

DEVICEMASTER[®] FreeWire

Installation and User Guide



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Product Overview

The DeviceMaster FreeWire is a high-performance, standalone device designed to connect a wide range of serial devices (i.e., security devices, telecommunications equipment, modems, data display devices, industrial instrumentation, etc.) to an Ethernet network. The DeviceMaster FreeWire supports RS-232 serial interfaces at a variety of baud rates (data transmission speeds), automatically senses both 100baseTX Fast Ethernet and 10baseT Ethernet network connections, and the wireless capability allows connections to 802.11g wireless networks as well.

DeviceMaster FreeWire Requirements

To use the wireless DeviceMaster FreeWire, you need an 802.11g compatible wireless network consisting of either of the following:

- An 802.11b/g wireless-enabled PC connected directly to the DeviceMaster FreeWire (Ad-Hoc or Peer-to-Peer mode).
- An 802.11b/g wireless access point that allows wireless and wired Ethernet-enabled PCs to connect to the serial server.

To configure the wireless DeviceMaster FreeWire, you will need the following information from your wireless network administrator:

- Wireless mode used (Infrastructure or Ad-Hoc)
- The SSID (service set identifier) for your wireless network.
- The Radio Frequency Channel of the wireless network.
- If you are using TCP/IP (recommended for Windows networks) and are not connected to a DHCP (Dynamic Host Configuration Protocol) server (for obtaining an IP Address automatically), you will need a unique IP Address for the DeviceMaster FreeWire (for example: 192.168.1.14). If the DeviceMaster FreeWire is not on the same IP subnet as the PCs you are using, you will also need a subnet mask and a router (default gateway) address.
- Wireless Security Settings (WEP keys, 802.1x settings, etc.)

Installation Overview

The DeviceMaster FreeWire installation follows these steps:

1. Install the hardware ([Hardware Installation](#) on Page 7).
2. Configure the DeviceMaster FreeWire using [Configuration Options](#) on Page 6 to locate configuration procedures for your environment.
3. If necessary, update the firmware ([Checking the Firmware Version](#) on Page 35).
4. Connect your serial device to the DeviceMaster FreeWire ([Connecting the Serial Device](#) on Page 41).

Configuration Options

After the hardware installation has been successfully completed, the DeviceMaster FreeWire is ready for configuration. The easiest and fastest way to configure the DeviceMaster FreeWire is to use the *DeviceMaster FreeWire Installation Wizard*, which also installs the *FreeWire Manager*, a configuration interface, and the port redirector.

Note: *Control Technical Support recommends using the FreeWire Installation Wizard and FreeWire Manager for configuration. If you do not have access to a Windows system, use one of the other methods discussed below.*

Use [Configuring the DeviceMaster FreeWire](#) on Page 13 for installation and configuration procedures, such as:

- Easily configure DeviceMaster FreeWire network and wireless settings
- Check DeviceMaster FreeWire status information
- Change options such as the DeviceMaster FreeWire access protocol and time-out values
- Access the web page to update firmware

Basic COM port properties can be configured using the *DeviceMaster FreeWire Installation Wizard* and advanced properties can be configured using the *FreeWire Manager*.

Optionally, you could use one of the other DeviceMaster FreeWire configuration and management methods.

- Embedded web server page ([Page 27](#)) which is accessed with a standard web browser (for example, Firefox or Internet Explorer), with no additional software and on any system that supports web browser capabilities. Simply, type the IP address into your web browser address bar to connect. The default address is 192.168.250.250.
- DeviceMaster FreeWire internal configuration console, which can be accessed via a Telnet connection or directly through the DeviceMaster FreeWire serial port ([Page 31](#)).

Use the Command Console to configure [Bridged Network Mode](#).

DeviceMaster FreeWire Downloads

You can download the latest files using the CD that accompanies the DeviceMaster FreeWire or by locating files on the Control FTP Interface at:

ftp://ftp.comtrol.com/html/freewire_main.htm.

Hardware Installation

This section discusses the following hardware related topics in addition to the hardware installation procedure:

- *Device Descriptions* (below)
- [LED Indicators](#) on Page 9
- [Reset Button Functions](#) on Page 9
- [Factory Default Settings](#) on Page 10
- [Port Parameters](#) on Page 11

Device Descriptions

The DeviceMaster FreeWire includes the components that are discussed in the following subsections:

- Power connector – The power supply cable plugs into this connector.
- LED status indicators (**Power**, **10**, and **100**) – Indicate the operational states of the DeviceMaster FreeWire. See [LED Indicators](#) on Page 9 for detailed LED status light descriptions.
- **Reset** button – Pressing the **Reset** button for less than five seconds prints a test page (if the device is connected to a serial printer). Pressing and holding the **Reset** button for more than five seconds resets the DeviceMaster FreeWire to factory default settings ([Reset Button Functions](#) on Page 9).
- **10/100** – The RJ45 Ethernet port is used for connecting the DeviceMaster FreeWire to an Ethernet card, hub, router, or other wired access point for network access.
- **RS232** – The DB9 serial port can be configured to connect the DeviceMaster FreeWire to a serial device that uses the RS-232 serial interface.



Installing the DeviceMaster FreeWire Hardware

The DeviceMaster FreeWire can be wall mounted, set on the desktop, or mounted using the optional DIN rail kit available from Comtrol Corporation.

1. Write down the 12-digit MAC (Media Access Code) address printed on the label located on the bottom of the DeviceMaster FreeWire (for example: **00 C0 4E 27 00 00**). You may need this number in order to configure the DeviceMaster FreeWire.
2. Plug the DeviceMaster FreeWire power supply adapter into a suitable AC receptacle, and then plug the power supply cable into the DeviceMaster FreeWire. The DeviceMaster FreeWire will run through a sequence of power-up diagnostics for a few seconds.

- If the DeviceMaster FreeWire is operating properly, the LEDs will blink momentarily and then go out, the yellow (10) and green (100) LEDs will illuminate if the network is active, and the orange (Power) LED will illuminate, indicating the device is receiving power.
- The unit powers up in the *Normal* mode, which provides for connection from the network to the device connected to the serial port of the DeviceMaster FreeWire.
- If the Power LED blinks continuously in a regular pattern, a problem exists. If this is the case, try powering the unit off and then on again. If the problem persists, refer to [Troubleshooting](#) on Page 47.

See [LED Indicators](#) on Page 9 for detailed information about the LEDs.

3. Connect the DeviceMaster FreeWire to your network through a switch or hub using a category 5 (CAT5) Ethernet cable. The DeviceMaster FreeWire IP address must be configured before a network connection is available.
 - The DeviceMaster FreeWire is configured with a static (fixed) IP address of **192.168.250.250** (see your system administrator for assistance). In most cases, a fixed IP address is preferred because a DHCP server may not always assign the same IP address to the DeviceMaster FreeWire when the DeviceMaster FreeWire is powered on.
 - If you want to use DHCP, you must configure the DeviceMaster FreeWire for DHCP during the network configuration process.

Note: *If a wired connection is established to the unit, the wireless link will be disabled. The IP address must be within a valid range, unique to your network, and in the same subnet as your PC.*

4. Go to [Configuring the DeviceMaster FreeWire](#) on Page 13 for DeviceMaster FreeWire configuration procedures for Windows operating systems. Optionally, you can go to [Web Browser and Console Configuration](#) on Page 27.

LED Indicators

The DeviceMaster FreeWire provides three multifunction LED indicators (yellow, green, and orange) for easy monitoring.

The following table defines the function of each LED.

Function	State	Status
POWER (Orange)	ON	The DeviceMaster FreeWire is receiving power
	OFF	The DeviceMaster FreeWire is not receiving power
	Blinking	The DeviceMaster FreeWire power supply is malfunctioning
NETWORK STATUS (Yellow/Green)	Yellow OFF Green OFF	No network activity
	Yellow ON Green OFF	10baseT network active
	Yellow Blinking Green OFF	10baseT network data received
	Yellow OFF Green ON	100baseTX network active
	Yellow OFF Green Blinking	100baseTX network data received
	Yellow ON Green ON	Wireless network active
	Yellow Blinking Green Blinking	Wireless network data received

Reset Button Functions

Action	Result
Depress for less than 5 seconds	Generates configuration data that can be viewed using a terminal emulator (e.g., Windows Hyper Terminal) or other serial device that can display ASCII characters, or it will initiate a test page if the DeviceMaster FreeWire is connected to a serial printer.
Depress for more than 5 seconds	Resets the DeviceMaster FreeWire's configuration to factory defaults (cold reset). The unit will automatically re-initialize after updating the configuration memory.
Depress for 3 seconds during power up	Places the device into console configuration mode, which can be used to configure the device via the DeviceMaster FreeWire's serial port. See Using the Command Console on Page 31.

Factory Default Settings

The DeviceMaster FreeWire is shipped with a default configuration that works with the most common serial-to-Ethernet and wireless connections. The default settings can be changed to suit specific installation requirements using the FreeWire Manager, embedded web server page, or a Telnet connection to the DeviceMaster FreeWire internal console.

The factory default settings can be easily restored at any time by performing a cold reset (press and hold the **Reset** button on the device for more than five seconds).

The following table lists the DeviceMaster FreeWire default settings.

Parameter	Description	Settings
Character	bits per character	8
Flow	flow control	None
Parity	parity	None
Baud rate	bits per second	115,200
Stop	stop bits per character	1
Mode	line mode (serial port protocol)	232
ECABLE	E-Cable mode (for TCP connections)	Disable
ECADDR	E-Cable destination IP address	(set by user)
ECONN	E-Cable connection attempt time	20 seconds
ECPORT	E-Cable destination IP port number	9100 (<i>raw data</i>)
Web browser	password (not case-sensitive)	access
Network settings	IP address Subnet mask Default Gateway	192.168.250.250 255.255.0.0 0.0.0.0
Protocols	DHCP, static addressing, arp, rasp, and BootP protocols	

Port Parameters

Parameter	Description	Settings
CHARACTER	bits per character	7, 8 (default)
FLOW	flow control	NONE (default), Xon/Xoff, CTS/RTS
PARITY	parity	NONE (default), EVEN, ODD, MARK, or SPACE
SPEED	baud rate (bits per second)	300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 38400, 57600, 76800, 115200 (default), 230400, 460800
STOP	stop bits per character	1 (default), 2
MODE	line mode (serial port protocol)	232 (default), Disabled
ECABLE	E-Cable mode (for TCP connections similar to serial tunneling)	Enable, Disable (default) (Originator; master only,
ECADDR	E-Cable destination IP address	(set by user)
ECONN	E-Cable connection attempt time	20 seconds
ECPORT	E-Cable destination IP port number	9100 (raw data), 9200 (telnet) or set by user

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

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Configuring the DeviceMaster FreeWire

The easiest and fastest way to configure the DeviceMaster FreeWire is to use the *FreeWire Installation Wizard* for Windows, which supports:

- Windows XP
- Windows Server 2003
- Windows Vista
- Windows Server 2008
- Windows 7

The *FreeWire Installation Wizard* also installs the *FreeWire Manager* and the port redirector after setting up basic configuration settings.

The *FreeWire Manager* provides an alternate method to configure the network, wireless serial settings. In addition, you can use the FreeWire Manager to:

- Check DeviceMaster FreeWire status information
- Change network and wireless settings, including access protocol
- Configure advanced serial settings
- Access the web page to update firmware

This section discusses the following topics:

- [Installing the DeviceMaster FreeWire Installation Wizard](#) (below)
- [Configuring Network and Wireless Settings](#) on Page 24
 - [Advanced Serial Port Configuration](#) on Page 24
 - [Configuring Ad Hoc Mode](#) on Page 25

Optionally, you can use the embedded web server page or Command Console for configuration, see [Web Browser and Console Configuration](#) on Page 27.

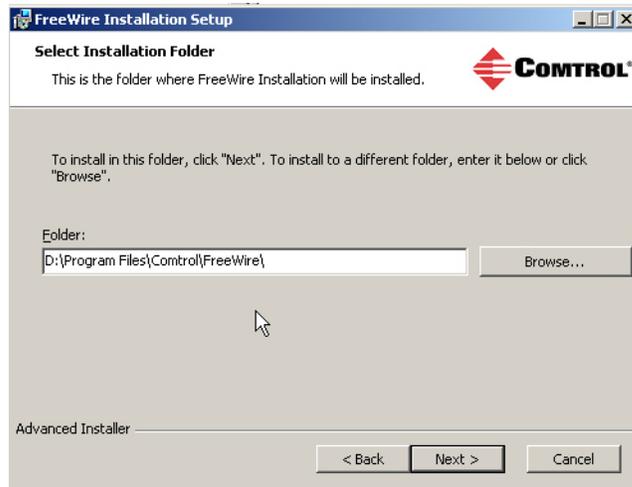
Installing the DeviceMaster FreeWire Installation Wizard

After the hardware installation has been successfully completed, you can configure the DeviceMaster FreeWire.

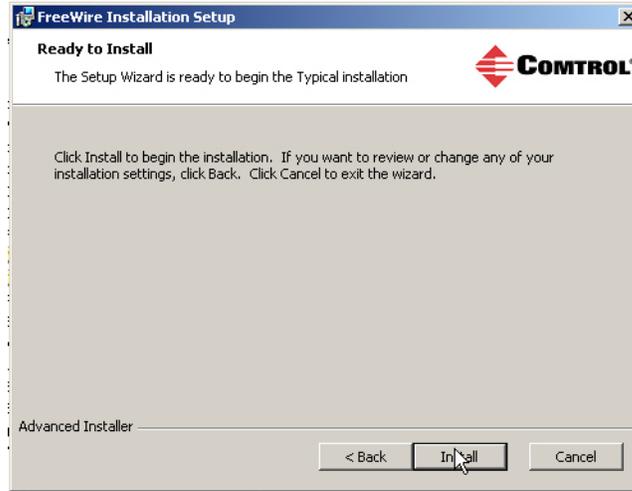
1. If you have not done so, locate the DeviceMaster FreeWire Installation Wizard on the CD that shipped with the DeviceMaster FreeWire or use the [ftp site](#). The *DeviceMaster FreeWire Installation Wizard* installs the FreeWire Manager and port redirector.
2. Execute the *FreeWire Installation Wizard .msi* file and click **Next**.



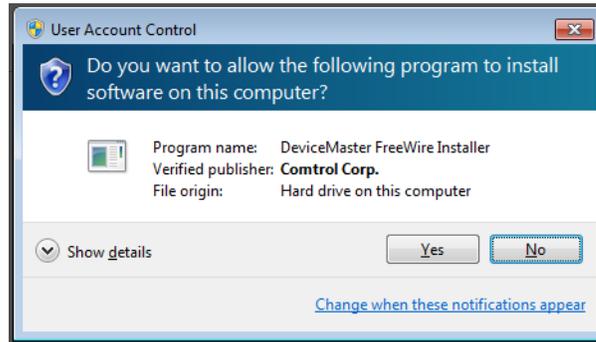
3. To use the default installation path, click **Next**.



4. Click **Install** to continue the installation.



Depending on the operating system, you may need to click **Yes** to allow the software installation.



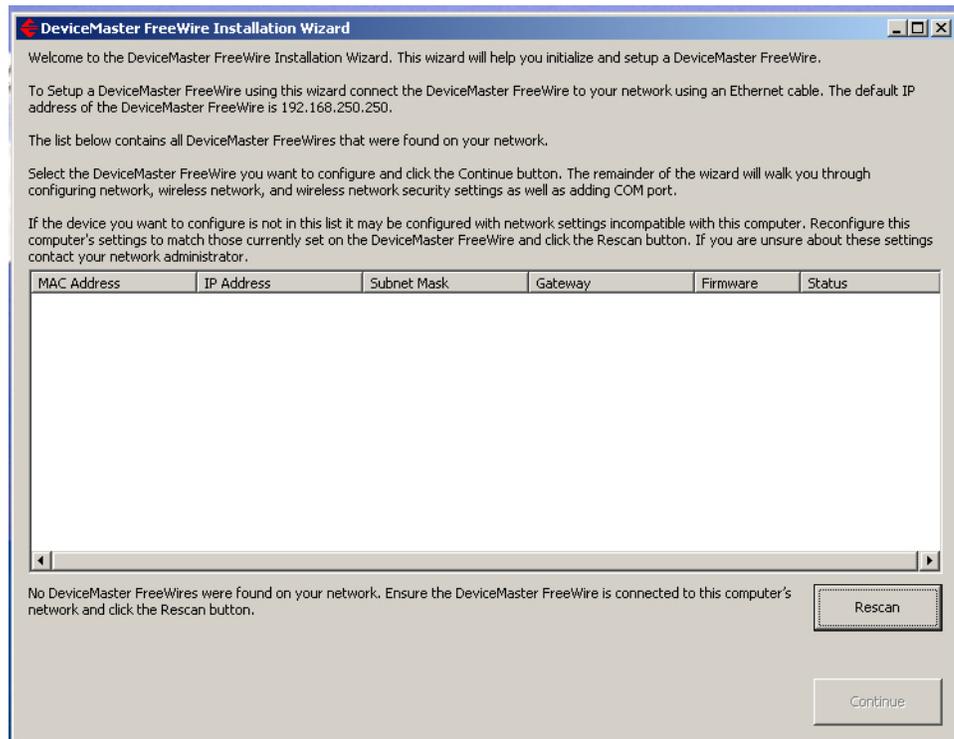
5. Click **Launch FreeWire Installation** and **Finish** to complete the *FreeWire Installation Setup*.



Depending on the operating system, click **Install** if prompted.



Go to [Using the DeviceMaster FreeWire Installation Wizard](#) on Page 17 to begin the DeviceMaster FreeWire configuration process.

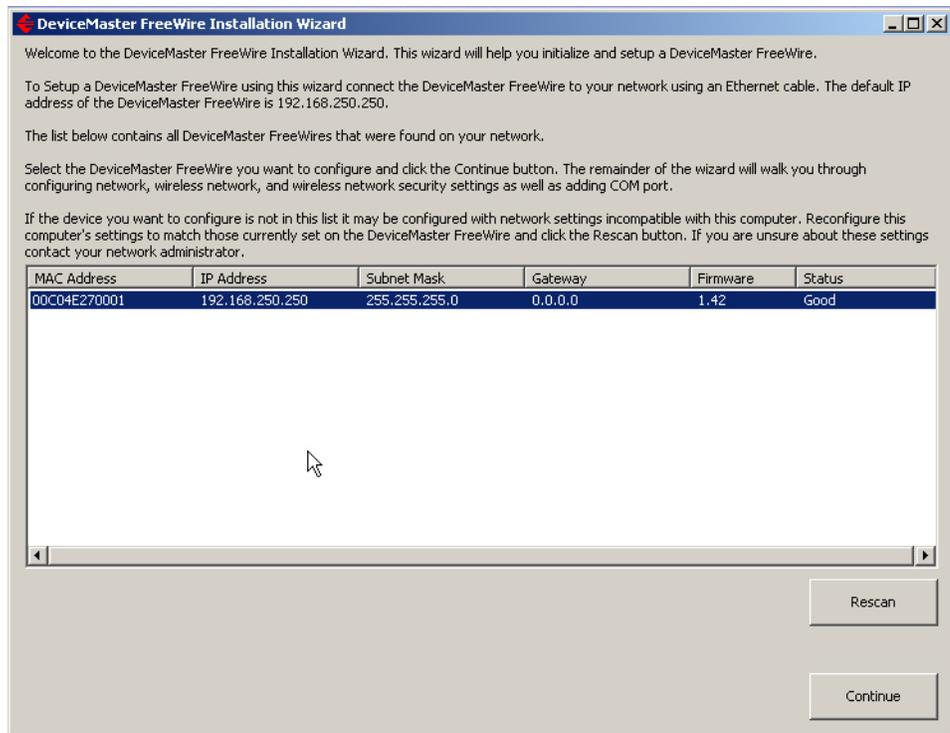


Using the DeviceMaster FreeWire Installation Wizard

The DeviceMaster FreeWire default address is 192.168.250.250. It may be necessary to change the IP address on your host system temporarily to program the IP address into the DeviceMaster FreeWire. For example: The network segment must be 192.168.250.x to program the DeviceMaster FreeWire IP address for your network.

Use this procedure to configure the DeviceMaster FreeWire.

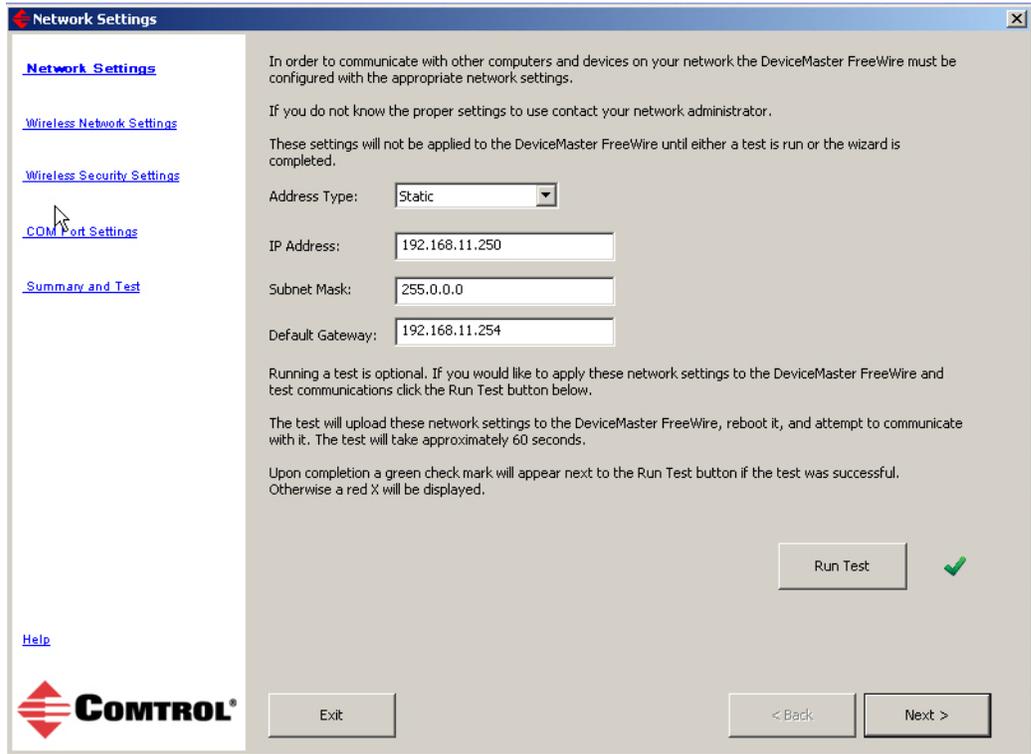
1. If you have not so, install the *DeviceMaster FreeWire Installation Setup* (Page 14).
2. If necessary, start the *DeviceMaster FreeWire Installation Wizard* using the desktop shortcut or **Start/Programs/Control/FreeWire/FreeWire Installation Wizard**.
3. Highlight the DeviceMaster FreeWire that you want to configure and click **Continue**.



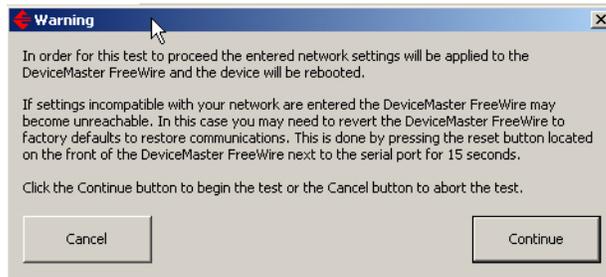
If the DeviceMaster FreeWire that you want to configure does not appear in the list, click **Rescan**.

Note: *If you have not done so, you must change the IP address on your host to 192.168.250.x so that the DeviceMaster FreeWire Installation Wizard can communicate with the DeviceMaster FreeWire.*

4. Configure the network settings for your environment.



- a. After entering the network settings, you can click **Run Test** to verify that DeviceMaster FreeWire has been programmed with valid network settings or optionally, click **Next** and go to Step 5.
- b. Click **Continue**.

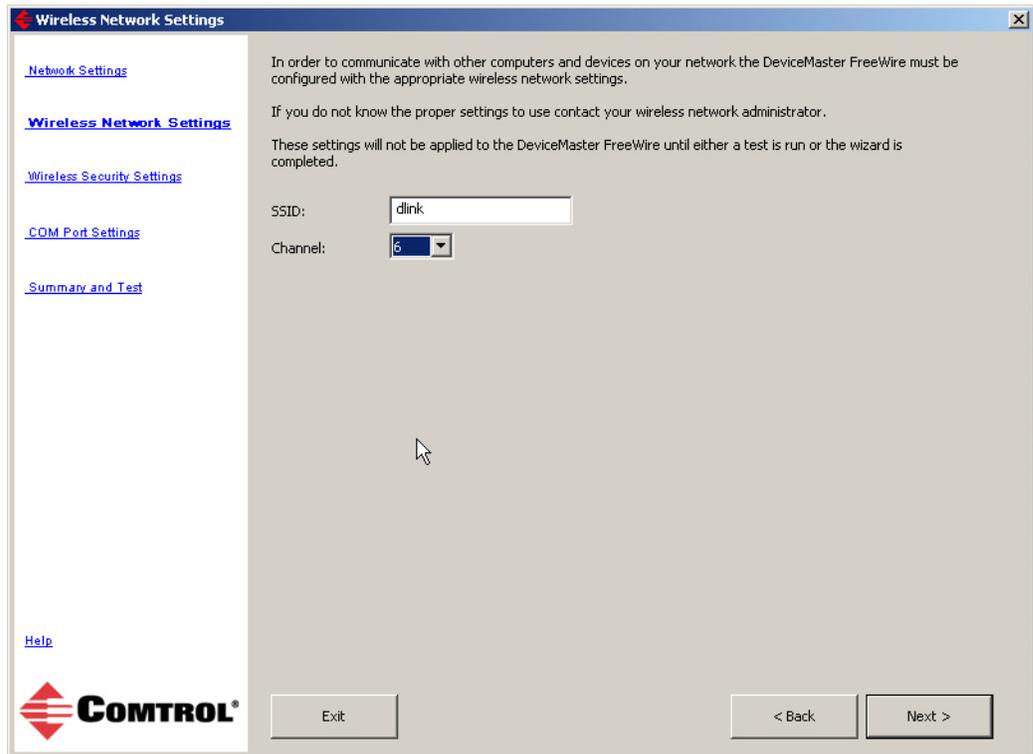


- c. If you programmed the DeviceMaster FreeWire for your network addressing scheme, you can change the IP address on your host machine back to the appropriate network settings while this message is displaying.

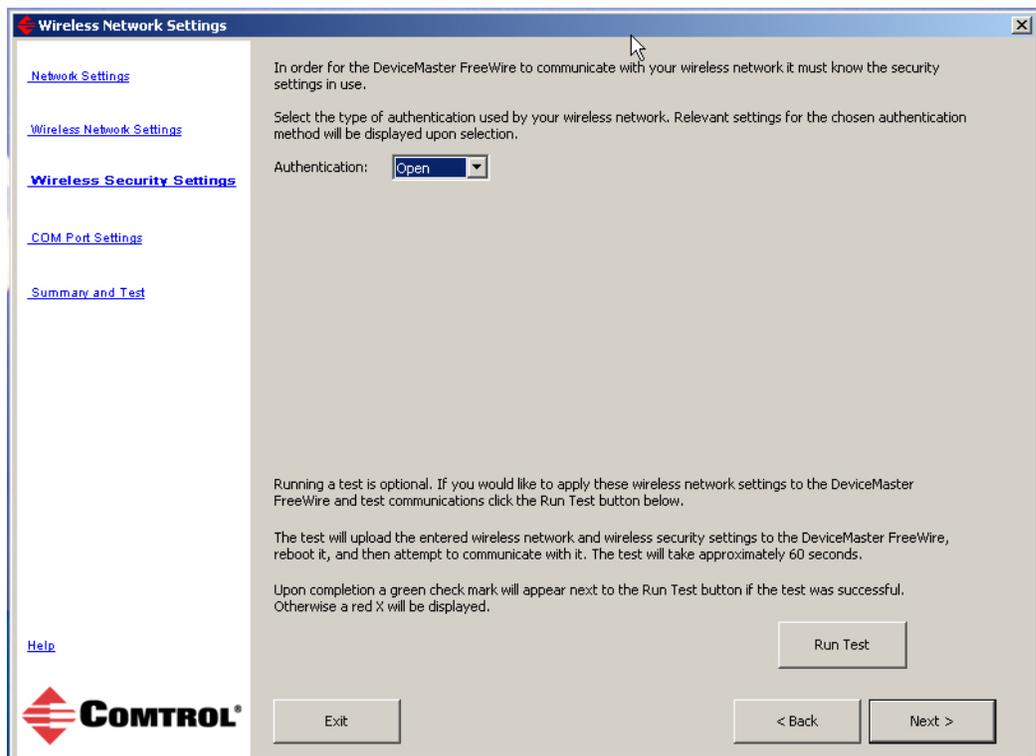


- d. If the DeviceMaster FreeWire network settings are valid, a green check mark appears next to the **Run Test** button.
- e. Click **Next** to continue the configuration process.

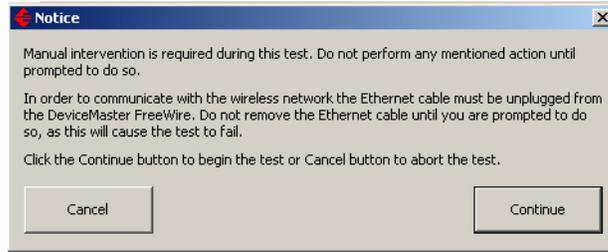
5. Enter the SSID and channel for your wireless network and then click Next.



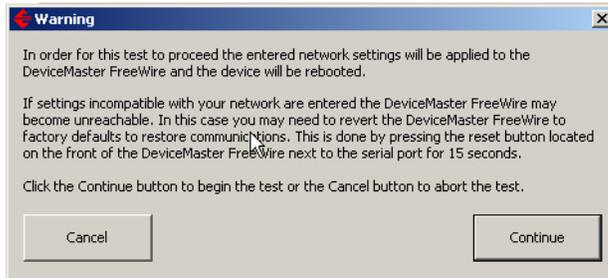
6. Select the appropriate **Authentication** (WPA-PSK, WEP, or Open) for your wireless network and complete the fields that appear for that selection.



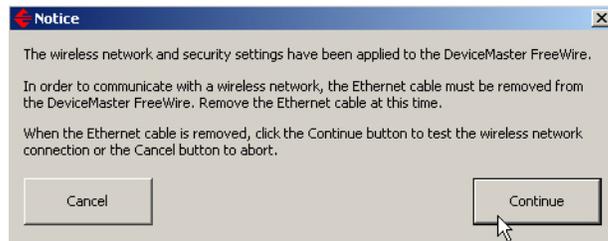
- a. To test the wireless network and security settings, click **Run Test** or optionally, click **Next** and go to Step 7.
- b. Click **Continue**.



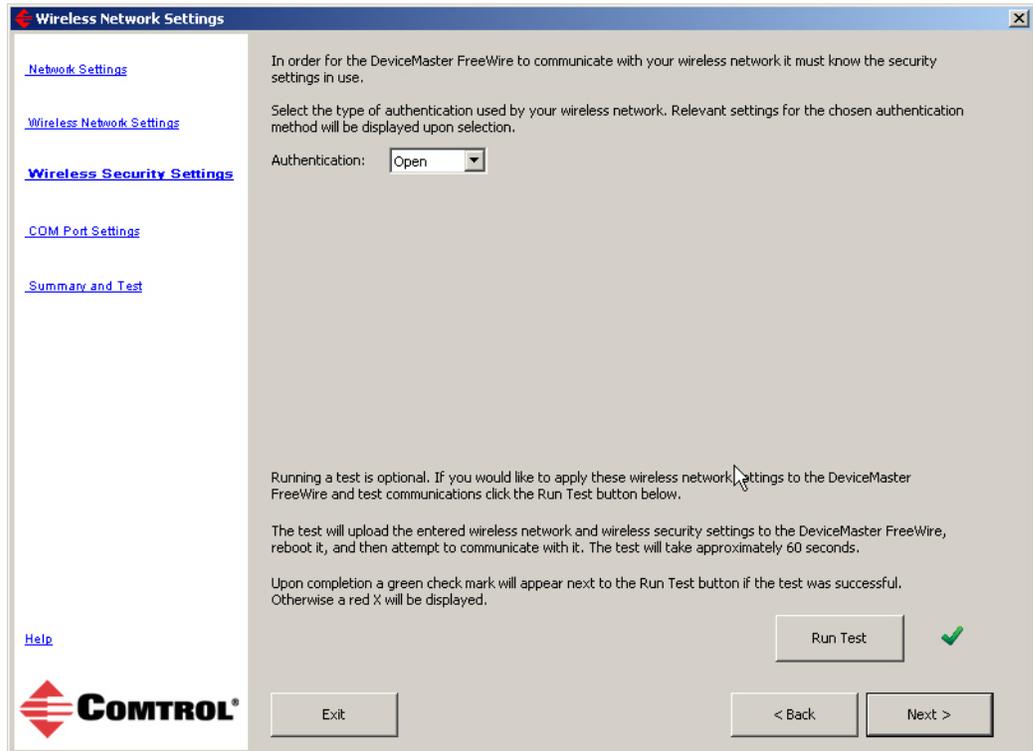
- c. Click **Continue**.



- d. Disconnect the Ethernet cable and then click **Continue**.

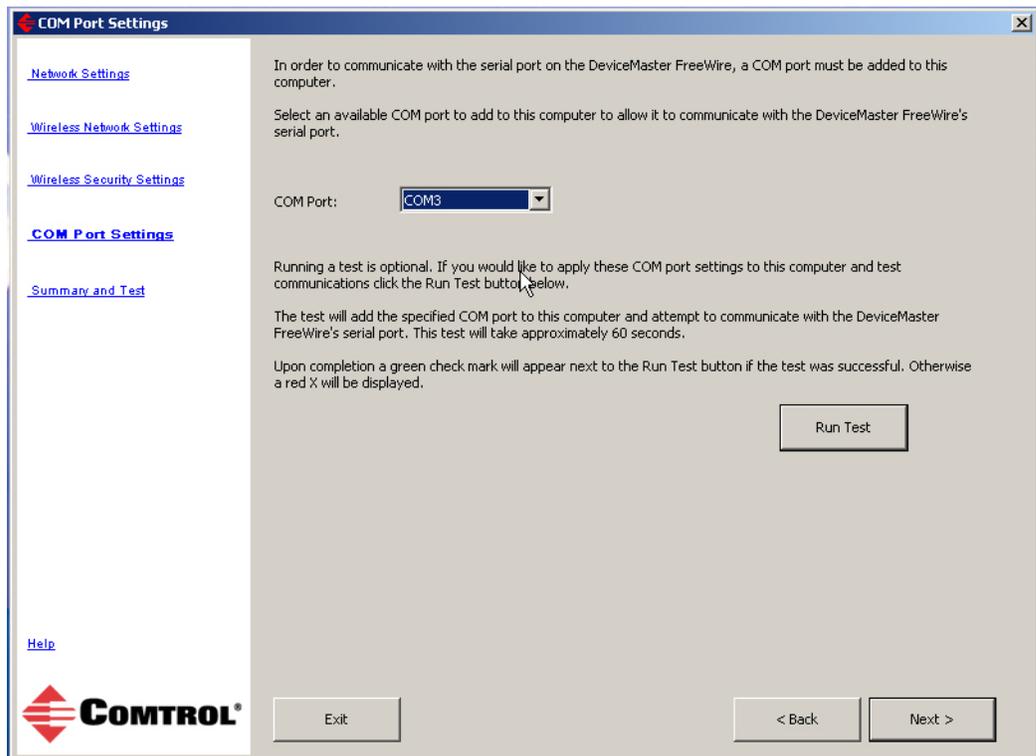


- e. If the DeviceMaster FreeWire wireless settings are valid, a green check mark appears next to the **Run Test** button.

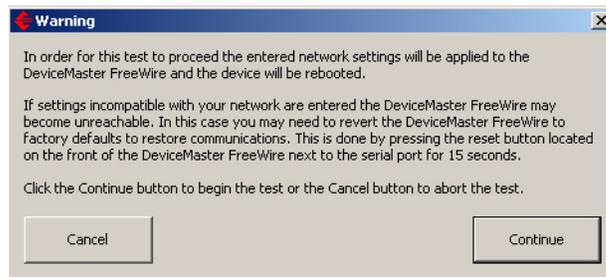


- f. Click **Next** to continue the configuration process.

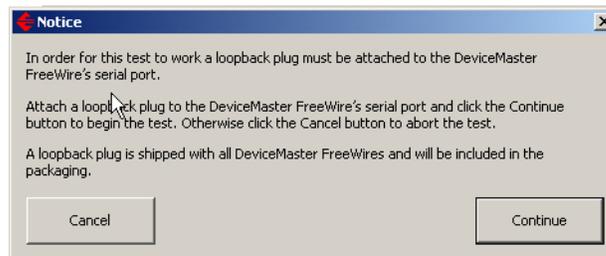
7. Select an available COM port number.



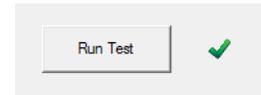
- a. To test the COM port, click **Run Test** or optionally, click **Next** and go to Step 8.
- b. Click **Continue**.



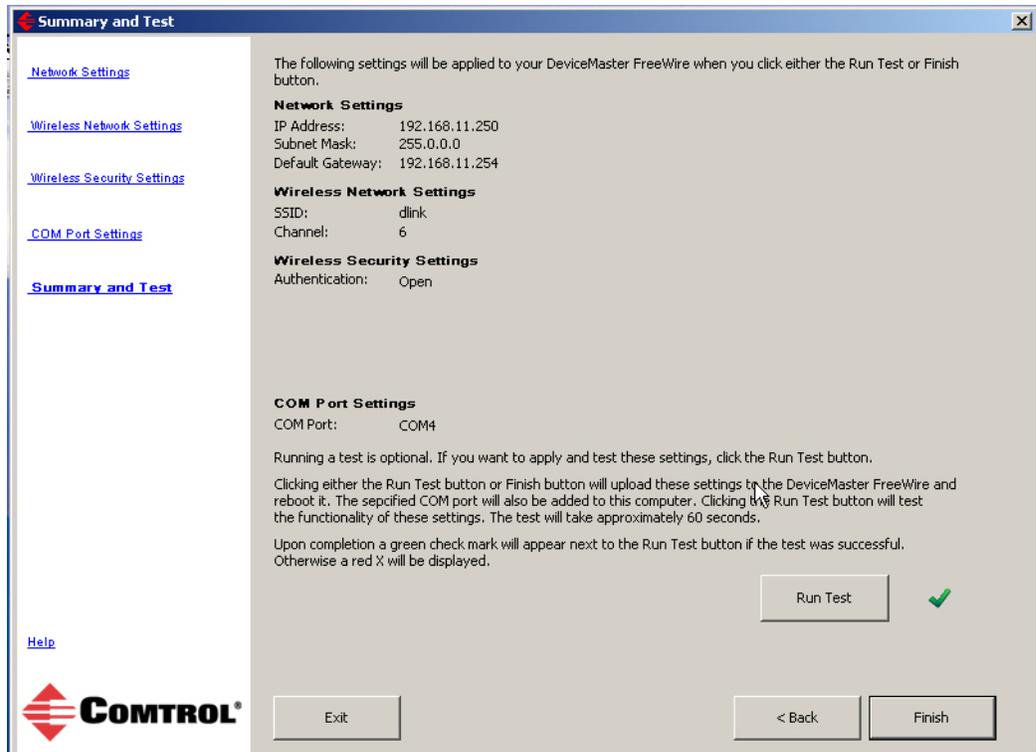
- c. Insert the loopback plug that was shipped with the into the serial port and click **Continue**.



- d. If the COM selection is valid, a green check mark appears next to the **Run Test** button.



- e. Click **Next**.
8. If you have not do so, you may want to click **Run Test** to verify that valid configuration setting have been selected. If you have tested each configuration step, it is not necessary to retest the DeviceMaster FreeWire.



9. Click **Finish** to complete the first phase of the configuration process.
10. In some cases, you may need to perform more configuration procedures:
- To configure serial port characteristics, go to [Advanced Serial Port Configuration](#) on Page 24
 - To configure Ad Hoc wireless settings, go to [Configuring Ad Hoc Mode](#) on Page 25

Configuring Network and Wireless Settings

After initial DeviceMaster FreeWire configuration using the *Installation Wizard*, you can use the *Installation Wizard* to change network or wireless settings.

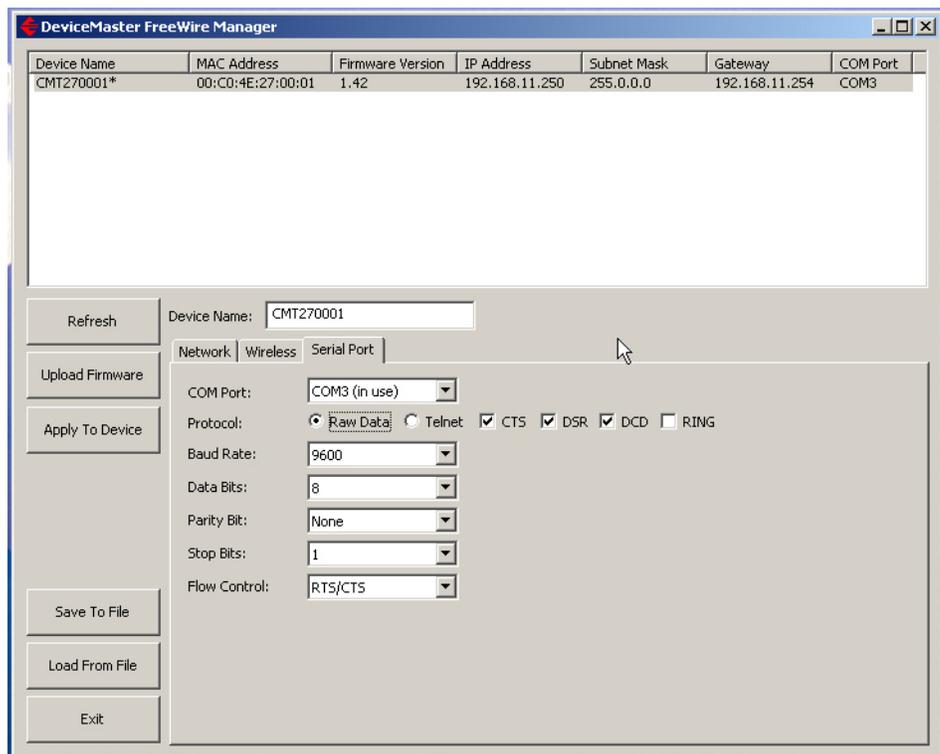
Optionally, you can use the *FreeWire Manager* to change your network or wireless settings. In addition, you can use the *FreeWire Manager* if you need to perform advanced configuration such as:

- Serial port
 - Protocol (raw data or Telnet)
 - Settings, for example: baud rate, data bits, parity bit, stop bits, and flow control
- Wireless (Ad hoc or infrastructure)
- Network

Advanced Serial Port Configuration

Use the following procedure if you need to configure advanced serial port settings for the DeviceMaster FreeWire.

1. Start the FreeWire Manager (desktop shortcut or **Start/Programs/Control/FreeWire/FreeWire Manager**).
2. Highlight the DeviceMaster FreeWire that you want to configure and click the **Serial Port** tab.
3. Set the options that reflect your serial device's properties.

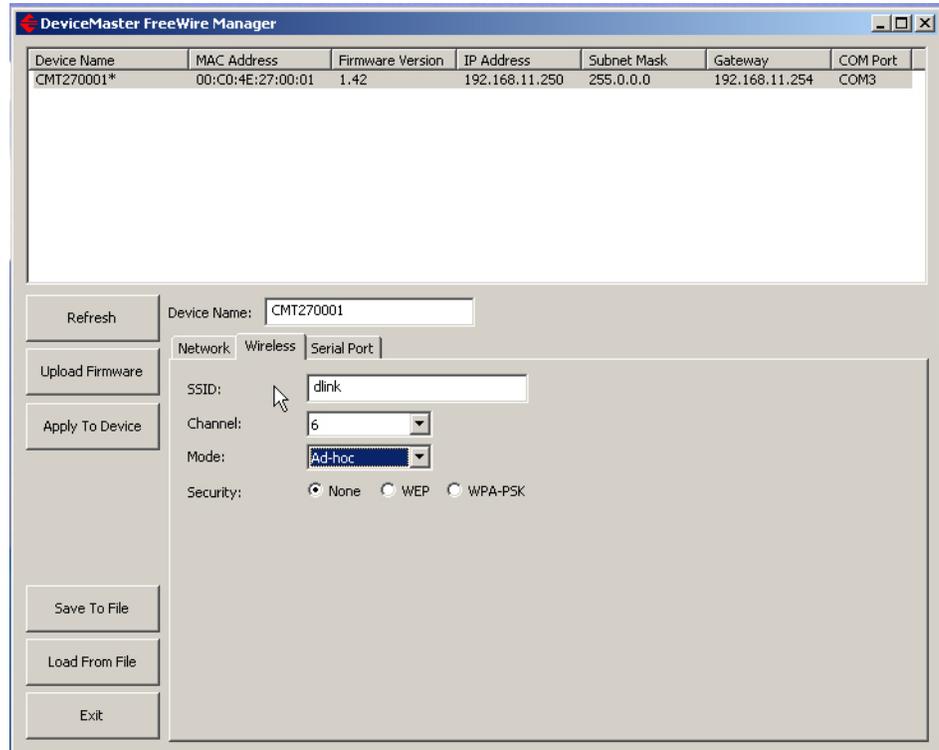


4. Click **Apply to Device**.
5. If you have completed all settings changes, click **Exit**.

Configuring Ad Hoc Mode

Use the following procedure if you need to configure the DeviceMaster FreeWire for Ad hoc mode.

1. Start the FreeWire Manager (desktop shortcut or **Start/Programs/Control/FreeWire/FreeWire Manager**).
2. Highlight the DeviceMaster FreeWire that you want to configure and click the **Wireless** tab.
3. Click **Ad hoc**.
4. Click the appropriate **Security** settings for your environment.
5. Click **Apply To Device**.



6. If you have completed all settings changes, click **Exit**.
7. If you do not have any other DeviceMaster FreeWire units to configure, close the FreeWire Manager.

Refer to [Connecting the Serial Device](#) on Page 41 for serial port pin-out information.

Web Browser and Console Configuration

After the hardware installation has been successfully completed, the DeviceMaster FreeWire is ready for configuration.

Most installations can use the *FreeWire Installation Wizard* for Windows, which also installs the *FreeWire Manager*, a configuration interface. The *FreeWire Installation Wizard* and *FreeWire Manager* can be used for typical installations. If you do not have a Windows system, you can use the embedded web server page.

In addition, there are configuration options that may need to be configured for your environment using the web browser interface or optionally, the Command Console.

This section also discusses how to operate DeviceMaster FreeWire in Bridging Network Mode. You may want to review these subsections before using Bridging Network Mode:

- [Limitations of Bridging Network Mode](#) on Page 33
- [Behavior in Ad-Hoc Mode](#) on Page 33
- [Behavior in Infrastructure Mode](#) on Page 33

Configuration Options

The DeviceMaster FreeWire also provides additional configuration and management methods.

- Embedded web server page ([Page 27](#)) which is accessed with a standard web browser (for example, Firefox or Internet Explorer), with no additional software and on any system that supports web browser capabilities. Simply, type the IP address into your web browser address bar to connect.
- DeviceMaster FreeWire internal configuration console, which can be accessed using a Telnet connection or directly through the DeviceMaster FreeWire serial port ([Page 31](#)) using a DB9 RS-232 null-modem cable for serial connection. The Command Console is a command-line-oriented console, which provides some advanced features not available through the embedded web server page or the FreeWire Manager.

Using the Web Browser Interface

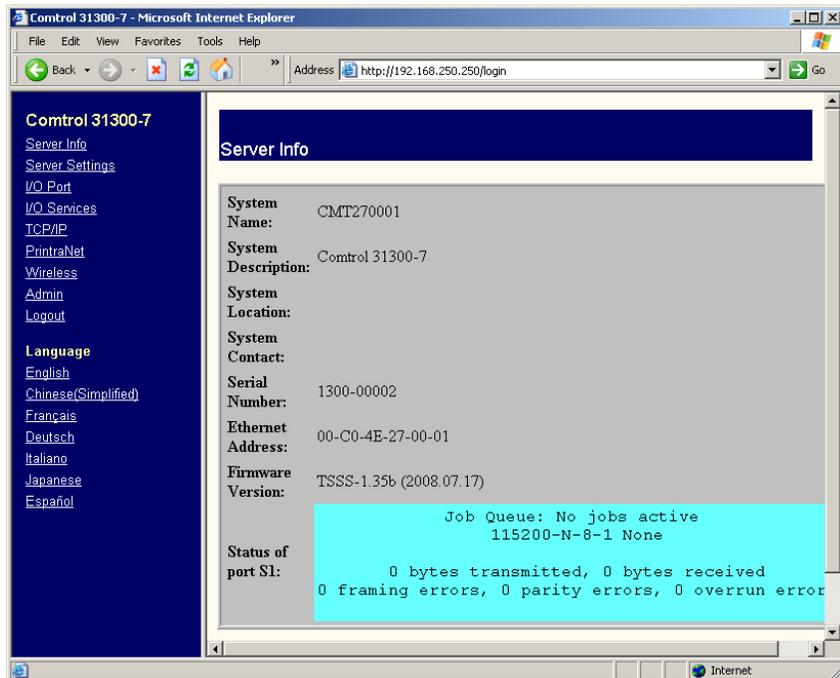
Optionally, you can configure the DeviceMaster FreeWire using a standard web browser to access the DeviceMaster FreeWire embedded web server pages, which contain the DeviceMaster FreeWire configuration options. No additional software is required.

Note: *To configure the DeviceMaster FreeWire, the IP address must also be valid for the network to which it is attached. The network segment must be 192.168.250.x to communicate to the DeviceMaster FreeWire default IP address of 192.168.250.250.*

1. Verify that your PC is connected and has access to the network.
2. If you have not done so, connect an available Ethernet cable from your network hub to the DeviceMaster FreeWire and verify that the DeviceMaster FreeWire is powered on.

To operate on an 802.11b/g network, you must set up the same configuration as the wireless network you want the DeviceMaster FreeWire to communicate on. All nodes of a wireless network need to have the same settings in order to communicate with each other.

- Wireless mode (ad-hoc or infrastructure)
 - SSID channel
 - Data rate
 - Security settings (WEP keys, 802.1x settings, etc.)
3. Enter the DeviceMaster FreeWire IP address in your web browser. The *Server Info* screen displays.
 4. Click the **Login** menu selection (left), enter the password (default is **access**), and then click **Submit**.



5. You should check the firmware version ([Page 35](#)) and if necessary, update the firmware before configuring the DeviceMaster FreeWire using the web page.
Note: Use the *Help* system if you need information about any of the settings.

6. Use the following web pages to configure the settings of the DeviceMaster FreeWire. The menu selections are displayed on the left side of the screen, and the individual settings are located at the top of the screen. At a minimum, you need to configure the following pages:
- **I/O Port** - if you are using the serial port in socket mode.

The screenshot shows the 'I/O Port Settings' page in a Microsoft Internet Explorer browser window. The address bar shows the URL: <http://192.168.250.250/portselect.htm?access=AE130F781E80AF118prot=&langu>. The left sidebar contains a menu with options: Server Info, Server Settings, I/O Port, I/O Services, TCP/IP, PrintraNet, Wireless, Admin, Logout, Language (English, Chinese(Simplified), Francais, Deutsch, Italiano, Japanese, Español).

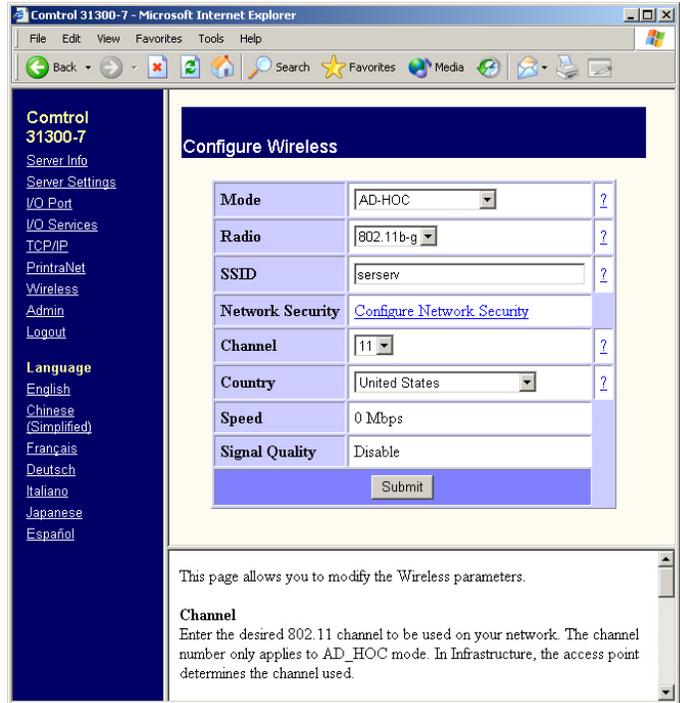
Port Name	S1
Port Type	Serial
Baud Rate	115200
Bits per character	8
Stop Bits	1
Parity	None
Flow Control	None
ECable Mode	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Destination IP Address	0.0.0.0

- **TCP/IP**- to configure the DeviceMaster FreeWire IP address for your network.

The screenshot shows the 'Configure TCP/IP' page in the same Microsoft Internet Explorer browser window. The left sidebar menu is the same as in the previous screenshot.

TCP/IP	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Enabled Services	CMT270001_S1_A CMT270001_S1_B
IP Address	IP Address: 192.168.11.250 Subnet Mask: 255.255.255.0 Gateway: 192.168.11.254 Boot Method: AUTO Boot Tries: 3
RARP Boot Settings	<input type="checkbox"/> No Subnet Mask <input type="checkbox"/> No Gateway <input checked="" type="checkbox"/> Set address with ARP/Ping
Applications Enabled	<input checked="" type="checkbox"/> LPD <input checked="" type="checkbox"/> TCP port <input checked="" type="checkbox"/> FTP <input checked="" type="checkbox"/> Telnet <input checked="" type="checkbox"/> S-TELNET <input checked="" type="checkbox"/> HTTP <input checked="" type="checkbox"/> HTTPS <input checked="" type="checkbox"/> POP3 <input checked="" type="checkbox"/> SMTP <input checked="" type="checkbox"/> SNMP <input checked="" type="checkbox"/> DNS <input checked="" type="checkbox"/> TFTP <input checked="" type="checkbox"/> ECHO
TCP Window	10240
TCP Timeout	1 min
LPD Settings	<input type="checkbox"/> LPD Banner Enable <input type="checkbox"/> LPD Retry Enable
Keepalive Timer	1 min
Probe Idle Connections	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Access Control	Configure IP Access Control
DNS	Configure DNS
Submit	

- **Wireless** - to configure the wireless settings that match your network.



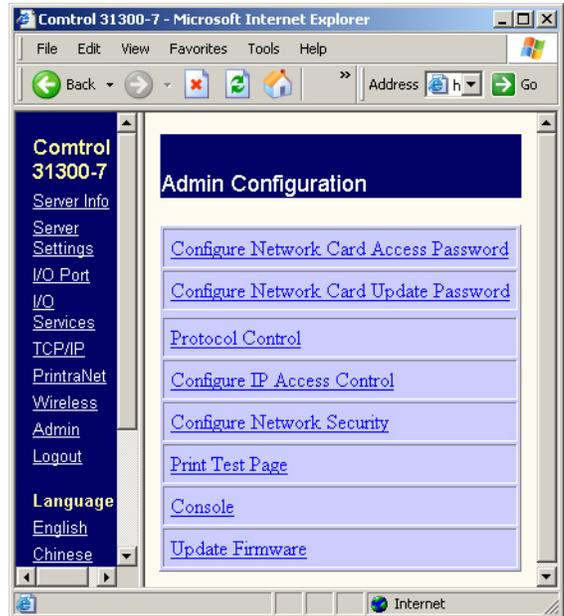
- **Admin** - you may want to configure network access password and an update password, which prevents unauthorized configuration changes.

7. To confirm wireless operation:
 - a. Close the web browser and disconnect the Ethernet cable.
 - a. Re-open the web browser, enter the IP address, and verify that *Server Info* web page loads.

Note: It takes approximately 7 seconds before the connection is operational.

If the web page does not load, see [Troubleshooting](#) on Page 47.

8. Refer to [Connecting the Serial Device](#) on Page 41 for serial port pinout information.



Using the Command Console

You can use a telnet or serial connection to configure the DeviceMaster FreeWire using the Command Console.

This subsection also discusses how to operate DeviceMaster FreeWire in Bridging Network Mode using the Command Console.

Telnet Connection

Use this procedure to access the Command Console through telnet.

Note: To configure the DeviceMaster FreeWire, the IP address must also be valid for the network to which it is attached. The network segment must be **192.168.250.x** to communicate to the DeviceMaster FreeWire default IP address of **192.168.250.250**.

1. Verify that the DeviceMaster FreeWire is connected via an Ethernet cable to the host PC.
2. From the Windows **Start** menu, click **Run**, and then type the following command (where *x.x.x.x* is the IP address of the DeviceMaster FreeWire). The system will use the default port **23**.

```
telnet x.x.x.x
```

3. After a connection is established, press **Return** or **Enter** to get the # prompt.
4. Enter the password, **access** (it will not “echo” on your screen), and type anything in response to the **Enter Username>** prompt.

When the **Local>** prompt appears, you are ready to enter commands.

For a list of commands, type **help** at the command prompt.

5. After configuring the DeviceMaster FreeWire, confirm wireless operation:
 - a. Close the Command Console, and disconnect the Ethernet cable.
 - b. Re-open a telnet session, enter the IP address, and verify that a DeviceMaster FreeWire telnet session opens.

Note: It takes approximately 7 seconds before the connection is operational.

If the telnet session does not start, see [Troubleshooting](#) on Page 47.

Refer to [Connecting the Serial Device](#) on Page 41 for serial port pinout information and [Verifying the Installation](#) on Page 45 to complete the installation.

Serial Connection

The Command Console can be accessed via a direct connection to the DeviceMaster FreeWire serial port using a COM port emulator and a null-modem serial cable.

1. Attach one end of a null-modem serial cable to the DB9 serial port of the DeviceMaster FreeWire, and the other end of the cable to the COM port on your PC.
2. Start a terminal emulation program (e.g., Windows Hyper Terminal), making sure you are connecting with the relevant COM port.

Note: You can use *Test Terminal (WCOM2)*, which is available on the CD. You can also download the latest version from the [ftp site](#).

3. Use the following settings for the connection:
 - Bits Per Second: **115200**
 - Data Bits: **8**
 - Parity: **None**
 - Stop Bits: **1**
 - Flow Control: **None**

4. After opening a serial port with the appropriate settings, type the following characters:

```
#!DM
```

After typing those characters, the following prompt appears:

```
Local>
```

For a list of commands, type **help** at the command prompt.

5. After configuring the DeviceMaster FreeWire, confirm wireless operation:
 - a. Close the Command Console, and disconnect the Ethernet cable.
 - b. Re-open a telnet session, enter the IP address, and verify that a DeviceMaster FreeWire telnet session opens.

Note: *It takes approximately 7 seconds before the connection is operational.*

If the telnet session does not start, see [Troubleshooting](#) on Page 47.

Refer to [Connecting the Serial Device](#) on Page 41 for serial port pinout information and [Verifying the Installation](#) on Page 45 to complete the installation.

Operating in Bridged Network Mode

The DeviceMaster FreeWire is capable of operating in a Bridged Networking Mode. Under normal operations the DeviceMaster FreeWire is able to communicate through the Ethernet or wireless interface but not both at the same time. Using Bridging Network Mode, a single device attached to the Ethernet port can communicate with a wireless network or device.

Configuration

Placing the DeviceMaster FreeWire in Bridging Network Mode can only be done through the Command Console. Once placed in Bridging Network Mode, telnet and the web interface can only be accessed via the wireless interface. Since networking settings change after enabling Bridging Network Mode, this subsection explains how to enable this feature through the serial port, which is not dependent on the network setup.

1. To access the Command Console, use the appropriate procedure:
 - [Telnet Connection](#) on Page 31, [Steps 1](#) through 4.
 - [Serial Connection](#) on Page 31, [Steps 1](#) through 4.
2. At the **Local>** prompt, enter the following three commands to enable Bridging Network Mode:

```
set nw bridge enable
init
exit
```

The DeviceMaster FreeWire reboots, after which it will be in Bridging Network Mode. The behavior of the DeviceMaster FreeWire in this mode is dependent on whether or not the wireless interface is in infrastructure or ad-hoc mode.

Disabling Bridging Network Mode

To disable Bridging Network Mode, use the following procedure:

1. To access the Command Console, use the appropriate procedure:
 - [Telnet Connection](#) on Page 31, [Steps 1](#) through 4.
 - [Serial Connection](#) on Page 31, [Steps 1](#) through 4.
2. At the **Local>** prompt, enter the following commands to disable Bridging Network Mode:

```
set nw bridge disable
init
exit
```

After the DeviceMaster FreeWire reboots, it is in its standard operating mode.

*Limitations of
Bridging Network
Mode*

Bridging Network Mode on the DeviceMaster FreeWire is designed so that it enables a single Ethernet device to become a wireless device. The DeviceMaster FreeWire is unable to act as a typical wireless access point, which allows multiple attached Ethernet devices to communicate with the wireless interface.

The DeviceMaster FreeWire works in a one-to-one mode. For example if you connect a network enabled printer to the DeviceMaster FreeWire then wireless devices can communicate with the printer.

If you attached the DeviceMaster FreeWire to a managed switch then a wireless device is able to communicate with and manage the switch. Wirelessly connected devices are not able to communicate with any device attached to the switch. If you attached the DeviceMaster FreeWire to an unmanaged switch, you can communicate with the first detected Ethernet device connected to that switch. None of the other devices attached to the Ethernet switch are visible to the DeviceMaster FreeWire's wireless interface.

Thus the DeviceMaster FreeWire Bridging Network Mode can only be used to attach one Ethernet device to a wireless network or device.

*Behavior in Ad-Hoc
Mode*

Ad-hoc mode allows a wireless device to connect to the DeviceMaster FreeWire as though it were an access point. Use this mode when you want to directly connect the attached Ethernet device to a computer via the wireless interface.

For example, if you want to connect a network enabled printer directly to a computer via the wireless interface you would use ad-hoc mode.

*Behavior in
Infrastructure Mode*

Infrastructure mode allows the DeviceMaster FreeWire to connect to a wireless access point. Use this mode when you want to connect an attached Ethernet device to a wireless network. This mode differs from ad-hoc mode in that it allows multiple devices to communicate with the attached Ethernet device via the wireless interface.

For example, if you want to attach an Ethernet printer to your wireless network so it can be accessed by multiple computers you would use infrastructure mode.

DeviceMaster FreeWire Firmware

After the hardware installation has been successfully completed, you should check to see if the DeviceMaster FreeWire is loaded the latest firmware.

Checking the Firmware Version

There are several ways to check the firmware version:

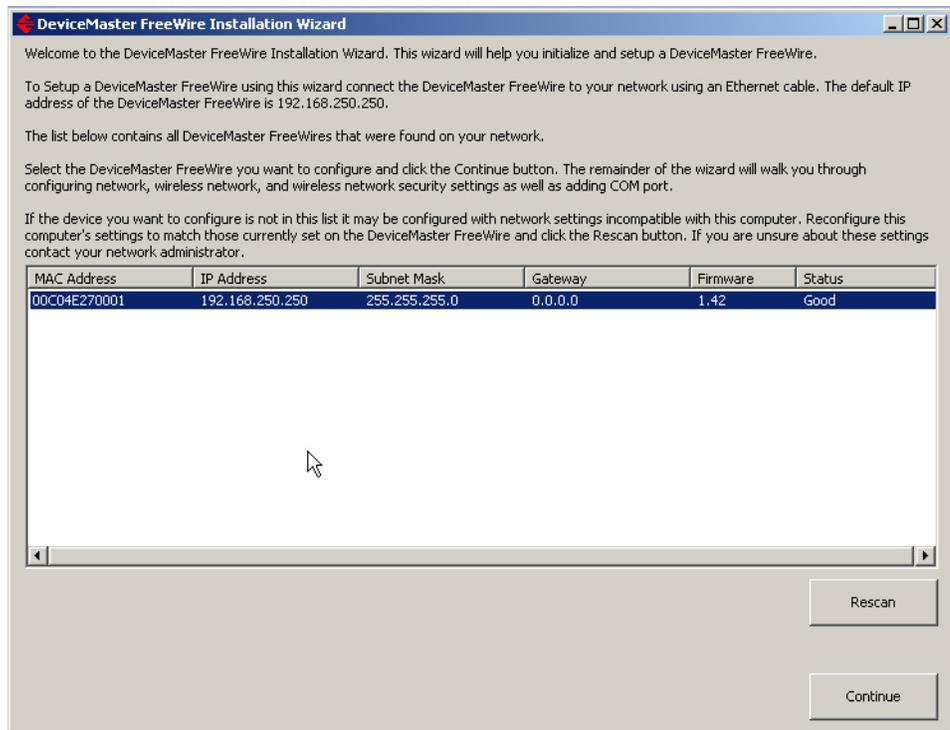
- DeviceMaster FreeWire Installation Wizard
- FreeWire Manager
- Web page

DeviceMaster FreeWire Installation Wizard

Use the following procedure to check the firmware version on the DeviceMaster FreeWire after hardware installation.

1. If necessary, start the *DeviceMaster FreeWire Installation Wizard* using the desktop shortcut or **Start/Programs/Control/FreeWire/FreeWire Installation Wizard**.

The firmware version is displayed on the right side of the DeviceMaster FreeWire information, next to the *Status*.

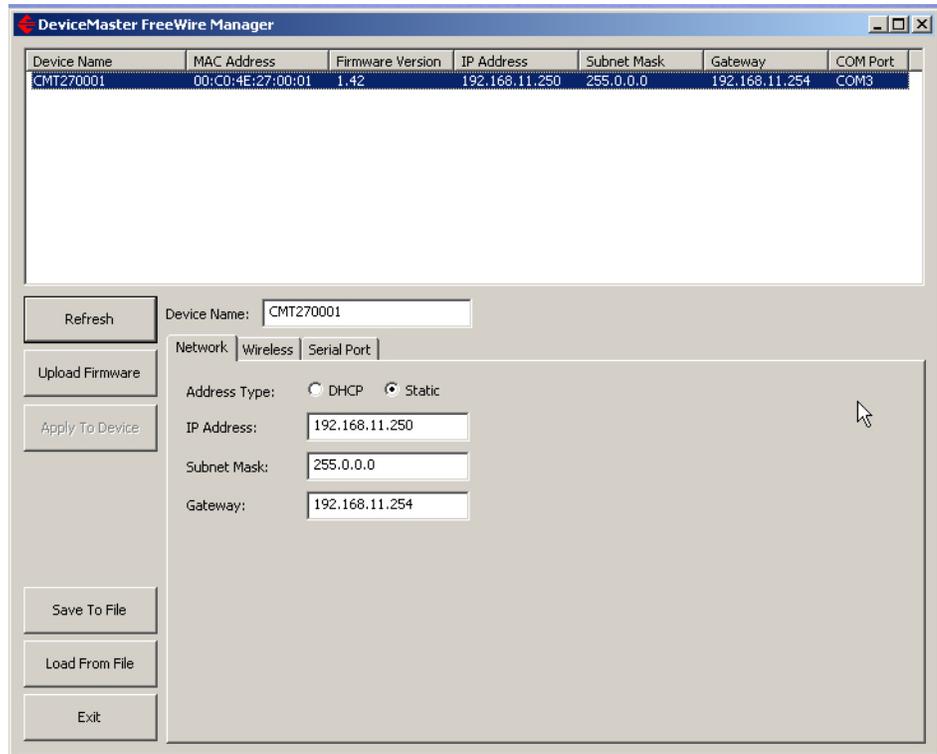


2. Check the ftp site for a later version at <ftp://ftp.comtrol.com/html/default.htm>.
3. If necessary, go to [Uploading the Latest Firmware](#) on Page 38.

FreeWire Manager

You can use the following procedure to check the firmware version using the FreeWire Manager.

1. Start the FreeWire Manager (desktop shortcut or **Start/Programs/Control/FreeWire/FreeWire Manager**).



The firmware version is displayed in the center of the DeviceMaster FreeWire information.

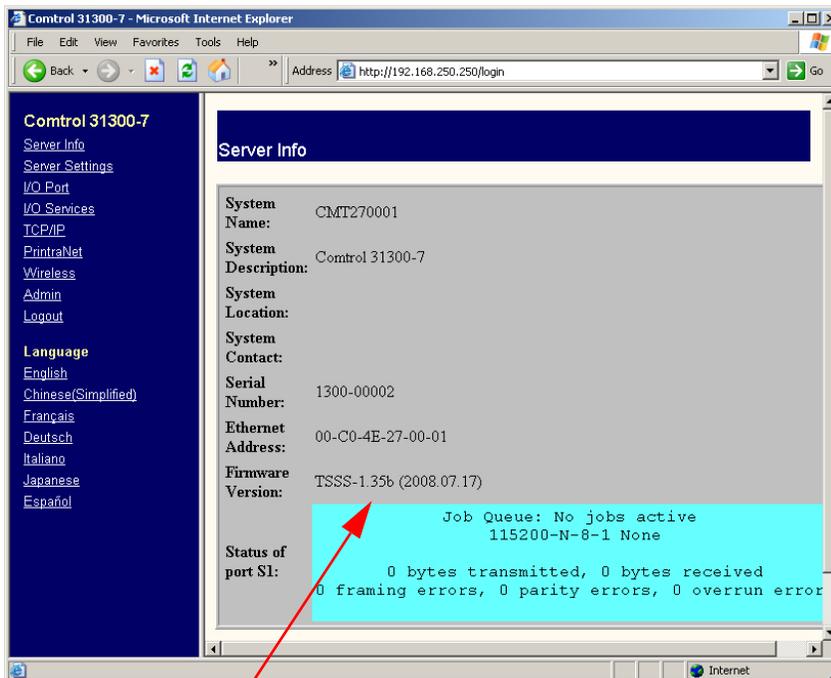
2. Check the ftp site for a later version at <ftp://ftp.comtrol.com/html/default.htm>.
3. If necessary, go to [Uploading the Latest Firmware](#) on Page 38.

Web Page

You can use the following procedure to check the firmware version using the web page.

Note: To communicate with the DeviceMaster FreeWire, the IP address must also be valid for the network to which it is attached. The network segment must be 192.168.250.x to communicate to the DeviceMaster FreeWire default IP address of 192.168.250.250.

1. Enter the DeviceMaster FreeWire IP address in your web browser. The *Server Info* screen displays.



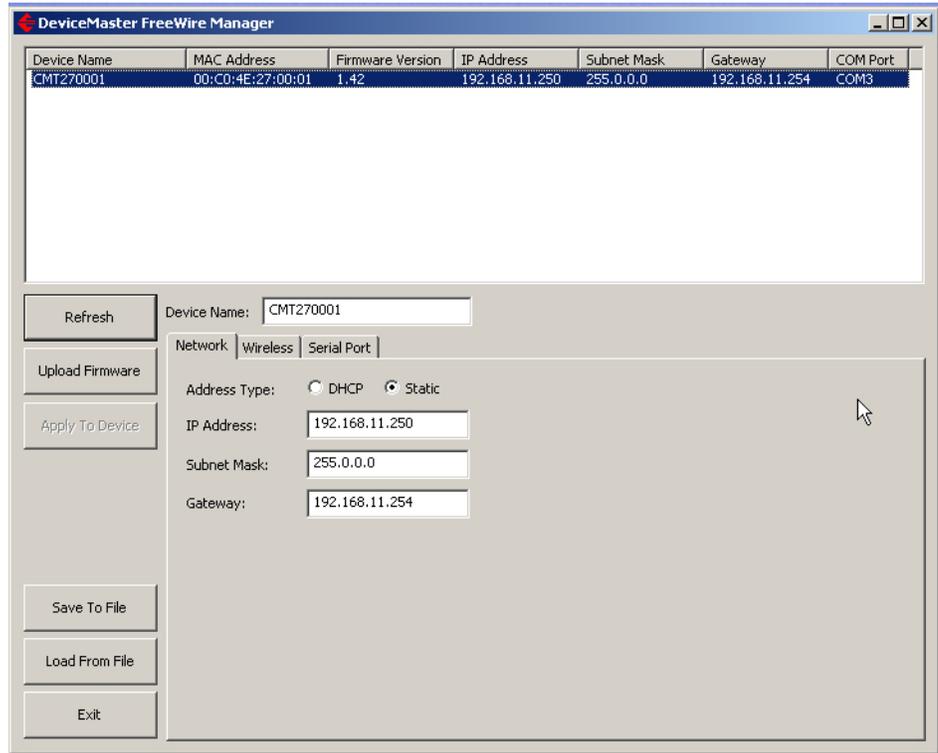
Note: This example displays firmware version 1.35b.

2. Check the ftp site for a later version at <ftp://ftp.comtrol.com/html/default.htm>.
3. If necessary, download the latest firmware and go to [Uploading the Latest Firmware](#) on Page 38 to load the firmware into the DeviceMaster FreeWire.

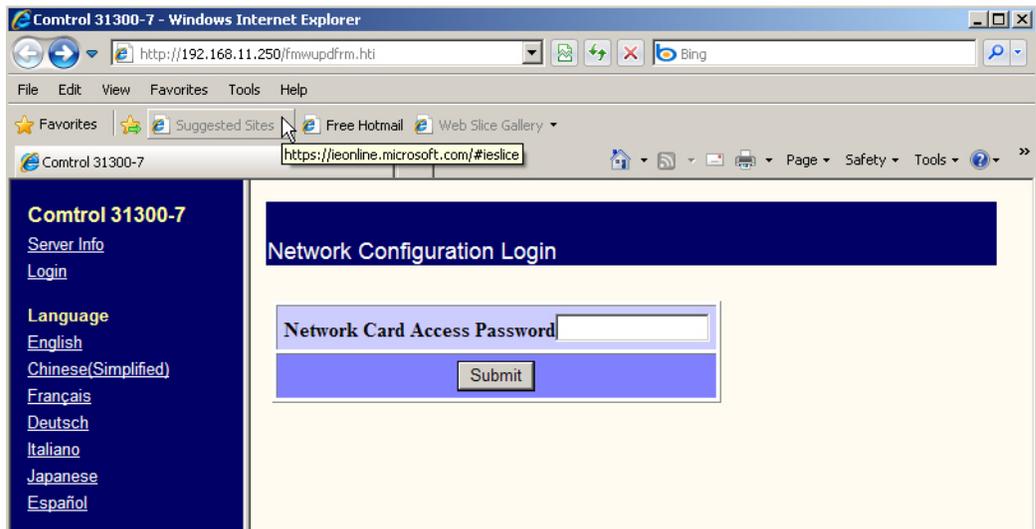
Uploading the Latest Firmware

Use the following procedure to upload the latest firmware into the DeviceMaster FreeWire using the FreeWire Manager.

1. Start the FreeWire Manager (desktop shortcut or **Start/Programs/Control/FreeWire/FreeWire Manager**).



2. Highlight the DeviceMaster FreeWire that requires a firmware update.
3. Click **Upload Firmware**.
4. Enter the password (default is **access**), and then click **Submit**.

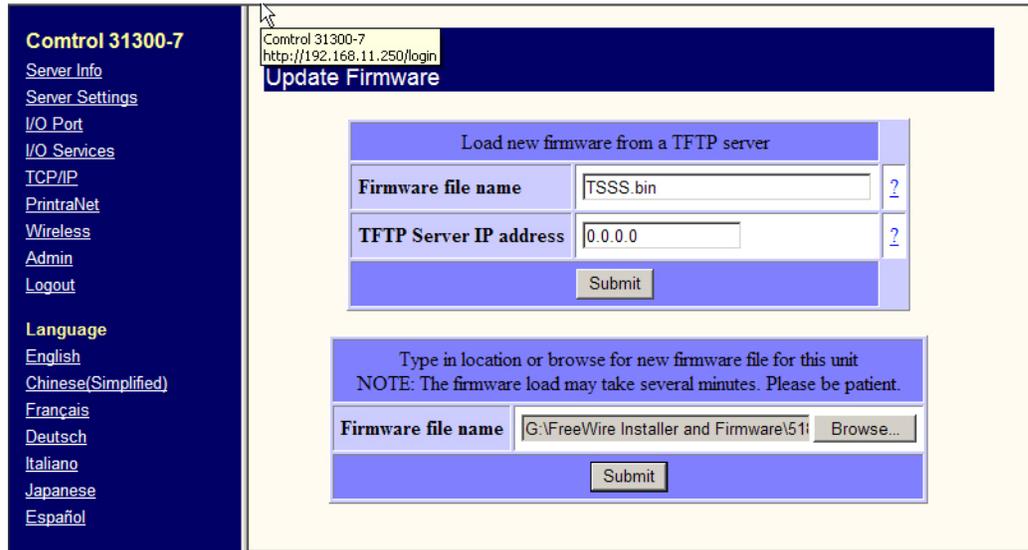


Note: Use the Help system if you need information about any of the settings.

5. Click **Continue**.



6. Browse to the location you downloaded the firmware, and click **Submit**.



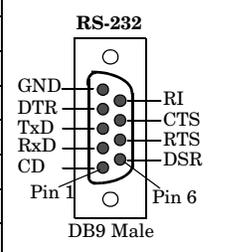
Connecting the Serial Device

Connect the DeviceMaster FreeWire to your serial device using a standard RS-232 DB9 serial cable. You can build your own null-modem or straight-through DB9 serial cables using the following subsections.

Serial Port Signals

The following table provide serial port pinouts for the DeviceMaster FreeWire.

<i>DB9 Connector Pinouts</i>	
Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI (Ring) or +5 VDC power input (selectable via 3-pin jumper)



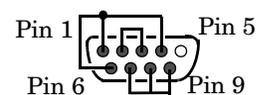
DB9 Loopback Plugs

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

Note: You can use *Test Terminal* to test the serial ports. You can use the *Support page* on the CD shipped with the DeviceMaster FreeWire.

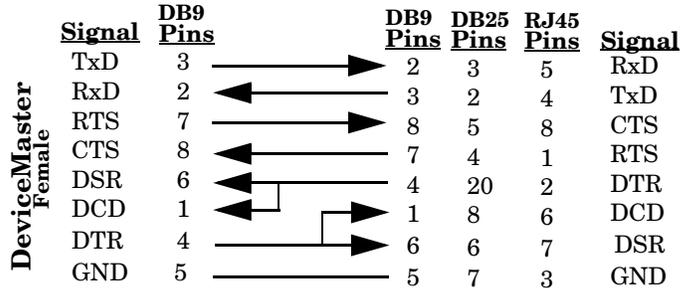
Wire the following pins together to build additional plugs or replace a missing RS-232 loopback plug:

- Pins 1 to 4 to 6
- Pins 2 to 3
- Pins 7 to 8 to 9



DB9 Null-Modem Cables

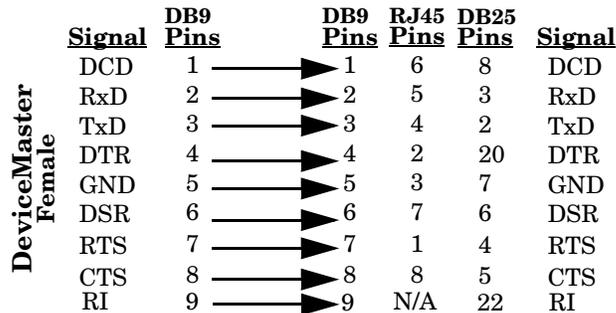
Use the following figure if you need to build an RS-232 null-modem cable. A null-modem cable is required for connecting DTE devices.



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.

DB9 Straight-Through Cables

Use the following figure if you need to build an RS-232 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.



TCP Port Connections

The DeviceMaster FreeWire supports port connections over TCP/IP using raw TCP ports only. The TCP ports are allocated as follows.

Port	Destination Device
3001	RS-232
9100	RS-232
9200	RFC 2217
<i>You should set the port to port forwarding in routers and firewalls.</i>	

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Verifying the Installation

There are several ways to verify that the serial port is functioning. This section discusses how to test a serial device able to display ASCII characters.

Refer to the *DeviceMaster FreeWire Software and Documentation* CD for procedures of how to use Test Terminal and the loopback plug to verify that the serial port is functioning.

Use the following procedure to verify that the DeviceMaster FreeWire and the serial device are working correctly.

1. Verify that both the DeviceMaster FreeWire and the connected serial device are powered on and ready, and that a serial cable is properly connected between the DeviceMaster FreeWire and serial device (i.e., transmit signal output from the DeviceMaster FreeWire going to the receive signal input on the serial device, ground leads connected together, etc.).

Note: *Before attempting to use the DeviceMaster FreeWire, you must verify the connection between the DeviceMaster FreeWire and the connected serial device. If this connection is not working, you will not be able to send and/or receive data from the connected serial device.*

2. Verify that the DeviceMaster FreeWire port settings (i.e., baud rate, flow control, character bit size, parity, etc.) exactly match the settings of the connected serial device port.
3. If the serial device connected to the DeviceMaster FreeWire is able to display or print ASCII characters (such as a terminal emulator or serial printer), then communication between the devices can be verified by pressing the **Reset** button on the DeviceMaster FreeWire for about one second (but less than five seconds), which initiates the output of configuration data from the DeviceMaster FreeWire to the connected serial device.
 - If communication has been successfully established between the two devices, the serial device should be able to display or print the DeviceMaster FreeWire's configuration data.
 - If no data is displayed or printed, verify that both devices are powered ON, are properly connected using a suitable serial cable, and are using compatible serial port parameters. The two most common serial communication problems are due to the either the cabling and/or mismatched serial port parameters.

Note: *If the DeviceMaster FreeWire is connected to a serial device that cannot display or print ASCII characters, then it is recommended that another serial device capable of displaying or printing ASCII characters be temporarily connected to the DeviceMaster FreeWire in order to verify the serial connection. After successful communication is verified using the temporary serial device, reconnect the original serial device, making sure that the original serial device is configured with serial port parameters that match the tested connection.*

If you are having installation problems, see [Troubleshooting](#) on Page 47 or the *Software and Documentation* CD for assistance.

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Troubleshooting

This section describes procedures for troubleshooting problems you may encounter with the DeviceMaster FreeWire, and is divided into the following sections:

- *Troubleshooting Installation Problems*
- [Troubleshooting Network Configuration Problems](#) on Page 47
- [Troubleshooting Windows Problems](#) on Page 48
- [Troubleshooting Wireless Configuration Problems](#) on Page 48

If your problem is not resolved using the troubleshooting sections, you can use [Where to Get Help](#) on Page 49 for additional help.

Troubleshooting Installation Problems

If you cannot access the connected serial device via the DeviceMaster FreeWire, first check the network connection and cabling.

- Check the physical cabling to ensure all cables are plugged in (Ethernet and DB9 serial cable).
- If the appropriate LEDs ([LED Indicators](#) on Page 9) are not illuminated, then there is probably a bad 10baseT or 100baseTX cable, or the hub port is bad. If possible, try a different cable and hub port, or try connecting a different device to the cable.
- Verify that you are using the correct values for both IP Address and Port Number. A common mistake is to assume the TCP port number is the “device number” on the server.
- If you are using a hub, verify that the hub port is operating correctly by trying the DeviceMaster FreeWire on a different port.

Troubleshooting Network Configuration Problems

The following information may help you diagnose network configuration problems.

- If you are using TCP/IP, make sure that your PC and the DeviceMaster FreeWire are on the same IP segment or can reach each other with a **PING** command from the host. The IP address you assign to the DeviceMaster FreeWire must be on the same logical network as your host PCs (e.g., if your PC has an IP address of **192.189.207.3**, the DeviceMaster FreeWire should have an IP address of **192.189.207.x**, where x is an integer between 1 and 254), or you must properly configure your router address to work with the DeviceMaster FreeWire.
- If your DeviceMaster FreeWire is set to **Auto** or **DHCP** for obtaining an IP address, it is possible that the DeviceMaster FreeWire IP address can change. Either configure your DHCP server to give the DeviceMaster FreeWire a permanent lease, or configure the DeviceMaster FreeWire to be on a **STATIC** IP address outside the scope of the DHCP addresses.

- Check to see if you have mismatched or duplicate IP addresses. Verify that the IP address is correctly loaded into the DeviceMaster FreeWire (via the displayed or printed configuration information or through the remote console), and make sure that no other nodes on the network have this address (duplicate addresses are the biggest cause of TCP/IP connectivity problems). If the IP address is not correct, then check whether the loading procedure was properly executed.
- Verify that the host PC and the DeviceMaster FreeWire are either on the same subnet (for example, if the DeviceMaster FreeWire has a subnet mask of 255.255.255.0, the host must have the same subnet mask) or that the router is properly configured to pass data between the two devices.
- If the wrong IP address is loaded, check your network for file servers that have DHCP, BOOTP, or rarp enabled, and make sure that these file servers are not set up to load IP addresses into the DeviceMaster FreeWire.

Troubleshooting Windows Problems

- If you are having trouble accessing the connected serial device through Windows, ensure you can ping the DeviceMaster FreeWire using the DOS command **PING *ipaddress***, where *ipaddress* is the IP address of the DeviceMaster FreeWire. If you cannot ping the DeviceMaster FreeWire, you will not be able to access the serial device.
- If the DeviceMaster FreeWire COM port redirector reports an error, verify that the correct serial/IP COM port is being used when the application runs. Verify that your application's COM port settings have been changed to use the serial/IP COM ports.

Troubleshooting Wireless Configuration Problems

- Verify that your PC's wireless adapter and/or access point is configured properly – note the settings, paying special attention to the wireless mode, SSID or network name, WEP or security, and IP address settings so you can configure your DeviceMaster FreeWire to the same wireless settings.
- Make sure you have a good wireless signal from your PC and from the DeviceMaster FreeWire, that the DeviceMaster FreeWire is within range (90 meters or 300 feet), and that it is away from metal objects and other devices that generate radio signals (like Bluetooth devices, cordless phones, and microwave ovens).
- Make sure your PC is set to infrastructure mode if you are connecting through an access point, or ad-hoc (802.11) if you are connecting to the DeviceMaster FreeWire without an access point. See the documentation for your wireless adapter for details.
- If you want to use WEP encryption or password protection for your wireless network, and your wireless adapter or access point normally uses a password or passphrase instead of WEP, it should allow you to enter 0x followed by a 10-digit key (for 40-bit or 64-bit WEP) or 26-digit key (for 128-bit WEP) in hexadecimal format (0-9 or A-F).
- If you are experiencing slow performance or are having intermittent problems connecting, try changing the RF channel of your wireless network. The RF channel can be changed [Using the Web Browser Interface](#) on Page 27 for the DeviceMaster FreeWire. See your wireless adapter and/or access point documentation for more information. When changing the RF channel, it is recommended that you select a channel that is at least three channels lower or higher than any other wireless networks within range.

Where to Get Help

Control Corporation offers several customer support options to assist you in the event you experience difficulties with the DeviceMaster FreeWire, including telephone support, repair services, and warranty.

Your first point of contact for technical support is the Distributor or Dealer from whom you bought your product. They are familiar with your needs, and will generally be able to provide you with the fastest and most comprehensive support. If your Distributor or Dealer is unable to answer your questions or is for some reason not available, then contact Control Corporation.

Before contacting Technical Support, please refer to the troubleshooting suggestions or the web site in this manual to isolate any problems, and be sure to write down any error messages. Also, make sure that you have the serial number of the product (located on the product label on the back of the DeviceMaster FreeWire).

Control Contact Information	
Downloads	ftp://ftp.control.com/html/default.htm
Web site	http://www.control.com
Forum	http://forum.control.com
Phone	(763) 494-4100

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Safety and Regulatory Notices

This section provides the following:

- [Information for United States Users](#)
- [Declaration of Conformity \(FCC\)](#) on Page 52
- [Information for Canadian Users \(IC notice\)](#) on Page 52
- [Information for European Users](#) on Page 52

Information for United States Users

This equipment has been tested and found to comply within the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, 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 and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and 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.

The user is cautioned that changes and modifications made to the equipment without the approval of manufacturer could void the user's authority to operate this equipment.

Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The radiated output power of the print server is far below the FCC radio frequency exposure limits. Nevertheless, print server shall be used in such a manner that the potential for human contact during normal operation is minimized.

To satisfy RF exposure requirements, this device and its antenna(s) must operate with a separation distance of at least 20 centimeters from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users must be provided with specific operating instructions for satisfying RF exposure compliance.

Declaration of Conformity (FCC)

According to 47CFR, Part 2 and 15 for Class B Personal Computers and Peripherals; and/or CPU Boards and Power Supplies used with Class B Personal Computers:

Comtrol Corporation
6655 Wedgwood Road
Maple Grove, MN 55311

Declare under sole responsibility that the product identified herein, complies with 47CFR Part 2 and 15 of the FCC rules as a Class B digital device FOR HOME OR OFFICE USE. Each product marketed, is identical to the representative unit tested and found to be compliant with the standards. Records maintained continue to reflect the equipment being produced can be expected to be within the variation accepted, due to quantity production and testing on a statistical basis as required by 47CFR §2.909. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Information for Canadian Users (IC notice)

The term “IC” before the radio certification number only signifies that Industry of Canada technical specifications were met. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment that is installed outdoors is subject to licensing.

This device has been designed to operate with an antenna having a maximum gain of 2 dB. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen than the equivalent isotropically radiated power (EIRP) is not more than the required for successful communication.

Information for European Users

The server and its built-in 802.11b, and 802.11g wireless technology is in compliance with the Class B Information Technology Equipment requirements and other relevant provisions of European Directive 1999/5/EC. The limits for Class B equipment were derived for typical residential environments to provide reasonable protection against interference with licensed communications devices. The internal function is a radio device using the 2.4 GHz frequency band (2.400GHz - 2.4845 GHz). It is intended for wireless communication with other 802.11b, and 802.11g-enabled devices in an indoor environment.

The use of 802.11b, and 802.11g wireless technology in certain countries may be restricted. Before using 802.11x products, please confirm with the frequency management authority in the country where you plan to use it. Many countries allow indoor use only. In Italy, general authorization is required if used outside. In France, the use of certain channels is restricted outdoors. In some situations or environments, the use of 802.11x wireless technology might be restricted by the proprietor of the building or responsible representatives of the organization, for

example, in airplanes, in hospitals or in any other environment where the risk of interference with other devices or services is perceived or identified as harmful.

If you are uncertain of the policy that applies to the use in a specific organization or environment, you are encouraged to ask for authorization to use 802.11x wireless technology prior to switching it on. Consult your physician or the manufacturer of personal medical devices (pacemakers, hearing aids, etc.) regarding any restrictions on the use of 802.11x wireless technology.

Control Corporation cannot be responsible for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product.

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