High Density Modular Video Router

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 (i.e.: servicing) instructions in the literature accompanying the product.

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Don't use this apparatus near water.
- Clean only with a dry cloth.
- Don't block any ventilation openings.
- Install in accordance with the manufacturer's instructions.
- Don't install near any heat sources such as radiators, heat registers, stoves, or other apparatuses (including amplifiers) that produce heat.
- Don't 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 third prong is provided for your safety. If the plug provided does not fit into your outlet, consult an electrician to replace 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 damage to the power-supply cord or plug, contact with liquid (or any object small enough to enter the apparatus), exposure to rain or moisture, drop damage, or upon experiencing any abnormal operation.

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, SUCH AS VASES, 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

WARNING

Never look directly into an optical fiber. Irreversible eye damage can occur in a matter of milliseconds.

INFORMATION FOR USERS IN EUROPE

This equipment with the CE marking complies with the EMC Directive (89/336/EEC) and the Low Voltage Directive (73/23/EEC) issued by the Commission of the European Community.

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

- EN60065 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/her own expense.

INFORMATION FOR USERS IN THE U.S.A.

FCC Class A Digital Device or Peripheral

This equipment has been tested and found to comply with the regulations 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/her 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.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	First Release	Feb 2011

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1. OVERVIEW

The EMR is a multi-format modular router that provides a high density solution without compromising functionality. The EMR provides a unified platform for routing video as well as other formats. The EMR uses a proprietary X-Link interface to produce a video router that is both cost effective and powerful.

A single 6RU frame can accommodate 128x128 video signals, and expansion beyond this is as easy as adding another frame. With two 6RU frames, the EMR can accommodate 256x256 video signals with full redundancy.

The modular design of the EMR means that there are no limitations to the signal formats that can be added to the router, or limitations to the size at which it can be expanded to. Other products that can be combined with the EMR are audio routing, master controllers, multi-viewers and more.

Configuration:
The EMR allows any mix of formats within a frame. The inputs and outputs are scalable in blocks of 32. A system consists of the input stage, the crosspoint, and the output stage. Each input and output device is connected to the crosspoint through a proprietary X-Link connection. It is the use of this connection that provides the flexibility for the system to scale and evolve with changing needs.

Scalability:
The EMR can be scaled well beyond a single frame. A single crosspoint module can support up to 9 input modules and 9 output modules, allowing a system to scale to 288x288 video signals.

Redundancy:
Each input and output card in the EMR contains multiple X-Link interfaces that allow connections to multiple crosspoints. Each input card provides two X-Link outputs that can be used for redundant connections, and each output card provides two X-Link inputs that can be setup to automatically failover if the primary connection fails. The redundancy structure of the EMR minimizes the chances of any failure to the system.

Control:
Control of the EMR is via two redundant frame controllers. When combined with the EQX server, the EMR can be controlled using a wide range of control panels and interfaces. The EMR also provides a SNMP interface to control various configuration options.

System Integration:
When combined with MVPX and VIPX multi-viewers, the EMR provides an abundant of options to monitor the integrity of video signals. Each crosspoint module contains 9 X-Link outputs that are available to feed video signals directly to Evertz multi-viewers. This provides a cost effective, and implementation effective way to monitor router inputs without sacrificing router outputs.

1.1. FEATURES & BENEFITS

Video Routing:

- Support for 3G-SDI, HD-SDI, SD-SDI, DVB-ASI, SMPTE 310M and more
- Scalable to 128x128 in a single 6RU frame
- Scalable to 256x256 in two 6RU frames
- Input expansion in steps of 32
- Output expansion in steps of 32
- Source-by-source intelligent auto configuration
- Input equalization (on/off)
- Output reclocking (on/off)
- ASI mode (on/off)
- Variable switch point

Advanced System Control & Interfacing:

- Supports the full range of Quartz remote control panels
- Full VistaLINK® PRO command & control, SNMP & AVM
- Supports a wide selection of control protocols
- Ethernet, Q-Link, and Serial RS-422/RS-232 connections
- Full integration with 3rd party automation systems

High Availability, 24/7 Design:

- Full modular design
- All modules are hot swappable
- All components are front accessible
- Passive I/O
- External MI connection
- Redundant frame controller
- Redundant crosspoint
- Redundant power supply
- VistaLINK® PRO SNMP monitoring of I/O modules

2. COMPONENT OVERVIEW

2.1. EMR FRAME

The EMR is housed in one of two rack-mountable frames. The two available frames are the EMX6-FR and the EMX3-FR. The EMX6-FR frame can accommodate up to 2 hot-swappable power supply units and up to 15 single-slot, hot-swappable I/O modules. The EMX3-FR frame can accommodate up to 2 hot-swappable power supply units and up to 5 single-slot, hot-swappable I/O modules. Each module has a corresponding passive rear plate, which is mounted via screws to the frame. It is important that all screws are used to fasten the rear plates to ensure proper connectivity with the I/O modules.

The EMR frame is also equipped with a frame controller unit used for facilitating network communications between the frame modules and the EQX Server.

The EMX6-FR and EMX3-FR frames use an EMX-FC frame controller which provides two network connections via RJ-45 connectors and two references via BNC connectors. The BNC labeled Ref 1 is the main reference and the BNC labeled Ref 2 is the backup reference. Figure 2-1 and Figure 2-2 show the rear of the EMX6-FR and EMX3-FR frames respectively. There are also main and backup serial connections to the EMX-FC that are provided for future use.

The EMX6-FR and EMX3-FR frames have optional redundant frame controller configurations.

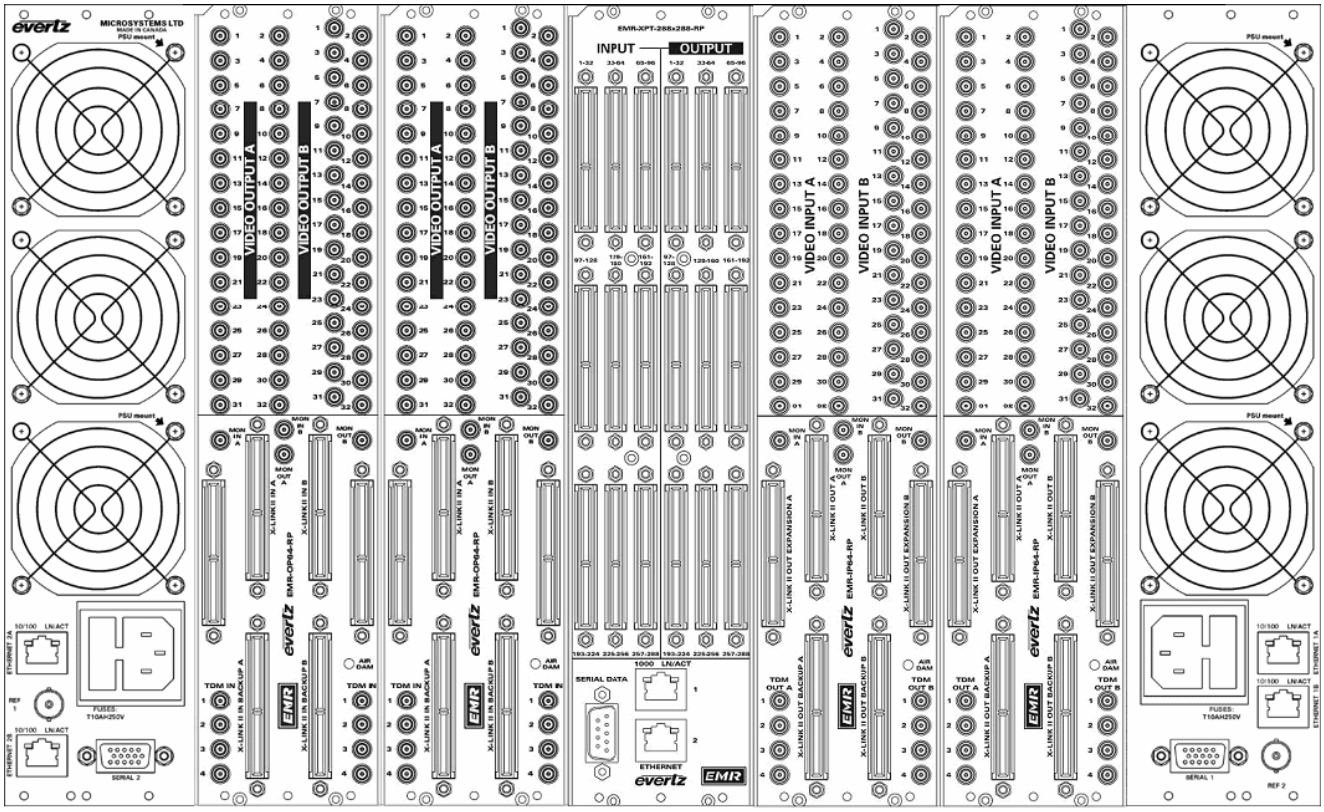

Figure 2-1: EMX6-FR Rear View

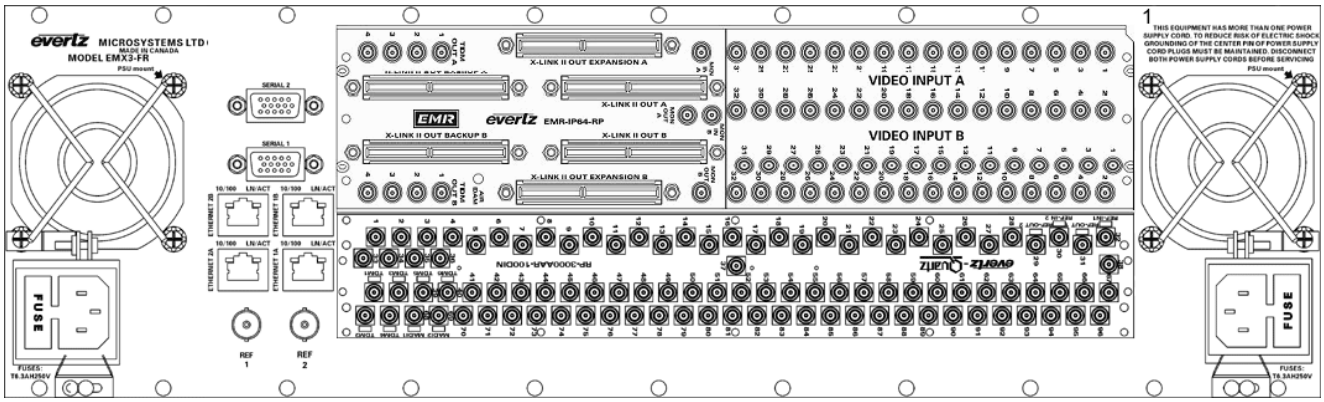

Figure 2-2: EMX3-FR Rear View

2.2. EMR I/O MODULES

The EMR system is built from a variety of input and output modules. All modules are hot-swappable and can reside in any one of the 15 slots of the EMX6-FR frame or 5 slots of the EMX3-FR frame.

Available I/O modules include:

- **EMR-IP32H** 32 HD/SD inputs with X-Link II outputs
- **EMR-IP32-3G** 32 3G/HD/SD inputs with X-Link II outputs
- **EMR-IP32-3G-F** 32 3G/HD/SD fiber inputs with X-Link II outputs
- **EMR-OP32H** 32 HD/SD outputs with X-Link II inputs
- **EMR-OP32-3G** 32 3G/HD/SD outputs with X-Link II inputs
- **EMR-OP32-3G-F** 32 3G/HD/SD fiber outputs with X-Link II inputs
- **EMR-XPT-160X160** Crosspoint with 5 X-Link II inputs and 5 X-Link II outputs
- **EMR-XPT-288X288** Crosspoint with 9 X-Link II inputs and 9 X-Link II outputs

Detailed module descriptions, module rear plate drawings, and specifications are provided in the following sections.

2.2.1. EMR Video Input Module

The EMR video input modules consists of 32 channels of adaptive cable equalization that feeds the incoming signal directly to 3 X-Link II outputs. On each input the cable equalization facility can be switched on/off as required.

Each EMR rear plate occupies 3 slots in a frame and has DIN 1.0/2.3 connectors for the video inputs and X-Link II outputs. Each rear plate accommodates 2 input cards with all connectors designated as A or B. The rear plate is passive so there are no active electronics on them. If any complications occur in the field, the front module can be repaired or replaced without the need to de-cable the system.

All 3 of the X-Link II outputs are identical, each carrying the 32 output signals from the card. The X-Link II outputs are used to drive the input signals to the crosspoint module. Only one connection is required per crosspoint.

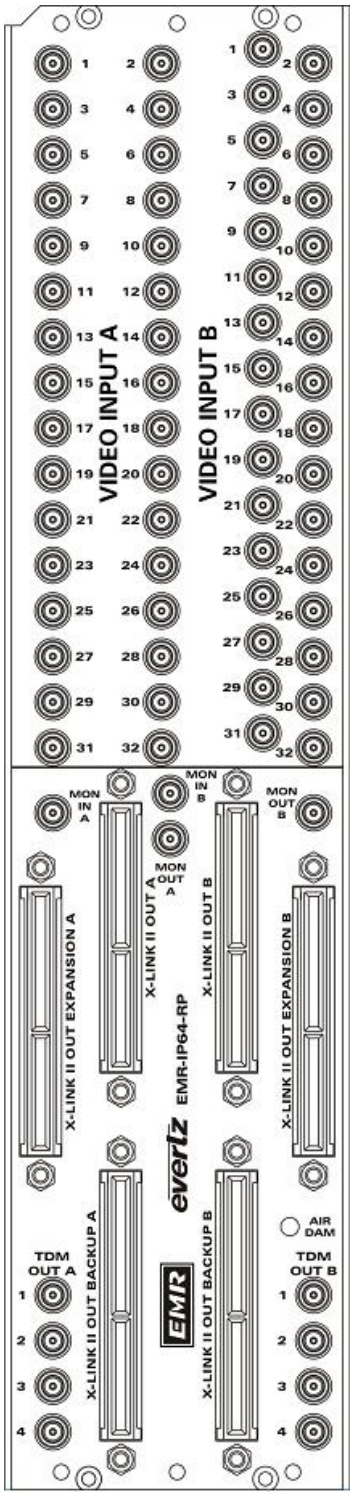

Figure 2-3: EMR-IP32H and EMR-IP32-3G Rear Plate

2.2.1.1. Fiber Optic Inputs

The EMR is able to accept Fiber Optic inputs when ordered with the optional Fiber Optic input modules. These modules utilize a different rear plate shown in Figure 2-5 that accepts Small Form-Factor Pluggable (SFP) modules, an example of which is show in Figure 2-4. Each SFP for the Fiber Optic input module is a dual channel RECEIVER. This means Optical signals can be wired as coaxial signals, where all inputs are wired to one type of card and all outputs are wired to another. The Input SFP (or receiver SFP) is called SFP1R-2 or SFP3R-2 and can accept signals from 3Mb/s to 3Gb/s depending on the type of input card that they are mated with.

The properties of the SFP module are as follows:

- The SFP receiver module supports SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M and other data rates
- The SFP receiver module is hot swappable, and is inserted and removed without the need for specialized tools
- RoHS compliant
- Operating temperature range: 0°C to 70°C
- 56.5mm x 13.4mm x 8.6mm standard SFP Package
- Each signal is on an individual connector of type LC

Figure 2-4: SFP Receiver Module

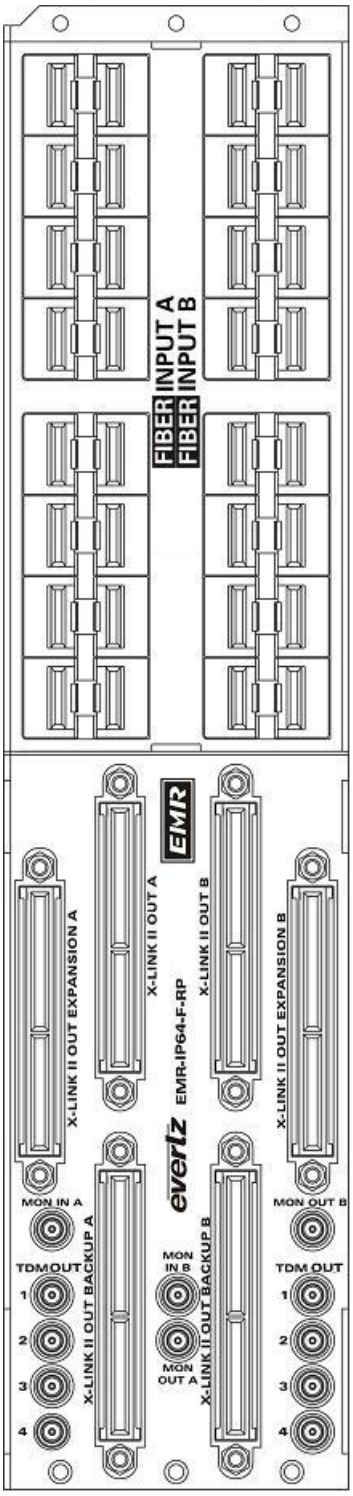

Figure 2-5: EMR-IP32-3G-F Rear Plate

2.2.1.2. Front Card Edge Controls and LEDs

The EMR-IP32H, EMR-IP32-3G and EMR-IP32-3G-F front card edge has some key controls and indicators that can help in the installation and debugging processes. Figure 2-6 and Table 2-1 show the card edge and describe the expected behavior of each component. If the status indicators do not behave as described it can be a sign of installation or configuration issues.

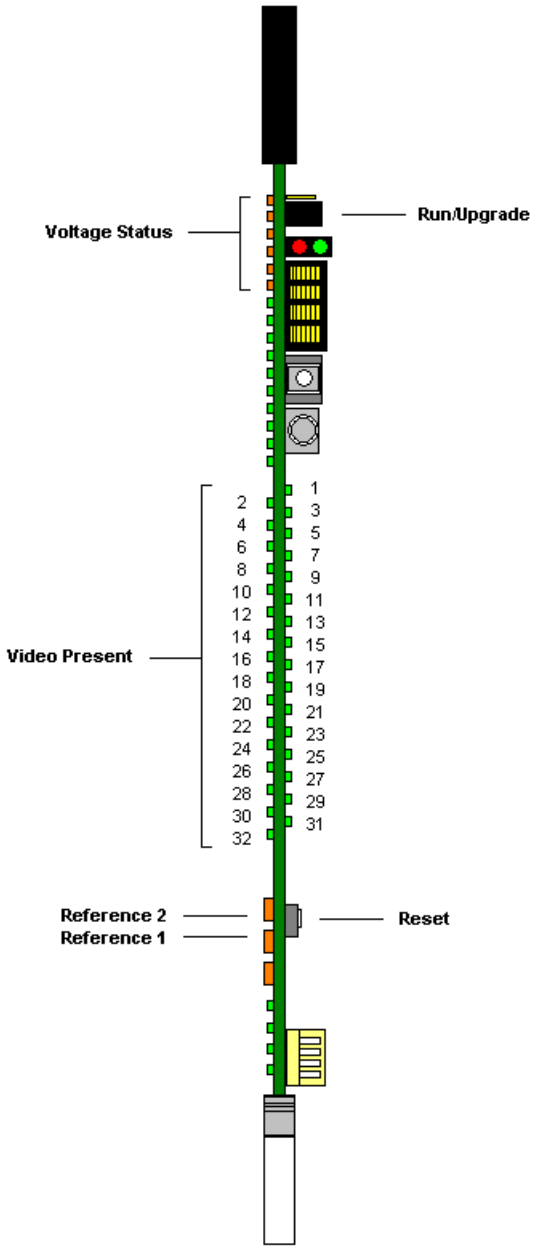

Figure 2-6: EMR Video Input Front Card Edge

Component	Description
Voltage Status LEDs	This set of LEDs is amber in color and should always be ON.
Video Present LEDs	This set of LEDs is green in color and indicate the presence of video on each respective input.
Run/Upgrade Jumper	This jumper is used to place the module in upgrade mode when upgrading the firmware
Reference 1 LED	This LED is amber in color and indicates the presence of a valid reference on input 1. It will be solid if reference is present.
Reference 2 LED	This LED is amber in color and indicates the presence of a valid reference on input 2. It will be solid if reference is present.
Reset Button	This button resets the module

Table 2-1: Description of EMR Video Input Card Edge

2.2.2. EMR Video Output Module

The EMR video output modules consists of 32 channels of re-clocked SD/HD/3G outputs that are sourced from one of 2 X-Link II inputs. The re-clocking function on each path can be switched on/off individually to facilitate the passing of ASI video signals.

Each EMR rear plate occupies 3 slots in a frame and has DIN 1.0/2.3 connectors for the video outputs and X-Link II inputs. Each rear plate accommodates 2 output cards with all connectors designated as A or B. The rear plate is passive so there are no active electronics on them. If any complications occur in the field, the front module can be repaired or replaced without the need to de-cable the system.

The 2 X-Link II outputs are designed to be selectable, each carrying the 32 input signals to the card. The X-Link II inputs are used to drive the output signals from the crosspoint module. Only one connection is required per crosspoint.

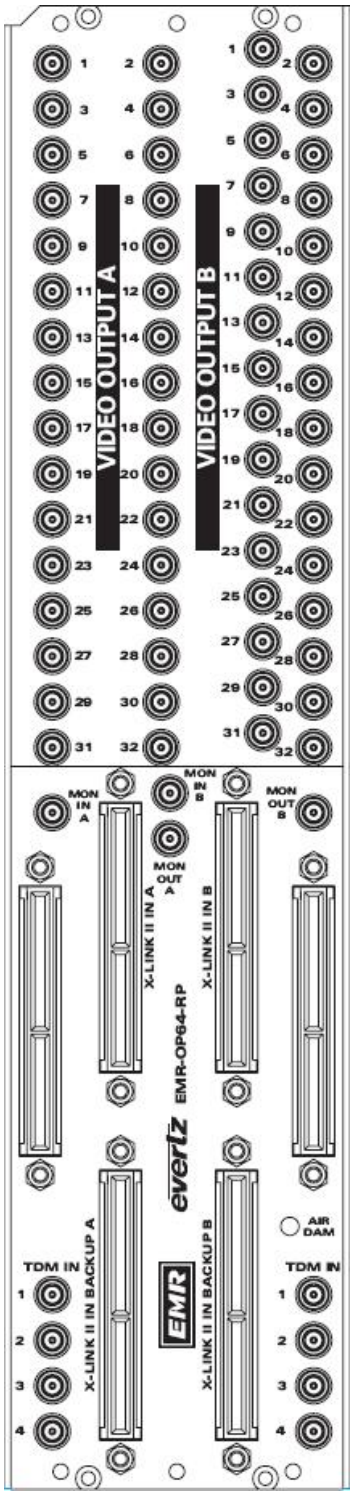

Figure 2-7: EMR-OP32H and EMR-OP32-3G Rear Plate

2.2.2.1. Fiber Optic Outputs

The EMR is able to launch Fiber Optic outputs when ordered with the optional Fiber Optic output modules. These modules utilize a different rear plate shown in Figure 2-8 that accepts Small Form-Factor Pluggable (SFP) modules, an example of which is show in Figure 2-9. Each SFP for the Fiber Optic output module is a dual channel TRANSMITTER. This means Optical signals can be wired as coaxial signals, where all inputs are wired to one type of card and all outputs are wired to another. The Output SFP (or transmitter SFP) is called SFP1T-13-2 or SFP3T-13-2 and can accept signals from 3Mb/s to 3Gb/s depending on the type of input card that they are mated with.

The properties of the SFP module are as follows:

- The SFP transmitter module supports SMPTE 259M, SMPTE 344M, SMPTE 292M and SMPTE 424M and other data rates
- The SFP transmitter module is hot swappable, and is inserted and removed without the need for specialized tools
- RoHS compliant
- Operating temperature range: 0°C to 70°C
- 56.5mm x 13.4mm x 8.6mm standard SFP Package
- Each signal is on an individual connector of type LC

Figure 2-8: SFP Transmitter Module

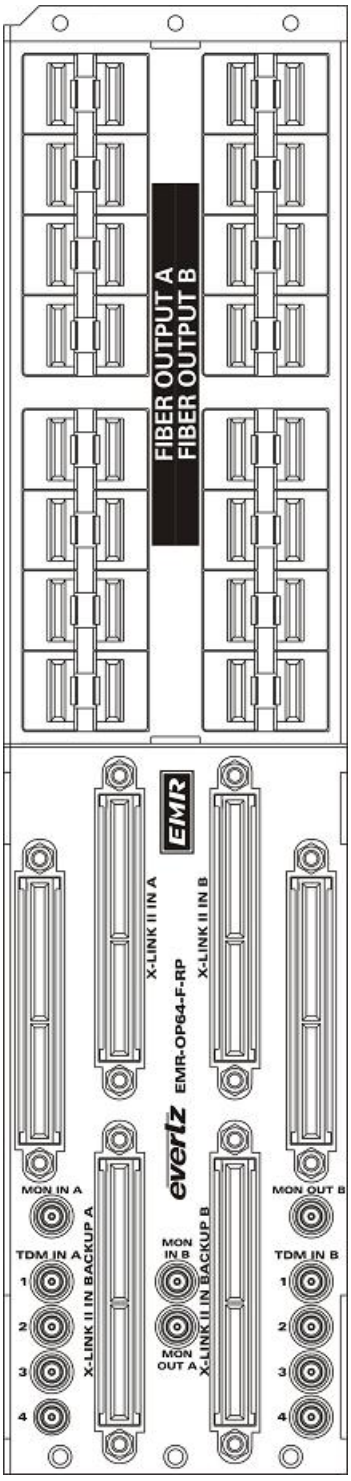

Figure 2-9: EMR-OP32-3G-F Rear Plate

2.2.2.2. Front Card Edge Controls and LEDs

The EMR-OP32H, EMR-OP32-3G and EMR-OP32-3G-F front card edge has some key controls and indicators that can help in the installation and debugging processes. Figure 2-10 and Table 2-1 show the card edge and describe the expected behavior of each component. If the status indicators do not behave as described it can be a sign of installation or configuration issues.

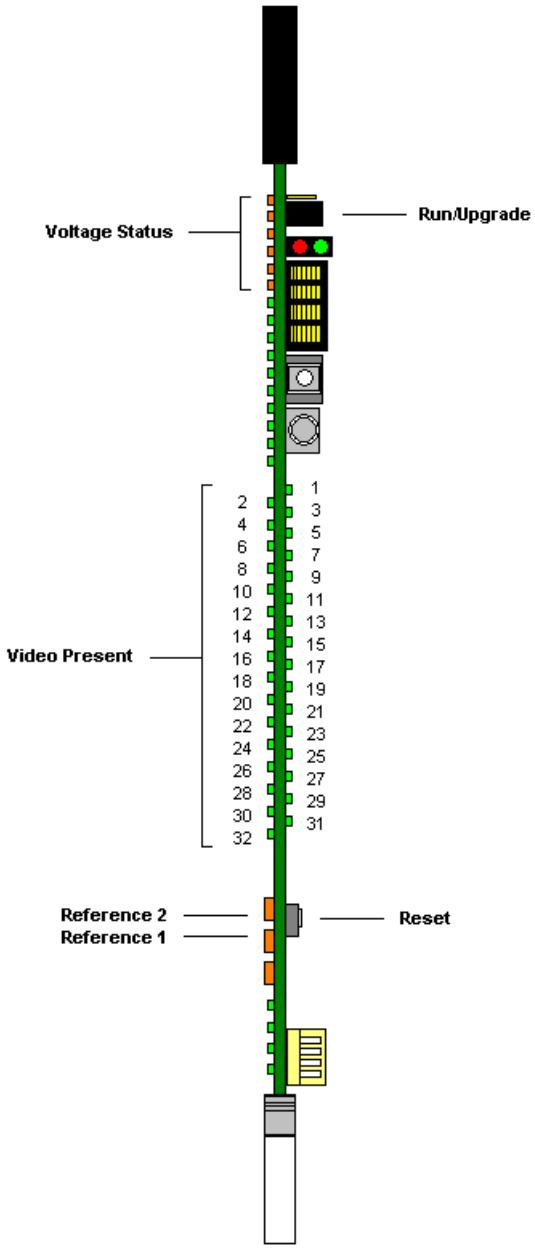

Figure 2-10: EMR Video Output Front Card Edge

Component	Description
Voltage Status LEDs	This set of LEDs is amber in color and should always be ON.
Video Present LEDs	This set of LEDs is green in color and indicate the presence of video routed to each respective output. If the LED is solid then it indicates that the routed source is from the main crosspoint. If the LED is flashing then it indicates that the routed source is from the redundant crosspoint.
Run/Upgrade Jumper	This jumper is used to place the module in upgrade mode when upgrading the firmware.
Reference 1 LED	This LED is amber in color and indicates the presence of a valid reference on input 1. It will be solid if reference is present.
Reference 2 LED	This LED is amber in color and indicates the presence of a valid reference on input 2. It will be solid if reference is present.
Reset Button	This button resets the module.

Table 2-2: Description of EMR Video Output Card Edge

2.2.3. EMR Video Crosspoint Module

The EMR-XPT-160X160 and EMR-XPT-288X288 are the crosspoint cards for the EMR video router. The EMR crosspoint utilizes the very latest technology to provide a very dense routing matrix, with the flexibility of a modular platform.

The EMR crosspoint modules use the X-LINK II interface to bring signals directly to the crosspoint and to supply signals directly from the crosspoint. This efficient use of a high density connector ensures that signal integrity is well maintained.

The rear plate for both crosspoints occupies 3 slots in a frame. The EMR-XPT-288X288 rear plate, as shown in Figure 2-11, has 9 X-Link II inputs and 9 X-Link II outputs, each carrying 32 video signals. The EMR-XPT-160X160 rear plate, as shown in Figure 2-12, has 5 X-Link II inputs and 5 X-Link II outputs, each carrying 32 video signals. Both rear plates have available Ethernet and serial control options that have yet to be implemented.

Note: The location of the input and output X-LINK II connectors on the rear plate (when viewed from the front) may not correspond to the left-to-right convention that is often used to place the I/O cards.

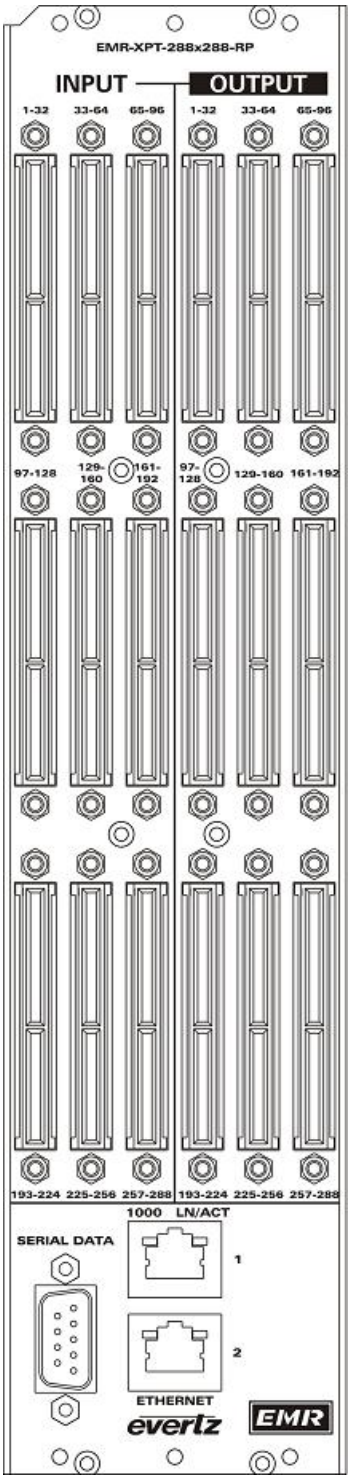

Figure 2-11: EMR-XPT-288X288 Rear Plate

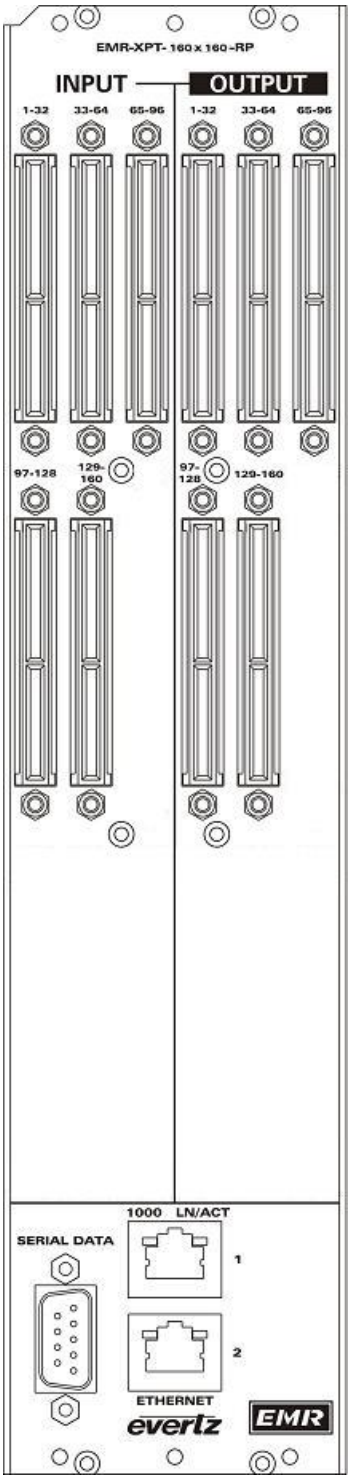

Figure 2-12: EMR-XPT-160X160 Rear Plate

2.2.3.1. Front Card Edge Controls and LEDs

The EMR-XPT-160X160 and EMR-XPT-288X288 front card edges have some key controls and indicators that can help in the installation and debugging process. Figure 2-13 and Table 2-3 show the card edge and describe the expected behavior of each component. If the status indicators do not behave as described it can be a sign of installation or configuration issues.

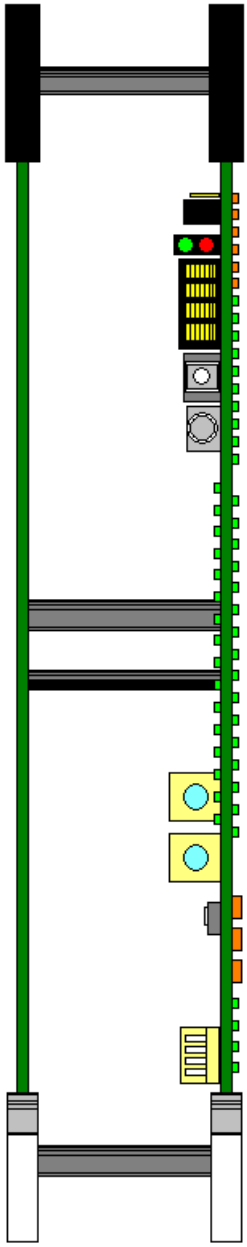

Figure 2-13: EMR Crosspoint Front Card Edge

Component	Description
Run/Upgrade Jumper	This jumper is used to place the module in upgrade mode when upgrading the firmware.

Table 2-3: Description of EMR Crosspoint Card Edge

2.3. EMX-FC FRAME CONTROLLER MODULE

The EMX-FC Frame Controller module provides a single point of access to communicate with the EMR cards. The EMX-FC provides a 10Base-T/100Base-TX Ethernet port and handles all communications between the frame and the control system, and serves as a gateway to individual cards in the frame. The EMX-FC also provides an RS-232 serial port at the card edge to set up the network addresses.

The EMX-FC is housed in a narrow slot underneath the left side or right side power supply in the EMX6-FR frame, and to the left of the right side power supply in the EMX3-FR frame.

2.4. SC-2000 SYSTEM CONTROLLER

The SC-2000 system controller is used to unify the individual modular components of the EMR system and to provide a single interface for control and monitoring. The SC-2000 is a 2RU modular chassis that has dual hot-swappable redundant power supplies. The chassis is built to accommodate two SC-2000 modules, one for main operation and one for redundant operation. Both cards are hot-swappable from the front of the chassis. When a SC-2000 is ordered, a single control card and a chassis are supplied. In addition, a SC-2000-R can be ordered to add a redundant control card to the system. In a fully redundant system, the bottom control card is the main and the top control card is the redundant.

The rear of the SC-2000 chassis is shown in Figure 2-14.

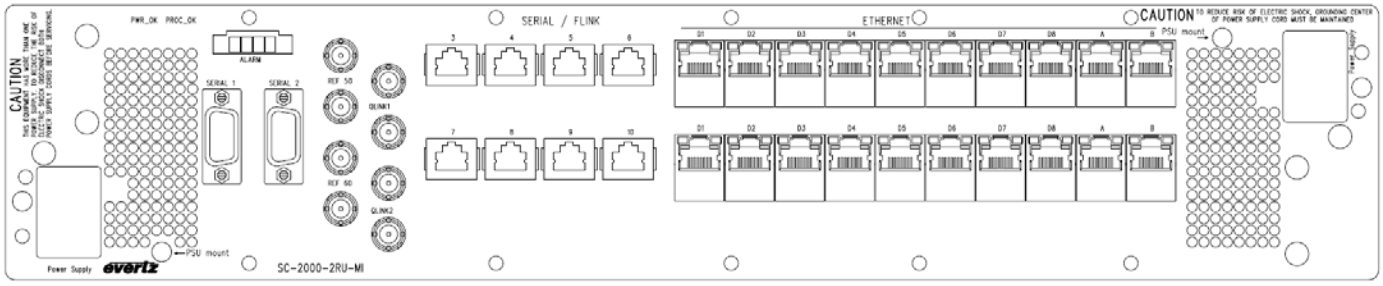

Figure 2-14: Rear View of SC-2000 Chassis

The SC-2000 has several interfaces with various functions. Some of the interfaces are independent between the top and bottom controller cards, and some are shared between the two. Details on each connector are in the following section.

2.4.1. SC-2000 Interfaces

Ethernet A: This RJ45 connector is the control port for sending configurations to the EMR and for making crosspoint changes. This port is also used to interface with an external control system to connect remote control panels. Ethernet port A is independent for each controller card.

Ethernet B: This RJ45 connector is the control port for interfacing the EMR with an external SNMP system such as VistaLINK®. Ethernet port B is independent for each controller card.

Ethernet D: This set of eight RJ45 connectors are used to interface with each EMX-FC or each EMX frame that consists of the entire EMR system. The D ports are essentially ports of a switch to allow all of the modular components of the EMR system to communicate as a single unit. Ethernet ports D are independent for each controller card.

Serial 1 & 2: These D9 connectors are serial ports used to provide serial control of the SC-2000. The serial ports can be configured to be RS-232 or RS-422 using the configuration software. These serial ports are shared between the main and redundant controller cards.

Serial/F-Link 3-10: These RJ45 connectors are serial ports used to provide serial control of the SC-2000. The serial ports can be configured to be RS-232 or RS-422 using the configuration software. These serial ports are shared between the main and redundant controller cards.

Q-Link 1 & 2: These two Q-LINK 75Ω termination BNC connectors support Evertz control panels that have a Q-Link connection. The connectors allow connection to two terminated external Q-Links. Q-Link is a dedicated control system specific to Evertz brand of Quartz products. The Q-Link system works as a single transmission line with devices connected along the length of the cable. It must be terminated at either end in 75Ω. The two connectors on the rear of the SC-200 have a dedicated loop through so they must be terminated for them to operate properly. The Q-Link connectors are shared between the main and redundant controller cards, with the card in control being the master of the Q-Link.

Ref 1 & 2: These two 75Ω termination BNC connectors are used to provide a reference to the SC-2000. Each reference connector has a loop through that can be used to loop the reference through the SC-2000 to the EMR frames in the system. The reference connectors are shared between the main and redundant controller cards.

2.4.2. SC-2000 Power Supply

The SC-2000 power supplies operate on either 100 to 240 volts AC at 50 or 60 Hz and automatically senses the input voltage. Power should be applied by connecting a 3-wire grounding type power supply cord to the power entry module on the rear panel. The power cord should be a minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.

The SC-2000 chassis is fitted with a power supply on one side, and an optional redundant supply on the opposite side. The supplies are hot swappable and can be removed for service or maintenance without removing the entire SC-2000 frame. Figure 2-15 shows an SC-2000 power supply module once it has been removed from the chassis.

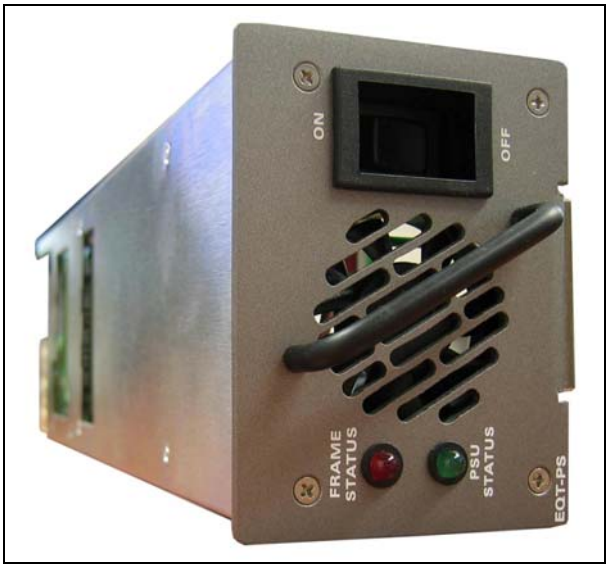

Figure 2-15: SC-2000 Power Supply

Each power supply has two status indicator LEDs. The green PSU STATUS LED indicates the health of the local power supply. The red FRAME STATUS LED indicates the health of the entire frame and is operated by the frame status bus of the frame. The FRAME STATUS LED will be Off under normal conditions and On when there are Frame Status Fault conditions.

If one of the power supplies malfunctions, (i.e. power cord disconnected, power switch is off, fuse is blown, rear fan is stopped, etc) then its PSU STATUS LED will go Off, and the red FRAME STATUS LED on both power supplies will turn On. The PSU STATUS LED on the power supply that is functioning will remain On.

2.5. INSTALLING AND REMOVING THE MODULES

2.5.1. Installing the Module Rear Plate

In most cases, the EMR frame will already have the modules and rear plates installed within the frame. However, when modules and rear plates need re-positioning, or when additional modules are purchased, proper module/rear plate installation is required.

Each EMR module is shipped with a matching rear panel plate that houses the appropriate connectors for that module.

To Install the Rear Plate:

1. Locate the specific slot in the frame and remove any filler plates.

2. Install the rear plate over the open slot by first fitting the plate then tightening the two lock-screws.

3. Tighten the screws after the main module is installed.

CAUTION: If any of the screws for the rear plate are missing, please contact Evertz immediately for the specification and/or replacement. Using the incorrect screw can cause thread stripping.

2.5.2. Opening and Closing the Front Panel

In order to insert or remove modules you will have to open the front panel using the following procedure:

1. Turn the two captive screws located on the front panel counter clockwise several turns until they release completely from the front extrusions.

2. Carefully lower the front panel door so that the front edge of the door is lower than the rear of the door.

2.5.3. Installing a Module

1. Orient the module vertically such that the smaller white card ejector is on the bottom, while the larger black card ejector is on the top.

2. Align the card with the card guide corresponding to the slot number where you installed the rear panel plate.

3. Carefully slide the module into the frame and press it completely into the rear panel connectors.

4. Use the upper card-ejector to latch the module into the slot.

5. Make sure that the connectors are fully seated in the rear panel.

6. When this is done, close the front panel and then tighten the screws that hold the rear panel in place.

2.5.4. Removing a Module

1. Press the card ejector down to release the module.

2. Grasp the card using the upper card ejector and pull the module out from the frame.

3. Carefully place the module in a safe place, free from static discharge.

2.6. MOUNTING

The EMR frame is equipped with rack mounting rails and fits into a standard rack space. The EMX6-FR requires a 19" x 10.5" x 15.75" (483 mm x 260 mm x 400 mm) space, and the EMX3-FR requires a 19" x 5.25" x 15.75" (483 mm x 133 mm x 400 mm) space. To securely fasten the frame to the equipment rack, make sure that all four mounting screws on each mounting rail are tightened securely.

Note: The EMX6-FR and EMX3-FR have front mounted cooling fans and require that the area below is flush so that there is sufficient room to open the frame completely to be able to remove the modules.

After the unit has been installed in a rack, all cards in the frame should be checked to ensure they are fully seated within the frame. This is best accomplished by simply pushing (simultaneously, with moderate force) on each card's top and bottom insertion/extraction levers. See section 2.5.3 for further information. This step should be repeated any time the frame is shipped, or relocated within a facility.

2.7. COOLING

The EMR frame is designed to ensure adequate cooling for up to 650 watts (EMX6-FR) or 360 watts (EMX3-FR) of processing power per frame. Fans at the front and rear of each power supply module accomplish forced air-cooling. Adjacent equipment may be mounted immediately to the top and bottom of the frame. Additional module cooling is provided by interior cooling channels to ensure that even fully loaded frames mounted adjacent to each other will operate within the normal temperature range.

The EMX6-FR and EMX3-FR frames have additional fans mounted to the front door of the frame to provide additional cooling.

CAUTION: For proper cooling, the frame must contain two EMX6-PS/EMX3-PS power supplies.

2.7.1. Fan Exhaust

The cooling fans for the power supplies, located at the front of the frame, draw air in the front and exhaust out the sides of the frame. The cooling fans for the modules, located at the rear of the frame, draw air in the front and the exhaust out the rear of the frame.

CAUTION: To ensure adequate cooling, care should be taken to ensure that the fan inlets and exhaust openings are free of obstructions.

2.8. SERVICING INSTRUCTIONS

CAUTION: These servicing instructions are for use by qualified service personnel only. To reduce the risk of electric shock, do not perform any servicing instructions in this section of the manual unless you are qualified to do so.

2.8.1. Changing the Fuses

CAUTION: For continued protection against the risk of fire, replace only with the same type and rating of fuse.

ATTENTION: Pour éviter les risques d'incendie, remplacer le fusible avec un fusible de même calibre.

The fuse holder is located inside the power entry module. To change the fuses, disconnect the line cord from the power entry module and pull the fuse holder out from the power entry module using a small screwdriver. The fuse holder contains two fuses, one for the line and one for the neutral side of the mains connection. Pull out the blown fuse and place a fuse of the correct value in its place.

For 100-120 VAC operation, use ceramic time delay 5 x 20 mm fuses rated for 250 Volts with a 10 amps current rating. For 220-240 VAC operation use ceramic time delay 5 x 20 mm fuses rated for 250 Volts with a 6.3 amps current rating.

For your convenience there are spare fuses located in the vinyl pouch in the front of this manual. Carefully reinsert the fuse holder into the power entry module.

2.8.2. Replacing the Power Supply

Each power supply is a complete assembly, and includes the power supply cooling fan and one frame-cooling fan. In the event that the power supply or one of the fans malfunctions, you will need to replace the power supply assembly with a spare one while the failed assembly is being repaired.

CAUTION: Do not run the frame for extended periods of time with one of the power supplies removed. Proper cooling of the frame requires both power supplies to be inserted into the frame, or one power supply and a power supply blank panel.

The EMX6-PS and EMX3-PS power supplies are hot swappable and can be easily replaced from the front without interrupting the signal integrity of the frame. Each power supply is capable of supplying full power to the frame by itself, however we recommend running with both supplies powered for power redundancy.

The power supply is secured into the frame by two machine screws through the rear panel (as shown in Figure 2-16). These screws must be removed before the power supply can be extracted from the front.

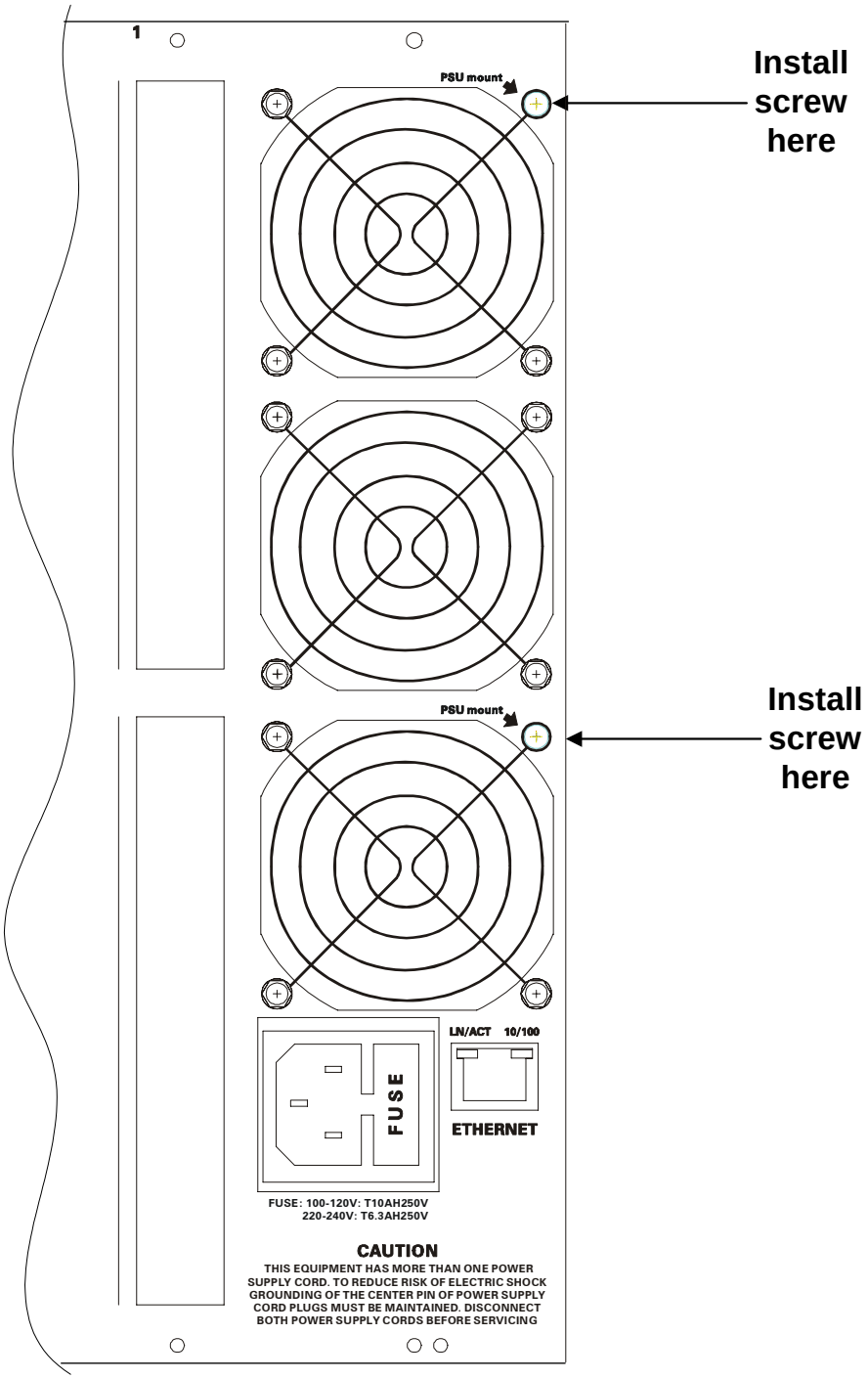

Figure 2-16: Locating the Power Supply Mounting Screw

CAUTION: To reduce the risk of electric shock, you must replace the mounting screw *after* replacing the power supply.

2.9. POWER

The power entry modules contain a standard IEC power inlet connector, two 5 x 20 mm fuse holders, and an EMI line filter.

CAUTION: The EMR frame is shipped with 10 Amp fuses rated for 100-120 VAC operation. If you are operating the EMR System in a country with nominal 220-240 VAC operation, replace the fuses with 6.3 Amp fuses rated for 220-240 VAC operation. See section 2.8.1 for information on changing fuses.

2.9.1. Connecting the Power

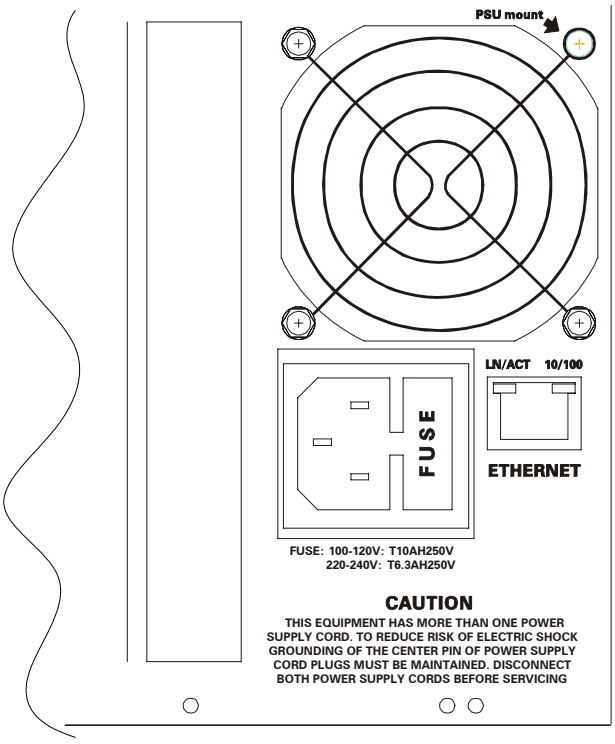

Figure 2-17: Connecting the Power to the Frame

The EMR frame comes standard with one auto-ranging power supply that automatically senses the input voltage over the range of 100 to 240 VAC. An additional power supply can be ordered to provide fully redundant powering of the frame. When only one power supply is fitted, the frame will be fitted with a fan module to ensure the thermal integrity of the frame cooling. In a frame that contains a redundant power supply module, each power supply may be powered from a different AC mains source, allowing complete AC supply redundancy.

Power should be applied by connecting a three-wire, grounding-type power supply cord to the power entry module on the rear panel of each power supply. For use in North America, the power cord should be a minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length. For use outside North America, use a power cord approved for the country of use with a minimum 1.00 mm^2 wire size.

CAUTION: To reduce the risk of electric shock, grounding of the ground pin of the main plug must be maintained.

2.9.2. Turning the Power On and Off

Each power supply is fitted with its own power switch. When the switch is turned off, the remaining power supply will power the frame. To completely remove power from the frame, both power supplies must be turned off.

2.9.3. Power Supply Status Indicators

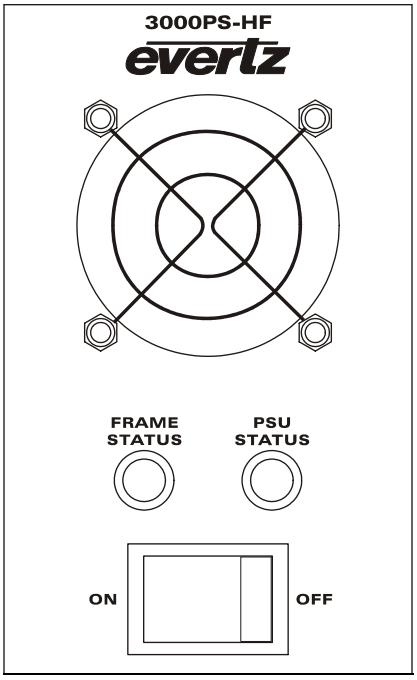

Figure 2-18: Power Supply Status Indicators

Each power supply has two status indicator LEDs. The green PSU STATUS LED indicates the health of the local power supply. The red FRAME STATUS LED indicates the health of the entire frame and is operated by the frame status buss of the frame. The FRAME STATUS LED will be Off under normal conditions and On when there are Frame Status Fault conditions. See section 2.10 for more information about the frame status buss fault conditions.

If one of the power supplies malfunctions, (power cord disconnected, power switch is off, fuse is blown, rear fan is stopped, etc,) then its PSU STATUS LED will go Off, and the red FRAME STATUS LED on both power supplies will turn On. (If the power supplies are fitted with green FRAME STATUS LEDs they will turn Off) The PSU STATUS LED on the power supply that is functioning will remain On. If the frame is connected to VistaLINK® then the power supply fault will send a trap message from the frame.

If there is a fuse failure, contact Evertz customer service regarding the power supply immediately. The power supplies are short circuit protected and should not blow the fuse under a short circuit condition.

2.10. FRAME STATUS FAULT CONDITIONS

The Frame is fitted with a global Frame Status monitoring buss that is connected to each of the power supplies and to each of the modules. When a fault condition occurs on one of the power supplies, or one of the modules, a Frame Status Fault condition is active on the frame status buss. When this occurs, the red FRAME STATUS LED on the power supply will come on and the relay on the Frame Status Tally terminal block will activate.

Power supplies, will assert a frame status fault when their PSU STATUS LED is off.

Each module has a large red LOCAL FAULT LED and a large green MODULE OK LED at the top of the card edge. This green LED indicates good module health while the red LED indicates that there is a fault condition on the module. Each module has its own criteria that determines when the red fault LED comes on. When the red LOCAL FAULT LED is On the module can also assert a fault condition on the Frame Status buss. On each module there is a jumper that disables sending local card fault information to the Frame Status Buss. For more information about fault conditions on individual modules, and for the location of the Frame Status Jumper on the module consult the individual chapter for the module. For example, if a module requires video or audio for its functionality and the video or audio is not present, the red LOCAL FAULT LED on the module will be On and the fault will be reported on the frame status buss if the FRAME STATUS jumper on the module is set to the On position (default).

2.11. CARE AND HANDLING OF OPTICAL FIBER

2.11.1. Safety

The **CLASS 1 LASER PRODUCT** sign will appear as the following image:

Background colour: Yellow
Triangular band: Black
Symbol: Black

2.11.2. Assembly

Assembly or repair of the laser sub-module is done solely at the Evertz facility, and is performed only by qualified Evertz technical personnel.

2.11.3. Labeling

Certification and Identification labels are combined into one label. As there is not enough room on the product to place the label, it is reproduced here in the manual. See Figure 2-19 below.

Note: There is not a date of manufacture on this label as it can be traced by the bar code label placed on the printed circuit board of each Evertz plug-in module

Figure 2-19: Reproduction of Laser Certification and Identification Label

2.11.4. Handling and Connecting Fibers

CAUTION: Never touch the end face of an optical fiber. Always keep dust caps on optical fiber connectors when not connected and always remember to properly clean the optical end face of a connector before making a connection.

Since the transmission characteristics of the fiber depend on the shape of the optical core, care must be taken to prevent fiber damage caused by heavy objects or abrupt fiber bending. Evertz recommends that you maintain a minimum bending radius of 5 cm to avoid fiber-bending loss that will decrease the maximum attainable distance of the fiber cable.

Dust particles on the ends of the optical fiber greatly increase the signal loss at interconnections, and large dust particles can even obscure light transmission altogether. To minimize the effects of dust contamination at the interconnections, the fiber should be cleaned each time it is mated or unmated. When using interconnection housings to mate two optical fibers, it is good practice to remove dust particles from the housing assembly with a blast of dry air. Alternatively, you can use the pre-moistened tissue that you should have received with the optical module. Remove this tissue from its package and wipe the end of the fiber connector before mating it to the module.

Whenever a fiber is unmated, it must be covered immediately. Most fiber manufacturers provide a plastic boot that fits over the ferrule body for this purpose.

Fiber interconnections must be made securely. The Evertz fiber optical transmitters and receivers come with SC interconnection housings built into the module. With this style of connector, the fiber assembly and the housing assembly can only be connected in one way and with very good repeatability. The rear fiber interconnect panel that is provided with each module can be ordered with optional SC/PC, ST/PC, or FC/PC connectors. The customer is required to provide the optical fiber with the correct connectors to connect the modules together. SC/PC, ST/PC, and FC/PC interconnection housing and connectors (as well as adapters) are industry standards with many available sources.

3. SPECIFICATIONS

3.1. EMR SPECIFICATIONS

3.1.1. Configuration

Inputs:	Selectable in blocks of 32
Outputs:	Selectable in blocks of 32

3.1.2. Video Inputs

Formats:	SMPTE 259M, SMPTE 292M, SMPTE 310M, SMPTE 424M, ASI
Signal Level:	800mV p-p
Impedance:	75Ω terminating
Return Loss:	> 15dB typical (5-1500MHz)
	> 10dB typical (1.5-3GHz)
Cable Equalization:	Belden 1694A, 190m @ 1.5GHz
	Belden 1694A, 130m @ 3GHz
Connectors:	DIN 1.0/2.3

3.1.3. Video Outputs

Formats:	Same as input
Reclocking:	Configurable
Non-Reclocking:	Configurable
Signal Level:	800mV p-p ±10%
Impedance:	75Ω terminating
Return Loss:	> 15dB typical (5-1500MHz)
	> 10dB typical (1.5-3GHz)
DC Offset:	0±0.5V
Output Jitter:	0.2UI
Connectors:	DIN 1.0/2.3

3.1.4. Switching Reference

Reference Inputs:	2x BNC, analog 525/625/tri-level HD
Reference Timing:	2 independent timing planes, programmable per output
Signal Level:	1V p-p ±3dB
Impedance:	75Ω terminating
Connectors:	BNC per IEC 61169-8 Annex A

3.1.5. Control

Ethernet:	2x RJ45
Serial RS-232/RS-422:	2x D9 female

3.1.6. Electrical

Supply: Auto ranging, 100 – 240VAC, 50/60Hz
Power Consumption:
EMX6-FR: 650W
EMX3-FR: 360W
Redundant: PSU Optional

3.1.7. Physical

EMX6-FR:

Height: 10.5” (266mm)
Width: 19.0” (483mm)
Depth: 15.75” (400mm)
Module Capacity: 15 single slot EMR series modules
Weight Approx.: 34.8lbs (15.8kg) with 2 power supplies, no slots occupied
Approximately: 64.0lbs (29kg) with 2 power supplies, all slots occupied

EMX3-FR:

Height: 5.25” (133mm)
Width: 19.0” (483mm)
Depth: 15.75” (400mm)
Module Capacity: 5 single slot EMR series modules
Weight Approx.: 17.4lbs (7.9kg) with 2 power supplies, no slots occupied
Approximately: 32.0lbs (14.5kg) with 2 power supplies, all slots occupied

3.2. EMX-FC SPECIFICATIONS

3.2.1. Ethernet

Network Type: Fast Ethernet 100 Base-TX IEEE 802.3u standard for 100 Mbps baseband CSMA/CD local area network
Ethernet 10 Base-T IEEE 802.3 standard for 10 Mbps baseband CSMA/CD local area network
Connector: RJ-45 (on rear panel of frame)

3.2.2. Serial Communications

Standard: RS-232 or RS-422
Connector: 15-Pin Female D
Baud Rate: 57600 (configurable)
Format: 8 bits, no parity, 2 stop bits, no flow control

3.2.3. Electrical

Voltage:	+ 12VDC
Power:	7 Watts
EMI/RFI:	Complies with FCC Part 15 Class A and EU EMC directive

3.3. SC-2000 SPECIFICATIONS

3.3.1. Reference Timing

Switching Reference:	Analog 525/625/tri-level HD looping
Connector:	BNC per IEC 60169-8 Amendment 2.
Signal Level:	1 V p-p ± 3dB
Impedance:	75Ω
Switching Line:	Lines 6/319 (625), Lines 10/273 (525), Line 7 (HD)

3.3.2. Ethernet

Network Type:	Fast Ethernet 100 Base-TX IEEE 802.3u standard for 100 Mbps baseband CSMA/CD local area network Ethernet 10 Base-T IEEE 802.3 standard for 10 Mbps baseband CSMA/CD local area network
Connector:	RJ-45

3.3.3. Q-Link

Connector:	75Ω video cable (max length 500m)

3.3.4. Serial Communications

Standard:	RS-232 or RS-422
Connector:	9-Pin Female D or RJ-45
Baud Rate:	57600 (configurable)
Format:	8 bits, no parity, 2 stop bits, no flow control

3.3.5. Electrical

Input Voltage:	Auto ranging 100-240V AC, 50/60Hz
Input Power:	200W

3.3.6. Physical

Height:	3.5” (89mm) 2RU
Width:	19” (483mm) 19” Rack Mount
Depth:	10.3” (262mm) over hinges and BNCs
Weight:	6 kg Fully Loaded
Operating Temperature:	0°C to 40°C
Cooling:	Fan cooled, front to rear

4. SYSTEM OVERVIEW

4.1. SYSTEM CONNECTIONS

The EMR video routing system provides a flexible and scalable interface that allows a system to be built for distributed applications. The EMR video input cards can be placed in locations that are closer to the video sources to limit the cable length runs. The same can be done with the EMR video output cards.

The interface for all of the EMR video modules is via an external X-LINK II connection. X-LINK II is a unique cable connection that is capable of carrying 32 baseband video signals with up to 3Gb/s data rates on each path. The X-LINK II cable is identified as a white or blue cable instead of the black one used for a standard X-LINK cable.

Figure 4-1 shows how a 128x128 system would be connected together. A system of 128 inputs and 128 outputs has 4 input cards and 4 output cards, which can be placed in a single 6RU EMX6-FR frame.

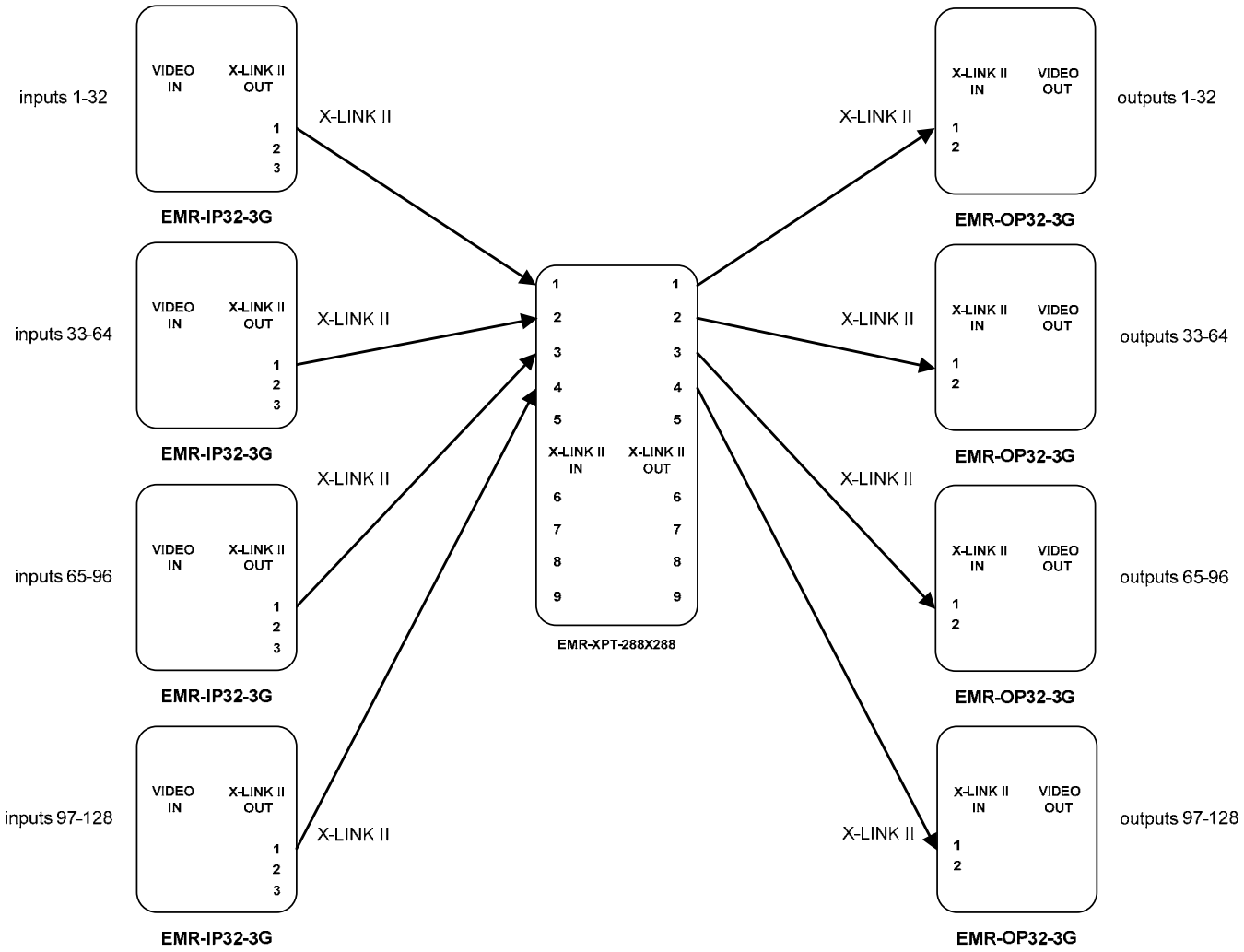

Figure 4-1: EMR Configuration for 128X128

An EMR video system can grow to a full 288x288 router by combining two 6RU EMX6-FR frames. In this configuration, the crosspoint would reside in one frame with 4 input cards and 4 output cards, while the rest of the input and output cards would reside in a second frame. The connection between the cards in the second frame to the crosspoint in the first frame is via X-LINK II. Figure 4-2 shows the connections for a 288x288 EMR video router.

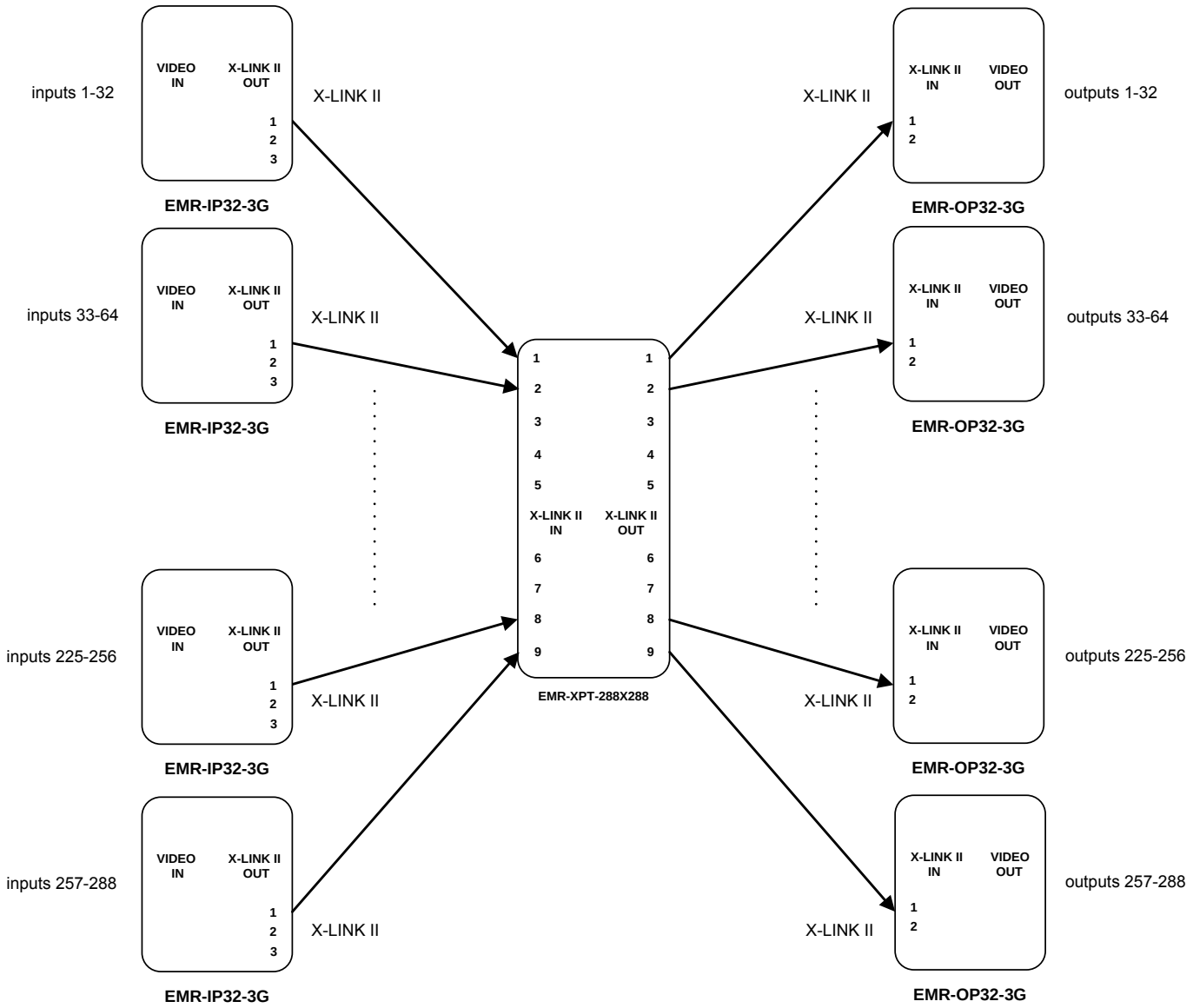

Figure 4-2: EMR Configuration for 288X288

The EMR system is built with a fully redundant architecture to ensure that it can handle mission critical applications. For systems that require this level of protection, the EMR system offers full path-by-path crosspoint redundancy.

The second redundant crosspoint can be added at any time, even while a system is live. To increase the resiliency of the system, the redundant crosspoint can be placed in a separate frame that is isolated from the primary crosspoint. Figure 4-3 shows the connections required for a fully redundant 288x288 EMR video router.

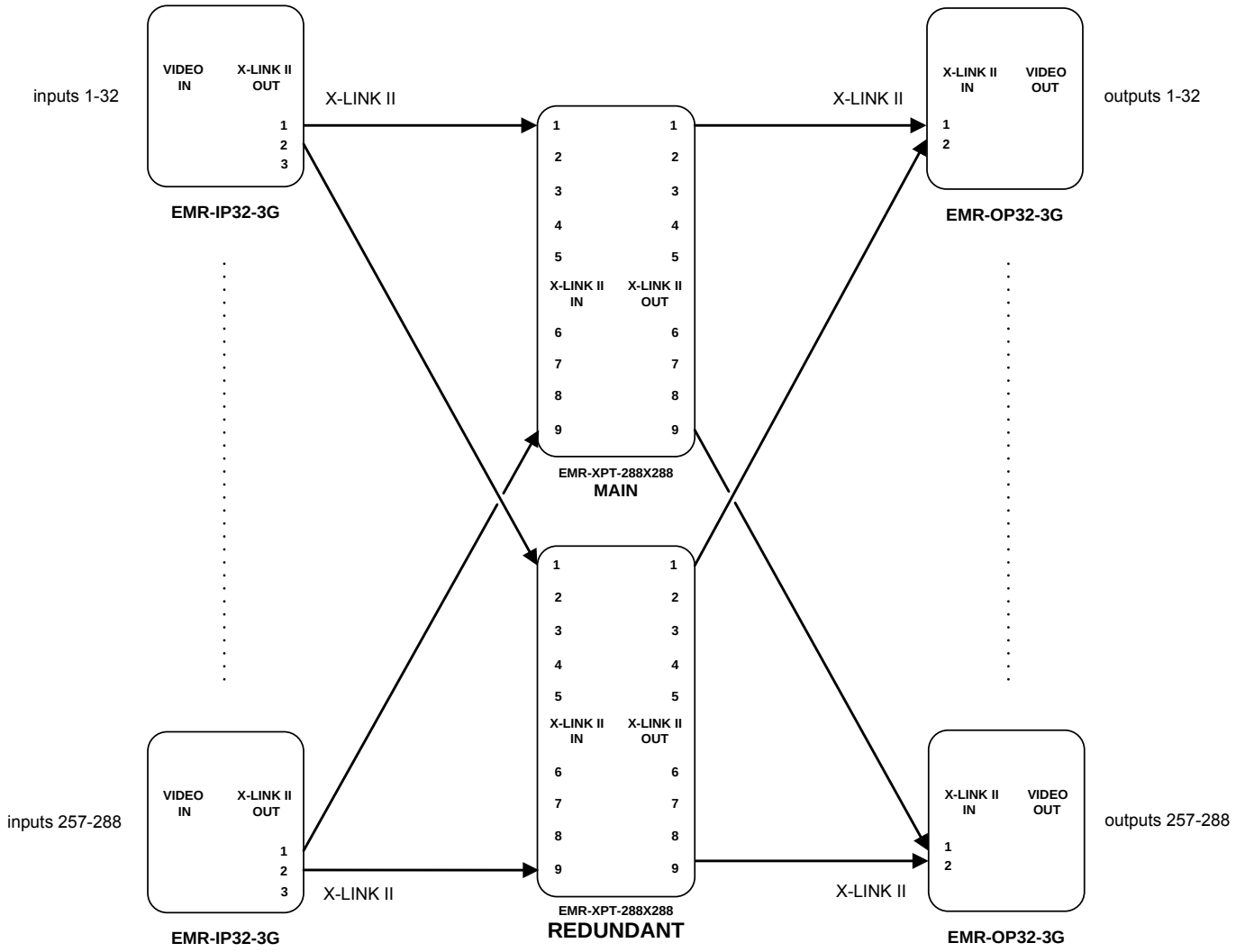

Figure 4-3: EMR Configuration with Main and Redundant Crosspoints

A fundamental feature of the EMR video router is the ability to interface with Evertz multi-viewers without requiring additional output modules. Since the interface to the EMR crosspoint is via X-LINK II connectors, it allows X-LINK equipped multi-viewers such as the VIPX to connect directly to the crosspoint.

These connections can be made directly off the main crosspoint, or if all 288 outputs are required, a third crosspoint module can be added to the system as shown in Figure 4-4.

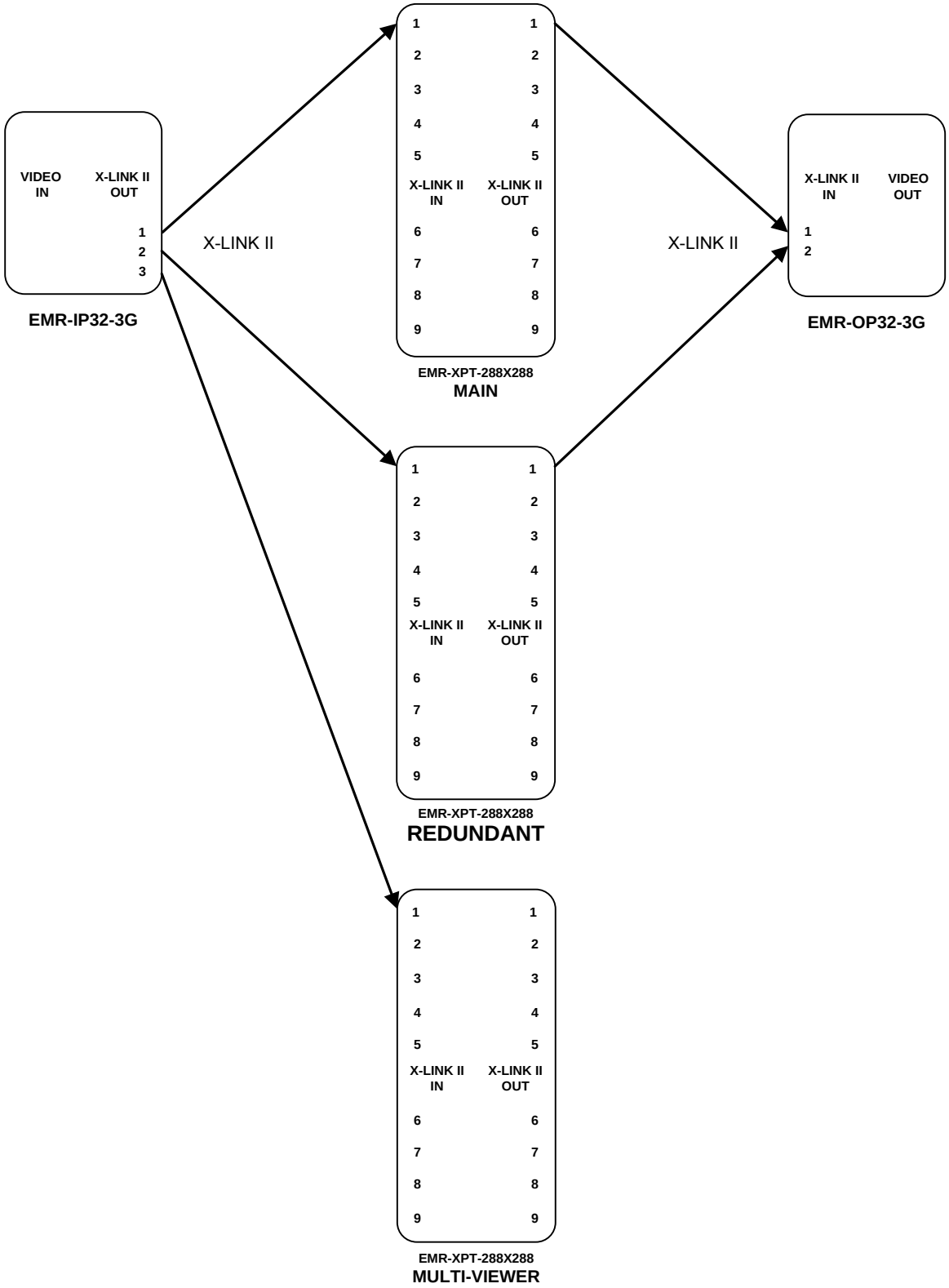

Figure 4-4: EMR Configuration with Main, Redundant and Multi-viewer Crosspoints

The third multi-viewer crosspoint is used exclusively to feed X-LINK enabled multi-viewers. This uses a standard X-LINK cable along with a X-LINK II to X-LINK converter. The X-LINK II to X-LINK converter is called a XLINK-II-S and is a passive device used to interface the two connectors.

Note: A XLINK-II-S module is required to interface the EMR video router with VIPX and MVPX multi-viewers.

4.1.1. Referencing

A common video reference must be applied to all EMR and SC-2000 frames within a system. The reference is required to ensure that all devices have a common clock that is used to synchronize the system. Among other functions, this enables the router to switch on the appropriate switch line.

Note: All EMR and SC-2000 frames must be locked to a common reference.

4.1.2. Inter-frame Cable Length Limitations

Since the interface between the input, output and crosspoint devices is external to the frame, the location of the cards is not important. The only limiting factor is the length of the X-LINK II cable which is 1 meter long.

For connections between EMR components that need to exceed this limit, Evertz has a full lineup of fiber conversion gear that can be used to transport the video signals. Please contact the factory for more details.

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5. EMR AND SC-2000 NETWORK CONFIGURATION

The modular aspect of the EMR system requires the SC-2000 to provide a unified interface for router control and for system monitoring. The following describes the function of each network interface and how a typical system should be wired together. Figure 5-1 shows the network connections between the EMR system, the SC-2000 and remote control panels.

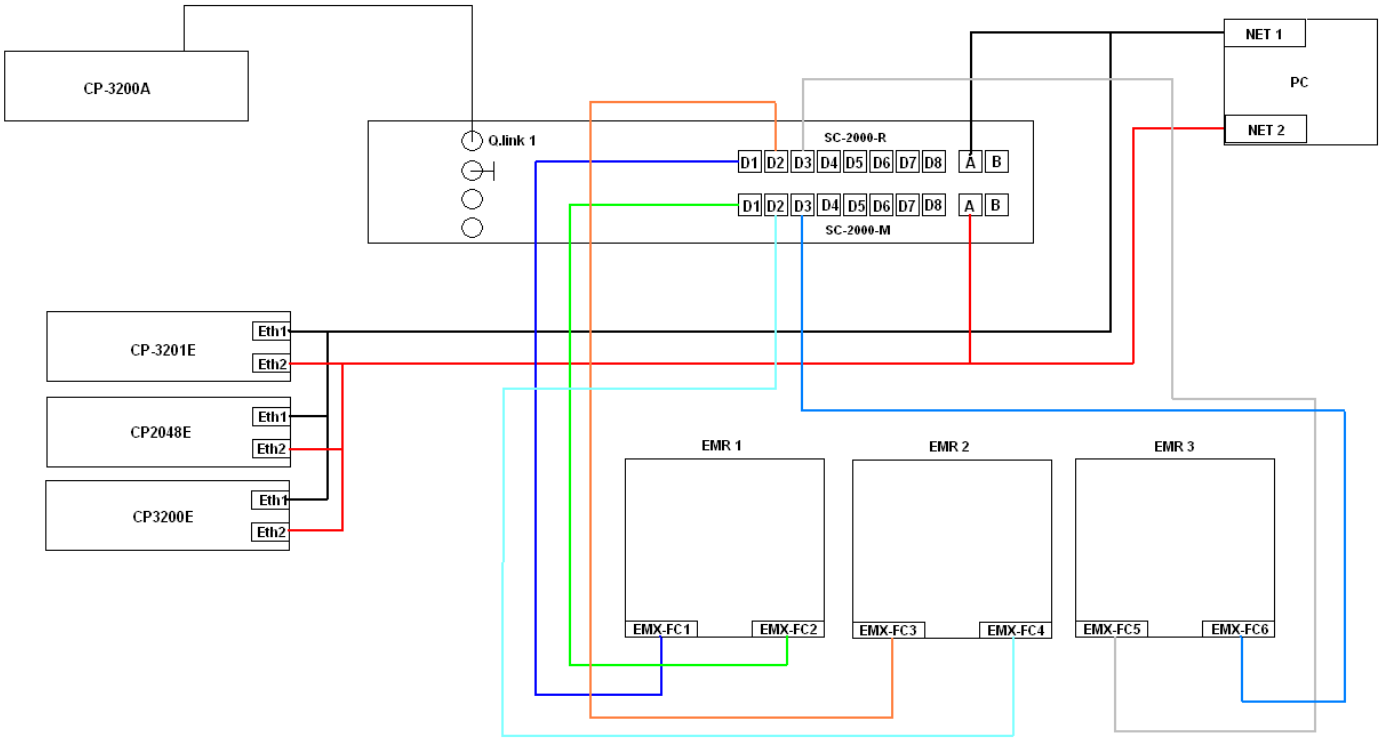

Figure 5-1: EMR and SC-2000 Network Connection

The architecture of the SC-2000 allows an EMR system to have complete network redundancy. When this is required, the EMR router and control panels should be connected in the manner shown in Figure 5-1. From a networking perspective, the top and bottom controller cards in the SC-2000 are completely separate. One can be considered the controller for the main network and one can be considered the controller for the redundant network.

For devices in which there are two network controllers, one should be connected to the main network and one should be connected to the redundant network. In the case of the EMR router, one EMX-FC should be connected to the main, and the other should be connected to the redundant. This is the same for any computer that will be used to interface with the SC-2000.

Remote control panels that are connected over Ethernet should also be put onto both networks if possible.

5.1. IP CONNECTION SETTINGS

The SC-2000 has 4 network ports so 4 IP addresses must be configured for the system to function properly. A fifth IP address is also configured for redundancy between the controllers.

The function of each network port is as follows:

- **Network A:** Control port for sending configurations, making crosspoint changes and connecting control panels. This will also be the port for any automation system that needs to control the router over IP.
- **Network B:** SNMP control and monitoring port.
- **Network C:** Interlink IP port used by the main and redundant controllers to communicate with each other to determine who is in control.
- **Network D:** Used to interface with the EMX-FC exclusively to provide a network switch for all of the individual EMR frames.
- **Remote IP:** Set to the C address of the other SC-2000 card (If fitted).

Each Ethernet port has to be on a different subnet (i.e. Port A: 192.168.5.100, Port B: 192.168.6.100, Port C: 192.168.0.100 and Port D: 192.168.7.100)

The first EMX-FC frame controller will match the A (network 1) address in the EMR cards and the D port on one of the SC-2000 cards.

The second EMX-FC frame controller will match the B (network 2) address in the EMR cards and the D port on the other SC-2000 card.

Setting the IP address in this manner will give full network redundancy between the SC-2000 card and the EMR frames. An example of how the IP addresses should be set for each port in the SC-2000 and each port in the EMR is shown in Table 5-1 and Table 5-2. Take note of the different subnets for each component in the system.

Note: The IP addresses are set using an Evertz ribbon cable connected to the 4-pin serial port on the front of each SC-2000 controller card

SC-2000	Port A IP	Port B IP	Port C IP	Port D IP	Remote IP
Top (Red)	192.168.5.210	192.168.6.210	192.168.0.210	192.168.7.210	192.168.7.211
Bottom (Main)	192.168.5.211	192.168.6.211	192.168.7.211	192.168.0.211	192.168.0.210

Table 5-1: IP Address Scheme for the SC-2000

Component	Main IP	Redundant IP
EMX-FC (Main)	192.168.0.20	
EMR-IP32-3G	192.168.0.21	192.168.7.21
EMR-XPT-288X288	192.168.0.22	192.168.7.22
EMR-OP32-3G	192.168.0.23	192.168.7.23
EMX-FC (Red)		192.168.7.20

Table 5-2: IP Address Scheme for EMR Components

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6. CONFIGURING THE SYSTEM USING WINSETUP

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

The configuration of the SC-2000 uses a special version of WinSetup. To ensure that the correct version is used, check the *Options, System Version* menu. The correct version has the SC-500E as the only system inside the Routing System Controller box.

Note: Configuration of the SC-2000 requires a specific version of WinSetup.

WinSetup is supplied with a comprehensive help system that can be accessed by pressing **F1** (function key F1) from any screen (dialog). The help system can also be entered from the *Help, Index* menu. The following notes are a very brief guide to WinSetup intended for getting started.

The following dialog, Figure 6-1, is the WinSetup main screen. Any part of the system can be configured from the menu at the top of the screen. The grey bars above each main section and the line items within the main sections can both be used for quick access to specific items.

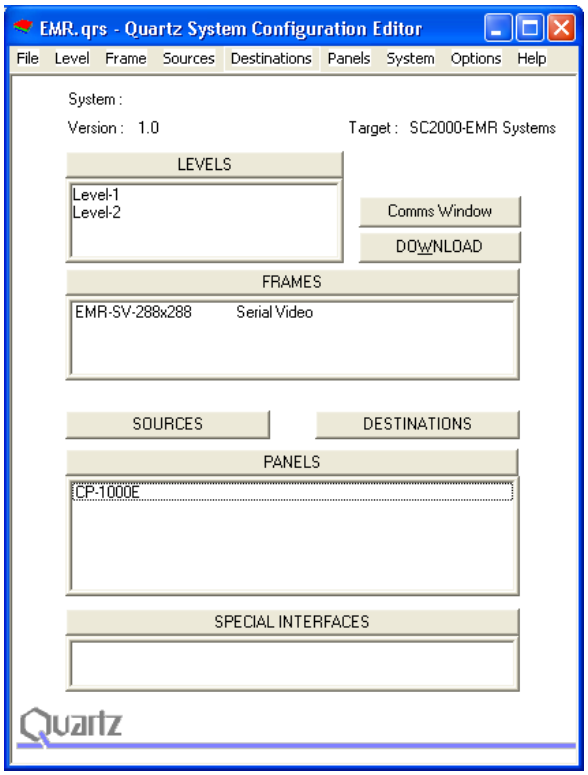


Figure 6-1: WinSetup Configuration Editor

When generating a new system configuration some of the menus and functions are grayed out (not available). This is deliberate to 'lead the user through' the functions that need to be set up. Carry out the following functions to configure the system.

(1) **Levels:** Enter the level names for each of the signal levels you want to control. Do not tick the "Complex" box at this stage. For the EMR router, two levels should be entered: Video and Redundant.

(2) **Frames:** Enter the frames dialog and use the new button. Select the appropriate router from the list available. Under the frame configuration, the frame must be sub-divided into two parts. This is required to setup the router for redundant operation.

The frame should be split into two parts, with one part being the Video level and the other part being the Redundant level. The sizes of the two parts should be 288x288 and 6x288 respectively. Figure 6-2 shows what the configuration should look like. Further details regarding the configuration of the EMR and the communication ports are in section 6.1 and section 6.2.

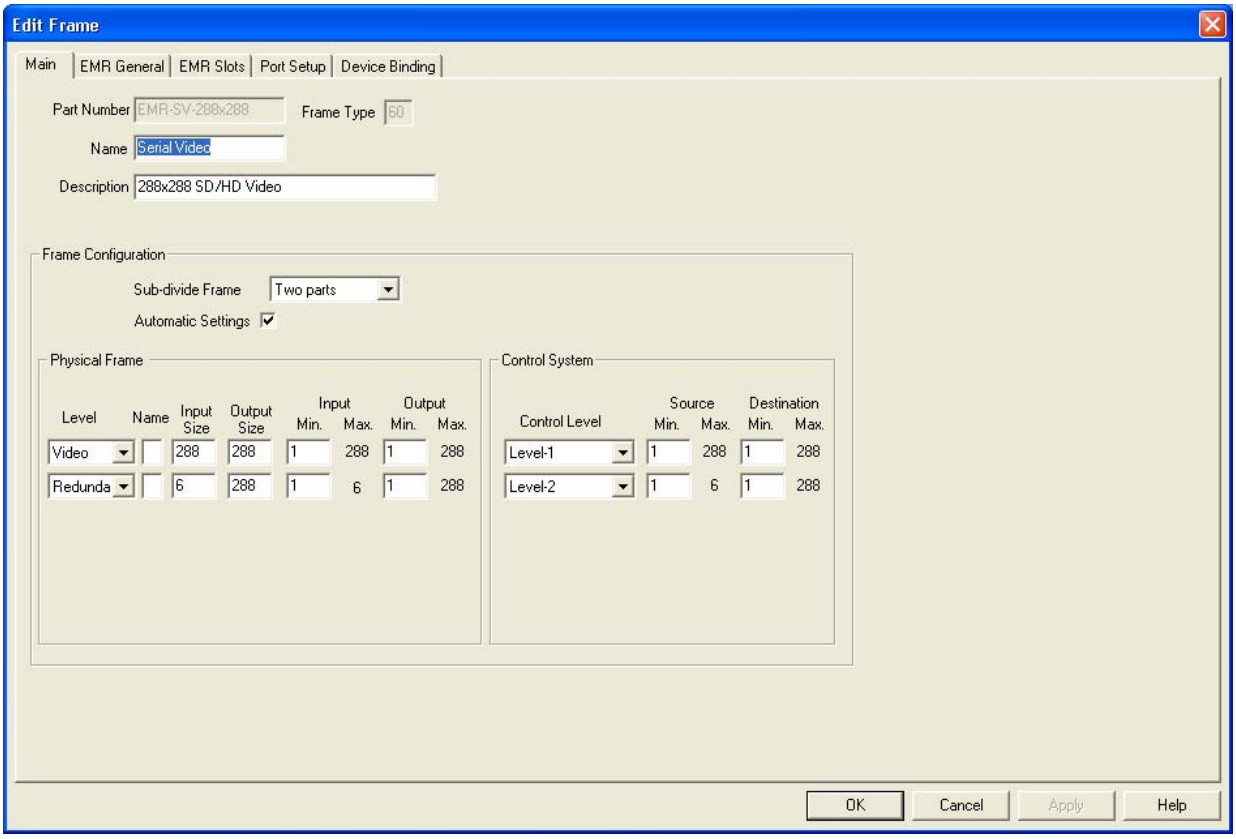


Figure 6-2: WinSetup Frame Editor

(3) **Sources:** Enter the sources dialog and use the add button to fill the name table with SRC-1 to SRC-X. The names can be edited later when a few panels are configured and working. It is important to set the number of sources in Level-1 to be 288, even if the router will be smaller. This is required to correctly define the redundant control level.

As shown in Figure 6-3, 6 sources must be defined for Level-2. These 6 sources are called manual main, manual redundant, manual shadow, auto main, auto redundant, and auto shadow. Note that manual shadow (SRC-291) and auto shadow (SRC-294) are not used but must still be defined in the sequence as shown. These additional sources are used to control crosspoint redundancy.

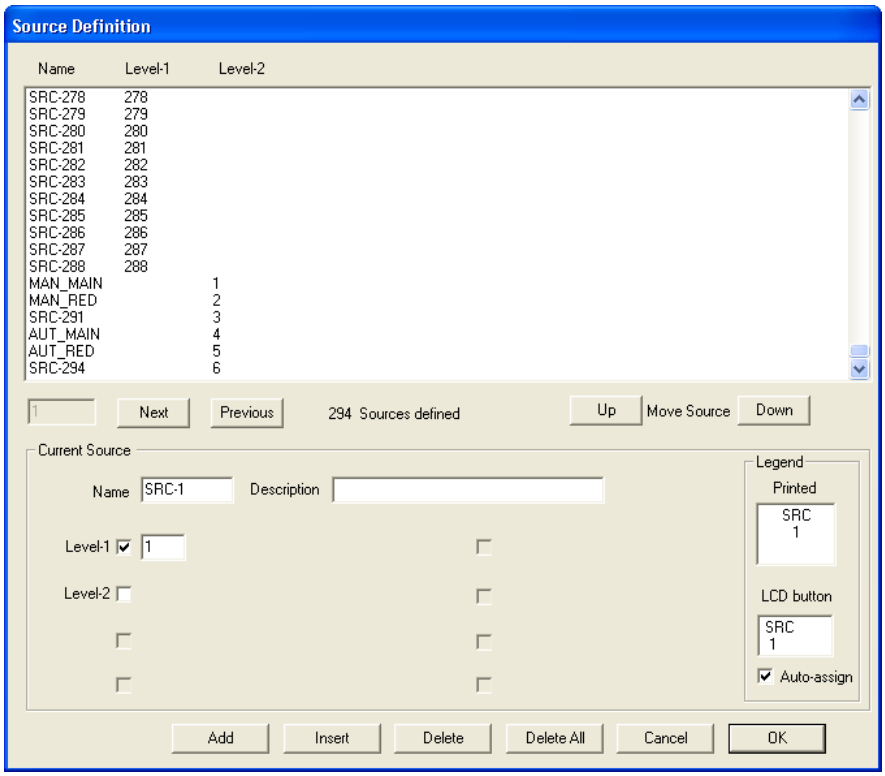


Figure 6-3: WinSetup Source Definition

If you want to edit a name now, select one row from the list of names in the upper part of the screen, the details appear in the lower part of the screen. From here you can edit the name and decide which signal levels that name will control when selected on a control panel.

(4) **Destinations:** Enter the destination dialog and set up the destination names in the same way as used for the source names. Destinations must be defined for both Level-1 and Level-2 as shown in Figure 6-4.

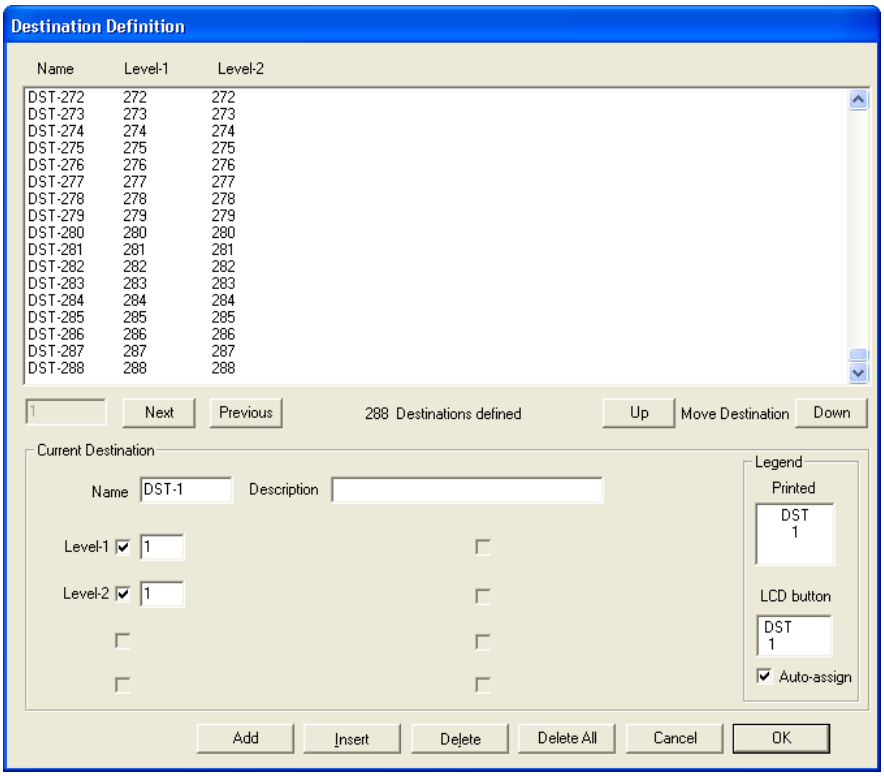


Figure 6-4: WinSetup Destination Definition

(5) **Panels:** Enter the panel's dialog and use the new button. This will show all Evertz panels listed by part number. Select the part number that matches the part number on the panel's serial number label. Ignore the A/E designation as the connection method for the panel will be defined in the panel configuration dialog. Once a part number is selected, a new dialog will appear showing a graphic of the panel as shown in Figure 6-5.

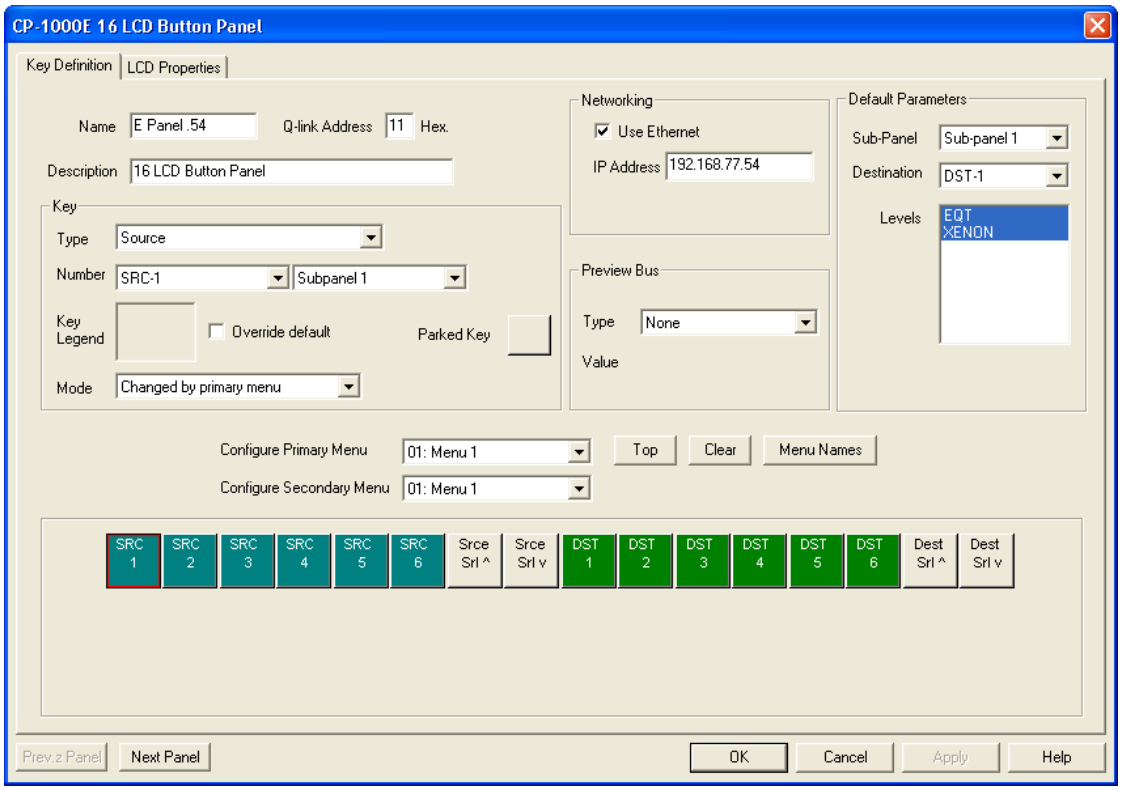


Figure 6-5: WinSetup Panel Configuration

Each button can be programmed by selecting the button and then editing the functions in the Key section of the dialog. Each panel should also be given a name for later identification, E Panel .54 in this example. The Q-Link address will be allocated automatically by the program but can be edited if required. The default parameters control how the panel will function at power up. In this example the panel will always control DST-1 to start with. Now add any further panels that the system will need.

Note: An indication for the connection method used (Q-Link or Ethernet) must be made in the panel configuration of each panel.

To differentiate between a panel that is connected via Q-Link and a panel that is connected via Ethernet, check the *Use Ethernet box* when appropriate. When checked, an IP address is required to be entered. This is the IP address of the control panel.

(6) **Download:** Use the System menu, Download-to-Router to transfer the setup data to the router. Remember to save the setup as it **CANNOT** be retrieved from the router.

Note: The configuration for the SC-2000 can only be downloaded over Ethernet and not serially.

Note: Configuration downloads to the SC-2000 must be done using port 3000.

6.1. EMR FRAME CONFIGURATION

The general configuration tab for the EMR contains the controls necessary to configure the EMR router for redundancy, switch timing and some other functional controls. The EMR General tab is shown in Figure 6-6.

The *General* section is used to set the number of EMR chassis or frames in the system, and to select whether or not there is a redundant crosspoint.

The *Timing Plane Configuration* section allows 4 timing planes to be configured so that sources in the EMR router can be switched using different switch lines. The switch line that is used will depend on the video standard that is selected in the *Switch Point Offset* drop-down box.

The *Default Signal Parameters* section is used to select the default timing plan that is used by the router, along with functions to control input equalization, reclocking and the output slew rate. In most case, all of these controls should be left in their default values.

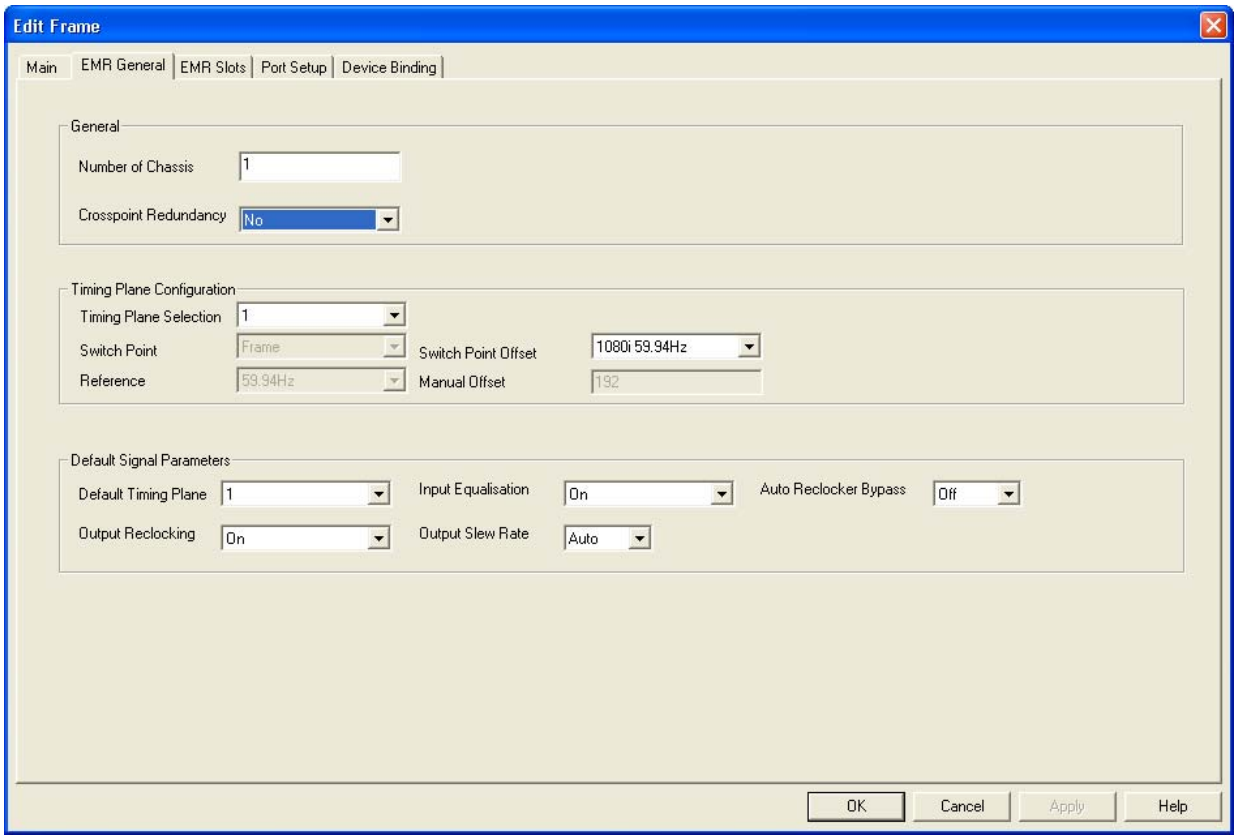


Figure 6-6: EMR General Frame Configuration

The EMR slot configuration tab for the EMR contains the controls necessary to configure the SC-2000 so that it is aware of all of the components that consist of the EMR system. The EMR Slots tab is shown in Figure 6-7.

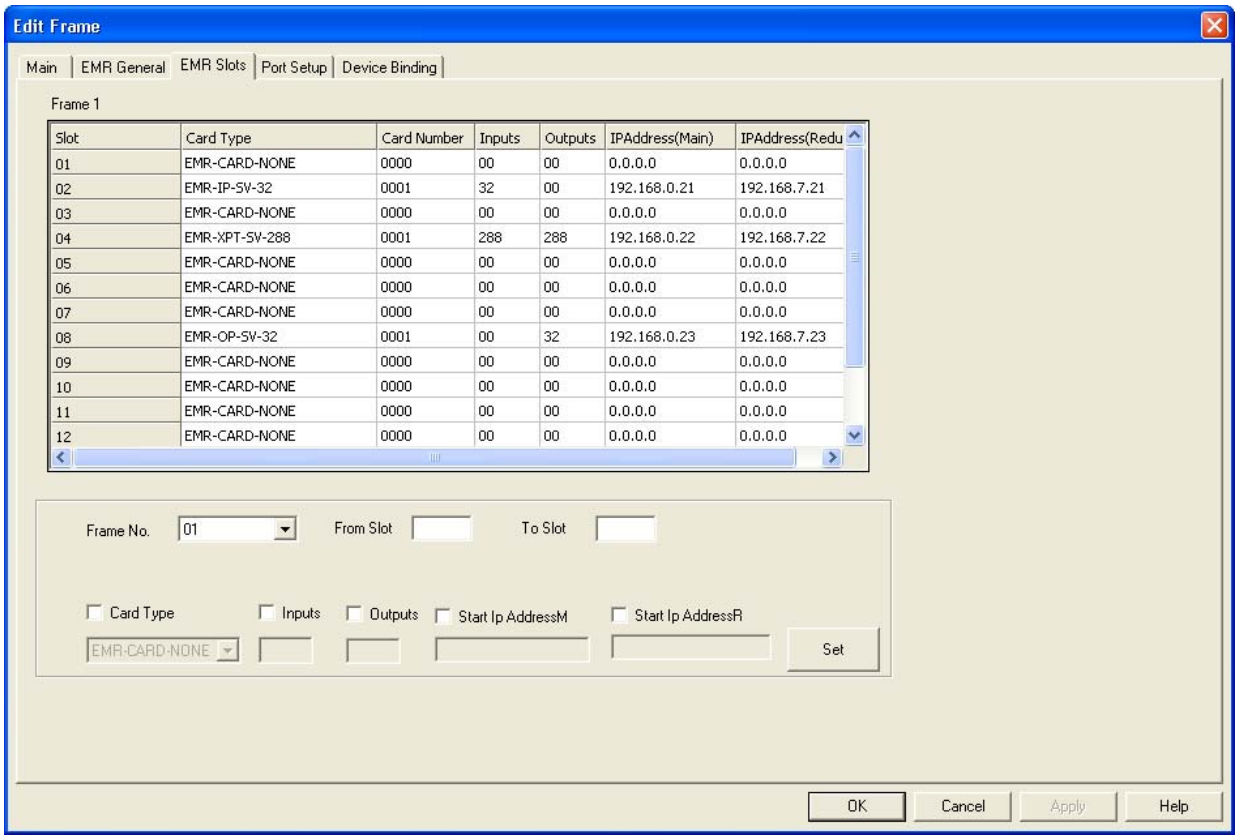


Figure 6-7: EMR Slot Configuration

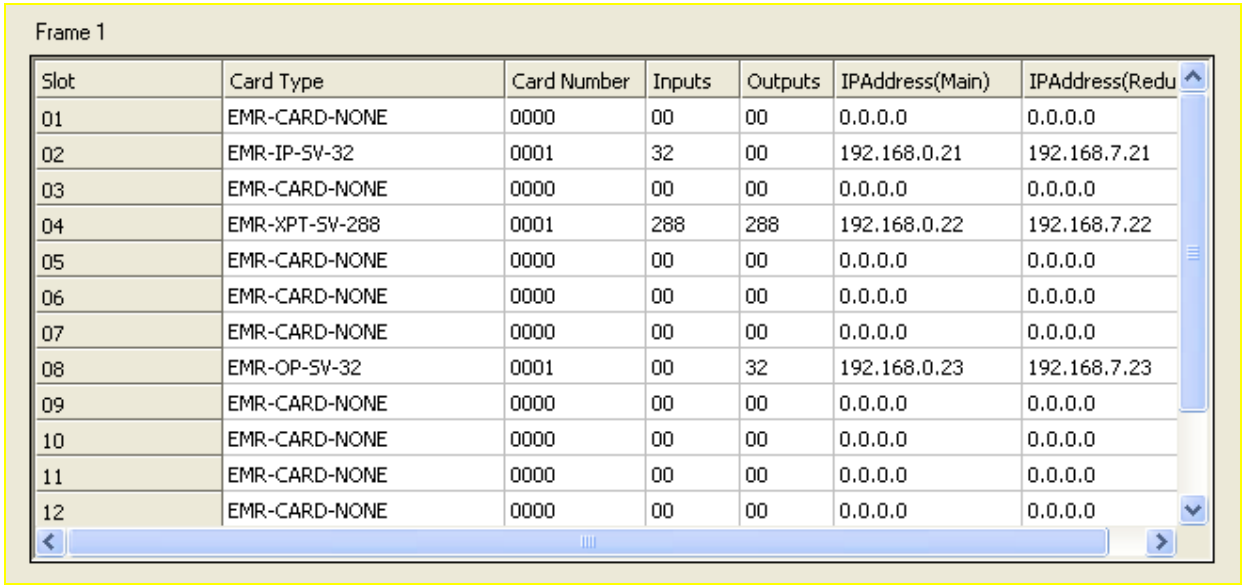
The configuration of the EMR slots is very important for getting the EMR system to function properly. For each frame in the EMR system, each slot in the frame must be configured to point to the correct type of card and to contain the correct IP address. This information will be used by the SC-2000 to ensure that the EMR functions as a unified router.

The slot location for each frame can either be entered manually or by using the controls at the bottom of the dialog. To enter the information automatically, select the frame and slot that is to be configured. For example, if slot 2 is to be configured, then set the *From Slot* and *To Slot* to 2. Once the slot is selected, select the appropriate *Card Type, Input, Output, Start IP AddressM and Start IP AddressR*. Once these items are selected, press the *Set* button. Once configured, the *Card Number* for each slot must also be defined. This determines the sequence for the input and output cards.

Note: The *Card Number* must be defined for all input and output cards as well as the crosspoint. If the *Card Number* is not defined, the system will not route.
Note: For a redundant crosspoint, the Card Number should also be 1 so that it is identical to the main crosspoint.

Where there is a blank slot in the frame, set the *Card Type* to *EMR-CARD-NONE*. Although the EMR-XPT-288X288 occupies 3 slots, only the first slot of the three should be identified in the system.

Figure 6-8 shows the configuration of the slots in detail. In this example, there is an EMR-IP32-3G card in slot 2, an EMR-XPT-288X288 card in slots 4-6, and an EMR-OP32-3G in slot 8.


Frame 1

Slot	Card Type	Card Number	Inputs	Outputs	IPAddress(Main)	IPAddress(Redu
01	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
02	EMR-IP-SV-32	0001	32	00	192.168.0.21	192.168.7.21
03	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
04	EMR-XPT-SV-288	0001	288	288	192.168.0.22	192.168.7.22
05	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
06	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
07	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
08	EMR-OP-SV-32	0001	00	32	192.168.0.23	192.168.7.23
09	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
10	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
11	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0
12	EMR-CARD-NONE	0000	00	00	0.0.0.0	0.0.0.0

Figure 6-8: EMR Slot Configuration Detailed

6.2. COMMUINCATION PORT SETUP

The SC-2000 has several communications ports that require additional setup. This section is used to define all of the interfaces that will be connected to the SC-2000. Enter the Edit Frame dialog and select the Port Setup tab. From this dialog, ports can be added for Ethernet or serial control, Ethernet panel hosting, and Q-Link panel hosting. This dialog is shown in Figure 6-9.

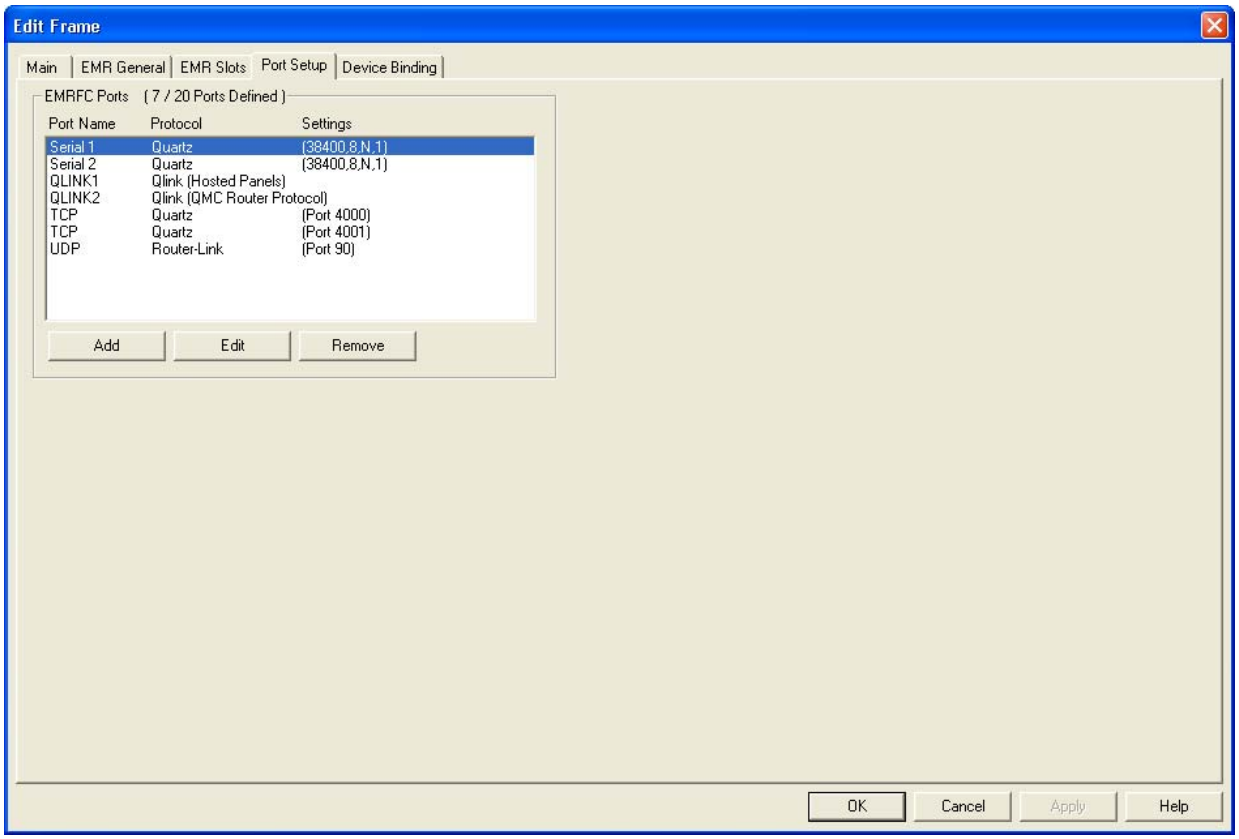


Figure 6-9: Port Setup

6.2.1. Control Panel Ethernet Interface

The control panel Ethernet port is a single interface that is defined to allow all properly equipped control panels to connect to the SC-2000 via Ethernet. The interface is defined as a *UDP* interface using the *RouterLink* protocol. The port is always defined as *90.* A properly configured setting is shown in Figure 6-10.

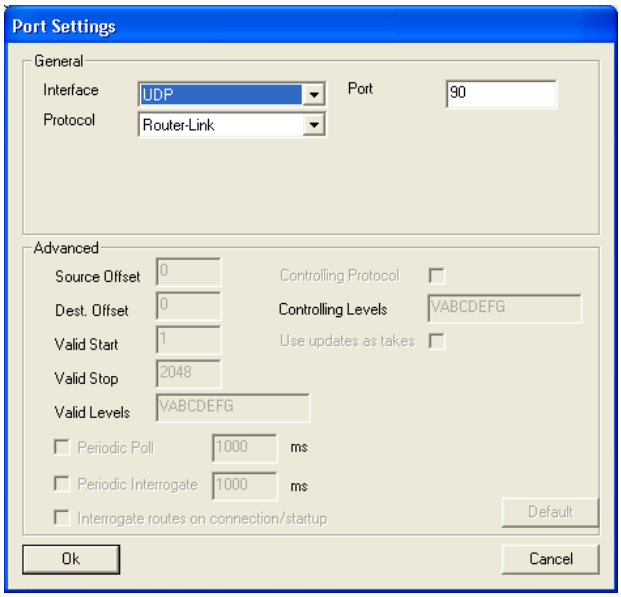


Figure 6-10: Ethernet Panels Port Settings

6.2.2. Control Panel Q-Link Interface

The control panel Q-Link port is an interface that is defined to allow all properly equipped control panels to connect to the SC-2000 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 *QLINK1* interface using the *Qlink (Hosted Panels)* protocol. A properly configured setting is shown in Figure 6-11. In this configuration, control panels can be connected to the physical port that is labeled Q-Link 1 on the rear of the device.

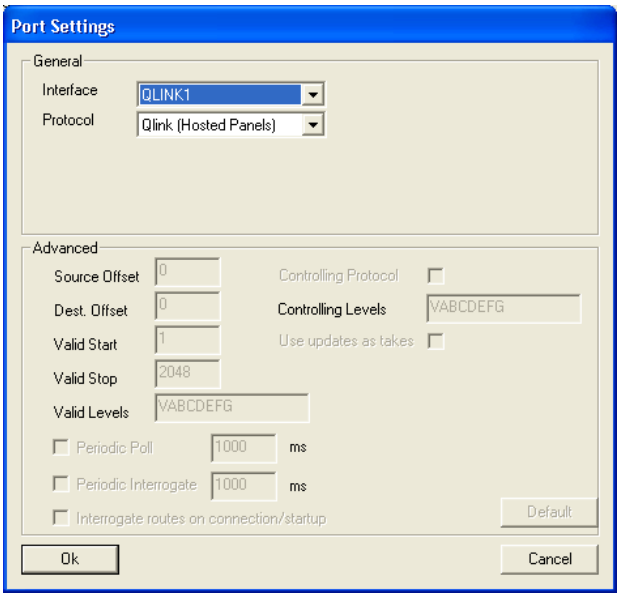


Figure 6-11: Q-Link Hosted Panels Port Settings

6.2.3. Serial Interface

The serial port is an interface that is defined to provide external automation control of the SC-2000. The interface is defined as a *COM1* 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 6-12.

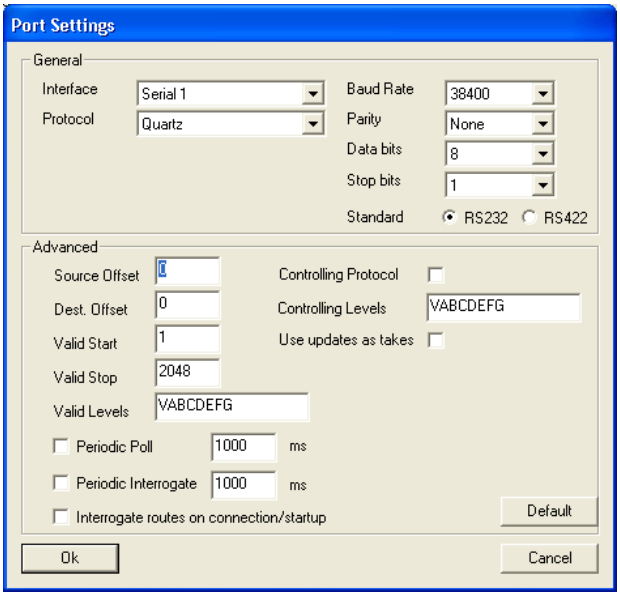


Figure 6-12: Serial Port Settings

6.2.4. Ethernet Interface

The Ethernet interface is defined to provide access to the SC-2000 so that it can be controlled via Ethernet using Quartz protocol. Port 25 is defined as the default port for control. In addition, four more ports can be added. An example of a properly configured Ethernet port for external control is shown in Figure 6-13.

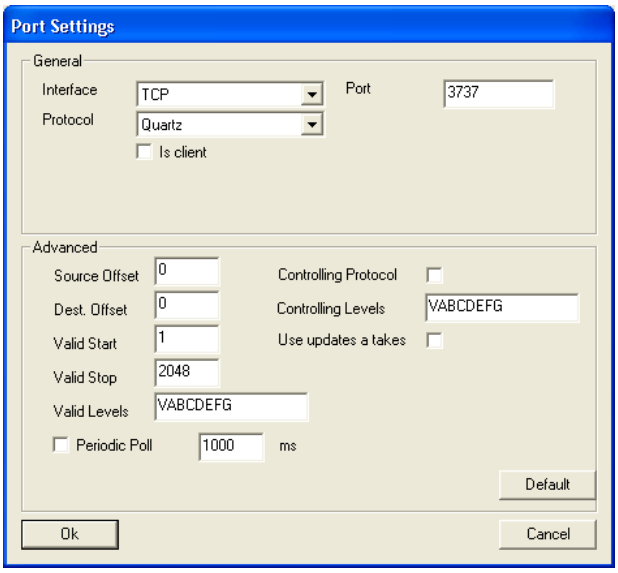


Figure 6-13: Ethernet Port Settings

Note: The default control port on the SC-2000 is port 25.

7. MODULE UPGRADES

There are two primary upgrade processes available to the user: File Transfer Protocol (FTP) and Serial Upload. Both are described below for specific I/O modules.

7.1. NETWORKING FUNDAMENTALS (FTP UPGRADE PROCESS)

Before any FTP (file transfer protocol) upgrades can be initiated:

- Modules must be pre-configured with IP addresses.
- The user must determine the IP address of the PC/laptop.
- All nodes must be on the same subnet for the FTP upgrade to work properly.

To check if a proper network connection has been established:

1. Connect the network cable from the PC/laptop to the EMR frame.

2. Open a Command Prompt window (**Start > Programs > Accessories > Command Prompt**) on the PC/laptop.

3. Ping the IP address of the module being upgraded. For example:

C:\ ping 192.168.9.100 <Enter>

If a proper network connection has been established, a “reply” is displayed on the DOS window

If the network connection is faulty, a “Destination Host Unreachable” message is provided. This means that either the IP addresses of the nodes should be verified or the network (Ethernet) cable is faulty.

7.2. UPGRADING THE APPLICATION CODE

There are two upgrade processes available for the SC-2000 and all EMR modules: File Transfer Protocol (FTP), and Serial Upload. Both FTP and Serial Upgrade methods are described.

7.2.1. FTP Upgrade Method

1. Identify and confirm the IP addresses of the module and PC/laptop, and ensure that they are on the same subnet.

2. Power on the EMR system with the module installed in the EMR frame.

3. Obtain the new application code from the FTP site and place it on the PC’s local drive.

4. Open a DOS window by selecting **Start > Run**, and typing “cmd” in the window that appears, as shown in Figure 7-1.

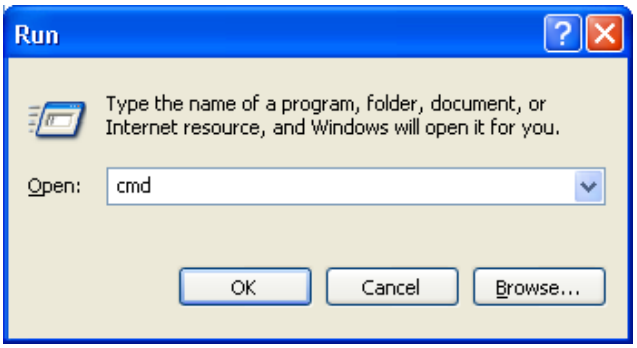


Figure 7-1: Run Window

5. In the DOS window type: ***ftp xxx.xxx.xxx.xxx*** (where the x's represent the module's IP address).

6. Press <ENTER> when prompted for a "Username", and again when prompted for a "Password".

7. At the "FTP>" prompt, type "put x.bin", where x represents the name of the application (.bin) file.

Note: If the application file is not local to where you are performing the FTP, then include the path with the name:

(e.g.: "put c:\temp\emr\firmware.bin")

8. Once the upgrade is complete, the card will reboot itself. Do not remove the card during this process or it could corrupt the application code.

7.2.2. Serial Upload Method

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

1. Turn off the EMR frame containing the module that is to be upgraded.

2. Connect the factory-supplied 7700PB serial upgrade cable on the front edge of the card, and connect the other end of this cable to a serial port on a PC with a serial terminal program.

3. Place a jumper across pins 2 and 3 on (J2 on the SC-200 and J17 on EMR modules) ("Upgrade" mode).

4. 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

5. Power on the EMR frame with the module installed.

6. When the module boots-up, “PPCBOOT>” is displayed on the terminal screen.

7. At the prompt type “upload”, then press <ENTER>

8. The following message will be displayed:

   Upload product firmware now

9. Upload the application code by using the *send file* function in the terminal software. When prompted, use the “Xmodem” protocol for data transfer.

When the transfer is complete (which can take up to 30 minutes or more) the terminal will return to the PPCBOOT prompt. You should:

1. Turn off the SC-2000 or EMR frame.

2. Remove the module from the SC-2000 chassis or EMR frame and remove the upgrade serial cable.

3. Place a jumper across pins 1 and 2 on (J2 on SC-2000 modules and J17 on EMR modules) (“Run” mode).

4. Re-insert the module into the SC-2000 chassis or EMR frame.

7.2.3. Upgrading EMX-FC Application Code

The EMX-FC is upgraded via the configuration serial port (J7) near the front of the card.

1. Turn off the EMR frame with the FC card that is to be upgraded.

2. Connect the 7700PB serial upgrade cable supplied with the EMR frame to the J7 on the front edge of the FC card and connect the other end of this cable to a serial port on a PC with a serial terminal program.

3. Place a jumper across pins 1 and 2 on J7 ("Upgrade Mode").

4. Set up the serial communication properties for the COM port as follows:

   COM: Select the COM port
   Bits per second: 57600
   Data bits: 8
   Parity: None
   Stop bits: 2
   Flow control: None

5. Power on the EMR frame with the FC card installed.

6. When the FC card boots up, the following information will be printed on the terminal screen:

```
EVERTZ MCF5272 MONITOR 2.3 BUILD 3 (66 MHZ)
COPYRIGHT 1997, 1998, 1999, 2000, 2001, 2002 EVERTZ MICROSYSTEMS LTD.
28F160C3B FLASH DETECTED
BRD=3000FC
MODEL=BA3000FC
PROD=3000FC
FRAME=3000FR
UPGRADE JUMPER INSTALLED
```

7. `UPLOAD FILE NOW, CONTROL-X TO CANCEL`

8. To upload the FC with the new application code, use the *send file* function in the terminal software.

Note: If prompted, use the "Xmodem" protocol for data transfer.

Execute the following steps when the download is complete:

1. Power down the EMR frame.

2. Remove the FC card from the frame.

3. Disconnect the upgrade serial cable, and place a jumper across pins 2 and 3 on J7.

4. Insert the FC card back into the EMR frame and power up the EMR frame.