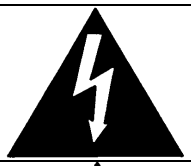
XRF6 RF Router System

User Manual

EVERTZ MICROSYSTEMS LTD.
5288 John Lucas Drive,
Burlington, Ontario,
Canada,
L7L 5Z9
Phone: 905-335-3700
Service Phone: 905-335-7570
Sales Fax: 905-335-3573
Service Fax: 905-335-7571
Sales: sales@evertz.com
Tech Support: service@evertz.com
Web Page: http://www.evertz.com

Version 1.0, May 2008

IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated “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 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 are 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 MOSITURE

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 bother 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 own expense.

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.

REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.1	Preliminary Version	Sept05
0.2	Added IF specifications	Jan 06
0.3	Added Safety notices, reformatting	May 06
0.4	Updated some of the RF specifications	Jun 06
0.5	Added XNCP2 configuration information	Sept 06
0.6	Updated specifications	Jan 07
1.0	Released: Removed ERC info, added instructions on inserting/removing I/O frame controller cards, added firmware upgrade procedure, updated specs	May 08

TABLE OF CONTENTS

1. OVERVIEW 1-1

1.1. HOW TO USE THIS MANUAL 1-3

2. INSTALLATION 2-1

2.1. REAR PANEL 2-1

2.2. MOUNTING 2-1

2.3. COOLING 2-2
2.3.1. Fan Exhaust 2-2

2.4. POWER 2-3
2.4.1. Connecting the Power 2-3
2.4.2. Turning the Power On and Off 2-4
2.4.3. Power Supply Indicator 2-4

2.5. CONTROL AND COMMUNICATIONS 2-4
2.5.1. Serial Port Control Connection 2-4
2.5.2. Ethernet Network Connections 2-5

2.6. INSERTING AND REMOVING I/O AND FRAME CONTROLLER CARDS 2-6
2.6.1. Inserting Input or Output Cards 2-6
2.6.2. Removing Input or Output Cards 2-7
2.6.3. Inserting a Frame Controller Module 2-7
2.6.4. Removing a Frame Controller Module 2-7

3. ROUTER CONFIGURATION USING THE FRAME CONTROLLER CONFIGURATION SERIAL PORT 3-1

3.1. CONNECTING TO THE FRAME CONTROLLER CONFIGURATION SERIAL PORT 3-1
3.1.1. Terminal Program Configuration 3-1
3.1.2. Connecting the PC to the Frame Controller Card 3-1

3.2. NETWORK CONFIGURATION MENU 3-3

3.3. ROUTER CONFIGURATION MENU 3-4
3.3.1. Router Input Card Settings 3-4
3.3.1.1. Setting The Number Of Router Inputs 3-4
3.3.1.2. Input Descriptions 3-5
3.3.1.3. Input Gain Stage Mode 3-5
3.3.1.4. Input Gain Stage Target Power Level 3-5
3.3.1.5. Input Gain Stage Manual Gain Amount 3-5
3.3.1.6. Input Upper And Lower Threshold Power Level 3-5
3.3.1.7. Input Squelch Threshold Power Level 3-5
3.3.1.8. Input Squelch Enable 3-5
3.3.1.9. Current Input Power Level 3-5
3.3.2. Router Output Settings 3-6
3.3.2.1. Setting The Number Of Router Outputs 3-6
3.3.2.2. Output descriptions 3-6
3.3.3. Crosspoints 3-6

3.4. SNMP SETUP 3-7

3.4.1. Set Trap IP Address 3-8
3.4.2. Remove Trap IP Address 3-8
3.4.3. Retrieve Trap IP Addresses from Flash 3-8
3.5. SERIAL CONTROL PORT CONFIGURATION 3-8
3.6. SHOW CARD STATUS 3-9
3.7. ENGINEERING / DEBUG 3-9
4. ROUTER CONFIGURATION USING THE INPUT CARD EDGE INTERFACE 4-1
4.1. INPUT CARD EDGE INTERFACE OPERATION 4-1
4.2. OUTPUT CARD EDGE INTERFACE 4-3
5. STATUS LED INDICATORS 5-1
5.1.1. Power Supply LEDs 5-1
5.1.2. Frame Controller LEDs 5-1
5.1.3. Input Card LEDs 5-2
5.1.4. Output Card LEDs 5-3
6. OPERATION 6-1
6.1. X-NCP2 ROUTER CONTROL PANEL 6-1
6.1.1. Adding XRF6 router frame controller to XNCP2 control list 6-1
6.1.2. Controlling the XRF6 Router via the XNCP2 6-2
6.1.3. Example 1: Pushbutton Control to Switch Input 2 to Output 5 6-2
6.1.4. Example 2: Rotary knob control to switch input 2 to output 5 6-3
6.2. VISTALINK® REMOTE MONITORING/CONTROL 6-3
6.2.1. What is VistaLINK®? 6-3
6.3. VISTALINK® MONITORED PARAMETERS 6-3
6.4. VISTALINK® CONTROLLED PARAMETERS 6-4
6.5. VISTALINK® CONTROL SCREEN 6-4
7. TECHNICAL DESCRIPTION 7-1
7.1. SPECIFICATIONS 7-1
7.1.1. System 7-1
7.1.2. RF Specifications: L Band 7-1
7.1.3. RF Specifications: If 7-1
7.1.4. Communication And Control: 7-2
7.1.5. Electrical 7-2
7.1.6. Compliance 7-2
7.1.7. Physical 7-2
7.2. SERVICING INSTRUCTIONS 7-3
7.2.1. Changing The Fuses 7-3
7.2.2. Replacing The Power Supply 7-3
8. XRF6 FIRMWARE UPGRADES 8-1
8.1. FIRMWARE UPGRADES USING VISTALINK® PRO 8-1
8.1.1. Checking the Currently Installed Firmware Version 8-1
8.1.2. Upgrading Input Card Firmware 8-2
8.1.3. Upgrading Output Card Firmware 8-5

8.1.4. Upgrading Frame Controller Firmware 8-7

8.2. FIRMWARE UPGRADES VIA SERIAL PORT 8-9
8.2.1. Upgrading Input or Output Card Firmware 8-9
8.2.2. Upgrading Frame Controller Firmware 8-11

Figures

Figure 1-1: XRF6 router fully populated to 64x64 matrix size 1-2
Figure 1-2: XRF6 Block Diagram 1-3
Figure 2-1: XRF6-FR Rear Panel Layout 2-1
Figure 2-2: Connecting the Power to the XRF6-FR 2-3
Figure 3-1: Location of the Frame Controller Upgrade/Configuration Port 3-2
Figure 4-1: Input card edge controls 4-1
Figure 5-1: Power Supply LED Indicators 5-1
Figure 5-2: Input card LED Indicators 5-2
Figure 5-3: Output Card LED Indicators 5-3
Figure 6-1: X-NCP2 Router Control Panel 6-1
Figure 6-2: VistaLINK® Control Screen 6-4
Figure 7-1: Locating the Power Supply Mounting Screw 7-4
Figure 8-1: Frame Controller Firmware Version 8-2
Figure 8-2: Input or Output Card Firmware Version 8-2
Figure 8-3: Version Information Menu Item 8-2
Figure 8-4: Active Radio Button 8-3
Figure 8-5: XRF6 Hardware Tree Listing 8-3
Figure 8-6: Firmware File Selection 8-4
Figure 8-7: Sub-Processor Upgrade Selection 8-4
Figure 8-8: Upgrade Process Completed 8-4
Figure 8-9: Version Information Menu Item 8-5
Figure 8-10: Active Radio Button 8-5
Figure 8-11: XRF6 Hardware Tree Listing 8-6
Figure 8-12: Firmware File Selection 8-6
Figure 8-13: Upgrade Process Completed 8-7
Figure 8-14: Version Information Menu Item 8-7
Figure 8-15: Active Radio Button 8-7
Figure 8-16: XRF6 Hardware Tree Listing 8-8
Figure 8-17: Firmware File Selection 8-8
Figure 8-18: Upgrade Process Completed 8-9
Figure 8-19: Input Card Upgrade Header With Upgrade Cable Connected 8-10
Figure 8-20: Output Card Upgrade Header With Upgrade Cable Connected 8-10
Figure 8-21: Frame Controller Card Upgrade Header With Upgrade Cable Connected 8-11

Tables

Table 2-1: Router RS-232 Port Pin Definitions 2-5
Table 2-2: Router RS-422 Port Pin Definitions 2-5
Table 2-3. Standard RJ45 Wiring Colour Codes 2-6
Table 3-1: 7700PB Upgrade Cable (WA-S76) 3-2
Table 4-1: Input Card Edge Interface Menu 4-2

This page left intentionally blank

1. OVERVIEW

The XRF6 is a modular RF signal matrix ideal for routing and monitoring RF L-band and IF signals within a satellite communications facility. Built upon a modular architecture, all active components are hot-swappable and front-loading, ensuring ease of maintenance and matrix expansion. Advanced features such as automatic gain control, salvo operations and monitoring, and alarm reporting of critical signal parameters like input signal presence and signal level, provide flexible RF signal management.

The XRF6 is offered with the X-NCP2 remote control panel option for crosspoint control and system configuration. Additionally, this flexible routing matrix can be controlled, configured, and monitored via serial control and/or SNMP control over Ethernet, using Evertz' VistaLINK® or other monitoring and control software.

The XRF6 houses up to a 64x64 routing matrix within a 6RU chassis. Matrix sizes range from 16x16 to 64x64 in increments of 16 inputs and outputs, within one frame. External expansion to 512x512 is available with the addition of multiple frames and SCRF series passive splitters/combiners. Input cards and output cards can be added independently for non-square matrix sizes. Ultra-high reliability is ensured by low component count per signal path, optional dual power supplies, and redundant system controllers.

Features:

- Future proof with 40 to 2250MHz operation
- 70/140MHz IF, L-Band, stacked L-Band and off-air DTV all in one platform
- Passes all modulation protocols
- Modular design; all cards are front-loading and hot-swappable
- External system expansion capability up to 512x512 using additional frames and Evertz SCRF series passive splitters/combiners
- Automatic or manual gain control on all input channels
- RF power monitoring on all input channel
- Adjustable output level in AGC mode
- Matrix crosspoint control using card-edge interface, X-NCP2 remote control panel, VistaLINK®, or 3rd party control software
- System configuration, alarm monitoring, event logging, and email notification available through VistaLINK® or 3rd party control software
- Passcode protection for configuration parameters, destination locks, and salvo locks
- Up to 32 programmable salvos
- Redundant power supply and frame controller options

The XRF6 matrix consists of the following major components as shown in Figure 1-1:

- 6 RU system frame (model XRF6-FR-64X64)
- Input cards (16 inputs each)
- Output cards (16 outputs each)
- Power supply(s) (one required, 2nd optional for redundancy)
- Frame controller(s) (one required, 2nd optional for redundancy)

The frame consists of the metal chassis and a passive rear backplane that interconnects all of the modules. The backplane also contains all of the matrix input and output connectors. The frame contains no active components, and the only serviceable items that are within the chassis are the AC fuses housed in the AC power receptacles. The router frame is designed to provide a lifetime of uninterrupted service.

Input and output cards are housed in the 8 card slots located within the main (center) section of the frame. The two leftmost card slots (1 and 2), and the two rightmost cardslots (7 and 8) may contain only input cards, while the center 4 slots (3 through 6) may contain only output cards.

All signal and control connections are located on the rear panel of the frame, with the exception of the firmware upgrade and configuration port, located near the front edge of all system cards.

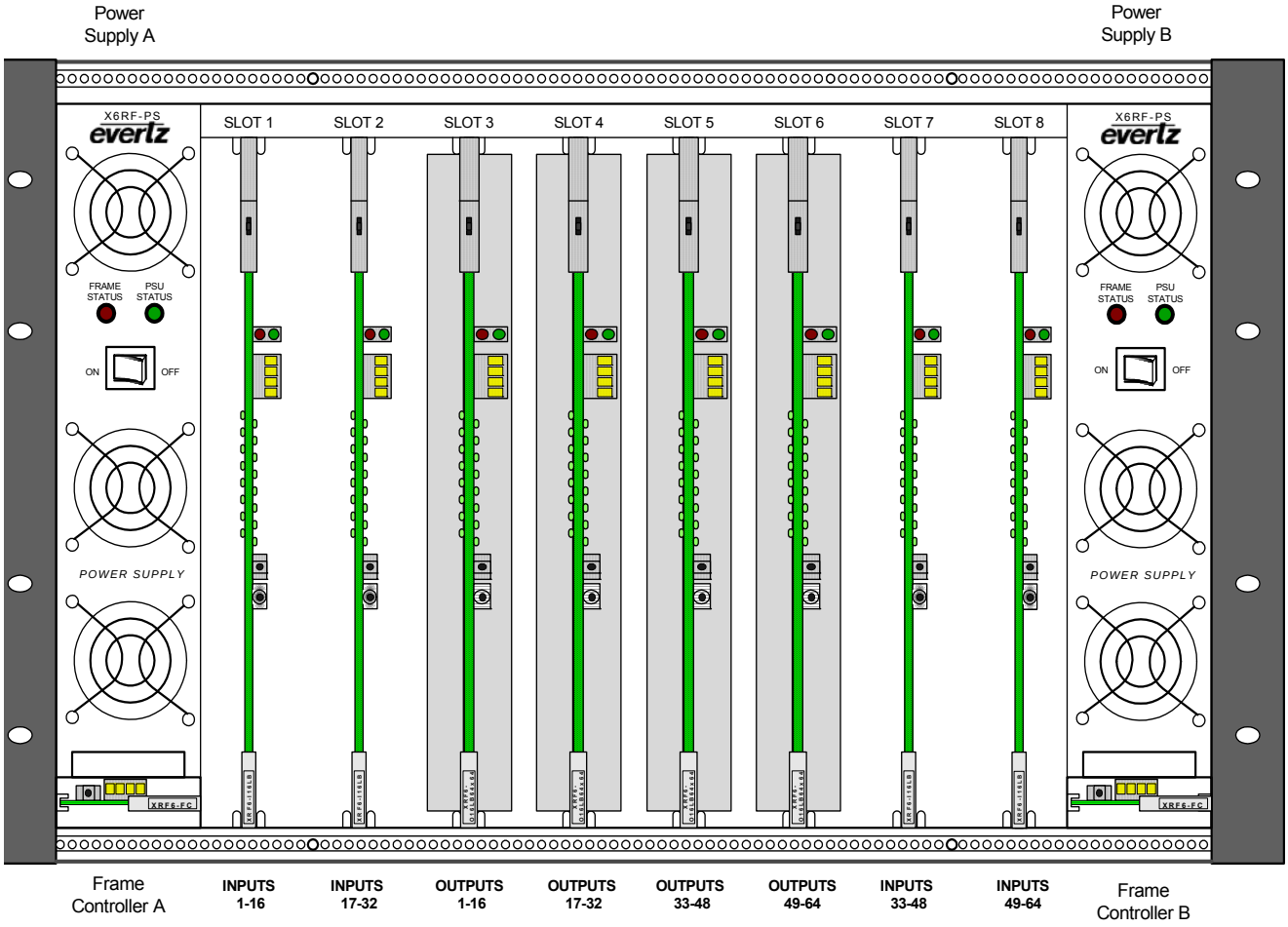


Figure 1-1: XRF6 router fully populated to 64x64 matrix size

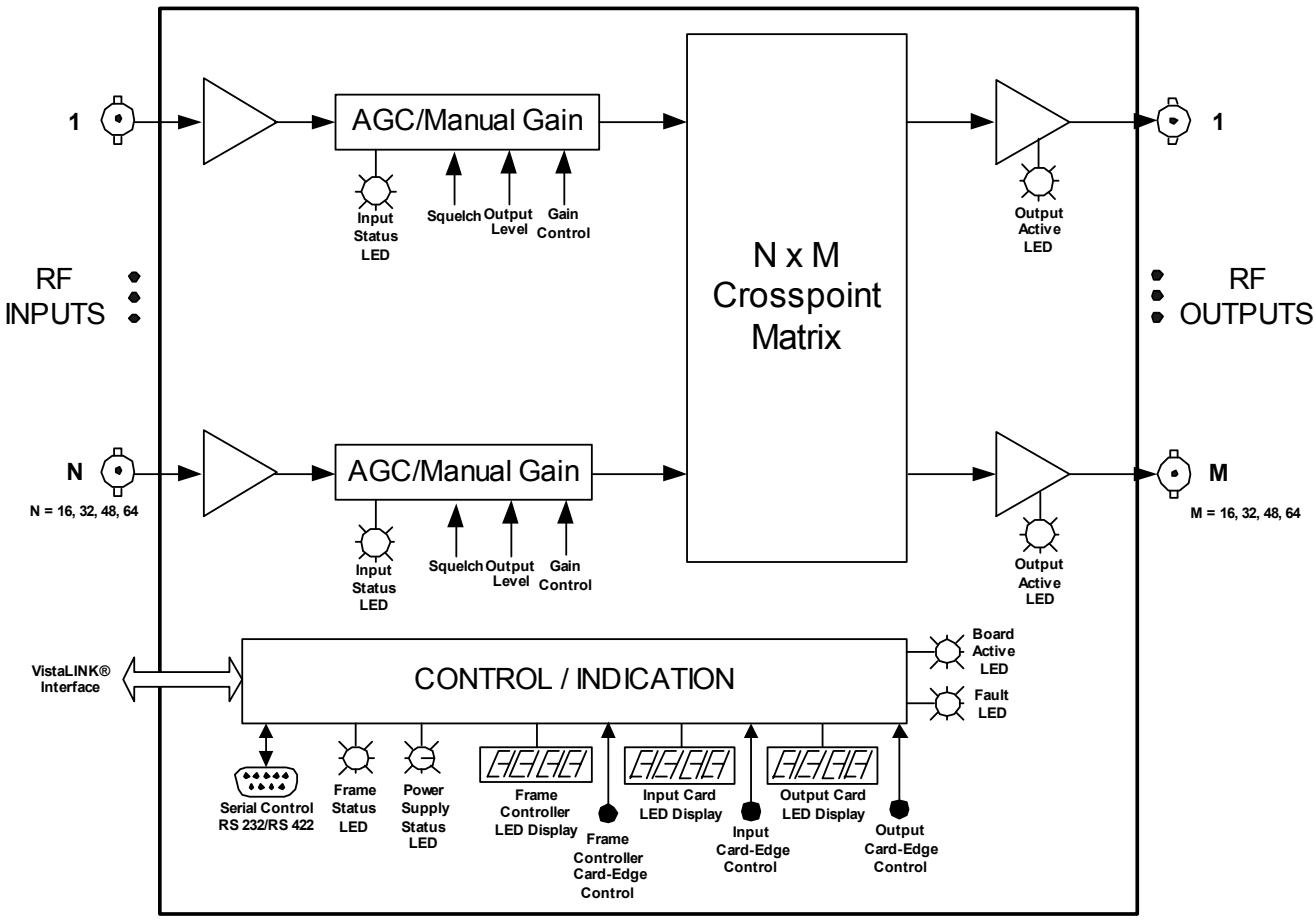


Figure 1-2: XRF6 Block Diagram

1.1. HOW TO USE THIS MANUAL

This manual is organized into 8 sections: Overview, Installation, Configuration (chapters 3&4), Operation, Technical Description, and XRF6 firmware upgrades.

Chapter 1 contains a quick summary of the router features and a glossary to define concepts and terms used throughout the remainder of the manual.

Chapter 2 gives a detailed description of the rear panel connectors and a guide for connecting the router to your existing system.

Chapter 3 describes the configuration of the router using the frame controller configuration port.

Chapter 4 describes the configuration of the router using the input card edge interface.

Chapter 5 gives a description of router operation using the optional remote control panel.

Chapter 6 provides a description of the router control panel and VistaLINK® monitoring application.

Chapter 7 lists the specifications for the XRF6 router.

Chapter 8 provides information on upgrading the XRF6 firmware.

The exclamation point within an equi-lateral triangle is intended to alert the user to the presence of important safety related operating and maintenance (Servicing) instructions in the literature accompanying the product.

This symbol is intended to alert the user to important operating instructions.

2. INSTALLATION

2.1. REAR PANEL

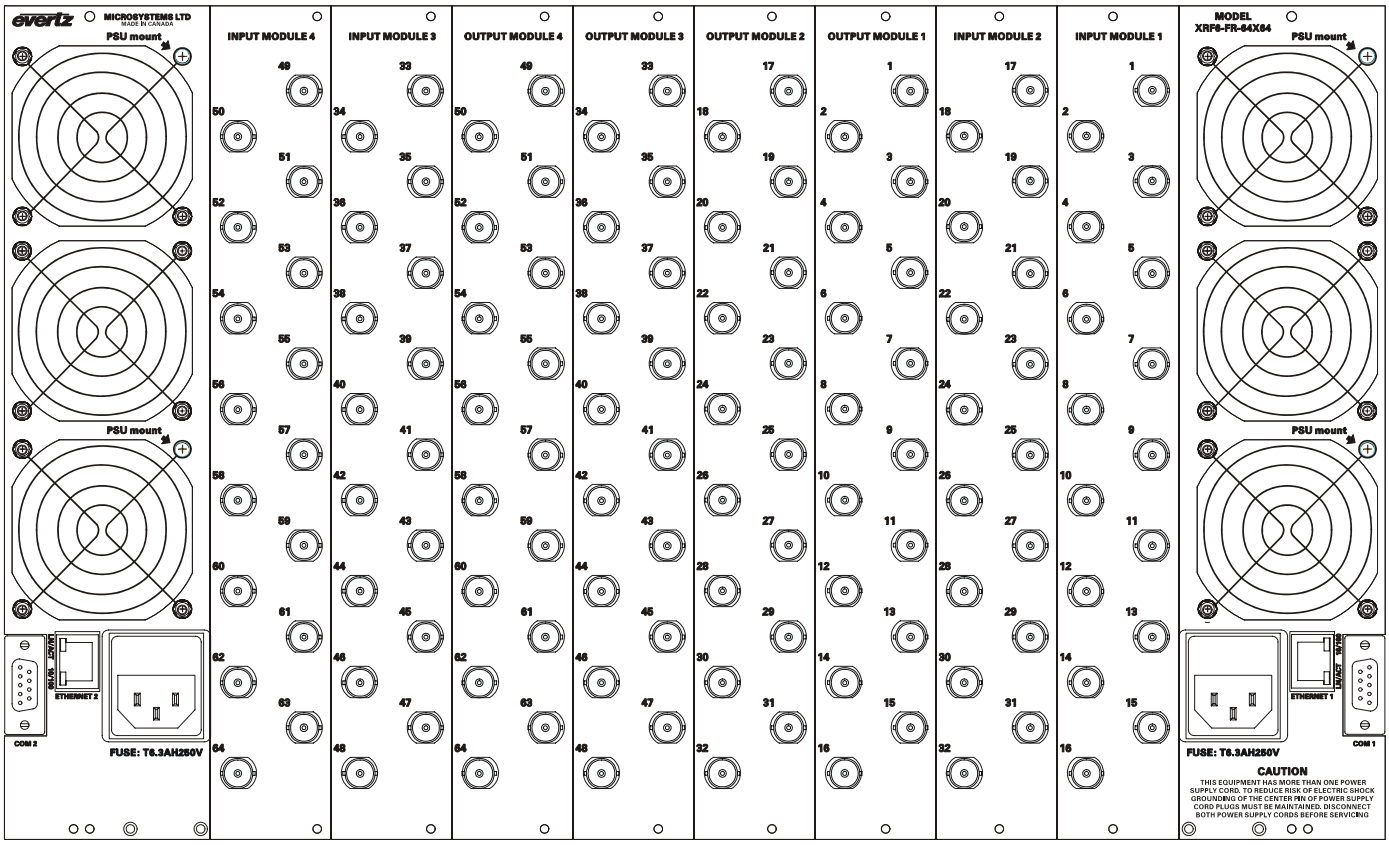


Figure 2-1: XRF6-FR Rear Panel Layout

If equipment connected to the router outputs supplies DC via coax (e.g. LNB supply voltage), this DC MUST be turned off or otherwise blocked. Damage to the router can result if DC is applied to the RF output ports.

2.2. MOUNTING

The Router frame is equipped with rack mounting rails and fits into a standard 19" x 10.5" x 20" rack space (483 mm x 260 mm x 510 mm). To securely fasten the frame to the equipment rack, make sure that all four mounting screws on each mounting rail are tightened securely.

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. This step should be repeated any time the frame is shipped, or relocated within a facility.

2.3. COOLING

The Router frame is designed to ensure adequate cooling for up to 300 watts 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.

For proper cooling, the frame must contain either two XRF6PS power supplies, or one XRF6PS power supply and one XRF6PS-FM power supply blank panel with cooling fan.

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

2.4. POWER

2.4.1. Connecting the Power

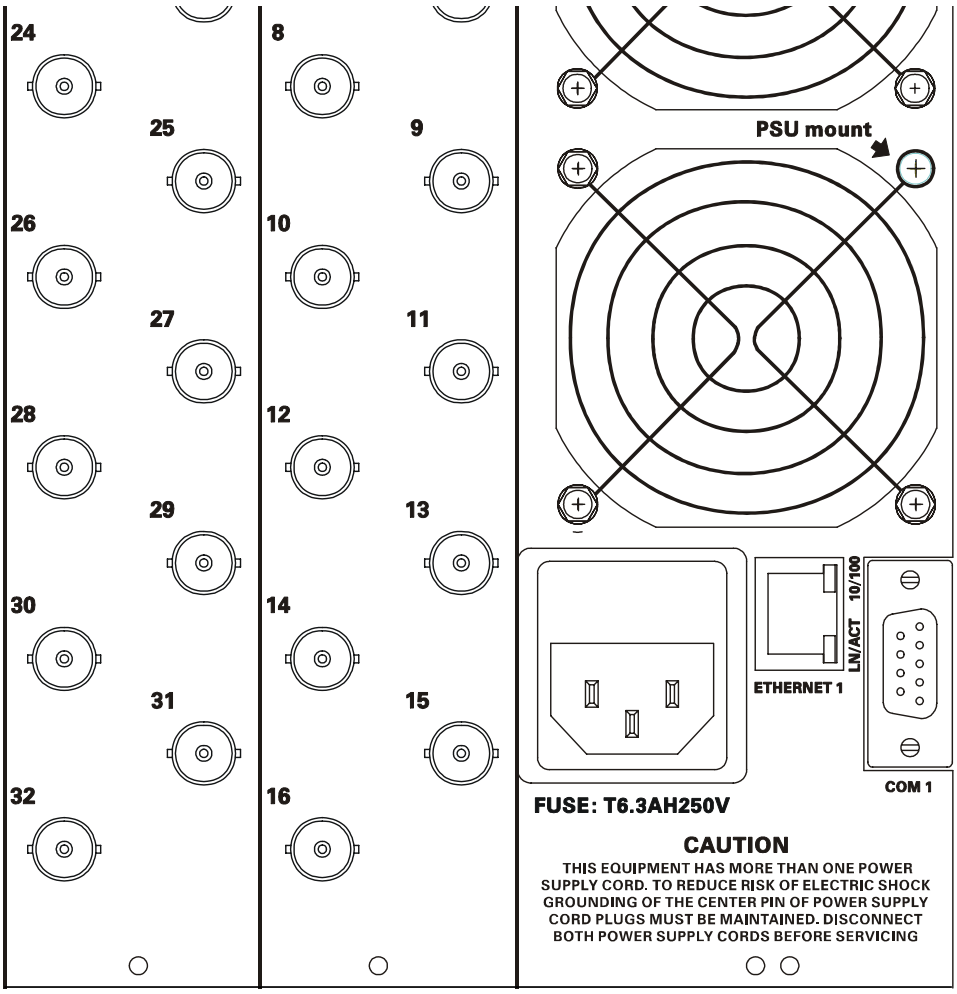


Figure 2-2: Connecting the Power to the XRF6-FR

The XRF6-FR frame comes standard with one auto-ranging power supply (XRF6PS) that automatically senses the input voltage over the range of 100 to 240 VAC. An additional power supply (XRF6PS) 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 XRF6PS-FM 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 3-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 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.

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

CAUTION - TO REDUCE THE RISK OF ELECTRIC SHOCK, GROUNDING OF THE GROUND PIN OF THE MAINS PLUG MUST BE MAINTAINED

2.4.2. 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.

2.4.3. Power Supply Indicator

Each power supply has two indicators. The LED on the left indicates the health of the entire frame. The LED on the right indicates the health of the local power supply.

For example, if one of the power supplies malfunctions, then its local power supply LED will go off, and the frame status LED on both power supplies will turn off. The local power supply status LED on the power supply that is still functioning will remain on.

If there is a fuse failure return the power supply immediately. The power supplies are short circuit protected and should not blow the fuse under a short circuit condition.

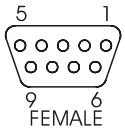
2.5. CONTROL AND COMMUNICATIONS

The XRF6 router can be controlled from third party monitor and control systems over the RS232 control port, by the X-NCP2 remote control panel over Ethernet, or by Evertz VistaLINK® or other SNMP control over Ethernet. The serial port pinouts are shown in section 2.5.1, and the protocol supported by the serial port is documented in section 2.5.1 of this manual.

The Ethernet connection information is shown in section 2.5.2. Basic Operation of the X-NCP2 control panel is documented in section 6.1. VistaLINK® control is documents in section 6.2. To interface with the XRF6 router via third party SNMP managers, contact Evertz technical assistance for the required SNMP MIB (management information database) information.

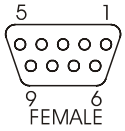
2.5.1. Serial Port Control Connection

This 9 pin female D connector provides an RS-232/RS-422 serial interface used for external serial remote control. The Setup menu is used to configure the serial port for external control. See Table 2-1 and Table 2-2 for the pinout of the connector for RS-232 and RS-422 applications.



Pin #	Name	Description
1	GND	Chassis ground
2	TxD	RS-232 Transmit Output
3	RxD	RS-232 Receive Input
4		
5	Sig Gnd	RS-232 Signal Ground
6		
7	RTS	RS-232 RTS Input
8	CTS	RS-232 CTS Output
9		

Table 2-1: Router RS-232 Port Pin Definitions



Pin #	Name	Description
1		
2	Tx-	RS-422 Tx- Output
3	Rx-	RS-422 Rx- Input
4		
5	GND	
6		
7	Tx+	RS-422 Tx+ Output
8	Rx+	RS-422 Rx- Input

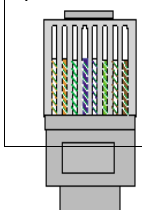
Table 2-2: Router RS-422 Port Pin Definitions

2.5.2. Ethernet Network Connections

There are two RJ-45 Ethernet ports used for redundant connections to an Ethernet network. In order to use both Ethernet connections the router frame must be fitted with two XRF6-FC Frame controller cards. Connect the Ethernet cable described below to the RJ-45 connector on the side of the frame where your XRF6-FC frame controller card is installed. If the frame is fitted with two frame controller cards then you will have to provide an Ethernet connection to each RJ-45 connector in order to commicate with both frame controllers.

The router is designed to be used with either 10Base-T (10 Mbps) or 100Base-TX (100 Mbps) also known as *Fast Ethernet*, 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. Make the network connection by plugging one end of the cable into the RJ-45 receptacle of the Base Station 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 pinout information in Table 2-3. A colour code wiring table is provided in Table 2-3 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 #	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 2-3. Standard RJ45 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 cables must use Category 5 rated connectors.

The maximum cable run between the router frame and the supporting hub is 300 ft (90 m). The maximum combined cable run between any two end points (i.e. router and X-NCP2 control panel or PC/laptop via network hub) is 675 feet (205 m).

Devices on the Ethernet network continually monitor the receive data path for activity as a means of checking that the link is working correctly. When the network is idle, the devices also send a link test signal to one another to verify link integrity. Each RJ-45 connector is fitted with two LEDs to monitor the Ethernet connection.

10/100 This Amber LED is ON when a 100Base-TX link is last detected. The LED is OFF when a 10Base-T link is last detected (the LINK LED is ON). Upon power-up the LED is OFF as the last detected rate is not known and therefore defaults to the 10Base-T state until rate detection is completed.

LN/ACT This dual purpose Green LED indicates that the Base Station has established a valid linkage to its hub, and whether the Base Station is sending or receiving data. This LED will be ON when the Base Station has established a good link to its supporting hub. This gives you a good indication that the segment is wired correctly. The LED will BLINK when the Base Station is sending or receiving data. The LED will be OFF if there is no valid connection.

2.6. Inserting and Removing I/O and Frame Controller Cards

The XRF6 is a modular system, employing plug-in circuit cards for input, output and frame controller modules. Each of these cards are easy to remove and insert, facilitating simple system expansion or service.

2.6.1. Inserting Input or Output Cards

1. Orient the card vertically, such that the black plastic lever is on the bottom, while the metal card ejector/latch is on the top.

2. Align the card with the card guide corresponding to the slot number where you wish to install the card. Note that slots are not universal and there are designated slots for input and output cards, clearly marked on the bottom edge of the frame.

3. Carefully slide the card into the frame while holding the plastic lever and metal ejector in a horizontal position, allowing them to clear the front edge of the frame and enter their engagement positions. The lever sits in a clearance hole in the bottom plate of the frame, while the lever latches against the inside of the top edge.

4. With the bottom lever and top ejector in their engagement positions, press firmly on both, **with the majority of force placed on the top metal ejector latch.**

5. Continue pressing the card in place until the top ejector latches and the card cannot be pushed any further into the frame.

Ensure that the cards are pushed into the frame until the connectors are entirely seated and the cards cannot be pushed any further into the frame. This will ensure the integrity of both RF and communications connections.

2.6.2. Removing Input or Output Cards

1. Simultaneously press down on the top metal ejector tab while squeezing the latch to release it.

2. Grasp the bottom plastic lever and simultaneously pull on both the bottom lever and top ejector latch to disengage the card from the frame. **The majority of force should be placed on the top metal ejector latch.**

3. Pull the rest of the card out of the frame.

4. Carefully store the card in an anti-static bag in an area free of static discharge.

2.6.3. Inserting a Frame Controller Module

1. Orient the card horizontally such that the rear-connectors are facing upwards.

2. Align the frame controller card with the card guides in one of the slots beneath the power supplies.

3. Slide the card into the frame.

4. Press on the white ejector tab until the card cannot slide any further into the frame and the connectors are entirely seated.

2.6.4. Removing a Frame Controller Module

1. If the system is powered up, the frame controller must be disabled prior to removal. Press and hold the white pushbutton on the frame controller to be removed until the text “-FC DISABLED” scrolls across the dot-matrix display.

Always ensure that the frame controller is disabled prior to removal from a powered system.

2. Grasp the white card ejector and pull to remove the card from the frame.
3. Carefully store the card in an anti-static bag in an area free of static discharge.

3. ROUTER CONFIGURATION USING THE FRAME CONTROLLER CONFIGURATION SERIAL PORT

The XRF6 router frame controller card has several settings that can be user configured. Settings such as matrix size, RF gain, ACG, network, and communication port settings are all accessed through the frame controller configuration port.

In frames with dual frame controller cards, each card must be configured separately.

3.1. CONNECTING TO THE FRAME CONTROLLER CONFIGURATION SERIAL PORT

Configuration of the router is performed through the configuration serial port located near the front edge of the frame controller (XRF6FC) card. A PC with a terminal emulation program (such as HyperTerminal) is used to communicate with the frame controller card's configuration port.

The steps for connecting a PC to the frame controller configuration/upgrade serial port are listed below.

3.1.1. Terminal Program Configuration

Run a suitable terminal program (such as Microsoft HyperTerminal) and set it to communicate through the appropriate RS232 serial port on the PC (usually COM1). Configure the serial port settings of the terminal program as follows:

Baud Rate	115200
Data bits	8
Parity	None
Stop bits	2
Flow Control	None

3.1.2. Connecting the PC to the Frame Controller Card

Use the special upgrade cable supplied with the frame to connect the frame controller card to the PC. This multi-coloured ribbon cable (Evertz part number WA-S76) has a six pin header socket on one end and a female 9 pin D connector on the other end. Place the 7700PB serial upgrade cable onto the 2x3 header connector on the frame controller module near the front card-edge. **(NOTE: The serial upgrade cable is keyed for the header connector with pins 1 and 5 being plugged).** To connect the cable, simply slide the frame controller partially out of the frame, insert the connector onto the header pins, and re-insert the frame controller card into the frame. Note that this step may be performed with the frame powered on or off. The location of the configuration/upgrade port header is shown in Figure 3-1.

XRF6FC End			PC End	
2 row X 3 pin Berg	Pin	3 ft. Cable (9501)	9 pin D Female	Pin
Key	1			1
Rx	2	-------1a------	Tx	2
Tx	3	-------1b------	Rx	3
Tx Gnd	4	----drain-----	Gnd	5
Key	5			
---	6			

Table 3-1: 7700PB Upgrade Cable (WA-S76)

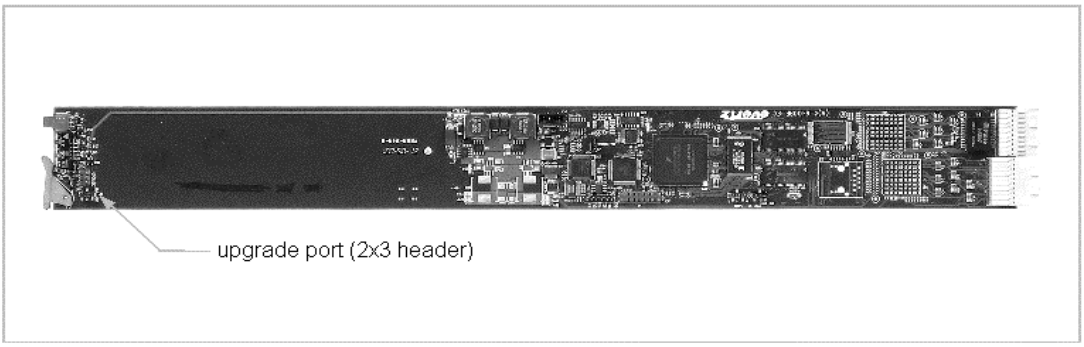


Figure 3-1: Location of the Frame Controller Upgrade/Configuration Port

After the frame controller is re-inserted into the frame, with power applied to the frame, the frame controller will automatically initiate a boot up procedure, resulting in the top-level configuration menu being displayed in the terminal program.

```
-------------------------------------------------
|                    Main Menu                  |
|               (X6RF-FC v1.00 b166)            |
 -----------------------------------------------
(1) Network Configuration
(2) Router Configuration
(3) SNMP Setup
(4) Serial Control Port Configuration
(5) Show Card Status
(6) Engineering/Debug

(X) Exit
>
```

At the prompt, enter the number from the menu list, and press “ENTER”. Remember to save the changes prior to exiting each configuration menu. Some of the settings require the frame controller to be re-booted prior to the changes taking effect. This is accomplished by cycling power to the router frame, or by executing the “Reboot” command from the Engineering/Debug menu.

The (x) option exits the current menu and moves up one menu level.

3.2. NETWORK CONFIGURATION MENU

The network configuration menu displays the existing network settings for the frame controller. To change any of these values, select the appropriate number from the list, then "ENTER", and you will be prompted for a new value.

After changing a network setting, the new setting must be saved prior to exiting configuration mode by selecting "(S) Save and Exit" after each change in the network configuration.

```
 ------------------------------------------------
|              Network Configuration             |
|               (X6RF-FC v1.00 b166)             |
 ------------------------------------------------
 ------------------------------------------------
 MAC:                00:02:c5:fe:cb:96
 ip address:         192.168.8.1
 netmask address:    255.255.255.0
 gateway:            0.0.0.0
 broadcast address:  192.168.8.255
 DHCP enabled:       False
 ------------------------------------------------
(1) Set IP Address
(2) Set Netmask
(3) Set Gateway
(4) Set Broadcast Address
(5) Use DHCP

(S) Save and Exit
(X) Exit
>
```

Each frame controller should be connected using a dedicated network in order to maximize network performance and reliability. In systems where each frame controller is on a dedicated network, the factory default network settings should be adequate. If the control network for the frame controller is to be connected to an existing network, the IP address and other network settings will have to be changed so as to be compatible with the existing network. If you are unsure how to configure your network contact your IT network support personnel.

In frames with dual frame controller cards, each card must be configured separately.

3.3. ROUTER CONFIGURATION MENU

The router configuration menu provides access to all configuration settings for the routing matrix.

```
 ------------------------------------------------
|              Router Configuration              |
|              (X6RF-FC v1.00 b166)              |
 ------------------------------------------------
(1) Router input settings
(2) Router output settings

(X) Exit
>
```

3.3.1. Router Input Card Settings

The Router Input Settings menu provides access to all of the matrix input card settings.

```
 ------------------------------------------------
|             Router input settings              |
|              (X6RF-FC v1.00 b166)              |
 ------------------------------------------------
 ------------------------------------------------------------
       Number of inputs: 16
 ------------------------------------------------------------
(1) Set number of router inputs
(2) Input descriptions
(3) Input gain stage mode
(4) Input gain stage target power level
(5) Input gain stage manual gain amount
(6) Input upper threshold power level
(7) Input lower threshold power level
(8) Input squelch threshold power level
(9) Input squelch enable
(10) Current input power level

(X) Exit
>
```

3.3.1.1. Setting The Number Of Router Inputs

The number of router inputs within a frame must be set to 16, 32, 48, or 64, depending on how many input cards are present within the frame. The frame controller will only recognize (and control) the number of inputs specified by this configuration setting, regardless of how many input cards are physically present in the frame.

The frame controller recognizes matrix inputs sequentially from input card slots from left to right in the frame, as viewed from the front. The left-most input card slot represents inputs 1-16, while the right-most input card slot represents inputs 49-64.

3.3.1.2. Input Descriptions

The default names (Input 1, Input 2…) may be changed to better correspond to the RF signal to which they are connected. The input descriptions are used by control system interfaces such as control panels or VistaLINK® interfaces, thus providing a more familiar control interface for the user.

3.3.1.3. Input Gain Stage Mode

Each input may be set to either manual or automatic gain control (AGC) mode. In manual mode, the gain through the system on a particular input is fixed, and user specified (0 dB is the default). In automatic gain control (AGC) mode, the input through the system on a particular input is fixed, to a user selected target output level (-20 dBm is the default). The AGC maintains the output level if the input level is within the range determined by the AGC output level and the available gain in AGC mode.

3.3.1.4. Input Gain Stage Target Power Level

In AGC mode, each input has a target power output level, as seen by all outputs connected to that input. The target power default is –20 dBm, but can be set from –20 dBm to –50dBm. The target output level is maintained, if the input level is within the range determined by the AGC output level and the available gain in AGC mode.

3.3.1.5. Input Gain Stage Manual Gain Amount

In manual gain mode, the gain through the router for all outputs connected to a particular input is fixed. The default value for all inputs is 0dB, with an adjustable gain range of -6 / +20 dB.

Regardless of the manual gain setting, the output of the router is limited to –10dBm.

If a high level input signal (i.e. –10 dBm) is set to full gain of +20 dB, the output level on any connected inputs will be exceeding design limits. Significant distortion to the RF signal may occur under these circumstances.

3.3.1.6. Input Upper And Lower Threshold Power Level

Each input contains an input power monitor that is capable of sending an alarm (SNMP trap) if the input RF signal power is out of range. These settings allow the user to adjust the acceptable input RF signal power upper and lower thresholds. If the RF signal input power goes outside of this range, an alarm is generated.

3.3.1.7. Input Squelch Threshold Power Level

Each input has an input squelch circuit that mutes the input when no signal is present. This command allows the user to set the power level of the squelch circuit for each input. Below the set input power level, the input squelch circuit will mute the input.

3.3.1.8. Input Squelch Enable

This command allows the squelch function to be enabled or disabled on each input.

3.3.1.9. Current Input Power Level

This command generates a list of the current RF signal power present on each input.

3.3.2. Router Output Settings

The Router Output Settings menu provides access to all of the matrix output card settings.

```
------------------------------------------------
|              Router output settings           |
|               (X6RF-FC v1.00 b166)            |
 ------------------------------------------------
 ------------------------------------------------------------
      Number of outputs: 16
 ------------------------------------------------------------
(1) Set number of router outputs
(2) Output descriptions
(3) Crosspoints

(X) Exit
>
```

3.3.2.1. Setting The Number Of Router Outputs

The number of router outputs within a frame must be set to 16, 32, 48, or 64, depending on how many output cards are present within the frame. The frame controller will only recognize (and control) the number of outputs specified by this configuration setting, regardless of how many output cards are physically present in the frame.

The frame controller recognizes matrix outputs sequentially from output card slots from left to right in the frame, as viewed from the front. The left-most output card slot represents outputs 1-16, while the right-most output card slot represents outputs 49-64.

3.3.2.2. Output descriptions

The default output names (Output 1, Output 2…) may be changed to better correspond to the RF signal to which they are connected. The output descriptions are used by control system interfaces such as control panels, or VistaLINK® interfaces, thus providing a more familiar control interface for the user.

3.3.3. Crosspoints

The Crosspoints menu displays a current crosspoint matrix configuration, and then prompts for changes to the crosspoint matrix connections (i.e. which input is routed to which outputs). Below is an example of the status for a frame populated with a 16x16 crosspoint matrix.

```
------------------------------------------------
|              Input Configuration              |
|               (X6RF-FC v1.00 b166)            |
 ----------------------------------------------
 output      input
 ------      -----
      1 <--- 2
      2 <--- 3
      3 <--- 3
      4 <--- 4
      5 <--- 5
      6 <--- 6
      7 <--- 7
      8 <--- 11
      9 <--- 9
     10 <--- 7
     11 <--- 11
     12 <--- 12
     13 <--- 13
     14 <--- 2
     15 <--- 15
     16 <--- 12
 ---------------------------------------------------------------
(1) Set crosspoint

(X) Exit
>
```

3.4. SNMP SETUP

The SNMP Setup menu is used to set the SNMP trap IP address used for alarm reporting over SNMP for VistaLINK® or third party M&C systems. It also displays the current IP address table stored in the frame controller flash memory.

```
------------------------------------------------
|                   SNMP Setup                  |
|               (X6RF-FC v1.00 b166)            |
 ----------------------------------------------
---------------------------------
Trap Destination 1: 192.168.8.3
---------------------------------

(1) Set Trap IP Address
(2) Remove Trap IP Address
(3) Retrieve Trap IP Addresses from flash

(S) Save and Exit
(X) Exit
>
```

All changes made within this menu must be saved prior to exiting this menu level by selecting the "(S) Save and Exit" command. Failure to do so will result in the changes not taking effect.

3.4.1. Set Trap IP Address

For alarm reporting, the frame controller sends out SNMP traps to a user-specified IP address. This command allows the user to set all trap destinations on the network. Normally this will be the IP address of the PC that is running the VistaLINK® program, or the IP address of the server running the user's M&C system (or both).

3.4.2. Remove Trap IP Address

If an SNMP trap destination address is no longer being used, it should be removed from the Trap IP Address table to avoid frame controller time out requirements for non-existent IP addresses. This will improve the efficiency of the frame controller and the control network.

3.4.3. Retrieve Trap IP Addresses from Flash

This command refreshes the frame controller RAM with the IP address table stored in the frame controller flash memory. This is the IP address table that was stored after the most recent "(S) Save and Exit" command.

3.5. SERIAL CONTROL PORT CONFIGURATION

The serial control port menu is used to set the configuration of the serial control port located on the rear of the frame. It also displays the current settings stored in flash memory. This port is used to control the routing matrix from external, third party control systems. This menu does not configure the configuration/upgrade port located on the front edge of the frame controller card.

Each frame has two serial control ports on the back panel, one for each frame controller slot. The serial port settings for each frame controller card must be configured separately.

```
-----------------------------------------------
|       Serial Control Port Configuration     |
|              (X6RF-FC v1.00 b166)           |
 ---------------------------------------------
 ---------------------------------------------
 Baud Rate: 115200
 Data Bits: 8
    Parity: None
 Stop Bits: 2
  Standard: RS 232
  Protocol: Evertz Router Control
 ---------------------------------------------
(1) Set baud rate
(2) Set number of data bits
(3) Set parity
(4) Set number of stop bits
(5) Set standard
(6) Set protocol

(X) Exit
>
```

At this time, the only supported protocol for the serial port is the “Evertz Router Control” protocol.

3.6. SHOW CARD STATUS

This command shows the current card status of all the input and output cards within the frame. It can be used to verify that all cards within a frame are recognized by the frame controller. It will also indicate if there are any current problems communicating with each card. An example of a card status display for a frame with one input card and one output card is shown below.

```
Slot Number Card Type Start  End  Configured Active Problem
----------- --------- ----- ----- ---------- ------ -------
    1         I16LB       1    16     y        y
    2         I16LB      17    32     n        n
    3         O16LB       1    16     y        y
    4         O16LB      17    32     n        n
    5         O16LB      33    48     n        n
    6         O16LB      49    64     n        n
    7         I16LB      33    48     n        n
    8         I16LB      49    64     n        n
```

3.7. ENGINEERING / DEBUG

This menu contains several menu commands that are intended for use only by Evertz engineering staff.

This page left intentionally blank

4. ROUTER CONFIGURATION USING THE INPUT CARD EDGE INTERFACE

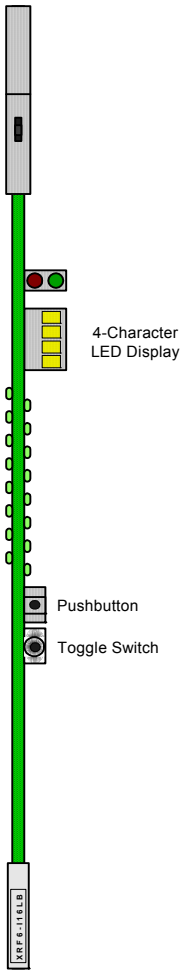


Figure 4-1: Input card edge controls

The input cards within the frame have a card edge mounted interface for configuration and status. This interface consists of a pushbutton switch, a toggle switch, and a 4-character display. It can be used to access the settings that are specific to each input card. These settings can also be accessed via the frame controller serial port, as described in Chapter 3.

4.1. INPUT CARD EDGE INTERFACE OPERATION

The input card edge interface is used to navigate through the configuration and status menus on the input card. Refer to Table 4-1 for the complete input card menu. Switch functions are indicated below:

Pushbutton: Selects the item shown in the 4-character display, and moves down (or back) one level in the menu tree.

Toggle Switch: Moves between all menu items within the current menu level

Level 1	Level 2	Level 3	Level 4	Level 5
XRF6 I16	BACK			
	CH1	INPL	-5 to -70dBm	
	…			
	CH16	OPL	-20 to -50dBm	
		MODE	AGC, MAN	
		GAIN	-6 to +20 dB	
		SQL	ON, OFF	
		RFTH	BACK	
			UPPR	-5 TO -30dBm
			LWR	-31 TO -70dBm
			SQL	-50 TO -70dBm
	VER	Displays software version		
	DISP	VERT, HORIZ		

Table 4-1: Input Card Edge Interface Menu

Individual commands are explained below:

Level 1:

Top level, displays the input card name “XRF6-I16LB”

Level 2:

CH1 –CH16: Selects which input channel is being set
VER: Displays the current input card firmware version
DISP: Used to switch between horizontal and vertical character orientation in the 4-character display

Level 3: (specific to an individual input channel)

INPL: Displays the RF input power level of the selected channel. It displays “LOW” when the input power level is too low to measure.
OUTL: Sets the target output power level for AGC mode (-20 to –50 dBm). This setting is only available when the input is in AGC mode.
MODE: Sets manual or automatic gain control mode (AGC, MAN)
SQL: Sets the squelch mode to ON or OFF
RFTH: Sets the upper power alarm, lower power alarm, and squelch thresholds (UPPR, LWR, SQL)

GAIN: Sets the system forward path gain for the input (when in manual gain mode). This setting is only available if the input is in manual gain mode.

Levels 4 and 5:

These levels contain the range and mode parameters specific to the settings in Level 3. Refer to Table 4-1 for these values.

4.2. OUTPUT CARD EDGE INTERFACE

The output card edge pushbutton and dip switch interface is currently not supported.

This page left intentionally blank

5. STATUS LED INDICATORS

5.1.1. Power Supply LEDs

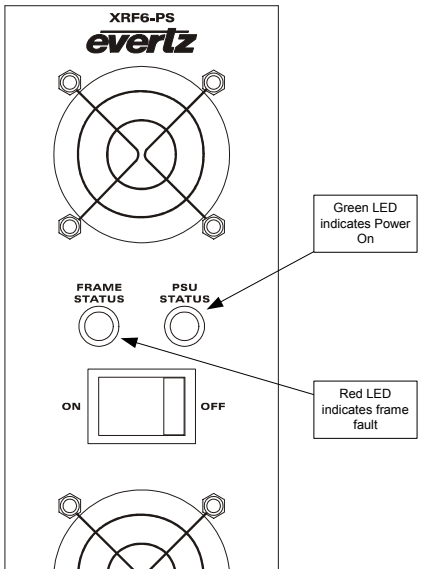


Figure 5-1: Power Supply LED Indicators

The power supply has a green LED that indicates normal operation. It also has a red LED that is used to indicate a failure on the power supply. The frame controller can also be configured to illuminate the red LED on the power supply(s) whenever there is an error reported on any card within the frame.

5.1.2. Frame Controller LEDs

The LEDs on the frame controller are currently used for engineering test indication; they are not yet assigned to user functions. However, any that are illuminated during normal operation should be green. Red LEDs indicate a configuration or other type of error.

5.1.3. Input Card LEDs

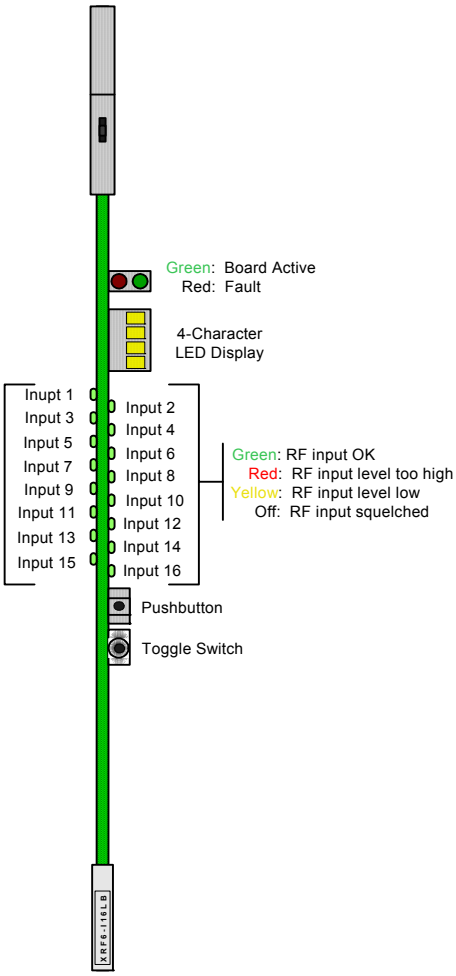


Figure 5-2: Input card LED Indicators

The input card has several edge-mounted LEDs that are used for configuration and status indication. The red and green LED pair located near the top of the board indicate overall board health status. The green LED indicates that the input card has established communication with the frame controller. The red LED indicates a card fault.

The 4 character LED display is used in conjuction with the pushbutton and toggle switch. Together they comprise the card edge interface for input card configuration (described in section 4.1).

The 16 multicolour LEDs indicate the status of the RF input at each of the 16 inputs on the card. Green indicates an RF signal is present and within acceptable power limits. Red indicates that the RF input power is too high, yellow indicates RF power is too low. An LED that is not illuminated indicates that the RF input signal (if any) is below the user adjustable input squelch threshold.

5.1.4. Output Card LEDs

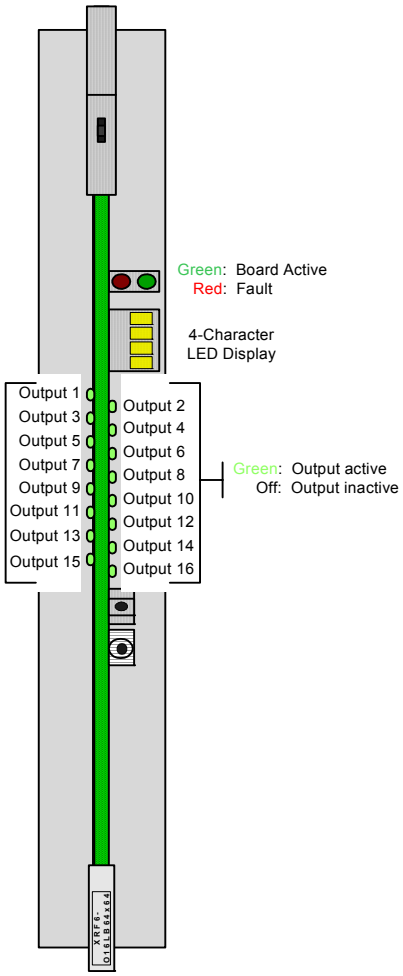


Figure 5-3: Output Card LED Indicators

The red and green LED pair located near the top of the board indicate overall board health status. The green LED indicates that the input card has established communication with the frame controller. The red LED indicates a card fault.

The output card has a group of 16 edge-mounted LEDs that correspond to an active RF output on the card. An output is active when any RF input is connected to that output via the system crosspoint matrix. An output is inactive (no LED illuminated) when no RF input is connected to it through the crosspoint matrix.

The other LEDs on the output card are for engineering test indication, and are not yet assigned to user functions. There are two LEDs next to the 4-character display, 1 red and 1 green, that alternate during normal operation.

This page left intentionally blank

6. OPERATION

The router matrix may be controlled via SNMP over the Ethernet port, or by RS232/422 over the frame's serial port. The Evertz X-NCP2 control panel uses SNMP over Ethernet, while many third party monitoring and control systems use the RS232/422 port.

6.1. X-NCP2 ROUTER CONTROL PANEL

Figure 6-1: X-NCP2 Router Control Panel

The Evertz X-NCP2 control panel is a multi-function control panel used to control the XRF6 router, as well as other Evertz products. The control panel may be connected directly to the router's Ethernet port (using a crossover Ethernet cable) or to a hub or switch, which is connected to the router's Ethernet port (using a standard Ethernet cable). A hub or switch is required to connect multiple control panels to a frame controller. The panel communicates with the router's frame controller using SNMP. See section 2.5.2 for more information on Ethernet connections and cabling.

To connect an XNCP2 control panel directly to an XRF6 router Ethernet port, a crossover Ethernet cable is required.

To control the XRF6 router via the XNCP2 panel, the IP address of each frame controller must be added to the XNCP2 list of controlled devices on the network. This is detailed in section 6.1.1.

6.1.1. Adding XRF6 router frame controller to XNCP2 control list

The addition of XRF6 router frame controllers can be performed once the XNCP2 panel and XRF6 frame controllers are on the same IP subnet.

Follow this procedure to add a frame:

1. Enter the <setup> menu at the top level menu of the XNCP2.
2. Depending on the firmware version in the X-NCP2, select the <add frame> item in the list, or if present select the <add XNCP device manually> item in the list and skip to step 4.
3. Select the frame type as <NON-SNMP>.
4. Enter the IP address of the XRF6 frame controller using the scroll knob and [SETUP] key.
5. The XNCP2 will update and display the IP address of the added frame controller.

The same procedure can be followed to remove a FC from the XNCP2 list, except in step 2, select <remove frame> instead of <add frame>. The panel will not require specification of frame type to remove the frame address.

6.1.2. Controlling the XRF6 Router via the XNCP2

To control the router matrix, a panel session with the frame controller must first be initiated. This is accomplished by scrolling to the IP address of the XRF6 frame controller and pressing the [SETUP] button on the panel. The XNCP2 will display the input and output range of the router on the left hand side display and the output destination selection mode on the right hand side display facing the panel.

A session may be terminated by pressing the [↑] and [↓] buttons simultaneously.

To release a session with the X-NCP2 panel (return to list of IP address selections), press the [↑] and [↓] buttons simultaneously.

If there is more than one device on the network, the panel will show multiple IP addresses (or names, if configured) in the display. Use the rotary knob to highlight the desired device, then press [SETUP] to initiate a session with that device.

Once a session is initiated, crosspoint changes may be made by using the [Output Select] and [Input Select] buttons, followed by the [TAKE] button. As an alternative to using the pushbuttons for input and output selection, the scroll knobs on either side of the display may be used for output and input selection, followed by the [TAKE] button.

The examples listed below illustrate two different methods of initiating a crosspoint take with the router. Both examples illustrate making a connection between output 5 and input 2.

6.1.3. Example 1: Pushbutton Control to Switch Input 2 to Output 5

1. Initiate a panel session by highlighting the IP address (or router name) of the router in the display area of the panel. This is done using the leftmost scroll knob. When the frame IP address (or name) is highlighted, press [SELECT].
2. Press [OUTPUT SELECT] to put the panel into output selection mode. The numeric buttons 0-9 will illuminate.
3. Use the numeric buttons to select the desired output (i.e. 5) by pressing [5], followed by [OUTPUT SELECT] to exit output selection mode.
4. Press [INPUT SELECT] to put the panel into input selection mode. The numeric buttons 0-9 will illuminate.
5. Use the numeric buttons to select the desired input (i.e. 2) by pressing [2], followed by [INPUT SELECT] to exit the input selection mode.
6. Press [TAKE]. The panel display will display the input and output selected, plus a “take successful” message. The router does not perform the input to output connection until the [TAKE] button is pressed.

In short, the steps are [SELECT], [OUTPUT SELECT], [2], [OUTPUT SELECT], [INPUT SELECT], [2], [INPUT SELECT], [TAKE].

6.1.4. Example 2: Rotary knob control to switch input 2 to output 5

1. Initiate a panel session by highlighting the IP address (or router name) of the router in the display area of the panel. This is done using the leftmost scroll knob. When the frame IP address (or name) is highlighted, press [SELECT].
2. Use the left scroll knob (of the right side display area) to select an output. As you scroll through the system outputs, the current input connection is displayed.
3. Use the right knob to select the desired input.
4. To make the crosspoint selection, press [TAKE]. A "take successful" message should appear in the display.

6.2. VistaLINK® REMOTE MONITORING/CONTROL

6.2.1. What is VistaLINK®?

VistaLINK® is Evertz's 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. VistaLINK® 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. Card configuration through VistaLINK® PRO can be performed on an individual or multi-card basis using simple copy and paste routines, which reduces the time to configure each module separately. Finally, VistaLINK® 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. An 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 *Vista*LINK™ Pro Manager graphical user interface (GUI), third party or custom manager software may be used to monitor and control Evertz *Vista*LINK™ enabled products.

2. Managed devices (such as the XRF6 router), each with a unique address (OID), communicate with the NMS through an SNMP Agent. The router communicates with the manager via the XRF6FC VistaLINK™ frame controller module, which serves as the Agent.

3. A virtual database known as the Management Information Base (MIB) lists all the variables being monitored and which both the Manager and Agent understand. Please contact Evertz for further information about obtaining a copy of the MIB for interfacing to a third party Manager/NMS.

6.3. VistaLINK® MONITORED PARAMETERS

The following items may be monitored through the VistaLINK® software:

- Input RF power level (too high or too low)
- Crosspoint status

6.4. VistaLINK® CONTROLLED PARAMETERS

The following items may be controlled or configured through the VistaLINK® interface:

- Router crosspoint settings
- Manual or AGC mode on each input
- Power level for each input (AGC mode)
- Gain on each input (manual gain mode)
- Input squelch mode (on or off)
- Input squelch threshold

6.5. VistaLINK® CONTROL SCREEN

The following picture shows the VistaLINK® crosspoint control matrix and the configuration menu available for each router input. For more information on the VistaLINK® suite of products, please contact an Evertz sales representative or visit www.evertz.com.

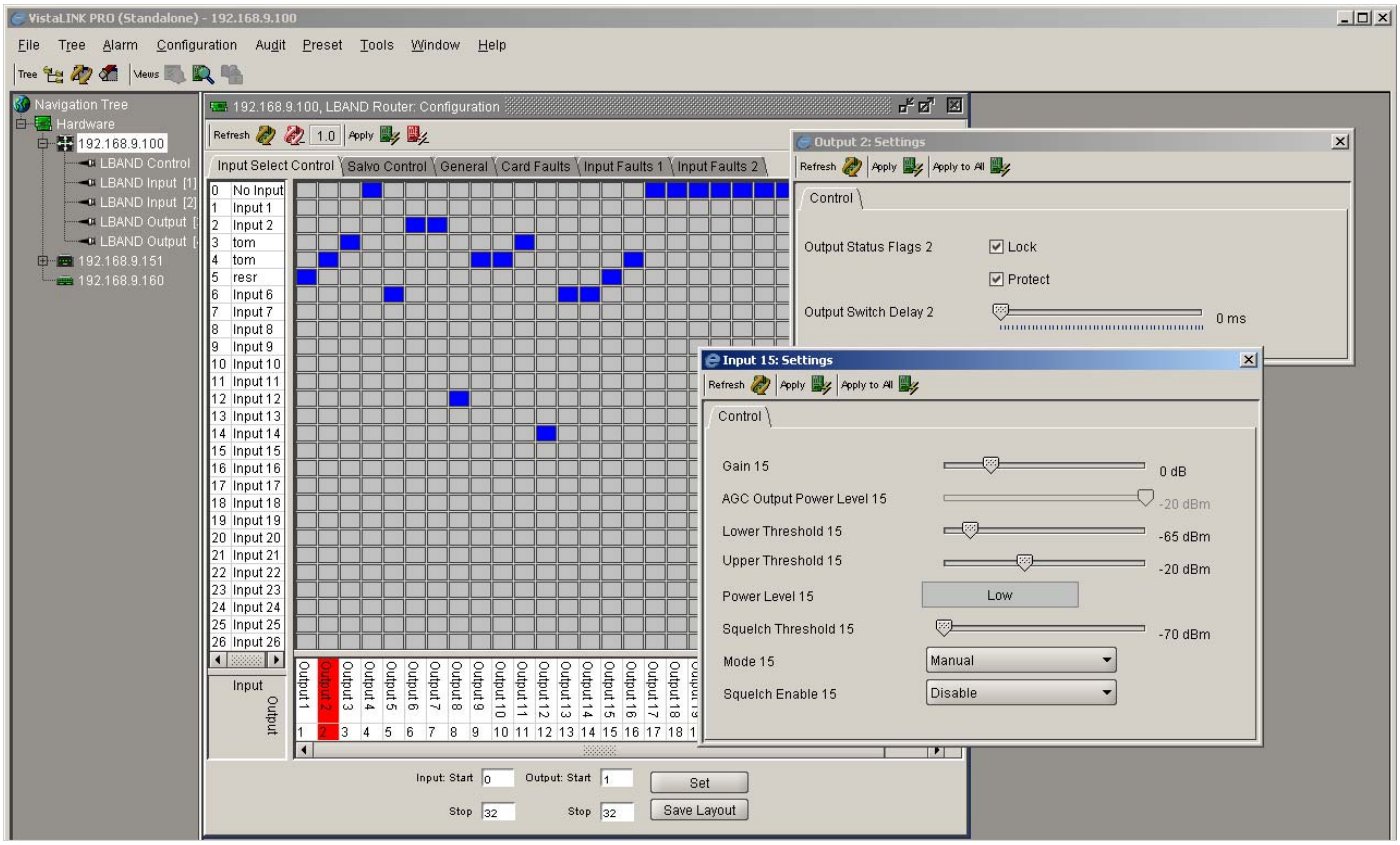


Figure 6-2: VistaLINK® Control Screen

7. TECHNICAL DESCRIPTION

7.1. SPECIFICATIONS

7.1.1. System

Matrix Sizes:	16x16 to 64x64 in a 6RU frame 512x512 maximum expanded system size.
System Expansion:	inputs or outputs are expandable in increments of 16. Expansion beyond 64x64 requires external distribution and combining.
Overall bandwidth:	40-2250 MHz

7.1.2. RF Specifications: L Band

Bandwidth:	850 to 2250 MHz*
Frequency Response:	+/- 1.5 dB over the passband, +/- 0.5 dB over any 36 MHz channel
Isolation:	> 60 dB (input to output) > 70 dB (output to output and input to input)
RF Input Power:	-10 to –70 dBm
Maximum RF Output Power:	-10dBm
Input P1dB:	+2 dBm (1500MHz) typ
OIP3:	+12dBm (1500MHz) typ
Gain Range: (manual gain mode)	-6 / +20dB, maximum system output power limited to –10 dBm
Output AGC level:	–20 to –50 dBm
Noise Figure:	6dB (1500MHz, Gain = +20dB) typ 20dB (1500MHz, Gain = 0dB) typ
Connector Type:	BNC per IEC 60169-8 Amendment 2 (F connector optional)
Impedance:	75 ohm (50 ohm BNC optional)
Return Loss:	> 15 dB (input and output)

*** All specifications over specified bandwidth unless noted.**

7.1.3. RF Specifications: If

Bandwidth:	40 to 200 MHz
Frequency Response:	+/- 0.5 dB over 50-90MHz and 120-160MHz
Isolation:	> 60dB (input to output) > 70dB (output to output and input to input)
RF Input Power:	-15 to –70 dBm
Maximum RF Output Power:	-10dBm
Input P1dB:	-4 dBm (70MHz) typ
OIP3:	+10dBm (70MHz) typ
Gain Range: (manual gain mode)	-6 / +20dB, maximum system output power limited to –10 dBm
Return Loss:	> 13 dB (input), > 15dB (output)

7.1.4. Communication And Control:

Serial: RS232/RS422 selectable – Femal 9 pin D connector
Ethernet: SNMP over IEEE 802.3/U (10/100 BaseTx) RJ45 connector
Control: Card-edge interface, VistaLINK®

7.1.5. Electrical

AC Mains Input: Auto ranging, 100 ⇔ 240 VAC, 50/60 Hz
Maximum Operating Current: 2.9 A (@ 120 VAC), 1.8 A (@ 240 VAC)
Maximum Power Consumption: 300 W for a fully loaded frame
Maximum Module Load: 200 W (25 W per slot)
Power Supply Configuration: 1 supply standard, optional redundant supply requires separate inlet
Connector: IEC 60320 - 1 per power supply
Fuses: 4 amp, 250 Volt time delay 5 x 20 mm. – 2 per power supply
Status Indicators (each power supply):
PSU status LED
Local Error/Failure LED
Temperature: 0 - 40°C

7.1.6. Compliance

Safety: CSA Listed to CSA C22.2 No. 60065-03, UL 60065-03
IEC 60065-(2001-12) 7th Edition
Complies with CE Low voltage Directive 93/68/EEC
EMC: Complies with FCC part 15, class A.
Complies with EU EMC directive 89/336/EEC

7.1.7. Physical

Height: 10.5” (266 mm)
Width: 19” (483 mm)
Depth: 20.5” (520 mm)
Module Capacity: 4 input slots, 4 output slots
Weight: Approx. 17.4 lbs. (7.9 Kg) with 2 power supplies, no slots occupied
Approx. 32 lbs. (14.5 Kg) with 2 power supplies all slots occupied

7.2. SERVICING INSTRUCTIONS

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

7.2.1. Changing The Fuses

Check that the line fuse is rated for the correct value marked on the rear panel. Never replace with a fuse of greater value.

The fuse holder is located inside the power entry module. To change the fuses, pull out the fuse holder 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. Use time delay 5 x 20 mm fuses rated for 250 Volts with a current rating of 6.3 amp. 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.

7.2.2. 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.

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 XRF6PS-FM power supply blank panel.

The XRF6PS 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. On frames with only one power supply, a XRF6PS-FM blank power supply module with cooling fan **must be** inserted into the second power supply space. The XRF6PS-FM contains a module cooling fan and baffles to maintain proper airflow within the frame.

The power supply is secured into the frame by two machine screws through the rear panel (as shown in figure 7-1). These screws must be removed before the power supply can be extracted from the front.

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

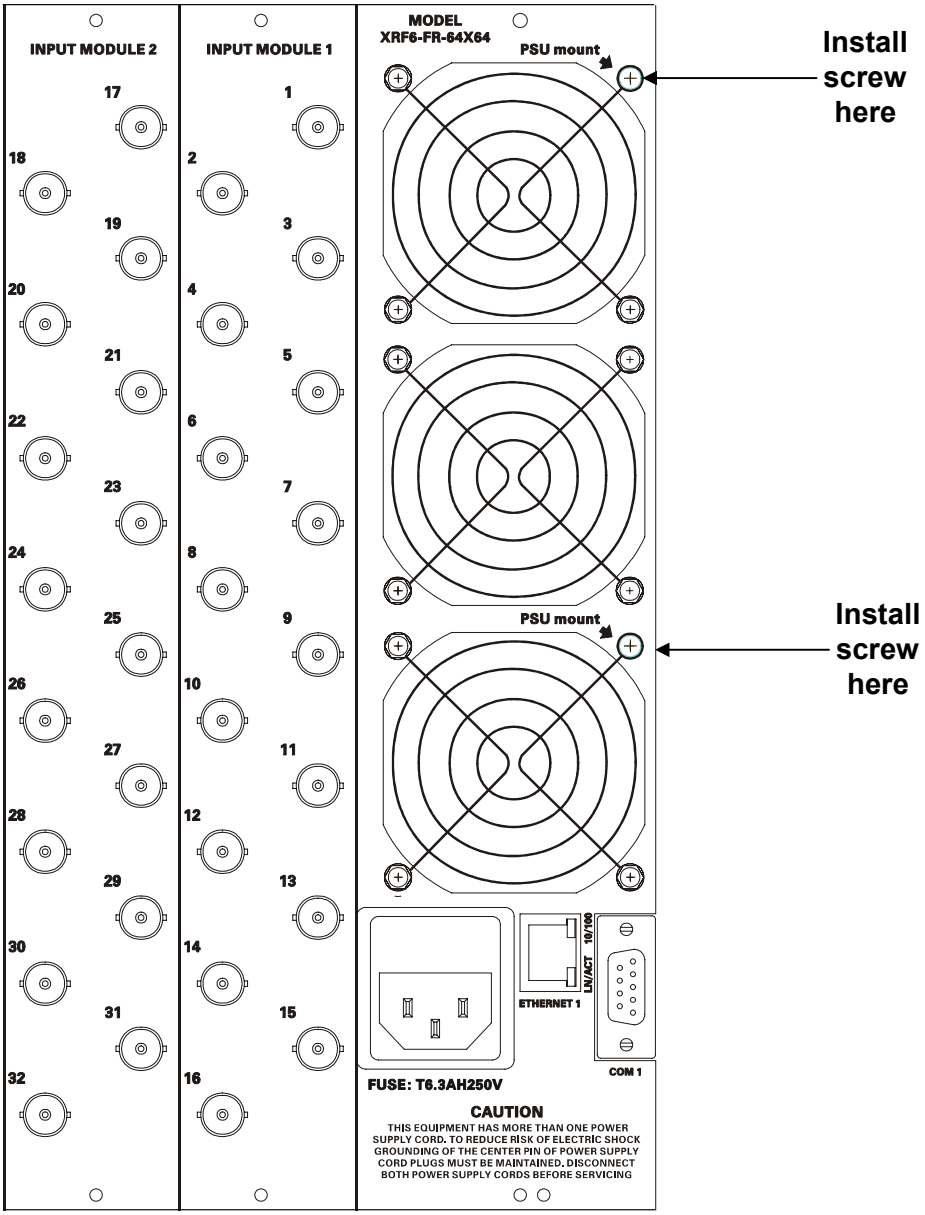


Figure 7-1: Locating the Power Supply Mounting Screw

8. XRF6 FIRMWARE UPGRADES

The XRF6 contains three types of modular, active circuit cards that contain upgradeable firmware:

1. Frame controllers (XRF6S-FC or XRF6L-FC)
2. Input cards (XRF6-16IP)
3. Output cards (XRF6S-16OP or XRF6L-16OP)

The most straight-forward and recommended means of updating the firmware is over TCP/IP through Evertz VistaLINK® Pro software. Cards may also be individually updated through RS232 by using a serial cable and suitable terminal program.

8.1. FIRMWARE UPGRADES USING VistaLINK® Pro

For purposes of illustration in this procedure, there will be one XRF6 chassis connected to the network and it contains:

- One frame controller at IP 192.168.9.100
- Two input cards
- Two output cards

When both the frame controller cards and input or output cards are being upgraded with new firmware, the input (XRF6-16IP) and/or output (XRF6S-16OP or XRF6L-16OP) cards should always be done first, followed by the frame controller (XRF6S-FC or XRF6L-FC).

To perform the upgrade, a PC connected to the same network as the XRF6 is required. This PC must also have VistaLINK® Pro installed. VistaLINK® Pro is available in free (VLPRO-C), Plus and Graphics versions. Any of these clients may be used for the firmware upgrade.

8.1.1. Checking the Currently Installed Firmware Version

1. Launch the VistaLINK® Pro client.

2. The XRF6 router(s) should appear in the hardware tree on the left. Expand the XRF6 entry to list all of the cards in the selected system.

3. To display the frame controller firmware version, right-click on the main entry for the XRF6 system (its IP address by default) and select *View Configuration*.

4. Click the *General* tab and the firmware version will be displayed.

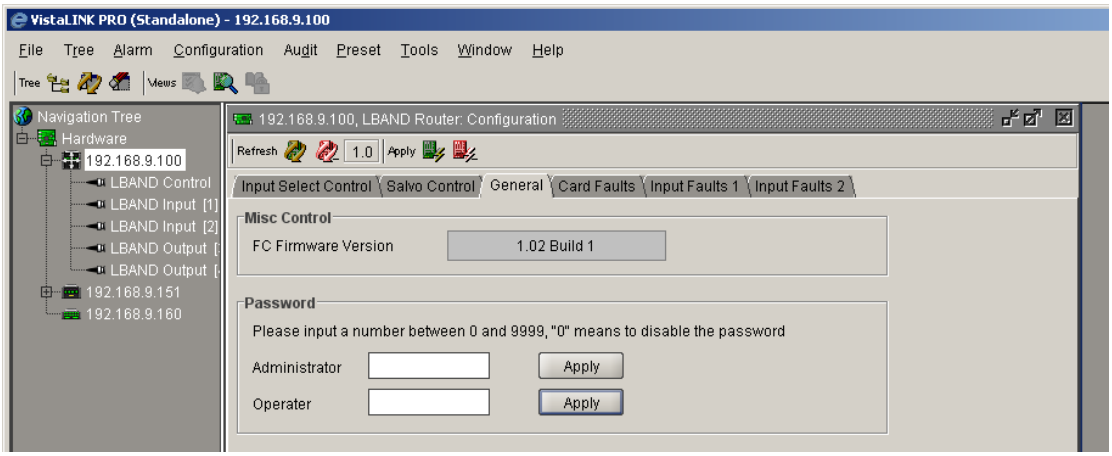


Figure 8-1: Frame Controller Firmware Version

5. To display the firmware version of either an input or output card, right-click on a card from the list in the hardware tree and select *View Configuration*. The firmware version will be displayed in a window.

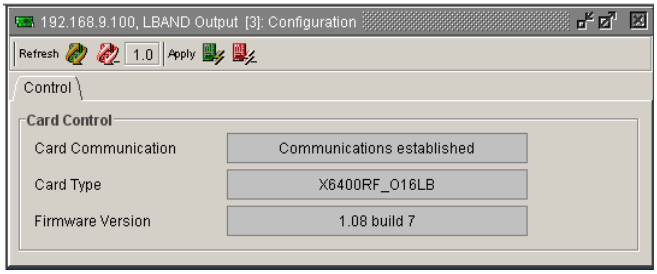


Figure 8-2: Input or Output Card Firmware Version

8.1.2. Upgrading Input Card Firmware

1. Launch the VistaLINK® Pro client.

2. Select Help → Version Information from the VistaLINK® toolbar.

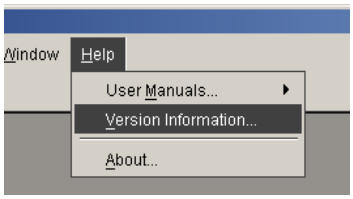


Figure 8-3: Version Information Menu Item

3. Click the *Active* radio button.

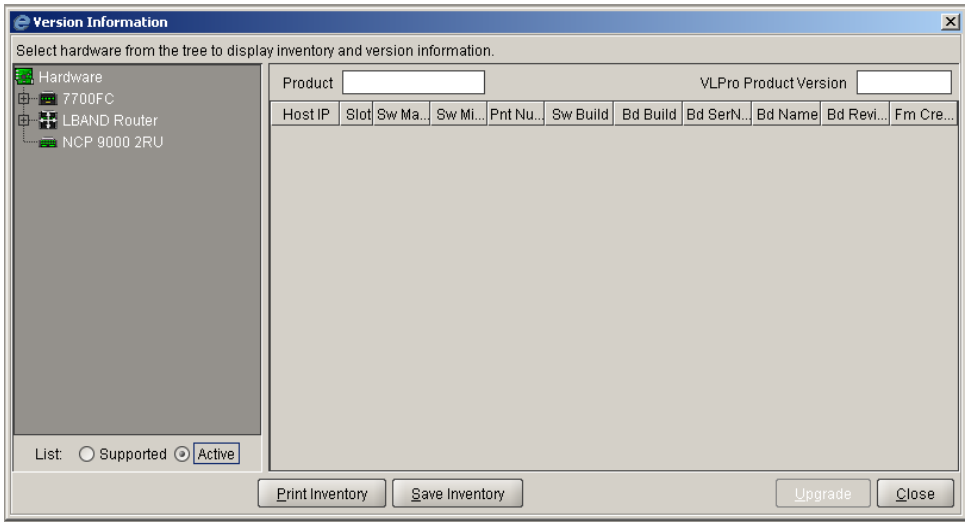


Figure 8-4: Active Radio Button

4. Expand the entry for *LBAND Router* from the hardware tree at the left and select *LBAND Input*.

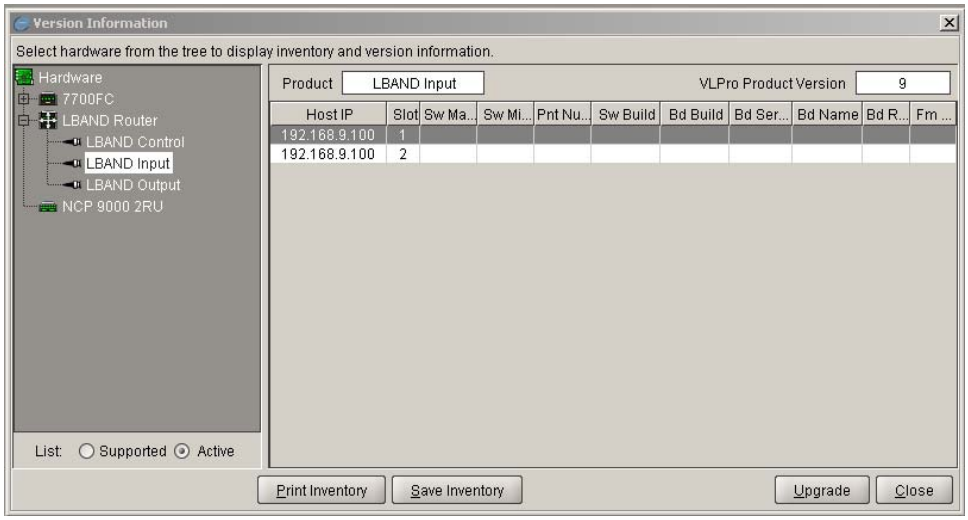


Figure 8-5: XRF6 Hardware Tree Listing

5. Click on *Upgrade*. A popup window named *Upgrade Firmware* will appear. Listed will be all of the XRF6 input cards detected in XRF6 systems on your network.

6. Click *Browse* and select the appropriate firmware file from your system, e.g. xrf6-i16lb-1-05-0037.bin

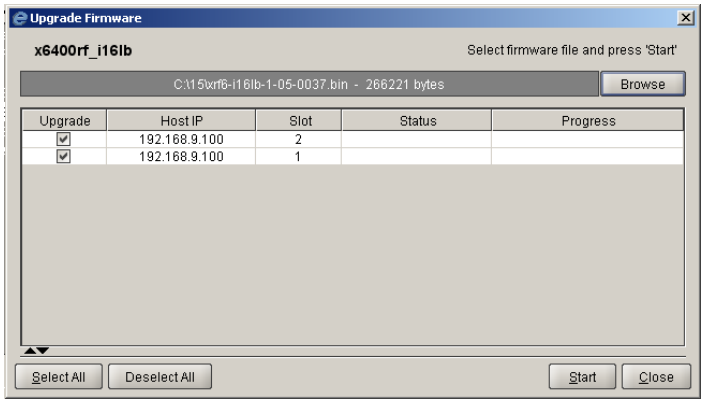


Figure 8-6: Firmware File Selection

7. The check boxes under the *Upgrade* column may be used to select or deselect cards for upgrade (all selected by default). Click *Start* to upgrade selected cards, and click *Yes* when prompted to begin the upgrade.

8. A window will appear requesting whether or not you would like to upgrade the sub-processors. Select *No sub-proc upgrade* (default). Upgrading of the-subprocessors is not normally required and **will result in interruption of the RF signal while they are upgraded.**

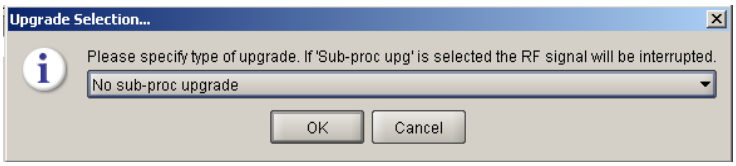


Figure 8-7: Sub-Processor Upgrade Selection

9. The upgrade process is finished when *Completed* is listed under Status for each card selected for upgrade.

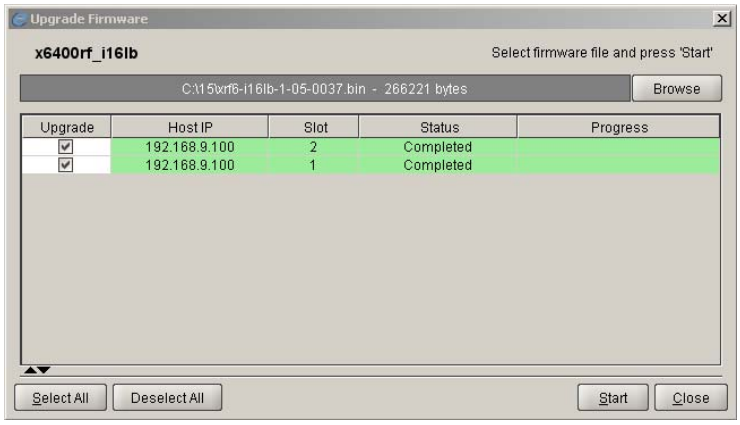


Figure 8-8: Upgrade Process Completed

8.1.3. Upgrading Output Card Firmware

1. Launch the VistaLINK® Pro client.
2. Select *Help* → *Version Information* from the VistaLINK® toolbar.

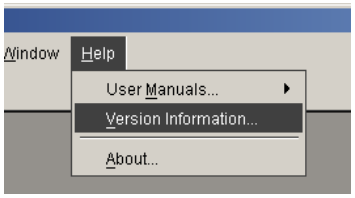


Figure 8-9: Version Information Menu Item

3. Click the Active radio button.

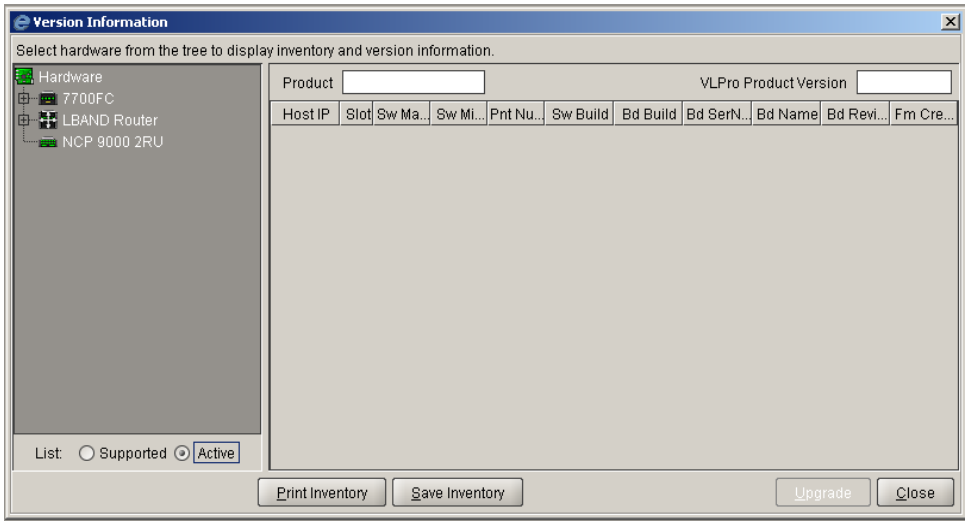


Figure 8-10: Active Radio Button

4. Expand the entry for *LBAND Router* from the hardware tree at the left and select *LBAND Output*.

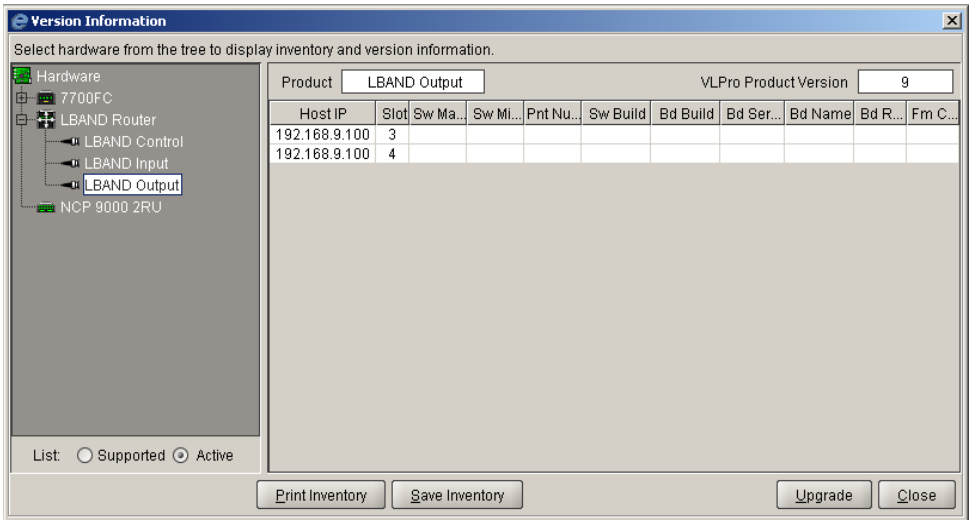


Figure 8-11: XRF6 Hardware Tree Listing

5. Click on *Upgrade*. A popup window named *Upgrade Firmware* will appear. Listed will be all of the XRF6 output cards detected in XRF6 systems on your network.

6. Click *Browse* and select the appropriate firmware file from your system, e.g. xrf6-o16lb-1-08-007.bin

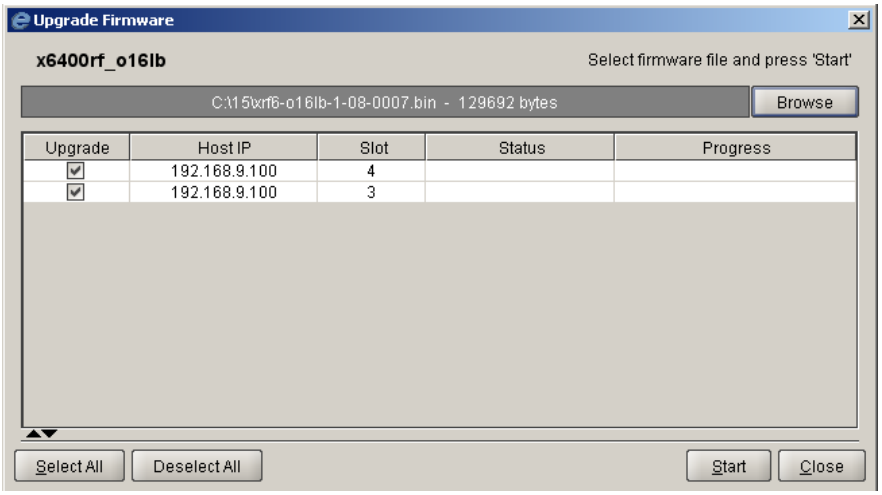


Figure 8-12: Firmware File Selection

7. The check boxes under the *Upgrade* column may be used to select or deselect cards for upgrade. Click *Start* to upgrade selected cards, and click *Yes* when prompted to begin the upgrade

8. The upgrade process is completed when Completed is listed under Status for each card selected for upgrade.

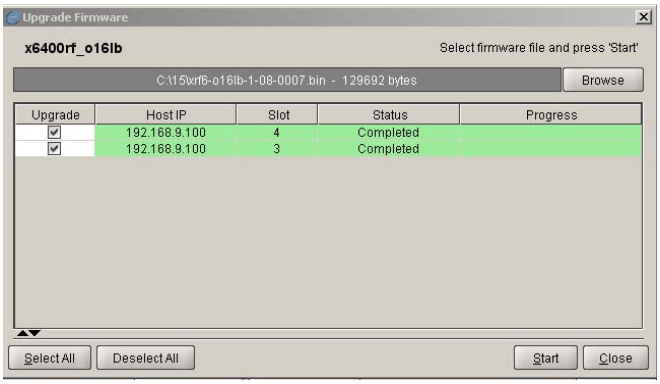


Figure 8-13: Upgrade Process Completed

8.1.4. Upgrading Frame Controller Firmware

1. Launch the VistaLINK® Pro client.
2. Select *Help* → *Version Information* from the VistaLINK® toolbar.

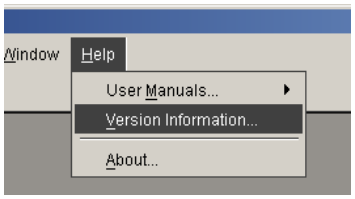


Figure 8-14: Version Information Menu Item

3. Click the Active radio button.

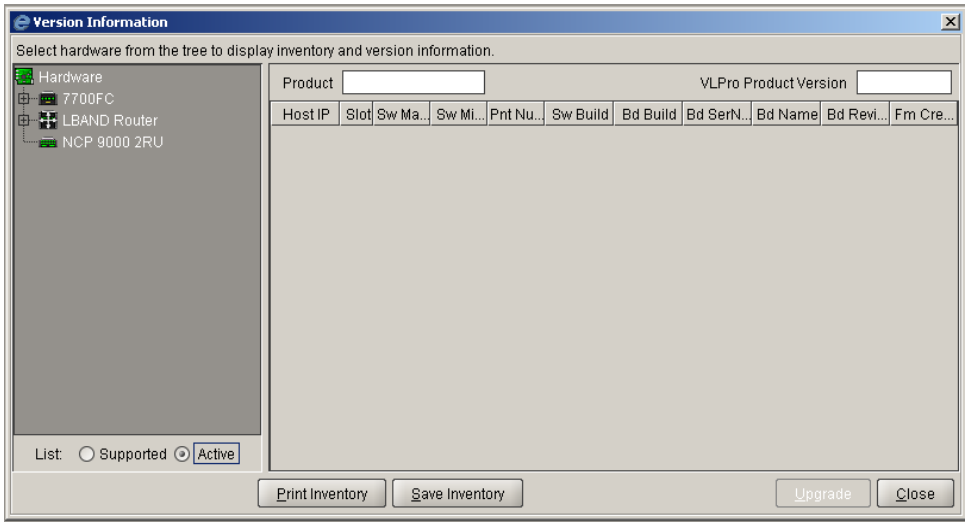


Figure 8-15: Active Radio Button

4. Expand the entry for *LBAND Router* from the hardware tree at the left and select *LBAND Control*.

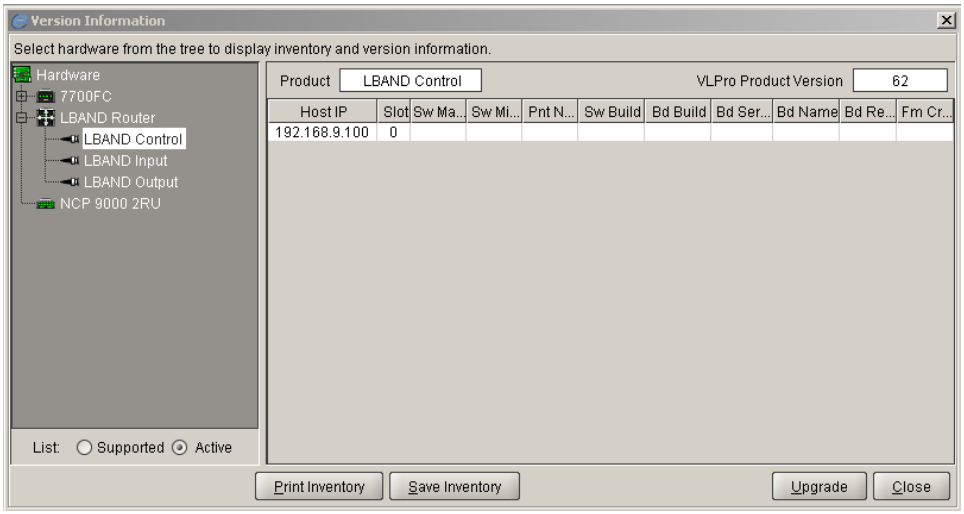


Figure 8-16: XRF6 Hardware Tree Listing

5. Click on *Upgrade*. A popup window named *Upgrade Firmware* will appear. Listed will be all of the XRF6 output cards detected in XRF6 systems on your network.

6. Click *Browse* and select the appropriate firmware file from your system, e.g. xrf6-o16lb-1-08-007.bin

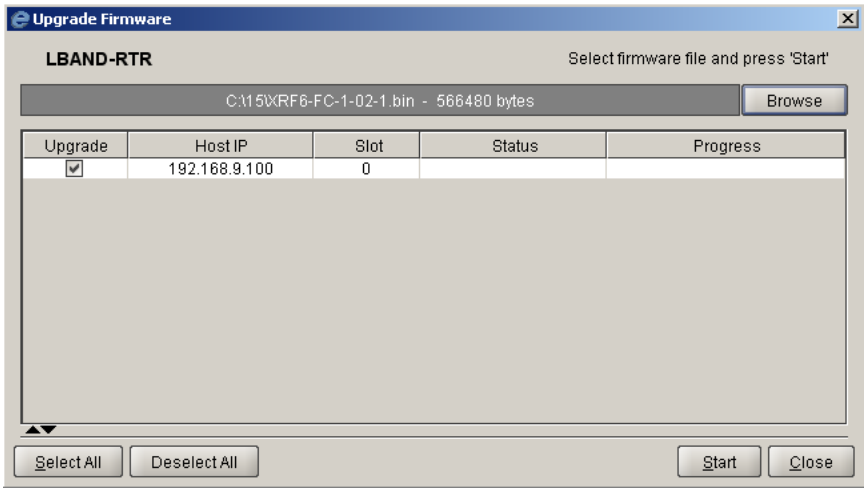


Figure 8-17: Firmware File Selection

7. The check boxes under the *Upgrade* column may be used to select or deselect cards for upgrade. Click *Start* to upgrade selected cards, and click *Yes* when prompted to begin the upgrade.

8. The upgrade process is completed when *Completed* is listed under Status for each card selected for upgrade.

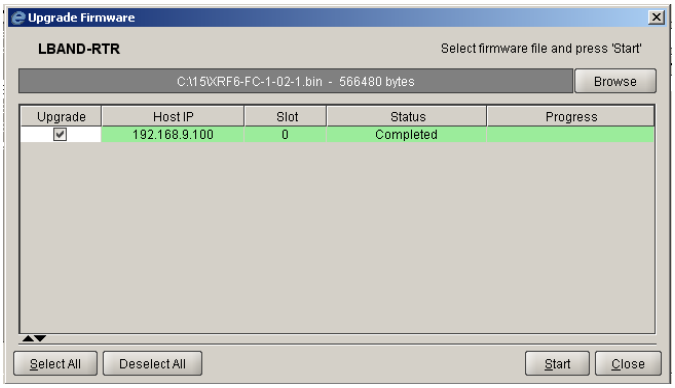


Figure 8-18: Upgrade Process Completed

8.2. FIRMWARE UPGRADES VIA SERIAL PORT

To upgrade the cards in the XRF6 router via RS232 serial, the following are required:

- PC with available communications port. The communication speed is 115200 baud, therefore a 486 PC or better with a 16550 UART based communications port is recommended.
- Straight-through serial extension cable (DB9 female to DB9 male) or (DB25 female to DB9 male)
- Terminal program that is capable of Xmodem file transfer protocol (such as HyperTerminal)
- Special upgrade cable supplied with the XRF6 frame. This cable has a DB9 female connector at one end, and a 2-row pin header connector at the other, connected together with multi-coloured ribbon cable. (Evertz part #WA S76)

When both the frame controller cards and input or output cards are being upgraded with new firmware, the input (XRF6-16IP) and/or output (XRF6-16OP) cards should always be done first, followed by the frame controller (XRF6-FC).

8.2.1. Upgrading Input or Output Card Firmware

1. Pull the selected card out of the frame, exposing the first ¼ of the card. Locate the J20 header and connect the ribbon cable.

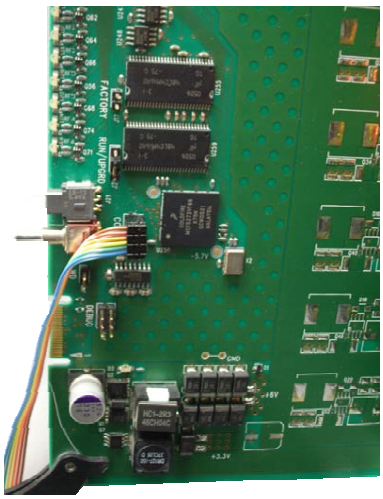


Figure 8-19: Input Card Upgrade Header With Upgrade Cable Connected

Figure 8-20: Output Card Upgrade Header With Upgrade Cable Connected

2. Connect the other end of the ribbon cable to the PC to be used for the upgrade.

3. Open a terminal session and enter the following settings:

Baud	**115200**
Parity	**no**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

4. Insert the card into the XRF6 frame and allow it to power up.

5. Press Enter to obtain a command prompt (>).

6. At the prompt, type *u* and press Enter.

7. Upload the appropriate file using the X-Modem protocol.

8. When the upload is complete, allow the card to reboot prior to removing the upgrade cable.

9. Repeat the above process for each card in the system requiring upgrade.

8.2.2. Upgrading Frame Controller Firmware

1. Pull the frame controller out of the frame, exposing the first ¼ of the card. Locate the J20 header and connect the ribbon cable.

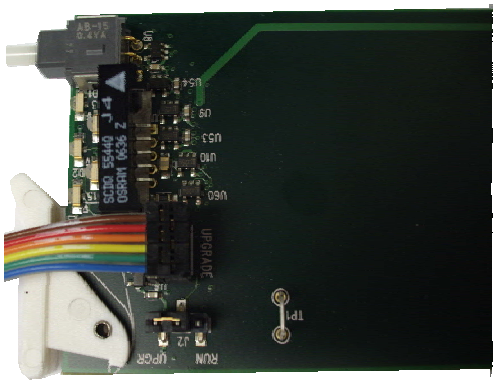


Figure 8-21: Frame Controller Card Upgrade Header With Upgrade Cable Connected

2. Connect the other end of the ribbon cable to the PC to be used for the upgrade.

3. Locate the RUN/UPGRADE jumper, J2, and move the jumper to the *UPGR* position.

4. Open a terminal session and enter the following settings:

Baud	**115200**
Parity	**no**
Data bits	**8**
Stop bits	**2**
Flow Control	**None**

5. Insert the card into the XRF6 frame and allow it to power up.

6. Wait for the command prompt (PPCBOOT>) to appear.

7. At the prompt, type *upload* and press Enter.

8. Upload the appropriate file using the X-Modem protocol.

9. When the upload is complete, allow the card to reboot.

10. Pull the card from the frame far enough to access the upgrade cable and jumper. Remove the cable and put the jumper back into the RUN position.

11. Re-insert the card in the frame.

This page left intentionally blank