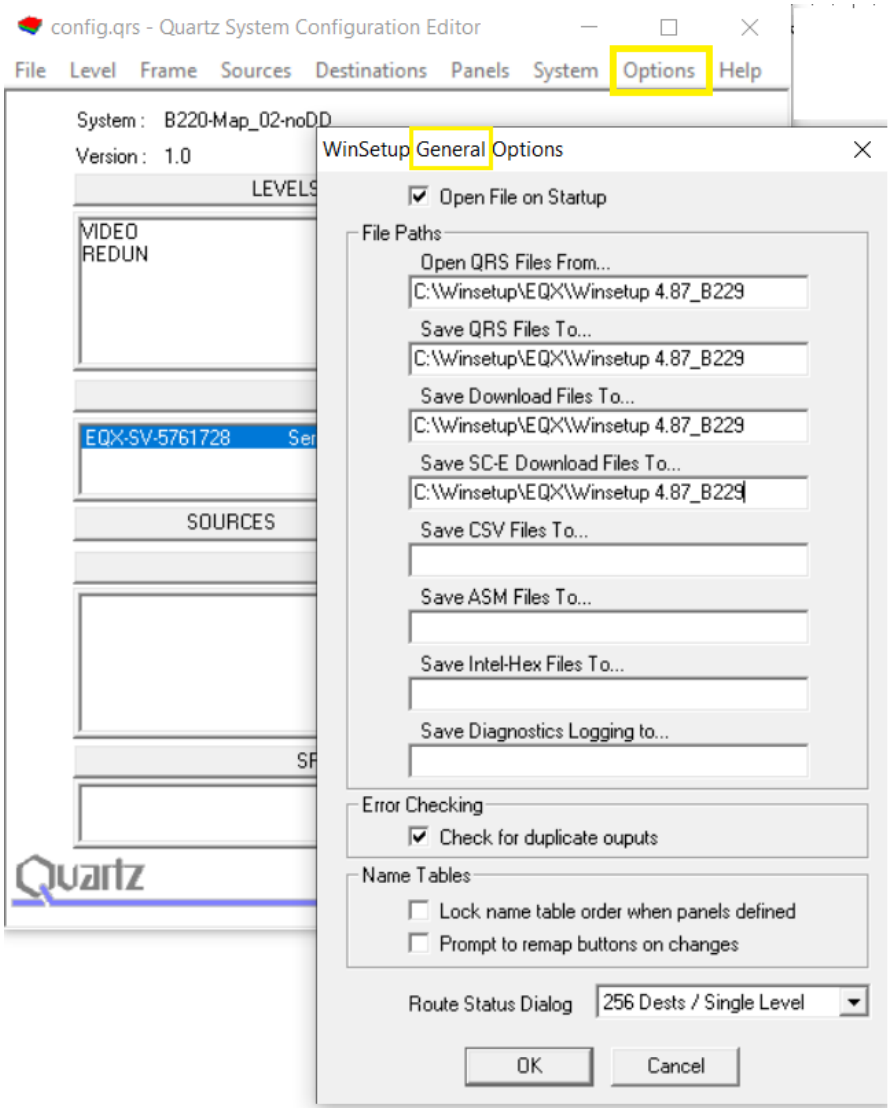

Figure 10-26: Update Temporary Files Path Winsetup

Window can download the configuration to EQX-FC by pressing the “DOWNLOAD” button. This should only occur when the configuration file is ready to be sent to the EQX-FC.

Any updates done to the configuration prior to download only updates the settings in the winsetup application window on the computer. Download the updated config is required to update stored config on the EQX-FC.

Note: Make sure the configuration is saved before closing the WinSetup.

Note: Config download can be done via Ethernet only and port 25 is the default to be used. When setting up an EQX-FC with no active configuration file, the initial load will error out and prompt the user to use default settings. Click okay to this message and follow instructions on using default values.

10.14 UPLOAD CONFIGURATION

On the latest WinSetup application, a feature to copy the active configuration from the router to the WinSetup configuration window is called Upload. This is handy if a change needs to be made to the system but there is uncertainty if a saved copy of the configuration is the most up-to-date one.

Click on “System” then “Upload Configuration”.

An error message “**Current configuration will be lost, are you sure?”** will appear in a text box.

This message means that the current settings made to the configuration file currently open in the **WinSetup application window** will be lost. It has nothing to do with the configuration on the router itself. Click **YES**. It will then prompt for a filename to save the configuration file. Enter a relevant name, such as the frame name and date, to identify the file.

The configuration from the router will be populated as the new configuration in the active WinSetup application window. Store the file as a backup.

11. FIRMWARE UPGRADE – (WITHOUT WEBPAGE)

There are two ways of upgrading modules in EQX, FTP and serially. FTP is a lot faster and requires Ethernet connection; on the other hand, serial upgrade is very time consuming and does not require any Ethernet connection. There are restrictions on both methods depending on the product.

11.1 FTP METHOD

11.1.1 UPGRADING FRAME CONTROLLER

1. Identify and confirm the IP addresses of the module and PC/laptop, and ensure that they are on the same subnet.
2. The **EQX-FC itself** can be upgraded from any of the 3 IP subnets (A,B,D); just make sure there is "ping" access to whichever port is being connected to.
3. Power on the EQX system with the module installed in the EQX frame
4. Obtain the new application code and place it on the PC's local drive.
5. Open a DOS window by selecting Start > Run, and typing "cmd" in the window that appears.

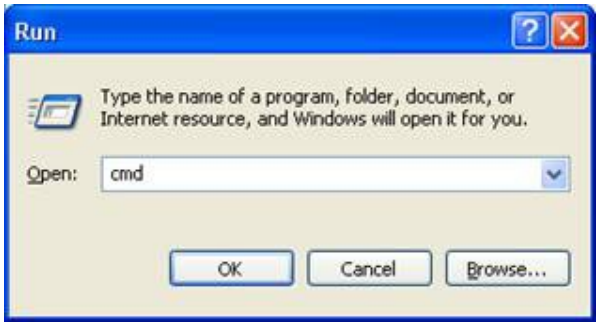

Figure 11-1: COM1 Window

6. In the command prompt window type: ***ftp xxx.xxx.xxx.xxx*** (where the x's represent the FC's IP address).
7. Press <ENTER> when prompted for a "Username," and again when prompted for a "Password."
8. Once an FTP connection is established, the directory needs to be changed. The EQX-FC by default will put you into the compact flash directory. To update the firmware, it is necessary to change to the [boot] directory. At the FTP command prompt, type "cd /[boot]" to switch directories.
9. Then type "ha" to print hash characters showing progress.
10. Type "put" followed by a space, then drag and drop the FC file into the window. After that, add another space followed by "fc.bin". Then press Enter. The FC restricts the maximum file name length for this file and may give an error if the name is too long. By adding the extra space followed by "fc.bin", the file is renamed to "fc.bin" to meet this criterion.
11. Once file download is complete, type "by" to exit the ftp session.
12. The FC requires a MANUAL reboot. No flash message, just wait a few seconds after loading and reboot the FC.

11.1.2 UPGRADING I/O AND MONITOR MODULES

1. Establish ethernet communication between the computer and the EQX-FC D subnet IP address.
2. Obtain the new firmware application code and place it on the PC's local drive.
3. Open a command prompt window by selecting **Start > Run**, and typing "cmd" in the window that appears.
4. In the command prompt window type: ***ftp xxx.xxx.xxx.xxx*** (where the x's represent the module's IP address).
5. Press <ENTER> when prompted for a "Username," and again when prompted for a "Password."
6. Type "ha" or "hash" then press enter. This prints a progress bar of hash symbols during the firmware loading.
7. Type "put" then a space; then "drag and drop" the firmware file into the command prompt window. Press Enter to start the command.
8. Once the file send is complete and it returns no errors. Type "by" to exit the ftp instance. At this point, the file will be written to flash. Do not manually reboot. Wait for the card to reboot itself.

Note: It is important to wait for the card to finish writing to flash. Writing to flash progress can be seen if a serial terminal window was open and connected to the card during the FTP load. If the card is manually rebooted before writing is completed, the firmware on this card could be corrupted and cause the card to fail.

11.2 SERIAL METHOD

This method transfers the new application code via the upgrade serial port on the front edge of the module.

1. Turn off the EQX frame containing the module that is to be upgraded.
2. Connect the factory-supplied 7700PB serial upgrade cable on the front edge of the module and connect the other end of this cable to a serial port on a PC with a serial terminal program.
3. Set up the serial communication properties for the COM port as follows:

COM:	Select the COM port
Bits per second:	115200
Data bits:	8
Parity:	None
Stop bits:	2
Flow control:	None

4. Set the upgrade jumper from "Run" to "Upgrade".
5. Power on the EQX frame with the module installed.

6. The card should display the boot header prompt followed by waiting for an upgrade file
7. Using hyperterminal or teraterm, send the firmware ".bin" file via "X modem" to the device. Often times, this is as simple as "file", "transfer", "x modem", "send", then select the file to use.
8. A running status meter should appear to indicate status of transfer.
9. If it is stuck at 2% or not moving, you may have to break the transfer and repeat again. If this is the case, cancel the transfer. Push enter a few times and at the prompt on the card, type "upgrade" to put it back into upgrade mode.
10. After the upgrade, set the upgrade jumper to “Run”.
11. Remove the upgrade serial cable and re-insert the module inside the frame.

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12. FIRMWARE UPGRADE – EQX-S AND EQX-H

To gain access to the webpage. Your computer will need access on the same subnet as the EQX-FC subnet D. Once the computer is plugged into the right connection and you gain access to the webpage, then follow the instructions below to upgrade or check firmware.

1. Open a web browser window and enter the IP address of the card into the address bar field.
2. Log in with credentials **root/evertz**. Then click on the Upgrade button in the header of the page. You will **not** see the upgrade page if logged in as customer/customer which is a read-only account.

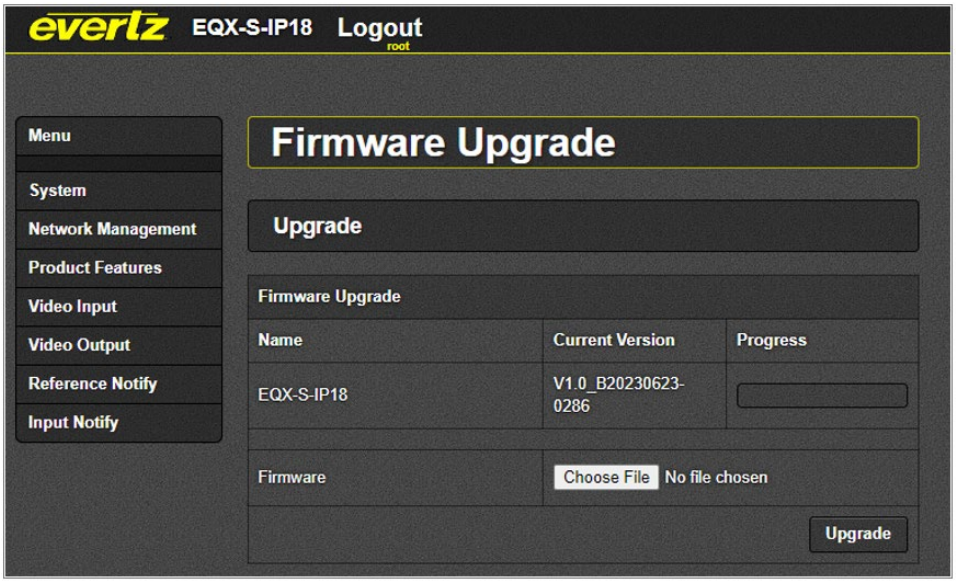

Figure 12-1: Firmware Upgrade via Webpage

3. Click on Choose File, the locate the firmware file to load on this product.
4. Click “Upgrade” and wait for the Progress bar to update with the status of the operation.
5. If successful, the card will reboot automatically once completed.

Note: Web page loading has some protection against loading the wrong file. Please ensure you obtained the correct file, (.ciu) of the firmware to be loaded. Some boards may use .gz, .ciu, or .img.

Note: Some product has firmware files that are very large in file size. It is no longer practical or possible to use serial transmission to load on these products. Please ensure the correct firmware file is loaded to the correct product.

Recovering a failed or invalid firmware load may or may not be possible without sending the product back to Evertz.

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13. TECHNICAL DESCRIPTION

13.1 SPECIFICATIONS

13.1.1 Configuration

EQX26:	576x576 in 26RU (PSU separate 1RU)
EQX16:	288x288 in 16RU (PSU separate 1RU)
EQX10:	180X180 in 10RU (PSU separate 1RU)
Inputs:	Selectable in blocks of 18
Outputs:	Selectable in blocks of 18
Redundant Protection:	Redundant Crosspoint Redundant Frame Controller Redundant Power Supply Redundant Cooling Fans

13.1.2 Video Inputs

Standards:	SMPTE 259M, SMPTE 292M, SMPTE 424M, ASI
Signal Level:	800mV p-p
Impedance:	75Ω terminating
Return Loss:	>15db typical (5-1500 MHz) >10db typical (1.5-3GHz)
Cable Equalization:	Belden 1694 @ 270 MHz 300m Belden 1694 @ 1.5GHz 100m
Connectors:	BNC per IEC 61169-8 Annex A, DIN 1.0/2.3
Optical Sensitivity:	-22 dBm
Optical Wavelength:	1260nm – 1620nm
Optical Format:	Single Mode

13.1.3 Video Outputs

Signals Supported:	SMPTE 259M, SMPTE 292M, SMPTE 424M, ASI
Reclocking:	Configurable
Non-Reclocking:	Configurable
Signal Level:	800mV p-p ± 10%
Impedance:	75Ω terminating
Return Loss:	>15 db typical (5-1500 MHz) >10db typical (1.5-3GHz)
DC Offset:	0 ± 0.5V
Output Jitter:	0.2 UI
Connectors:	BNC per IEC 61169-8 Annex A, DIN 1.0/2.3
Average Optical Power:	-5 dBm
Optical Wavelength:	1310nm
Optical Format:	Single Mode

13.1.4 Fiber Output/Input

SFP3T13-2: Dual Optical SFP Transmitter, Up to 3Gb/s, 1310nm
Connector: LC/PC
Wavelengths: 1310nm
Output Power: -2dBm ±1dBm

SFP3R-2: Dual Optical SFP Receiver, Up to 3Gb/s
Connector: LC/PC
Wavelengths: 1270nm to 1610nm
Maximum Input Power: -1dBm
Optical Sensitivity: -21dBm+/-1dBm

13.1.5 Reference Timing

Switching Reference: Analog 525/625 looping connections
Connector: 2 BNC per IEC 61169-8 Annex A
Signal Level: 1 V p-p ± 3dB
Impedance: 75Ω terminating active loop out optional
Reference Timing: 4 independent timing planes, programmable output by output

13.1.6 Control

Q-Link: 4x 75Ω video cable (max length 500m)
Serial RS422/232: 4x D9 female
Ethernet: 10/100baseT, 4x RJ45

13.1.7 Physical

Height:
- **EQX-26FR:** 45.5” (115.5cm) 26RU
- **EQX-16FR:** 28” (49cm) 16RU
- **EQX-10FR**: 17.5” (44.5cm) 10RU

Width: 19” (483mm) 19” Rack Mount
Depth: 19.4” (493mm) over hinges and BNCs
Weight:
- **EQX-26FR:** 374Lbs (171Kg) Fully Loaded
- **EQX-16FR:** 218Lbs (99Kg) Fully Loaded
- **EQX-10FR**: 124Lbs (56Kg) Fully Loaded

Operating Temperature: 0°C to 40°C
Cooling: Fan cooled, front to rear

13.1.8 Electrical – Router

Input Voltage: 48 VDC
Typical Input Power: 2880 W **for fully loaded** 180X288 configurations with **EQX-H**
4900 W **for fully loaded** 288x288 configurations with **EQX-H**
7900 W **for fully loaded** 576x576 configurations with **EQX-H**
Redundancy: Separate 1RU frame with up to 4 PS modules for 1:1 redundancy available

13.1.9 Electrical – External Power Supply (EQX-PS-C)

Configuration: Up to 4 load sharing PS modules in 1RU frame
Connector: IEC 60320 - separate mains input for each PS module
Input Voltage: Auto ranging 85 ⇔ 265V nominal, 47/63Hz
Maximum Input Current: 14.2 A (@ 115 VAC), 8.1 A (@ 230 VAC) per PS module at 1400W load
Output Voltage: 48 VDC
Output Power: 1400 Watts per PS module

13.2 CONNECTOR PIN-OUTS

13.2.1 Serial Ports

The EQX router supports 5 serial ports controls on each FC, 4 are shared. Serial 1 to 4 refers to the 4 DB9 connections on the FC rear plates; 2 on top and 2 on bottom. Serial 5 is the DB9 on the front of the hardware itself.

The serial ports are typically used for the connection of third party control devices, such as automation systems. These ports are only used for Quartz control.

Note: It is recommended that Serial Port 1 is left available for the connection of the PC running the EQX configuration software (WinSetup).

The pin-out for the Serial ports is shown in Table 13-1 below.

RS422 9 PIN FEMALE D-TYPE	
PIN	**SIGNAL**
1	0V
2	Tx-
3	Rx+
4	0V
5	-
6	0V
7	Tx+
8	Rx-
9	-

Table 13-1: RS422 Serial Port Pin-out

As an option, it is possible to convert either of the two serial ports to RS232 with the following pin-out shown in Table 13-2.

RS232 9 PIN FEMALE D-TYPE	
PIN	**SIGNAL**
1	0V
2	RTS
3	RXD
4	0V
5	-
6	0V
7	TXD
8	CTS
9	-

Table 13-2: RS232 Serial Port Pin-out

The Serial Ports are set to RS422 or RS232 via the WinSetup configuration software.

13.2.2 Ethernet Connections

There are four RJ-45 network connectors on the rear panel. The RJ-45 connectors are Ethernet port used for monitoring and control of the system, etc. See section 13.2.3 for information on connecting to an Ethernet network.

13.2.3 Connecting to an Ethernet Network

The EQX uses 10Base-T (10 Mbps), 100Base-TX (100 Mbps) or Gigabit (1Gbps) twisted pair Ethernet cabling systems. When connecting for 10Base-T systems, category 3, 4, or 5 UTP cable as well as EIA/TIA – 568 100Ω STP cable may be used. When connecting for 100Base-TX systems, category 5 UTP cable is required. The cable must be “straight-through” with a RJ-45 connector at each end. Establish the network connection by plugging one end of the cable into the RJ-45 receptacle of the EQX and the other end into a port of the supporting hub.

The straight-through RJ-45 cable can be purchased or can be constructed using the pin-out information in Table 13-3. A colour coded wiring table is provided in Table 13-3 for the current RJ-45 standards (AT&T 258A or EIA/TIA 258B colour coding shown). Also refer to the notes following the table for additional wiring guide information.

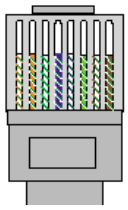
Pin 1 	Pin #	Signal	EIA/TIA 568A	AT&T 258A or EIA/TIA 568B	10BaseT or 100BaseT
	1	Transmit +	White/Green	White/Orange	X
	2	Transmit –	Green/White or White	Orange/White or Orange	X
	3	Receive +	White/Orange	White/Green	X
	4	N/A	Blue/White or Blue	Blue/White or Blue	Not used (required)
	5	N/A	White/Blue	White/Blue	Not used (required)
	6	Receive –	Orange/White or Orange	Green/White or Green	X
	7	N/A	White/Brown	White/Brown	Not used (required)
	8	N/A	Brown/White or Brown	Brown/White or Brown	Not used (required)

Table 13-3: Standard RJ-45 Wiring Colour Codes

Note the following cabling information for this wiring guide:

- Only two pairs of wires are used in the 8-pin RJ-45 connector to carry Ethernet signals.
- Even though pins 4, 5, 7 and 8 are not used, it is mandatory that they be present in the cable.
- 10BaseT and 100BaseT use the same pins (a crossover cable made for one will also work with the other).
- Pairs may be solid colours and not have a stripe.
- Category 5 cable must use Category 5 rated connectors.

The maximum cable run between the router and the supporting hub is 300 ft (90 m). The maximum combined cable run between any two end points (i.e. router and PC/laptop via network hub) is 675 feet (205 m).

13.2.4 Alarm Connector

A 3-pin alarm terminal provides external alarm indication. The alarm signal conforms to SMPTE 269M Standard for fault reporting in television systems. This is a simple interface over which television equipment can report the occurrence of internal failures and faults in incoming signals. It is intended for use in all television equipment.

The interface consists of an isolated closure, which can assume one of three states: open, closed, or pulsing. Respectively, the three signal states indicate that either the reporting device is okay, has detected an internal fault, or is detecting incoming signal faults.

The EQX may be in one of three states:

1. **Normal Operation:** The EQX is currently not detecting any internal failures and is receiving power.
2. **Internal Failure:** The EQX is currently detecting an internal failure or has lost power.
3. **Incoming Signal Fault:** The EQX is not detecting any internal failures but is currently detecting faults in incoming signal(s).

This requires that the user connect an external fault indicator and power supply to the alarm terminals. The power supply should be 24 VDC max and the current should be limited to 20mA (See SMPTE 269M for further details). The pin-out for the Alarm connector is shown in Figure 13-1.

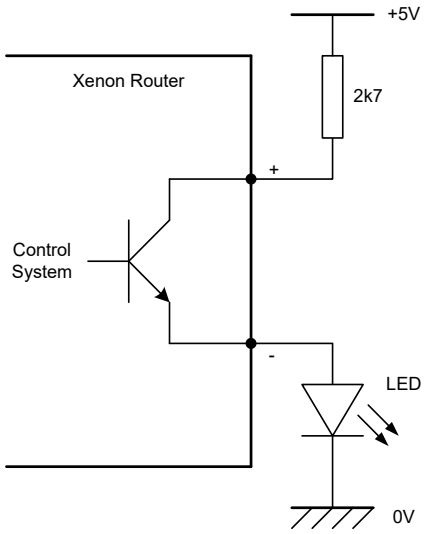


Figure 13-1: Example Alarm Circuit

14. VISTALINK® REMOTE MONITORING/CONTROL

14.1 WHAT IS VISTALINK®?

*Vista*LINK® is Evertz' remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. *Vista*LINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPRO Clients connected to the server. Module configuration through *Vista*LINK® Pro Server and Client can be performed on an individual or multi-module basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, *Vista*LINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. A SNMP manager, also known as a Network Management System (NMS), is a computer running special software that communicates with the devices in the network. Evertz VistaLINK® Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz VistaLINK® enabled fiber optic products.
2. Managed devices (such as EQX), each with a unique address (OID), communicate with the NMS through an SNMP Agent.
3. A virtual database, known as the Management Information Base (MIB) lists all the variables being monitored, which both the Manager and Agent understand. The MIB file is a collection of information about that device, that can be used to manage and monitor fields enabled in the firmware. Inside the MIB file, the product itself is given a unique OID value to correctly distinguish between products. A VLPRO Jar will be constructed from this which we will used to monitor Evertz gear in VistaLINK. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

14.2 VISTALINK® REMOTE MONITORING/CONTROL FOR EQX-FC4NET

The EQXFC4net operates on a proxy SNMP configuration. Standalone VistaLINK has been obsoleted and is no longer supported. Please obtain VistaLINK Server and Client as well as the applicable license.

14.2.1 General setup to enable monitoring

The EQX-FC4net will automatically assign a unique community proxy string to each device in the EQX system. An example string is like such: public/f0s5. This string represents device in frame 1 at slot 6 as the numbers operates with base 0.

The EQX-FC4net itself is the agent and the community string defaults are still public/private.

During the frame configuration with Winsetup, the IP address of the EQX-FC should have been configured in the IP address table. If done correctly, this IP will automatically be set as the trap address on these cards. The device will forward all SNMP information to the agent.

For the cards in the frame, everything is automatic. The trap address on the agent (EQX-FC4net) needs to be manually configured. Via the FC's serial menu, assign the IP address of the computer with Vistalink installed. This computer needs to be able to communicate with the EQX-FC via the B subnet.

SNMP via subnet A and D on the EQX-FC is not supported.

Please collect all the required Jar files needed for the system based on what products are present. Below is an example of a system that has the EQX-H input & Output, EQX-S Input and Output, and EQX-XPTG-576x576 crosspoint card.

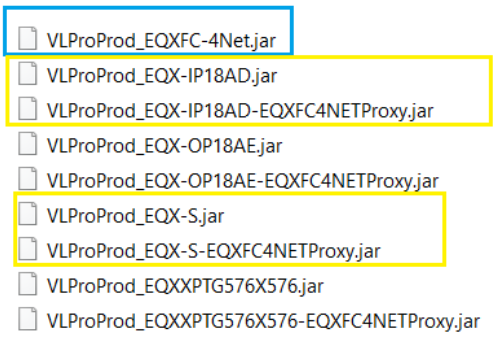


Figure 14-1: Jar Files Required for EQX-FC4net

Notice how there is only one file for the Agent (**VLProProd_EQXFC-4Net.jar**), while 2 for every other product in the frame. The files without the suffix (-EQXFC4NETProxy) are the main base jars. The ones with the suffixes are the proxy jar. Both are required for the proxy system to work correctly.

Once connection is established, launch VistaLINK Server and Client. The EQX router system will appear in the hardware product tree as the IP address of the router. All cards inside the frame will appear as a subbranch of this device.

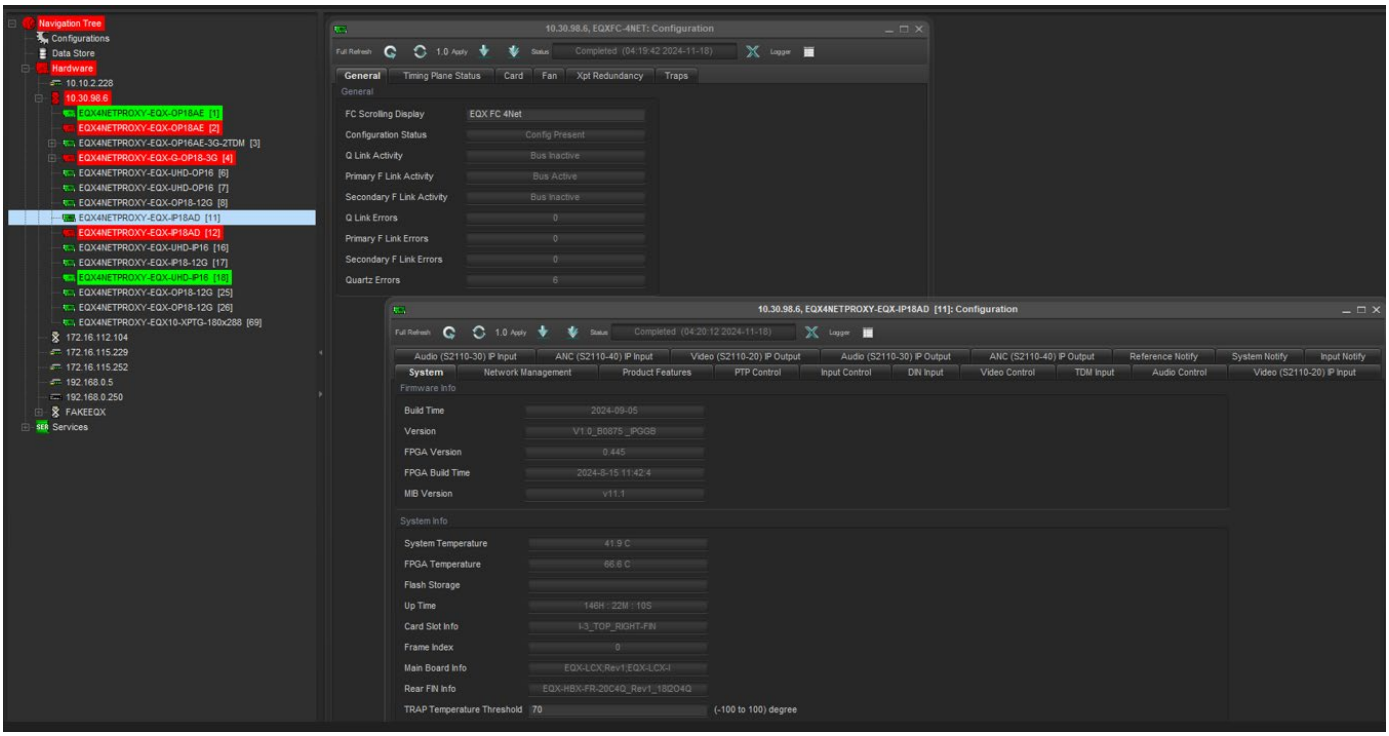


Figure 14-2: EQX-FC4net Proxy Vistalink Server/Client

15. MAGNUM

Magnum is a comprehensive control and monitoring system designed by Evertz to manage and control broadcast and media facilities. Here are some key points about Magnum:

- Centralized Control: Provides a centralized platform to manage various devices and systems within a broadcast facility.
- Scalability: Suitable for small to large-scale operations, making it adaptable to different sizes of broadcast facilities.
- Integration: Integrates with a wide range of Evertz and third-party equipment, ensuring seamless operation across different systems.
- User Interface: Offers a user-friendly interface for easy configuration, monitoring, and control of the network.
- Automation: Supports automation of routine tasks, improving efficiency and reducing the potential for human error.
- Monitoring and Alerts: Provides real-time monitoring and alerting capabilities to ensure quick response to any issues that arise.

15.1 BASIC MAGNUM CONFIGURATION

1. Connect ethernet connections for EQX Net A port to a switch that also has magnum connected to. Ensure that the magnum port connected to the switch and the EQX NET A port connected to the switch are on the same subnet.
2. Using a web browser, navigate to the cluster IP address of the Magnum server
3. Log in using the appropriate login and password. The factory default is admin/admin.

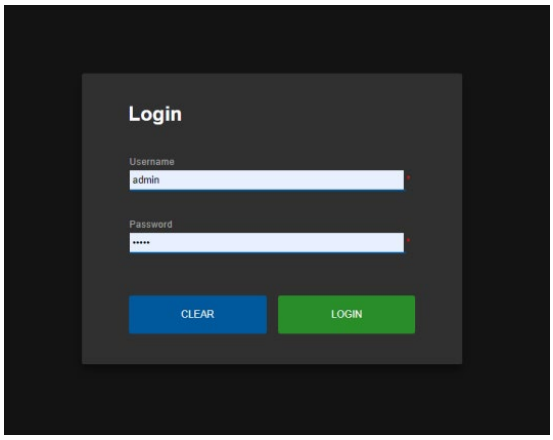


Figure 15-1: Login Screen

4. Switch to Client Host by clicking “SDVN” at the top-left and then selecting “CH”

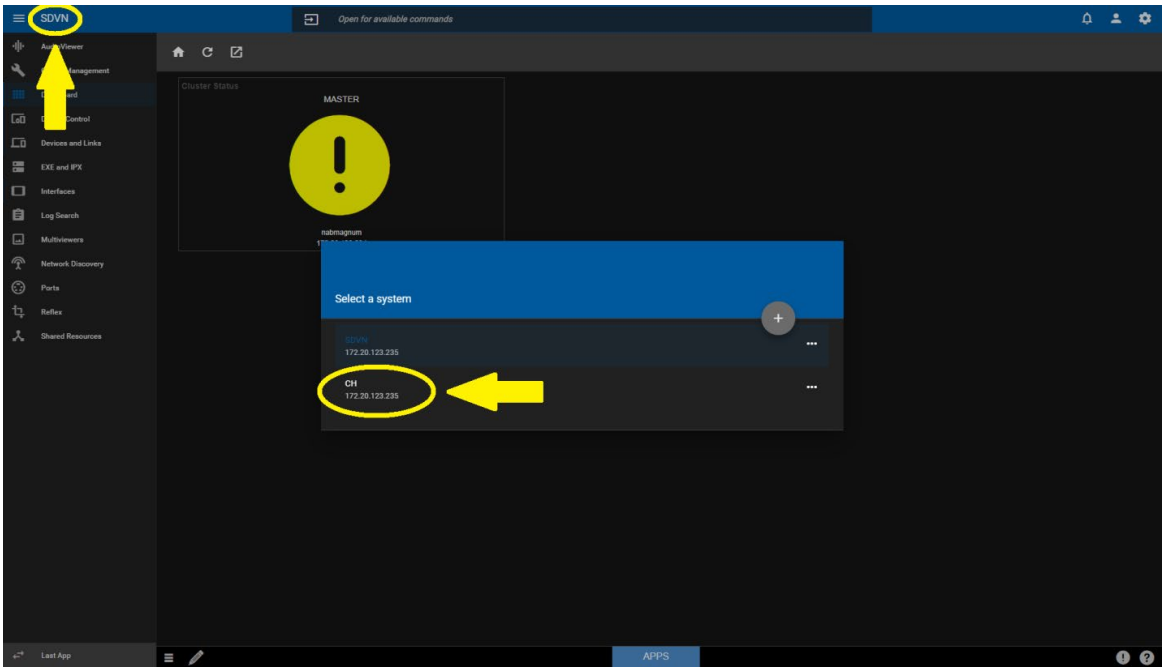


Figure 15-2: SDVN Screen

5. If navigation pane is collapsed, click the icon at the top-left to expand the pane.

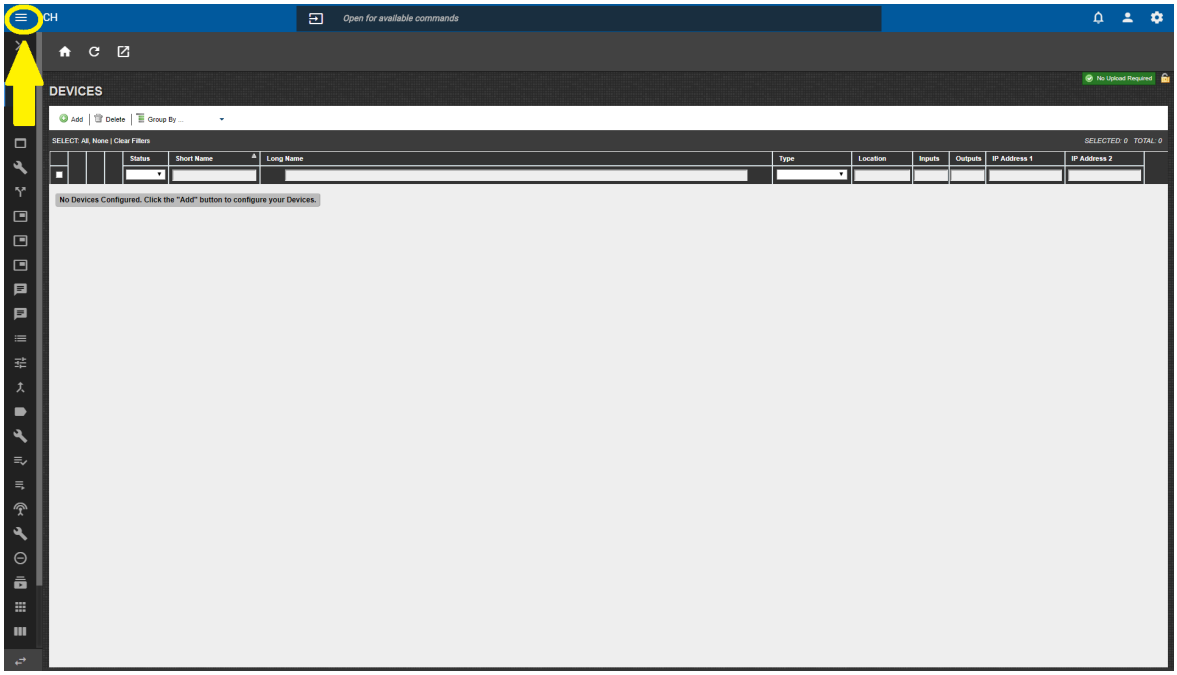


Figure 15-3: Expanding the Pane

6. Navigate to the Devices page and click Add

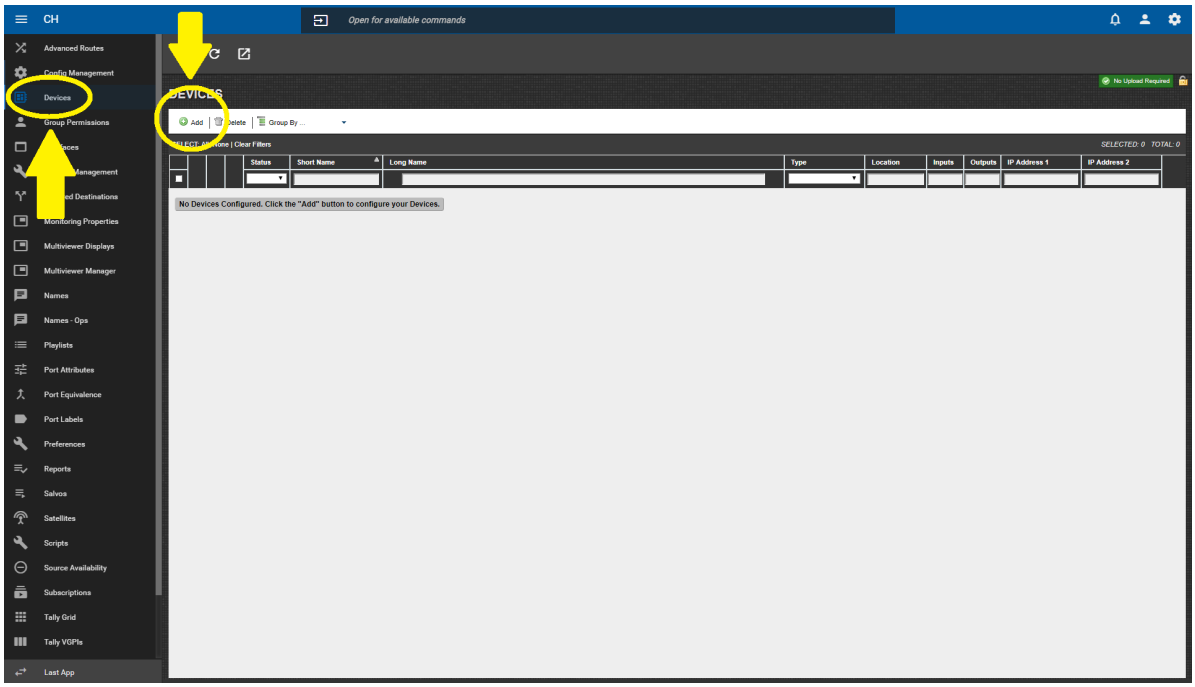


Figure 15-4: Devices Page

7. In Select Device Type drop down menu, for standalone EQX systems, select either EQX, or EQX10. Fill in the values to match the frame. Ignore any XLINK output channels here.

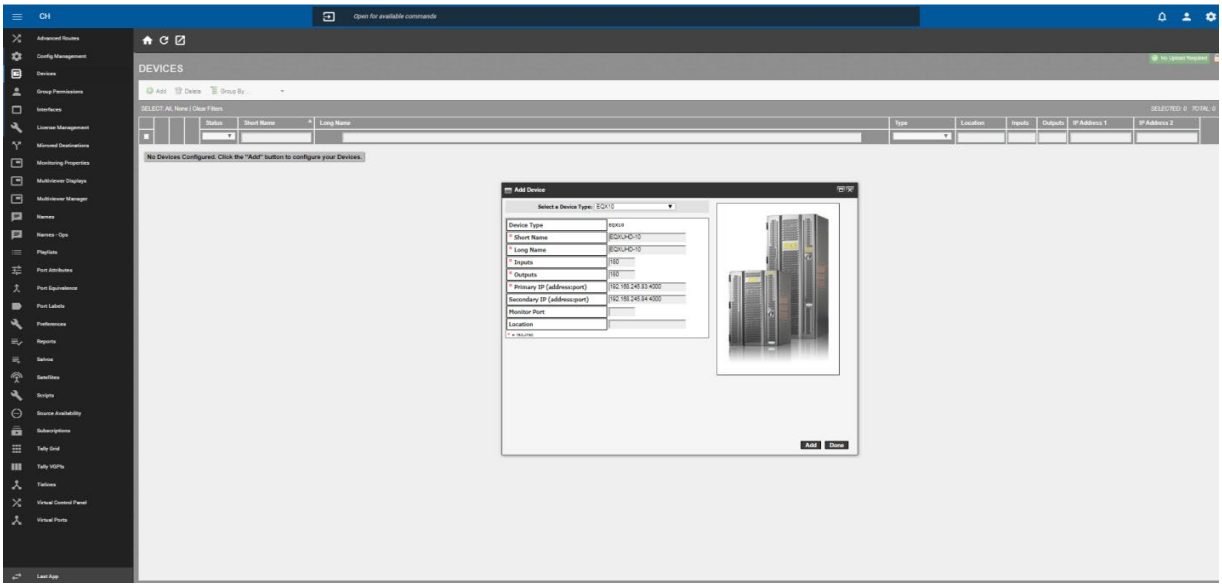


Figure 15-5: Add Dialog

8. Enter the IP addresses of the main and redundant frame controllers, along with a TCP/Quartz port (typically 4000 and up) that has been defined in the WinSetup configuration. Do not use default port 25 here, as it will disrupt WinSetup communications.

9. Once device added, click the edit layout button to configure the router's I/O layout.

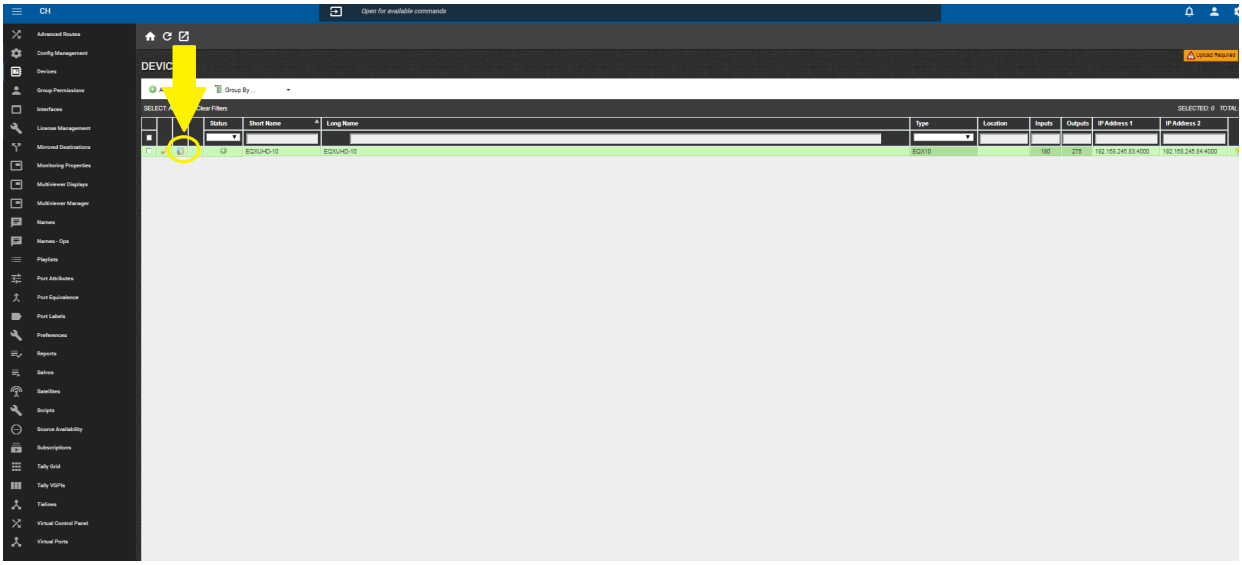


Figure 15-6: Bringing Up Configuration

10. "Slots" Tab adjust all slots to match what card is present. If nothing is present, default it to standard OP18 or IP18 to allocate the index.
    Magnum does not require the card to be present specifically; it only needs to know the capabilities of the device inserted. Therefore, all EQX product names will not be listed.

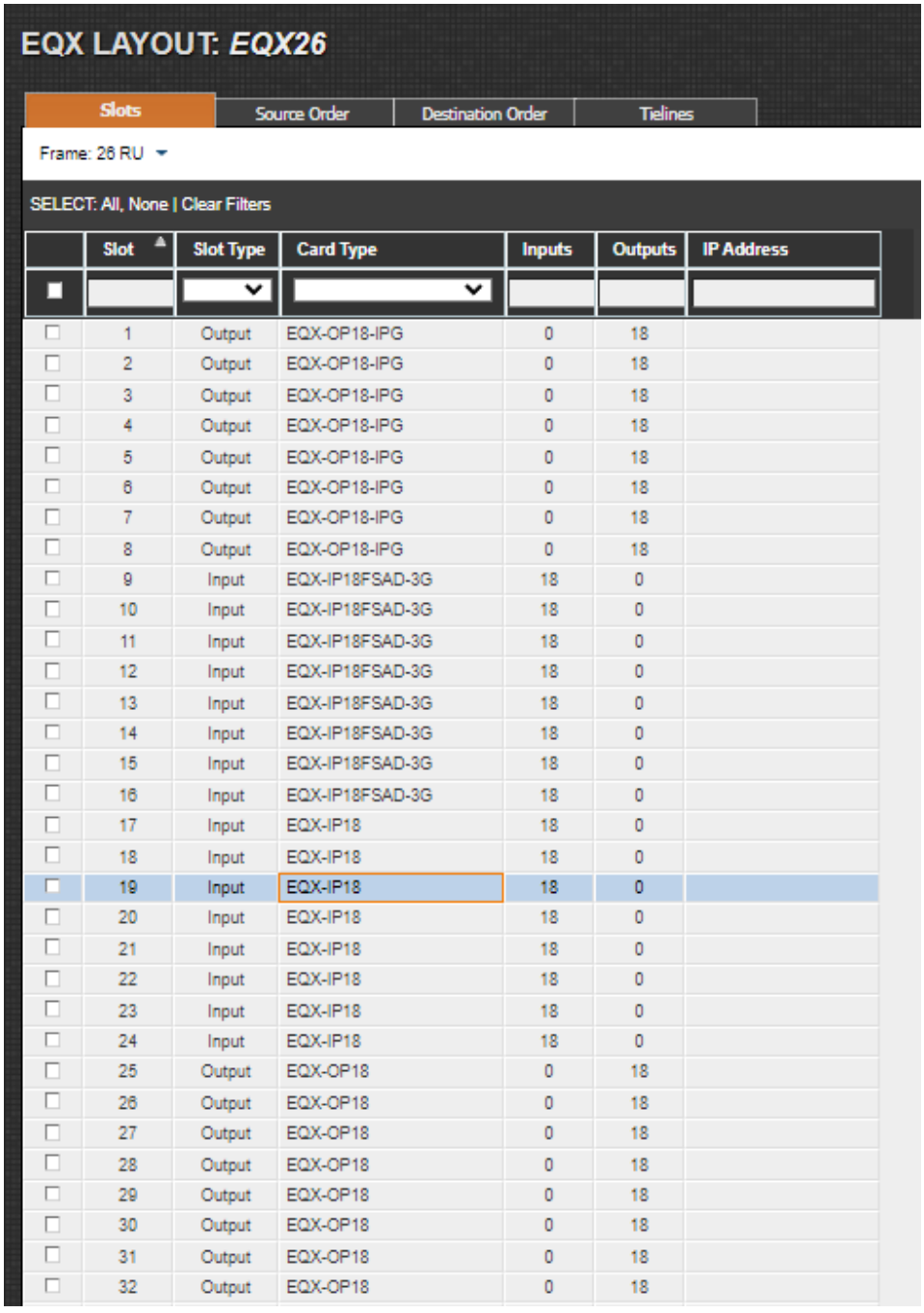
    - **AVIP**: 16 input channels + 2TDM
    - **EQX-IP18**: 18 input channel, no TDM
    - **EQX-IP18FSAD-3G**: 18 input channel + 2TDM
    - **AVOP**: 16 output channel + 2TDM
    - **EQX-OP18**: 18 output channel, no TDM
    - **EQX-OP36**: 36 output channel, no TDM
    - **EQX-OP18-IPG**: 18 output channels + 2TDM

The EQX-S or EQX-H input and output cards do not have their own entry in the Magnum Client host. When adding these devices, select the device closest to the same characteristics of the card, having the same number of paths and TDM support.

If the cards do not need TDM audio setup, the device selection can remain on the default IP18 and OP18 slot selections.

Below are the selections if these cards have TDM audio in use and require it for connection to an ADMX:

- EQX-S/H-IP18: 18 Inputs with TDM → EQX-IP18FSAD-3G
- EQX-S/H-OP18: 18 Outputs with TDM → EQX-OP18-IPG



Slot	Slot Type	Card Type	Inputs	Outputs	IP Address
1	Output	EQX-OP18-IPG	0	18	
2	Output	EQX-OP18-IPG	0	18	
3	Output	EQX-OP18-IPG	0	18	
4	Output	EQX-OP18-IPG	0	18	
5	Output	EQX-OP18-IPG	0	18	
6	Output	EQX-OP18-IPG	0	18	
7	Output	EQX-OP18-IPG	0	18	
8	Output	EQX-OP18-IPG	0	18	
9	Input	EQX-IP18FSAD-3G	18	0	
10	Input	EQX-IP18FSAD-3G	18	0	
11	Input	EQX-IP18FSAD-3G	18	0	
12	Input	EQX-IP18FSAD-3G	18	0	
13	Input	EQX-IP18FSAD-3G	18	0	
14	Input	EQX-IP18FSAD-3G	18	0	
15	Input	EQX-IP18FSAD-3G	18	0	
16	Input	EQX-IP18FSAD-3G	18	0	
17	Input	EQX-IP18	18	0	
18	Input	EQX-IP18	18	0	
19	Input	EQX-IP18	18	0	
20	Input	EQX-IP18	18	0	
21	Input	EQX-IP18	18	0	
22	Input	EQX-IP18	18	0	
23	Input	EQX-IP18	18	0	
24	Input	EQX-IP18	18	0	
25	Output	EQX-OP18	0	18	
26	Output	EQX-OP18	0	18	
27	Output	EQX-OP18	0	18	
28	Output	EQX-OP18	0	18	
29	Output	EQX-OP18	0	18	
30	Output	EQX-OP18	0	18	
31	Output	EQX-OP18	0	18	
32	Output	EQX-OP18	0	18	

Figure 15-7: EQX-S or EQX-H Slot Configuration with/without TDM

Magnum uses a filter search system, so the entire selection has to be cleared and then the spacebar on the keyboard has to be pressed to see applicable options. Select the option that best matches the ability of the card inserted.

For crosspoint cards, Magnum does not handle any redundancy control. The top crosspoint card will likely be populated with a default value matching the frame without Xlinks. Configure all the XPTs to match the hardware installed. Magnum will update DST allocation if a crosspoint was selected to enable XLINK paths.

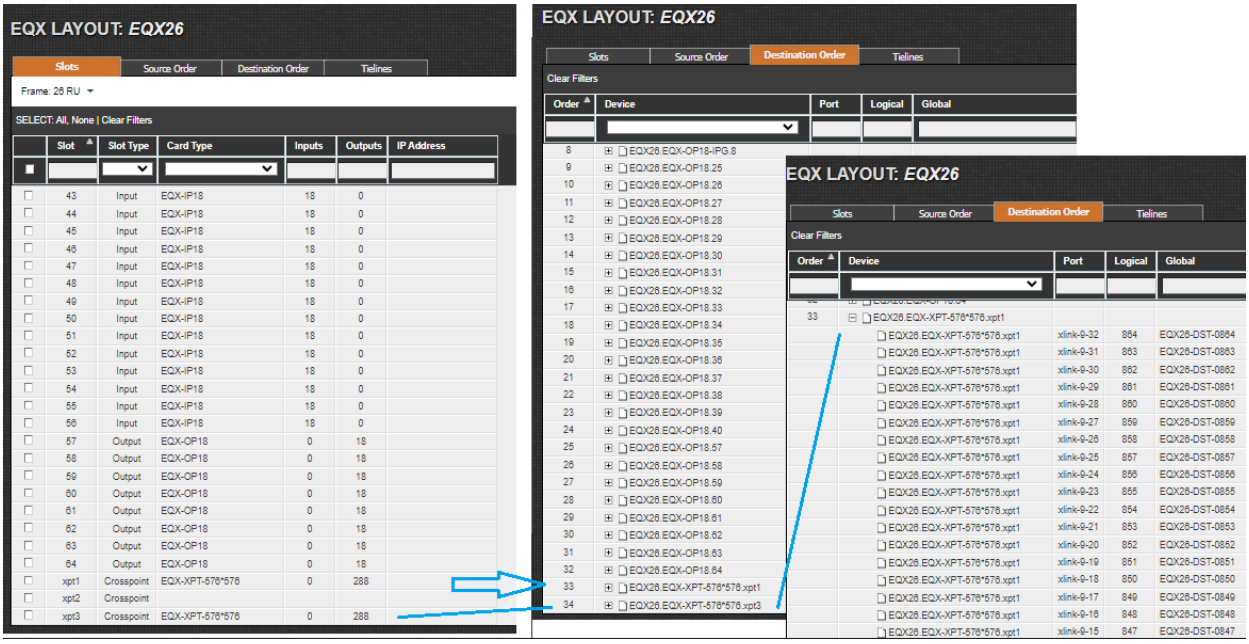


Figure 15-8: Magnum Enabling XLINK Destinations

11. The “Source Order” and “Destination Order” tabs will give you magnum’s logical indexed values for each path. Using those values, a route can be made.
12. Once a device has been added and configured, ensure the server is update by pressing the upload configuration button in the top right corner.
13. Now that a device has been added. The server needs to grant permission access to the device per path.
14. In the page “Source Availability”. Locate the device that was just added and select it in the Device tab on the left under Destinations. Below displays the page with the device selected.

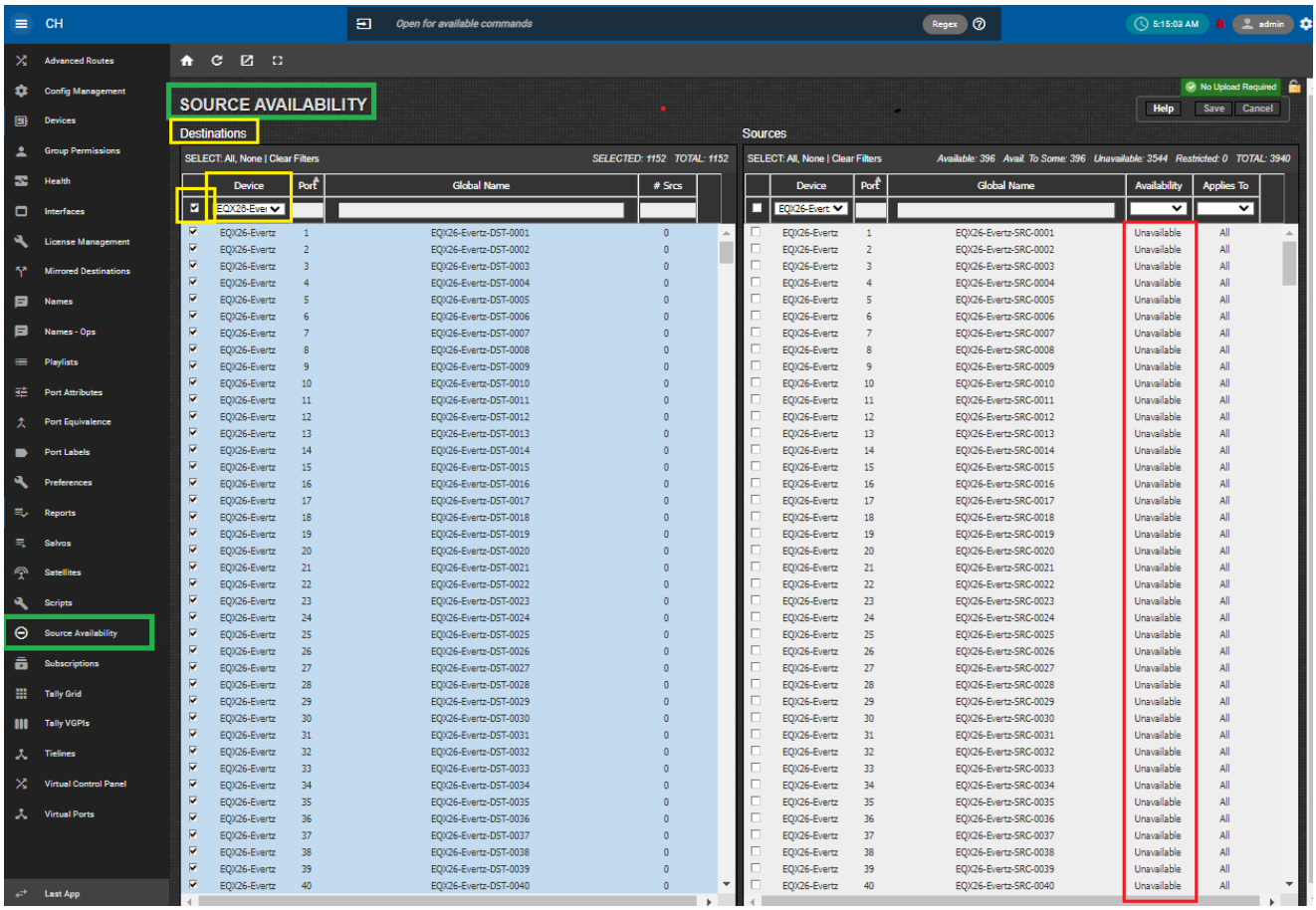


Figure 15-9: Magnum – Source Availibility – Not Available

15. Once a device destination is selected on the left, select the device on the right side under Sources. In previous capture, the sources side displayed “Unavailable” for all sources. This means that the sources displayed for this device are NOT available for routing to the destinations selected on that device.

16. Enable all by selecting all the sources.

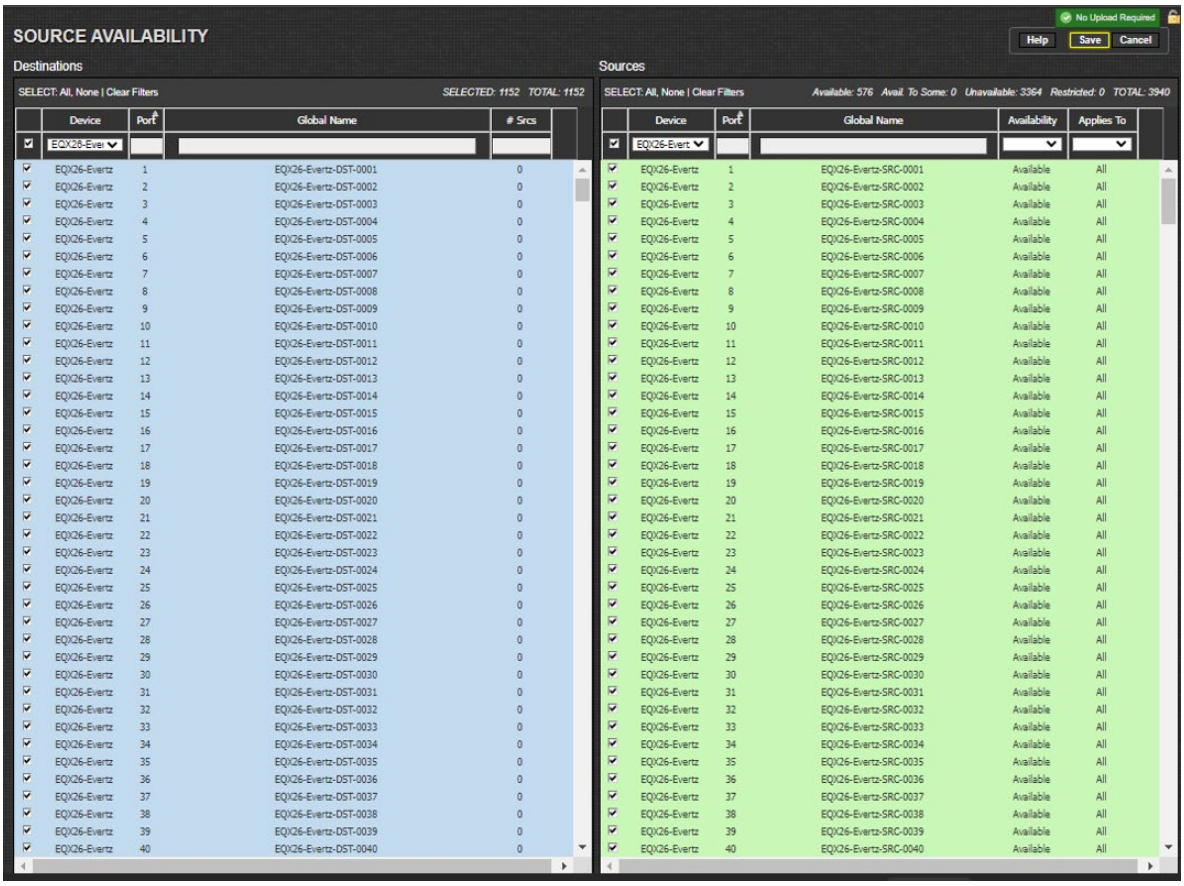


Figure 15-10: Magnum – Source Availibility – All Available

17. Don't forget to save and upload

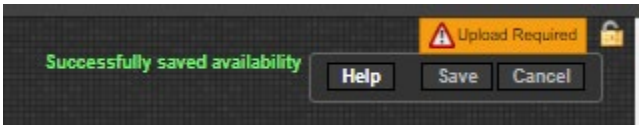


Figure 15-11: Magnum – Save and Upload to server

18. Switch to the "Advanced Routes" tab in magnum. Under the Physical tab, routing to the device can now be performed. Search for the device DST to be changed. Then under the Video column, enter the source that should be routed to that destination. Hit "Take" and if all setup is working correctly, the route will be applied.

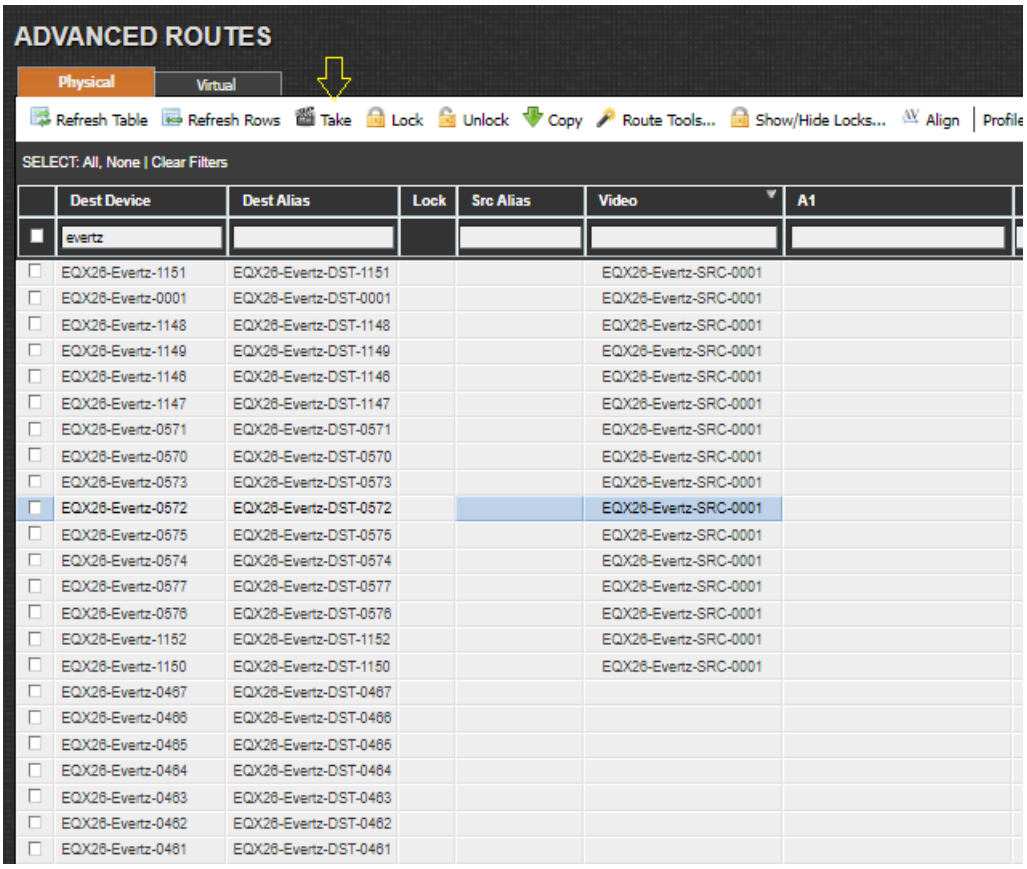


Figure 15-12: Magnum – Advanced Routes

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16. APPENDIX A - VIDEO REDUNDANT PATH MONITORING

There are different methods for checking if a route path is on main or redundant.

1. **Checking the Output modules' Status LEDs**
   - Output modules' Status LEDs indicate if an output is on Main or Redundant path.
   - If LEDs are Solid, it means the outputs are on the Main path.
   - If one or more LEDs are flashing, it means those outputs are on Redundant Path.

2. **Using Engineering Panel in Winsetup**
   - In Winsetup under "system" menu click on "Engineering Panel"
   - To check if an output is on main or redundant path, select that destination from drop down menu under "Current Destination".
   - The status of the output will be displayed under "Level Status Window". Shown in Figure 16-1 below.

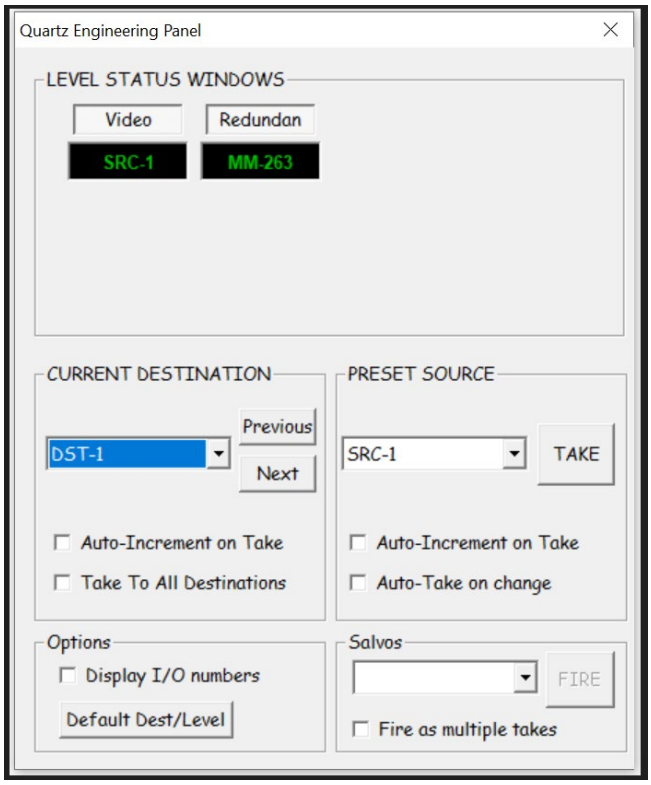

Figure 16-1: Level Status Window

   - In the above picture, source 1 is routed to Destination 1 and it is on the Main path.

3. **Using Quartz Commands:**

   - Open the comms window in Winsetup.
   - Click on “Acknowledgement” button a couple of times and make sure “.A” is coming back in response.
   - Inside comms window type “.IA[DST] [Press Enter]“ or for a range of destinations type

     “.IA [DST-DST] [Press Enter]. Shown in Figure 16-2.

     - .IA25
     - .AA025,263 (output 25 is on Manual Main Path)
     - .IA1-4
       .AA001,263 (output 1 is on Manual Main Path)
       .AA002,263 (output 2 is on Manual Main Path)
       .AA003,263 (output 3 is on Manual Main Path)
       .AA004,263 (output 4 is on Manual Main Path)

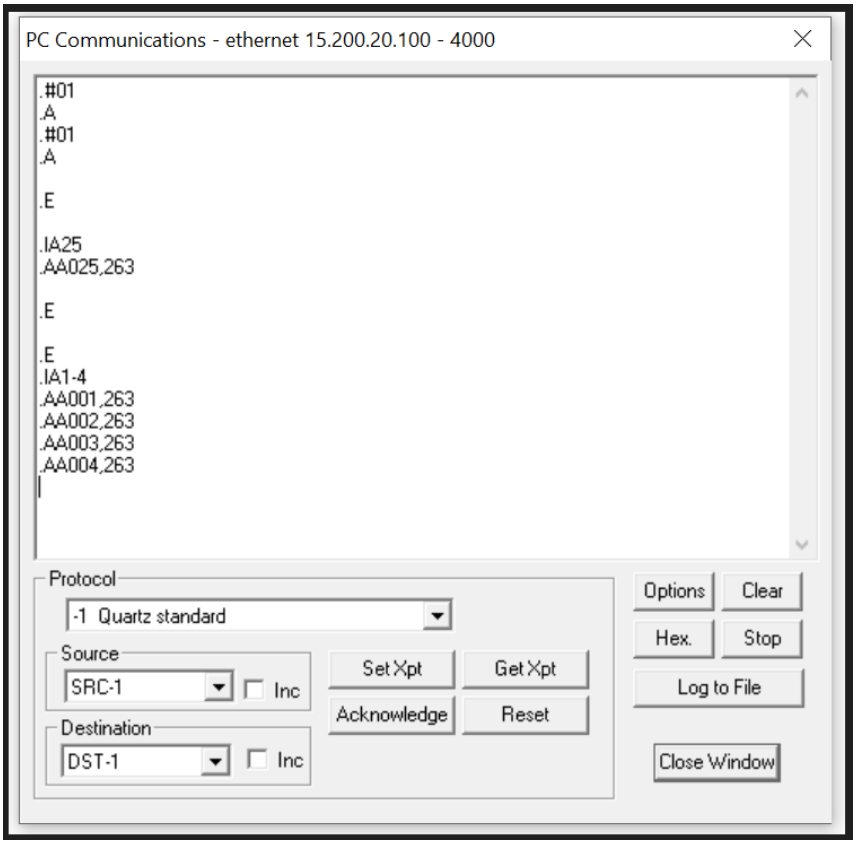

Figure 16-2: PC Comms Window in WinSetup

Note: Different Systems have different main and redundant sources assigned; it all depends on the config file. Figure 16-3 shows the sources table for a 262X262 system.

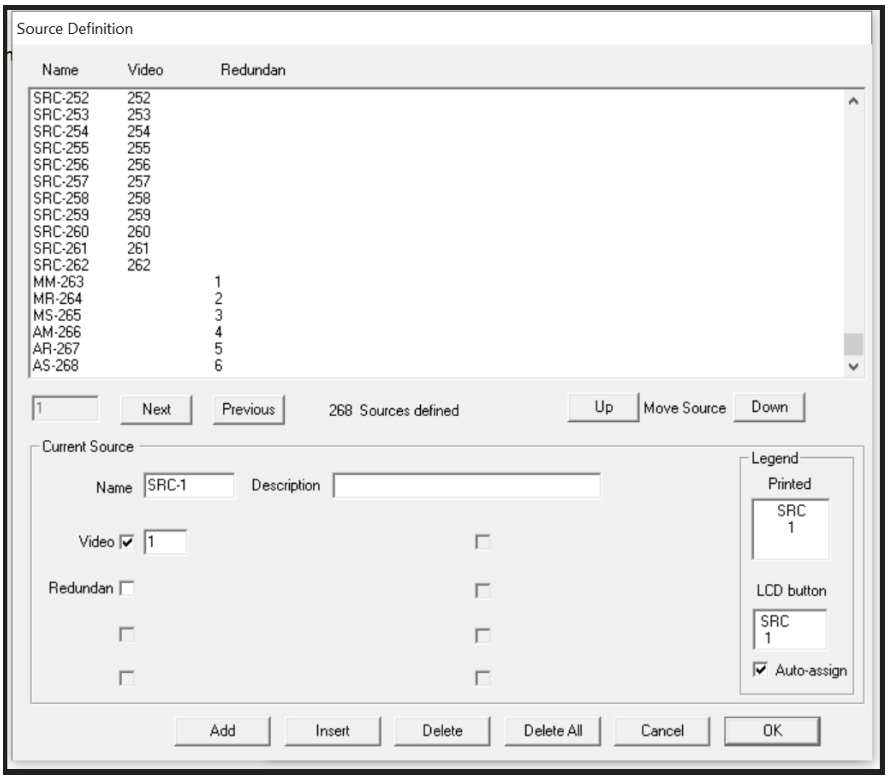

Figure 16-3: Source Definition

Descriptions for the Sources on Level A (RED) are described in Appendix A:

263 is Manual Main
264 is Manual Redundant
266 is Auto Main
267 is Auto Redundant

4. By using Telnet or Serial port:

- FC config menu can be accessed either by telnet or Serial port, connected to the FC's module edge four pin connector.
- Under "Main Menu" select option 4 (Monitor and Control) and then option 12 (Show FC redundancy table), in that table it will show if the Outputs are on main or redundant path. Shown in Figure 16-4.

  In Figure 16-4, output one is on MM (Manual Main):

  - MM: Manual Main
  - MR: Manual Redundant
  - AM: Auto Main
  - AR : Auto Redundant

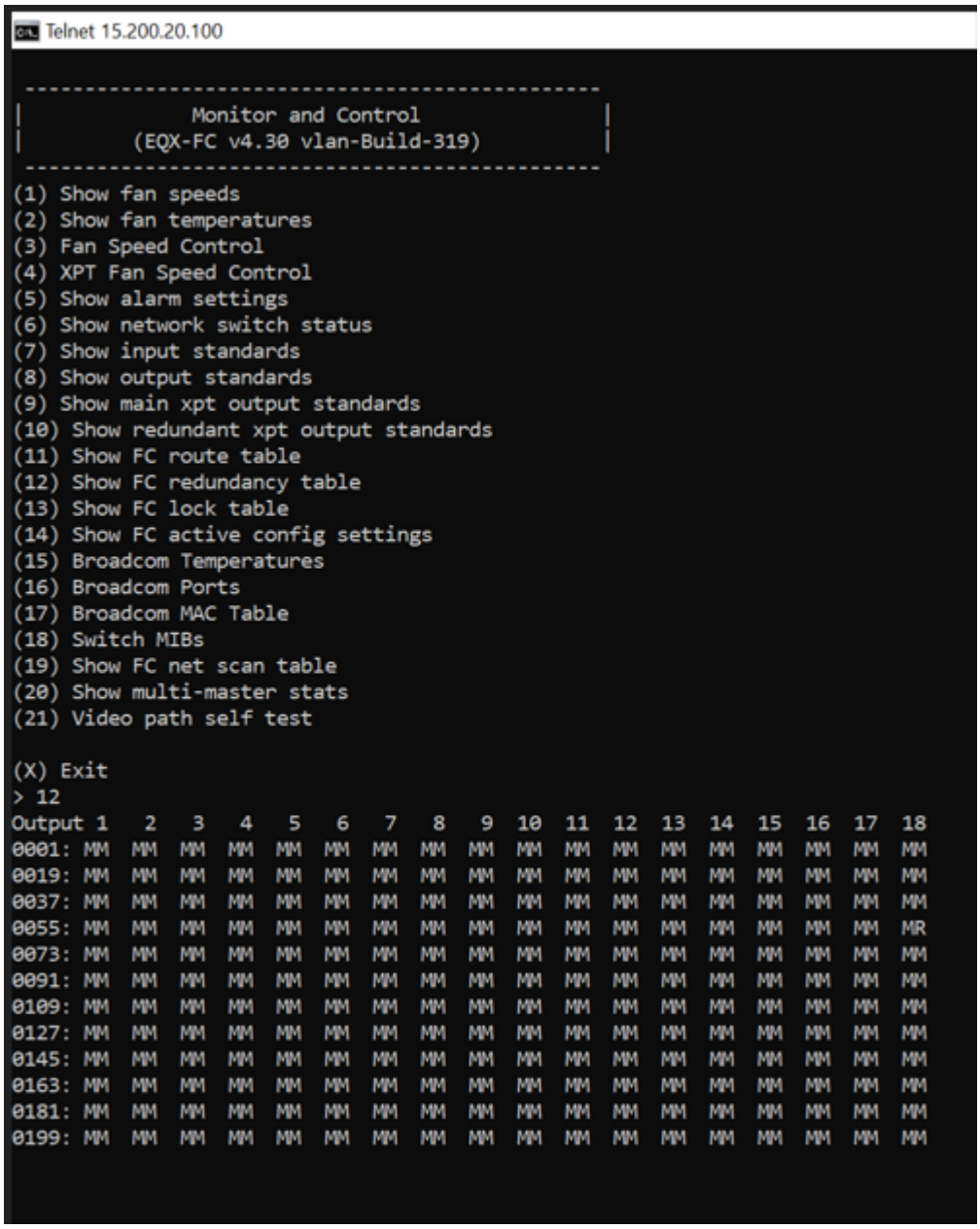

Figure 16-4: FC Config Menu

5. **By checking In VistaLINK PRO:**
   - Open EQX-FC4net config in VLPRO
   - Under XPT Redundancy tab, the second column shows whether the output is on main or redundant path.

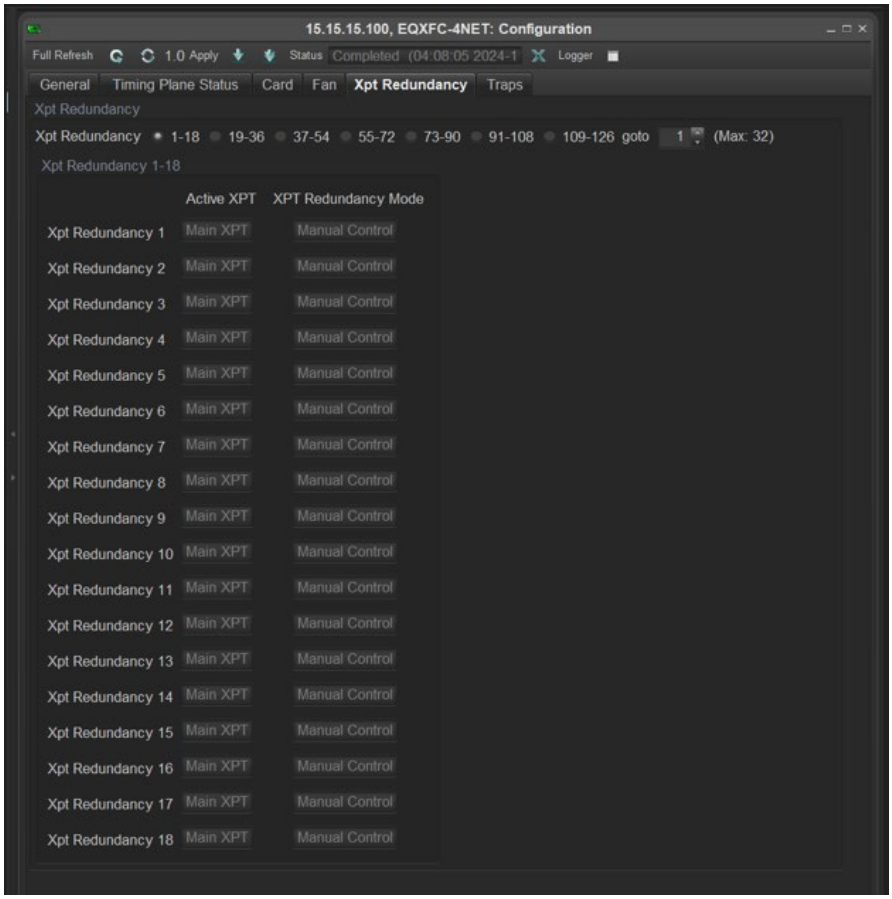

Figure 16-5: EQX-FC4net Config in VLPRO

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17. APPENDIX B - REDUNDANCY MODES

There are 6 virtual sources that are hard coded to the redundant level as defined in the config files. They are always in the following order.

1. **Manual Main (MM)**: (The path for the output is from the main XPT and will not auto fail to the redundant path upon path failure).

2. **Manual Redundant (MR)**: (The path for the output is from the redundant XPT and will not change under any circumstance).

3. **Manual Shadow (MS):** (Never USE This Option) (main and redundant paths for an output are following each other as routes are done – R&D debug feature).

4. **Automatic Main (AM):** (The path for the output is from the main XPT and will automatically failover upon main XPT path failure, if the redundant path is not already used by a shared output and is good.)

5. **Automatic Redundant (AR):** (The path for the output is from redundant XPT. When the output is on Auto-Redundant this would represent a path failure on the Main path for the given output. The ONLY times that output will switch from Auto-Redundant back to Auto-Main is by switching it manually or if the redundant path is shared by a failed destination which has a higher redundancy priority set. This would release the redundant path for use by the more important output. Redundancy priorities can be set as exceptions in WinSetup.

6. **Automatic Shadow (AS):** (The router enters auto shadow mode on a destination when a DST is in Auto-Main mode and a path failure is detected on the main path. This is where the decision making is done.)

Note: Always keep the routes to AM and never try to force any routes to redundant unless you are told by Evertz Engineers.

Example:

DST 99 main path fails:

a. The output module reports a loss of video on DST-99

b. The FC checks that the routed input is still present (if SRC is NOT present stay on main path) (If SRC is present go to step c)

c. The FC initiates Auto-Shadow mode which routes the redundant path to the same SRC which is routed on the main path.

d. You get an update .UA99,268

e. The output module now compares the Main path to the Redundant path to decide if the redundant path is better.

f. From the video standards information reported from the output module to the FC, FC now makes a decision.

- Main path good + Redundant path good = stay on Main path (.UA99,266)
- Main path bad + Redundant path good = switch to redundant (.UA99,267)
- Main path bad + Redundant path bad = stay in shadow mode and wait for a path to become good.

18. APPENDIX C - Q-LINK – EQX CONTROL PANEL NETWORK

Q-Link is the network that interconnects the Quartz routers and the Quartz remote control panels. Q-Link is a standard 75Ω video cable that daisy-chains from frame-to-frame and panel-to-panel. The maximum distance for a Q-Link chain is 500m.

Note: Each end of the Q-Link must be terminated with a 75Ω terminator. It is also recommended that all unused Q-Link ports on the rear of the router are fitted with a 75Ω terminator.

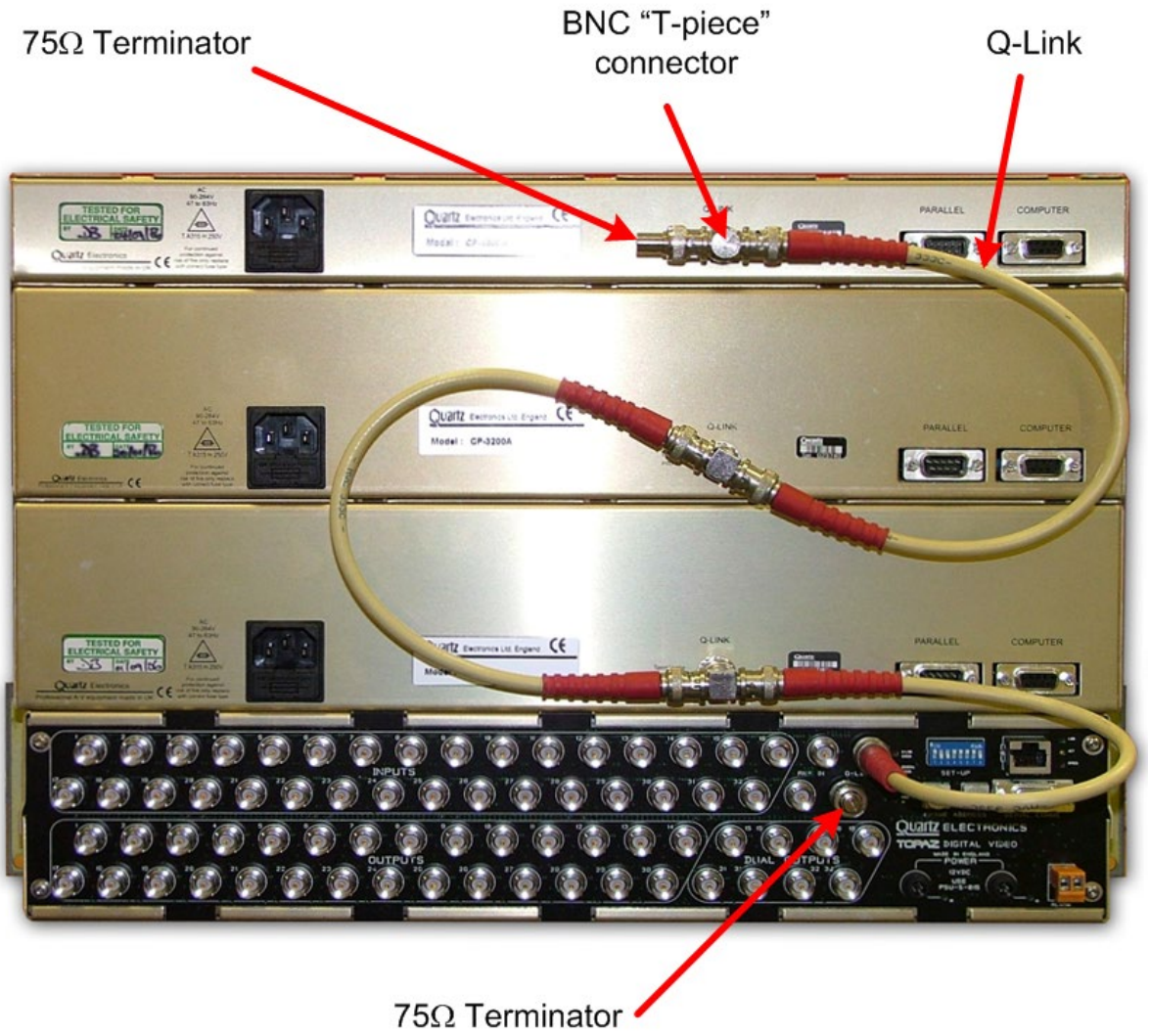

Figure 18-1: Daisy Chain Configuration of Q-Link Panels

The standard EQX router has four (4) Q-Link ports that are internally terminated with 75Ω.

Only one Q-Link connector is fitted on the remote-control panel.

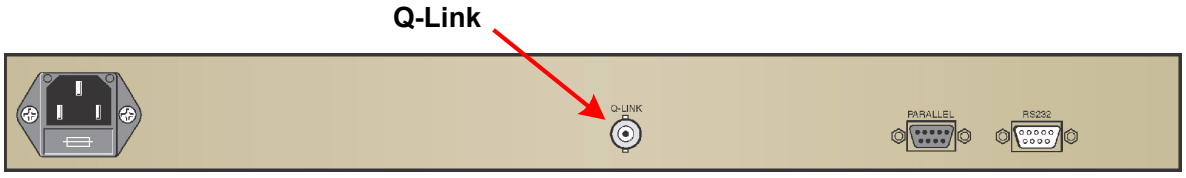

Figure 18-2: Q-Link Connector on the Remote-Control Panel

A 'T-piece' is required to connect the control panel onto the Q-Link network.

Figure 18-3: T-piece Connector

The “T-piece” allows any of the control panels within a Q-Link chain to be removed from service and replaced without disrupting the Q-Link.

This daisy chain method ensures the best transmission quality of the control signals down the cable. A total of 32 devices can be supported by Q-Link. This includes the router frames and remote control panels.

Each unit connected to the Q-Link, router and control panel have their own addresses, which is set via two rotary address switches in the older panels and via serial menu in the newer models.