TABLE OF CONTENTS

Figures

Tables

Revision History

Version	Description	Date
Rev 1	Build 53	Sep 05

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1. OVERVIEW

The 7700PTX-RCL is a network-controlled protocol translator designed to translate SNMP or TCP application commands into GVG Router Control Language (RCL) protocol packets. Translated packets are transmitted to one of up to four Encore controllers.

The 7700PTX-RCL can communicate with the Encore controller in two ways: over a serial link or over a TCP/IP link. Figure 1-1 shows how the 7700PTX-RCL is typically set up.

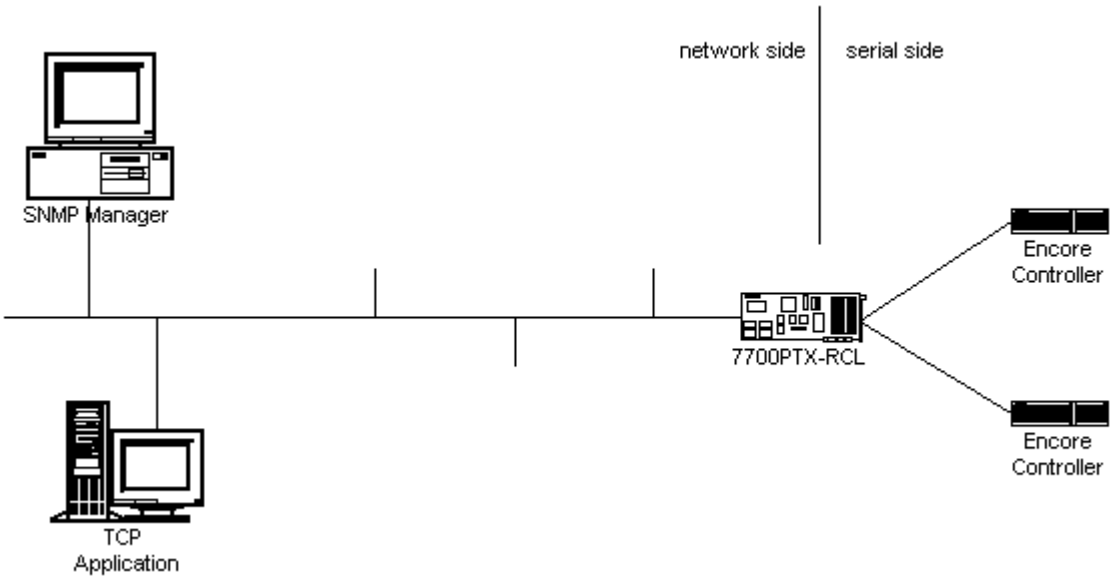


Figure 1–1: Typical 7700PTX-RCL Setup

2. BASIC CONFIGURATION

2.1. Configuration Steps

1. Using the adapter cable provided, connect a PC running a console application, such as Windows *HyperTerminal*, to the 7700PTX-RCL debug/monitor port
2. Power on the 7700PTX-RCL
3. Configure the 7700PTX-RCL network parameters
4. Decide whether or not the 7700PTX-RCL will communicate with the Encore controller via a serial or Ethernet link
5. For serial communication, configure the parameters of each serial port of the 7700PTX-RCL to match those of the SIO port(s) of the Encore controller. Configure the 7700PTX-RCL to act as a serial RCL client
6. For Ethernet communication, configure on the 7700PTX-RCL the IP address of the Encore controller, and configure the 7700PTX-RCL to act as an Ethernet RCL client
7. Power off the 7700PTX-RCL
8. If the 7700PTX-RCL is to act as a serial RCL client, physically wire its serial port(s) to the SIO port(s) of the Encore controller
9. Power on the 7700PTX-RCL

For detailed instructions on configuring serial and network connections please see Chapter 5

2.2. Card Edge Controls

2.2.1. Determining Current Settings

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

2.2.2. Clearing Previous Settings

To clear ALL current settings, apply power to the card while holding the toggle switch UP. The Red LED (the left of the two LEDs) will light. When the Red LED is off and the Green LED (the right of the two LEDs) lights, the settings have been cleared, and you can enter your new settings.

2.2.3. Card Edge LEDs

LED 15 (when facing the card edge, on the left side; sixth from the top) is lit when Ethernet activity is detected.

All other card edge LEDs are for factory use only.

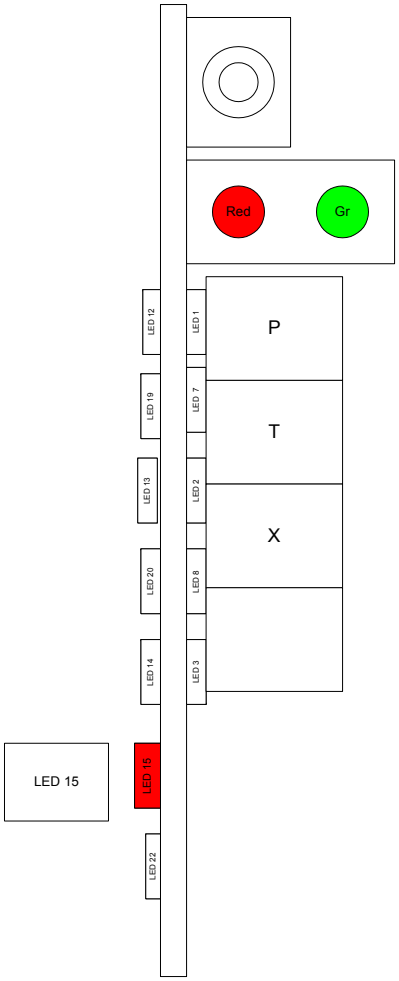


Figure 2–1: PTX Upper Card Edge

2.3. Debug/Monitor Serial Port Settings

The 7700PTX-RCL is configured via the debug/monitor serial port the header of which is labeled *J1*. A special adapter cable allows the 7700PTX-RCL to connect to a PC. The terminal application (for instance *HyperTerminal* in ANSIW emulation mode) should use the serial port settings given in Table 2-1.

Setting	Value
Baud rate	115,200
Number of data bits	8
Parity	None
Number of stop bits	2

Table 2–1: Debug/Monitor Serial Port Settings

2.4. Main Menu

Table 2–2 lists the entries available in the 7700PTX-RCL 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 which connect to the SIO ports of the Encore controller
3	SNMP Setup	IP address of SNMP manager(s) to receive traps
4	RCL Protocol Settings Setup	Settings specific to the Router Control Language (RCL) protocol
5	Under Monitor Display Setup	IP address and TCP port of PPV to receive the label of the source associated with a particular output
6	Engineering/Debug	Used for troubleshooting

Table 2–2: 7700PTX-RCL Main Menu

2.5. Network Configuration

To configure the network settings of the 7700PTX-RCL, select *Network Configuration* from the *Main Menu*. If DHCP is desired, set the *Use DHCP* field to *true*.

Otherwise, the IP address, subnet mask, and gateway (if any) must be input, and the *Use DHCP* field set to *false*.

Once the network settings are configured be sure to select *Save and Exit* before exiting *Network Configuration*; otherwise select *Exit*.

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

During normal operation, press down the card edge toggle switch to view the IP address on the card edge LCD.

2.6. Serial Port Setup

A serial port connects to one of the SIO ports of the Encore controller. The serial port settings must match those of the SIO port to which it is connected. Table 2–3 lists the parameters associated with the serial ports of the 7700PTX-RCL

Parameter	Notes
Baud Rate	115200
Data Bits	8
Parity	N
Stop Bits	2
Standard	For serial port 4, only RS-232 is valid.

Table 2–3: Serial Port Parameters

2.7. Serial Port Wiring

The back plate connections of the 7700PTX-RCL are shown in Figure 2–2.

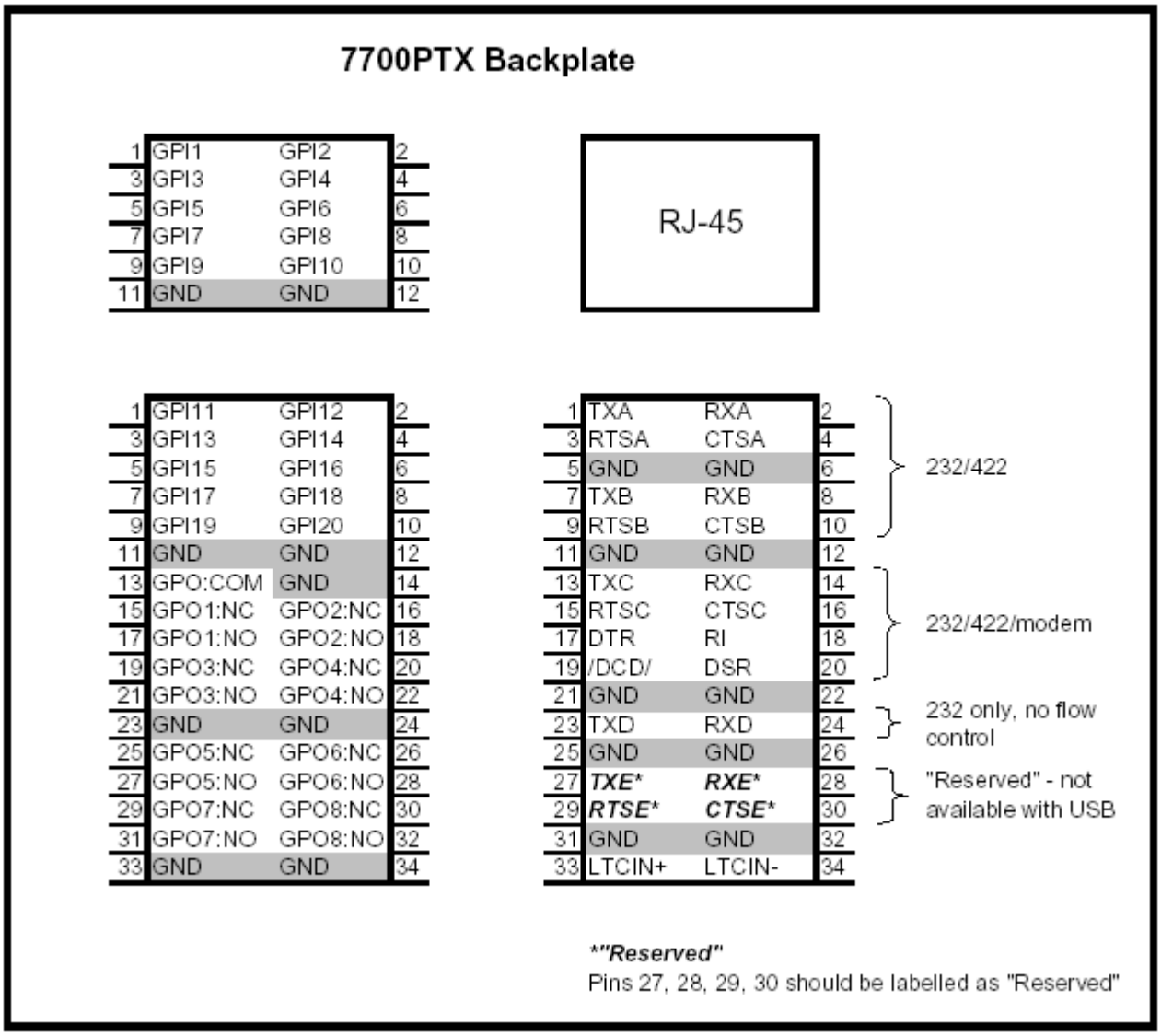


Figure 2–2: Back Plate Connections

In the figure, the serial ports located under the RJ-45 block are labeled A – D. These correspond to serial ports 1 – 4. Serial port E is currently not in use.

2.7.1. RS-232 Wiring

7700PTX-RCL Pin	SIO Controller Pin
Tx	Rx
Rx	Tx
Gnd	Gnd

Table 2–4: RS-232 Wiring

2.7.2. RS-422 Wiring

7700PTX-RCL Pin	SIO Controller Pin
Tx (tx-)	Rx-
Rts (tx+)	Rx+
Gnd	Rx common
Rx (rx-)	Tx-
Cts (rx+)	Tx+
Gnd	Tx common

Table 2–5: RS-422 Wiring

2.8. RCL Client Type Setup

The Encore controller is a RCL server. The 7700PTX-RCL is a RCL client. There are 2 types of RCL clients: serial and Ethernet. The 7700PTX-RCL supports both client types, but not simultaneously. The default setting is a serial RCL client.

2.8.1. Enabling Ethernet RCL Client

To enable the 7700PTX-RCL to act as an Ethernet RCL client that communicates with the Encore controller over TCP, use the following steps:

1. From *Main Menu* select *RCL Protocol Settings Setup*
2. Select *Enable Ethernet RCL client*
3. Select *RCL Ethernet Settings Setup*
4. Select *RCL server IP address/TCP port setup*
5. From R*CL server IP address/TCP port setup*, select *Set Encore IP address*
6. Enter the IP address of the Encore controller
7. Select *Save* and *Exit*
8. The 7700PTX-RCL must be rebooted for the client type changes to take effect.

2.8.2. Enabling Serial RCL Client

To enable the 7700PTX-RCL to act as a serial RCL client use the following steps:

1. From *Main Menu* select *RCL Protocol Settings Setup*
2. Select *Enable serial RCL client*
3. The 7700PTX-RCL must be rebooted for the client type changes to take effect

3. EXTENDED CONFIGURATION

Section 2 covers the steps required to configure the 7700PTX-RCL for most installations. However, further configuration is available for extended features.

3.1. SNMP Setup

The 7700PTX-RCL monitors its ability to communicate with an Encore controller. It can communicate the communication status with an SNMP manager via traps. If this functionality is desired then the IP addresses of any SNMP managers can be added (or removed) via the *SNMP Setup* entry of the *Main Menu*. Once an SNMP manager is added or removed, the setting takes effect immediately – no reboot is required.

By default, no SNMP manager IP addresses are configured.

3.2. RCL Protocol Settings Setup

3.2.1. Level Bitmap

When configured, the 7700PTX-RCL includes a level bitmap with the appropriate commands it transmits to the Encore controller. The level bitmap is a 32-bit quantity in which each bit specifies the presence (bit = 1) or absence (bit = 0) of a particular level. If no level bitmap accompanies a command that supports it, then all levels are used.

By default the 7700PTX-RCL does not use a level bitmap. If a level bitmap is required it can be configured on a per-port basis:

3.2.1.1. Serial RCL Client

1. From *Main Menu*, select *RCL Protocol Settings Setup*
2. Select *RCL Serial Settings Setup*
3. Select *RCL Protocol Setup For Port 1* (if the Encore controller is connected to the 7700PTX-RCL second serial port then select *RCL Protocol Setup For Port 2*)
4. Select *Set level bitmap usage*
5. Select *y* when prompted
6. From *RCL Protocol Setup For Port 1* use *Set individual level* and *Set all levels* to set/clear the appropriate levels in the bitmap
7. Select *Save and Exit* to start using the level bitmap. No reboot of the 7700PTX-RCL is required

3.2.1.2. Ethernet RCL Client

1. From *Main Menu* select *RCL Protocol Settings Setup*
2. Select *RCL Ethernet Settings Setup*
3. Select *RCL Protocol Setup For Port 1*
4. Select *Set level bitmap usage*
5. Select *y* when prompted
6. From *RCL Protocol Setup For Port 1* use *Set individual level* and *Set all levels* to set/clear the appropriate levels in the bitmap
7. Select *Save and Exit* to start using the level bitmap. No reboot of the 7700PTX-RCL is required

3.2.2. Areas

The maximum number of router sources and destinations supported on a per-port basis are shown in Table 3–1.

Port	Maximum Number of Sources	Maximum Number of Destinations
Serial 1	4096	2048

Serial 2	4096	2048
Serial 3	4096	2048
Serial 4	4096	2048
Ethernet	4096	2048

Table 3–1: Supported Number of Router Sources/Destinations

Should the total number of sources and/or destinations configured on the router exceed these limits, configure area names on the 7700PTX-RCL.

The Encore controller can partition the router system into smaller units called areas with each area having some user-assigned name. The 7700PTX-RCL can manage up to 16 different areas. The 7700PTX-RCL manages all areas (the default) when no area names are specified.

Configure Area names on the 7700PTX-RCL as follows:

3.2.2.1. Serial RCL Client

1. From *Main Menu* select *RCL Protocol Settings Setup*
2. Select *RCL Serial Settings Setup*
3. Select *RCL Protocol Setup For Port 1* (if the Encore controller is connected to the 7700PTX-RCL second serial port the *RCL Protocol Setup For Port 2* would be selected)
4. From *RCL Protocol Setup For Port 1* use *Add/edit area name* and *Remove area name* to configure the areas of interest
5. If you do not wish the 7700PTX-RCL to report area names to VLPro or to propagate them to UMDs, select *Set area name reporting usage* and then select *y*
6. Select *Save And Exit* to start using the configured area names. No reboot of the 7700PTX-RCL is required

3.2.2.2. Ethernet RCL Client

1. From *Main Menu* select *RCL Protocol Settings Setup*
2. Select RCL Ethernet Settings Setup
3. From *Protocol Setup For Port 1* use *Add/Edit area name* and *Remove area name* to configure the areas of interest
4. If you do not wish the 7700PTX-RCL to report area names to VLPro or to propagate them to UMDs, Select *Set area name repo*rting usage and then select *y*
5. Select *Save And Exit* to start using the configured area names. No reboot of the 7700PTX-RCL is required

3.3. Under Monitor Display Setup

The 7700PTX-RCL has the ability to transmit router source label information to the UMDs of up to 12 PPVs. As an example, suppose we have the setup of Figure 3–1

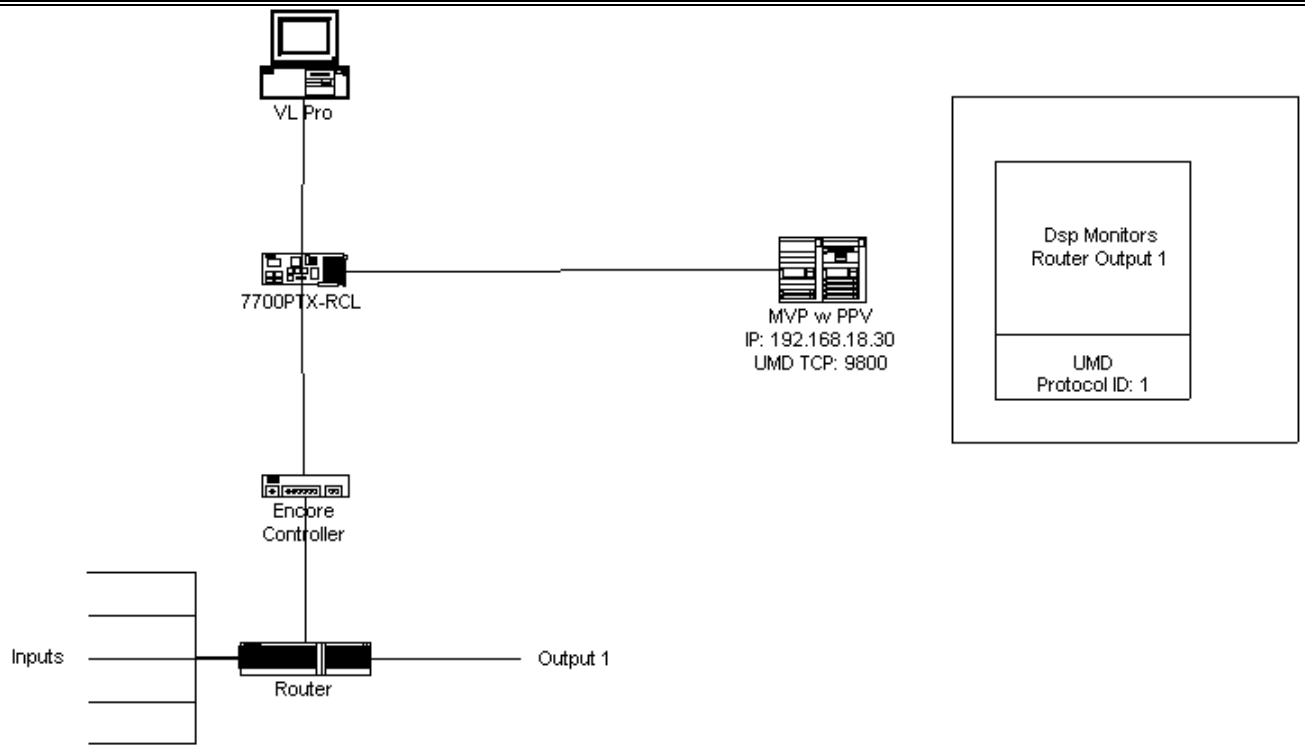


Figure 3–1: UMD Example

Where:

- A router has several 5 inputs connected and 1 output (labeled *Output 1*)
- A 7700PTX-RCL monitors the router for cross point changes
- An MVP contains a PPV with IP address 192.168.18.30
- The PPV is set to receive UMD data via the *Image Video* protocol over TCP (TCP port is configured at 9800)
- The PPV drives a single display monitoring router Output 1; the display contains a UMD with protocol ID (PID) set to 1
- A PC running VistaLINK® Pro (VLPro) is used to configure the 7700PTX-RCL so that the UMD PID associated with router Output 1 matches the PID of the UMD (ie: 1)

The *Under Monitor Display Setup* menu allows the configuration of the IP address and TCP port of the PPV to receive router source label information. In keeping with the above example, the 7700PTX-RCL would be configured to have a peer 1 IP address of *192.168.18.30* and a TCP port of *9800*. When router Input 1 is on Output 1, the UMD of the display should display *Input 1*. If the cross point is switched to Input 3, the UMD should display *Input 3*.

4. DEBUG TIPS

4.1. Statistics

The 7700PTX-RCL tracks a wide variety of statistical information. These statistics are viewed via the *Show task statistics* entry of the *Engineering/Debug* menu. Some of these statistics are discussed briefly below.

4.1.1. Serial Port Activity

4.1.1.1. Incoming

An example of incoming serial port activity is represented by the following:

```
Framer statistics...
  in      in     in
prot   port   subp                          valid       cmds      cmds     timeout                 no
  id      id     id        in chars       cmds out    too lng  malfrmd  discrds    no outQ  mbufs
**** **** ***** ********** ********** ******* ******* ******* ******* *******
 9RC  1S1        0  0x00000003 0x00000001 0x00000 0x00000 0x00000 0x00000 0x00000
 9RC  2S2        0  0x00000003 0x00000001 0x00000 0x00000 0x00000 0x00000 0x00000
 9RC  3S3        0  0x00000003 0x00000001 0x00000 0x00000 0x00000 0x00000 0x00000
 9RC  4S4        0  0x00000003 0x00000001 0x00000 0x00000 0x00000 0x00000 0x00000
```

An example of incoming Ethernet activity is represented by the following:

```
Framer statistics...
  in      in     in
prot   port   subp                          valid       cmds      cmds     timeout                 no
  id      id     id        in chars       cmds out    too lng  malfrmd  discrds    no outQ  mbufs
**** **** ***** ********** ********** ******* ******* ******* ******* *******
 9RC  6E1        1  0x00000003 0x00000001 0x00000 0x00000 0x00000 0x00000 0x00000
```

These statistics are described in Table 4–1.

Parameter	Notes
In prot id	The router protocol expected on this serial port displayed in both a numeric (9) and textual (RC) format.
In port id	The port identifier in both numeric (1 – 4 for serial, 6 for Ethernet) and textual (S1 – S4 for serial, E1 for Ethernet) format.
In subp id	The sub-port identifier. Serial ports do not require a sub-port ID so this value should be 0.
In chars	The number of alpha-numeric characters received from the Encore controller. If a controller is connected and this value is 0 it may mean: The serial port configuration is incorrect The serial port wiring is incorrect The RCL client is not configured on the Encore controller.
Valid cmds out	The number of full Encore packets received by the 7700PTX-RCL.
Cmds too long	The number of Encore packets received that were too long. Typically, this field should be 0. If not, it may indicate bad wiring or incorrect serial port settings.
Cmds malfmd	The number of bad Encore packets received by the 7700PTX-RCL. Typically, this field should be 0 during normal router operation. If not, it may indicate bad wiring or incorrect serial port settings.
Timeout discards	The number of Encore packets discarded due to inactivity. This value gets incremented if part of a Encore packet is received. This value should normally be 0.
No outQ	This value should be 0.
No mbufs	The number of Encore packets discarded due to lack of internal storage on the 7700PTX-RCL. The value should normally be 0.

Table 4–1: Incoming Statistics

4.1.1.2. Outgoing

An example of outgoing serial port activity:

```
Outgoing serial port statistics...
Port    Out Cmds
****    **********
  S1    0x00000001
  S2    0x00000001
  S3    0x00000001
  S4    0x00000001
```

These statistics are described in Table 4–2.

Parameter	Notes
Port	The port identifier in textual (S1 – S4) format.
Out Cmds	The number of packets sent by the 7700PTX-RCL to the Encore controller.

Table 4–2: Outgoing Serial Port Statistics

An example of outgoing Ethernet activity:

```
Router ethernet statistics...
    data pkts tx (pass): 0x0000000e
    data pkts tx (fail): 0x00000000
```

These statistics are described in Table 4–3.

Parameter	Notes
data pkts tx (pass)	The number of packets successfully sent over TCP/IP by the 7700PTX-RCL to the Encore controller.
data pkts tx (fail)	The number of packets which failed to be sent over TCP/IP by the 7700PTX-RCL to the Encore controller.

Table 4–3: Outgoing Ethernet Port Statistics

4.2. Operational State

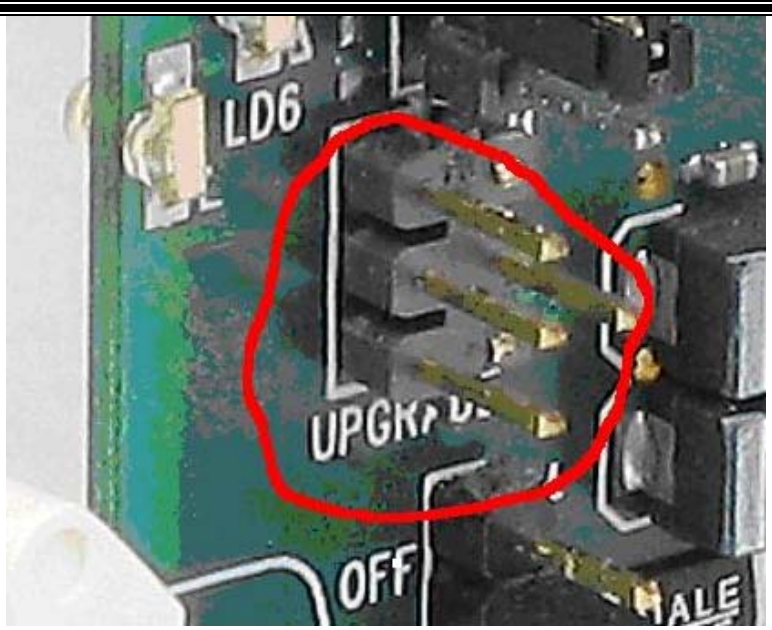
The state of the various 7700PTX-RCL tasks is accessed via the *Show task state entry* of the *Engineering/Debug* menu. Generally speaking, all tasks/statuses should report their status ready.

5. CONFIGURING NETWORK AND SERIAL CONNECTIONS

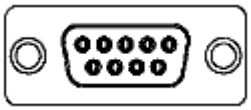
5.1. Making the Serial Connection

1. **Take 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.**



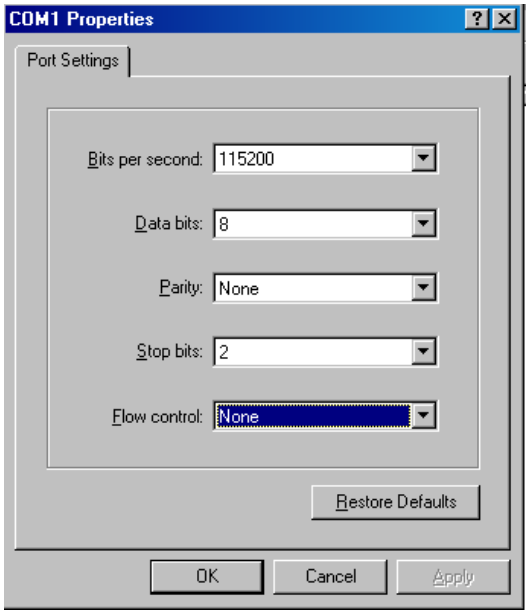
3. Connect the other end of the upgrade cable to the serial or COM port of the computer. This is commonly called a DB-9 connector.



5.2. Configuring the Serial Connection

1. On the Windows computer, click “Start”. A menu opens.
2. Click “Programs”. A menu opens.
3. Click “Accessories” A menu opens.
10. Click “Communications”. A menu opens.
11. Click “HyperTerminal”. A window opens.
12. Enter a name for your connection. Example: “PTX”.
13. Press the <Enter> key. A new “Connect To” window opens.

14. Enter country and area code details in the appropriate spaces. If COM1 is already taken for another device, choose COM2.
15. Press the <Enter> key or click OK. “HyperTerminal” and “Properties ”windows open.

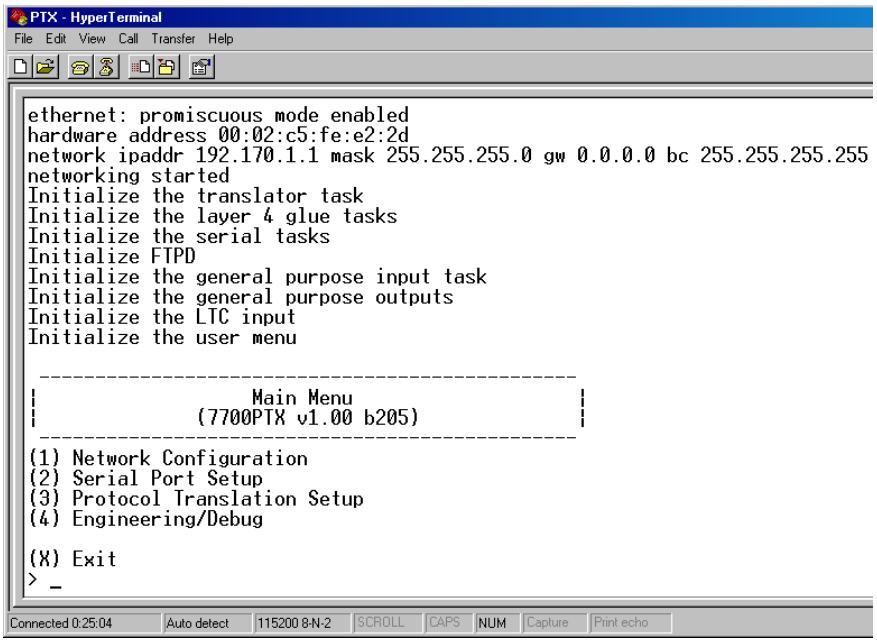


16. Enter the information as listed in the illustration above, the same as in the table below.

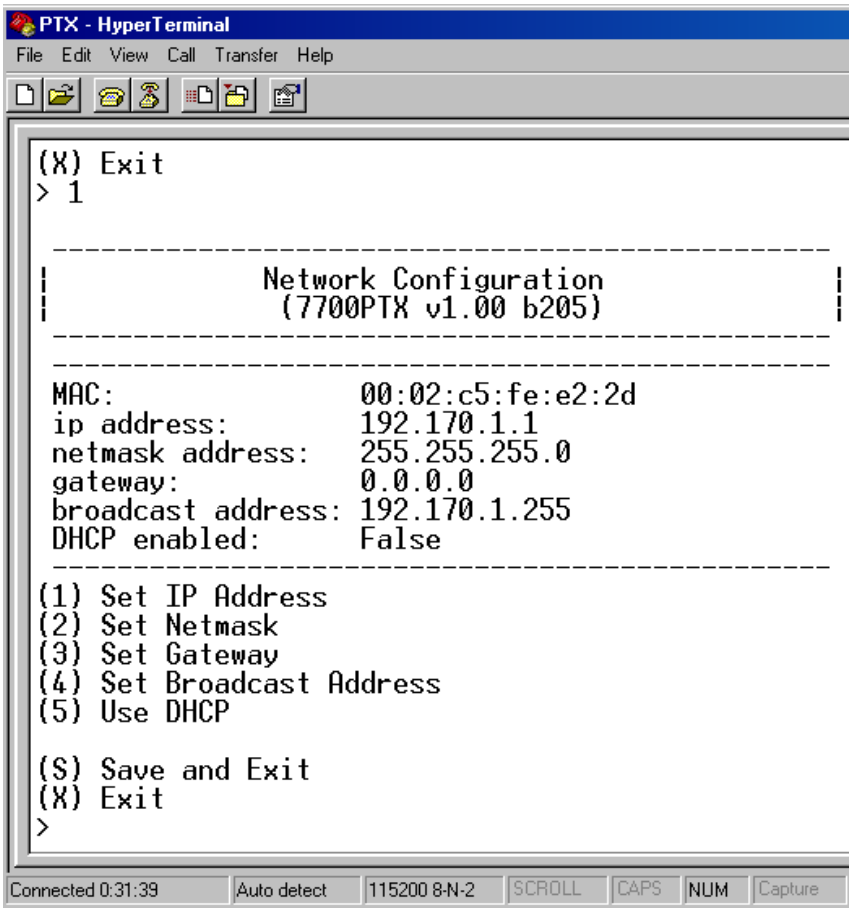
Baud	115200
Data bits	8
Parity	None
Stop bits	2
Flow Control	None

17. Press the <Enter> key or click OK. The “Properties” window closes, leaving the HyperTerminal window open.

18. Apply power to the card. The boot sequence is displayed in the HyperTerminal window.



19. Use the numbered menu on the HyperTerminal window to change settings. For example, press 1 and <Enter> to change the Network Configuration, including IP address, Net Mask, Gateway, and Broadcast Address, or to use DHCP.



5.3. Finding the Computer IP Address

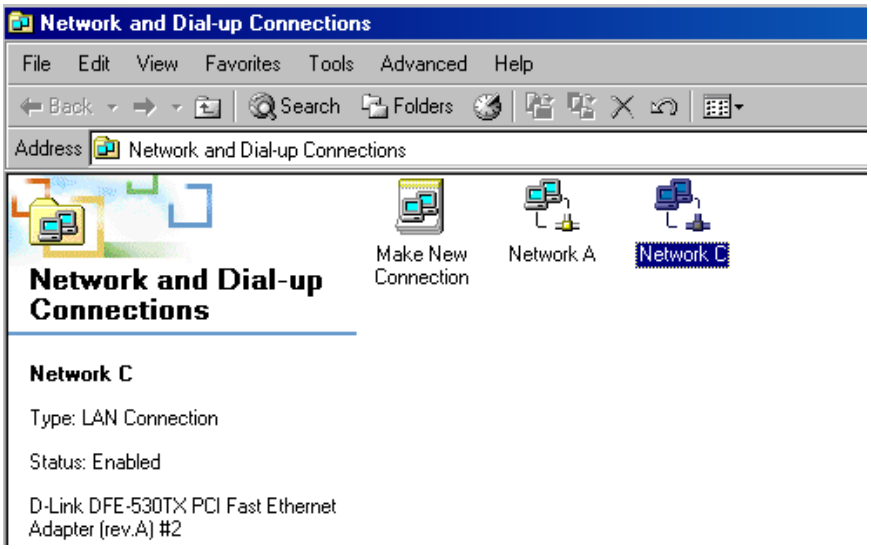
On a network, you might not have any control over what the IP address of your computer is. The following example is for Windows 2000, which may differ from other operating systems.

To learn the IP address of your computer in MSFT Windows 2000:

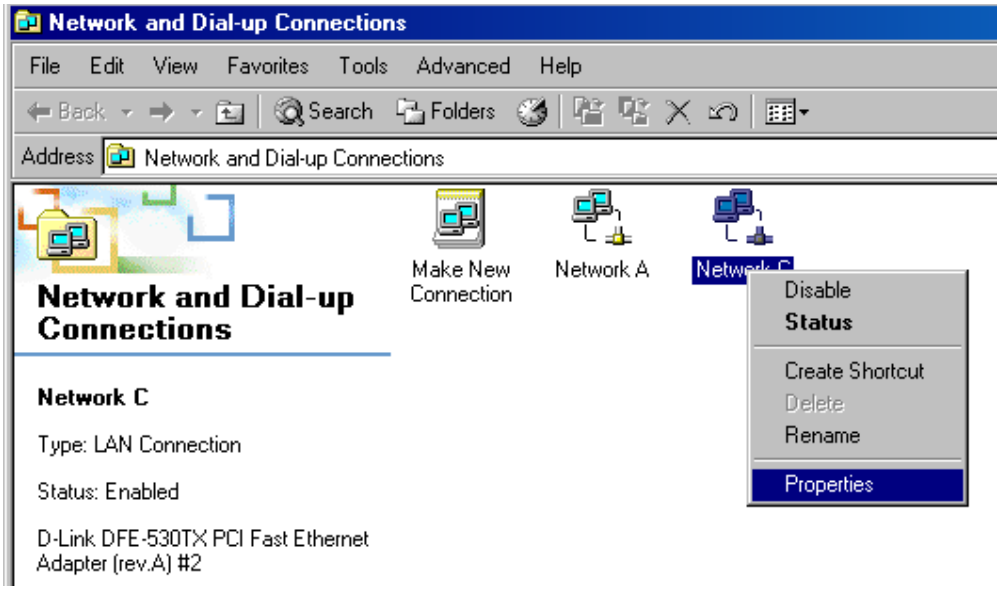
1. Click “Start”. A menu opens.
2. Click “Programs”. A menu opens.
3. Click “Accessories” A menu opens.
4. Click “Communications”. A menu opens.
5. Click “Network and Dial-up Connections”. A new pane opens. In the new pane will be icons, including one titled “Make a New Connection”. Your network card icon(s) should also be visible there.

If there is no network card icon, or none configured in the computer, please see your IT staff

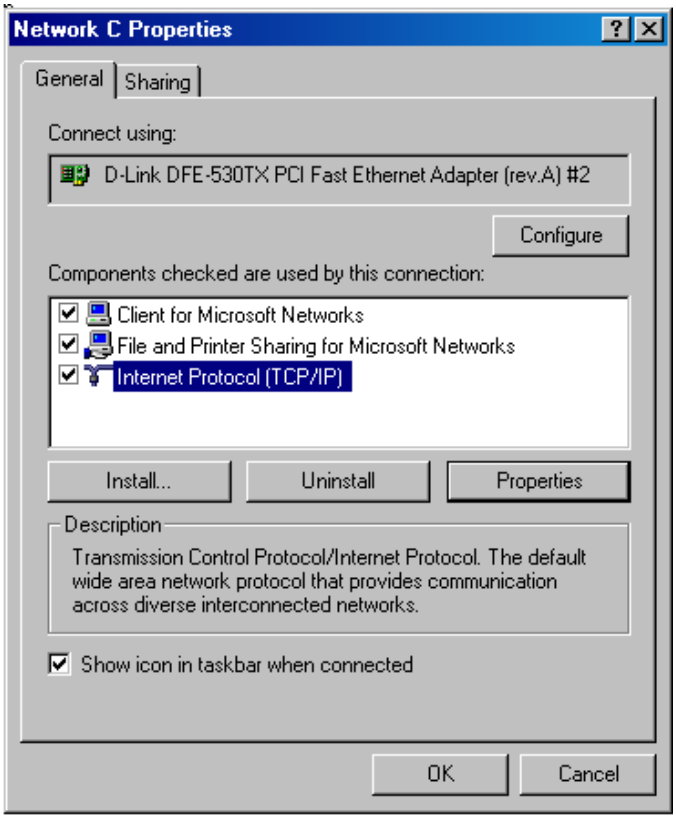
In the example below there are two Network Interface Cards. Network A is the corporate network, which we won't change. Network C is what we'll use to connect to the PTX.



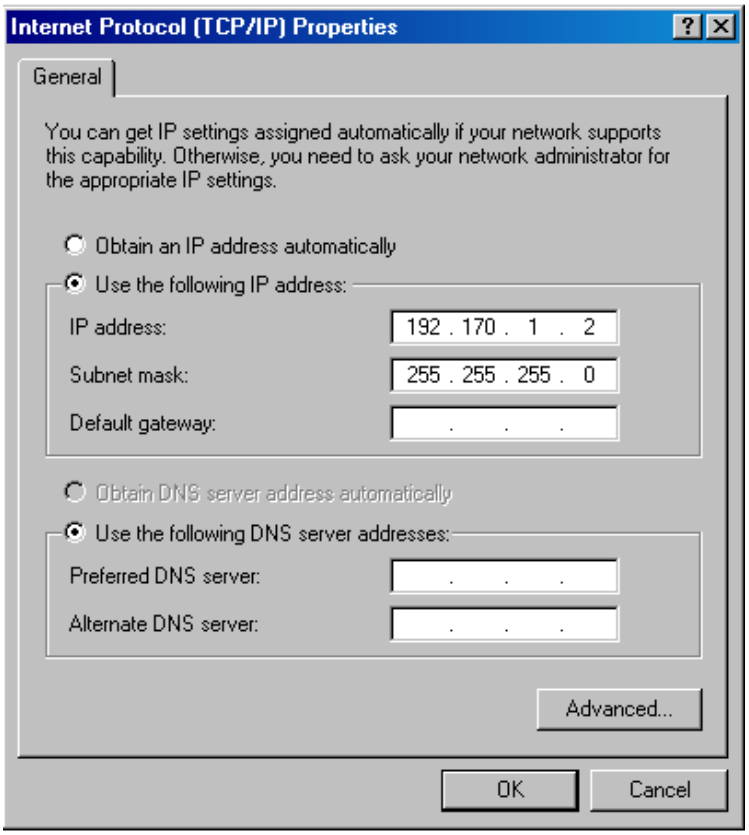
6. Highlight the icon of the NIC you wish to use to connect with the PTX.
7. Right click the icon. A menu opens.



8. Click "Properties". A Network Properties window opens.



9. Ensure a box next to “Internet Protocol (TCP/IP)” is checked, meaning it is installed. If TCP/IP is not installed in the computer, please see your IT staff.
10. Highlight “Internet Protocol (TCP/IP)”
11. Click on the PROPERTIES button. A TCP/IP Properties window opens.



12. View the IP Address provided. If no IP address is present, you must enter one, as you cannot obtain one automatically from the PTX.

5.4. Setting the Computer IP Address

13. In the “Properties” window, click the round box next to “Use the following IP address”.
14. Enter the IP address desired. Example: 192.170.1.2
15. Your PTX and NIC must be on the same subnet. If no number is already specified, enter 255.255.255.0 as the Subnet Mask.
16. Click OK. The TCP/IP Properties window closes.
17. Click OK. The Network Properties window closes.

During normal operation, press down the card edge toggle switch to view the IP address on the card edge LCD.

5.5. Testing an Ethernet Connection

Ping is a method of determining if a device is connected to a network. You can ping the addresses of your PTX and computer network interface cards.

1. Click Start. A menu opens
2. Click Run. A windowpane opens
3. Type “Cmd” and press enter. The Command Prompt windowpane opens.

4. At the Command Prompt, type *ping*, space, and the IP address of the device you are pinging. Press Enter. You should see the results of your ping in the command prompt window.

Once your computer NIC IP Address is correctly configured you can communicate with other devices on the network.

6. PERFORMING A FIRMWARE UPGRADE

There are two ways to upgrade PTX firmware:

1. Using a terminal application such as *HyperTerminal* to perform the upgrade via a serial connection
2. Using FTP to perform the upgrade via TCP/IP

FTP is recommended, as it is much quicker.

6.1. FTP

Suppose the PTX IP address is 192.168.18.22, its firmware file is called ptx.bin, and the firmware file is located in c:\temp.

1. Open a command prompt window (in Windows: Start/Programs/Accessories/Command Prompt)
2. Enter the command: *cd c:\temp*.
3. Enter the command: *ftp –A 192.168.18.22*.
4. Enter the FTP command: *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.

6.2. Serial

Suppose the firmware file is called ptx.bin:

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. Set the terminal application serial port settings to 115200 8 N 2.
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 firmware file 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.