DEVICE·MASTER® UP

Hardware Installation Guide

COMTROL®
Network Enabling Devices

Table of Contents

Getting Started

This guide discusses initial DeviceMaster UP installation, configuration, and provides information on locating DeviceMaster UP protocol-specific software and related installation documentation.

Protocols Supported

The DeviceMaster UP is a network attached, solid-state 1 or 4-port device server, which hosts an Industrial Ethernet® engine and translates device communications to a programmable logic controller (PLC) and any serial device.

After installing the appropriate firmware for your DeviceMaster UP, it enables connectivity between any PLC® and any serial device. The DeviceMaster UP supports the following protocols:

- EtherNet/IP
- Modbus/TCP
- PROFINET CbA

Note: *This guide does not discuss configuring the port characteristics or protocol-specific programming information. See* *Locating Software and Documentation* *on Page 6 to locate the firmware and the appropriate documentation for your environment.*

Quick Start

Installation and configuration follows these steps.

1. Install the hardware (Page 9).
2. Install PortVision Plus (Page 19).
3. Configure the DeviceMaster UP network settings (Page 20).
4. Update the firmware on the DeviceMaster UP for your protocol (Page 22).
5. See *Locating Software and Documentation* on Page 6 to locate the appropriate installation document for your protocol so that you can perform the following procedures:
   a. Configure port characteristics using the *Server Configuration* web page.
   b. Program the PLCs.
6. Connect the serial device or devices (Page 25).

Locating Software and Documentation

You can access the appropriate firmware assembly, PortVision Plus, and the *DeviceMaster UP* documentation from the CD shipped with the DeviceMaster UP or you can download the latest files using these internet links.

PortVision Plus

PortVision Plus is the application that you use to configure network settings and upload the firmware for your protocol.	

DeviceMaster UP Firmware

EtherNet/IP (**.msi**) file contains the firmware and supporting files. The firmware provides embedded configuration web pages. *Note: If you are currently running EtherNet/IP firmware V2.x platform, you may want refer to the DeviceMaster UP EtherNet/IP User Guide for architecture information before upgrading.*	
Modbus/TCP (**.msi**) contains the firmware and supporting files. The firmware provides embedded configuration web pages. *Note: If you are currently running Modbus/TCP firmware V2.x platform, you may want refer to the DeviceMaster UP Modbus/TCP User Guide for architecture information before upgrading.*	
PROFINET CbA (**.msi**) contains the firmware and supporting files. The firmware provides embedded configuration web pages.	
Bootloader (**.bin**) is the operating system that runs on the DeviceMaster UP hardware during the power on phase, which then starts SocketServer. The bootloader can be disabled and you can communicate to the device using Redboot.	
SocketServer (**.bin**) is the DeviceMaster UP default application that is loaded on the unit.	

DeviceMaster UP Documentation

EtherNet/IP Quick Start is an outline of installation and configuration procedures with links to the appropriate documents.	
EtherNet/IP Interface Configuration Guide contains configuration procedures for the DeviceMaster UP embedded web pages.	
EtherNet/IP User Guide contains detailed protocol-specific information about the DeviceMaster UP.	
Modbus/TCP Quick Start is an outline of installation and configuration procedures with links to the appropriate documents.	
Modbus/TCP Interface Configuration Guide contains configuration procedures for DeviceMaster UP embedded web pages.	

DeviceMaster UP Documentation (Continued)

Modbus/TCP User Guide contains detailed protocol-specific information about the DeviceMaster UP.	
PROFINET CbA Quick Start is an outline of the installation and configuration procedures with links to the appropriate documents.	
PROFINET CbA User Guide contains protocol-specific information about configuring the DeviceMaster UP.	
DeviceMaster UP Filtering and Data Extraction Reference Guide describes the data extraction and filtering processes provided by the DeviceMaster UP with EtherNet/IP or Modbus/TCP 3.x firmware or higher.	
DeviceMaster UP Hardware Installation Guide (this guide) contains hardware installation, PortVision Plus installation, and firmware updating procedures.	

Hardware Installation

Installation Overview

The enables communications with serial devices over an Ethernet network. The DeviceMaster UP provides for remote management, configuration, and connectivity through its 10/100BASE–T Ethernet connection.

Default Network Settings

IP address:
192.168.250.250

Subnet mask:
255.255.0.0

Gateway address:
192.168.250.1

Use the links below to locate installation procedures for the following models:

Ports	Model Description	Installation Procedure
1†	DB9 serial port with one Ethernet port	*1-Port Installation* on Page 10
1	Embedded system	*1-Port Embedded Installation* on Page 12
4†	DB9 serial ports with two Ethernet†† ports	*4-Port Installation* on Page 16
†	*The DeviceMaster UP 4 -port models also include DB9 to RJ45 adapters.*	
††	*One of the Ethernet ports on the DeviceMaster UP 4-port is a built-in downstream port for daisy-chaining DeviceMaster UP systems or other network-ready devices.*	

1-Port Installation

Use the following procedure to install the DeviceMaster UP 1-Port.

1. Record the MAC address, model number, and serial number of the DeviceMaster UP unit on the customer service label provided.

   The serial number and MAC address are located on a label on the device. The MAC address starts with **00 C0 4E**.

2. Place the DeviceMaster UP 1-Port on a stable surface and skip to Step 3 or optionally mount the DeviceMaster UP using the mounting flanges or DIN rail adapters.

   a. Pick up the DeviceMaster UP so that the front of the device is facing you.

   b. Pick up a DIN rail clip. (The three tines should be on top and the **M4** label should face you.)
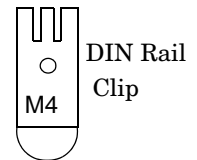
   c. Slide the DIN rail clip behind the DeviceMaster UP and line it up with one of the screw holes on the DeviceMaster UP.

   DIN Rail Clip
   M4

   d. Insert a screw into the hole and tighten with a Phillips screwdriver.

   e. Repeat Steps b through d with the second DIN rail clip. Make sure the screws on both DIN rail clips line up.

   Side View
   Press here

   Note: *If you need to remove the DeviceMaster UP from the DIN rail, exert pressure on the backside of the tabs at the bottom of both DIN rail clips.*
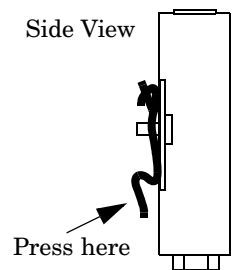
   f. Attach the DeviceMaster UP to the DIN rail.

   Note: *For optimal operation, make sure that the device is mounted in a vertical orientation with a minimum of 1.0" space on either side and a minimum of 4.5" clearance from the center of the rail to any device or wire trough above the unit and a minimum of 5.0" below.*

   4.5" 1.0" **DeviceMaster UP** 1.0"
   5.0" Front View
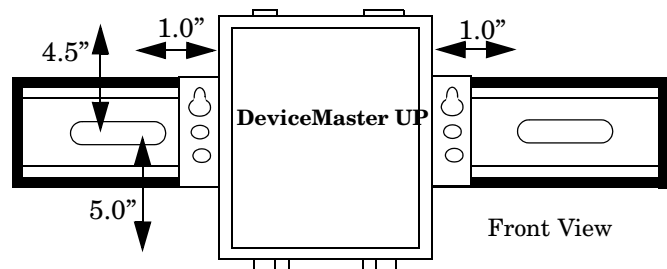
3. Connect the DeviceMaster UP port labeled **10/100 ETHERNET** to the same Ethernet network segment as the PLC using a standard network cable.

   The default serial port setting on the DeviceMaster UP is RS-232. Do not connect serial devices until you have configured the serial port settings. You must first configure the network and then upload the firmware before you can configure serial port settings.

   Caution

4. Apply power to the DeviceMaster UP using the following procedure.

   Note: *See Power Supply for the 1-Port on Page 32, if you want to provide your own power supply.*

⚠️ **Caution**

Observe proper ESD techniques when connecting and disconnecting the DeviceMaster UP.

a. Connect the screw terminal power connector to the wires on the power supply as displayed below. If you want to provide your own power supply, see *Power Supply for the 1-Port* on Page 32.

Larger Picture, *Page 35*

If you are using the power supply (optionally) shipped with the DeviceMaster UP:

- Red is 5-30VDC positive
- White is 5-30VDC return
- Black is earth ground

Screw Terminal Power Connector

Earth Gnd   5-30VDC   Return

Positive

Wire gauge:

AWG 12-22

b. Use a small flat head screw to lock the wires into place.

c. Plug the screw terminal power connector into the DeviceMaster UP.

   Note: Align the plug properly. The scalloped side of the screw terminal power connector should be aligned with the scalloped side of the power jack on the unit.
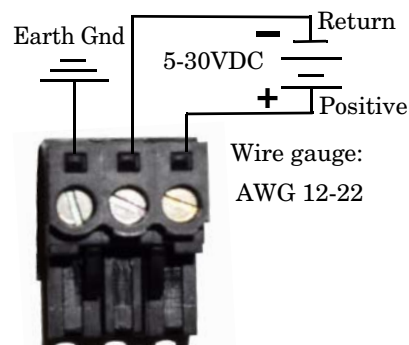
d. Connect the power supply to a power source.

e. Go to Step 5 to verify that the DeviceMaster UP is functioning properly.

5. Verify that the network connection for the DeviceMaster UP is functioning properly.

LED	Description
Status	The amber **Status** LED on the device is lit, indicating you have power and it has completed the boot cycle. *Note: The Status LED flashes while booting and it takes approximately 15 seconds for the bootloader to complete the cycle.*
Link Act	If the red **Link Act** LED is lit, it indicates a working Ethernet connection.
Duplex	If the red **Duplex** LED is lit, it indicates full-duplex activity.
100	If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).

6. Go to *Configuring the DeviceMaster UP* on Page 19 to install PortVision, configure the network settings, and upload the appropriate protocol firmware on the DeviceMaster UP.

1-Port Embedded Installation

Installing the DeviceMaster UP 1-Port Embedded system follows these basic steps:

- Building the serial ribbon cable (below).
- *Mounting the Embedded 1-Port* on Page 13 and installing light pipes.
- *Attaching the Network and Serial Cables* on Page 14.
- *Connecting the Power and Verifying Installation* on Page 14.

Building the Serial Ribbon Cable

Use the following information to build a DB9 serial ribbon cable to connect to the DeviceMaster UP 1-Port Embedded IDC10 connector (**J2**).

IDC10	1	2	3	4	5	6	7	8	9
DB9M	1	6	2	7	3	8	4	9	5
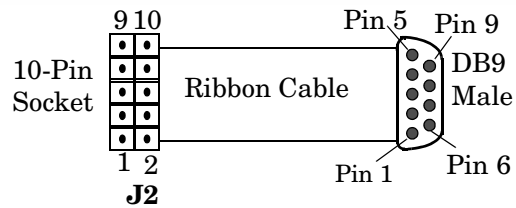
J2 Header	RS-232	RS-422	RS-485
1	CD	Not used	Not used
2	DSR	Not used	Not used
3	RxD	RxD-	Not used
4	RTS	TxD+	TRX+
5	TxD	TxD-	TRX-
6	CTS	RxD+	Not used
7	DTR	Not used	Not used
8	RI	Not used	Not used
9	GND	Not used	Not used
10	Not connected		

Mounting the Embedded 1-Port

Use the following procedure to mount the DeviceMaster UP 1-Port Embedded with the 5-30VDC power supply.

> ⚠️ **Caution**

Observe proper ESD techniques when handling the DeviceMaster UP.

1. Carefully remove the DeviceMaster UP from the anti-static bag, following standard electrostatic device handling procedures.

   Note: Write down the MAC address located on a label on the bottom (solder side) center of the DeviceMaster UP because you may need it during configuration.

2. Mount the DeviceMaster UP for your environment using 1/4" stand-offs to separate the DeviceMaster UP from the base.
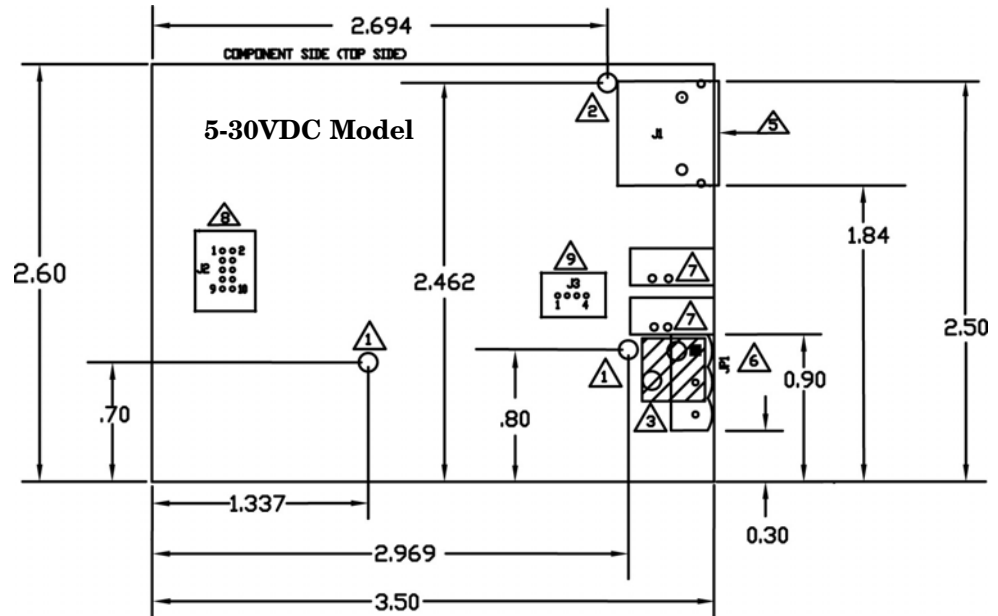
1. Non-plated/non-grounded mounting holes 0.116" diameter (+/-0.003").

2. Plated/chassis grounded mounting hole 0.116" diameter (+/-0.003").

3. WARNING: Holes in hatched area are not mounting holes.

4. Maximum component height above board is 0.55".

5. Ethernet connection J1: J1 overhangs board edge by 0.14" and the height is 0.55".

6. Power connector; the mating connector is Weidmuller P/N: 152651.

7. LED light pipe mounting holes. The LED light pipes are not provided.

8. Serial port connector J2: 0.1" pin spacing, 0.025" square pin diameter, and 0.230" pin height.

9. Debug port connector J3: 0.1" pin spacing, 0.025" square pin diameter, and 0.230" pin height.

> ⚠️ **Caution**

3. Use one of the following methods to ground the DeviceMaster UP.

   - Through the **power supply** by connecting the ground wire on the power cable using plastic or metal stand-offs.

   - Through the **chassis**, using metal stand-offs. If plastic stand-offs are used to mount the board, then you must ground the DeviceMaster UP using the power cable.

   Note: The maximum diameter of the metal stand-offs should be 0.175" with a 4-40 machine screw. Metal stand-offs are not provided with the DeviceMaster UP.

4. Optionally, attach the light pipes. The following light pipes have been tested and found to function; Bivar, Inc. (P/N:LP-230) and Ledtronics, Inc. (P/N:LTP003-0CW-001).

After mounting the DeviceMaster UP, you are ready to connect the cables.

Attaching the Network and Serial Cables

Use the following procedure to attach the serial ribbon and Ethernet cables. For a larger illustration of the system, see *1-Port Embedded* on Page 36.

1. Attach the ribbon cable built in *Building the Serial Ribbon Cable* on Page 12 to the header labeled **J2**.

Ethernet 10/100 Connector

J2
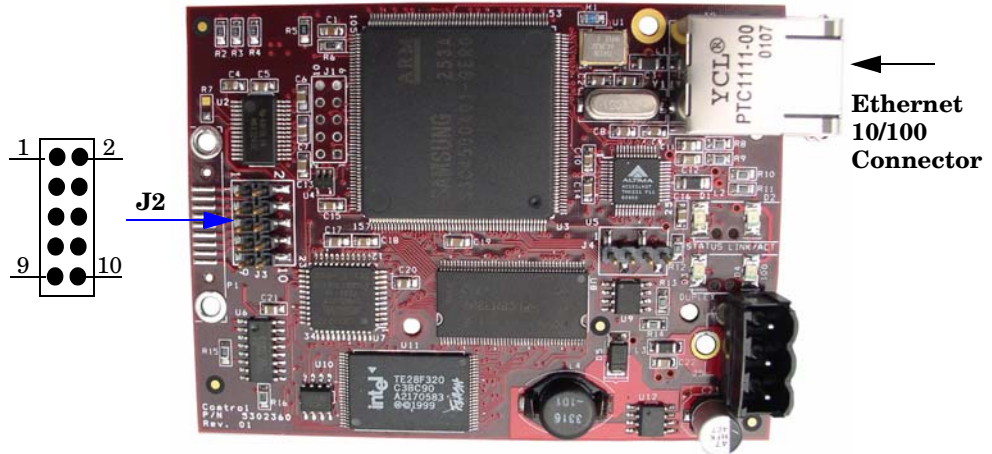
2. Connect a standard Ethernet cable from the RJ45 port on the DeviceMaster UP to your Ethernet hub or a crossover cable to a server NIC.

⚠ **Caution**

The default port setting on the DeviceMaster UP is RS-232. Do not connect the serial device until you have configured the serial port settings. You must configure network settings and upload firmware before configuring the serial port settings.

Use the next subsection to wire the power terminal connector and verify the hardware installation.

Connecting the Power and Verifying Installation

Use the following procedure to wire the power terminal connector and connect the DeviceMaster UP to a power source.

1. Connect the screw terminal power connector to the wires as displayed in the image.

   The locally-supplied power supply must conform to the specifications provided in *Power Supply for the 1-Port* on Page 32.

Screw Terminal Power Connector
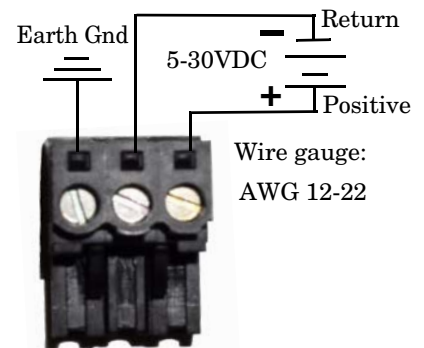
Earth Gnd

Return

5-30VDC

Positive

Wire gauge:
AWG 12-22

⚠ **Caution**

Observe proper ESD techniques when connecting and disconnecting the DeviceMaster UP.

2. Use a small flat head screw to lock the wires into place.

3. Plug the screw terminal power connector into **JP1** on the DeviceMaster UP by aligning the scalloped sides.
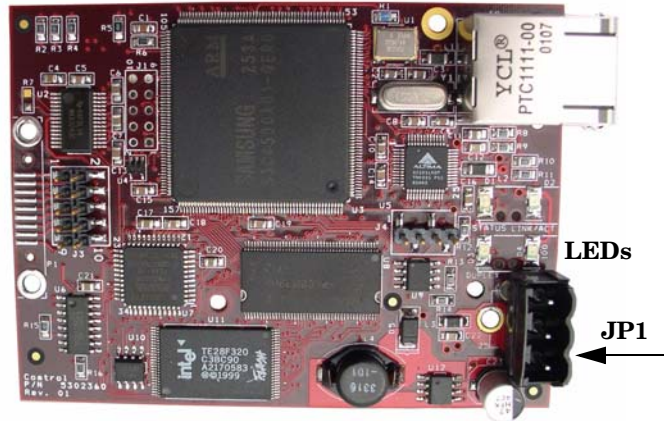
4. Apply power to the DeviceMaster UP.

5. Verify that the network connection for the DeviceMaster UP is functioning properly.

   The LEDs are located between the RJ45 connector and the power terminal block.

LED	Description
Status	When lit, the amber **Status** LED (**D1**) on the DeviceMaster UP indicates the devices is fully powered and has completed the boot cycle. *Note:* *The Status LED flashes for approximately 15 seconds while booting. When the bootloader completes the cycle, the LED has a solid, steady light.*
Link/Act	When lit, the red **Link/Act** LED (**D2**) indicates a working Ethernet connection.
Duplex	When lit, the red **Duplex** (**D3**) LED indicates full-duplex activity.
100	When lit, the red **100** (**D4**) LED indicates a working 100 MB Ethernet connection (100 MB network, only).

6. Go to *Configuring the DeviceMaster UP* on Page 19 to install PortVision, configure the network settings, and upload the appropriate protocol firmware on the DeviceMaster UP.

4-Port Installation

Use the following procedure to install the DeviceMaster UP 4-port.

1. Record the MAC address, model number, and serial number of the DeviceMaster UP unit on the customer service label provided.

   You may need the MAC address during driver configuration. The serial number and MAC address are located on a label on the device. The MAC address starts with **00 C0 4E**.

2. Optionally, attach the mounting brackets using the screws provided in the kit (6-32 1/4" flathead machine) or place the DeviceMaster UP on a stable surface.

 Larger Picture, *Page 36*

Caution

Failure to use the correct screws can damage the PCB and void the warranty. Do NOT use screws that exceed the length of the screws provided with the mounting bracket kit.

Note: *If you ordered the DeviceMaster Rackmount Shelf Kit accessory, use the document that accompanied that kit or download the document to mount the DeviceMaster UP on the shelf.*

3. Connect the DeviceMaster UP to the same Ethernet network segment as the PLC using one of the following methods:

   - **Ethernet hub or switch (10/100Base-T)**: Connect to the port labeled **UP** on the DeviceMaster UP using a standard Ethernet cable.

   - **Server NIC (10/100Base-T)**: Connect to the port labeled **DOWN** on the DeviceMaster UP using a standard Ethernet cable.

   - **Daisy-chaining DeviceMaster UP units**: Connect the port labeled **DOWN** on the first DeviceMaster UP to the port labeled **UP** on the second DeviceMaster UP or other device using a standard Ethernet cable. Refer to *Daisy-Chaining DeviceMaster UP 4-Port Units* on Page 51 for more detailed information.

      Note: *Do not connect multiple units until you have changed the default IP address, see Configuring the DeviceMaster UP on Page 19.*

Caution

The default serial port setting for the DeviceMaster UP is RS-232. Do not connect any serial devices until you have configured the serial port settings. You must first configure the network settings and upload the firmware on the DeviceMaster UP before configuring the serial port settings.

4. Apply power to the DeviceMaster UP by connecting the AC power adapter to the DeviceMaster UP, the appropriate power cord for your location to the power adapter, and plugging the power cord into a power source. If you want to provide your own power supply, see *Power Supply for the 4-Port* on Page 32.

5. Verify that the network connection for the DeviceMaster UP is functioning properly.

LED	Description
PWR	LED on the front panel of the DeviceMaster UP is lit, indicating you have power and it has completed the boot cycle. ***Note:*** *The PWR LED flashes while booting and it takes approximately 15 seconds for the bootloader to complete the cycle.*
LNK ACT	The red **LNK ACT** LED is lit, indicating that you have a working Ethernet connection.
COL	If the red **COL LED** is lit, there is a network collision.
100	If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).

The table's right-hand side shows a diagram labeled: 10/100 NETWORK, LNK ACT, COL, 100, UP, DOWN.

6. Go to *Configuring the DeviceMaster UP* on Page 19 to install PortVision, configure the network settings, and upload the appropriate protocol firmware on the DeviceMaster UP.

Adding a Unit to an Existing Installation

Use this procedure to add another DeviceMaster UP to an existing configuration.

1. Install the DeviceMaster UP to an Ethernet hub or server NIC using the appropriate subsection found in *Installation Overview* on Page 9.

   Note: *Technical support recommends installing one unit at a time and testing that unit when installing multiple units. In the event troubleshooting must be done, a single unit is much easier to resolve than several at once.*

2. Power-up the new DeviceMaster UP and verify that the **PWR** or **Status** LED lights.

3. If required, program an IP address into the new DeviceMaster UP.

4. Configure the DeviceMaster UP ports to support the serial devices.

Replacing Hardware

Use this procedure to replace hardware.

1. Configure the IP address in the new DeviceMaster UP.

2. Remove the old unit and attach a new or spare DeviceMaster UP.

3. Connect the new DeviceMaster UP to the network hub or server NIC.

4. Apply power to the new DeviceMaster UP and verify that it passes the power on self-test.

5. Program the IP address of the new DeviceMaster UP.

6. Configure any ports as necessary to match the previous unit.

7. Transfer *all* cabling from the old DeviceMaster UP to the new DeviceMaster UP.

8. *It is not necessary* to shut down and restart the host PC.

Configuring the DeviceMaster UP

The DeviceMaster UP platform includes PortVision Plus, which is the management application that you use to:

- Configure the DeviceMaster UP network settings
- Upload protocol-specific firmware for your environment
- Access the protocol-specific *Server Configuration* page for serial port configuration

You can use PortVision Plus to monitor and manage devices from a centrally-located personal computer. PortVision Plus detects and graphically displays, in detail, every DeviceMaster UP server on the network. Network administrators can see the real-time operating conditions for each device server at a glance.

Note: If PortVision Plus is already installed, go directly to Configuring the DeviceMaster UP Network Settings on Page 20 to change the IP address on the DeviceMaster UP.

Installing and Upgrading PortVision Plus

PortVision Plus requires a host system running Windows 2000, Windows XP, or Windows Server 2003.

Before installing PortVision Plus, consider the following:

- Use PortVision Plus to upload firmware and apply changes to a DeviceMaster UP that is on the *same local network segment* as the system on which PortVision Plus is installed. You cannot apply changes through PortVision Plus to a DeviceMaster UP that is not on the same local network segment.
- Use PortVision Plus to monitor any DeviceMaster UP on the network. The DeviceMaster UP does not have to be on the same local network segment as PortVision Plus for monitoring purposes.

You can install or upgrade PortVision Plus from the *Software and Documentation* CD that came with your DeviceMaster UP or download the latest version.

- Install from the CD using the menu system or by executing the **.msi** file in the **/Dev_Mstr/PortVision_UP** directory.
- Download the latest from http://support.comtrol.com/download.asp?partnumber=1800294.

Note: See the PortVision Plus help system for information.

Installing PortVision Plus

Use the following procedure to install PortVision Plus.

1. Execute the PVPlus.msi file, follow the *Installation Wizard*, and optionally select **Launch** PortVision Plus at the last screen.

2. When you launch PortVision Plus, you are queried as to whether you want to access to the COM port utilities (Test Terminal and Port Monitor), select **No**.

Upgrading PortVision Plus

Use the following procedure to upgrade PortVision Plus.

1. Execute the **PVPlus.msi** file.

2. Select **Next** at the first screen.

3. Select **Modify** and follow the installation wizard.

Configuring the DeviceMaster UP Network Settings

Default Network Settings

IP address:
  192.168.250.250

Subnet mask:
  255.255.0.0

Gateway address:
  192.168.250.1

Use the following procedure to change the DeviceMaster UP network settings.

Note: The DeviceMaster UP must be connected to the same local network segment as the computer on which PortVision Plus is installed.

1. If you have not done so, install PortVision Plus (see *Installing and Upgrading PortVision Plus* on Page 19).

2. If necessary, start PortVision Plus by double-clicking the PortVision Plus icon or select **Start > Programs > Comtrol > PortVision Plus**.

3. If this is the first time PortVision Plus has been opened, select the **Scan** button to locate DeviceMaster UP units on the network.

4. Highlight the DeviceMaster UP for which you want to program network information and select the **Config** button.

    Optionally, you can double-click on the DeviceMaster UP or right-click on the DeviceMaster UP and select **Configure Device**.

    *Note: The **Status** column for the DeviceMaster UP must display **ON-LINE** before you can go to the next step.*

5. Optionally, rename the device in the **Device Name** box.
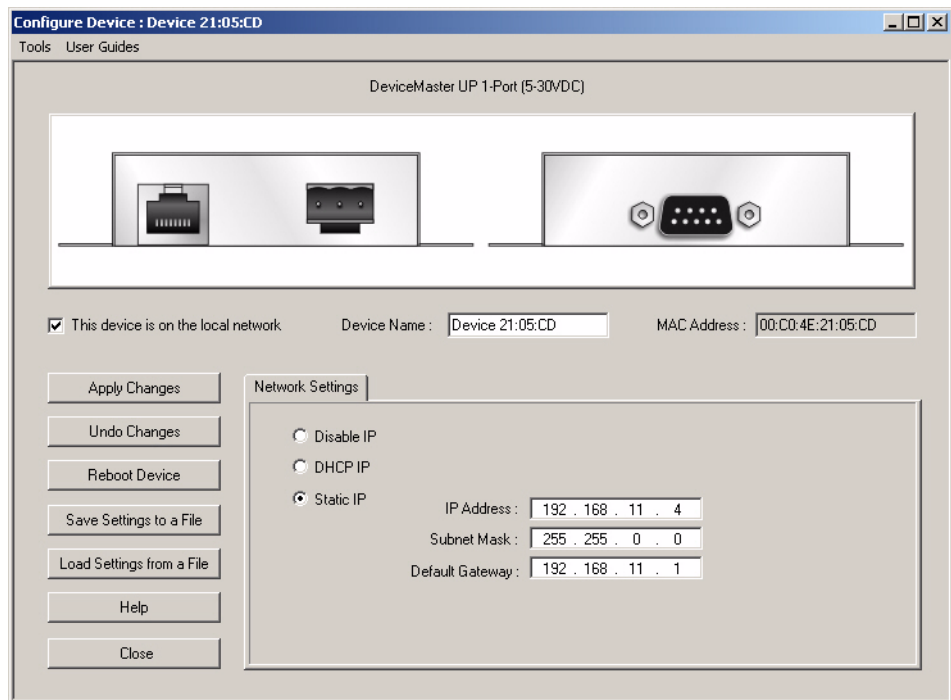
6. If necessary, select **This device is on the local network**.

7. Change the device network properties as required for your site.

Select one of the following options:	
Disable IP	Select this option if you want to run the device using the MAC addressing scheme. ***EtherNet/IP Users:*** The DeviceMaster UP does not support **Disable IP**.
DHCP IP†	Select this option if you want to use the device with DHCP. Make sure that you provide the MAC address of the device to the network administrator.
Static IP†	Select this option to program a static IP address and type the appropriate IP address, subnet mask, and default gateway values for your site in the provided boxes.
† ***PROFINET Users:*** *The network address entered here must match the IP address entered in SIMATIC® iMap. See the [DeviceMaster UP PROFINET User Guide](#) for information about assigning addresses.*	

8. Select **Apply Changes** and **Close**. It may take up to a minute for the DeviceMaster UP status return to **ON-LINE**.

9. If you have not done so, upload the appropriate protocol firmware for your environment using the next subsection, *[Uploading Protocol-Specific Firmware on the DeviceMaster UP](#)* on Page 22.

Uploading Protocol-Specific Firmware on the DeviceMaster UP

Comtrol ships the PortVision Plus from the factory with SocketServer firmware installed on the device. The SocketServer firmware provides an interface to TCP/IP socket mode configuration and services.

If you intend to use DeviceMaster UP in one of the following environments, you must replace SocketServer with protocol-specific firmware:

- EtherNet/IP
- Modbus/TCP
- PROFINET CbA

The CD shipped with the DeviceMaster UP contains the required firmware and support files in a self-installing (**.msi**) file or you can download the latest from the Internet.

Use the following procedure to update the firmware on your DeviceMaster UP for the appropriate protocol. See *Locating Software and Documentation* on Page 6, if you need to download the **.msi** file.

1. If you have not done so, open the **.msi** file and follow the installation wizard to copy the files to a **/Comtrol/** folder onto your system.

2. Start PortVision Plus by double-clicking the PortVision Plus icon or select **Start > Programs > Comtrol > PortVision Plus**.

3. Right-click on the device or devices for which you want to upload firmware and select the **Upload Firmware** menu option.

   Optionally, you can high-light a device and use the **Load** button.
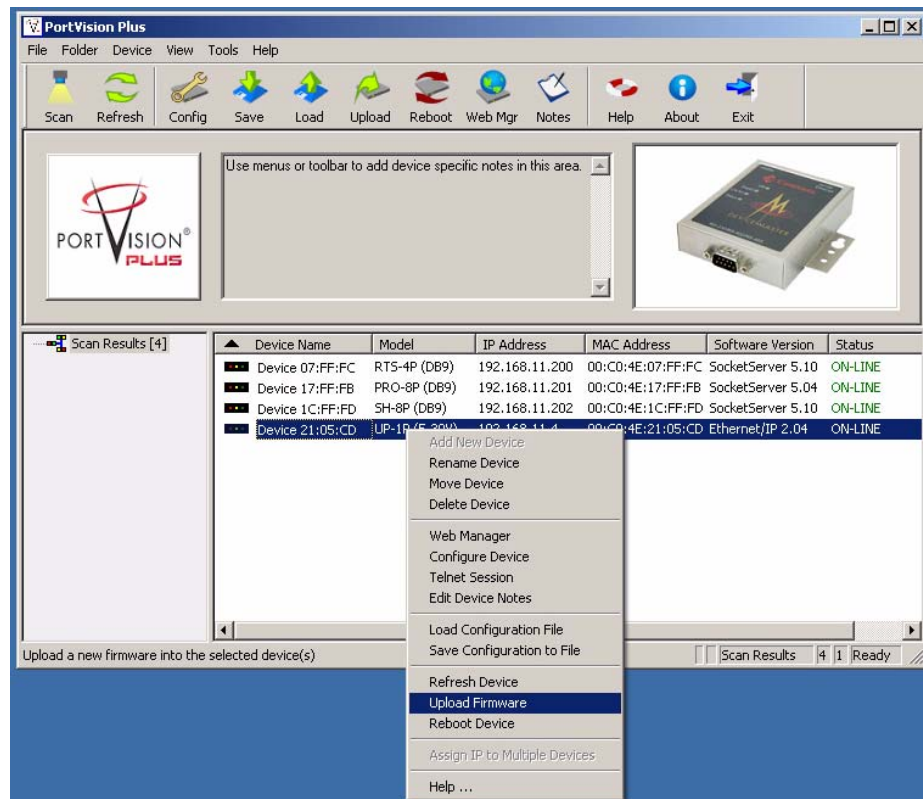
4. Browse and select the appropriate firmware (**.bin**) file and select **Open**.

5. Select **Yes** to upload the firmware.
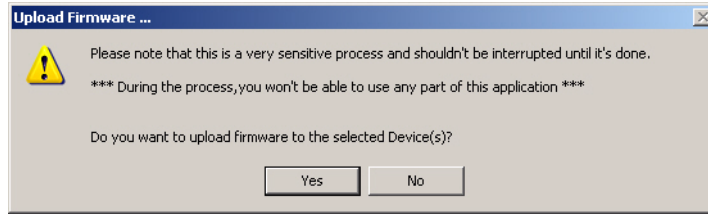
6. Select **OK** to the advisory message about waiting until the DeviceMaster UP is on-line and in the next minute the DeviceMaster UP unit or units should display **ON-LINE** in the **Status** field

7. Go to the appropriate *DeviceMaster UP User Guide* for your protocol for information about configuring the serial port or ports and programming your PLCs.

8. After configuring the serial port characteristics and preparing your PLC programs, you can use the next section in this guide, to attach the serial device or devices.

Connecting Serial Devices

This section discusses connecting your serial devices. In addition, it provides you with information to build serial or test cables and loopback connectors to test the serial ports.

Note: *Go to* [Building the Serial Ribbon Cable](#) *on Page 21 for connector information for the DeviceMaster UP 1-Port Embedded adapter.*

Connecting Devices

Use this procedure to connect asynchronous serial devices to the DeviceMaster UP ports.

1. Connect your serial devices to the appropriate port on the DeviceMaster UP using the appropriate cable. You can build your own DB9 cables using the appropriate discussion:
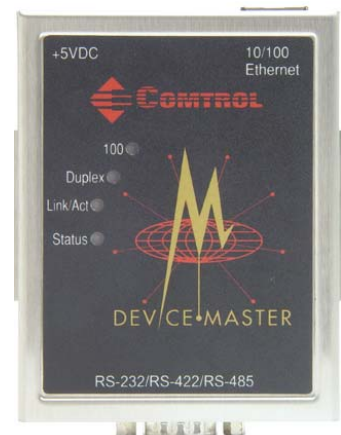
   - [DB9 Serial Cables and Loopback Plugs](#) on Page 27
   - [RJ45 Serial Cables and Loopback Plugs](#) on Page 29

   Note: *Refer to the hardware manufacturer's installation documentation if you need help with connector pinouts or cabling for the peripheral device.*

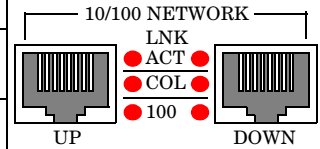2. Verify that the devices are communicating properly.

   The DeviceMaster UP 1-port has four LEDs on the top of the unit that provide information about the network connection of the serial port.

LED	Description
Status	The amber **Status** LED on the device is lit, indicating you have power and it has completed the boot cycle. *Note:* *The **Status** LED flashes while booting and it takes approximately 15 seconds for the bootloader to complete the cycle.*
Link Act	If the red **Link Act** LED is lit, it indicates a working Ethernet connection.
Duplex	If the red **Duplex** LED is lit, it indicates full-duplex activity.
100	If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).

The DeviceMaster UP 4-port model has Rx and Tx LEDs next to each port that provide information about the network connection of the serial port.

LED	Description
PWR	LED on the front panel of the DeviceMaster UP is lit, indicating you have power and it has completed the boot cycle. ***Note:*** *The **PWR** LED flashes while booting and it takes approximately 15 seconds for the bootloader to complete the cycle.*
LNK ACT	The red **LNK ACT** LED is lit, indicating that you have a working Ethernet connection.
COL	If the red **COL LED** is lit, there is a network collision.
100	If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).

- The amber Rx LEDs shows that the port is connected to another RS-232 device or receiving data in RS-422/485 mode.
- The green Tx LED shows that the data is transmitting.

DB9 LEDs

RX1*
TX1*

* Represents port number.

DB9 Serial Cables and Loopback Plugs

You can build your own null-modem or straight-through DB9 serial cables using the following subsections.

DB9 Connector Pinouts			
Pin	**RS-232**	**RS-422**	**RS-485**
1	DCD	Not used	Not used
2	RxD	RxD-	Not used
3	TxD	TxD-	TxD/RxD-
4	DTR	Not used	Not used
5	GND	Not used†	Not used†
6	DSR	Not used	Not used
7	RTS	TxD+	TxD/RxD+
8	CTS	RxD+	Not used
9	RI	Not used	Not Used
† *Pin 5 is tied to ground on the board, but is not used in the cable.*			

This illustrates the DB9 connector signals.

Pin 5 is tied to ground on the board, but is not used in the cable.
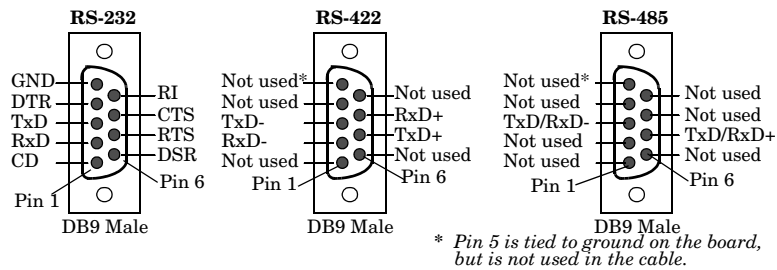
Note: If you are using a DB9 to RJ45 adapter, see RJ45 Serial Cables and Loopback Plugs on Page 29.

DB9 Loopback Plugs

Loopback connectors are DB9 female serial port plugs, with pins wired together as shown, that are used in conjunction with application software (Test Terminal or Minicom) to test serial ports. The DeviceMaster UP is shipped with a a single loopback plug (RS-232/422).

Wire the following pins together to build additional plugs or replace a missing RS-232 loopback plug:
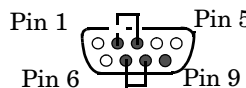
- Pins 1 to 4 to 6
- Pins 2 to 3
- Pins 7 to 8 to 9
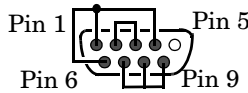
RS-232 Only (Back View)

The RS-232 loopback plug also works for RS-422.

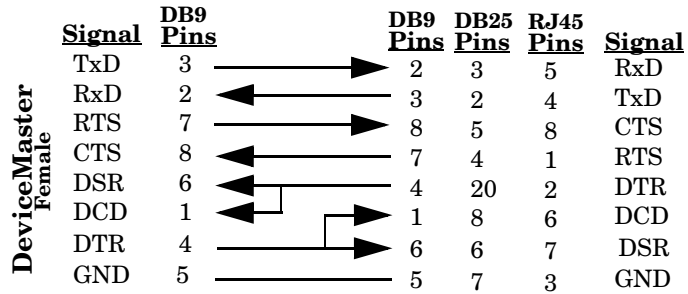Wire the following pins together for an RS-422 loopback plug:

- Pins 2 to 3
- Pins 7 to 8

RS-422 Only (Back View)

DB9 Null-Modem Cables (RS-232)

Use the following figure if you need to build an RS-232 null-modem cable. A null-modem cable is required for connecting DTE devices.

	Signal	DB9 Pins		DB9 Pins	DB25 Pins	RJ45 Pins	Signal
DeviceMaster Female	TxD	3	→	2	3	5	RxD
	RxD	2	←	3	2	4	TxD
	RTS	7	→	8	5	8	CTS
	CTS	8	←	7	4	1	RTS
	DSR	6	←	4	20	2	DTR
	DCD	1	←	1	8	6	DCD
	DTR	4	→	6	6	7	DSR
	GND	5	—	5	7	3	GND

Note: *You may want to purchase or build a straight-through cable and purchase a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.*
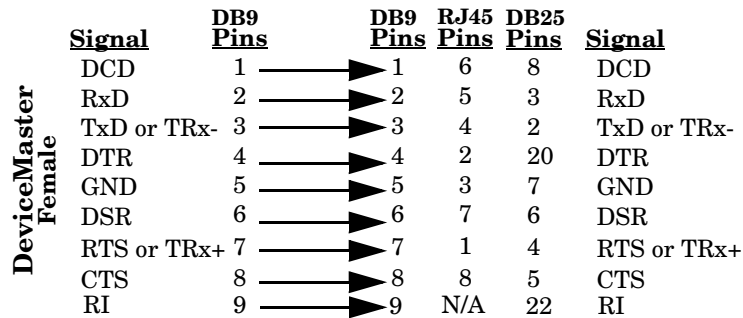
DB9 Null-Modem Cables (RS-422)

Use the following figure if you need to build an RS-422 null-modem cable.
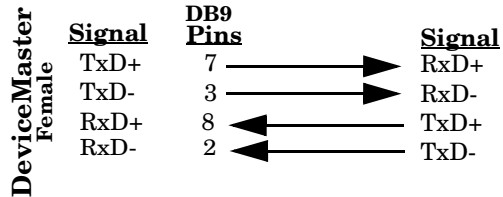
	Signal	DB9 Pins		Signal
DeviceMaster Female	TxD+	7	→	RxD+
	TxD-	3	→	RxD-
	RxD+	8	←	TxD+
	RxD-	2	←	TxD-

Note: *RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the documentation for the peripheral to determine the pinouts for the signals above.*

DB9 Straight-Through Cables (RS-232/485)

Use the following figure if you need to build an RS-232 or RS-485 straight-through cable. Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 of one PC to COM2 to a modem.

	Signal	DB9 Pins		DB9 Pins	RJ45 Pins	DB25 Pins	Signal
DeviceMaster Female	DCD	1	→	1	6	8	DCD
	RxD	2	→	2	5	3	RxD
	TxD or TRx-	3	→	3	4	2	TxD or TRx-
	DTR	4	→	4	2	20	DTR
	GND	5	→	5	3	7	GND
	DSR	6	→	6	7	6	DSR
	RTS or TRx+	7	→	7	1	4	RTS or TRx+
	CTS	8	→	8	8	5	CTS
	RI	9	→	9	N/A	22	RI

RJ45 Serial Cables and Loopback Plugs

You can build your own null-modem or straight-through RJ45 serial cables using the following subsections.

RJ45 Plug Signals
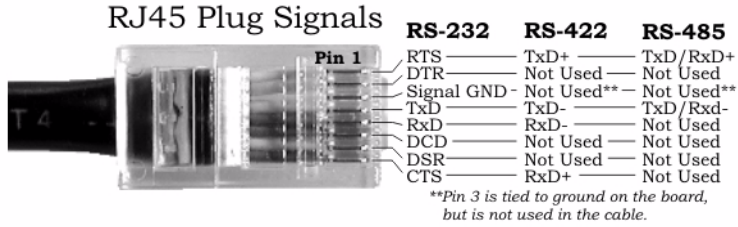
Pin	RS-232	RS-422	RS-485
1	RTS	TxD+	TxD/RxD+
2	DTR	Not used	Not used
3	Signal GND	Not used*	Not used*
4	TxD	TxD-	TxD/RxD-
5	RxD	RxD-	Not used
6	DCD	Not used	Not used
7	DSR	Not used	Not used
8	CTS	RxD+	Not used

Pin 3 is tied to ground on the board, but is not used in the cable.

RJ45 Null-Modem Cables (RS-232)

Use the following figure if you need to build an RS-232 null-modem cable. A null-modem cable is required for connecting DTE devices.
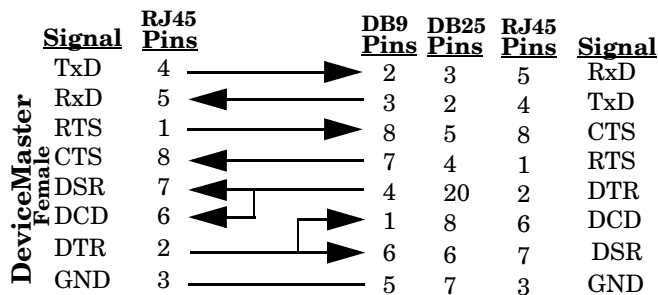
Note: *You may want to purchase or build a straight-through cable and purchase a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.*
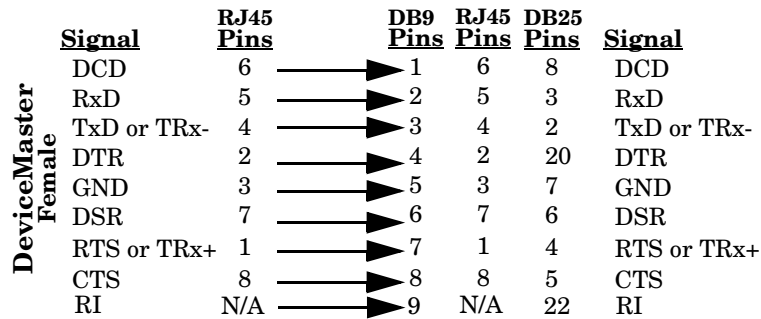
**RJ45 Null-Modem
Cables (RS-422)**

Use the following figure if you need to build an RS-422 null-modem RJ45 cable. A null-modem cable is required for connecting DTE devices.
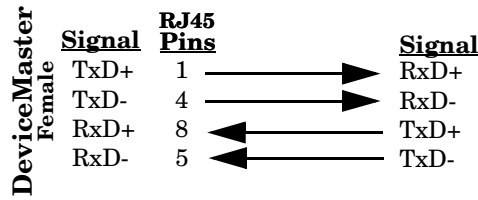
DeviceMaster Female	Signal	RJ45 Pins		Signal
	TxD+	1	→	RxD+
	TxD-	4	→	RxD-
	RxD+	8	←	TxD+
	RxD-	5	←	TxD-

Note: RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the documentation for the peripheral to determine the pinouts for the signals above.

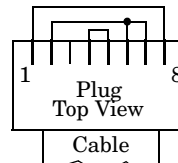**Straight-Through
Cables (RS-232/485)**

Use the following figure if you need to build an RS-232 or RS-485 straight-through cable. Straight-through cables are used to connect modems and other DCE devices. For example, a straight-through cable can be used to connect COM2 of one PC to COM2 to a modem.

DeviceMaster Female	Signal	RJ45 Pins		DB9 Pins	RJ45 Pins	DB25 Pins	Signal
	DCD	6	→	1	6	8	DCD
	RxD	5	→	2	5	3	RxD
	TxD or TRx-	4	→	3	4	2	TxD or TRx-
	DTR	2	→	4	2	20	DTR
	GND	3	→	5	3	7	GND
	DSR	7	→	6	7	6	DSR
	RTS or TRx+	1	→	7	1	4	RTS or TRx+
	CTS	8	→	8	8	5	CTS
	RI	N/A	→	9	N/A	22	RI

**RJ45 Loopback
Plugs**

Loopback connectors are RJ45 serial port plugs, with pins wired together as shown, that are used in conjunction with application software (Test Terminal or Minicom) to test serial ports. The DeviceMaster UP is shipped with a a single loopback plug (RS-232/422).
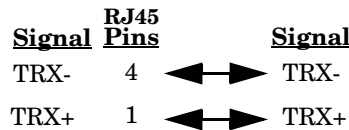
- Pins 4 to 5

- Pins 1 to 8

- Pins 2 to 6 to 7

1 Plug Top View 8

Cable

The RS-232 loopback plug also works for RS-422.

RS-485 Test Cable

You can use a straight-through cable as illustrated previously, or build your own cable.

Signal	RJ45 Pins		Signal
TRX-	4	← →	TRX-
TRX+	1	← →	TRX+

Note: RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the documentation for the peripheral to determine the pinouts for the signals above.

Hardware Specifications

The following subsections contain specifications and safety notices for the DeviceMaster UP family.

Electromagnetic Compliances

This table lists electromagnetic compliances for the DeviceMaster UP family.

Electromagnetic Compliances

Emission	Canadian EMC requirements ICES-003:
	    CISPR-22: AS/NZS-3548
	    European Standard EN55022:
	        Amendment A1:
	    FCC Part15 Subpart B: Class A limit

Immunity	EN55024:
	    IEC 1000-4-2: EN61000-4-2: ESD
	    IEC 1000-4-3: EN61000-4-3: RF
	    IEC 1000-4-4: EN61000-4-4: Fast Transient
	    IEC 1000-4-5: EN61000-4-5: Surge
	    IEC 1000-4-6: EN61000-4-6: Conducted disturbance
	    IEC 1000-4-8: EN61000-4-8: Magnetic field
	    IEC 1000-4-11: EN61000-4-11: Dips and Voltage Variations

Safety	IEC 60950/EN60950 CSA C22.2 No. 60950/UL 60950, Third Edition
Regulatory approvals	CE Mark, C-Tick, UL/CUL, and FCC Part 15: Subpart B: Class A

External Power Supply Specifications

This subsection discusses information that you may need if you wish to use your own external power supplies.

- *Power Supply for the 1-Port* on Page 32

  Note: *Use the specifications to provide a power supply for the embedded version.*

- *Power Supply for the 4-Port* on Page 32

Power Supply for the 1-Port

This subsection provides information for the DeviceMaster UP 1-port.

Screw Terminal Power Connector

Earth Gnd
Return
5-30VDC
Positive
Wire gauge: AWG 12-22

Table 1. Power Supply Shipped with Product

Comtrol Power Supply	5-30VDC Specifications
Input line frequency	50-60 Hz
Input line voltage	90-260 VAC
Output voltage	24VDC
Output current	500 mA @ 24VDC

Table 2 provides the specifications, if you intend on purchasing your own power supply.

Table 2. 5-30VDC Requirements for External Power Supply

External Power Supply	5-30VDC Specifications
Output voltage† Current† Power	5-30VDC 100 mA (Min) @ 24VDC 2.5 W
† *Any power supply that meets current consumption, voltage, power, and connector pinouts requirements can be used.*	

Power Supply for the 4-Port

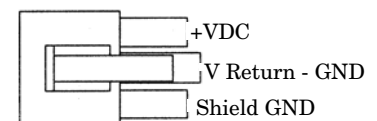Table 3 provides the specifications for the power supply shipped with the DeviceMaster UP 4-port.

+VDC
V Return - GND
Shield GND

Housing Molex P/N: 39-01-4030
Pins Molex P/N: 44485-1211

Table 3. 4-Port Power Supply Shipped with Product

Comtrol Power Supply	Specifications
Input line frequency	47 - 63 Hz
Input line voltage	90 - 260 VAC
Output voltage	24VDC
Output current	500 mA @ 24VDC

Table 4 provides the specifications, if you intend on purchasing your own power supply.

Table 4. 4-Port Requirements for External Power Supply

External Power Supply	Specifications
Output voltage† Current† Power	9-30VDC 200 mA (Min) @ 24VDC 4.8 W
† *Any power supply that meets current consumption, voltage, power, and connector pinouts requirements can be used.*	

Hardware Specifications

The following table lists hardware specifications for the DeviceMaster UP. See *External Power Supply Specifications* for detailed power supply specification information.

Topic	Specification

Current consumption:
   1-Port models
   4-Port
	420 mA @ 5VDC
	200 mA @ 24VDC

Power consumption:
   1-Port models
   4-Port
	2.1 W
	4.8 W

Processor type	ARM7/44Mhz
Memory	8MB SDRAM/4MB flash
Real time clock (4-port, only)	Battery backup, 256B RAM, watchdog timer/power off monitor
Baud rate/port (maximum)	230.4 Kbps
Ethernet host interface (10/100Base-T): • 1-Port models (single port) • 4-Port model (dual ports - Upstream and Downstream)	10/100 Mbps - RJ45
Serial interface	RS-232, RS-422, and RS-485

Serial connector types:
   1-Port
   1-Port Embedded System
   4-Port model
	DB9 Male
	Header, IDC10
	DB9 (and DB9 to RJ45 adapter)

Network default values:
   IP address
   Subnet mask
   Gateway
	192.168.250.250
	255.255.0.0
	192.168.250.1

Network protocols	TCP/IP and UDP Socket services, BOOTP, TFTP, ICMP, ARP, SNMP (MIB-II), Telnet, HTTP, DHCP/RARP/Ping, RFC 1006

Software control:
   Data bits
   Parity
   Stop bits
	7 or 8
	Odd, Even, None
	1 or 2

SNMP support	Monitoring only.

Dimensions:
   1-Port (without mounting tabs)
   1-Port Embedded System
   4-Port
	3.6" x 2.8" x 0.8"
	3.5" x 2.6" x 0.6""
	10.8" x 6.3" x 1.5"

Weight (hub, only):
   1-Port
   1-Port Embedded System
   4-Port
	0.46 lbs
	0.09 lbs
	3.44 lbs

Environmental Specifications

This table list environmental conditions.

Environmental Conditions	Value
Air temperature 1-Port models	
• Ambient operating temperature*	-20 to 60ºC
• Storage	-20 to 85ºC
4-Port model	
• Ambient operating temperature*	-37 to 74ºC
• Storage	-40 to 85ºC
Altitude	0 to 10,000 feet

Heat output:
   1-Port models
   4-Port
	7.16 BTU/Hr
	16.4 BTU/Hr

Operating humidity (non-condensing):	5% to 95%

Mean time between failures (MTBF):
   1-Port
   1-Port Embedded System
   4-Port
	48.4 years
	48.2 years
	25.0 years

Surge protection** on all serial ports	Provides ESD surge protection minimum of 15KV @ 200A for a duration of 1 ns.

*   *If this product is stacked, the environmental air flow must insure that the Ambient Operating Temperature does NOT exceed these limits.*

**   *Ethernet components are rated to 1.5KV magnetic surge protection, in addition to the surge protection level listed above.*

DeviceMaster UP Product Pictures

This subsections provides you with detailed pictures of the different DeviceMaster UP models:

- *1-Port Embedded* on Page 36
- *4-Port (DB9)* on Page 36

See the appropriate discussion in the *Hardware Installation* section (Page 9) for information about the LEDs.

1-Port (DB9)   This illustrates the DeviceMaster UP 1-Port.

1-Port Embedded

This illustrates the DeviceMaster UP 1-port Embedded system that uses a 5-30VDC power supply. See *Power Supply for the 1-Port* on Page 32 so that you can provide a power supply for the DeviceMaster UP.
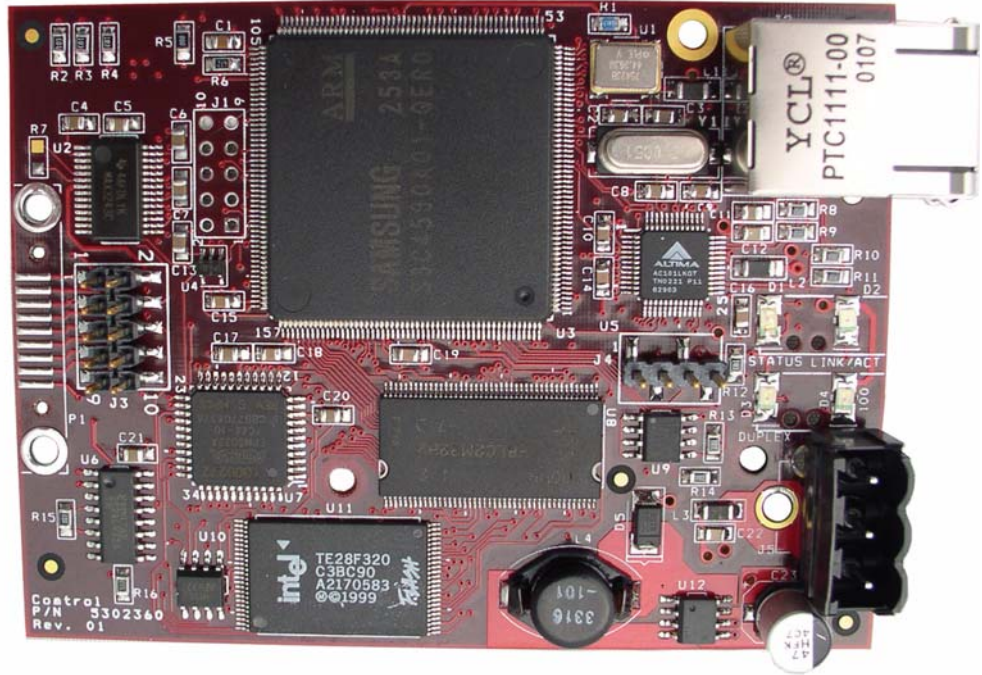
4-Port (DB9)

The **PWR** LED for the DeviceMaster UP 4 with DB9 ports is on the other side of the unit.

Notices

Radio Frequency Interference (RFI) (FCC 15.105)

This equipment has been tested and found to comply with the limits for Class A digital devices pursuant to Part 15 of the FCC Rules.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and the receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

Labeling Requirements (FCC 15.19)

This equipment complies with part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Modifications (FCC 15.21)

Changes or modifications to this equipment not expressly approved by Comtrol Corporation may void the user's authority to operate this equipment.

Serial Cables (FCC 15.27)

This equipment is certified for Class A operation when used with unshielded cables on models with the RJ45 connectors and with shielded cables on all models with DB9 connectors.

Underwriters Laboratory

This equipment is Underwriters Laboratory "UL" listed.

Important Safety Information

To avoid contact with electrical current:

Warning

- Never install electrical wiring during an electrical storm.
- Never install the power plug in wet locations.
- Use a screwdriver and other tools with insulated handles.

RedBoot Procedures

Use this section as a reference if you want to perform tasks in Redboot. Typcially, most of these procedures can be performed using PortVision Plus.

You can use a *serial* connection between Port 1 on the DeviceMaster UP and a COM port on a PC. If you plan on using the serial method, you will need a null modem cable and a terminal program installed and configured on the PC.

Note: *Use the serial connection method, if the DeviceMaster UP is not on the same Ethernet network segment as the PC.*

You can use a *telnet* connection, if the DeviceMaster UP is locally accessible by Ethernet.

Note: *Telnet is not recommended in Microsoft environments, unless you are familiar with Telnet use in your particular operating system.*

If necessary, see *Establishing a Serial Connection* on Page 39 or *Establishing a Telnet Connection* on Page 40 to disable the bootloader before performing any of these procedures.

Establishing a Serial Connection

Use the following procedure to set up serial connection with a terminal server program (for example, HyperTerminal® or Minicom) and the DeviceMaster UP.

1. Connect the null-modem cable shipped with your device from an available COM port on your PC to **Port 1** on the DeviceMaster UP.

   Note: *If you cannot locate the cable shipped with the DeviceMaster UP, see .*

2. Configure a terminal server program (such as, HyperTerminal or Minicom) to the following values:

   - Bits per second = 57600
   - Data bits = 8
   - Parity = None
   - Stop bits = 1
   - Flow control = None

3. Reset the DeviceMaster UP.

   Note: *Depending on the model, disconnect and reconnect the power cable (external power supply and no power switch) or turn the power switch on and then off (internal power supply).*

4. Immediately type **#!DM** and press **Enter** in the terminal program.

5. At the **RedBoot>** prompt, type **dis**, and press **Enter**.

```
#!DM
RedBoot>dis
Loading disabled
```

   Note: *If you do not disable the loading feature of the bootloader within the time-out period (default is fifteen seconds), an application will be loaded from flash and started. If this happens, repeat Steps 3 through 5. The #!DM command is the only case-sensitive command and must be in uppercase.*

6. Verify that the system responds with a **Loading disabled** message.

7. Go to the appropriate task:
   - *Determining the Network Settings* on Page 41
   - *Configuring the Network Settings* on Page 41
   - *Determining the Bootloader Version* on Page 42
   - *Resetting the DeviceMaster UP* on Page 42
   - *Uploading Firmware* on Page 43
   - *Configuring Passwords* on Page 46
   - *Redboot Command Overview* on Page 47.

Establishing a Telnet Connection

Use the following procedure to telnet to the DeviceMaster UP.

Note: If you are not familiar with telnet, this procedure may be difficult to use.

1. Open a telnet session, enter the DeviceMaster UP IP address.

   *Note: Press the **Enter** key if you have not programmed a password or use the password previously configured. The DeviceMaster UP does not come preprogrammed with a password.*

2. Type **reset**, and close the session.

3. Open a new telnet session, enter the DeviceMaster UP IP address, and the password.

4. Type **dis** to disable the bootloader.

```
$ telnet 192.168.250.250        ◄────── Default IP Address
Trying 192.168.250.250...
Connected to 192.168.250.250.
Escape character is '^]'.
Password:

Comtrol DeviceMaster Boot Version 1.20
RedBoot(tm) debug environment - built 14:57:53 Jun 21 2004
Platform: Comtrol DeviceMaster (ARM 7TDMI)
Portions Copyright (C) 2000. Red Hat, Inc.
Portions Copyright (C) 2001-2004. Comtrol Corp.
RedBoot>dis
Loading disabled
```

5. Verify that the system responds with a **Loading disabled** message.

6. Go to the appropriate task:
   - *Determining the Network Settings* on Page 41
   - *Configuring the Network Settings* on Page 41
   - *Determining the Bootloader Version* on Page 42
   - *Resetting the DeviceMaster UP* on Page 42
   - *Uploading Firmware* on Page 43
   - *Configuring Passwords* on Page 46
   - *Redboot Command Overview* on Page 47.

Determining the Network Settings

If you are not sure what the network information is on a DeviceMaster UP, you can perform the following procedure.

1. Establish communications with the DeviceMaster UP using the serial (Page 39) or telnet (Page 40) method.

Default Network Settings

IP address:
    192.168.250.250

Subnet mask:
    255.255.0.0

Gateway address:
    192.168.250.1

2. At the **RedBoot** prompt, type **ip**.

```
RedBoot>dis
Loading disabled
RedBoot> ip
IP Config: IpAddr 192.168.250.250 IpMask 255.255.0.0 IpGate 192.168.250.1
RedBoot>
```

The IP address, subnet mask, and IP gateway values will display.

Configuring the Network Settings

The following subsections show you how to establish a communications link with Redboot on the DeviceMaster UP, by using one of these methods:

- *Serial connection* between Port 1 on the DeviceMaster UP and a COM port on a PC.

    If you do not know the IP address of the DeviceMaster UP you must use a serial connection to communicate with the DeviceMaster UP.

- *Telnet connection* requires that you know the IP address. In addition, the IP address must also be valid for the network to which it is attached. For example: The network segment must be 192.168.250.x to telnet to the DeviceMaster UP default IP.

Use the following procedure to program the IP address using Redboot.

1. Establish communications with the DeviceMaster UP using the serial (Page 39) or telnet (Page 40) method.

2. Enter **ip [*addr mask gateway*]** and press the **Enter** key to configure the IP address.

    Where:

    > **addr** = IP address you want to use
    > **mask** = matches you network subnet mask
    > **gateway** = assigned by your network administrator

    Make sure that each value is separated by a space.

```
RedBoot>dis
Loading disabled
RedBoot> ip ###.###.###.### ###.###.###.### ###.###.###.###
RedBoot> ip
IP Config: IpAddr ###.###.###.### IpMask ###.###.###.### IpGate ###.###.###.###
RedBoot> reset
... Resetting
```

3. Verify that Redboot responds with your configured network information or reissue the command.

4. Type **reset** to reset the DeviceMaster UP, if you do not have any other related Redboot tasks.

Determining the Bootloader Version

Use the following procedure to determine what bootloader version is loaded in the DeviceMaster UP.

1. Establish communications with the DeviceMaster UP using the serial (Page 39) or telnet (Page 40) method.

2. At the **RedBoot** prompt, type **version**.

```
RedBoot> version

Comtrol DeviceMaster Boot Version 1.20
RedBoot(tm) debug environment - built 14:57:53, Jun 21 2004
Platform: Comtrol DeviceMaster (ARM 7TDMI)
Portions Copyright (C) 2000. Red Hat, Inc.
Portions Copyright (C) 2001-2004. Comtrol Corp.
RedBoot>
```

The bootloader information will display.

3. To update the bootloader on the DeviceMaster UP, make sure that you download the latest version and see Updating Firmware on Page 43.

4. Type **reset** to reset the DeviceMaster UP, if you do not have any other related Redboot tasks.

Resetting the DeviceMaster UP

When you have completed your tasks in Redboot, you must enter a **reset** command at the **RedBoot>** prompt for the DeviceMaster UP to begin operation.

Note: *The LEDs on the DeviceMaster UP will go through the power up sequence. The unit has completed its reset cycle when the PWR or Status LED is lit and it stops flashing.*

Uploading Firmware

Use the appropriate procedure for your environment:

- *Serial Method)* on Page 43
- *Telnet Method)* on Page 45

Serial Method)   The procedure for updating the Bootloader and SocketServer are the same, but the **.bin** files are unique.

1. Verify that you have the **.bin** file (Latest Firmware on Page 43) and cable *Establishing a Serial Connection* on Page 39).

2. Connect a null modem cable from an available COM port on your PC to **Port 1** on the DeviceMaster UP.

3. Start the terminal program and configure your terminal server program (for example, HyperTerminal or MiniCom) to the following values:
    - Bits per second = 57600
    - Data bits = 8
    - Parity = None
    - Stop bits = 1
    - Flow control = None

4. Reset the DeviceMaster UP (disconnect and reconnect the power cable).

5. Immediately type **#!DM** and press **Enter** in your terminal program.

```
#!DM
RedBoot>dis
Loading disabled
```

6. At the **RedBoot>** prompt, type **dis**, and press **Enter**.

    *Note: If you are unsuccessful in disabling the Bootloader within ten seconds, type **reset, #!DM, and** **dis** again. The #!DM command is the only case-sensitive command and must be in uppercase.*

7. Verify that the system responds with an **Loading disabled** message.

8. Type **load -r -b 0 -m x** at the **RedBoot>** prompt and press **Enter**.

```
RedBoot> load -r -b 0 -m x
CC
```

9. Upload the file using Xmodem for the protocol. For example, if you are using HyperTerminal:

    a. Select **Transfer**.

    b. Select **Send File**.

    c. Browse to the location where you stored the file from Latest Firmware on Page 43.

    d. Select **Xmodem** as the protocol.
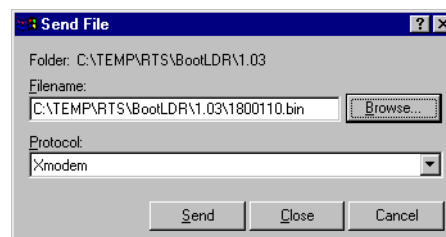
The file name in this screen shows the Bootloader.

   e.   Select the **Send** button.
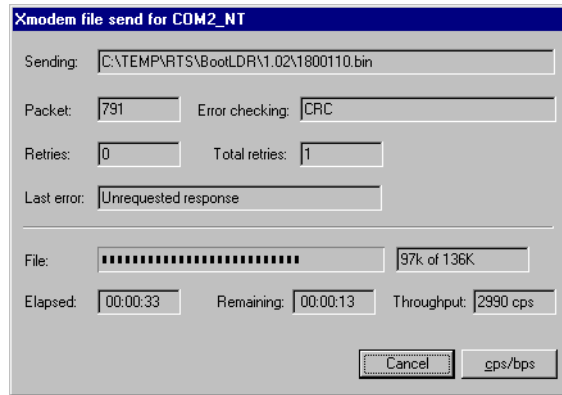
The file name in this screen shows the Bootloader.

10. When the **RedBoot>** prompt appears (after approximately one minute for the Bootloader and approximately three minutes for SocketServer), type **go**.

```
CCCCCCRaw load done: 542721 bytes read
Address range:  00000000-00084800, Entry point:  00000000,
xyzModem - CRC mode, 4241(SOH)/0(STX)/0(CAN) packets, 8 tries
RedBoot> go
... Erase from 0x05030000-0x050c0000: .........
... Program from 0x00000000-0x00084801 at 0x05060000: ...
... Erase from 0x050f0000-0x05400000:  .
... Program from 0x007a0000-0x007b0000 at 0x053f0000: .
```

Note: *In a few seconds, the ethernet and PWR LEDs cycle through a light sequence once and then upgrade is complete.*

11. ***If you updated SocketServer:*** type, **fis list** and press **Enter** at the RedBoot> prompt.

```
RedBoot> fis list
Name              FLASH addr    Mem addr     Length       Entry point
FIS_directory   0x053F0000   0x053F0000   0x00010000   0x00000000
default         0x05030000   0x00000000   0x00090000   0x00000000
RedBoot>
```

Note: *You should see file information for a file called **default**. If you do not see this file, repeat the process starting with <u>Step 6</u>.*

12. Reset the DeviceMaster UP by typing **reset** at the RedBoot> prompt.

```
RedBoot> reset
. . .Resetting
```

Note: *In a few seconds the ethernet and PWR LEDs cycle through a light sequence once and the update is complete.*

13. Start your internet browser and enter the IP address of the DeviceMaster UP to verify that the new version of SocketServer loads.

Telnet Method)

Use the following procedure to update the Bootloader or SocketServer with telnet to the DeviceMaster UP.

1. Verify that you have the **.bin** file (Latest Firmware on Page 43).

2. Open a telnet session, type **reset,** and close the session.

3. Open a new telnet session and enter the DeviceMaster UP IP address.

```
$ telnet 192.168.250.250  ◄──────── Default IP Address
Trying 192.168.250.250...
Connected to 192.168.250.250.
Escape character is '^]'.
```

4. Enter the webserver password.

   Note: Press the **Enter** *key if you have not programmed a password.*

```
Password:

Comtrol DeviceMaster Bootloader Version 1.20
RedBoot(tm) debug environment - built 14:57:53, Jun 21 2004
Platform: Comtrol DeviceMaster (ARM 7TDMI)
Portions Copyright (C) 2000. Red Hat, Inc.
Portions Copyright (C) 2001-2004. Comtrol Corp.
RedBoot>
```

5. At the Redboot prompt: type **dis** and press **Enter** to disable the bootloader.

```
RedBoot>dis
Loading disabled
```

6. Verify that the system responds with an **Loading disabled** message.

7. Load the file from a TFTP server using the following command and press the **Enter** key:

   load -r -b 0 -h <TFTP-Server_IP_Addr> <Downloaded_File_Name>

   Note: The default IP address is: **192.168.250.250**.

```
RedBoot> load -r -b 0 -h 192.168.250.1 1800110.bin
CCCCRaw load done: 139521 bytes read
Address range: 00000000-00022100, Entry point: 00000000.
xyzModem - Cksum mode, 1091(SOH)/0(STX)/0(CAN) packets, 6 retries
RedBoot>
```

8. When the RedBoot> prompt appears (after approximately one minute if you are uploading the Bootloader and approximately three minutes if you ware uploading SocketServer), type **go**.

```
RedBoot>go
```

If uploading Bootloader: In a few seconds the ethernet and PWR LEDs cycle through a light sequence once and the update is complete.

If uploading SocketServer:

a. At the RedBoot> prompt, type: **fis list** and press **Enter**.

```
RedBoot> fis list
Name              FLASH addr    Mem addr     Length       Entry point
FIS_directory   0x053F0000    0x053F0000   0x00010000   0x00000000
default           0x05030000    0x00000000   0x00090000   0x00000000
RedBoot>
```

> *Note: You should see file information for a file called **default**. If you do not see this file, repeat the process starting with <u>Step 7</u>.*

b. Reset the DeviceMaster UP by typing **reset** at the RedBoot> prompt.

> *Note: In a few seconds the ethernet and PWR LEDs cycle through a light sequence once.*

c. Start your internet browser and enter the IP address of the DeviceMaster UP to verify that the new version of SocketServer loads.

*Note: Your SocketServer version may be different. The default IP address is: **192.168.250.250**.*

If it displays an NS-Link version, you must update the driver to update the SocketServer. If you want to only run the ports in socket mode (not COM mode), you can remove the NS-Link driver.

Configuring Passwords

This section discusses how to configure a password for the web and telnet server.

Note: See the PortVision Plus or SocketServer help system for information about email notification.

Use the following procedure to establish the DeviceMaster UP password for the Web and telnet server. Establishing a password prevents unauthorized changes to the DeviceMaster UP configuration.

1. Establish communications with the DeviceMaster UP using the serial (Page 43) or telnet method (Page 40).

2. Type **password** [*your_password*] and press **Enter**.

Note: If you forget your password, you can reprogram the password using the serial method which bypasses the password.

```
Password:

Comtrol DeviceMaster Boot Version 1.20
RedBoot(tm) debug environment - built 14:57:53, Jun 21 2004
Platform: Comtrol DeviceMaster (ARM 7TDMI)
Portions Copyright (C) 2000. Red Hat, Inc.
Portions Copyright (C) 2001-2004. Comtrol Corp.
RedBoot> dis
Loading disabled
RedBoot> password dev1357
Password 'dev1357'
RedBoot>
```

Note: The bootloader version on your DeviceMaster UP may be different than the version displayed in this graphic.

See the **auth** command in the *<u>Redboot Command Overview</u>* on Page 47 if you want to set up Web browser authentication.

Redboot Command Overview

The following table is an overview of Redboot commands available. You can access the list of commands online by entering **help** and pressing the **Enter** key. For more detailed information, see the *Redboot User's Guide* that is located on the Comtrol product CD or download it from the web.

RedBoot Command	Description
auth **{noaccess, none, basic, md5, invalid}**	Sets or displays web authentication. The default is set to **none**, which means that there is no authentication required to access the web server. To deny access to the web server, select **noaccess** or **invalid**. If access is attempted, a message appears to notify the user that access is denied. To configure the web server to request an un-encrypted password, select **basic**. To configure the web server to request an encrypted password, select **md5**. (Some browsers do not support the **md5** command.)
boardrev†	Displays board revision.
cache [ON | OFF]	Manages machine caches.
disable	Disables automatic load of the default application.
dump -b <location> -l <length>	Displays (hex dump) of a range of memory.
fis {cmds}	Manages flash images. See the *Redboot User's Guide* (located at this address on the CD or ftp site: Dev_Mstr\\Software\RedBoot\User_Guide) for **{cmds}** information.
go [-w <timeout>] [entry]	Executes code at a location.
help <topic>	Displays available Redboot commands.
ip {addr mask gateway}	Displays or sets the IP address configuration.
load {-r} {-v} {-h <host>} {-m {TFTP | xyzmodem}} {-b <base_addr>} <file_name>	Loads a file from TFTP server or XModem.
mac†	Displays ethernet MAC address.
model†	Shows model number.
password {password}	Sets the password.
reset	Resets the DeviceMaster UP. You must reset after changing an IP address.
telnet [disable | enable}	Sets or displays telnet server enable. Disables telnet.
teltimeout [seconds]	Shows or sets telnet time-out.
terse	Terse command response mode.
timeout {seconds}	Displays or sets bootloader timeout value.
version	Displays RedBoot version information.
† *Do not use these commands to change the values. Doing so may cause the DeviceMaster UP to stop functioning.*	

Troubleshooting and Technical Support

This section contains troubleshooting information for your Comtrol device. You should review the following subsections before calling Technical Support because they will request that you perform many of the procedures or verifications before they will be able to help you diagnose a problem.

- *Troubleshooting Checklist* on Page 49
- *General Troubleshooting* on Page 50

If you cannot diagnose the problem, you can contact *Technical Support* on Page 52.

Troubleshooting Checklist

The following checklist may help you diagnose your problem:

- Verify that you are using the correct types of cables on the correct connectors and that all cables are connected securely.

    Note: Most customer problems reported to Comtrol Technical Support are eventually traced to cabling or network problems.

- Isolate the unit from the network by connecting the device directly to a NIC in a host system.

Product Type	Connected to	Ethernet Cable	Connector Name
1-Port	Ethernet hub or NIC	Standard	10/100 ETHERNET
1-Port Embedded	Ethernet hub or NIC	Standard	RJ45 port (not labeled)
4-Port	NIC	Standard	DOWN
	Ethernet hub	Standard	UP

- Verify that the Ethernet hub and any other network devices between the system and the Comtrol device are powered up and operating.

- Reset the power on the Comtrol device and watch the **PWR** or **Status** light activity.

PWR or Status LED	Description
5 sec. off, 3 flashes, 5 sec. off, 3 flashes ...	Redboot™ checksum failure.
5 sec. off, 4 flashes, 5 sec. off, 4 flashes ...	SREC load failure.
5 quick flashes	The default application is starting up.
10 sec. on, .1 sec. off, 10 sec. on .1 sec. off ...	The default application is running.

- If the device has a power switch, turn the device's power switch off and on, while watching the LED diagnostics.

- If the unit does not have a power switch, disconnect and reconnect the power cord.

- Verify that the network IP address, subnet mask, and gateway is correct and appropriate for the network. If IP addressing is being used, the system should be able to ping the Comtrol device.

- Verify that the IP address programmed into the Comtrol device matches the unique reserved IP configured address assigned by the system administrator.
- If using DHCP, the host system needs to provide the subnet mask and gateway.
- Reboot the system and the Comtrol device.
- If you have a spare Comtrol device, try replacing the device.

General Troubleshooting

This table illustrates some general troubleshooting tips.

Note: *Make sure that you have reviewed the Troubleshooting Checklist on Page 49.*

General Condition	Explanation/Action
PWR or **Status** LED flashing	Indicates that boot program has not downloaded to the unit. 1. Reboot the system. 2. Make sure that you have downloaded the most current firmware for your protocol: http://support.comtrol.com/download.asp. *Note:* *If the PWR or Status LED is still flashing, contact Technical Support.*
PWR or **Status** LED not lit	Indicates that power has not been applied or there is a hardware failure. Contact Technical Support.
Cannot ping the device through Ethernet hub	Isolate the unit from the network. Connect the device directly to the NIC in the host system (see Page 49).
Cannot ping or connect to the DeviceMaster UP	The default IP address is often not accessible due to the subnet masking from another network unless **192.168** is used in the network. In most cases, it will be necessary to program in an address that conforms to your network.
DeviceMaster UP continuously reboots when connected to some Ethernet switches or routers	Invalid IP information may also cause the switch or router to check for a gateway address. Lack of a gateway address is a common cause.

Daisy-Chaining DeviceMaster UP 4-Port Units

The DeviceMaster UP 4-port models with external power supplies follow the IEEE specifications for standard Ethernet topologies.

When using the **UP** and **DOWN** ports, the DeviceMaster UP 4 is classified as a switch. When using the **UP** port only, it is a simple end node device.

The maximum number of daisy-chained DeviceMaster UP 4 units, and the maximum distance between units is based on the Ethernet standards and will be determined by your own environment and the conformity of your network to these standards.

Comtrol has tested with seven DeviceMaster UP 4 units daisy-chained together using 10 foot CAT5 cables, but this is not the theoretical limit. You may experience a performance hit on the devices at the end of the chain, so it is recommended that you overload and test for performance in your environment. The OS and the application may also limit the total number of ports that may be installed.

Following are some quick guidelines and URLs of additional information. Please note that standards and URLs do change.

- Ethernet 10BASE-T Rules
  - The maximum number of repeater hops is four.
  - You can use Category 3 or 5 twisted-pair 10BASE-T cables.
  - The maximum length of each cable is 100m (328ft).

    Note: *Category 3 or 5 twisted pair cables look the same as telephone cables but they are not the same. The network will not work if telephone cables are used to connect the equipment.*

- Fast Ethernet 100BASE-TX rules
  - The maximum number of repeater hops is two (for a Class II hub). A Class II hub can be connected directly to one other Class II Fast Ethernet hub. A Class I hub cannot be connected directly to another Fast Ethernet hub.
  - You must use Category 5 twisted-pair 100BASE-TX cables.
  - The maximum length of each twisted-pair cable is 100m (328ft).
  - The total length of twisted-pair cabling (across directly connected hubs) must not exceed 205m (672ft).

    Note: *Category 5 twisted pair cables look the same as telephone cables but they are not the same. The network will not work if telephone cables are used to connect the equipment.*

- IEEE 802.3 specification: A network using repeaters between communicating stations (PCs) is subject to the "5-4-3" rule of repeater placement on the network:
  - Five segments connected on the network.
  - Four repeaters.
  - Three segments of the 5 segments can have stations connected. The other two segments must be inter-repeater link segments with no stations connected.

    See http://www.optronics.gr/Tutorials/ethernet.htm for more specific information.

    Additional information may be found at http://compnetworking.about.com/cs/ethernet1/ or by searching the web.

Technical Support

It may contain troubleshooting procedures that you may want to perform before contacting Technical Support because they will request that you perform, some or all of the procedures before they will be able to help you diagnose your problem. If you need technical support, contact Comtrol using one of the following methods.

Contact Method	Corporate Headquarters	Comtrol Europe
Customer support	http://support.comtrol.com/online	
Downloads	http://support.comtrol.com/download.asp	
Web site	http://www.comtrol.com	http://www.comtrol.co.uk
Fax	(763) 494-4199	+44 (0) 1 869-323-211
Phone	(763) 494-4100	+44 (0) 1 869-323-220

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