comnet
Communication Networks

CNFE2DOE2

TERMINAL SERVER

v1.0 Oct 2011

The ComNet CNFE2DOE2 terminal server converts RS-232, RS-422 and 2- and 4-wire RS-485 serial data to a 10/100 Ethernet-based signal. The CNFE2DOE2 is a two-channel unit and can transport each channel of Ethernet data over either optical fiber or through RJ-45 cable. A wide variety of ComNet SFP (Small Form Pluggable) optical interfaces are available to meet transmission distance requirements.

The two serial ports may be configured through either the user's network, or via a PC, through the unit's web server. Open source com0com TCP/IP protocol is supported to communication with terminal servers over the Ethernet network.

LED indicators confirm the operating status of the device. The ComNet CNFE2DOE2 may be wall mounted, rack mounted ("ComFit" packaging) or DIN-rail mounted with the use of the ComNet DINBKT1 adapter. ComNet products are made in the USA.

Contents

Hardware description

The ComNet™ CNFE2DOE2 terminal server supports bi-directional data transmission over 2 optical fibers. The server is universally compatible with RS232, RS422, RS485 and serial data protocols. All configurations are done through its web server. The CNFE2DOE2 has two serial ports which can be configured by communicating from one port to another through the network. Distances depend on which SFP (Small Form Pluggable) module is used. The RJ45 Ethernet and SFP interfaces are both enabled. They function as an Ethernet media converter.
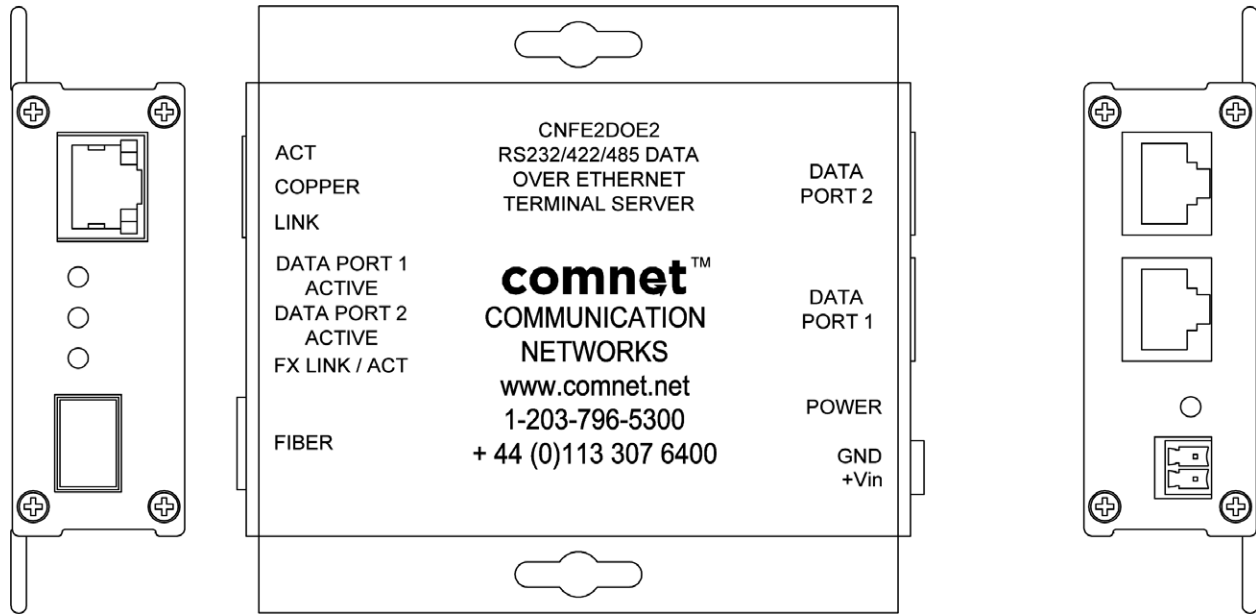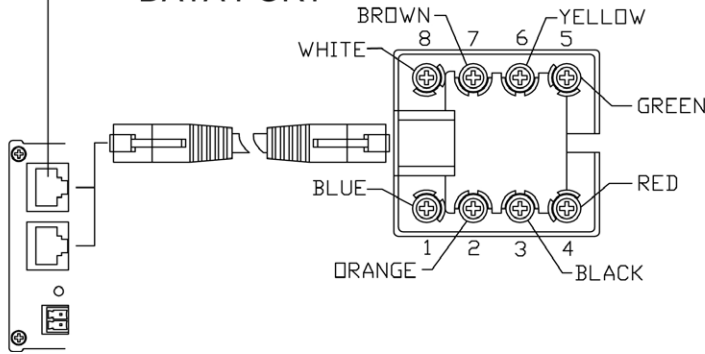
Mechanical Drawing of CNFE2DOE2 Unit

The data connector pin-out is as below:

PIN NO	DATA CONNECTION
1	TD+
2	TD-
3	RD+
4	CTS (OUT)
5	RTS (IN)
6	RD-
7	TERM
8	GND

VIEW INSIDE DATA PORT

CONNECTIONS FOR EACH DATA PORT

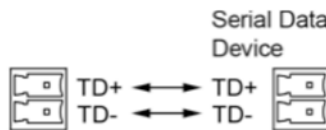| RJ45 PIN NO	WIRE COLOR	DATA CONNECTION
1	BLUE	TD+
2	ORANGE	TD-
3	BLACK	RD+
4	RED	CTS (OUT)
5	GREEN	RTS (IN)
6	YELLOW	RD-
7	BROWN	TERM
8	WHITE	GND

RS232
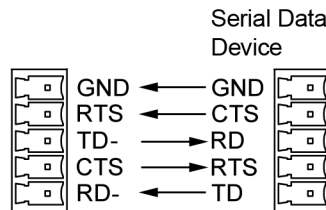
RS422 / RS485 4-Wire
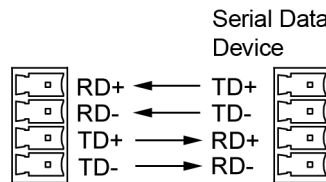
RS485 2-Wire

Settings by Data Type (Port 1 or 2)

Assign IP Address to a Terminal Server

A unique IP address has to be assigned to each terminal server device. You can connect one at a time to change the default IP address. The default IP address of the device is the same: 192.168.12.1.

Connect the terminal server on to your local Ethernet network which your PC is connected to, as Figure 1 below, and power on the unit.
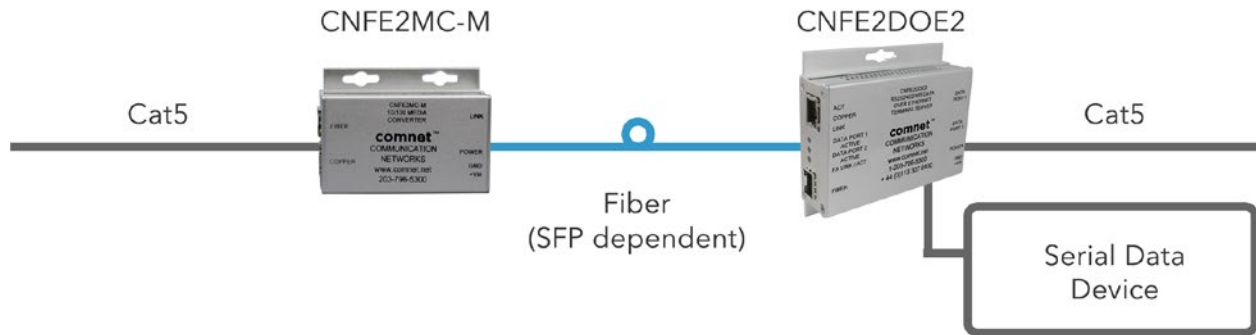

Figure 1

Following the steps below to set up your PC IP address to the same subnet as the terminal servers.

Disable the machine's wireless network connection and any other internet connections that could interfere with the network being created.

Select the Internet Protocol (TCP/IP) connection within the Local Area Connection Properties from **start -> Control Panel -> Network Connections -> Properties**.
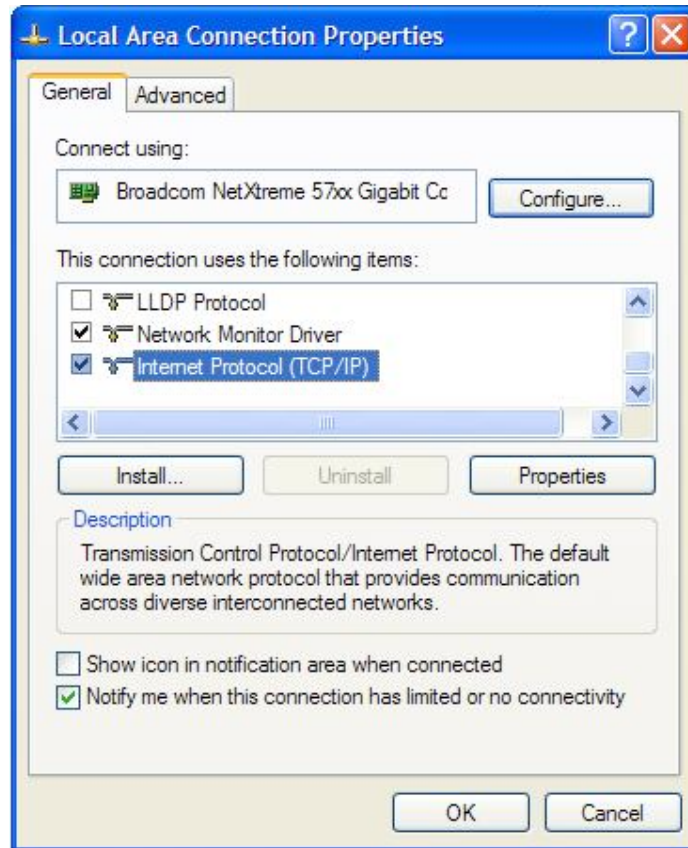
Next, manually set your IP address to **192.168.12.100**, for instance, and your subnet mask to **255.255.255.0**, as shown below.
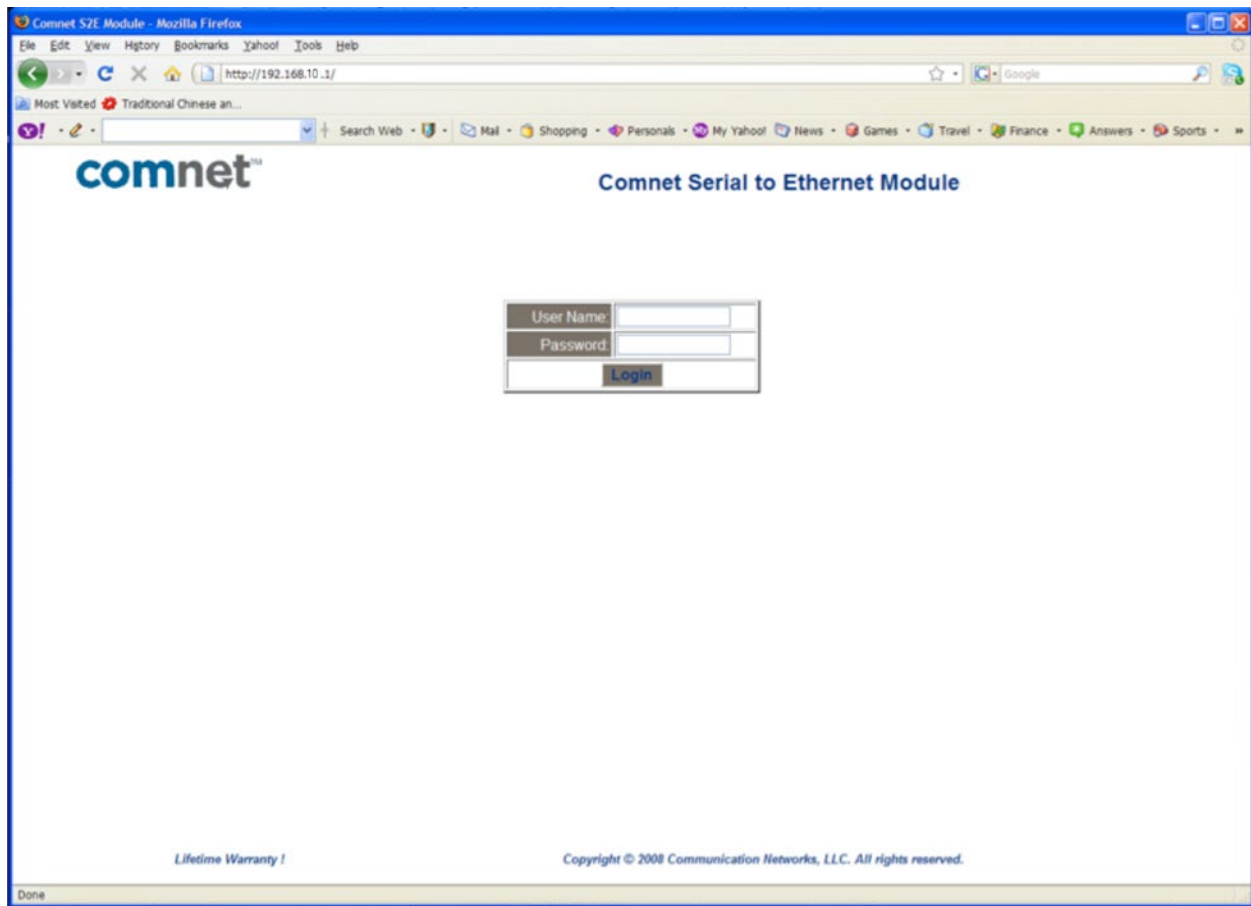
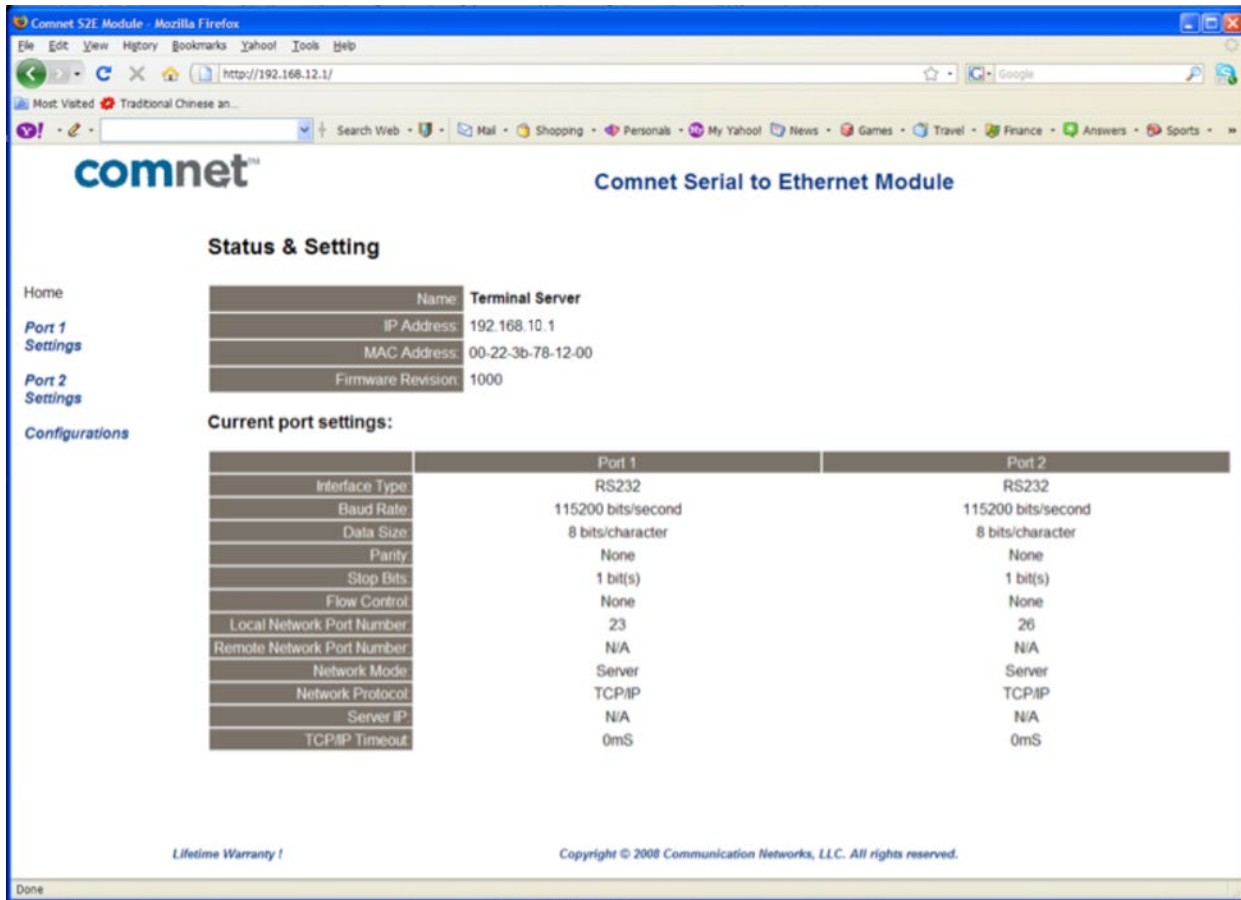Click **OK** to finish the setting.

Open the browser on your PC, and type in **192.168.12.1** and open the Terminal Server Log in Page as shown.

The default User Name and Password are both **admin**

Log in to the Terminal Server Home Page as shown.

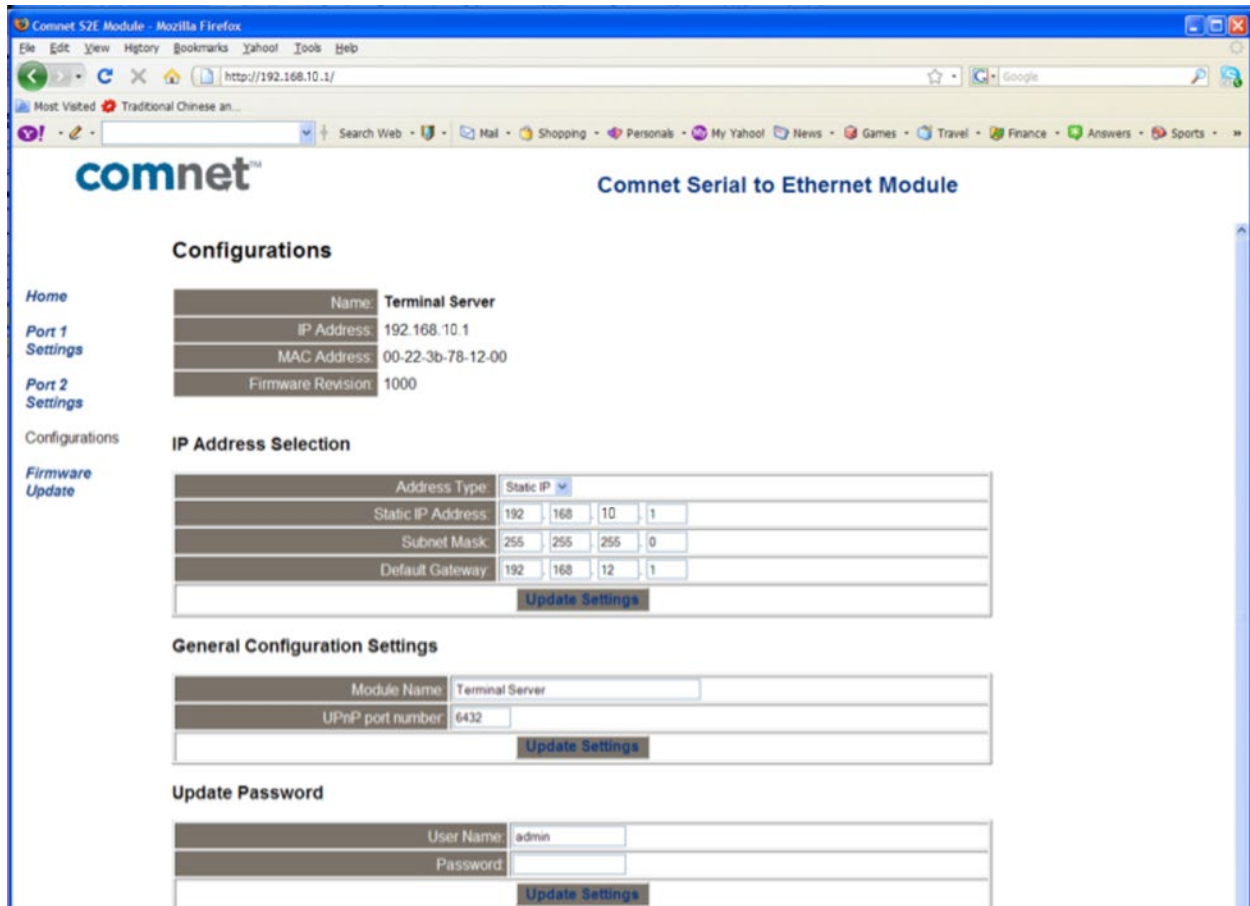*Terminal Server Log in Page*

Terminal Server Home Page

Click on **Configuration** on the left of the screen.

Change the IP address to an IP address with subnet appropriate for your network. In the following examples an IP address in subnet **192.168.12.xxx** will be used.

Configure the IP address to **192.168.12.10** as shown in the Terminal Server Configuration Page.

Click **Update Settings**.

Terminal Server Configuration Page

Log in to the terminal server again using the new IP address.

If an IP address in a different subnet was used, be sure to change the PC's network address to an IP address in the appropriate subnet.

Using Terminal Server as a Serial Extender over Ethernet

To use the Terminal Server as a serial extender over Ethernet, connect two terminal servers to your local Ethernet network.

Configure the first device as a server:

» Set port 1 to **Server** Network Mode. Assuming Port 1 will be used, click on the **Port 1 Settings** on the left.

» Configure data type and data rate on **Configurations** page. Click **Save**.
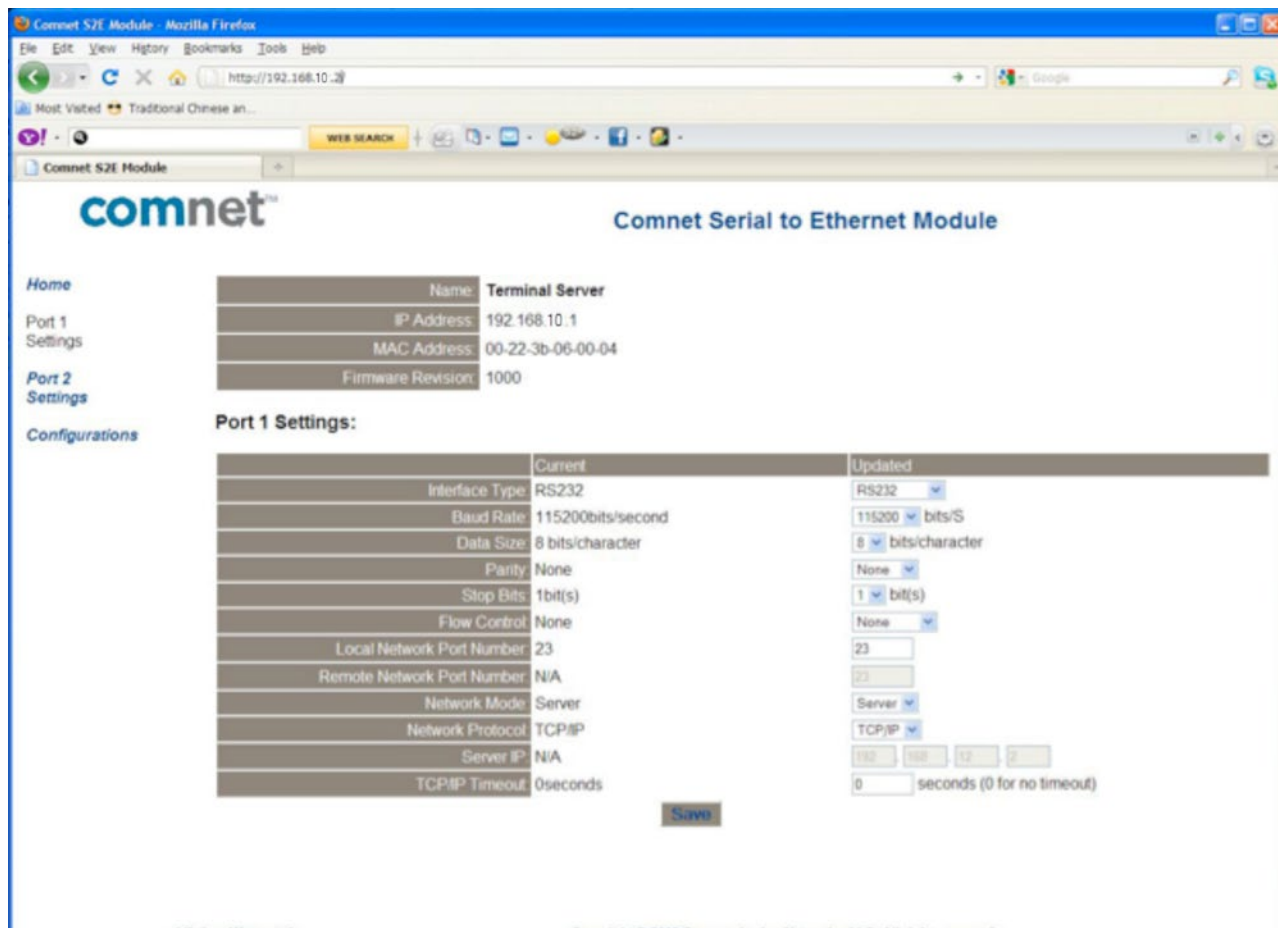
Port 1 Settings Page in Server Mode

Repeat above steps to configure second device. Change its IP address to **192.168.12.2**.

Assuming Port 1 is used, click **Port 1 Settings** on the left side of the screen.

Configure the device to be client:

» Set Port 1 Settings to **Client** Network Mode.

» Configure data type and data rate on **Configurations** page. Click **Save**.

Units	TCP/IP Type	IP Address	Remote IP Address
Unit 1	Server	192.168.12.2	N/A
Unit 2	Client	192.168.12.1	192.168.12.2

The point-to-point configuration is complete. Server and client units will pass data across the Ethernet network.
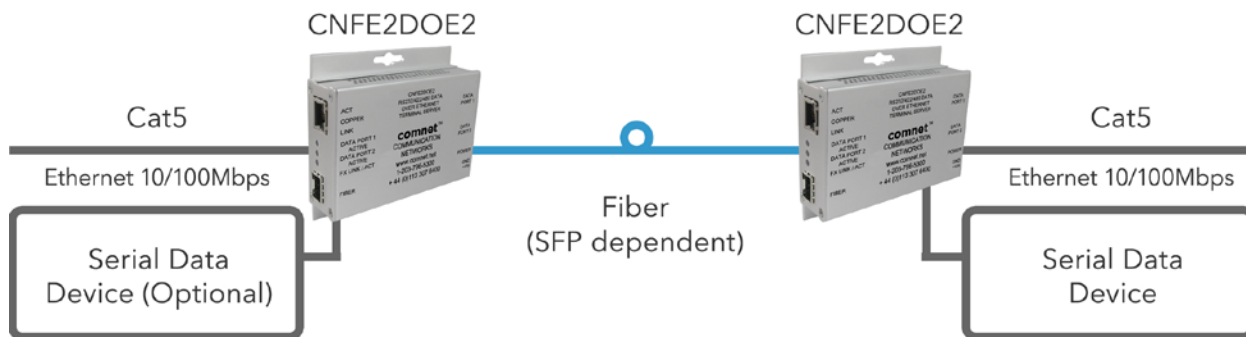
Rwo terminal servers connected to the local Ethernet network

Note: *For faster link recovery after power failure, the unit set as "Client" should be connected to the application data source.*
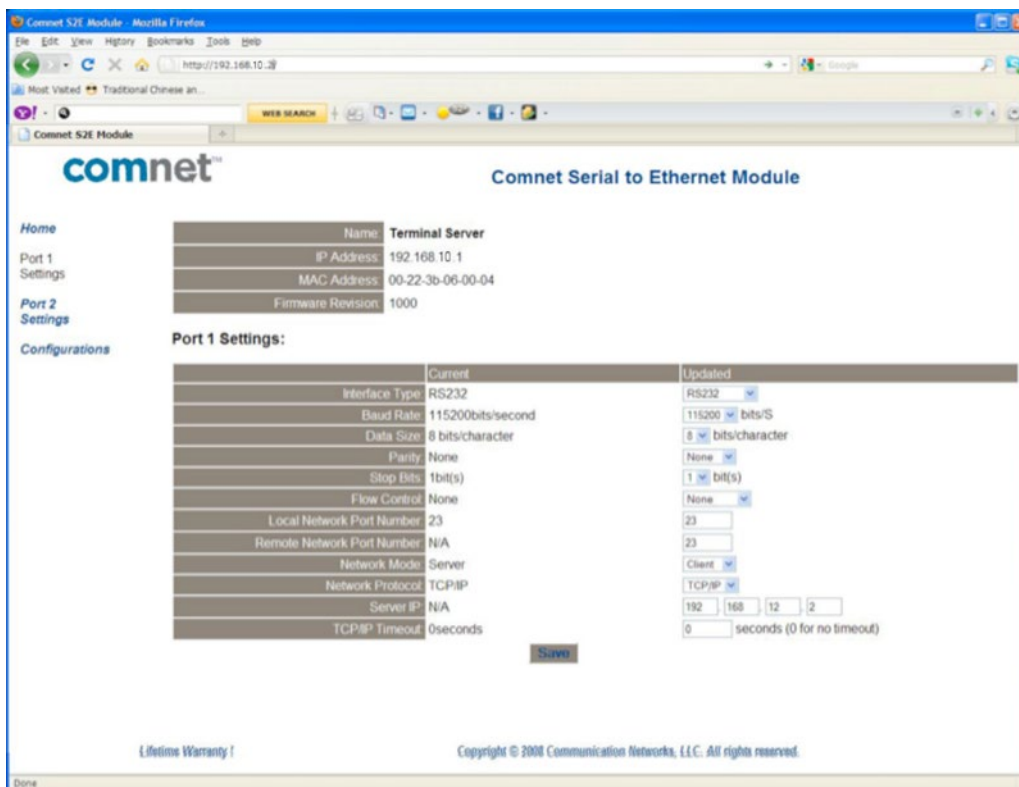
Port 1 Settings Page in Client Mode

Install ComNet Software Utilities

To use the Terminal Server as a virtual comm port, some software utilities need to be installed. Refer to following instructions to install them from the CD that accompanied the CNFE2DOE2 terminal server.

Install the com2com

Com0com is an open source virtual serial port driver for Windows. Once installed it will configure one or more pairs of virtual COM ports each time Windows starts.

Insert the ComNet Terminal Server Documentation and Software CD into the CD-ROM drive of your computer. Use Windows Explorer or other browser to open directory **com0com-2.2.1.0**. Double click on the file setup. This will start the installation process with the following dialog.
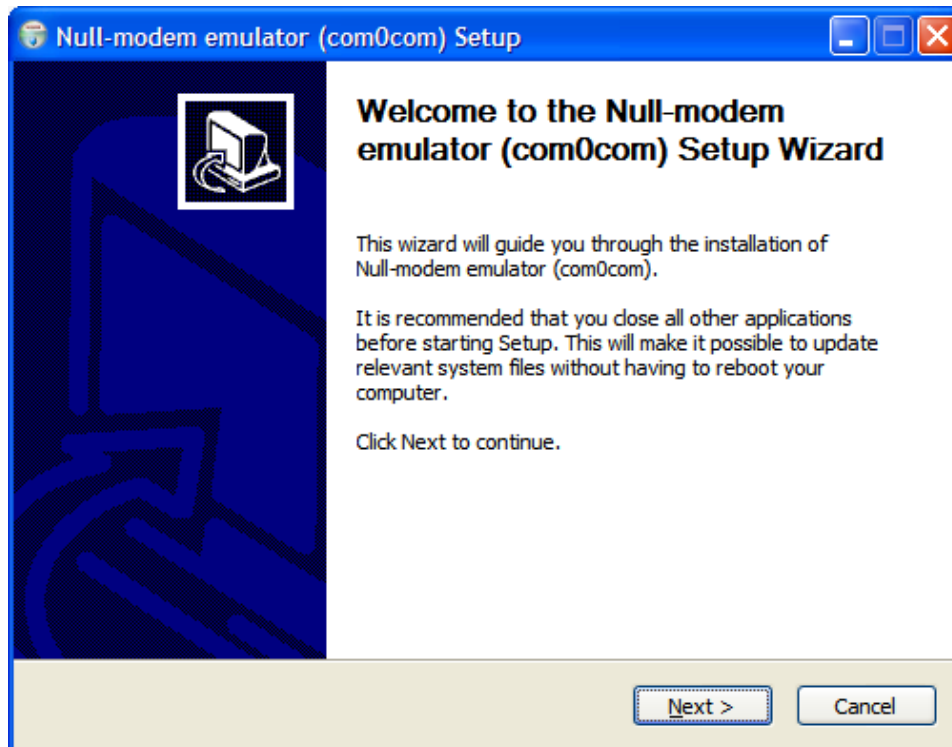
Click **Next**.
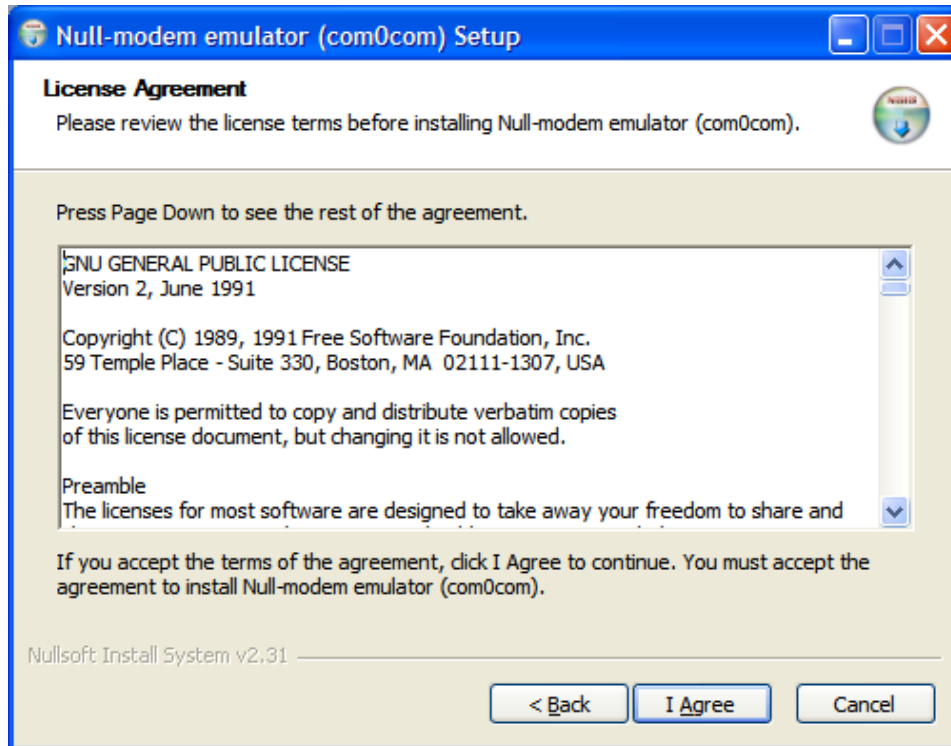
Click **I Agree**.
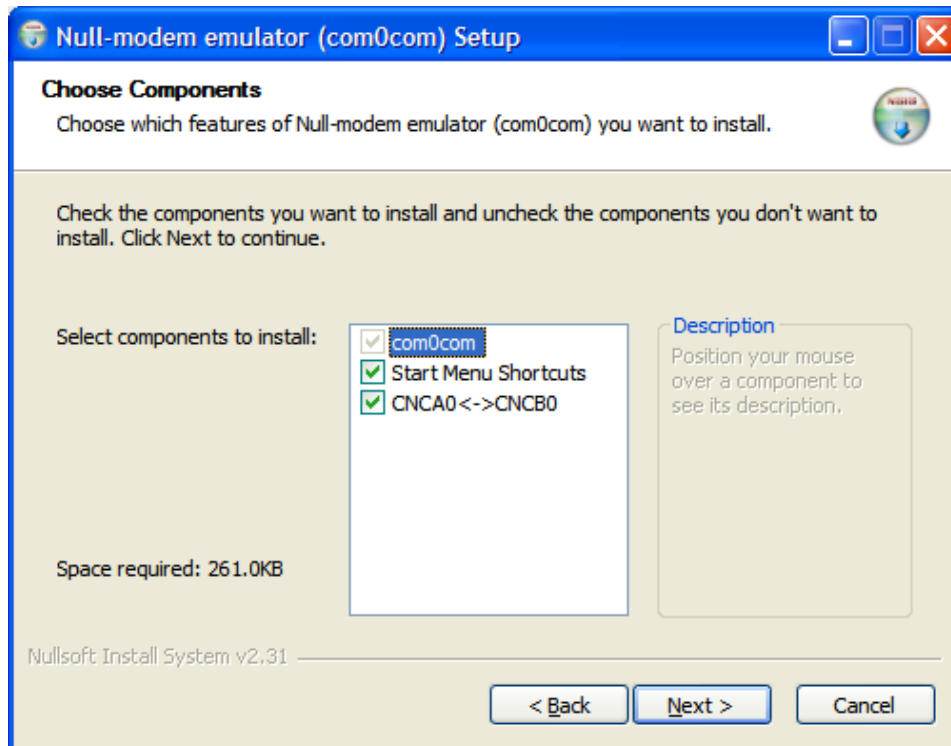
Leave the Component setup at the default settings. Click **Next**.

Choose the Install Location. Click **Install.**

When installation is complete, click **Next**.
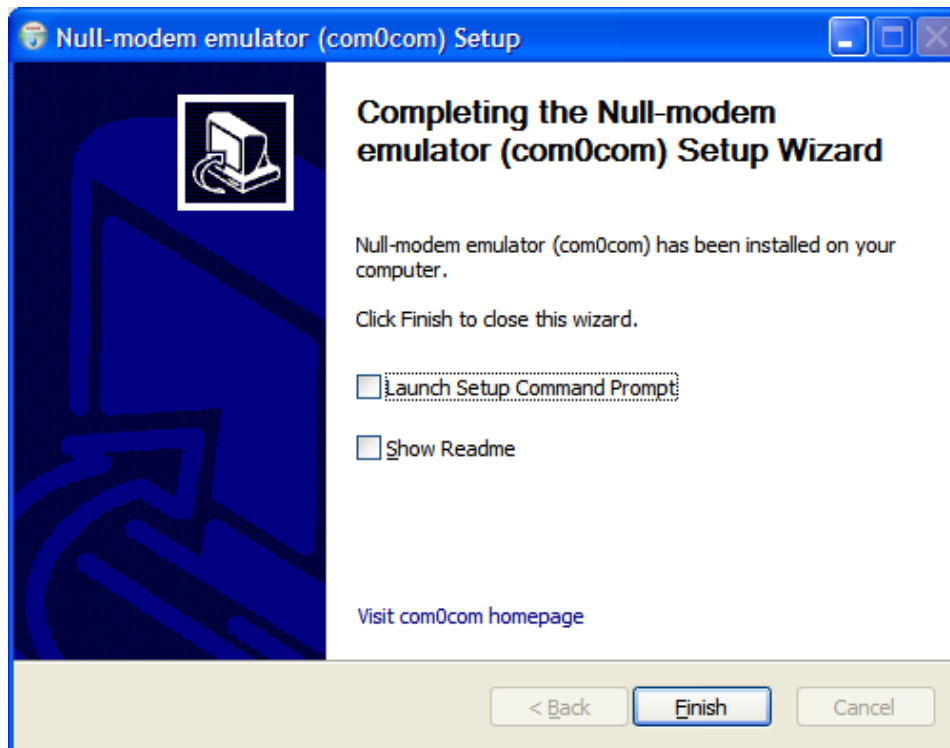
Click **Finish.**

The Windows New Hardware Wizard will now run automatically for each of the two new Virtual COM ports. Please complete the following steps twice.

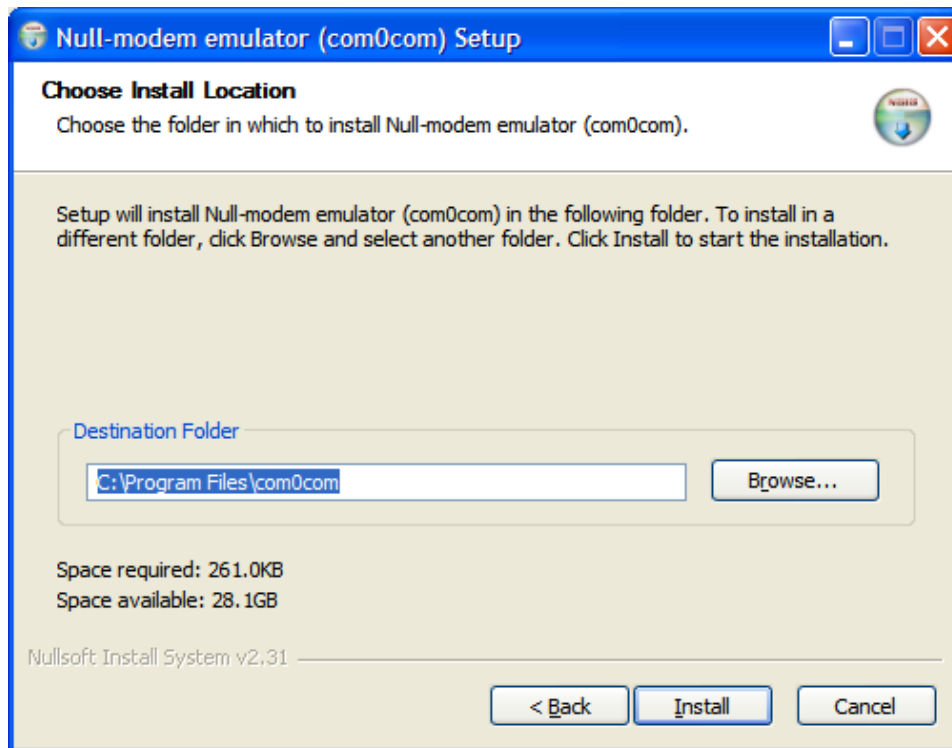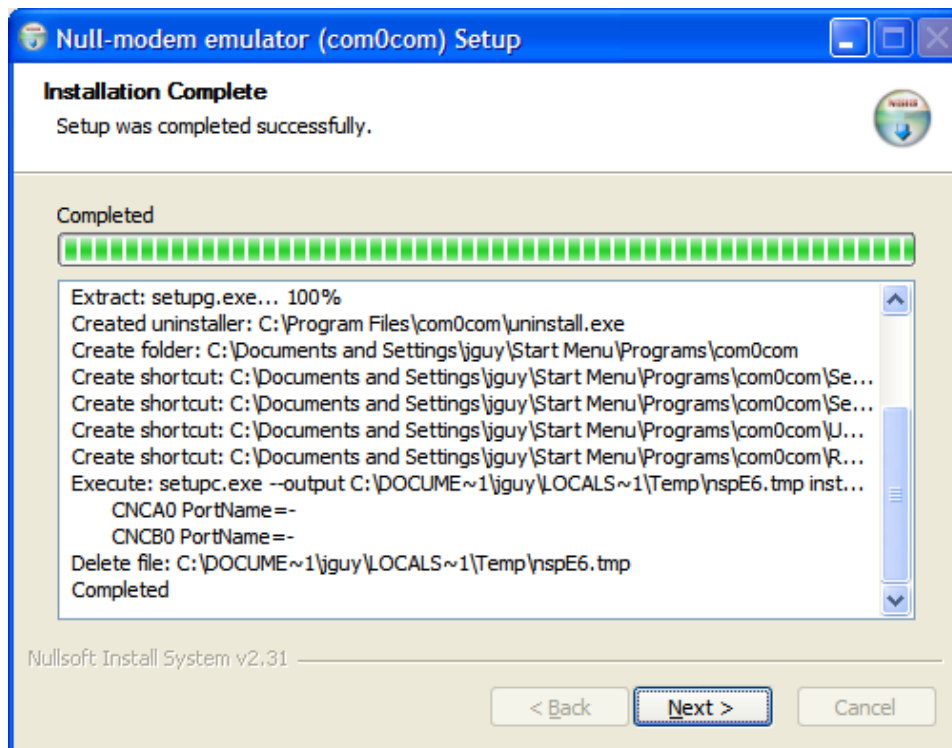Windows will detect the new Com port. When the New Hardware Wizard runs, select **No, not this time** and click **Next**. Select **Install the software automatically**. Click **Next**.

When the New Hardware Wizard completes, click **Finish**.

Repeat for the second half of the Virtual Com port pair. Com0com has now created virtual Com ports CNCA0 and CNCB0. These ports will be visible to Windows serial applications such as HyperTerminal or TeraTerm, which will be installed later.

The port names can be change by running the ComNet Terminal Server Configuration application, which will be installed next.

Install the com2tcp

Com2tcp is an open-source project used in conjunction with com0com to redirect data traffic from a virtual COM port on the PC to a telnet server or client on the Ethernet network.

To install com2tcp, copy **com2tcp.exe** from the CD to the directory of **C:\Program Files\com0com**.

The application will be linked to ComNet Terminal Server Configuration application when you start the application the first time.

Install the freeware TeraTerm

Go to directory **\TeraTerm** on the ComNet Terminal Server Documentation and Software CD.

Double click on the application file **setup.exe**.

Follow the instructions to finish the installation.

By default, the application will be installed in the directory **C:\Program Files\TTERMRO**.

You can either make a short cut of **ttermpro.exe** and copy it to your desktop for convenience, or start the application from Windows startup menu.

Install ComNet Terminal Server Configuration software

Create a directory named **comnet** under your C: drive. Copy the application **cns2econf.exe** on the ComNet Terminal Server Documentation and Software CD to **C:\comnet**. You can make an Windows application shortcut of **cns2econf.exe**, and move it the your desktop.

If you start the cns2econf application for first time, the following screen will appear.
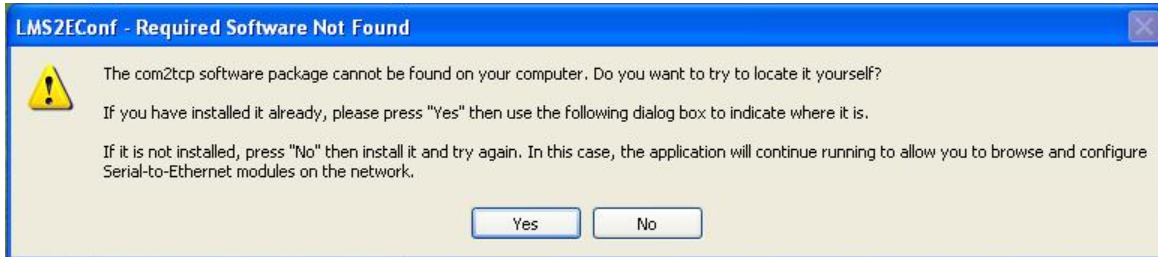
Click **Yes**.
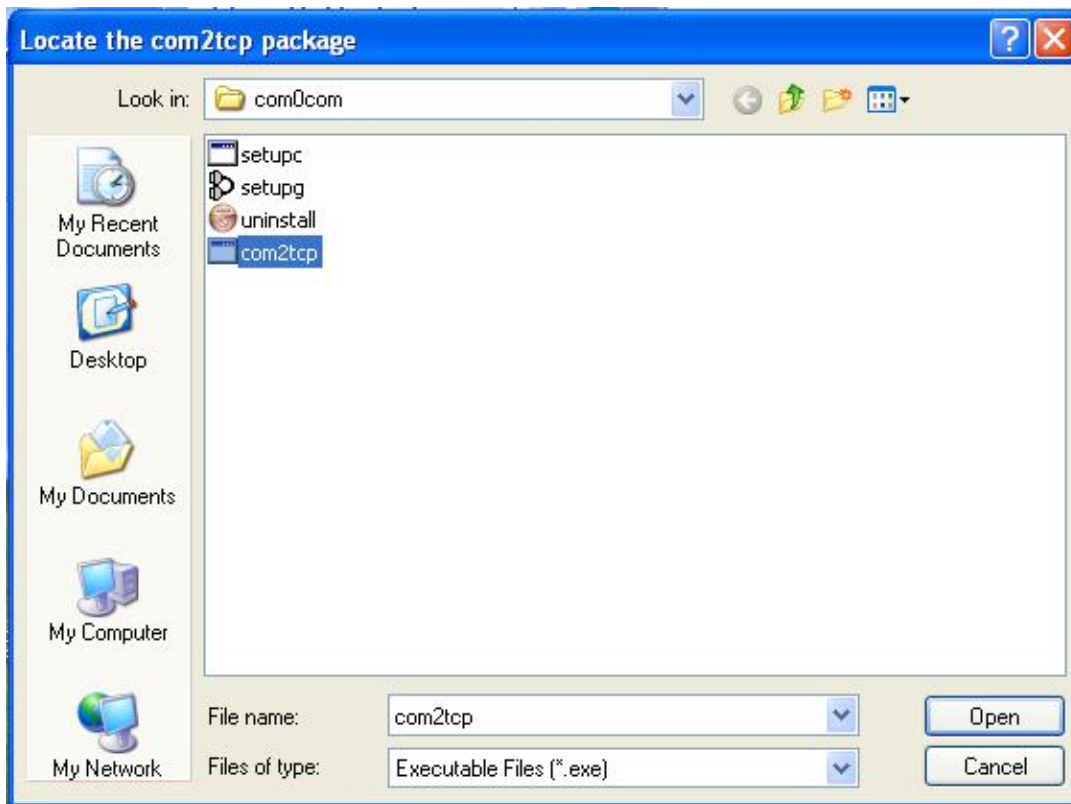
Browse to **C:\Program Files\com0com**, and select **com2tcp.exe**. Click **Open**.
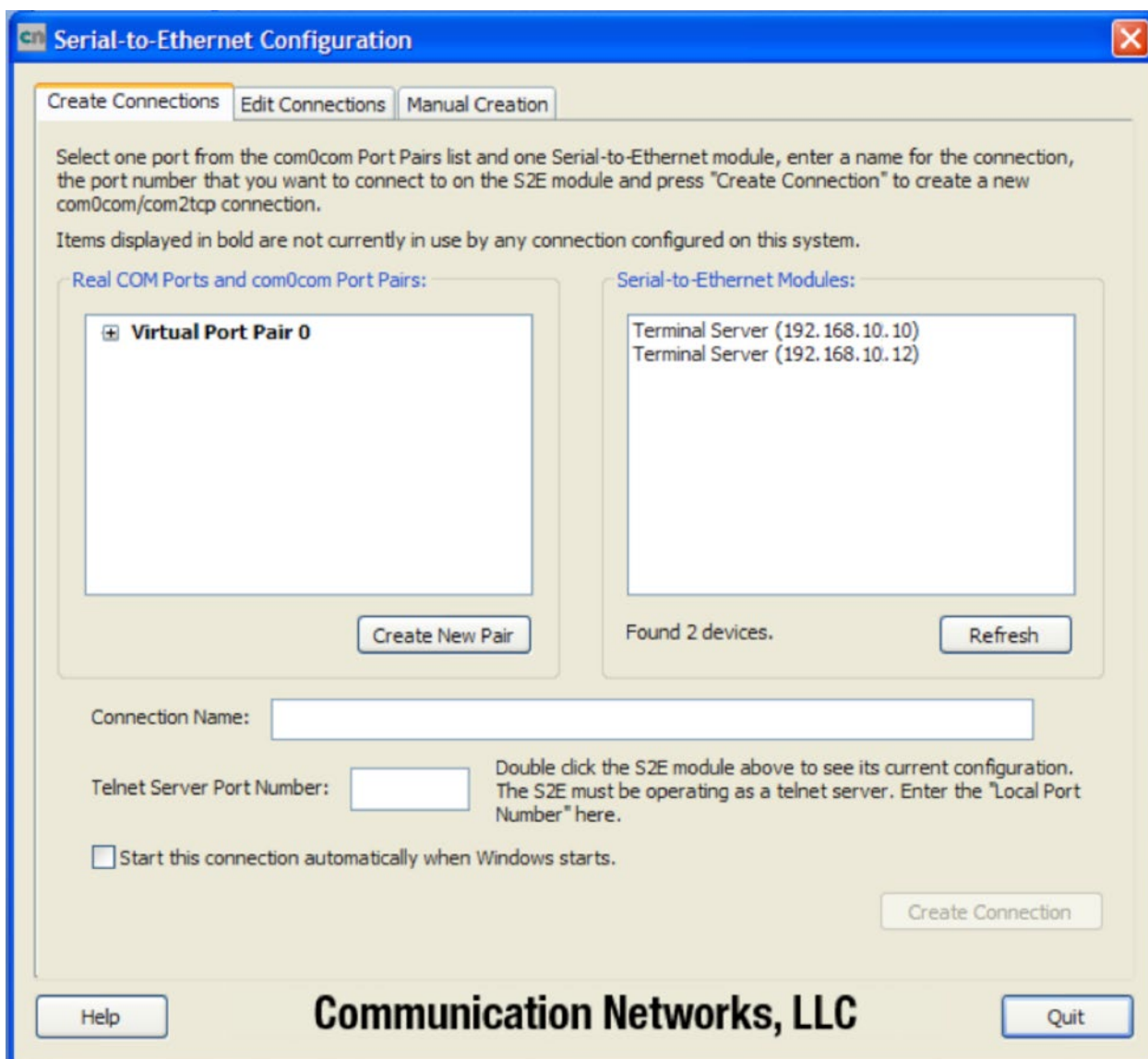
Main ComNet Terminal Server Configuration application window

This is the Main ComNet terminal server configuration application window you will see when you start the application next time. Wait approximately 30 seconds, the **Serial-to-Ethernet Modules:** panel will list the units you have connected to your local Ethernet network, as shown above.

Note: Make sure every terminal server has been configured with its unique IP address.

Using Terminal Server as a Virtual COM port (VCP)

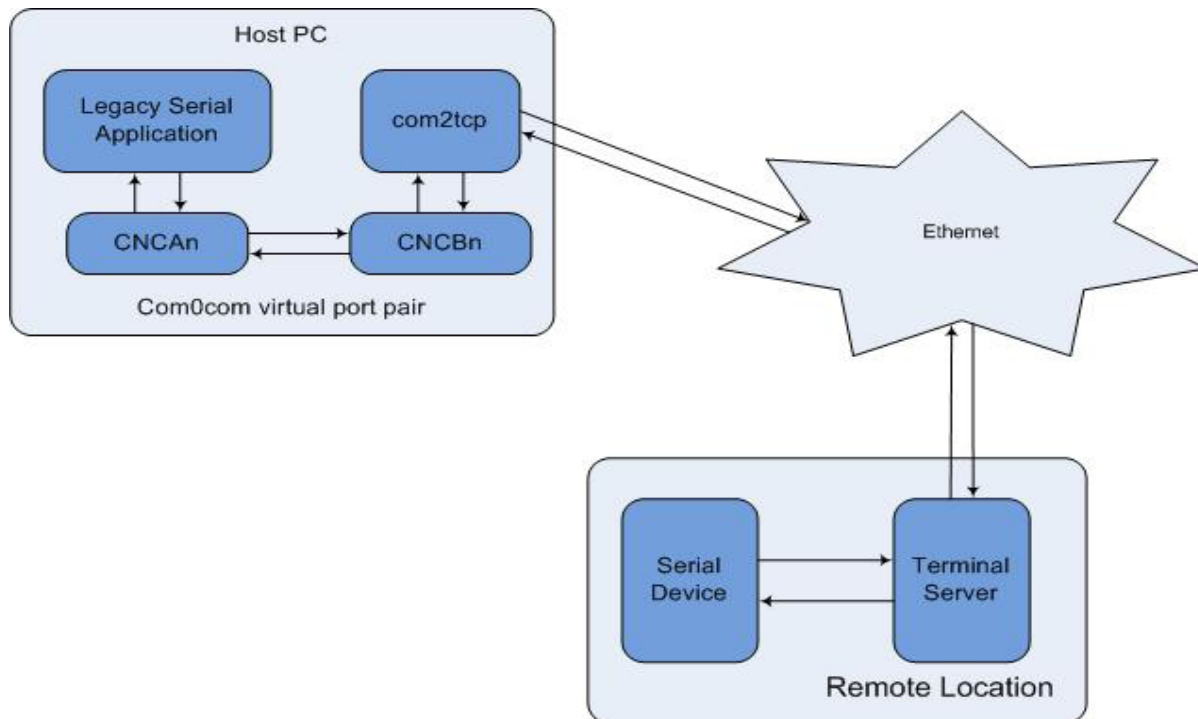The ComNet Terminal Server Configuration application offers easy creation and modification of VCP connections using a single application. Such connections contain several components:

» The legacy serial application connects to a virtual COM port on the PC. This port is one of a pair created using com0com. From within the ComNet Terminal Server Configuration application you can create new port pairs and edit the names of existing ports to cater to serial applications that do not understand the default CNCA/CNCB naming convention used by com0com.

» The second port in the pair is opened by com2tcp, which creates a telnet connection to the remote terminal server over Ethernet. The Configuration application lists all terminal servers it finds and offers a convenient method for accessing their web-based configuration pages.

» The terminal server connects to the remote serial device, as shown below.

Connection creation

The ComNet Terminal Server Configuration application gathers the information necessary for creating these connections using com0com and UPnP and then saves entries in the system registry.

The connections created here assume that the terminal server is running as a telnet server, which is the default for a new terminal server. To create a new connection between a virtual COM port on the PC and remote device:

» Select **Start** ComNet Terminal Server Configuration application by double click on the icon cns2econf.exe, The **Main ComNet Terminal Server Configuration application window** appears as above.

» The application performs an UPnP query to discover all terminal servers on the network. Once this query completes, the terminal servers pane of the main application window updates to show a complete list of the devices found. Once this list appears, select the device to which you want to set up a connection. Double-click a device to launch its configuration website, and log in.
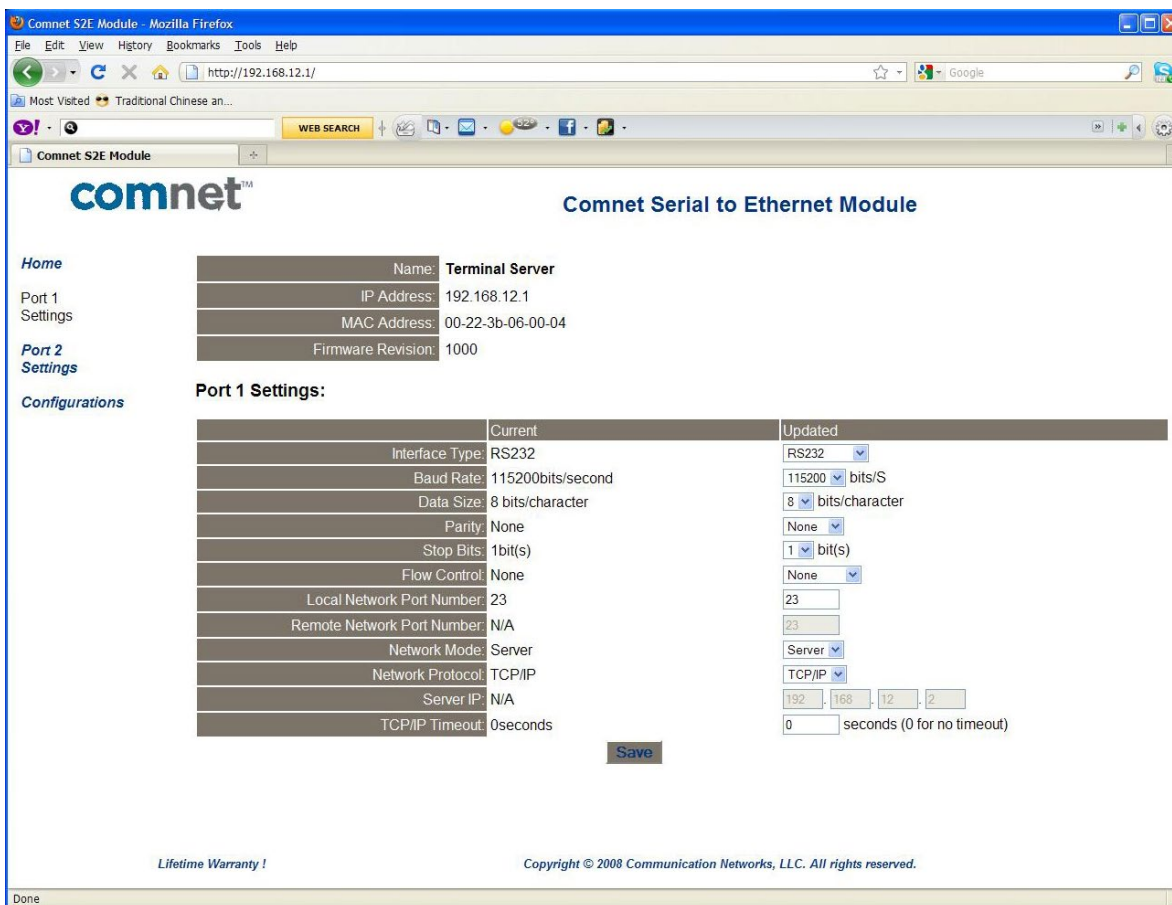
» In the com0com Port Pairs pane, click the **+** to the left of **Virtual Port Pair 0** to expand the listing. Select one of the two virtual COM ports listed. This is the port that com2tcp will use in the connection you are configuring.

» Enter a **Connection Name** for this connection.

» Enter the **Telnet Server Port Number** (TCP/IP port number) for the terminal server and serial port.
To find the **Telnet Server Port Number**, double-click the configuration device's listing to go to its website.
Then, go to the **Status & Configuration** page and locate the **Local Telnet Port Number** row, and select the number for the serial connection, Port 0 or Port 1, that you wish to use with this connection.

» Select **Start this connection automatically when Windows starts**.

» If you do not select this option, the connections will not been made unless you provide the –a command line option that instructs the launcher to start all connections.

» Click **Create Connection** to save the information on the newly configured connection.
Notice that **Virtual Port Pair 0** is no longer bolded, indicating that the port pair is already in use and you cannot configure another connection using the same pair. To create another VCP pair for use by your second (or subsequent) connection, click **Create New Pair** and repeat the above process.

» You can now start your legacy serial application and open virtual COM port CNCA0 and communicate with the remote serial device attached to the terminal server.

Edit port names

Some serial applications are unable to connect to a serial port named using a form other than COMm, where m is the port number. Since com0com ports are named CNCAn and CNCBn by default, this can cause problems. If you encounter this problem, ComNet Terminal Server Configuration application allows you to change the names of virtual COM ports, as long as neither port in the pair is currently part of a configured connection. To edit the port name, expand the virtual port pair listing that contains the port you want to change. Double-click the port name, edit the connection name, and press **ENTER**.
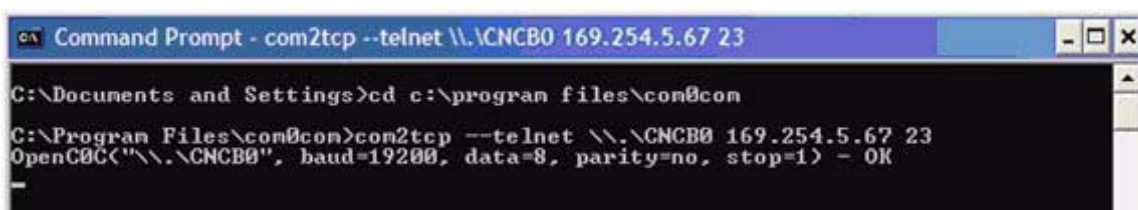
Manual VCP Configuration

If you do not want to install the ComNet Terminal Server Configuration application, you can manually configure and start com0com and com2tcp connections.

To manually create a virtual port pair, select **All Programs > com0com > setup**.

Once you create a virtual port pair, com2tcp establishes a link between one of the two ports in the pair and the terminal server. You can select either port for use with com2tcp. You must also know the following:

> › The terminal server's IP address

> › The terminal server's telnet port number
> The default telnet port numbers are 23 and 26.For information on determining the specific telnet port numbers. The process for manual VCP configuration shown here assumes the creation of a com0com port pair with the default name, as occurs with initial installation of the com0com package, and that com2tcp will use CNCB0 and the legacy serial application will use CNCA0.

» Open a command prompt window; to do this, select **Start > All Programs > Accessories > Command Prompt**.

» Change to the installation location for com2tcp.

» At the command prompt, enter
com2tcp --telnet \\.\<CNCB0> <IP address> <telnet port> where

> › **<CNCB0>** is the name of the VCP used by com2tcp, for which CNCB0 is the default name

> › **<IP address>** is the actual terminal server IP address; for example, 169.254.5.67

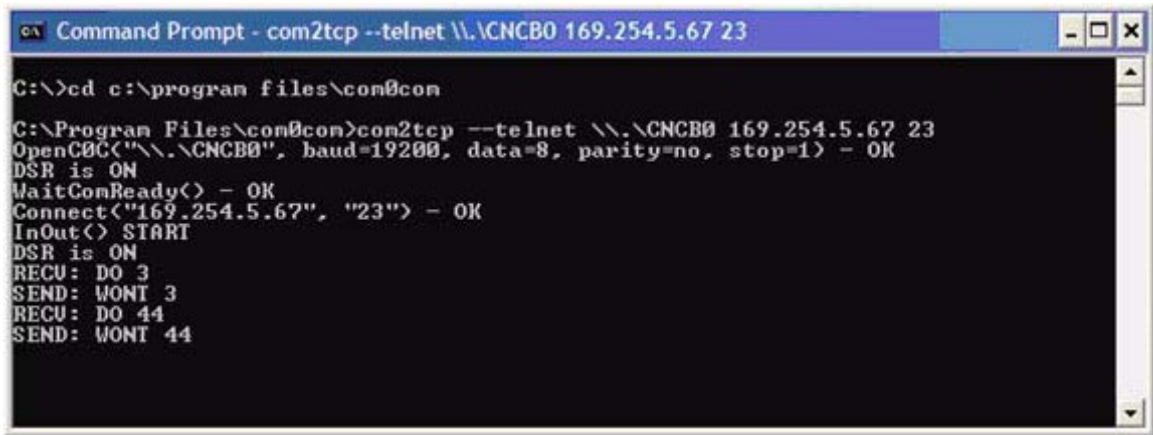> › **<telnet port>** is the actual telnet port number; for example, 23

For an example of this command string and the terminal server's response, see Manual VCP configuration window below.

Manual VCP configuration window

Com0com now has an established link between the terminal server and virtual COM port CNCB0, allowing Windows applications to connect to the terminal server through the virtual COM port CNCA0 (the port used by the legacy serial application). When communication occurs, com2tcp provides status information in the command prompt window, as shown below.

Com2tcp communication shown in the command prompt window

If you need to end com2tcp, click the command prompt window to be sure it is the active window and press **CTRL+C**.

Verify VCP Operation

Connect the terminal server hardware as figures shown earlier. Open two HyperTerminal windows, one Virtual COM port and one standard COM port, as follows:

1. Open one HyperTerminal window. On Windows XP, HyperTerminal can be found by clicking **Start**, **Programs**, **Accessories**, and then **Communications**.

2. Enter a name for the terminal window and click **OK**.

3. In the **Connect Using** pull-down menu, select the COM port associated with the port that the Terminal block is connected to on your PC and click **OK**.

4. Select 115200 for **Bits per second**, 8 for **Data bits**, None for **Parity**, 1 for **Stop Bits**, and None for **Flow Control**.

5. Open another HyperTerminal window.

6. Enter a name for the terminal window and click **OK**.

7. In the **Connect Using** pull-down menu, select **CNCA0**. Then click **OK**.

8. Now you can type in one of the HyperTerminal windows and see the text displayed in the other HyperTerminal window. This demonstrates the terminal server converting serial data to Ethernet and vice versa.

As an alternative, the **Serial** connection of TeraTerm can be used to verify the VCP operation.

Com0com and com2tcp are open-source (GPL) projects. For additional information and source code for the com0com and com2tcp, refer to the terminal server documentation and source code CD or search the Internet for the respective project name.

Using TeraTerm Telnet Connection

As an easier solution, Telnet support of Teraterm can be used to connect a terminal window direct to the terminal server.

Start the TeraTerm application. Check TCP/IP box, and type in the terminal server IP address **192.168.12.10**. Click **OK**.

The TeraTerm terminal window works similar to windows terminal window. Refer to **Help** of the TeraTerm for its configuration details.
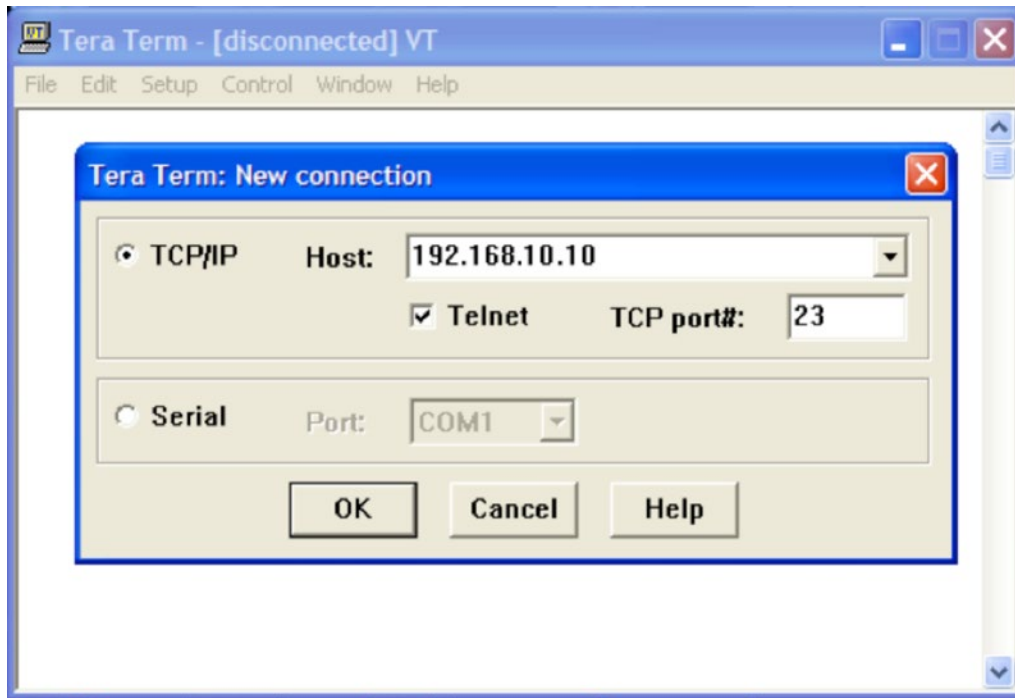
Using Windows UPnP to Discover Your Terminal Servers

Universal Plug and Play (UPnP) support is provided by default in Windows XP and Windows Vista, but must be enabled. All the terminal servers **MUST** be assigned with different IP address.
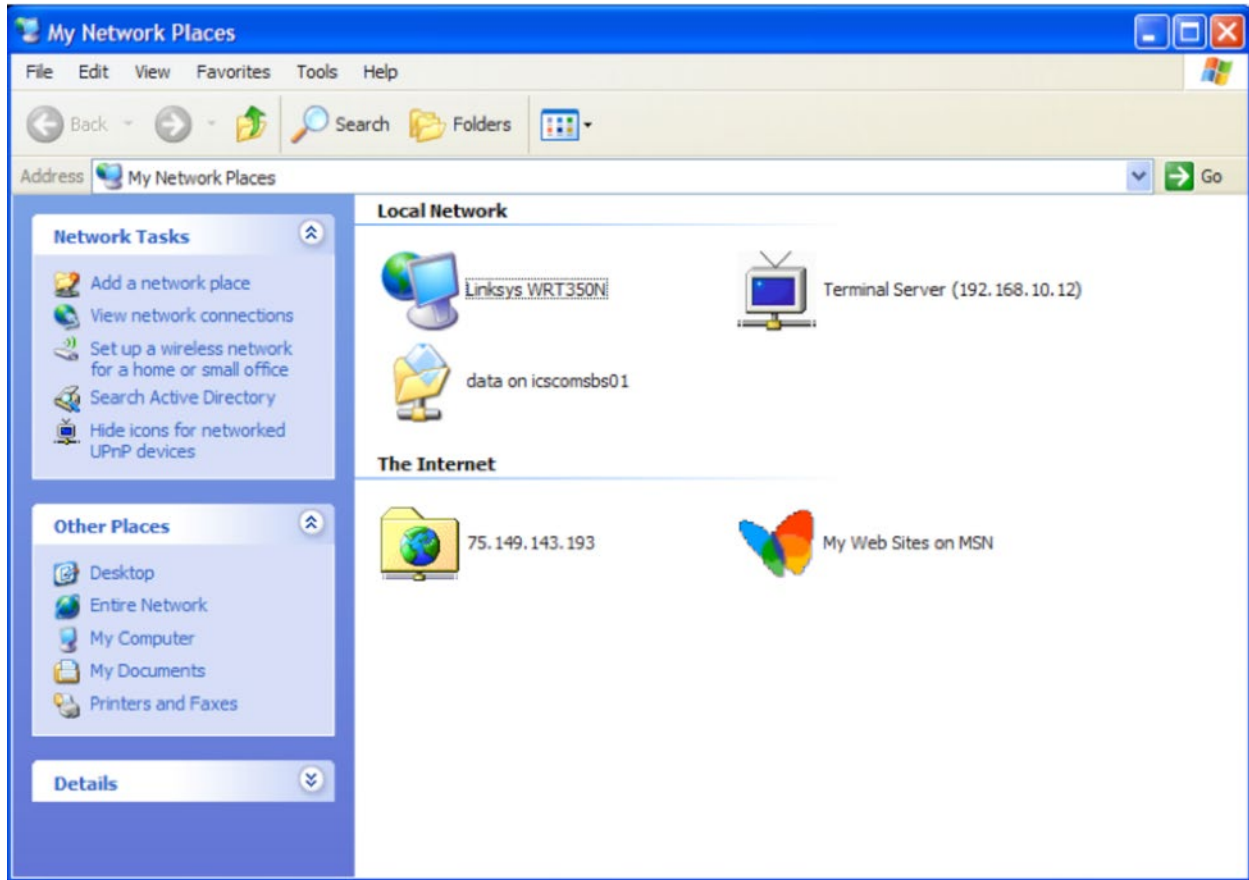
Open **Windows Firewall** from **start** -> **Control Panel**
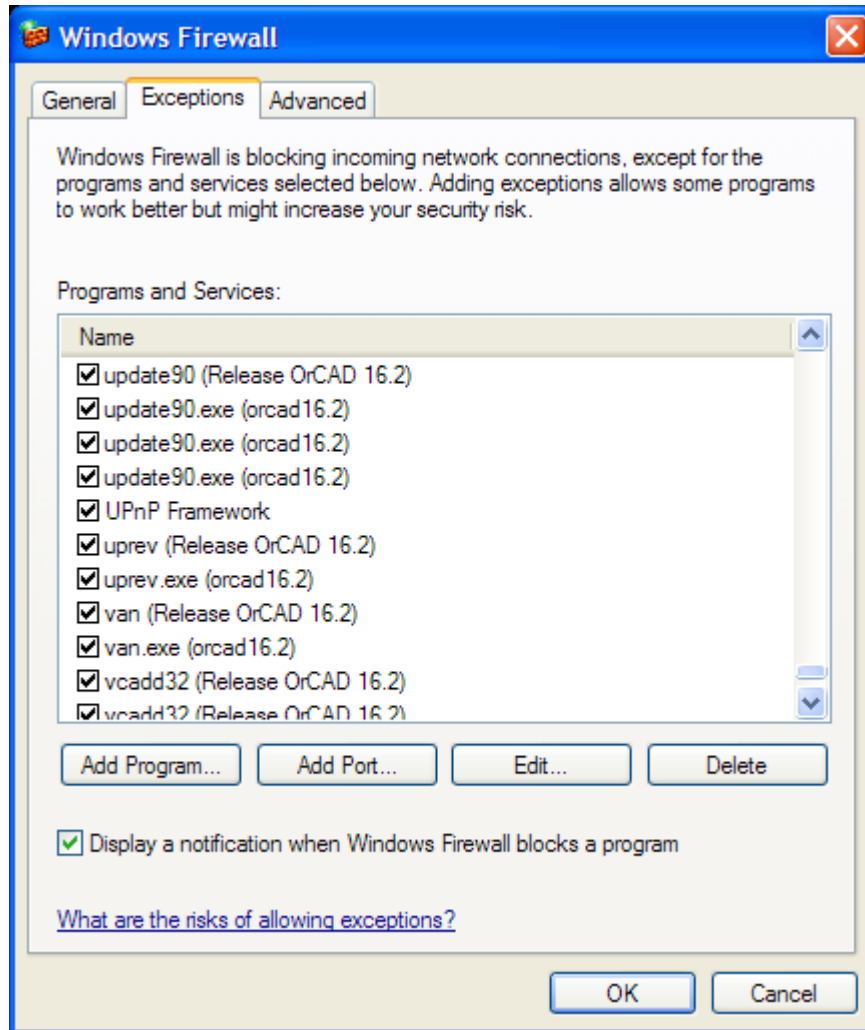
Windows Firewall

To enable the UPnP, make sure the **UPnP Framework** box is checked. Click **OK**.

Go to **start** -> **My Network Places**. **Terminal Server (192.168.12.12)** appears.

Windows My Network Places

ComNet Customer Service
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Email ComNet Global Service Center: customercare@comnet.net