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REVISION HISTORY

REVISION	DESCRIPTION	DATE
0.0	Preliminary Release	Jul 06
1.1	Updates/corrections	Aug 06
1.2	General format cleanup	Sept 09

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1. OVERVIEW

1.1. INTRODUCTION

The 7700SRV-XRF is the system controller (SC) for multi frame L band matrices comprised of Evertz Microsystems L band routers. A maximum matrix size of 512x512 is achievable with the XRF6 router. The 7700SRV-XRF hardware consists of a maximum of two SC cards housed in a 1RU 7701 multiframe with optional dual power supply. One card is designated the primary SC card and the other the secondary SC card. The secondary is optional and provides redundancy. At any given time, one SC card is deemed active. Only the active SC card initializes the individual XRF6 routers. If present, the other SC card is deemed standby. Both SC cards monitor their communication paths to the XRF6 routers. By default, when the system controller is powered on, the primary SC card becomes active and the secondary SC card becomes standby. Switchover between the active and standby system controller cards is automatic and the conditions causing switchover are discussed in section 1.2.

1.2. SYSTEM DIAGRAM

Figure 1-1 illustrates the connection configuration for an XRF system controller.

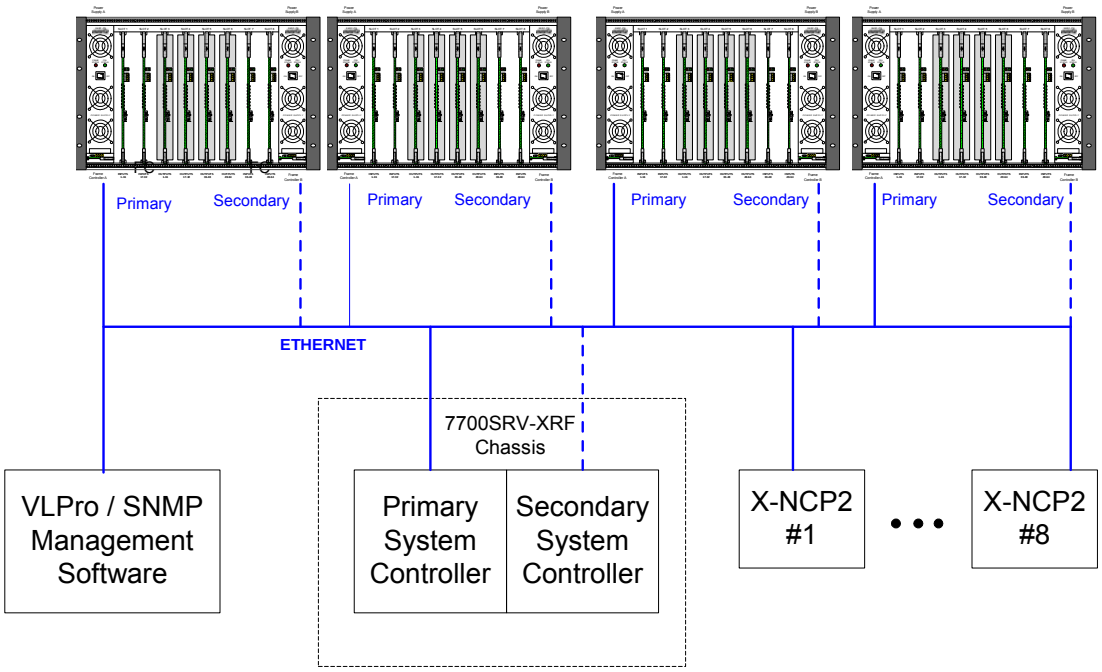

Figure 1-1: Connection Diagram for System Controller with XRF6 Routers for a 128x128 System

Four XRF6 routers are illustrated for a 128x128 configuration (RF splitters and combiners not shown). Each XRF6 router has two frame controller (FC) cards that are designated as either primary or secondary via the chassis orientation table of the SC.

It is strongly recommended that all equipment involved with the router system be located on its own IP network.

The SC uses SNMP (Simple Network Management Protocol) to communicate with the FCs of each router. The primary SC card communicates with the primary FCs and the secondary SC card communicates with the secondary FCs.

Control of the router system can be accomplished by using any combination of SNMP manager software (such as VL-Pro), X-NCP2 panels, or Evertz Router Control (ERC) protocol over the SC's Serial Control Port (SCP). The control system(s) must interface with the active SC card.

Automatic switchover from the active SC to standby occurs under the following situations:

- The active SC fails to communicate with one of its router FC cards.
- The active SC is removed from its chassis.
- The active SC fails to provide a watchdog handshake response to the standby SC.

Manual changeover can be forced using:

- SNMP (VL-Pro)
- A serial console connected to the upgrade port of one of the SC cards.

For any switchover to take place:

- The standby SC must be present within the chassis.
- The standby SC must provide a watchdog handshake response to the active SC.
- The standby SC must be able to communicate with all of its router FC cards.

Up to 8 X-NCP2 network control panels can be connected to the active SC card. If switchover occurs between the SC cards, the operator must have the X-NCP2 panel initiate a communications session with the new active SC card.

2. INSTALLATION

The 7700SRV-XRF comes with a 1RU 7701 Evertz Microsystems Multiframe with rear panel. There are three slots available on this chassis. The second and third slots from the left (facing the front of the frame) are used for the 7700SRV-XRF cards.

2.1. FRAME

The 7701 Evertz Microsystems multiframe has a door at the front which can be opened by loosening the two screws at the far sides of the door.

2.2. BACKPANEL CONNECTIONS

The rear panel of the 7700SRV-XRF is illustrated in Figure 2-1.

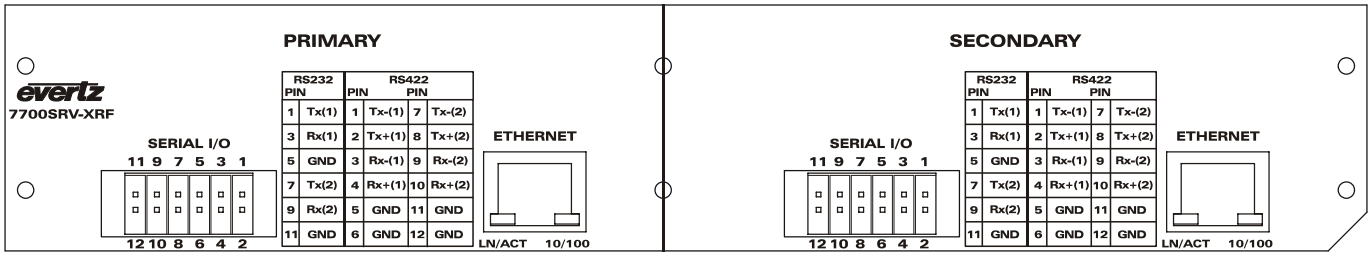

Figure 2-1: Rear Panel of 7700SRV-XRF

There are serial and ethernet connections for both the primary and secondary cards. The pinout for the 12 pin strip connector is illustrated on the back panel. There are two ports available on each connector and are labelled (1) and (2).

2.2.1. Serial Control Port Connections

Table 2-1 illustrates the pinout for the serial control port (SCP) when operating in RS232 mode.

Pin Number	Signal
1	TX (1)
3	RX (1)
5	GND
7	TX (2)
9	RX (2)
11	GND

Table 2-1: SCP RS232 Pinout

Table 2-2 illustrates the pinout for the SCP when operating in RS422 mode.

Pin Number	Signal
1	TX- (1)
2	TX+ (1)
3	RX- (1)
4	RX+ (1)
5	GND
6	GND
7	TX- (2)
8	TX+ (2)
9	RX- (2)
10	RX+ (2)
11	GND
12	GND

Table 2-2: SCP RS422 Pinout

2.2.2. Ethernet Connections

There are two ethernet connections on the rear panel of the 7700SRV-XRF. One connection is for the primary SC card and the other for the secondary SC card. Use a 'straight-thru' network cable to connect this device to an Ethernet switch.

It is strongly recommended that all equipment involved with the router system be located on its own IP network.

3. STATUS INDICATORS AND DISPLAY

The 7700SRV-XRF includes a number of status LEDs, a toggle switch and 4 character dot matrix display for monitoring and diagnostics. The large green and red LEDs next to the toggle switch are used to indicate the overall health of the card. The three small LEDs on the card edge illustrated in Figure 3-1 indicate the current operating mode of the card and information on the peer card in the frame.

3.1. CARD EDGE

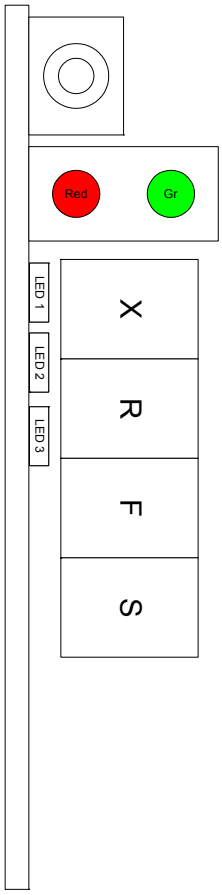

Figure 3-1: 7700SRV-XRF card edge

LED	Off	On
1	SC is in secondary slot.	SC is in primary slot.
2	SC does not detect its peer physically within the chassis.	SC detects its peer physically within the chassis.
3	SC is active.	SC is standby.

Status LED: The large green and red LEDs at the top of the board indicate the card status. Only one of these LEDs will be on at any time after power up. The Red LED ON indicates an error has occurred and has been logged in the event log. Reading the event log returns the status LED to green. The green LED ON indicates the system controller is operating normally.

Toggle Switch: The toggle switch is used to display either the active / standby status of the SC card or the IP address of the SC card. Moving the switch to the left will display ACTIVE or STANDBY on the dot matrix display to indicate the current operating status of the card. Moving the switch to the right will display the IP address of the card on the dot matrix display.

4. CONFIGURATION

The serial port console of the SC can be used to configure the network settings, serial port control settings and SNMP settings of the card.

4.1. CONFIGURATION VIA CARD EDGE SERIAL CONNECTION

The basic steps in configuring the 7700SRV-XRF are:

Note: The following steps are to be repeated on any secondary SC card.

1. Connect a PC serial cable to the 4 pin 7700SRV-XRF connector J1 using the Evertz Microsystems upgrade cable (female DB9 serial connector to 2x3 strip connector) as illustrated in Figure 4-1.

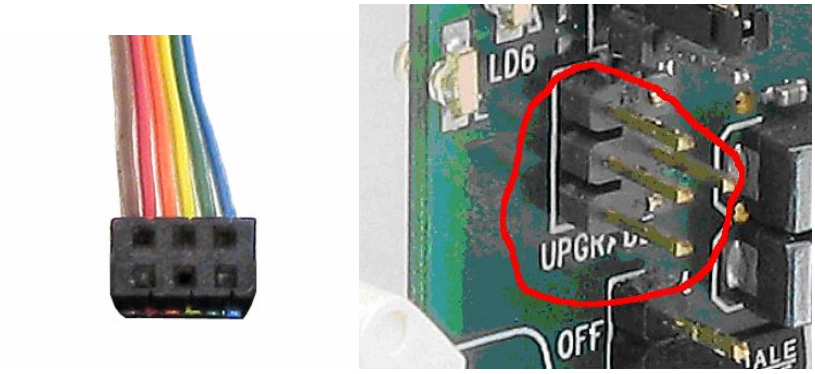

Figure 4-1: Upgrade Cable and PCB Connector for Serial Connection.

2. Open a HyperTerminal session with settings baud rate=115200bps, Data bits=8, Parity=None, Stop bits=2, Flow Control=None.

3. Insert card into frame. Make sure the RUN / UPGRADE jumper is installed in the RUN position.

The following menu will be displayed in the HyperTerminal session:

```
 ------------------------------------------------
|                   Main Menu                    |
|            (7700SRV-XRF v1.00 b56)             |
 ------------------------------------------------
(1) Network Configuration
(2) SNMP Setup
(3) Database
(4) Card status
(5) Serial Control Port Configuration
(6) Event log
(7) Engineering/Debug

(X) Exit
>
```

For detailed instructions on configuring serial and Ethernet connections, please see Chapter 4.

4.1.1. Network Configuration

Menu item (1) allows configuration of the network settings of the card. The following menu is displayed:

```
 ------------------------------------------------
|             Network Configuration              |
|            (7700SRV-XRF v1.00 b56)             |
 ------------------------------------------------
 ------------------------------------------------
 MAC:               00:02:c5:fe:f1:63
 ip address:        192.168.9.18
 netmask address:   255.255.255.0
 gateway:           0.0.0.0
 broadcast address: 192.168.9.255
 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
>
```

Make sure to save any changes to the network configuration prior to exiting. The current Internet Protocol (IP) settings of the card can be displayed on the 4 character dot matrix display by pushing the toggle switch to the right.

4.1.2. Serial Control Port Settings

The 7700SRV-XRF can be controlled via the proprietary Evertz Router Control (ERC) protocol. To configure the settings of this port, use menu item (5). The following selections are displayed for each serial port connection of the card (Two per card, each configurable independently):

```
 ------------------------------------------------
|      Serial Control Port 1 Configuration       |
|            (7700SRV-XRF v1.00 b56)             |
 ------------------------------------------------
 ------------------------------------------------
 Baud Rate: 57600
 Data Bits: 8
    Parity: None
 Stop Bits: 1
  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

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

4.1.3. SNMP Settings

Menu item (2) allows configuration of the SNMP settings for the card. The following menu is displayed:

```
 ------------------------------------------------
|                   SNMP Setup                   |
|            (7700SRV-XRF v1.00 b56)             |
 ------------------------------------------------
(1) Trap Setup
(2) Community Setup

(X) Exit
>
```

Menu item (1) allows the user to enter trap destinations for the server. Any SNMP alarms will be broadcast to the IP addresses set in this section.

```
 ------------------------------------------------
|                  Trap Setup                    |
|            (7700SRV-XRF v1.00 b56)             |
 ------------------------------------------------
---------------------------------
No Trap Destinations Assigned
---------------------------------

(1) Set Trap IP Address
(2) Remove Trap IP Address

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

Menu item (2) of the SNMP setup menu allows the user to set the read only and read – write community.

4.1.4. Other Settings

The main menu items (3) Database, (4) Card Status, (6) Event Log and (7) Engineering / Debug are used for status monitoring and diagnostics. All user functionality contained in these items is available via SNMP.

4.1.5. Upgrading Firmware via Serial Connection

To upgrade the firmware on the card using the serial connection, switch the RUN / UPGRADE jumper to the UPGRADE position. Power up the card and in the HyperTerminal session the prompt:

PPCBOOT>

Will appear. Type ‘upload’ and the card will be ready for file transfer.

PPCBOOT> upload
Upload product firmware now

Use the Send File command on HyperTerminal with the Xmodem protocol. The card will reboot after the file transfer.

4.2. MATRIX CONFIGURATION USING SNMP

This section outlines an example configuration of a 128x128 router using four XRF6-64x64 frames via SNMP. It is assumed that the system controller has been configured. Details on configuring the system controller card can be found in the MIB file. (Please contact Evertz Microsystems for this information).

Information on each router in the system is contained in the chassis orientation table. To configure a matrix, data on all the frames in the system must be entered and then applied in SNMP by performing a set (set to ‘true’) on the MIB parameter xrf6ApplyOrientationData.

For each frame, the required information includes the primary and secondary (if available) IP addresses, the input start and end values and the output start and end values.

4.2.1. Example 128x128 Configuration

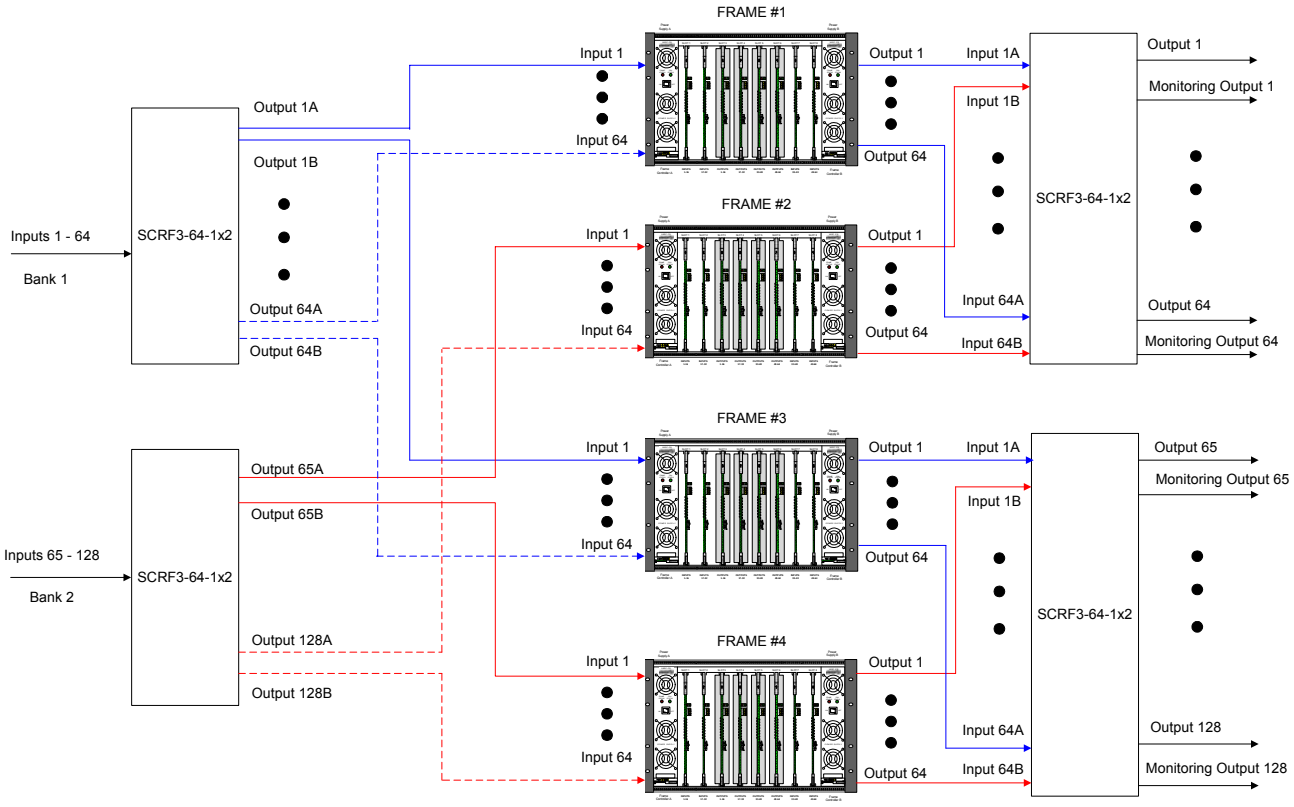

Figure 4-2: Connection Diagram for 128x128 Matrix Using Four XRF6-64x64 Routers

Step1: Enter the primary frame controller IP addresses for each frame.

Step 2: Enter the secondary frame controller IP addresses for each frame.

Step 3 Enter the start and stop values for inputs and outputs of each frame. In this example, Frame #1 is assigned inputs 1-64 and outputs 1-64. Frame #2 is assigned inputs 65-128 and outputs 1-64. Frame #3 is assigned inputs 1-64 and outputs 65-128. Frame #4 is assigned inputs 65-128 and outputs 65-128.

Step 4: Set the xrf6ApplyOrientationData MIB parameter to true and the data applied to the orientation table will be updated and applied to the system controller.

Table 4-1 describes the *Chassis Orientation Table*.

Number	Description	Primary IP	Secondary IP	IN Start	IN End	OUT start	OUT End	Valid	Clear
1	Frame#1	192.168.9.5	192.168.9.7	1	64	1	64	Y	N
2	Frame#2	192.168.9.8	192.168.9.10	65	128	1	64	Y	N
3	Frame#3	192.168.9.44	192.168.9.55	1	64	65	128	Y	N
4	Frame#4	192.168.9.66	192.168.9.77	65	128	65	128	Y	N

Table 4-1: Chassis Orientation Table

The valid bit is an indicator of the validity of the data in the table. The frame information is not valid if the start and end values overlap or are not contiguous. The Clear bit is used to clear the information contained for this frame index.

The MIB file contains all the information regarding the parameters. Please consult this file for further information on controlling a multi frame matrix.

5. X-NCP2 PANEL OPERATION

5.1. X-NCP2 CONTROL PANEL

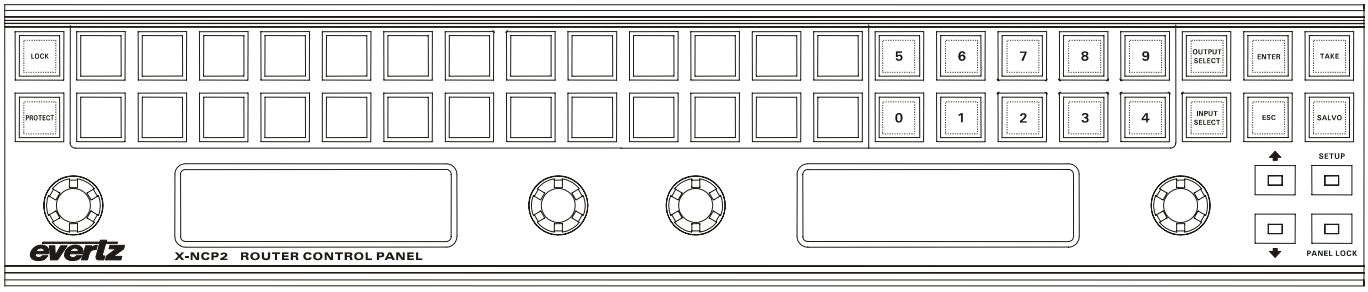

Figure 5: X-NCP2 Control Panel

The Evertz X-NCP2 control panel is a multi-function control panel used to control the 7700SRV-XRF system controller or XRF6 and XRF1 routers, as well as other Evertz products. When connected to the 7700SRV-XRF system controller, the panel can be used to set crosspoints, execute salvos or configure parameters associated with inputs and/or outputs. The panel communicates with the active SC card using TCP.

To configure the IP addresses of the SC cards on the X-NCP2 panel:

1. Use the rotary knob to highlight <*setup*> on the LCD and push the SETUP key.
2. Highlight *add frame* and push SETUP.
3. Use the rotary knob to select *Non SNMP* as the frame type.
4. Use the rotary knob, SETUP key, and PANEL LOCK key to set the IP address of the primary SC card.
5. Repeat step 4 for any secondary SC card.
6. Highlight <*back*> and push SETUP.
7. The IP address(es) of the primary (and secondary) SC card(s) should appear on the LCD.

To establish a communications session with the 7700SRV-XRF:

1. Use the rotary knob to highlight the IP address of the active SC card.
2. Press the SETUP key.

Once established, the communications session will remain active until:

1. Switchover occurs between the active and standby SC cards.
2. It is terminated manually by the X-NCP2 panel.

To manually terminate the communications session using the X-NCP2:

1. Simultaneously press the [↑] and [↓] keys.

Once a session is initiated, the panel is in destination (output) selection mode. This is the home or root mode of the panel. An output can be selected using the scroll knobs or numeric keys. Press [Input Select] to select an input destination. Press the [TAKE] button to apply the crosspoint to the system controller.

The examples listed below illustrate two different methods of initiating a crosspoint take with the router and also configuring the gain setting on the inputs. To move up one level in the menus when in configuration mode, press the [ESC] key.

5.1.1. 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 [SETUP].

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 [SETUP], [OUTPUT SELECT], [2], [OUTPUT SELECT], [INPUT SELECT], [2], [INPUT SELECT], [TAKE].

5.1.2. 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 [SETUP].

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.

5.1.3. Example 3: Setting the Gain to +6dB in Manual Model on All Inputs

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 [SETUP].

2. Press the [SETUP] to access the configuration options.

3. Scroll through the menu items using the scroll knob and select CONFIGURE INPUT, press the [ENTER] key.

4. Select ALL INPUTS, press the [ENTER] key.

5. Select GAIN MODE, press the [ENTER] key and select MANUAL GAIN MODE, press the [ENTER] key to save changes.

6. Scroll to the GAIN selection, press the [ENTER] key.

7. Use the scroll knob or numeric keypad to display +3 dB. Press the [ENTER] key to save the changes. The gain on all input channels is in manual mode and set to +3dB.

5.1.4. Example 4: Executing a Salvo Command

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 [SETUP].

2. Press the [SALVO] key in Output Destination Select Mode and the display will show ‘Salvo Selection’ with a number indicating the currently selected salvo.

3. Use the scroll knob or numeric key to select the salvo command to execute. There are 32 salvo commands that can be saved on the 7700SRV-XRF. Press the [TAKE] button to execute the salvo command. The display will show ‘TAKE SUCCESSFUL’ and return to the Output Destination Select Mode.

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