

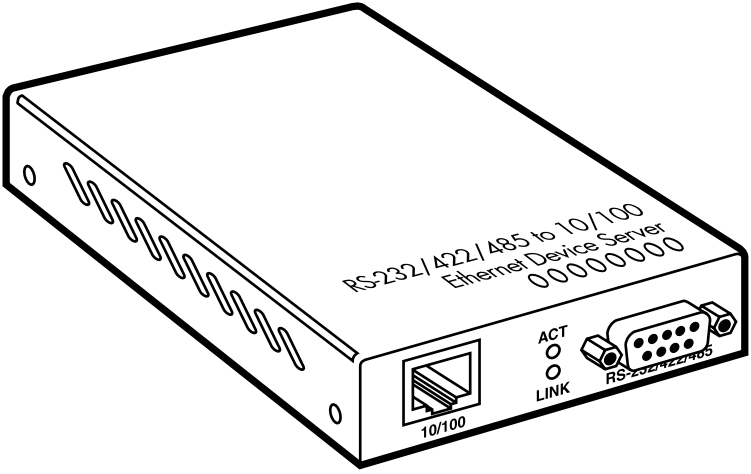


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Pure Networking RS-232/422/485 to Twisted-Pair Device Server



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This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

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Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

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This equipment complies with the requirements of the European EMC Directive 89/336/EEC.



**NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT**

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.
5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..
6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.
7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.
8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.
9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.
10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.
11. El aparato eléctrico deberá ser conectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra física y la polarización del equipo no sea eliminada.
13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.
14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.
15. En caso de existir, una antena externa deberá ser localizada lejos de las líneas de energía.
16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.
17. Cuidado debe ser tomado de tal manera que objetos líquidos no sean derramados sobre la cubierta u orificios de ventilación.
18. Servicio por personal calificado deberá ser provisto cuando:
 - A: El cable de poder o el contacto ha sido dañado; u
 - B: Objetos han caído o líquido ha sido derramado dentro del aparato; o
 - C: El aparato ha sido expuesto a la lluvia; o
 - D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o
 - E: El aparato ha sido tirado o su cubierta ha sido dañada.

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1. Specifications

Standards: IEEE 802.3 (10BASE-T Ethernet), IEEE 802.3u (100BASE-TX/Fast Ethernet), EIA/TIA RS-232, EIA/TIA-574

Data Rate: Twisted-pair: 100 Mbps; Serial: 50–115.2 kbps (asynchronous)

Maximum Distance: Twisted-pair: RS-232: Up to 328 ft. (100 m);
RS-422, RS-485: Up to 0.8 miles (1.2 km)

Signals: RS-232: TxD, RxD, CTS, RTS, DTR, DSR, RI, DCD, GND;
RS-422: TxD+, TxD-, RxD+, RxD-, GND;
RS-485: Data+, Data-, GND

Configuration: Parity: None, odd, even, mark, or space;
Data bits: 7, 8;
Stop bits: 1, 2

User Controls: DIP-switch 1: Enables/disables console/data communication mode;
DIP-switch 2: Enables/disables RS-232;
DIP-switch 3: Enables/disables RS-422/485 (4-wire);
DIP-switch 4: Enables/disables RS-485 (2-wire);
DIP-switch 7: Enables/disables termination (TMR)

Connectors: (1) RJ-45 female, (1) DB9 female

Indicators: (5) LEDs: Lnk/Act, Act, Sys, 100, Pwr

Temperature Tolerance: Operating: 32 to 122°F (0 to 50°C);
Storage: -4 to +158°F (-20 to +70°C)

Relative Humidity: Operating: 10 to 80%, noncondensing;
Storage: 5 to 90%, noncondensing

Power: 100–240 VAC (12-VAC adapter @ 0.8 amps); 50–60 Hz

Size: 2.3"H x 7.4"W x 10.9"D (5.8 x 18.8 x 27.7 cm)

Weight: 0.4 lb. (0.2 kg)

2. Overview

2.1 Introduction

The Pure Networking™ RS-232/422/485 to Twisted-Pair Device Server provides an RS-232/422/485 point-to-point connection over twisted-pair cabling. Each connected device has an RS-232/422/485 interface. The servers enable industrial serial devices such as milling machines, measurement instruments, and robots to connect to LAN-based automation. Other devices typically found on campus networks—such as card readers, code readers, lab equipment, medical equipment, and other similar serial devices—can now instantly migrate to a TCP/IP network.

The server has one RJ-45 connector for linking to twisted-pair cable.

The server works in 2-wire half-duplex (RS-485) and 4-wire full duplex (RS-422/485) asynchronous serial data transmission modes at data rates of up to 115.2 kbps. And it gives you extended distances up to 0.8 miles (1.2 km) over 24 AWG using RS-422/485.

A handy terminator feature improves signal quality and distance. Plus, LEDs give you device status at a glance.

2.2 Components

The server's front panel is shown in Figure 2-1. LED indicators display the server's and the network's status. Table 2-1 describes the server's front-panel indicators and connectors. The numbers in Figure 2-1 correspond to the numbers in Table 2-1.

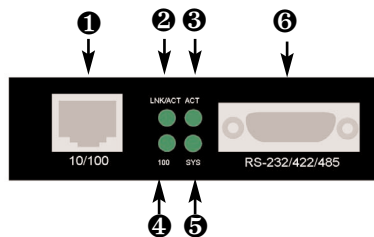


Figure 2-1. Front panel.

Table 2-1. Front-panel components.

Indicator or Connector	Function
❶ 10/100 Ethernet port	This port is an autosensing RJ-45 female
❷ Lnk/Act LED	When the Link/Act LED is on, the switch's respective port is connected to the network.
	When the Link/Act LED is blinking, the port is transmitting or receiving data on the Ethernet network.
	When the Link/Act LED is off, no link is connected.
❸ Act LED	When this LED is on, the server is receiving data packets.
	When this LED is off, the server is transmitting or receiving RS-232/422/485 data packets.
❹ 100 LED	When the 100 Mbps LED is on, the switch's respective twisted-pair port is connected to a Fast Ethernet network.
	When the 100 Mbps LED is off, the switch's respective port is connected to a 10-Mbps Ethernet port.
❺ Sys LED	When the CPU is working, the System LED blinks.
	When this LED is continuously on or off, the CPU is not working.
❻ DB9 female serial port	Connect the console to this port.

PURE NETWORKING RS-232/422/485 TO TWISTED-PAIR DEVICE SERVER

The server's rear panel is shown in Figure 2-2. Table 2-2 describes the server's rear panel switches, indicator, and connector. The numbers in Figure 2-2 correspond to the numbers in Table 2-2.

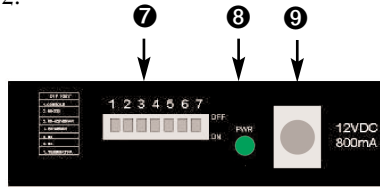


Figure 2-2. Rear panel.

Table 2-2. Rear-panel components.

Switch, Indicator, or Connector	Function
⑦ DIP switches	Set these switches to configure communication parameters (see Tables 3-2 and 3-3).
⑧ Power LED	This indicator lights when power to the server is on.
⑨ Power Input	Plug the power supply into this barrel power connector.

2.3 Typical Applications

Figure 2-3 shows a typical application. In this example, an RS-232/422/485 to Twisted-Pair Device Server connects to an industrial serial PC.

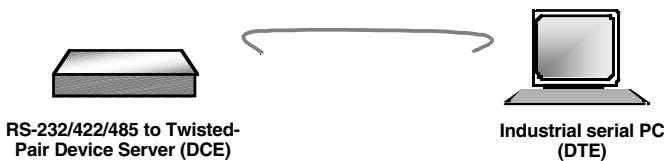


Figure 2-3. Female-to-male DCE to DTE wiring.

Table 2-3 shows the RS-232 wiring configurations for the application shown in Figure 2-3.

Table 2-3. RS-232 cable and connector pinnings for DCE to DTE wiring.

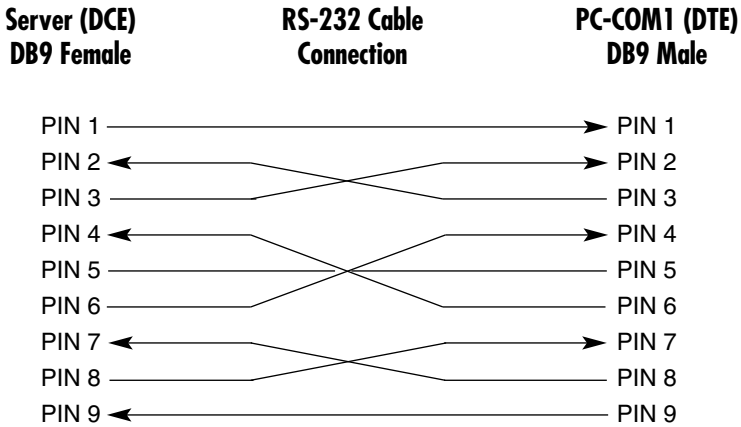


Figure 2-4 illustrates another sample application. In this figure, an RS-232/422/485 to Twisted-Pair Device Server (DCE) connects to an industrial DCE device.

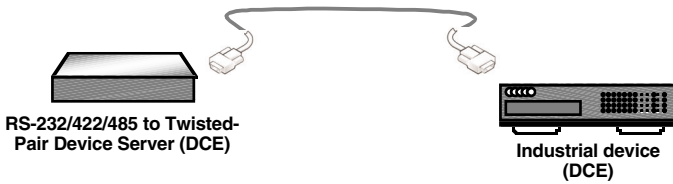


Figure 2-4. Female-to-male DCE to DCE wiring.

Table 2-4 shows the wiring configuration for the application shown in Figure 2-4.

PURE NETWORKING RS-232/422/485 TO TWISTED-PAIR DEVICE SERVER

Table 2-4. RS-232 cable and connector pinnings for DCE to DCE wiring.

Server (DCE) DB9 Female	RS-232 Cable Connection	DCE Device DB9 Male
PIN 1	←————→	PIN 1
PIN 2	←————→	PIN 2
PIN 3	←————→	PIN 3
PIN 4	←————→	PIN 4
PIN 5	←————→	PIN 5
PIN 6	←————→	PIN 6
PIN 7	←————→	PIN 7
PIN 8	←————→	PIN 8
PIN 9	←————→	PIN 9

Figure 2-5 shows an RS-422/485 4-wire configuration example.

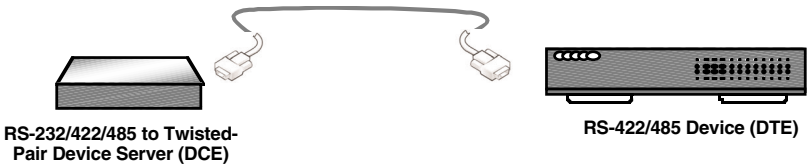
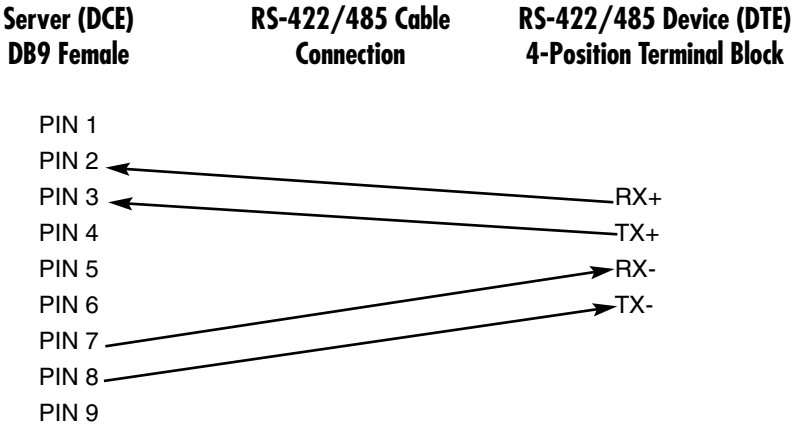


Figure 2-5. RS-422/485 4-wire application.

Table 2-5. RS-422/485 4-wire cable and connector pinnings for DCE to DTE wiring.



CAUTION

When using an RS-422/485 serial cable to connect to a device, check for the correct pin assignment and signal direction on the terminal plugs. Otherwise, the transmission will fail.

Figure 2-6 shows an RS-422/485 2-wire configuration application.

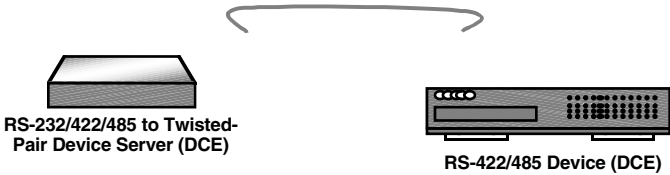
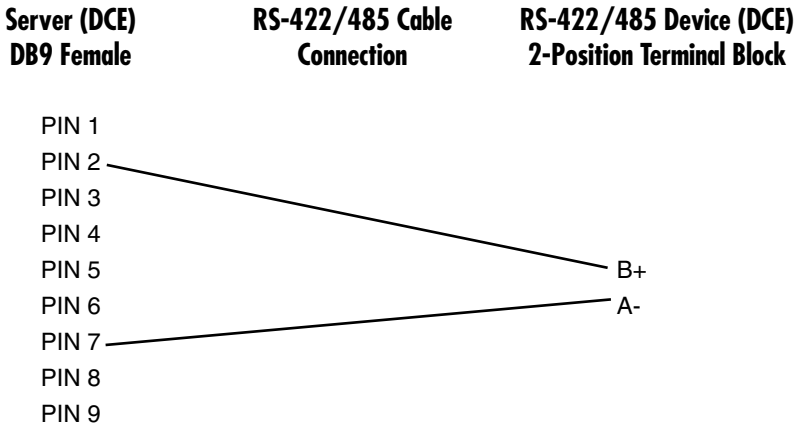


Figure 2-6. RS-422/485 2-wire application.

Table 2-6. RS-422/485 2-wire cable and connector pinnings for DCE to DCE wiring.



2.4 What's Included

Your package should contain the following items. If anything is missing or damaged, please contact Black Box at 724-746-5500.

- (1) Pure Networking RS-232/422/485 to Twisted-Pair Device Server
- (1) power adapter
- (4) self-adhesive rubber feet
- (2) screws for wallmount installation
- This user's manual on CD-ROM

3. Installation

3.1 Location

The location you select to install the server may greatly affect its performance. When selecting a site, consider the following rules:

1. Install the server in a fairly cool and dry place. See **Chapter 1** for the acceptable temperature and humidity operating ranges.
2. Install the server in a location free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.
3. Leave at least 3.9" (9.9 cm) of space at the server's front and rear for ventilation.

3.2 Installing the Server

Follow the instructions listed below to install the server on a desktop.

1. Place the server in a clean, flat, safe position with easy access to AC power.
2. Affix the four self-adhesive rubber feet to the server's underside.
3. Plug the server's AC power adapter into an available wall socket. (The green Pwr LED on the rear panel should light.)
4. Connect cables from the network devices to the server's front-panel ports. (The green LNK LED should light.)

You can also mount the server vertically (for instance, on a wall). Simply use the server's underside as a template to measure and mark the holes' position onto the surface where you will install the server. Then use the two screws provided to mount the server firmly in place.

WARNING

Install the server away from damp or wet locations, and away from very hot surfaces. These environments can have a detrimental effect on both the server and the cables. An ideal location is a cool, dry environment such as a typical equipment room.

3.3 Powering On the Unit

The server uses a 12-VDC, 0.8-amp, 50–60-Hz external power supply.

1. Plug the power adapter's cable directly into the connector on the server's back panel.
2. Plug the other end of the power adapter into an available wall socket.
3. As the server is powered on, verify that the Pwr LED is lit. If not, make sure the power cable is correctly and securely plugged in.

3.4 Connecting Copper Cables

When connecting copper cable to the server's 10/100BASE-TX port, be sure that you use the correct type of connector (RJ-45). Follow the steps below to properly connect copper cable.

1. Insert one end of Category 5 twisted-pair cable into an available RJ-45 port on the converter and the other end into the network node's port.
2. Check the corresponding port LED on the converter to make sure that the connection is valid. (Refer to **Chapter 4**.)

3.5 Connecting to the DB9 Connector

Figure 3-1 illustrates the server's DB9 connector.

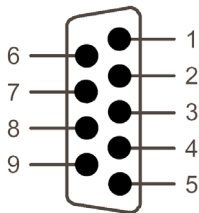


Figure 3-1. DB9 female connector.

Table 3-1 describes the pins shown in Figure 3-1.

Table 3-1. DB9 pin signal descriptions.

Pin	RS-232 (Full Duplex)	RS-422/485 4-Wire (Full Duplex)	RS-485 2-Wire (Half-Duplex)	Signal Direction
1	DCD	—	—	Out
2	RX	RX-	*Data B (-)	In
3	TX	TX-	—	Out
4	DTR	—	—	In
5	GND	GND	GND	—
6	DSR	—	—	Out
7	RTS	RX+	*Data A (+)	In
8	CTS	TX+	—	Out
9	RI	—	—	In

*Bidirectional RS-485 bus line.

3.6 Serial Connection

This server features rear-panel DIP switches that set the unit to the correct cable configuration type to support connection with an RS-232/422/485 device.

The first time you use the server, set its serial port's control function (see Table 3-2).

Table 3-2. Setting the DIP switch.

DIP-Switch 1 Position	Function
On	RS-232 console
Off	Data communication

NOTES

- To avoid incorrect connection, review your DTE or DCE's DIP-switch settings (see Sections 3.7 and 3.8) and the converter's connector pin configurations (see Section 3.5) before installation.
- For RS-422/485 devices that aren't designed to provide DB9 connection, ignore the DTE/DCE mode installation procedure (Sections 3.7 and 3.8) and check the pin configuration to connect the devices.
- For first-time installation, use console mode to set up the connection configuration with RS-232 cable.

3.7 Connection to Data Terminal Equipment (DTE)

1. Make sure DIP-switch 1 is in the "OFF" position. (This disables console mode.)
2. Set DIP-switches 2, 3, and 4 according to the wire type as indicated in Table 3-3.

Table 3-3. DIP switches 2–4 settings.

Function	DIP-Switch 2	DIP-Switch 3	DIP-Switch 4
RS-232	On	Off	Off
4-wire (RS-232/485)	Off	On	Off
2-wire (RS-485)	Off	Off	On

NOTE

There isn't a switch for DTE/DCE. Configure the attached device as a DTE or DCE by using either a null-modem cable or a straight-through cable. This DTE/DCE configuration only applies to RS-232 ports.

3. Prepare TIA/EIA-574 compliant crossover shielded cables with DB9 connectors.
4. Connect the DB9 male connector at the end of the cable to the server's DB9 female connector.
5. Connect the DB9 male or female connector at the other end of the cable to the DTE's DB9 male or female connector.

6. DIP-switch 7 only supports RS-422/485 mode. Set it for your network configuration. The default setting is Off.

3.8 Connection to Data Communication Equipment (DCE)

1. Make sure that DIP-switch 1 is in the Off position. (This disables console mode.)
2. Set DIP-switches 2, 3, and 4 according to the wire type as indicated in Table 3-3.
3. Prepare TIA/EIA-574/422/485-compliant straight-through shielded cables with DB9 connectors.
4. Connect the DB9 male connector at the end of the cable to the server's DB9 female connector.
5. Connect the DB9 male or female connector at the other end of the cable to the DCE's DB9 male or female connector.

3.9 Ethernet Connection

The server has a 100-Mbps Fast Ethernet fiber port. To link the server to a Fast Ethernet hub, switch, or computer, simply insert one end of a multimode or single-mode fiber into the media converter's ST[®] or SC port and the other end into a 100-Mbps hub, switch, or computer's Fast Ethernet card.

NOTE

The RJ-45 port accepts both straight-through and crossover Ethernet cables without having to reconfigure the port.

4. Operation

Once the server is installed, its four front-panel LED indicators (Lnk/Act, Act, Sys, and 100) and its rear-panel Pwr LED give you status at a glance. The first time you use the server, you must configure it by following the instructions in **Chapter 5**.

When the Pwr LED is on, the server is operating in normal power mode. When this LED is off, the power is off or has failed.

The Lnk/Act LED lights when the switch's respective port is connected to the network. This LED blinks when the port is transmitting or receiving data on the Ethernet network. The Link/Act LED is off when no link is connected.

The Act LED lights when the server is receiving data packets. When it's off, the server is transmitting or receiving RS-232/422/485 data packets.

The Sys LED blinks when the CPU is working. When this LED is continuously on or off, the CPU is not working.

The 100 LED is on when the switch's respective twisted-pair port is connected to a Fast Ethernet network. This LED is off when the switch's respective port is connected to a 10-Mbps Ethernet port.

5. Configuration

There are three separate methods for configuring the server. **Section 5.1** describes the Command Line Interface (CLI) or menu-driven interface via the console port used to set the device for connection to data terminal equipment in console mode. **Section 5.2** explains the Internet browser interface. **Section 5.3** describes the CLI or menu-driven interface via Telnet configuration.

Before you begin, connect the server to your Fast Ethernet device (hub, switch, or computer) via RS-232 cable. DIP-switch 1 should be set to the On position.

5.1 Configuring via the Console Port

Access the server via a terminal emulator attached to its RS-232 console port. After completing the steps outlined to connect the devices (see **Section 3.7**), follow the instructions on the next page to log into the management facility using HyperTerminal. The server is preset with a factory IP address (192.168.0.254) that you must reconfigure to an individual IP address. Make sure that you do this; otherwise, the server might conflict with other devices that have the same defaults.

NOTE

Before following the instructions listed next for HyperTerminal configuration, make sure that the server and the Fast Ethernet device are connected by a serial cable.

5.1.1 HYPERTERMINAL CONFIGURATION

1. The default login name is `admin`, and there's no preset password. At the login prompt, type `admin`, then type the following command line to change the device IP address in CLI mode (where `xxx` represents values between 0 and 254. Users should type in their own IP address in this form.)

```
set eth0 ip xxx.xxx.xxx.xxx
```

2. After you type in the new IP address, the system will confirm whether the operation is successful.

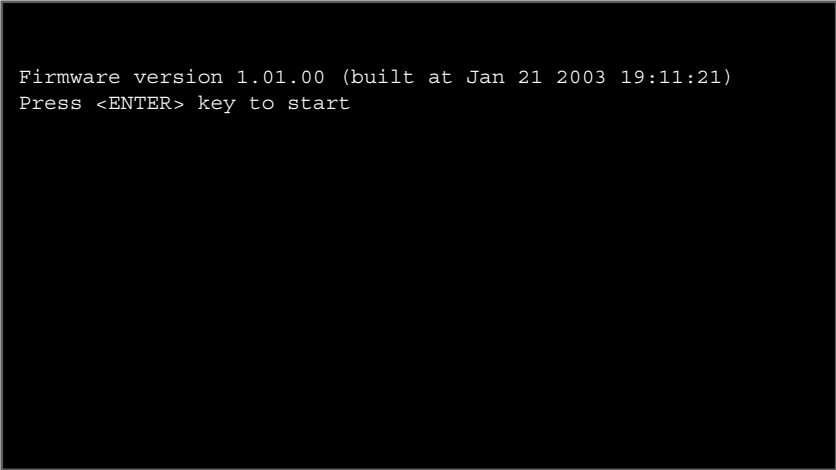
NOTE

Copy the new address down on a piece of paper. You will need the address when you are going to use Telnet or set up data transfer/communication connection.

WARNING

IP addresses are unique! If an address isn't available, please contact your Internet Service Provider (ISP) to apply for one.

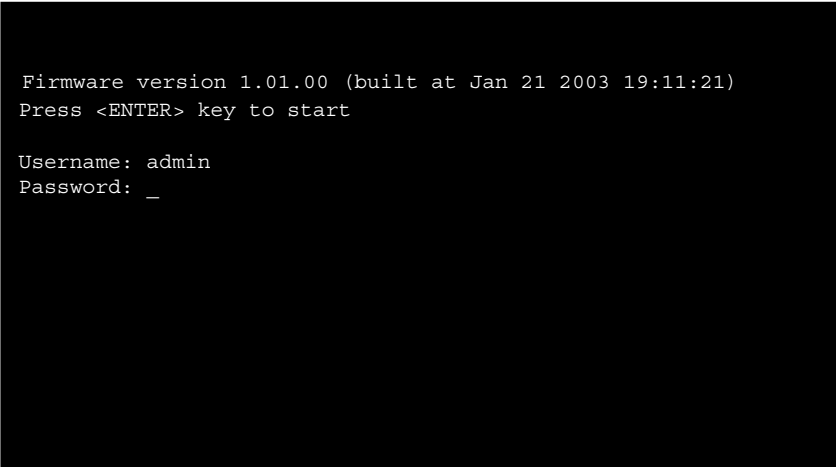
3. After you log into the system, you will see a welcome message as shown in Figure 5-1.



```
Firmware version 1.01.00 (built at Jan 21 2003 19:11:21)
Press <ENTER> key to start
```

Figure 5-1. Welcome screen.

4. Press the **Enter** key, and the screen shown in Figure 5-2 appears.



```
Firmware version 1.01.00 (built at Jan 21 2003 19:11:21)
Press <ENTER> key to start

Username: admin
Password: _
```

Figure 5-2. CLI or menu-driven interface login screen.

- Type `admin` (the default username) at the username prompt, but leave the password field blank since there's no default value. Press the **Enter** key to proceed. The Select User Interface screen (Figure 5-3) appears.

```

<1> CLI User Interface

<2> Menu-Driven Interface

```

Figure 5-3. Select User Interface screen.

- To select the command-line interface, type `1`. To choose the menu-driven interface, type `2`. Or, use the **Tab** key to select `1` or `2`, then press the **Enter** key.
- If you pressed `1`, the following prompt will appear.

```
Converter>
```

NOTE

At this prompt, you can type in command line interface commands. However, we do not recommend using the command-line interface option since the required commands are not documented in this manual. Instead, use the menu-driven interface option.

If you pressed `2` (the menu-driven interface), the screen shown in Figure 5-4 appears.

5.1.2 MAIN MENU CONFIGURATION OPTIONS

Figure 5-4 shows the Main Menu screen for the menu-driven configuration option. From this screen, the configuration options available enable you to quickly access and adjust the server settings as required. For descriptions, see **Sections 5.1.3–5.1.9**.

```

                                Main Menu
System Information Menu
DHCP Configuration Menu
RS-232 Configuration Menu
Monitor Menu
Firmware Upgrade Menu
Load Factory Default Settings
System Reset
Exit
<Tab> to move|           <Enter> to select
```

Figure 5-4. Main Menu.

5.1.3 SYSTEM INFORMATION MENU

From this menu (Figure 5-5), you can view some system-related information and the default IP address. To get to this screen, click on **System Information Menu** in Figure 5-4.

```

                                System Information
Description      :
Serial Number   :      000000001001
Model Name      :      RS-232/422/485-100TX Converter
Company Name    :
Board Name      :      Ver. 0.0.1
MAC-1 Address   :      00:08:04:31:00:01
Manufacture time :      00:00:00  00/00/0000

DHCP Client     :      Disabled
IP Address      :      192.158.0.254
Subnet Mask     :      255.255.255.0
Gateway         :      192.168.0.1
<SAVE>         :      <ESC>
<Tab> to move|           <Enter> to select
```

Figure 5-5. System Information menu.

Type in an appropriate IP address, subnet mask, and gateway for your network. Once you enter a new IP address, Telnet™ and data communication will be based on this address.

5.1.4 DHCP CONFIGURATION MENU

DHCP (Dynamic Host Configuration Protocol) allows the server to obtain an IP address from a DHCP server automatically. See Figure 5-6. To get to this screen, click on **DHCP Configuration Menu** in Figure 5-4.

NOTE

A DHCP server must exist and be available in your local network before enabling the DHCP client.

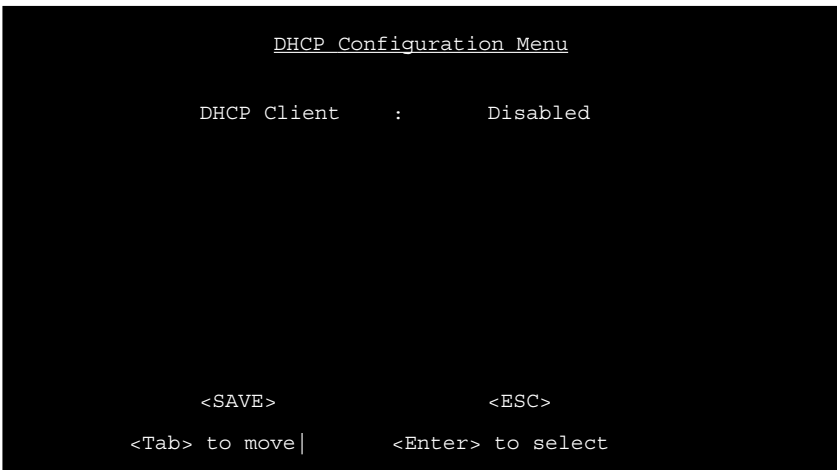


Figure 5-6. DHCP Configuration menu.

The DHCP Client field in Figure 5-6 toggles between **Disabled** and **Enabled**. To use DHCP configuration, select **Enabled**.

5.1.5 RS-232 CONFIGURATION MENU

The RS-232 Transfer menu (see Figure 5-7) is applicable to all RS-232, RS-422, RS-485 modes. Before transferring data through a server, you must set up a connection between the local and remote server.

The connection setup process involves the server waiting for a connection service request sent by the client. During this process, the default setting is AUTO mode (the system will automatically determine which end is the server and which end is the client).

To get to the RS-232 Transfer menu and Serial Port Configuration menu (Figure 5-7), click on **RS-232 Configuration Menu** in Figure 5-4.

NOTE

If necessary, you can manually designate the server and client.

```
RS-232 Transfer Configuration
Server/Client Type      :      AUTO
Remote IP               :      192.168.0.155
TCP Port Number:       :      1234
Connection Idle Timeout (sec) :600

Serial Port Configuration
Operation Mode         :      Console Mode
Baud Rate              :      115200
Parity                 :      None
Word Length            :      0
Stop Bits              :      1
Flow Control           :      NONE
<SAVE>                 <ESC>

The saved configuration is not effective until System Reset at Power off/on.
<Tab> to move |      <Enter> to select
```

Figure 5-7. RS-232 Transfer and Serial Port Configuration menus.

CAUTION

Changes to the settings are saved to a system flash memory and do not take effect until you reset or reboot the system. This validates the new settings.

In this screen, type in the IP address of the remote server to which the connection is being made. (The TCP Port Number is a number from 1024 to 65535.)

NOTE

Local and remote servers must have the same port number in order to connect.

The Connection Idle Timeout field becomes active when there is no traffic passing through the server. Type in an idle time value between 30 and 3600 seconds. When this time limit has been reached, the connection will be terminated automatically.

Under the Serial Port Configuration heading, the Operation Mode field is a read-only value indicating one of the following modes: Console, RS-232, RS-422, or RS-485. The mode is based on the DIP switch positions 1–4’s settings on the server’s rear panel.

Other fields that can be modified from this screen are: communication data baud rate, parity, word length, stop bits, and flow control. Defaults for these are:

- Baud rate: 38400
- Parity: None
- Word length: 8
- Stop bits: 1
- Flow control: None

5.1.6 MONITOR MENU

This screen (Figure 5-8) provides at-a-glance system status information. To get to this screen, click on Monitor Menu in Figure 5-4.

```

Connection Status
Connect status : Not connected
Dest. IP Address: 0.0.0.0
Dest/Srce port number: 0/0
Byte counts from UART: 235
Byte counts to network: 0
Byte counts from network: 0
Byte counts to UART: 12078

RS-232 Transfer Configuration
Server/Client Type: AUTO
Remote IP: 192.168.0.155
TCP Port Number: 1234
Connection Idle Time (sec): 600

Serial Port Configuration
Operation Mode : Console Mode
Baud Rate : 115200
Parity : None
Word Length : 0
Stop Bits : 1
Flow Control : NONE

<Clear> <ESC>
<Tab> to move| <Enter> to select

```

Figure 5-8. Monitor menu.

5.1.7 TFTP FIRMWARE UPGRADE MENU

From the menu shown in Figure 5-9, you can upgrade the existing firmware to newer firmware that's available from a TFTP server. To get to this screen, click on **Firmware Upgrade Menu** in Figure 5-4.

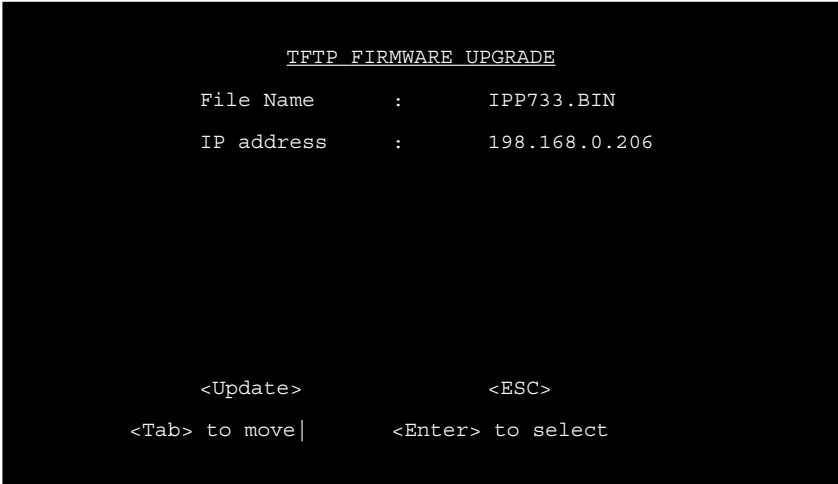


Figure 5-9. TFTP Firmware Upgrade menu.

5.1.8 LOAD FACTORY DEFAULT SETTINGS

The Load Factory Default Settings command allows you to restore factory-default settings to the server. From the Main Menu (Figure 5-4), select **Load Factory Default Settings** field and press the **Enter** key.

5.1.9 SYSTEM RESTART

The System Restart option allows you to perform a warm restart and validate a newly saved configuration to the server. In the Main Menu (Figure 5-4), select **System Restart** and press the **Enter** key to reset the server.

CAUTION

After each configuration session, set DIP-switch 1 to the Off position. Otherwise, the server will not transmit data.

5.2 Configuring via the Internet Browser Interface

You can access the server via a remote computer using an Internet browser. The server is preset with a factory IP address (192.168.0.254) that must be configured to your individual IP address. This section gives a step-by-step guide to configuring and monitoring the server using the Web user interface. A series of screen shots and instructions illustrate the main menu structure and how it works.

Open a Web browser and type in the server's IP address, then click **OK**. The Web Manager screen shown in Figure 5-10 will appear.



Figure 5-10. Web Manager screen.

In the user name field, type in `admin`. This is the default user password. Since there is no preset password for this module, click on the **OK** button to proceed. (Or, click on **Cancel** to halt the login.) The screen shown in Figure 5-11 appears.

5.2.1 HOME PAGE

The Home page (Figure 5-11) displays the server's information and its link status. Beneath it is the display for system information. You can edit the IP address, subnet mask, and gateway address on this page. Click on the fields to get a text prompt and edit the information.

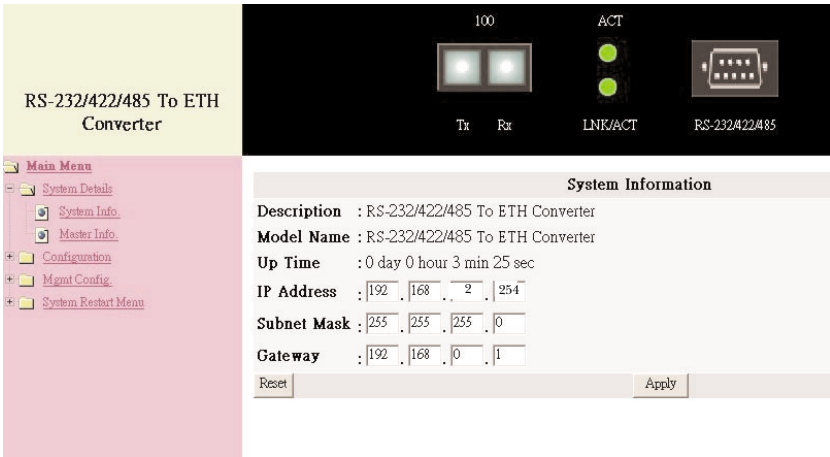


Figure 5-11. Home page.

Default address: IP Address: 192.168.2.254
 Subnet Mask: 255.255.255.0
 Gateway: 192.168.0.1

Click on the **Reset** button to select the previously configured settings, or click on the **Apply** button to save the new configured settings.

NOTE

The factory defaults listed above are used as an example only. For a new address, choose numbers between 0 and 255 for each sub-address field. Make a note of them and keep the details in a safe place.

5.2.2 MAIN MENU

On the left side of the Home page (Figure 5-11), the Main Menu appears. The Main Menu (Figure 5-12) gives you all the necessary tools and information for managing the server. Click on the minus signs (located to the left of the folder symbol) to open the sub-menus.

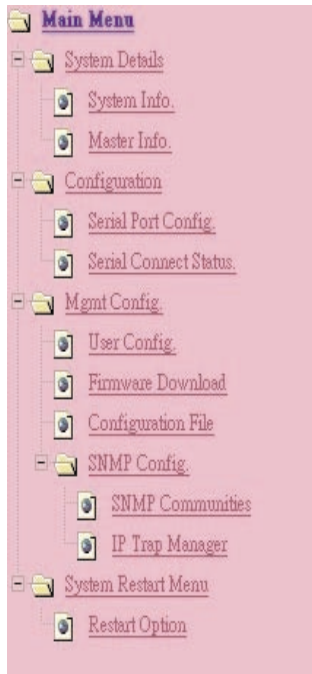


Figure 5-12. Main Menu options.

System Details

Two options are available: System Info and Master Info.

System Info

When you click on System Info in the Main Menu (Figure 5-12), the System Info screen appears (not shown in this manual). This screen displays the server's model number, IP address, subnet mask, and gateway address.

Master Info

If you click on Master Information in the Main menu, Figure 5-13 appears. The master information page displays the server's hardware and firmware versions.

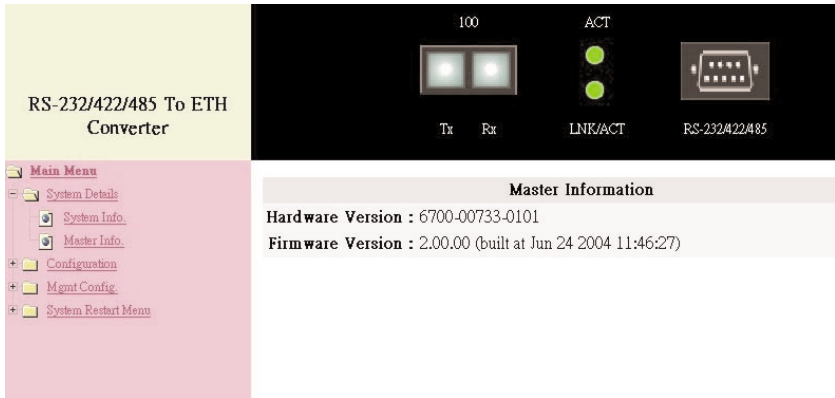


Figure 5-13. Master information page.

Configuration

If you click on **Configuration** in the Main Menu (Figure 5-12), Figure 5-14 appears.



Figure 5-14. Configuration screen.

CAUTION

Changes to the settings are saved to a system flash memory and do not take effect until a system reset or reboot occurs. This validates the new settings.

In the Configuration screen (Figure 5-14), type in the remote server's IP address to which you want to connect. Then type in its TCP port number. (The TCP port number is a number from 1024 to 65535.)

NOTE

Local and remote servers must be configured with the same port number to establish a connection.

The Connection Idle Time field becomes active when there's no traffic passing through the server. Set the idle time value between 30 and 3600 seconds. When this time limit has been reached, the connection will be terminated automatically.

Serial Port Config

Under the Serial Port Configuration heading, the Operation Mode field is a read-only value indicating one of the following modes: Console, RS-232, RS-422, or RS-485. The mode is based on the server's rear-panel DIP-switch settings.

Other fields that can be modified from this screen include communication data baud rate, parity, word length, stop bits, and flow control. Defaults for these are:

- Baud rate: 38400
- Parity: None
- Word length: 8
- Stop bits: 1
- Flow control: None

Click on the **Reset** button to revert to the previously saved settings, or click on the **Apply** button to save the newly created settings.

Serial Connect Status

If you click on Serial Connect Status in the Main Menu (Figure 5-12), Figure 5-15 appears. This screen provides at-a-glance system operation status information.

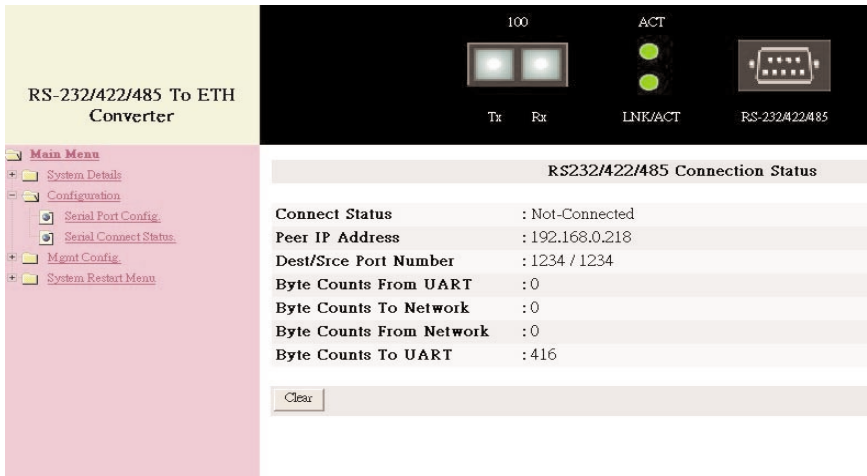


Figure 5-15. Connection status screen.

Mgmt Config

Four options are available: User Config, Firmware Download, Configuration File, and SNMP Config.

User Config

If you click on **User Config** in Figure 5-12, Figure 5-16 appears.



Figure 5-16. User configuration screen.

Use this menu to change the login user name and password. Click on the fields to get a text prompt, and type in a new user name and password. Then click on **Apply** to activate them.

Firmware Download

When you click on this option in Figure 5-12, the firmware download screen appears (not shown in this manual). Follow the instructions on the screen to download firmware.

Configuration File

When you click on this option in Figure 5-12, the System Backup screen appears (see Figure 5-21). Follow the instructions on the screen.

SNMP Config

If you click on SNMP Config in the Main Menu (Figure 5-12), Figure 5-17 appears.

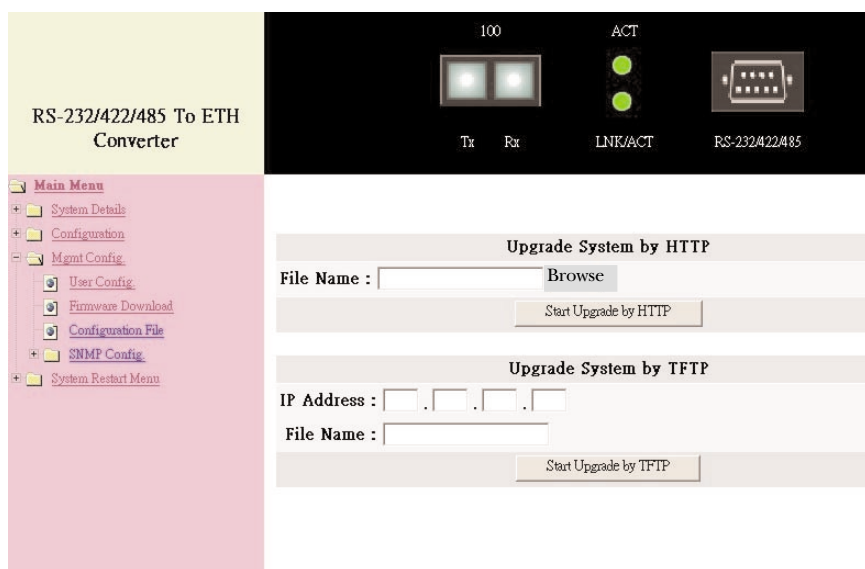


Figure 5-17. SNMP Configuration screen.

SNMP support software is upgradeable. To upgrade via HTTP, first download the software to a designated computer and click on the **Browse** button to select the program. Then click on **Start Upgrade by HTTP**. If you have an IP address and file name for new software, enter them in the fields and click on **Start Upgrade by TFTP**.

SNMP Communities

If you click on SNMP Communities in Figure 5-12, Figure 5-18 appears.

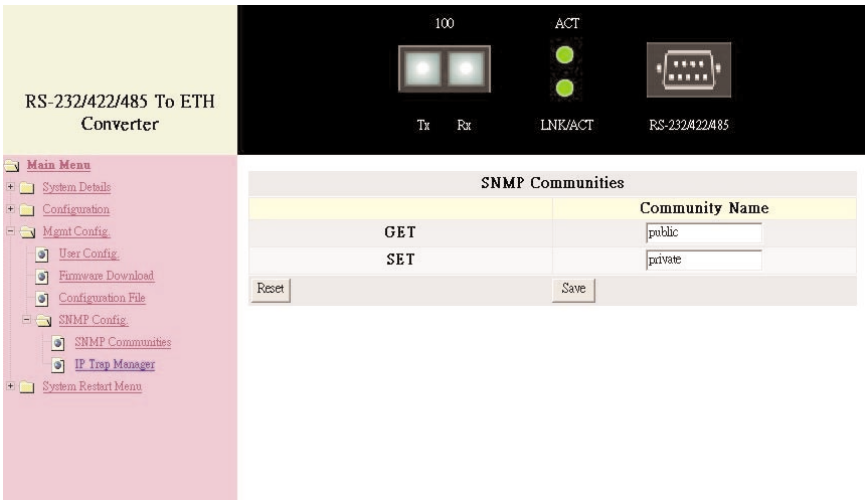


Figure 5-18. SNMP Communities screen.

There are two communities listed on this page. The Get Community Name (public) is for reference only. The Set Community Name (private) is a group that can be renamed. For example, it might be a group of individuals that uses or has access to this management program.

NOTE

Get and Set Communities are user account names. There are no preset user passwords for them. If the community names are changed, the new names must also be activated with SNMP Tool.

IP Trap Manager

If you click on IP Trap Manager in Figure 5-12, Figure 5-19 appears.

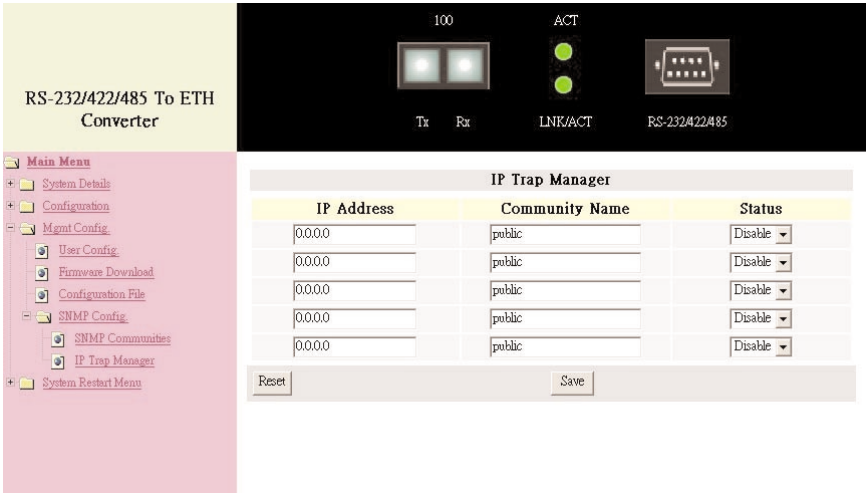


Figure 5-19. IP Trap Manager screen.

All data on this page is set to factory default. To change them, click on each field to get a text prompt and type in the new information. Type in the computers' IP address for when abnormalities on a connection occur and to send an alarm. Type in their community names and disable or enable the alarm function accordingly. Click on **Reset** to restore previously saved configurations, or click on **Save** to retain newly entered information.

System Restart Menu

If you click on System Restart Menu, Restart Option in Figure 5-12, Figure 5-20 appears.

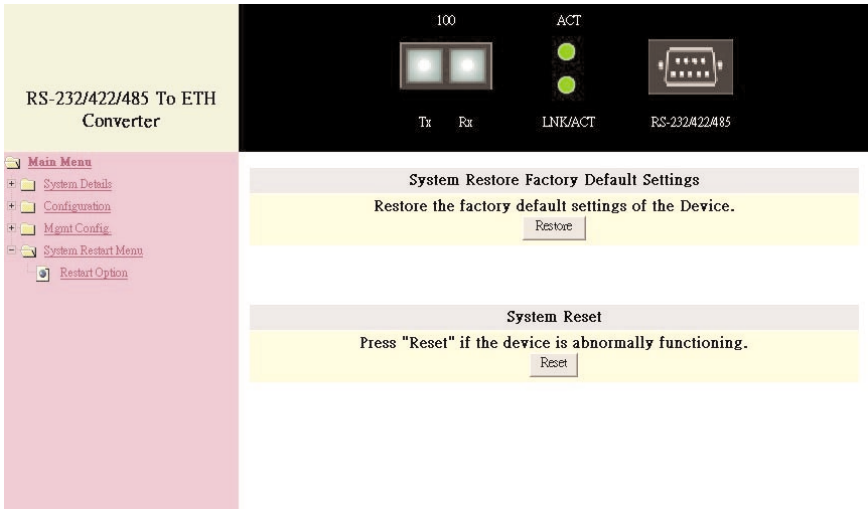


Figure 5-20. System Restart menu.

Click on the **Restore** button to retrieve factory defaults.

Click on the **Reset** button to reboot the system.

Restore Button

Do not interrupt or power off the server while programming. When you select the **Restore** button, the prompt below appears.

Please wait *xx* seconds

where *xx* is the countdown timer value.

System Backup

If you click on Configuration File in Figure 5-12, Figure 5-21 appears.

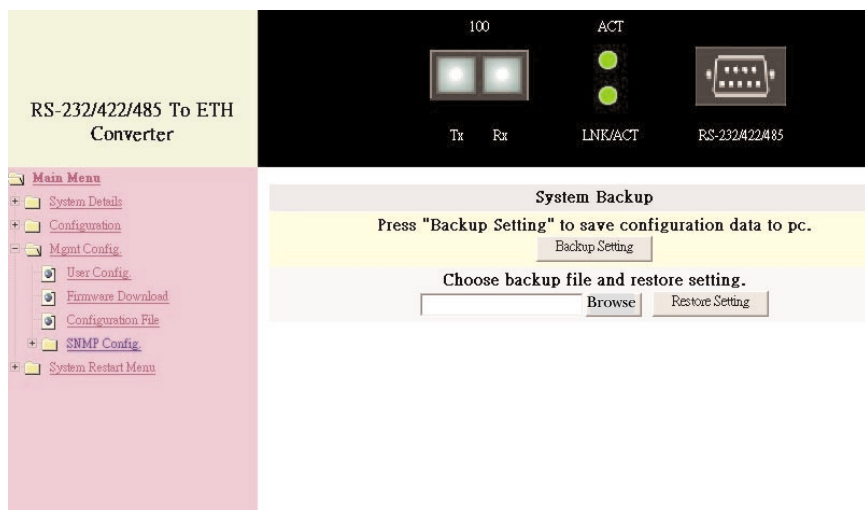


Figure 5-21. System Backup screen.

Use this menu to back up configurations. To begin, click on the **Backup Setting** button. Then follow the prompts to save new configurations to a designated computer.

This menu lets you retrieve saved files. Either type in the file name or use the **Browse** button to select the file. Then click on **Restore Setting**.

5.3 Configuring via CLI (Telnet)

Access the server via a remote computer using Telnet. After completing the steps outlined to connect the devices (see **Section 3.7**), proceed with the directions below to log into the management facility using a remote computer. The server is preset with a factory IP address. It's important to do this so that the server doesn't conflict with other devices with the same defaults.

NOTE

Before following the instructions listed below for remote computer login, make sure that a serial cable connection between the server and the remote workstation exists.

5.3.1 REMOTE COMPUTER LOGIN

1. The default login name is **admin**, and there's no preset password. After logging in, type the following command line to change the device IP address in CLI mode. *xxx* represents values between 0 and 254. Enter your IP address in this format.

```
telnet xxx.xxx.xxx.xxx
```

2. After entering the new IP address, the system will confirm whether the operation is successful.

NOTE

Copy the new address on a piece of paper. You will need the address when you are going to use Telnet or set up data transfer/communication connections.

CAUTION

IP addresses are unique! If an address isn't available, contact the appropriate authorities to apply for one.

3. After you log into the system, you will see a welcome message on the screen (Figure 5-22).

```
Converter>
Converter>?
[Command List]
? . . . . . Help commands
backup . . . . backup configuration file
exit . . . . . Logout
help . . . . . Help commands
logout . . . . Logout
ping . . . . . Ping a specified host with IP address
reset . . . . . Reset system or reset factory default setting
set . . . . . set commands
show . . . . . show commands
upgrade . . . . upgrade runtime firmware or configuration file
Converter> net
[Command List]
? . . . . . Help commands
help . . . . . Help commands
admin . . . . . Set administrator name and password
cfg . . . . . Set system information
eth0 . . . . . Set network eth0 configuration
idle . . . . . Set idle time for CSI session
xfer . . . . . Set RS-232 transfer configuration
Converter>
Converter>?
```

Figure 5-22. Welcome screen.

4. Press **Enter**, and on the following screen type the default username `admin`. Leave the password field blank since there is no default value. Press **Enter** to proceed.
5. Select the CLI user interface option by pressing the associated number key or using the **Tab** key and pressing **Enter**. A command prompt appears.

NOTE

Type “?” or “help” to view the entire commands and explanations list.

5.3.2 COMMAND DEFINITIONS

backup: Use this command to save configuration settings to file.

exit: Type `exit` or `logout` and press **Enter** to quit the program.

help: Access the help commands list.

ping: Type `ping`, then a space, then the IP address of the device to send a test signal. If a response is received, then the device is connected. To view a full list of ping options, type `ping` and press **Enter**.

reset: Type `reset config` and press **Enter** to load factory-default settings, or type `reset system` and press **Enter** to restart the system.

set: To configure the management console, type the commands below, followed by the **Enter** key.

NOTE

Separate each command line port with a space.

set admin: Follow the prompts to change the username and password.

set cfg: Use this command to set new addresses. Use `set eth0 ip` (new IP address), `network mask` (new network mask), or `gateway` (new gateway).

set idle: Set the automatic logout time (in seconds) when the program or communication is idle.

set xfer: This command sets RS-232 configuration and data communication parameters. The command syntax is as follows.

```
set xfer [arg_1 data_1] [arg_2 data_2]
[arg_n data_n]
```

[Argument List]

idle...Set the serial port's idle time.

type...Set the operation type (AUTO, SERVER, or CLIENT).

remote...Set the remote IP address.

port...Set the TCP port number.

baud...Set the serial port's baud rate.

parity...Set the serial port's parity.

length...Set the serial port's word length.

stopbits...Set the serial port's stop bits.

flow...Set the serial port's flow control type.

statistics...Clear statistics.

show: Type show to view a complete view commands list.

upgrade: Reloads the configuration file or upgrades runtime firmware.

upgrade config: Use this command to reload previously saved configurations. For this operation to be successful, type in the IP address and filename accurately.

upgrade firmware: Use this command to load new software versions for this console. For example:

```
upgrade firmware xxx.xxx.xxx.xxx  
Soft2.bin
```

CAUTION

After each configuration session, set DIP-switch 1 to the Off position. Otherwise, the server will not transmit data.

6. Troubleshooting

6.1 Calling Black Box

If you determine that your Pure Networking RS-232/422/485 to Twisted-Pair Device Server is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box at 724-746-5500.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.
- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

6.2 Shipping and Packaging

If you need to transport or ship your Pure Networking RS-232/422/485 to Twisted-Pair Device Server:

- Package it carefully. We recommend that you use the original container.
- If you are shipping the Pure Networking RS-232/422/485 to Twisted-Pair Device Server for repair, make sure you include everything that came in the original package. Before you ship, contact Black Box to get a Return Authorization (RA) number.