XRF1/XRF1A 16x16 RF Router

User Manual

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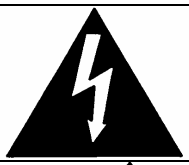
IMPORTANT SAFETY INSTRUCTIONS

	The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of 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 this information.
- 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 the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

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

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

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

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

INFORMATION TO USERS IN EUROPE

NOTE

This equipment with the CE marking complies with both the EMC Directive (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	May 06
0.2	Formatting, updated specifications	Jun 06
0.3	Updated technical specifications	Mar 07
0.4	Fixed typos, formatting and references	April 07
0.5	Added XRF1A info, removed ERC	Aug 08
1.0	Released	Nov 08
1.1	Added VistaLINK section 7. General cleanup.	Jan 09
1.2	Added F-Type connector conductor range info	Oct 09

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1. OVERVIEW

The Evertz XRF1 signal management platform is a routing and monitoring system for L-Band, stacked L-Band and 70/140 MHz IF signal applications. It provides a compact, reliable method for building routing matrices from 16x16 to 32x32 inputs and outputs. In addition to routing RF signals, it provides control, monitoring, and alarm reporting of critical signal parameters such as input signal presence, input signal level and gain control. LNB DC supply voltages (+13 and +17 Vdc) are available on all 16 inputs to this device with overload and short circuit protection and alarming.

The XRF1 is comprised of a standalone 1RU chassis that can be expanded up to 32x32 with additional XRF1 units and SRF series splitter/combiners. As a system option, redundant power supplies are available to further enhance system reliability.

The XRF1 is available with a built-in control panel and may be remotely controlled with Evertz X-NCP2 control panel, with Evertz *Vista*LINK®, or with other third party monitor and control (M&C) systems. Evertz provides an SNMP interface over Ethernet as well as an RS323/422 control port for serial control applications.

1.1. HOW TO USE THIS MANUAL

This manual is organized into 8 chapters: Overview, Installation, Configuration (chapters 3&4), Operation, *Vista*LINK®, and Technical Description.

Chapter 1 contains a quick summary of the router features used throughout the remainder of the manual.

Chapter 2 provides 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 serial port or Telnet.

Chapter 4 describes the configuration of the router using the front panel controller.

Chapter 5 provides a reference specification for front panel control of the router.

Chapter 6 provides a description of router operation using the optional remote control panel.

Chapter 7 describes how to control and configure the XRF1 router using *Vista*LINK®.

Chapter 8 lists the specifications for the XRF1 router.

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2. INSTALLATION

2.1. REAR PANEL

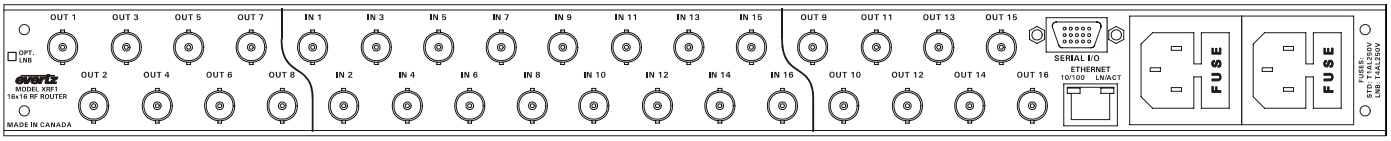

Figure 2-1: XRF1 Rear Panel Layout

2.2. MOUNTING

The XRF1 occupies 1RU of rack space and fits into a standard 19" rack. The dimensions 19"W x 1.75"H x 18.75D (483mm x 45mm x 477mm). RF, Ethernet and serial port connections are located at the back of the unit. Forced-air cooling is through the sides of the unit, therefore extra space above and below is not required.

2.2.1. RF Connections

The 16 RF inputs are located in the central portion of the rear panel, and the 16 outputs are located on both sides of the central input connectors. Outputs 1-8 on the left side (when facing the rear panel) and outputs 9-16 on the right side.

Note for XRF1 model only: If equipment connected to the router supplies DC via coax, this DC MUST be turned off or otherwise blocked. Damage to the router can result if DC is applied to the RF in/output ports. This does not apply to the XRF1A.

When equipped with 75-Ohm F-Type coaxial connectors, these connectors accept conductors in the range of 21-19 AWG (0.41-0.64 mm^2). Using a larger conductor will damage the connector. If you are using cable with a center conductor larger than 19 AWG (0.64 mm2), a connector with a fixed or crimp pin of a suitable diameter must be used (i.e. Amphenol Connex 222123 (for RG6) or Canare FP-C series).

2.2.2. Power Connections

The AC input voltage for the XRF1 power supply is auto ranging, 100 to 240 VAC, 50/60Hz. Maximum power dissipation for the frame is 175 Watts (LNB option) or 40 Watts (non LNB option).

2.3. POWER REQUIREMENTS

Each power supply in the chassis is powered by a separate AC connector, each of which is independent of the other power supply in the chassis. In a chassis that contains a 2nd (redundant) power supply module, each power supply may be powered from a different AC mains source, allowing complete AC supply redundancy. In this case, the unit will be powered from one supply and will automatically switchover to the secondary supply in case of failure. There are two LEDs on the front panel to indicate the health of the power supply units (PSUs). These LEDs will be lit (green) when the PSU is ok and off when there is a problem with the supply.

Power requirements are 115 or 230 volts AC at 50 or 60 Hz. The router has universal power supply(s) that automatically sense 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 minimum 18 AWG wire size; type SVT marked VW-1, maximum 2.5 m in length.

The IEC 320 power entry module combines a standard power inlet connector, two 5 x 20 mm fuse holders and an EMI line filter.

2.3.1. Changing the Fuses

The fuse holder is located inside the power entry module. To change the fuses, remove 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. Remove the blown fuse and replace it with a fuse of the correct value. Replacement fuse type: T1AL250V, slow blow, 1A, 250VAC (non LNB), T4AL250V, slow blow, 4A, 250VAC (LNB option).

Never replace with a fuse of greater value.

2.3.2. Serial Port Breakout Cable Control / Upgrade Connection

This 15 pin female D connector provides an RS-232/RS-422 serial interface used for external serial remote control. A breakout cable is provided with the router to separate to three 9 pin female D connectors. The cable labelled 'UPGRADE1' is a RS232 connection to the frame controller (FC) CPU for performing configuration and status monitoring in a terminal session on a PC and also upgrading the FC CPU firmware. The cable labeled 'UPGRADE2' is a RS232 connection that allows upgrading of the micro-controller. The cable labeled 'CONTROL' is a RS232/RS422 connection used to control the router via Evertz Router Control serial control protocol (please contact Evertz sales or service for details on this protocol). The *Main Menu / Serial Port Configuration* menu of the FC configuration port (UPGRADE1) is used to configure the serial port for external control.

Refer to Table 2-1 and Table 2-2 for the pinout of these cables in RS232 or RS422 modes.

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	GND	Chassis ground
2	Tx-	RS-422 Tx-(a) Output
3	Rx+	RS-422 Rx+(b) Input
4	GND	
5		
6	GND	
7	Tx+	RS-422 Tx+(b) Output
8	Rx-	RS-422 Rx-(a) Input
9	GND	

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

2.4. CONTROLLING THE ROUTER USING THE EXTERNAL SERIAL PROTOCOL

The XRF1 router can be controlled from third party M&C systems over the RS232/422 control port, or by SNMP control over Ethernet. The serial port pinouts are shown in Table 2-1 and Table 2-2 above, and the protocol supported by the serial port is available by contacting Evertz sales or service departments.

To interface with the XRF1 router via SNMP, contact Evertz technical assistance for the required SNMP MIB (management information database) information.

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3. ROUTER CONFIGURATION USING THE CONFIGURATION SERIAL PORT OR TELNET FACILITY

The XRF1 router frame controller has several settings that can be user configured. Settings such as matrix size, RF gain mode, crosspoints, network and communication port settings are all accessed through the frame controller configuration port.

3.1. CONNECTING TO THE FRAME CONTROLLER USING TELNET FACILITY

Using an Ethernet cable, connect the Ethernet port of the XRF1 on the rear panel to an Ethernet switch or hub (or crossover cable from Ethernet port directly to network card of PC). Open a telnet session on a PC that is on the same sub-network. The Main Menu will appear with selections as illustrated in section 3.3. See section 4.5.1 to 4.5.4 for instructions on obtaining the IP address of the router.

3.2. CONNECTING TO THE FRAME CONTROLLER CONFIGURATION SERIAL PORT

Configuration of the router is performed through the configuration serial port labelled 'UPGRADE1' on the breakout cable included with the XRF1. This cable should be connected to the DB15 "SERIAL I/O" connector on the back of the XRF1. A PC with a terminal emulation program (such as HyperTerminal) is used to communicate with the frame controller.

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

3.2.1. Terminal Program Configuration

Launch a suitable terminal emulation 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	**115200**
Data bits	**8**
Parity	**None**
Stop bits	**1**
Flow Control	**None**

3.2.2. Connecting the PC to the Frame Controller

Connect the computer to the cable labeled 'UPGRADE1' on the breakout cable connected to the DB15 "SERIAL I/O" female connector on the rear panel of the XRF1.

3.3. CONFIGURATION MAIN MENU

With power applied to the chassis, the frame controller will automatically initiate a boot up procedure, resulting in the top-level configuration menu being displayed in the terminal program or telnet session.

```
-----------------------------------------------
|                  Main Menu                  |
|              (XRF1-FC v1.00 b961)           |
-----------------------------------------------
(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.

3.4. 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 press “ENTER”, and you will be prompted for a new value.

NOTE: 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             |
|              (XRF1-FC v1.00 b961)             |
 -----------------------------------------------
 -----------------------------------------------
 MAC:                00:02:c5:fe:cb:99
 ip address:         192.168.18.50
 netmask address:    255.255.192.0
 gateway:            0.0.0.0
 broadcast address:  192.168.18.255
 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
>
```

It is recommended that the frame controller 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.

3.5. ROUTER CONFIGURATION MENU

The *router configuration* menu provides access to all configuration settings for the routing matrix. (Select 2 on the main menu item list).

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

```
-----------------------------------------------
|                Router settings                |
|              (XRF1-FC v1.00 b961)             |
 -----------------------------------------------
(1) Input descriptions
(2) Output descriptions
(3) Salvo descriptions
(4) Salvo Commands
(5) Execute Salvo
(6) Input salvo flag
(7) Output flag
(8) Crosspoints
(9) Passcode
(10) Mode
(11) AGC Output Level
(12) Manual Gain
(13) RF Upper Threshold
(14) RF Lower Threshold
(15) Squelch Threshold
(16) Squelch Enable
```

```
(17) Input Power Level
(18) Output switch delay
(19) LNB power
(20) LNB reset
(21) Misc Fault Status
(22) Input Fault Status
(23) Fan Fault Status

(X) Exit
>
```

3.5.1. Input / Output 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 *Vista*LINK® interfaces, thus providing a more familiar control interface for the user.

3.5.2. Salvo Descriptions

This menu item allows the salvo descriptions to be altered. A salvo is a preset routing crosspoint map that can be saved or recalled at any time. Up to 8 salvos can be saved on the XRF1 through the SNMP control system. The salvos can be executed from any control point (Front panel, serial port or SNMP).

3.5.3. Salvo Commands

This menu item displays the salvos saved on the XRF1 and their corresponding crosspoint maps. Salvos can only be saved through the *Vista*LINK®/SNMP software.

3.5.4. Execute Salvo

This menu item allows the execution of the 8 salvos that are stored in memory.

3.5.5. Salvo Flag

This indicates the authority access to a salvo. A flag value of 0 indicates the salvo does not contain any outputs that are locked or protected. A value of 1 indicates the salvo contains an output that is locked and requires the user or administrator access to execute. A value of 2 indicates the salvo contains an output that is protected. A value of 3 indicates the salvo contains an output that is locked and protected.

3.5.6. Output Flag

This indicates the authority access to an output. A flag value of 0 indicates the output is not locked or protected. A value of 1 indicates the output is locked and requires user or administrator access to execute. A value of 2 indicates the output is protected. A value of 3 indicates the output is locked and protected.

3.5.7. Crosspoints

This menu item displays the crosspoints and allows a crosspoint to be set by the user. An input of 0 indicates the output is not connected.

```
 ------------------------------------------------
|                  Crosspoints
|              (XRF1-FC v1.00 b961)
|
 ------------------------------------------------
     output      input
      ------      -----
            1 <--- 1
            2 <--- 2
            3 <--- 3
            4 <--- 4
            5 <---- 5
            6 <---- 0
            7 <---- 0
            8 <--- -0
            9 <---- 0
  10 <--- 0
  11 <--- 0
  12 <--- 0
  13 <--- 0
  14 <--- 0
  15 <--- 0
  16 <--- 0
 ------------------------------------------------------------
(1) Set crosspoint

(X) Exit
>
```

3.5.8. Passcode

This menu item allows the user to view and reset the passwords for the user and the administrator.

3.5.9. 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 output level on a particular input is fixed, to a user selected target (-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.

3.5.10. AGC Output 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.

3.5.11. Manual Gain Level

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 -9 to +18 dB on the XRF1, or –10 to +12 dB on the XRF1A.

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

3.5.12. RF Upper Threshold Level / RF Lower Threshold 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 for upper and lower thresholds. If the RF signal input power goes outside of this range, an alarm is generated.

3.5.13. 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.

3.5.14. Squelch Enable

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

3.5.15. Input Power Level

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

3.5.16. Output Switch Delay

This menu item allows the adjustment of delay between an output switch. The range for this parameter is 0 to 10000 milliseconds in increments of 100.

3.5.17. LNB Power

On XRF1 units with –LNB option, this item allows enable / disable control of the LNB power on the input connectors of the unit. For each input, the LNB control allows setting the LNB power to OFF or 13V or 17V.

3.5.18. LNB Reset

On XRF1 units with –LNB option, this item allows the reset of the LNB voltage after a short circuit has occurred. On XRF1A units with the –LNB option, this menu item is not applicable as LNB short circuit protection is dynamic (i.e. automatically restores when the short/overload is removed)

3.5.19. Misc Fault Status

This item provides information on miscellaneous faults with the router.

3.5.20. Input Fault Status

This item indicates any faults on a particular input, such as RF threshold alarms and AGC out of range.

3.5.21. Fan Fault Status

This item indicates any faults with the cooling fans in the chassis.

3.6. SNMP SETUP

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

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.

```
 ------------------------------------------------
|                    SNMP Setup                  |
|               (XRF1-FC v1.00 b961)             |
 ------------------------------------------------
---------------------------------
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
>
```

3.6.1. 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 *Vista*LINK® program, or the IP address of the server running the user's M&C system (or both).

3.6.2. Remove Trap IP Address

If a 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.

3.6.3. 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.

3.7. 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.

```
 ------------------------------------------------
|       Serial Control Port Configuration        |
|              (XRF1-FC v1.00 b961)              |
 ------------------------------------------------
 ------------------------------------------------
 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
>
```

3.8. ENGINEERING / DEBUG

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

4. ROUTER CONFIGURATION USING FRONT PANEL

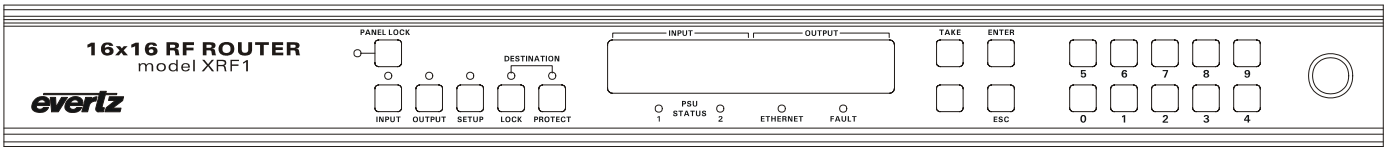


Figure 4-1: Front Panel

The optional XRF1 control panel provides complete crosspoint matrix control, parameter configuration, and error reporting for the XRF1 16 x 16 RF Router. The control panel is illustrated in Figure 4-1.

The XRF1 RF Router also has a blank front panel ordering option (Figure 4-2), used in multi-chassis systems as "slave routers" or where system control and configuration are accomplished using a network control panel, the X-NCP2.

Figure 4-2: Blank Front Panel

4.1. PUSH BUTTON CONTROLS

The XRF1 Control Panel contains 5 modes (described below), which determine the specific operations of the push buttons and display while performing a specific function. This section describes the operation of the control panel while in each mode, as well as details the context-sensitive button and display operation. Refer to Table 4-6 for a description of the function of each button from all modes of operation.

4.1.1. Mode Definitions

4.1.1.1. Destination Selection Mode

This is the default mode of operation for the XRF1 Control Panel. *Destination Selection* Mode is initiated by pressing [OUTPUT]. This mode is used to select matrix destinations (router outputs). The following table outlines the operations performed by each button while in *Destination Selection* Mode:

Button/Process	Action While in Destination Selection Mode	Resulting Action
0-9 NUMERIC, SCROLL KNOB	Select destinations	Displays selected destination
[TAKE]	Performs physical crosspoint change within router for currently selected input/output pair	Returns to Destination Selection Mode
[INPUT], [ENTER]	Toggles to Source Selection Mode	Displays last manipulated source
[MENU]	Initiates Configuration Menu Mode	Displays passcode prompt, if enabled

Table 4-1: Button Operations for *Destination Selection* Mode

4.1.1.2. Salvo Selection Mode

This mode is initiated by pressing the [INPUT] and [OUTPUT] buttons simultaneously. It accesses up to 8 pre-programmed salvos that have been configured using Evertz *Vista*LINK® software.

A SALVO is a pre-programmed sequence of crosspoint connections that can be constructed using *Vista*LINK® and executed from the XRF1 Control Panel. Execution of a salvo is very similar to the execution of an individual crosspoint connection, but the entire list of connections contained in the salvo is performed. The following table outlines the operations performed by each button while in *Salvo Selection* Mode.

Button/Process	Action While in Salvo Selection Mode	Resulting Action
0-9 NUMERIC, SCROLL KNOB	Select salvos	Displays selected salvo
[TAKE]	Performs physical group of crosspoint changes within router for currently selected salvo	Returns to Salvo Selection Mode
[OUTPUT]	Toggles to Destination Selection Mode	Displays last manipulated destination
[INPUT]	Toggles to Source Selection Mode	Displays last manipulated source
[MENU]	Initiates Configuration Menu Mode	Displays passcode prompt, if enabled
30 SECONDS OF INACTIVITY	Panel times out	Returns to Destination Selection Mode

Table 4-2: Button Operations for *Salvo Selection* Mode

4.1.1.3. Source Selection Mode

This mode is initiated by pressing [INPUT]. This mode is used to select matrix sources (router inputs). The following table outlines the operations performed by each button while in *Source Selection* Mode.

Button/Process	Action While in Source Selection Mode	Resulting Action
0-9 NUMERIC, SCROLL KNOB	Select sources	Displays selected source
[TAKE]	Performs physical crosspoint change within router for currently selected input/output pair	Returns to Destination Selection Mode
[INPUT], [ENTER]	Toggles to Destination Selection Mode	Displays last manipulated destination
[MENU]	Initiates Configuration Menu Mode	Displays passcode prompt, if enabled
30 SECONDS OF INACTIVITY	Panel times out	Returns to Source Selection Mode

Table 4-3: Button Operations for *Source Selection* Mode

4.1.1.4. Configuration Menu Mode

This mode accesses the router *Configuration Menu*. The *Configuration Menu* is passcode protected only if the user has enabled this feature through *Vista*LINK®. If enabled, pressing [MENU] prompts the user for an Administrator-level passcode. Entry of the proper passcode accesses router control and configuration parameters. If passcode protection has not been enabled, pressing [MENU] takes the user directly to Level 1 of the Configuration Menu. Selecting the "exit" option from menu Level 2 terminates *Configuration Menu* Mode.

The following table outlines the operations performed by each button while in *Configuration Menu* Mode.

Button/Process	Action While in Configuration Menu Mode	Resulting Action
[ESC]	Moves up one menu level. At the top level of the configuration menu, it will exit this mode and return to Destination select menu mode (default)	Displays higher menu level or exits menu mode to default
0-9 NUMERIC	Selects source channel	Displays selected source channel
SCROLL KNOB	Navigates menu options	Displays selected option
[INPUT] and/or [OUTPUT]	Exits Configuration Menu Mode, and enters Source, Destination, or Salvo Selection Mode	Displays last manipulated source, destination, or salvo
[ENTER]	Finalizes option selection and moves down one menu level	Displays first option in subsequent menu level
[MENU]	Returns user to Menu Level 1 (Input Channel Selection)	Displays "SELECT INPUT"
30 SECONDS OF INACTIVITY	Panel times out	Returns to Destination Selection Mode

Table 4-4: Button Operations for *Configuration Menu* Mode

4.1.1.5. Configuration Set Mode

This mode defines the operation of the XRF1 while in the lowest menu level, where parameters such as gain and output levels can be set from within the *Configuration Menu*. The following table outlines the operations performed by each button while in *Configuration Set* Mode.

Button/Process	Action While in Configuration Set Mode	Resulting Action
[ESC]	Moves up one full menu level	Displays first menu option on selected level
0-9 NUMERIC, SCROLL KNOB	Sets configuration parameter	Displays selected configuration parameter
[INPUT] and/or [OUTPUT]	Exits Configuration Menu Mode, without making changes, and enters Source, Destination, or Salvo Selection Mode	Displays last manipulated source, destination, or salvo
[ENTER]	Saves parameter changes and moves up one menu level	Displays “CHANGES SAVED” for 1 second, then shows first option in upper menu level
[MENU]	Returns user to Menu Level 1 (Input Channel Selection) without making changes	Displays “SELECT INPUT”
30 SECONDS OF INACTIVITY	Panel times out	Returns to Destination Selection Mode

Table 4-5: Button Operations for *Configuration Set* Mode

Pressing [ENTER] is the only way to make physical changes to the router configuration parameters.

BUTTON	Destination Selection Mode	Salvo Selection Mode	Source Selection Mode	Configuration Menu Mode	Configuration Set Mode	NOTES
PANEL LOCK	Disables all buttons (except Panel Lock)	Disables all buttons (except Panel Lock)	Disables all buttons (except Panel Lock)	Disables all buttons (except Panel Lock)	Disables all buttons (except Panel Lock)	Toggles between Panel Lock enabled and disabled.
INPUT	Exits Destination Selection Mode and enters Source Selection Mode	Exits Salvo Selection Mode and enters Source Selection Mode	No operation	Exits Configuration Menu and enters Source Selection Mode	Exits Configuration Menu without making changes and enters Source Selection Mode	Enters Source Selection Mode Used with [OUTPUT] to access Salvo Selection Mode
OUTPUT	No operation	Terminates Salvo Selection Mode and toggles to Destination Selection Mode	Terminates Source Selection Mode and toggles to Destination Selection Mode	Exits Configuration Menu and enters Destination Selection Mode	Exits Configuration Menu without saving changes and enters Destination Selection Mode	Enters Destination Selection Mode Used with [INPUT] to access Salvo Selection Mode
MENU	Enters Configuration Menu Mode and prompts for 4-digit passcode, if one has been set	Enters Configuration Menu Mode and prompts for 4-digit passcode, if one has been set	Enters Configuration Menu Mode and prompts for 4-digit passcode, if one has been set	Returns user to Level 1 of the Configuration Menu and displays “SELECT INPUT”	Returns user to Level 1 of the Configuration Menu without making changes and displays “SELECT INPUT”	If passcode protection is enabled using VL software, pressing [MENU] prompts for Administrator passcode to access Configuration Menu

LOCK	Enables "locking" of the current destination from manipulation by unauthorized users, denoted by the LOCK LED blinking at 2Hz	If LOCK LED is blinking when displaying current salvo, this indicates the salvo contains an output that is locked.	No operation	No operation	No operation	If passcode protection is enabled through VL, 2 levels of passcode protection are supported to lock/unlock destinations/salvos: - multiple operator codes -one administrator code
PROTECT	Enables a "protect" on the current destination, denoted by the PROTECT LED blinking at 2Hz	If PROTECT LED is blinking when displaying current salvo, this indicates the salvo contains an output that is protected.	No operation	No operation	No operation	Toggles between Protect enabled and disabled for currently selected destination or salvo
TAKE	Performs router crosspoint change for input/output currently displayed	Performs router crosspoint change for the salvo currently displayed	Performs router crosspoint change for input/output currently displayed	No operation	No operation	Performs crosspoint connection of displayed Source/Destination pair, or displayed Salvo
ENTER	Finalizes destination selection and toggles to Source Selection Mode	Finalizes manual keypad entry of salvo selection and displays selected salvo name	Finalizes source selection and toggles to Destination Selection Mode	Finalizes menu selections and moves to subsequent menu level	Enters value selected and displays "CHANGES SAVED" message for 1 second; moves user up one menu level	Must be used before exiting Configuration Set Mode for changes to take effect (this action displays a "CHANGES SAVED" confirmation message)
0 – 9 NUMERIC	Manual entry of specific destination desired	Manual entry of specific salvo desired	Manual entry of specific source desired	Manual entry of specific source (input channel) desired	Manual entry for setting parameters, such as gain; changes to nearest value in MIB upon pressing [ENTER]	0 – 9 NUMERIC

Table 4-6: Overview of Push-Button Operations

4.2. SCROLL KNOB

Scroll Knob Manipulation	Function within Destination Selection Mode	Function within Salvo Selection Mode	Function within Source Selection Mode	Function within Configuration Menu Mode	Function within Configuration Set Mode
Rotate	Navigates destinations available on the router network	Navigates available salvos programmed from *Vista*LINK®	Navigates sources available on the router network	Navigates menu choices on the current menu level	Allows user to set desired parameter, such as gain, in 1 Db increments

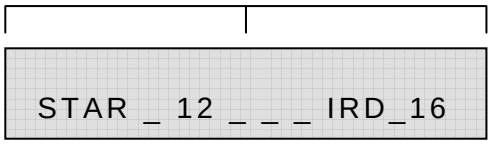
4.3. 16-CHARACTER DISPLAY SCREEN

When equipped with a local control panel, the 16-character display screen of the XRF1 Control Panel is responsible for visually informing the user of a variety of conditions, including source, destination, and salvo name display, passcode prompting, confirmation messaging, and error reporting.

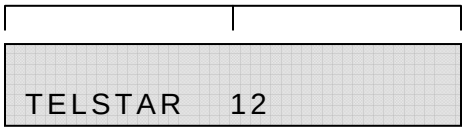
4.3.1. Display Function within Modes of Operation

Through Monitoring and Control software, such as Evertz' *Vista*LINK®, each source, destination and salvo can be assigned up to a 16-character name. The XRF1 display screen functions in a "split-display view" or "full-display view," depending on if the unit is sitting idle, actively scrolling through sources/destinations, or displaying a level of the Configuration Menu. When entering selections numerically, using the 0-9 keypad, the XRF1 display will automatically function in "numeric entry display," described below.

SPLIT-DISPLAY VIEW: The display screen utilizes this view only from *Source Selection* Mode or *Destination Selection* Mode. The screen functions as a "split display" when it is idle, or after 1 second of inactivity. In split-display view, the screen shows the 7 rightmost characters of the source name on the left-hand side of the display and the 7 rightmost characters of the destination name on the right-hand side.



FULL-DISPLAY VIEW: The display screen can utilize this view from all modes of operation. The screen functions as a full 16-character display when a user is actively scrolling in Source or Destination Selection Modes, as well as when displaying a salvo name, or any level of the Configuration Menu. In full-display view, the screen shows all 16 characters of the source/destination/salvo name, or the configuration menu option.



NUMERIC ENTRY VIEW: The display screen can utilize this view from all modes of operation. The screen functions only to display the numeric characters being entered when making selections using the 0-9 keypad. When a number is manually entered from the keypad, only the number is displayed, right justified; the rest of the screen is blank. When the user has entered the full 1 or 2 digit number, they can finalize their selection by pressing [ENTER] and move to the subsequent selection display. If the user fails to finalize their selection by pressing [ENTER], numeric entry view will timeout after 2 seconds of inactivity and return to the previous display. Pressing any other button from numeric entry view will exit the view without finalizing a selection.

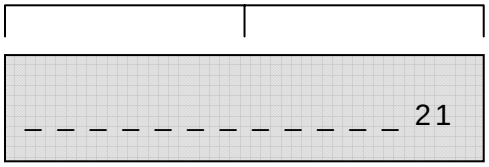


Table 4-7 defines the function of the display more clearly for each mode of operation and the action being performed.

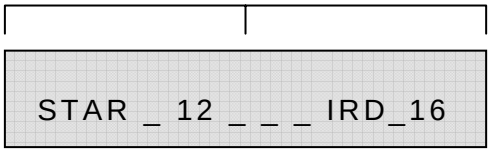
Content Display within Destination Selection Mode	Content Display within Salvo Selection Mode	Content Display within Source Selection Mode	Content Display within Configuration Menu Mode and Configuration Set Mode
WHILE IDLE, or AFTER 1 SECOND OF INACTIVITY: split-display view of the selected destination and its current source WHILE ACTIVELY SCROLLING THROUGH DESTINATIONS: full-display view of 16-character destination name WHILE ENTERING A 0-9 NUMERIC SELECTION FROM THE KEYPAD: numeric entry view	WHILE IDLE, WHILE ACTIVELY SCROLLING THROUGH SALVOS, and AFTER 1 SECOND OF INACTIVITY: full-display view of 16-character salvo name WHILE ENTERING A 0-9 NUMERIC SELECTION FROM THE KEYPAD: numeric entry view	WHILE IDLE, or AFTER 1 SECOND OF INACTIVITY: split-display view of the selected source and its current destination WHILE ACTIVELY SCROLLING THROUGH SOURCES: full-display view of 16-character source name WHILE ENTERING A 0-9 NUMERIC SELECTION FROM THE KEYPAD: numeric entry view	WHILE NAVIGATING THE CONFIGURATION MENU: full-display view of the current menu option or parameter being set WHILE ENTERING A 0-9 NUMERIC SELECTION FROM THE KEYPAD: numeric entry view

Table 4-7: Description of Display Function within XRF1 Modes of Operation

4.3.1.1. Name Display when Control Panel is Idle

The display screen of the XRF1 Control Panel is designed to show users the full 16-character name assigned to each source and destination, as well as the current pairing status for each source/destination. While in *Source Selection* Mode or *Destination Selection* Mode, the screen typically functions in split-display view.

A possible name for one user source/destination pairing may be: TELSTAR 12 and IRD 16. The *Destination Selection* Mode display of that pairing **while idle** would look like the following example:



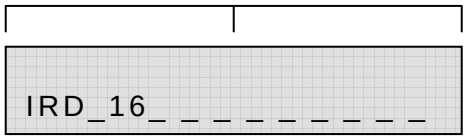
The "_" underscores are not visible, but are included in the manual for a clearer explanation.

The full assigned name of the source in this example is "TELSTAR 12," but when sitting idle, only the last 7 **alphanumerical** characters of the name are shown. Therefore, if a name is less than 7 characters long, such as "IRD 16," it will be displayed as "IRD 16," not as 7 empty spaces.

4.3.1.2. Name Display when Actively Scrolling

While actively scrolling in *Source Selection* or *Destination Selection* Modes, the screen functions in full-display view, showing all 16 characters of the source or destination name.

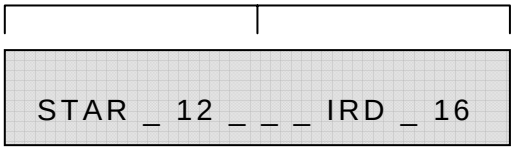
For example, while scrolling through destinations, the display will show the destination “IRD 16” as:



4.3.1.3. Name Display after 1 Second of Inactivity

In *Source Selection* or *Destination Selection* Mode, the user stops scrolling when they reach a desired channel. The display will timeout after 1 second of inactivity and return to split-display view, providing status of this destination and the source currently associated with it.

The screen would then look like this:

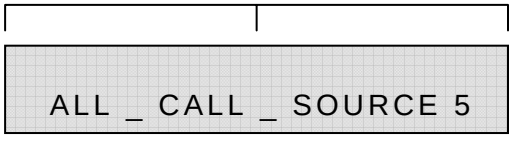


The full assigned name of the source in this example is “TELSTAR 12,” but after 1 second of inactivity, only the last 7 **alphanumerical** characters of the name are shown. Therefore, if a name is less than 7 characters long, such as “IRD 16,” it will be displayed as “IRD 16,” not as 7 empty spaces.

4.3.1.4. Name Display when in Salvo Selection Mode

Salvos may be assigned up to a 16-character name through *Vista*LINK®, just as source and destination names are assigned. If no name is assigned, default naming of salvos will be “SALVO 1,” “SALVO 2,” and so on, to 8. Examples of salvo names are “ALL CALL SOURCE 5,” which would connect input channel 5 to all destinations, or “DIAGONAL,” which would connect source 1 to destination 1; source 2 to destination 2, and so on.

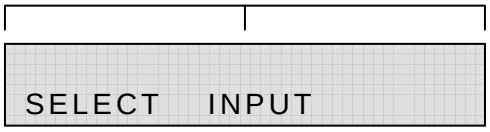
There is no difference in the display of salvo names while actively scrolling vs. periods of inactivity, as salvo names are always shown in full-display view, containing all 16 characters. If the user stops on a salvo name while scrolling, the 1-second timeout does not occur. The display continues to function in full-display view. For example, the display for a salvo named “ALL CALL SOURCE 5” will **always** look like this:



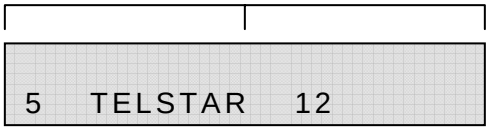
To execute a salvo, the user scrolls to the desired salvo name in Salvo Selection Mode, and presses [TAKE].

4.3.1.5. Name Display when in Configuration Menu Mode

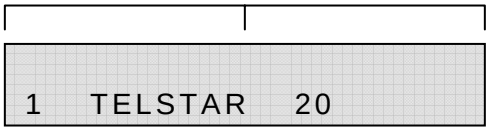
When a user presses [MENU], they are prompted for a passcode (if enabled). Refer to section 4.3.2 of this document for further explanation of this passcode protection. After the user passes the code protection feature of the *Configuration Menu*, they are prompted to select the input channel they are wishing to access parameters for. The display prompt will look like the following example:



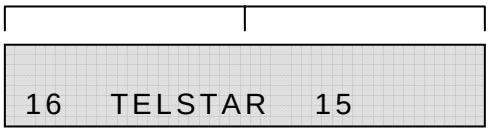
Entering a number from the 0-9 keypad takes the user directly to that input channel. For example, if the source named "TELSTAR 12" is on input channel 5, pressing #5 on the keypad would result in the following display:



From the "SELECT INPUT" prompt, one rotation of the scroll knob clockwise or pressing the down arrow displays input channel 1. If the source on input channel 1 has been named "TELSTAR 20," the display would show the following:



From the "SELECT INPUT" prompt, one rotation of the scroll knob counter-clockwise or pressing the up arrow displays input channel 16 (or 32). If the source on input channel 16 (or 32) has been named "TELSTAR 15," the display would show the following:

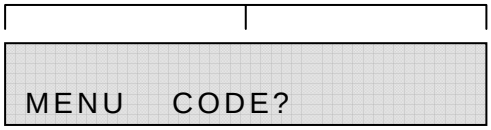


4.3.2. Display Function in Passcode Prompting

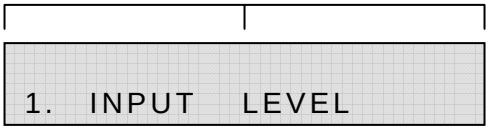
The XRF1 Control Panel has 3 passcode-protected features: the *Configuration Menu*, *Destination Lock* and *Salvo Lock*. When passcode protection has been enabled, through *Vista*LINK®, for any of these functions, the display screen visually prompts the user for the passcode necessary to access these features. If no passcode protection has been setup through *Vista*LINK®, no prompting will occur and the user will be free to directly access any of these features.

4.3.2.1. Configuration Menu Passcode Access

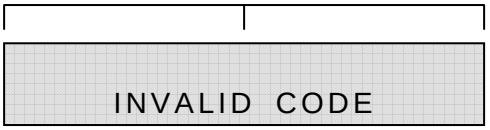
The *Configuration Menu* may be protected by 1 system-wide, administrator-level passcode, when enabled through *Vista*LINK®. When passcode protection is enabled, the user presses [MENU] from *Source Destination* or *Salvo Selection* Mode, and the display now prompts the user for the passcode:



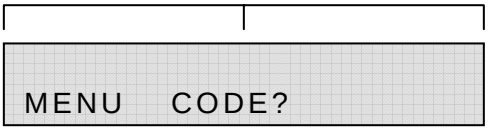
The user enters the passcode using the 0-9 numeric buttons and the first choice of Level 2 of the *Configuration Menu* is displayed in full-display view:



If the user enters the incorrect passcode, the screen will display a 2-second message that will look like this:



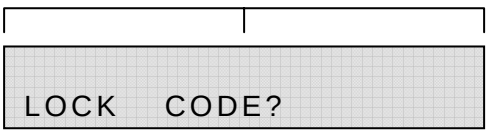
After 2 seconds, the screen will once again display the passcode prompt, as shown below:



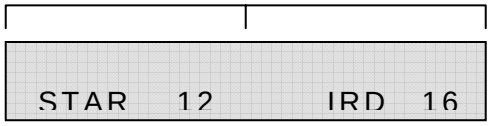
Refer to Figure 5-3 for the operational flow for accessing the *Configuration Menu*.

4.3.2.2. Destination Lock Passcode Access

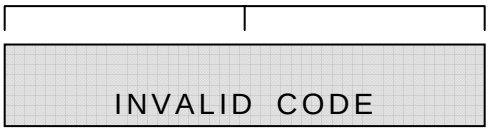
The destination "lock" function may be passcode protected, when enabled through *Vista*LINK®. A system administrator may assign both "operator" and "administrator" passcode types. When passcode protection is enabled, the user presses [LOCK] from *Destination Selection* Mode, and the display now prompts the user for the passcode:



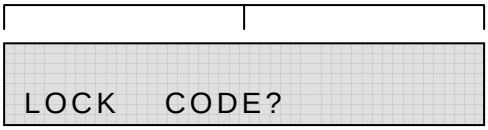
The user now enters the passcode using the 0-9 numeric buttons and the control panel returns to *Destination Selection* Mode:



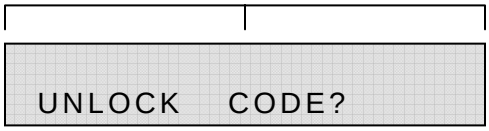
If the user enters the incorrect passcode, the screen will display a 2-second message that will look like this:



After 2 seconds, the screen will once again display the passcode prompt:



If a user presses [TAKE] for a crosspoint pair that includes a “locked” destination, the display will prompt for the passcode again:



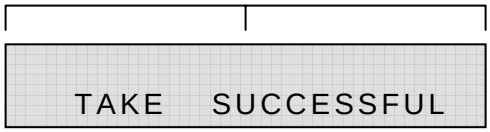
If the user enters a valid passcode, the display will return to provide the status of the current crosspoint pair and a successful “take” can then be executed.

Refer to Figure 5-4 for the operational flow for accessing the destination Lock feature.

4.3.3. Display Function in Confirmation Messaging

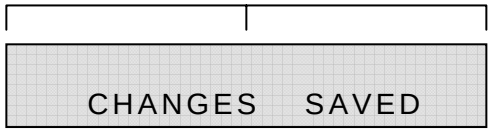
The XRF1 Control Panel has two possible confirmation messages.

From *Source Selection* Mode, *Destination Selection* Mode, or *Salvo Selection* Mode, a successful “take” will result in the following display for 2 seconds:



After 2 seconds, the display will return to the previous mode, defining the status of the crosspoint pair or salvo just “taken.”

From the Configuration Set Mode, pressing [ENTER] or depressing the scroll knob after changing a configuration parameter will result in the following display for 2 seconds:

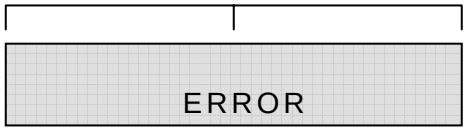


After 2 seconds, the display will show the previous menu level. Pressing [ENTER], depressing the scroll knob, or pressing the down arrow will take the user back into the parameter to be changed.

4.3.4. Display Function in Error Reporting

A “fault” status for the XRF1 can occur in two forms. The panel will detect a “fault” when it experiences a loss of communication with any device on the system network. A “fault” can also develop in the event that a user attempts to manipulate router configurations beyond acceptable parameters. When the XRF1 panel detects a fault status, it will display an “ERROR” message for 2 seconds.

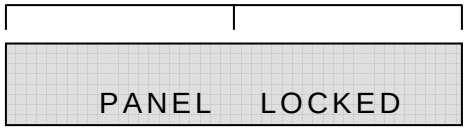
The screen would look like this:



After the “ERROR” message has been displayed for 2 seconds, the display will return to the function it was performing prior to the error occurrence.

4.3.5. Display Function in “Panel Locked” Status

When the “Panel Lock” function has been enabled, (refer to Table 4-6 and Table 4-8) the display will flash a 2-second message when any buttons or knobs are manipulated. The screen will look like this:



4.4. STATUS INDICATOR LEDS

The XRF1 Control Panel is equipped with 10 LED indicators and the blank front panel that has 4 LEDs for status indication. The function of each is outlined in Table 4-8.

INDICATOR NAME	COLOUR WHEN LIT	LIT INDICATION	DARK INDICATION
PANEL LOCK LED	Green	Panel controls are fully locked out of operation	Panel controls are available for manipulation
INPUT LED	Green	Source Selection Mode initiated When lit with the OUTPUT LED, indicates Salvo Selection Mode initiated	Panel not in Source Selection Mode or Salvo Selection Mode
OUTPUT LED	Green	Destination Selection Mode initiated When lit with the INPUT LED, indicates Salvo Selection Mode initiated	Panel not in Destination Selection Mode or Salvo Selection Mode
MENU LED	Green	Configuration Menu Mode initiated	Panel not in Configuration Menu Mode
LOCK LED	**Blinking** Green	Selected destination has been 'locked' out of availability from unauthorized users or selected salvo contains a 'locked' destination.	Selected destination is not locked or selected salvo does not contain locked destination.
PROTECT LED	**Blinking** Green	Selected destination has been flagged as 'protected' to users or selected salvo contains a 'protected' destination.	Selected destination is not protected or selected salvo does not contain protected destination.
PSU STATUS 1 & 2 LED's	Green	Power supply unit(s) are functioning properly	Power supply is not in use, or is in "Fault" status
ETHERNET LED	Green	Ethernet network communication is functioning properly	Ethernet network communication has been lost and is in "Fault" status
FAULT LED	Red	Corresponds to any trap breech within the router configuration	Router hardware is functioning within acceptable parameters

Table 4-8: Description of Status Indicator LED Functions

The "LOCK" and "PROTECT" LED's will blink at 2 Hz.

4.5. CONFIGURATION MENU OVERVIEW

4.5.1. Configuration Menu Function and Display

The *Configuration Menu* allows the user to access all configuration parameters for the XRF1 RF Router via the front face Control Panel. The *Configuration Menu* is accessed via the [MENU] button, and the user has the option to enable passcode protection for this menu. (Refer to section 4.3.1.5 for further description of the *Configuration Menu* passcode protection). Figure 4-3 defines the *Configuration Menu* structure, per input channel.

4.5.2. Configuration Main Menu Options and Parameters

The following options are available at the top level of the configuration menu:

PARAMETER	DESCRIPTION
Configure Input	Allows configuration of all inputs (see section 5.2 for more info).
Configure Output	Allows configuration of all outputs.
Lock Idle Panel	Allows locking of panel after inactivity for 5 minutes. Panel is unlocked by pressing the [PANEL LOCK] key.
IP Address	Displays the router IP address.
Firmware Version	Displays the firmware version.
Reboot	Allows a 'warm' reboot of the router processor. Configuration settings are maintained during a reboot.

Table 4-9: *Configuration Menu* Options

4.5.3. CONFIGURE OUTPUT Menu Options and Parameters

LEVEL1:

PARAMETER	DESCRIPTION
All Outputs	Allows configuration of all outputs.
Channel 1 to 16	Output channel selection.

Table 4-10: *Configure Output* Menu Options

LEVEL 2: (options available for ALL INPUTS or individual input channel as selected in Level 1)

PARAMETER	DESCRIPTION
Output Delay	Accesses output delay setting, set from 0 to 5000ms in 100ms increments.

Table 4-11: Options Available for ALL INPUTS or Individual Input Channel as Selected in *Configure Output* Menu Level 1

4.5.4. CONFIGURE INPUT Menu Options and Parameters

LEVEL1:

PARAMETER	DESCRIPTION
All Inputs	Allows configuration of all inputs
Channel 1 to 16	Input channel selection

Table 4-12: *Configure Input* Menu Options

LEVEL 2: (options available for ALL INPUTS or individual input channel as selected in Level 1)

PARAMETER	DESCRIPTION
Input Level	Statuses current input level -5dBm to -70dBm
Output Level	Accesses output level setting -20dBm to -50dBm in increments of 1dBm in AGC MODE only.
Gain Mode	Accesses AGC MODE and MANUAL GAIN MODE options.
Gain	Accesses manual gain (+18 to –6dB on XRF1, or +12 to –10dB on XRF1A, in 1dB steps) in MANUAL. GAIN MODE only
Squelch	Accesses ON or OFF options.
RF Threshold	Accesses UPPER, LOWER, and SQUELCH threshold settings.
LNB Power (-LNB option only)	Accesses +13V / +18V / OFF settings for LNB.
LNB Reset (-LNB option only)	Accesses reset of LNB power after a short circuit detect.

Table 4-13: Options Available for ALL INPUTS or Individual Input Channel as Selected in *Configure Input* Menu Level 1

LEVEL 3 (RF THRESHOLD MENU ITEMS):

PARAMETER	DESCRIPTION
Upper	1dBm increments, from –5dBm to –30dBm
Lower	1dBm increments, from - 70dBm to –31dBm
Squelch	1dBm increments, from –70dBm to –50dBm

Table 4-14: *RF Threshold* Menu Options

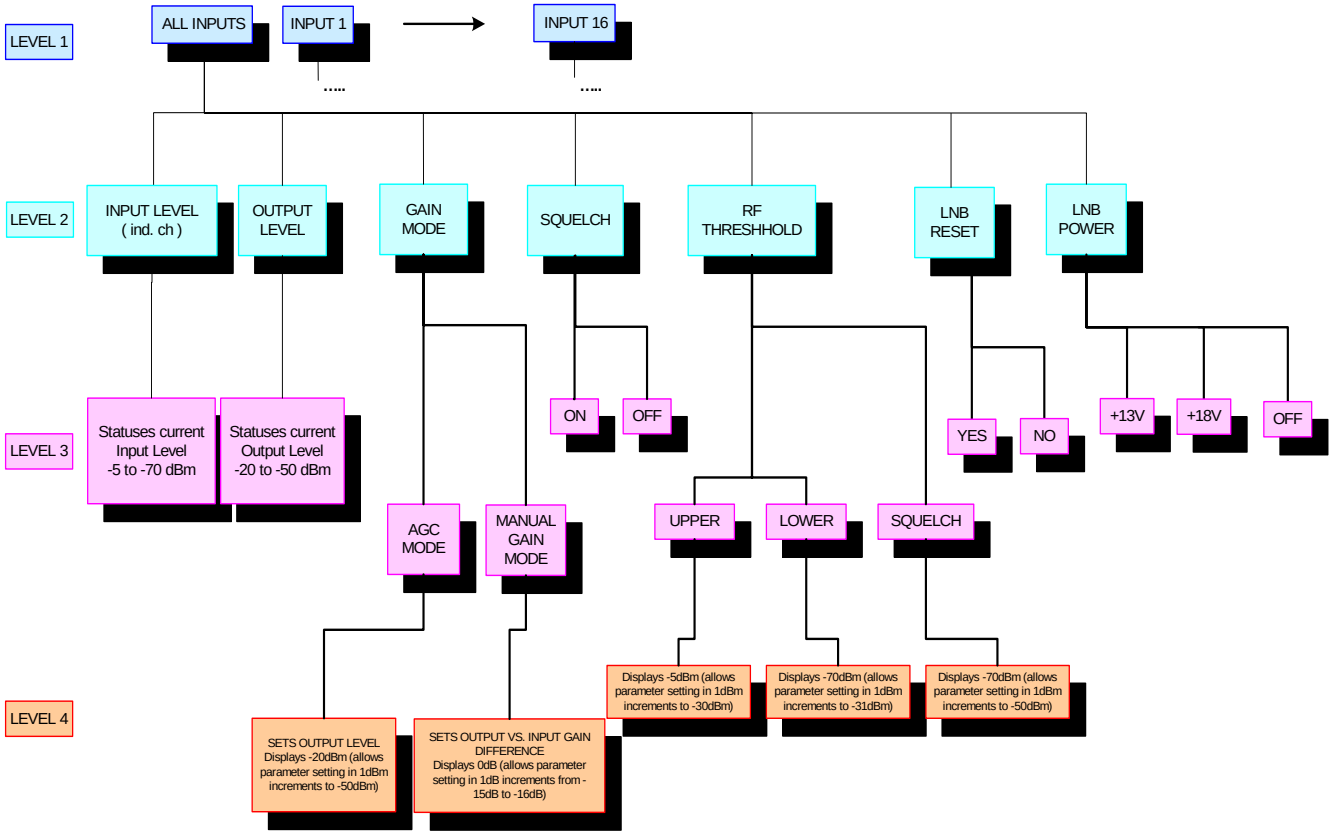


Figure 4-3: Configuration Menus Structure per Input Channel

5. CONTROL PANEL OPERATION SPECIFICATION

5.1. [PANEL LOCK] FUNCTION

Panel Lock can be initiated from any mode. When Panel Lock is enabled from any mode, the display screen will timeout after 30 seconds and return to *Destination Selection* Mode. If a user manipulates any buttons or knobs on the control panel while Panel Lock is enabled, a "PANEL LOCKED" message will be displayed for 2 seconds and the display will then return to *Destination Selection* Mode. (Refer to section 4.3.5 for a further description of the Panel Lock display function.)

5.1.1. [PANEL LOCK] Enable

Press [PANEL LOCK]
All buttons are "locked out" of use and the PANEL LOCK LED is illuminated.

5.1.2. [PANEL LOCK] Disable

Press [PANEL LOCK]
All buttons are available for use and the PANEL LOCK LED is dark.
XRF1 Control Panel is in default Destination Selection Mode.

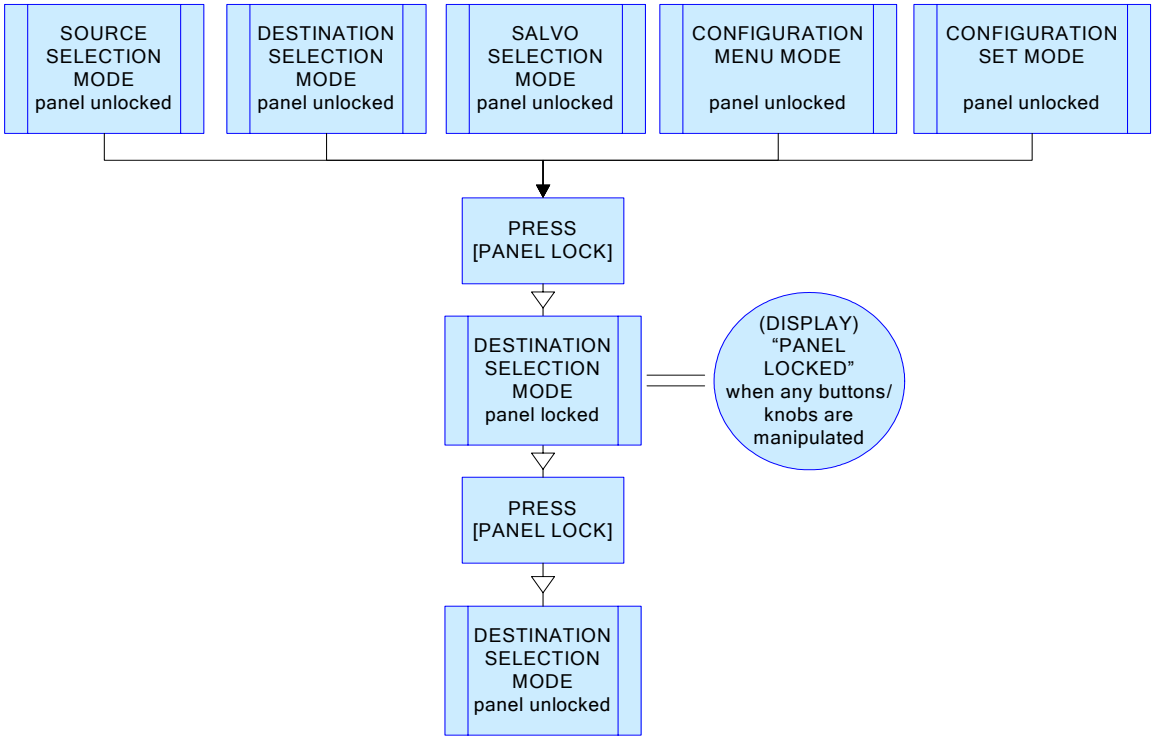


Figure 5-1: Panel Lock Operation

If 'Panel Lock" is enabled from Configuration Menu or Configuration Set Modes, the panel will timeout after 30 seconds and return to Destination Selection Mode without saving any configuration parameter changes.

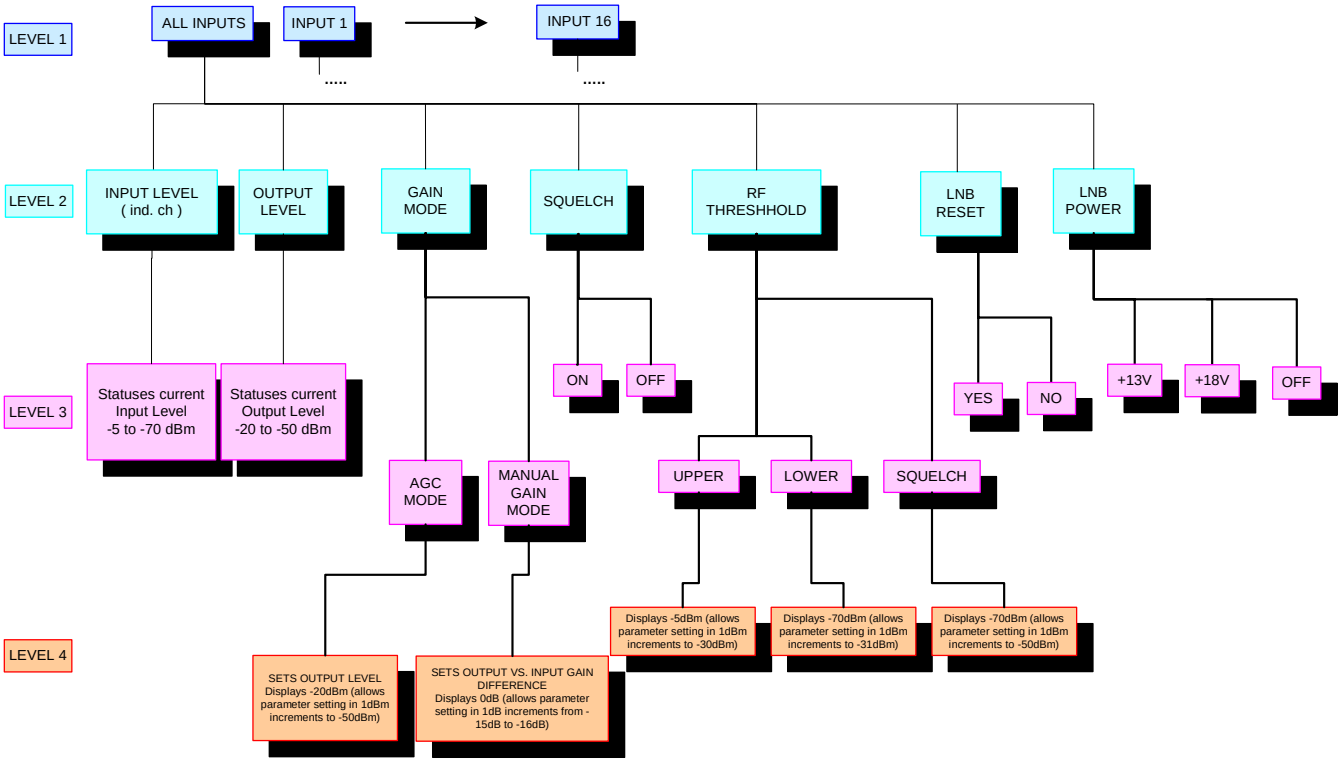


Figure 5-2: Configuration Menu Structure per Input Channel

5.2. [INPUT] SELECT FUNCTION

5.2.1. [INPUT] Function from Destination Selection Mode

Press [INPUT]
This toggles to *Source Selection* Mode.

5.2.2. [INPUT] Function from Salvo Selection Mode

NOTE: [INPUT] and [OUTPUT] are pressed simultaneously to initiate Salvo Selection Mode (from within Salvo Selection Mode)

Press [INPUT]
This exits *Salvo Selection* Mode and enters *Source Selection* Mode.

5.2.3. [INPUT] Function from Configuration Menu Mode

Press [INPUT]
This exits the Configuration Menu and enters *Source Selection* Mode.

5.2.4. [INPUT] Function from Configuration Set Mode

Press [INPUT]
This exits *Configuration Set* Mode, without making configuration changes, and enters *Source Selection* Mode.

When the user exits Source Selection Mode, or after 30 seconds of inactivity, the XRF1 Control Panel returns to Destination Selection Mode.

5.3. [OUTPUT] SELECT FUNCTION

5.3.1. [OUTPUT] Function from Source Selection Mode

Press [OUTPUT]
This toggles to *Destination Selection* Mode.

5.3.2. [OUTPUT] Function from Salvo Selection Mode

[INPUT] and [OUTPUT] are pressed simultaneously to initiate Salvo Selection Mode (from within Salvo Selection Mode)

Press [OUTPUT]
This exits *Salvo Selection* Mode and enters *Destination Selection* Mode.

5.3.3. [OUTPUT] Function from Configuration Menu Mode

Press [OUTPUT]
This exits the Configuration Menu and enters *Destination Selection* Mode.

5.3.4. [OUTPUT] Function from Configuration Set Mode

Press [OUTPUT]
This exits Configuration Set Mode, without making configuration changes and enters *Destination Selection* Mode.

5.4. [MENU] FUNCTION

The XRF1 user has the option to enable passcode protection, through *Vista*LINK® software, limiting access to *Configuration Menu* Mode. Setting and enabling of the menu passcode is processed only through Evertz's *Vista*LINK®. The XRF1 is only responsible for querying the user for the passcode when required. When passcode protection has been enabled, pressing [MENU] prompts for an Administrator-level 4-digit passcode. If passcode protection is never enabled through *Vista*LINK®, pressing [MENU] will enter the Configuration Menu directly. Refer to Figure 5-3 for the operation flow for accessing the *Configuration Menu* Mode.

5.4.1. [MENU] Function from Source and Destination Selection Modes – Passcode Protection Enabled

Press [MENU]
When enabled, this action displays a prompt for the 4-digit Administrator-level passcode.
The user enters the passcode configured through *Vista*LINK®.

Press [ENTER]
Initiates Configuration Menu Mode and prompts for input channel selection.

5.4.2. [MENU] Function from Source and Destination Selection Modes – Passcode Protection Not Enabled

Press [MENU]
Initiates *Configuration Menu* Mode and prompts for input channel selection.

5.4.3. [MENU] Function from Configuration Menu Mode or Configuration Set Mode

Press [MENU]
Returns the user to Menu Level 1 and prompts for Input channel selection.

When the user exits Configuration Set Mode, or after 30 seconds of inactivity, the XRF1 Control Panel returns to *Destination Selection* Mode without making changes to configuration parameters.

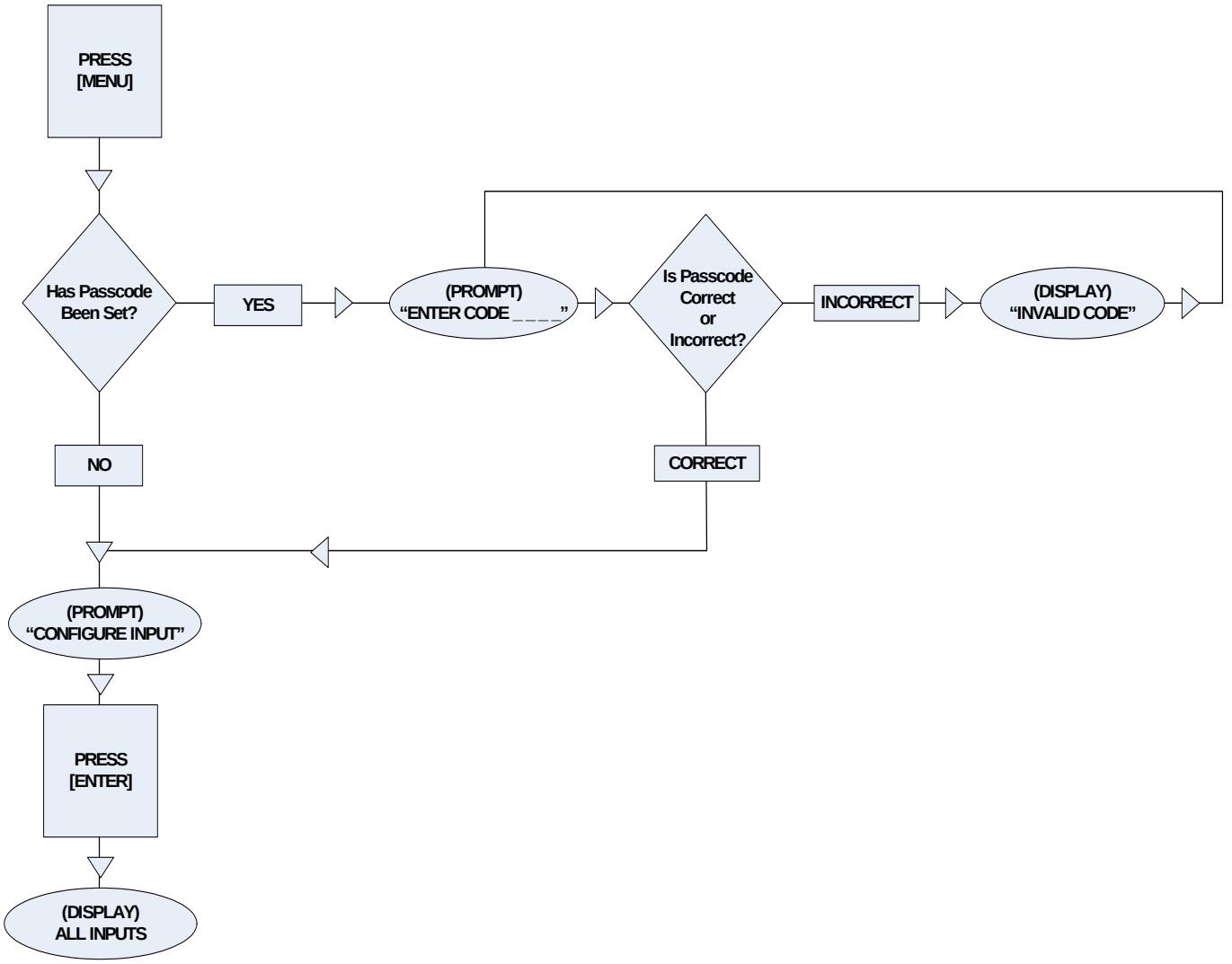


Figure 5-3: Configuration Menu Access Operation

5.5. DESTINATION [LOCK] FUNCTION

The XRF1 user also has the option to enable passcode protection, through *Vista*LINK® software, limiting access to the Lock feature on the router destinations. All setting, enabling, and disabling of passcodes is accomplished through Evertz' *Vista*LINK®, not through the XRF1 Control Panel. The XRF1 is only responsible for querying the user for a passcode when required. Refer to Figure 5-4 for the operation flow for accessing the Destination Lock function.

Passcode protection for the Lock function may be configured on two levels, Operator and Administrator. There may be up to 8 Operator-level passcodes, but only one Administrator-level passcode distributed for the system.

Operator Level: This level of protection allows a system operator, with an Operator-level 4-digit passcode, to enable a "lock" on any selected destination. To disable the lock on a selected destination, the **same** 4-digit Operator-level code, or the Administrator-level code is required.

Administrator Level: This level of protection allows system managers, with the Administrator-level 4-digit passcode, to enable a "lock" on any selected destination. To disable the lock on a selected destination, only the Administrator-level code is accepted.

When passcode protection has been enabled, pressing [LOCK] from *Destination Selection* Mode prompts the user for a 4-digit passcode. If passcode protection is never enabled through *Vista*LINK®, pressing [LOCK] from *Destination Selection* Mode will enable a "lock" on the selected destination without prompting for a passcode.

5.5.1. [LOCK] Function

The Lock function can only be used from *Destination Selection* Mode:

TO ENABLE:

1. *Navigate to desired destination*
2. Press [LOCK]
3. Displays a prompt for a 4-digit passcode
4. The user enters the 4-digit passcode
5. Press [ENTER]
6. LOCK LED will blink at 2Hz. when any "locked" destination is selected

TO DISABLE:

1. *Navigate to desired "locked" destination*
2. Press [LOCK]
3. Displays a prompt for a 4-digit passcode
4. The user enters the 4-digit passcode
5. Press [ENTER]
6. LOCK LED will be dark when any "unlocked" destination is selected

When a Lock enable or disable process is completed, or after 30 seconds of inactivity, the XRF1 Control Panel will return to the previous mode, *Destination Selection* Mode.

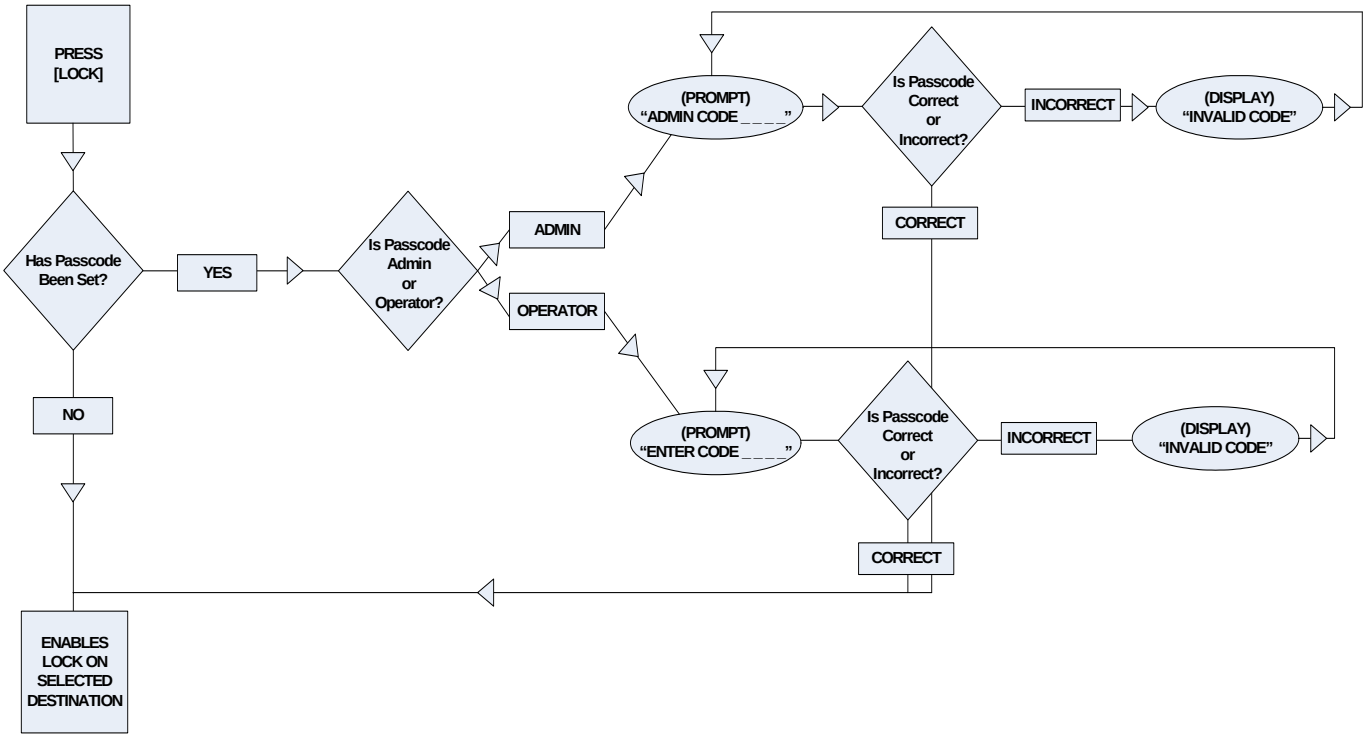


Figure 5-4: Destination Lock Access Operation – Enabling a Destination Lock

5.6. DESTINATION [PROTECT] FUNCTION

The Lock function can only be used from Destination Selection Mode.

TO ENABLE:

1. Navigate to desired destination.
2. Press [PROTECT].
3. PROTECT LED will blink at 2Hz when any "protected" destination is selected

TO DISABLE:

1. Navigate to the desired *"protected"* destination.
2. Press [PROTECT].
3. PROTECT LED will be dark when any "unprotected" destination is selected

When a Protect enable or disable process is completed, or after 30 seconds of inactivity, the XRF1 Control Panel will return to the previous mode, *Destination Selection* Mode.

5.7. [TAKE] FUNCTION

The [TAKE] button performs the physical crosspoint connection within the XRF1 router. A "take" can only be initiated from *Source Selection* Mode, *Destination Selection* Mode, or *Salvo Selection* Mode. Pressing [TAKE] will perform the physical crosspoint change for the current statuses input/output pairing or the currently selected salvo.

One example of how a typical crosspoint change (for source "TELSTAR 12" and destination "IRD 16") may be performed is as follows:

Navigate to desired destination	--- using the up/down arrow keys, the scroll knob, or 0-9 numeric buttons
Depress the scroll knob	--- enters Source Selection Mode
Navigate to desired source	--- using the up/down arrow keys, the scroll knob, or 0-9 numeric buttons
[TAKE]	--- performs physical router connection between "TELSTAR 12" and "IRD 16" --- displays "TAKE SUCCESSFUL" for 2 seconds, then returns to Destination Selection Mode

An example of how a salvo (named "ALL CALL SOURCE 5" – input channel 5 to all destinations) is executed is as follows:

Navigate to desired salvo	--- using the up/down arrow keys, the scroll knob, or 0-9 numeric buttons
[TAKE]	--- performs physical router connection between input channel 5 and all destinations --- displays "TAKE SUCCESSFUL" for 2 seconds, then returns to Destination Selection Mode

After a "take" is completed, from any selection mode, the 16-character screen will display a "TAKE SUCCESSFUL" message for 2 seconds. The display will then return to the previous mode and display the last manipulated input/output pairing or salvo.

5.8. [ENTER] FUNCTION

5.8.1. [ENTER] Function from Destination Selection Mode

1. *Navigate to desired destination*
2. Press [ENTER]
   Toggles to *Source Selection* Mode

NOTE: The [ENTER] key **does not perform physical crosspoint changes.** The [ENTER] key cannot perform a [TAKE].

NOTE: Pressing [ENTER] while a salvo is selected is a NO OP. The [ENTER] key cannot perform a [TAKE].

5.8.2. [ENTER] Function from Source Selection Mode

1. *Navigate to desired source*
2. Press [ENTER]
   Toggles to Destination Selection Mode

NOTE: The [ENTER] key **does not perform physical crosspoint changes.** The [ENTER] key cannot perform a [TAKE].

5.8.3. [ENTER] Function from Configuration Menu Mode

1. *Navigate to desired menu option*
2. Press [ENTER]
   Finalizes menu choice and moves down one menu level

5.8.4. [ENTER] Function from Configuration Set Mode

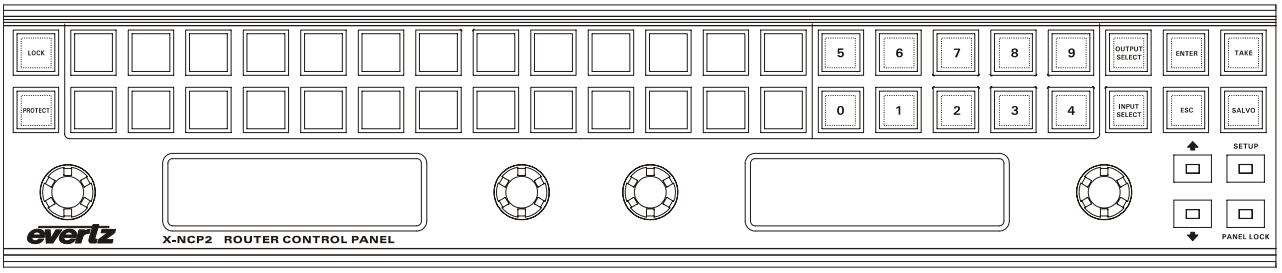
1. *Navigate to desired configuration parameter and perform desired change to settings.*
2. Press [ENTER]
   Performs physical changes to parameter settings and displays a “CHANGES SAVED” message
   Moves back up one menu level

NOTE: It is necessary to press [ENTER] after making any configuration parameter changes, or the changes will not take place. If the user exits Configuration Set Mode without pressing [ENTER], **no changes will be made** to the physical router settings.

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 M&C systems use the RS232/422 port.

6.1. X-NCP2 ROUTER CONTROL PANEL



The Evertz X-NCP2 control panel is a multi-function control panel used to control the XRF series of routers, and X Series of optical routers. The display area consists of a two 24 digit alphanumeric displays, 0-9 numeric keypad, 12 functional push-buttons and tactile rotary encoders with push-button selection.

6.1.1. Connections

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. A single XRF1 may have up to eight X-NCP2 panels connected to it on the same network. Conversely, a single X-NCP2 panel can control multiple connected XRF1's.

To connect an XNCP2 control panel directly to an XRF1 router Ethernet port, a crossover Ethernet cable is required.

6.1.2. Mounting

The X-NCP2 is equipped with rack mounting brackets and fits into a standard 19 inch by 1 3/4 inch (483 mm x 45 mm) rack space. 2RU of vertical space is required. The mounting brackets may be removed if rack mounting is not required.

6.1.3. Specifications

6.1.3.1. Serial I/O (COM 1)

Standard:	RS-232
Connector:	Female DB-9
Baud Rate:	57600
Format:	8 bits, no parity, 2 stop bits, no hardware flow control (COM2 not available)

6.1.3.2. Ethernet I/O

Standard:	IEEE 802.3 (10BaseT), IEEE 8002.3u (100BaseTx)
Connector:	1 RJ45
Cable Requirements:	
10 Base T:	UTP category 3, 4 or 5 cable up to 328ft/100m (2 pairs)
100 Base Tx:	UTP category 5 cable up to 328ft/100m (2 pairs)

6.1.3.3. Electrical

Voltage:	100-240VAC, 50/60 Hz auto-ranging
Power:	11 Watts
EMI/RFI:	Complies with FCC Part 15, class A and EU EMC directive.

6.1.3.4. Physical

Size:	17 1/8” W x 4 3/8” D x 3 ½” H (435mm x 111mm x 89mm)
Weight:	4 lbs. (1.81 kg)
Temperature:	0 to 50 deg. C. (Operating)

6.1.4. X-NCP2 Configuration Menu

When power is applied to the unit, the X-NCP2 provides a set-up menu with the following parameters:

<back>	Conveniently located at the start and end of a menu stack, this menu item allows the user to return to the previous menu for further configuration, if required.
Network Setup:	Set the IP address of the X-NCP2 unit, its subnet mask and gateway IP.
Configuration:	N/A
Service:	N/A
Reboot:	A menu option that allows the user a quick way to reboot the X-NCP2 unit without unplugging the AC power source from the unit. Options are “yes” and “cancel”.
Discovery:	N/A
Add Frame:	Menu option to add routers to the X-NCP2 control list
Remove Frame:	Menu option to remove routers from the available list.
Request update:	N/A

6.1.5. Setting the X-NCP2 IP Address

The X-NCP2 should be configured on the same subnet as the connected router(s).

Follow this procedure to configure the X-NCP2 IP address:

1. Enter the <setup> menu at the top level menu of the X-NCP2.
2. Enter the <Network> item in the list.
3. Select the <IP Address> item in the list.
4. Enter the desired IP address of the XRF1 using the scroll knob, press the knob to move to the next set of digits in the IP address.
5. When complete, the XNCP2 will return to the Network Setup menu. Configure other network settings as required using the above procedure.

6.1.6. Adding XRF1 Router to XNCP2 Control List

The X-NCP2 should be configured to be on the same subnet as the connected router(s).

The addition of XRF1 routers can be performed once the X-NCP2 panel and XRF1 IP addresses are on the same IP subnet.

Follow this procedure to add routers to the X-NCP2 control list.

1. Enter the <setup> menu at the top level menu of the X-NCP2.
2. Enter the <add frame> item in the list.
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 an XRF1 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.

6.1.7. Initiating a Control Session with an XRF1

To control the router matrix, a panel session with the frame controller must first be initiated. This is accomplished by using the rotary knob to highlight the IP address of the router to be controlled and pressing the [SELECT] button on the panel.

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 [SELECT] to initiate a session with that device.

Once a session is initiated, the left hand window of the X-NCP2 will display the type of router connected (i.e. XRF1 Router) and the range of available inputs and outputs. The right-hand window will show the current status of input and output routes (destination select mode). Rotating any of the shaft encoders will increment the crosspoint displayed in the order of the outputs.

6.1.8. Terminating a Control Session with an XRF1

To manually terminate a session at any time, simultaneously press the [↑] and [↓] keys to return to the list of router IP addresses.

6.1.8.1. Controlling Crosspoints Using the X-NCP2

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.

6.1.8.2. 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].

NOTE: The control panel session will time out after approximately 30 seconds of no panel activity.

6.1.8.3. 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.

6.1.9. Control Configuration Items with the X-NCP2

Once a session is initiated, configuration changes may be made by pressing the [SETUP] button and using the rotary encoder to select the desired configuration value, then pressing enter to select it. Configurable values and the method of setting them is the same as doing so with the local control panel, as outlined beginning in section 4.5.

6.1.10. Panel Lock Button

The panel lock function works the same as on the XRF-1 local control panel. Refer to section 5.1 for details.

6.1.11. Lock Button

The destination lock function works the same as on the XRF-1 local control panel. Refer to section 5.5 for details.

6.1.12. Protect Button

The destination protect function works the same as on the XRF-1 local control panel. Refer to section 5.6 for details.

6.1.13. Salvo Select Button

Pressing this button allows access to up to 8 pre-programmed salvos that have been configured using Evertz *Vista*LINK® software.

A SALVO is a pre-programmed sequence of crosspoint connections that can be constructed using *Vista*LINK® and executed from the XRF1 Control Panel or X-NCP2. Execution of a salvo is very similar to execution of an individual crosspoint connection, but the entire list of connections contained in the salvo is performed.

To execute a salvo, press the [SALVO SELECT] button and use the scroll knob to browse the available salvos. Press the [TAKE} button to execute the desired salvo.

6.1.14. Escape Key

The [ESC] key may be used to move up one menu level. At the top level of the configuration menu, it will exit this mode and return to Destination select menu mode (default). Pressing the [ESC] key prior to the [ENTER] or [TAKE] keys will exit the current configuration item without performing any crosspoint or configuration changes.

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7. *VISTA*LINK® REMOTE MONITORING/CONTROL

7.1. WHAT IS *VISTA*LINK®?

*Vista*LINK® is Evertz' remote monitoring and configuration platform which operates over an Ethernet network using Simple Network Management Protocol (SNMP). SNMP is a standard computer network protocol that enables different devices sharing the same network to communicate with each other. *Vista*LINK® provides centralized alarm management, which monitors, reports, and logs all incoming alarm events and dispatches alerts to all the VLPro Clients connected to the server. Card configuration through *Vista*LINK® 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, *Vista*LINK® enables the user to configure devices in the network from a central station and receive feedback that the configuration has been carried out.

There are 3 components of SNMP:

1. 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®-C Configuration Utility 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, each with a unique address (OID), communicate with the NMS through an SNMP Agent. The XRF1/XRF1A communicates directly with the manager using its internal Agent.

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

7.2. *VISTA*LINK® INTERFACE

The *Vista*LINK® control, configuration, and monitoring software application may be used to configure and control the XRF1 router, as well as monitor alarms (SNMP traps) within the system. The following items may be controlled or configured through the *Vista*LINK® 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
- Salvo Save / Recall / Execute
- Password Control

The following items may be monitored through the *Vista*LINK® software:

- Input RF power level (high or low)
- Crosspoint status
- LNB short circuit detection

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

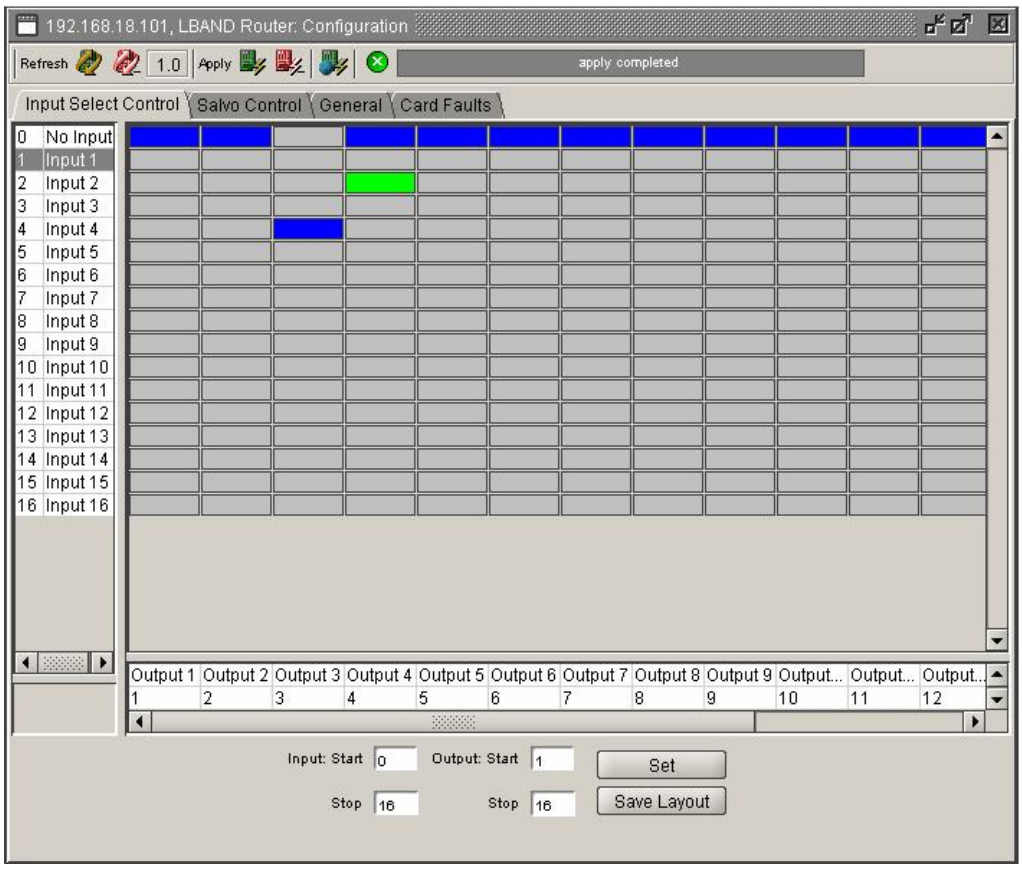

Figure 7-1: *Vista*LINK® Configuration Menu for each Router Input

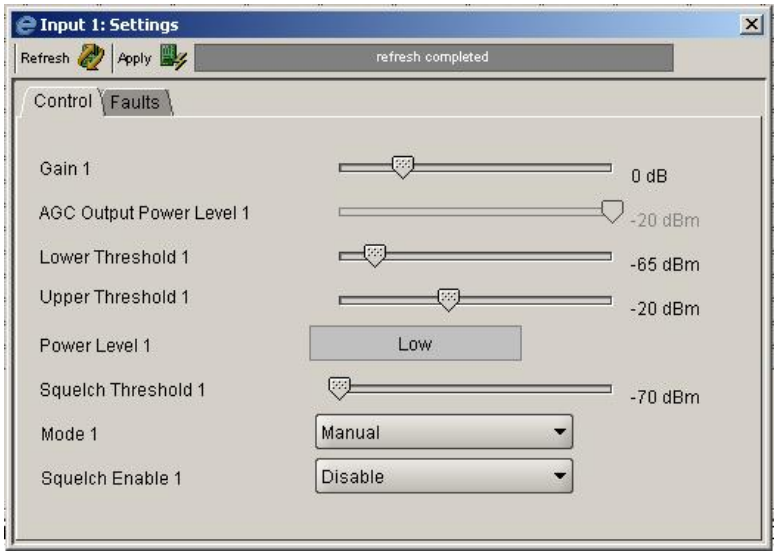

Figure 7-2: *Vista*LINK® Crosspoint Cross Matrix

8. TECHNICAL DESCRIPTION

8.1. SPECIFICATIONS

8.1.1. SYSTEM

Matrix Size: 16x16 in a 1RU frame
System Expansion: Inputs and outputs are expandable in increments of 16
32x32 maximum expanded system size using external distribution and combining with SRF series passive splitter/combiners
Gain Range: (manual gain mode):
XRF1: –9 to +18 dB
XRF1A: -10 to +12 dB
Output AGC Level: –20 to –50 dBm

8.1.2. 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: > 60dB (input to output)
> 70dB (output to output)
> 70dB (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
Max RF Output Power: –10 dBm
Noise Figure:
XRF1: 6dB (1500MHz, Gain = +18dB) typ, 20dB (1500MHz, Gain = 0dB) typ
XRF1A: 6dB (1500MHz, Gain = +12dB) typ, 15dB (1500MHz, Gain = 0dB) typ
Connector Type: BNC per IEC 61169-8, Annex A (F connector optional – accepts conductor range 21-19 AWG (0.41-0.64 mm^2) on center pin)
Impedance: 75 ohm (50 ohm BNC optional)
Return Loss:
XRF1: > 15 dB (input and output)
XRF1A: > 15 dB output, >13 dB input

8.1.3. 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)
> 70dB (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
Return Loss:
XRF1: > 15 dB (input and output)
XRF1A: > 15 dB output, >13 dB input

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

8.1.4. LNB Power (LNB option only)

LNB Maximum Output Current (per connector): 400 mA @ +13/+17 VDC (selectable)

8.1.5. Communication and Control

Serial:	RS232/RS422 selectable – Female 9 pin D connector
Ethernet:	SNMP over IEEE 802.3/U (10/100 BaseTx) RJ45 connector
Control:	Front panel, *Vista*LINK®
Control Panels:	X-NCP2

8.1.6. Electrical

AC Mains Input:	Auto ranging, 100 ⇔ 240 VAC, 50/60 Hz
Maximum Power Consumption:	
	40 Watts max. w/o LNB power option
	175 Watts max. with LNB power option
Power Supply Configuration:	1 supply standard, optional redundant supply requires separate inlet
Connector:	IEC 60320 - 1 per power supply
Fuses:	
Standard:	1 amp, 250 Volt time delay 5 x 20 mm (T1AL250V). – 2 per PSU
LNB option:	4 amp, 250 Volt time delay 5 x 20 mm (T4AL250V). – 2 per PSU

8.1.7. 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

8.1.8. Physical

Height:	1.75” (45 mm)
Width:	19” (483 mm)
Depth:	18.75” (477 mm)
Weight:	Approx. 7.4 lbs. (7.9 Kg)
Temperature:	0 - 40°C

8.2. 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.

8.2.1. 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 a greater value.

The fuse holder is located inside the power entry module. To change the fuses, remove 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. Remove the blown fuse and replace it with a fuse of the correct value. Replacement fuse type: T1AL250V, slow blow, 1A, 250VAC (non LNB), T4AL250V, slow blow, 4A, 250VAC (LNB option).

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