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REVISION HISTORY

REVISION	DESCRIPTION	DATE
1.0	Original	July 04
1.1	Additions for GPI.	Feb 05
1.2	New Configuration Style.	Feb 05
1.3	Correct issue with routes of previous firmware versions not appearing correctly.	Mar 05
1.4	Expand explanations; add Appendix and back plate drawing.	Nov 05
1.5	Standardize format.	Mar 07
1.6	Updated card edge drawing	Nov 07

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1. OVERVIEW

1.1. PORTS

The 7700PTX-MVP is a *Under Monitor Display* (UMD) protocol converter that translates unidirectional protocols from *Other Vendor Equipment* (OVE) into a protocol suitable for the Evertz MVP.
The 7700PTX-MVP has the following ports for protocol usage:

- 4 serial ports
- 1 10/100 Ethernet port
- 20 General purpose inputs

The 7700PTX-MVP can:

- Receive 1 protocol per serial port
- Receive up to 4 TCP protocol streams, one for each unique configurable TCP port
- Receive status data via the 20 general purpose inputs
- Transmit data over each of its serial ports
- Transmit data to a maximum of 12 peers via TCP

1.2. UMD PROTOCOLS

1.2.1. Incoming

The 7700PTX-MVP supports the following incoming protocols:

1. Leitch Up/Down timer
2. Image Video
3. Television Systems Limited (TSL)
4. Buftek crosspoint UMD

1.2.2. Outgoing

The 7700PTX-MVP transmits only the Image Video protocol over serial or TCP.

1.2.3. Protocol Stream Combiner

The PTX can combine incoming protocol streams received over various incoming ports into a single stream intended for a single PPV. For instance, data received on serial ports 1 and 2 can simultaneously be routed to serial port 3.

1.2.4. Protocol Stream Replicator

The PTX can send a protocol stream received on an incoming port to more than one outgoing port. For example, an Up/Down timer protocol received on serial port 1 can be sent to serial ports 1, 2, 3, 4, and up to 12 outgoing TCP connections via the Ethernet port.

1.2.5. Protocol Routing

Incoming data streams can be independently routed to outgoing ports. For instance, data received on serial port 1 can be routed to serial port 2. Data received on serial port 3 can be routed to serial ports 1 and 3.

2. CARD EDGE CONTROLS

2.1. DETERMINING CURRENT IP ADDRESS SETTINGS

To read the current IP address during normal operation, press the toggle switch DOWN. The IP address can be read on the four-character alphanumeric display.

2.2. RESTORING FACTORY DEFAULTS

To restore all settings to factory defaults, apply power to the card while holding the toggle switch UP until the green LED is illuminated.

2.3. CARD EDGE LEDS

LED 22 is illuminated when Ethernet activity is detected.

All other card edge LEDs are for factory use only.

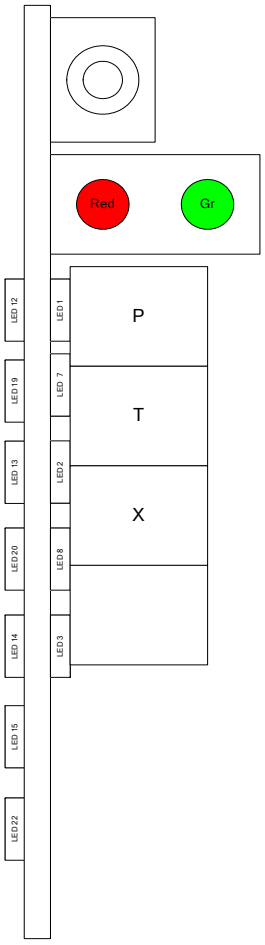


Figure 2-1: PTX Card Edge

3. CONFIGURATION

3.1. CONFIGURATION STEPS

Perform the following steps to configure the 7700PTX-MVP:

1. Connect a PC running a console application to the PTX debug/monitor port via the adapter cable.
2. Configure the 7700PTX-MVP's network parameters.
3. Configure the parameters of each serial port to match those of the OVE.
4. Configure what protocols will be received on what ports (incoming protocol translation setup).
5. When transmitting data via TCP, configure the IP address and TCP port of the peers (outgoing protocol translation setup).
6. Configure the incoming port-to-outgoing port routes.
7. Power off the 7700PTX-MVP.
8. Physically wire the serial port(s) of the 7700PTX-MVP to the OVE.
9. Power on the 7700PTX-MVP.

3.2. DEBUG/MONITOR PORT CONNECTION

The 7700PTX-MVP is configured via the debug/monitor port, the header of which is labelled J1. A special Evertz adapter cable allows this port to connect to the COM port of a personal computer. The following steps describe this procedure.

1. Locate the small, keyed, four–pin end of the upgrade cable provided by Evertz.

2. Connect it to the four-pin interface (J1) near the front of the 7700PTX, directly above the card unlock latch.

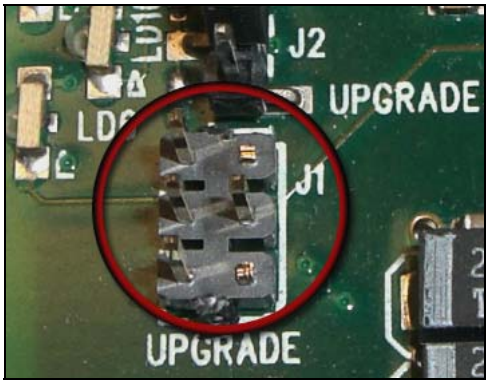


Figure 3-1: Upgrade Jumper

3. Connect the other end of the upgrade cable to a straight-through serial cable. Connect the serial cable to the serial or COM port of the computer.
4. Initiate HyperTerminal on your computer by selecting: "Start\Programs\Accessories\Communications\HyperTerminal".
5. Enter a name for your connection, for example: PTX.
6. Press the <Enter> key. A new "Connect To" window opens.

Figure 3-2: 'Connect To' Window

7. Select COM1 for the "*Connect using*' setting. If COM1 is in use, choose an alternate COM port.
8. Press the <Enter> key or select OK. This opens the "COM Properties" window.

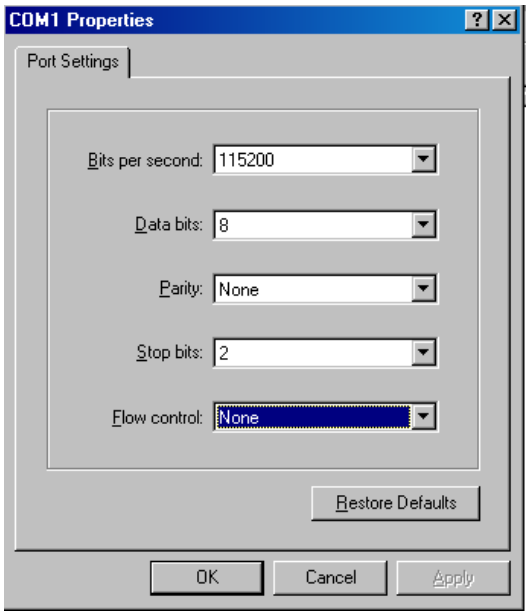


Figure 3-3: COM1 Properties

9. Enter the information as listed in the screen above.
10. Press the <Enter> key or select OK. The "COM Properties" window closes, leaving the HyperTerminal window open.
11. Apply power if the 7700PTX-MVP does not have power. The boot sequence and Main Menu are displayed in the HyperTerminal window.
12. If the 7700PTX-MVP has power, press the <Enter> key to view the 7700PTX-MVP's menu system.
13. Various 7700PTX-MVP parameters are configurable via the 7700PTX-MVP's menu system, the root of which is called *Main Menu*.

3.3. MAIN MENU

Table 3-1 lists the entries available in the 7700PTX-MVP's *Main Menu*.

Entry	Item	Notes
1	Network Configuration	IP address, subnet mask, gateway, etc.
2	Serial Port Setup	Baud rate, number of data bits, etc. of serial ports that connect to OVE (for incoming serial data) or MVP output cards (for outgoing serial data).
3	Protocol Translation Setup	Incoming, Outgoing, and Route configuration.
4	Engineering/Debug	Used for troubleshooting.

Table 3-1: 7700PTX-MVP Main Menu

3.4. NETWORK CONFIGURATION

1. From the *Main Menu* select *Network Configuration*.
2. If DHCP (Dynamic Host Configuration Protocol) is desired, then the *Use DHCP* field is set to *True*. Otherwise, the IP address, subnet mask, and gateway (if any) are set and the *Use DHCP* field set to *False*.
3. Once the network settings are configured, select *Save* and *Exit* before exiting *Network Configuration* to save the settings, otherwise select *Exit*.

The 7700PTX-MVP must be rebooted for any network setting changes to take effect.

3.5. SERIAL PORT SETUP

3.5.1. Parameters

The 7700PTX-MVP has 4 serial ports. The parameters associated with each serial port are listed in Table 3-2.

Parameter	Special Notes
Baud Rate	
Data Bits	
Parity	
Stop Bits	
Standard	For serial port 4, only RS-232 is valid.

Table 3-2: Serial Port Parameters

The serial port settings of the 7700PTX-MVP must match those of the OVE. The 7700PTX-MVP must be rebooted for any serial parameter changes to take effect. Even though a given serial port can receive data from one device and transmit data to another, the transmit and receive parameters for a particular serial port must be the same.

3.5.2. Back Plate

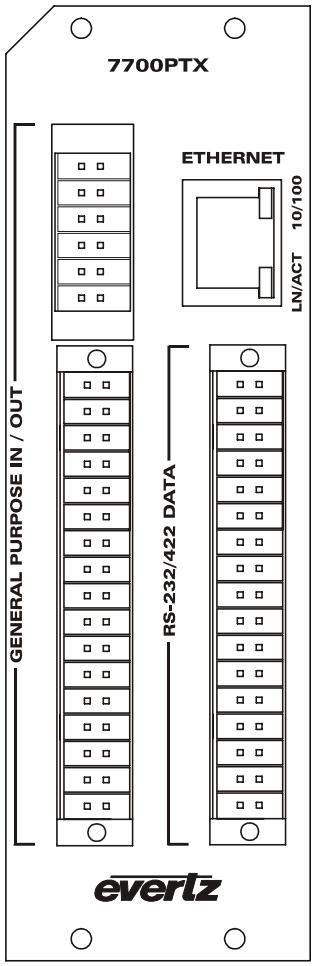


Figure 3-4: 7700PTX Back Plate

3.5.3. RS-232 Wiring

Figure 3-5 shows which pins of the back plate are used for RS-232 serial connections.

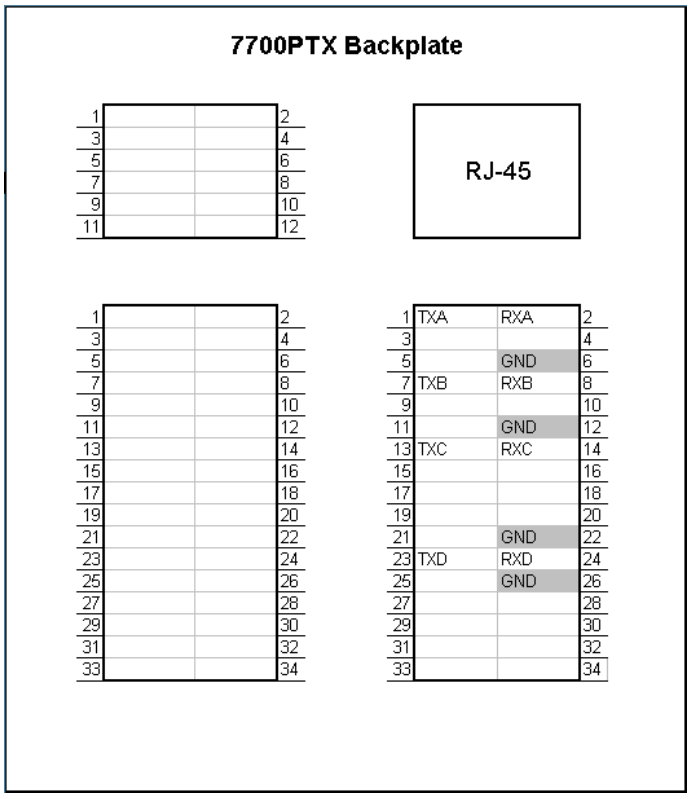


Figure 3-5: RS-232 Pins

Table 3-3 details how to connect the 7700PTX-MVP to the router for RS-232 operation.

7700PTX-MVP			OVE
Port	**Pin Name**	**Pin**	**Pin Name**
1	TXA	1	RX
	RXA	2	TX
	GND	6	GND
2	TXB	7	RX
	RXB	8	TX
	GND	12	GND
3	TXC	13	RX
	RXC	14	TX
	GND	22	GND
4	TXD	23	RX
	RXD	24	TX
	GND	26	GND

Table 3-3: RS-232 Wiring

3.5.4. RS-422 Wiring

Figure 3-6 shows which pins of the back plate are used for RS-422 serial connections.

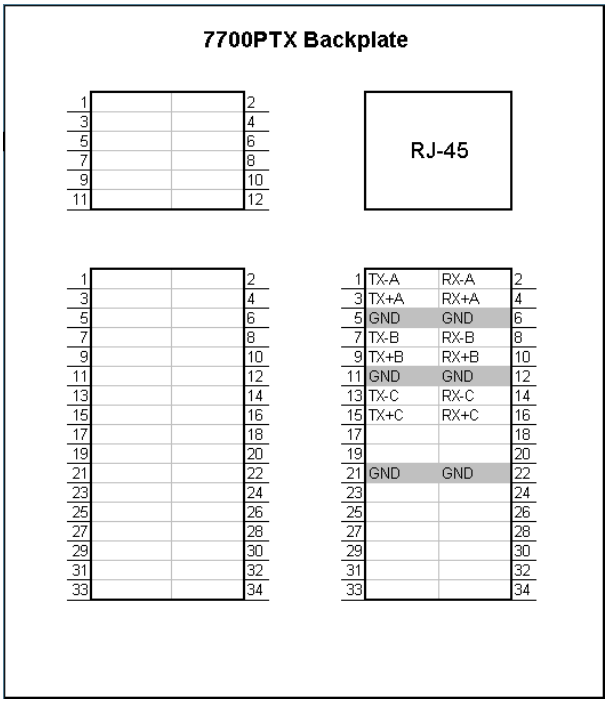


Figure 3-6: RS-422 Pins

Table 3-4 details how to connect the 7700PTX-MVP to the router for RS-422 operation.

7700PTX-MVP			OVE
Port	**Pin Name**	**Pin**	**Pin Name**
1	TX-A	1	RX-
	TX+A	3	RX+
	RX-A	2	TX-
	RX+A	4	TX+
	GND	6	GND
2	TX-B	7	RX-
	TX+B	9	RX+
	RX-B	8	TX-
	RX+B	10	TX+
	GND	12	GND
3	TX-C	13	RX-
	TX+C	15	RX+
	RX-C	14	TX-
	RX+C	16	TX+
	GND	22	GND

Table 3-4: RS-422 Wiring

The 7700PTX-MVP's fourth serial port is not RS-422 capable.

3.6. CONNECTING TO UP/DOWN TIMER

Third party UDTs often offer two serial communications options: an RS-232 output or an RS-422 output. The default communications settings are 9600 baud, eight data bits, one stop bit, no parity. Unless otherwise specified when ordering, **RS-232 is the default output**. Sometimes the rear cover of the UDT must be removed to determine which output option is installed.

The UDT should be configured so that it outputs serial data in hh:mm:ss format (NOT hh:mm:ss.ff).

3.6.1. Accessing Serial Communications

To access the serial communications options, press the SHIFT-7 key combination. The UDT lower display indicates which option is currently selected. The display will read — —:— —:00 for continuous second output (HH:MM:SS), and — —:— —.30 for continuous frame output (HH:MM:SS.FF). Alternately, '25' may be displayed instead of '30' when using EBU timecode.

NOTE: while accessing the serial communications options, the UDT will automatically pause both channels and suspend all other timing operations.

3.6.2. Changing the Output Options

To change the output options, press the <+> (plus) key to step through the selections. Press the START/STOP key to accept a particular output option. This section may be exited at any time by again pressing the <Shift> and <7> key combination or Clear All.

3.6.3. RS-232 Wiring

UDT Pin	Description
24	Tx
25 – 32	Gnd

Table 3-5: RS-232 Wiring

3.6.4. RS-422 Wiring

UDT Pin	Description
5	Tx-
23	Tx+
25 – 32	Gnd

Table 3-6: RS-422 Wiring

3.7. CONNECTING TO IMAGE VIDEO CONSOLE

3.7.1. Default Settings

The default RS-422 settings are 9600, 7 data bits, even parity, 2 stop bits.

Pin Number	Description
1	Gnd
2	Rx-
3	Tx+
4	Tx common
6	Rx common
7	Rx+
8	Tx-
9	Gnd

Table 3-7: Pin Out Definitions

3.8. PROTOCOL TRANSLATION CONFIGURATION

The 7700PTX-MVP must be rebooted for any protocol translation parameter changes to take effect.

3.8.1. Incoming Ports

The 7700PTX-MVP can receive data on its serial ports, GPIs, or Ethernet port. Incoming protocol translation configuration specifies which protocols, if any, will be received on a particular 7700PTX-MVP port.

3.8.1.1. Serial

The serial ports of the 7700PTX-MVP support the following incoming protocols:

- None (off)
- Up/Down Timer
- Image Video
- TSL
- Buftek Crosspoint UMD

None indicates no protocol is to be received on the serial port – effectively rendering it off. Thus, in order to enable a serial port to receive incoming data a protocol other than *None* needs to be selected.

As an example, suppose we have the setup of Figure 3-7:

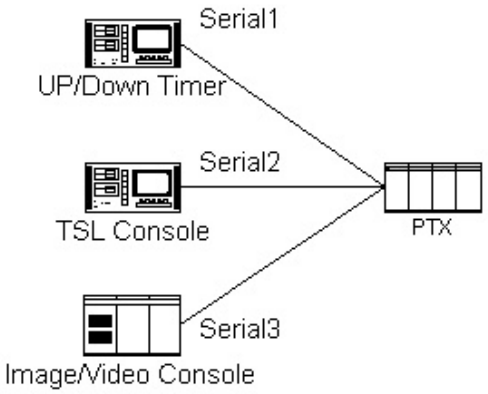


Figure 3-7: Incoming Serial Port Example Setup

The corresponding incoming serial port translation configuration would be:

Port	Protocol
1	Up/Down Timer
2	TSL
3	Image Video
4	None

Table 3-8: Serial Port Translation Configuration

3.8.1.2. General Purpose Inputs

As shown in Figure 3-8, the 7700PTX-MVP has 20 general-purpose inputs. Each input has an internal pull-up resistor.

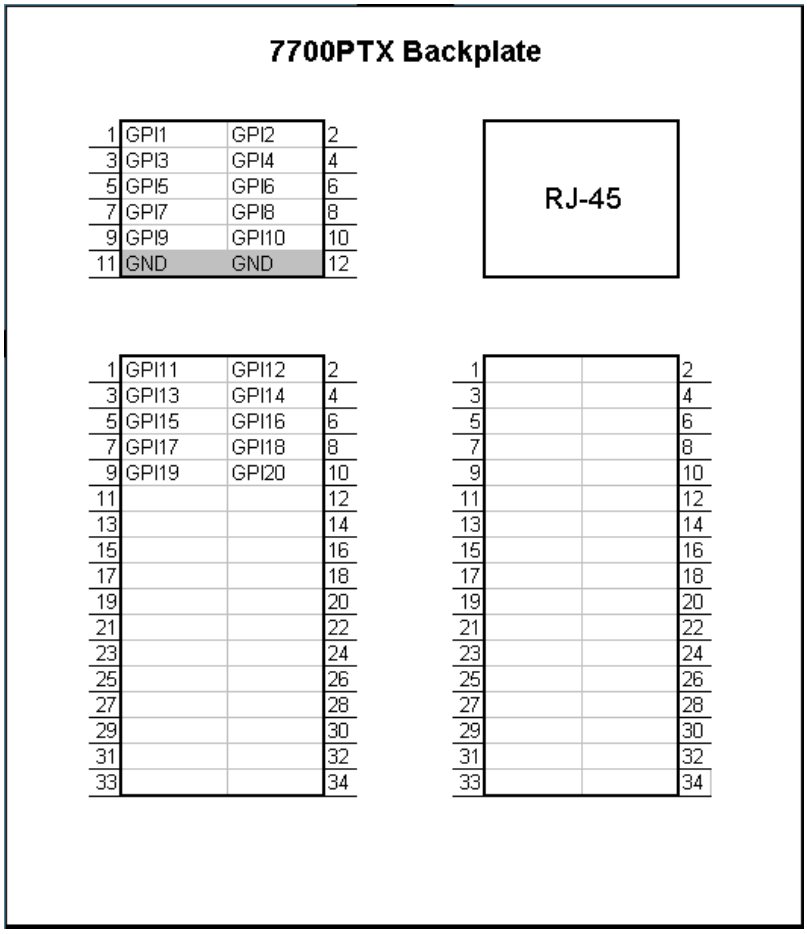


Figure 3-8: GPI Pins

To enable GPI signal monitoring the protocol associated with the GPIs must be set to *GPI*. If set to *None*, GPI monitoring will not occur. The *Virtual Offset* field represents the offset added to the physical GPI pin number when determining the Virtual GPI (VGPI) pin number. The states of the VGPI pin numbers are transmitted to the MVP. If more than 20 VGPIs are required, then more than 1 7700PTX-MVP is required – each with a unique *Virtual Offset*.

Physical GPI Number	Virtual Offset	Virtual GPI Number
1	0	1
2	20	22
3	40	43
4	0	4

Figure 3-9: Virtual GPI Numbers

By default, each GPI pin has an *Active Low* setting of *n* or *no*. The association between the GPI pin signal, *Active Low* setting, and VGPI state is summarized in Table 3-9.

GPI Pin Signal	Active Low Field Setting	Virtual GPI State
Low	n	Off
Low	y	On
High	n	On
High	y	Off

Table 3-9: VGPI States

Typically, a GPI pin connects to a contact closure which is tri-stated when off and drives 0 volts when on. For this scenario, the Active Low field should be set to *yes*.

3.8.1.3. Ethernet

From an incoming perspective, the Ethernet port can receive data over a maximum of four TCP ports. These are referred to as *Ethernet Sub-Ports*. Thus, the 7700PTX-MVP can receive TCP data from up to 4 different hosts – one for each Sub-Port.

An incoming Ethernet Sub-Port has the following parameters:

- IP Address of host
- TCP port over which data will be received by the 7700PTX-MVP
- Type of protocol

The Ethernet Sub-Ports of the 7700PTX-MVP support the following incoming protocols:

- None (off)
- Up/Down Timer
- Image Video
- TSL
- Buftek Crosspoint UMD

None indicates no protocol is to be received on the Sub-Port port – effectively rendering it off. Thus, in order to enable a Sub-Port port to receive incoming data, the following parameters must be configured:

- A protocol other than *None*
- The IP address of the transmitting host
- The TCP port to which the transmitting host is sending the data

As an example suppose we have the setup of Figure 3-10 where an Image Video console with an IP address of 192.168.18.22 transmits data to the 7700PTX-MVP over TCP port 9800:

Figure 3-10: Incoming Ethernet Sub-Port Example

The corresponding Ethernet Sub-Port 1 incoming protocol translation configuration would be:

- IP Address: 192.168.18.22
- TCP Port: 9800
- Protocol: Image Video

3.8.2. Outgoing Ports

The 7700PTX-MVP can transmit Image Video data over its serial and Ethernet ports.

3.8.2.1. Serial

No special configuration is required to enable a serial port to transmit data.

The PPV receiving serial data from the 7700PTX-MVP must be configured to receive Image Video over a serial UMD connection.

3.8.2.2. Ethernet

The 7700PTX-MVP can transmit data for up to 12 peers. Thus, the 7700PTX-MVP supports up to a maximum of 12 outgoing Ethernet Sub-Ports. In order to transmit data to a peer, the following Sub-Port parameters must be configured:

Parameter	Description
IP Address	IP address of peer to receive data
TCP Port	TCP port over which the outgoing data is to be sent. Any TCP port can be configured, however, it is suggested that 9800 – 9812 be used. This value must match that configured on the peer.

Table 3-10: Outgoing Ethernet Sub-Port Configuration Parameters

The PPV that receives TCP data from the 7700PTX-MVP must be configured to receive Image Video over a network connection and to have a TCP port which matches that configured on the 7700PTX-MVP Sub-Port.

As an example, suppose we have the 7700PTX-MVP set to transmit data to a PPV (IP address 192.168.18.50) listening on TCP port 9800 for Image Video data:

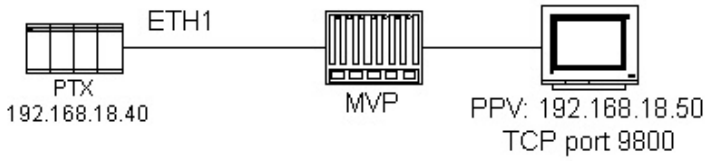


Figure 3-11: Outgoing Ethernet Sub-Port Example

The corresponding configuration for outgoing Ethernet Sub-Port 1 would be:

- IP Address: 192168.18.50
- TCP Port: 9800

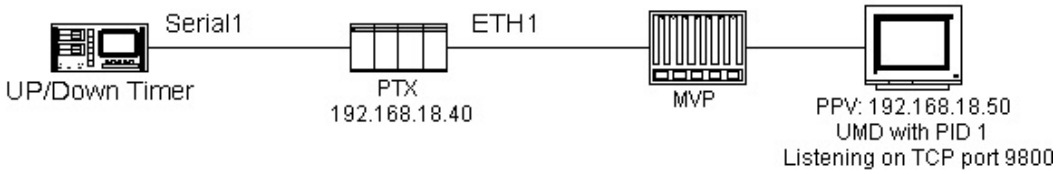
3.8.3. Route Configuration

Each incoming port/sub-port has a table of routes that specify to which outgoing port/sub-port the incoming data is destined.

3.8.3.1. Example 1

Suppose we have:

- An Up/Down timer connected to serial port 1
- Its output is intended for a PPV with a single UMD with PID 1
- A PPV configured to receive Image Video data over TCP port 9800



The Serial 1 route configuration would be:

Route Number	Outgoing Port	Outgoing Sub-Port	Display ID
1	Eth1	1	1

Note: The Up/Down timer protocol provides no addressing. Thus, it must be configured via the Display ID field. For the Up/Down protocol, the Display ID field must match the PID (Protocol ID) associated with the UMD. The Display ID field takes 1 of 3 formats:

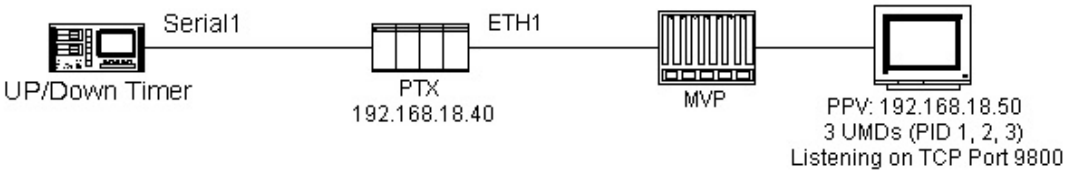
- An individual display
- A group of displays
- All displays

Display IDs must be configured when using the Up/Down timer protocol.

3.8.3.2. Example 2

Suppose we have:

- An up/down timer connected to serial port 1
- Its output is intended for two UMDs (PIDs 1 and 2) of a PPV with three UMDs
- A PPV configured to receive Image Video data over TCP port 9800



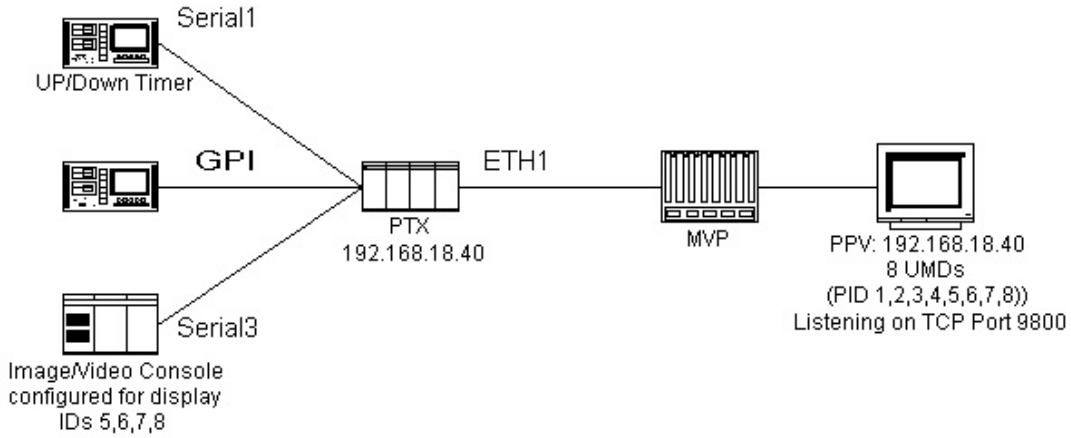
Serial 1 route configuration would be:

Route Number	Outgoing Port	Outgoing Sub-Port	Display ID
1	Eth1	1	1,2

3.8.3.3. Example 3

Suppose we have:

- An up/down timer is connected to serial port 1
- Its output is intended for a 4 UMDs (PID 1, 2, 3, 4)
- A device connected to GPI pin 1
- An image video console, configured to send data to display ids 5, 6, 7, and 8 connected to serial port 3
- A PPV configured to receive Image Video data over TCP port 9800



The Serial 1 route configuration would be:

Route Number	Outgoing Port	Outgoing Sub-Port	Display ID
1	Eth1	1	1,2,3,4

The GPI route configuration would be:

Route Number	Outgoing Port	Outgoing Sub-Port	Display ID
1	Eth1	1	2000

NOTE: A Display ID is configured which corresponds to NO UMD PID. This prevents Virtual GPI data from interfering with the Up/Down timer and Image Video console data.

Display IDs must be configured when using GPIs.

The serial 3 route configuration would be:

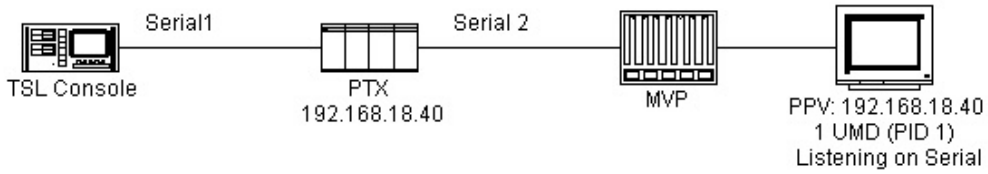
Route Number	Outgoing Port	Outgoing Sub-Port	Display ID
1	Eth1	1	

Since the Image Video protocol stream provides its own addressing, no display ID need be configured.

3.8.3.4. Example 4

Suppose we have:

- A TSL console configured to send output to address 1 is connected to serial port 1
- A PPV, configured to receive Image Video data over serial, connected to serial port 2



The serial 1 route configuration would be:

Route Number	Outgoing Port	Outgoing Sub-Port	Display ID
1	Ser2		

Since the TSL protocol stream provides its own addressing, no display ID's need to be configured.

4. TROUBLESHOOTING TIPS

4.1. CHECKING INCOMING COMMUNICATION

Once the incoming protocol translation configuration has been set for a given port, one can check if data is being received using the following method:

1. From the *Main Menu* select *Engineering/Debug*.
2. Select *Show task statistics*.
3. Under the heading *framer statistics…* you'll see a table whose rows correspond to each configured incoming port. Figure 4-1 shows an Up/Down timer configured on serial port 2 and an Image Video console on Ethernet Sub-Port 1.
4. The column labelled *in chars* reports the number, in hexadecimal, of protocol characters received by the 7700PTX-MVP. As per Figure 4-1, serial port 2 has received 0x24 protocol characters. Ethernet Sub-Port 1 has received no data since its *in chars* field is 0.

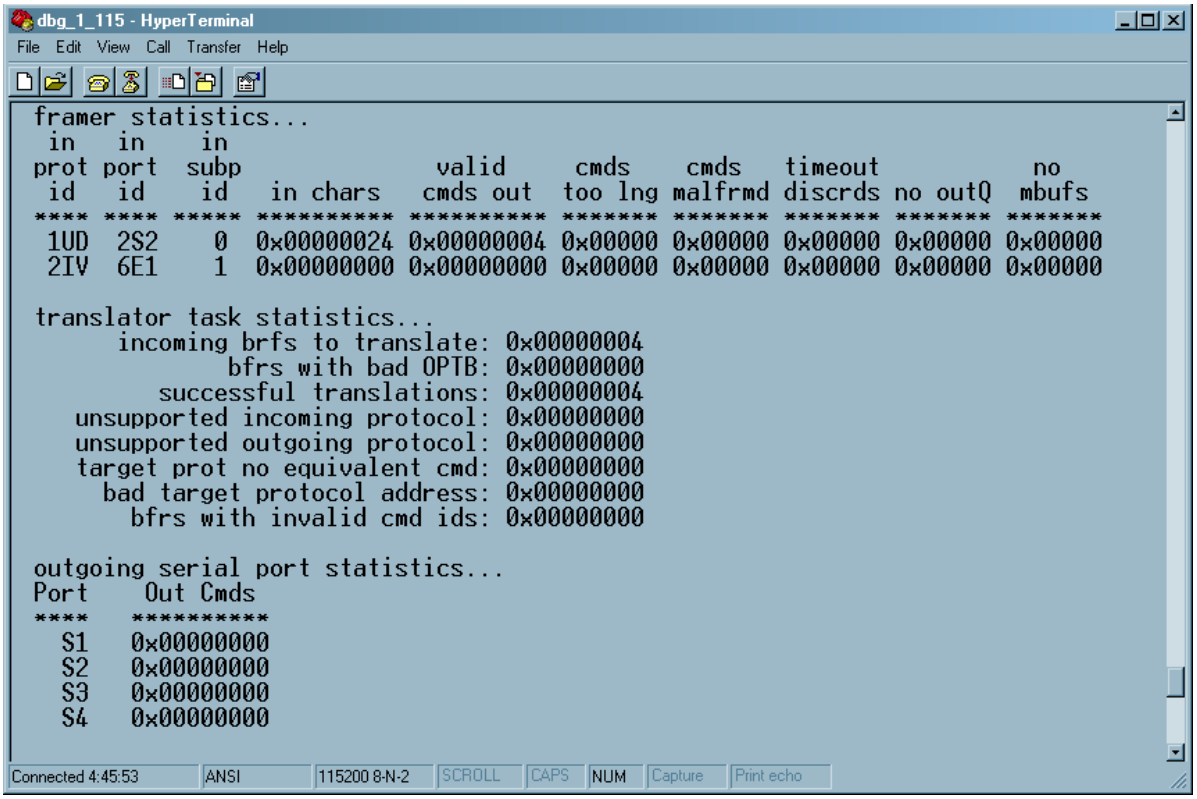


Figure 4-1: Incoming Communication

Generally speaking, *in chars* and *valid cmds out* should be non-zero. The remaining columns should be reported as 0.

If *in chars* is reported as 0 and you have an incoming serial connection configured:

- Verify that the cabling between the 7700PTX-MVP and OVE is correct
- Verify that the serial settings are correct
- Recall that any changes to serial settings require a reboot of the 7700PTX-MVP

If *in chars* is reported as 0 and you have an incoming Ethernet Sub-Port connection configured:

- Verify that the IP address and TCP port incoming protocol translation settings are correct
- Use a computer to ping both the 7700PTX-MVP and the host transmitting data to the 7700PTX-MVP.

4.2. CHECKING OUTGOING COMMUNICATION

4.2.1. Serial

Once the route for a given port has been configured to point to an outgoing serial port, one can check if data is being transmitted over that serial port using the following method:

1. From the *Main Menu* select *Engineering/Debug*.
2. Select *Show task statistics*.
5. Under the heading *outgoing serial port statistics…* you'll see a table whose rows correspond to each outgoing serial port (S1 – S4). Figure 4-2 provides an example.
3. The column *Out Cmds* lists, in hexadecimal, the number of commands the 7700PTX-MVP has sent out to each serial port.

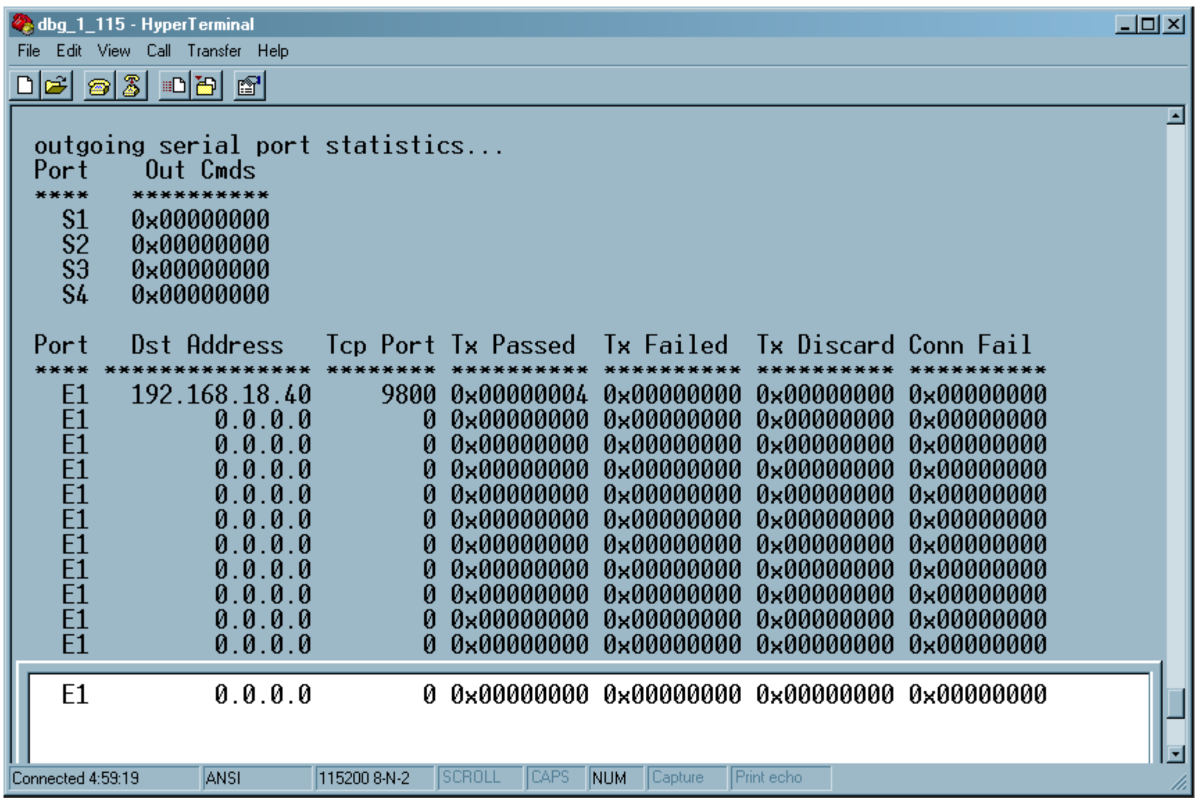


Figure 4-2: Outgoing Communication

If *Out Cmds* is reported as 0 when you expect a non-zero value:

- Confirm that at least on route points to the serial port in question
- Recall that any route changes require a reboot of the 7700PTX-MVP

4.2.2. Ethernet

Once the outgoing protocol translation has been configured to point to a peer and the route configuration for a given port has been set to point to an outgoing Ethernet Sub-Port, one can check if data is being transmitted over that Sub-Port using the following method:

1. From the Main Menu select Engineering/Debug.
2. Select Show task statistics.
3. Look for the table where the ports are listed as E1. Each entry in this table corresponds to an outgoing Ethernet Sub-Port. Figure 4-2 shows a peer whose IP address and TCP port correspond to 192.168.18.40 and 9800 respectively.
4. The column Tx Passed lists, in hexadecimal, the number of commands the 7700PTX-MVP has transmitted to that peer. Figure 4-2 indicates four packets have been sent to 192.168.18.40/9800.

If *Tx Passed* is reported as 0 when you expect a non-zero value:

- Confirm that the outgoing protocol translation configuration parameters are correct
- Confirm that the peer is ready to receive Image Video data over TCP. PPVs need to be rebooted in order for UMD configuration changes to take effect.
- Recall that changes to any protocol translation parameter requires a reboot of the 7700PTX-MVP for that parameter to take effect.
- Use a computer to ping the 7700PTX-MVP and the peer.

5. PERFORMING A FIRMWARE UPGRADE

There are two ways to upgrade PTX firmware:

5. Using FTP to perform the upgrade via TCP/IP. (*recommended procedure*)
6. Using a terminal application such as *HyperTerminal* to perform the upgrade via a serial connection.

5.1. FTP

1. Open a command prompt window (in Windows: Start/Programs/Accessories/Command Prompt)
2. Enter the location of the firmware file. For example, type *cd c:\temp*.
3. Enter the command *ftp* followed by the PTX IP address.
   For example, type *ftp –A 192.168.18.22*.
4. Enter the FTP command *put* followed by the firmware file name. For example, *put ptx.bin*.
5. When the transfer is complete enter the FTP command: *bye*.
6. Step 5 begins the process of saving the firmware to the non-volatile flash of the PTX. The save process is displayed as a percentage on the PTX LCD. Once the process is complete, the PTX LCD again displays the product name and firmware version.
7. Power off the PTX.
8. Power on the PTX.

5.2. SERIAL

1. Power off the PTX.
2. Connect an adapter cable to a PC running a console or terminal application, such as Windows *HyperTerminal*, to the PTX debug/monitor port.
3. Configure the port settings of the terminal program as follows:

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

4. Set the PTX run/upgrade jumper to the upgrade position.
5. Power on the PTX.
6. After a few moments, the prompt *PPCBOOT>* will appear. Enter the command *upload.*
7. Start the firmware upload on the terminal application (for instance, in *HyperTerminal* select Transfer/Send File…), use Xmodem as the transfer protocol, and select the firmware file. For example, *ptx.bin.*
8. Once the upload is complete the message *upload okay* is displayed.
9. Power off the PTX.
10. Set the PTX run/upgrade jumper to the run position.
11. Remove the serial adapter cable.
12. Power on the PTX.

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