DEVICE·MASTER® AIR

User Guide

Table of Contents

Introduction

Product Overview

The DeviceMaster AIR 1-Port is a one-port wireless serial device server that can be panel or DIN rail mounted. The DeviceMaster AIR utilizes the 802.11b protocol for the Ethernet connection, a DB9 male serial port, and is housed in a stainless steel enclosure. It supports RS-232, RS-422, and RS-485 serial communication modes. The product includes an external 100VAC power supply.

A longer Ethernet cable is required during WLAN configuration.
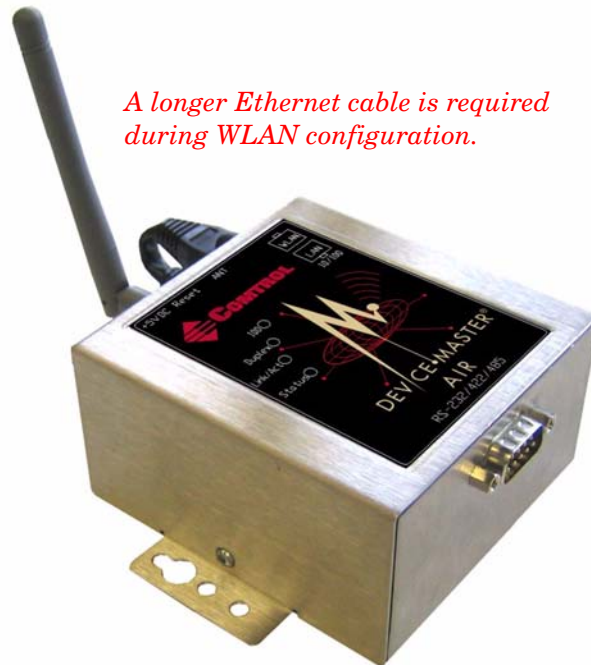
Note: *The IAD DeviceMaster AIR 1-Port is shipped with an external 100/240VAC power supply with both US and European style power cords.*

You must use a web browser to initially configure the wireless settings for the DeviceMaster AIR. See *Connecting the Hardware and Initial Configuration* on Page 9 for web browser requirements.

The DeviceMaster AIR supports Ad Hoc or Infrastructure mode.

Ad Hoc mode simply refers to peer-to-peer wireless networking. Ad Hoc does not require an access point or wireless router. Wireless devices instead communicate directly to each other in Ad Hoc mode. A basic Ad Hoc setup could consist of a DeviceMaster AIR and a PC with a wireless NIC. A more complex example would be to remove the access point and LAN Ethernet segment from the Infrastructure example on the next page.

Infrastructure mode requires a wireless access point (AP) or wireless router and is the most commonly used wireless configuration. In infrastructure mode, wireless devices can communicate with each other or can communicate with a wired network. The following drawing is an example of using the DeviceMaster AIR in Infrastructure mode.
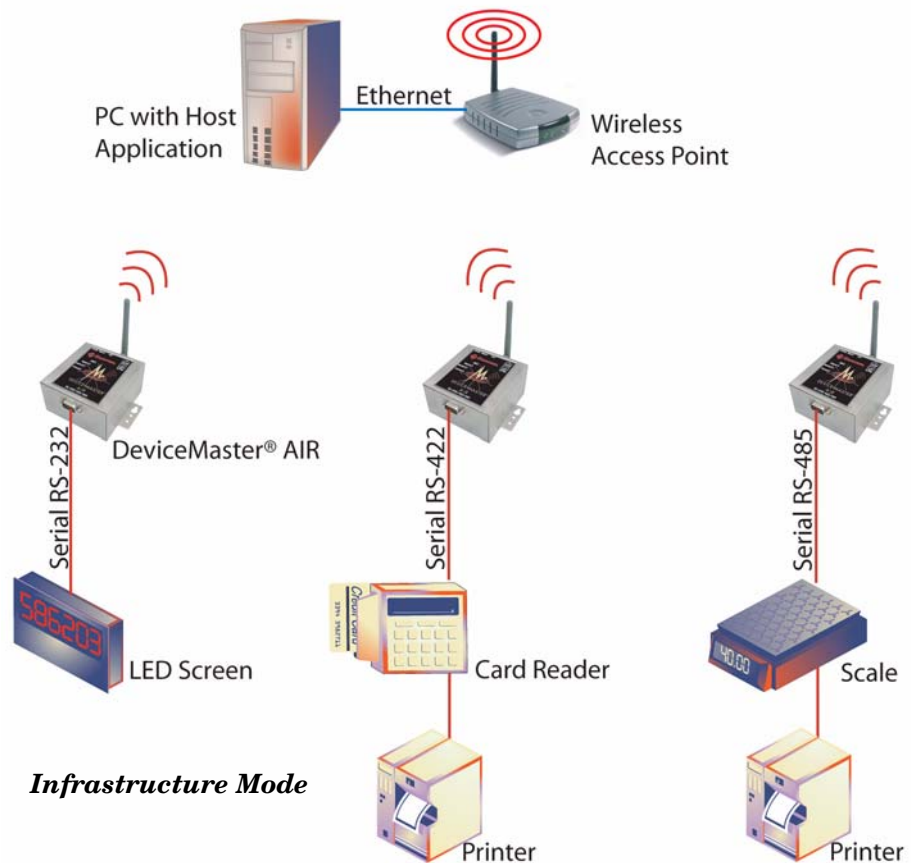
Infrastructure Mode

Installation Considerations (Wireless)

Designed to support ranges of 984 feet (300 meters) outdoors and up to 328 feet (100 meters) indoors, the DeviceMaster AIR allows you to access your serial devices wirelessly from virtually anywhere within its operating range.

Keep in mind, that the number, thickness and location of walls, ceilings or other objects that the wireless signal must pass through may limit range. Typical ranges vary depending on the types of materials and any background RF (radio frequency) noise in your environment. The key to maximizing range is to follow these basic guidelines:

1. Keep the number of walls and ceilings between the DeviceMaster AIR and your receiving device (access points, residential gateways, and computers) to a minimum. Each wall or ceiling can reduce your DeviceMaster AIR unit's range from 3 to 90 feet (1 to 30 meters).

2. Be aware of the direct line between the DeviceMaster AIR and the device with which it communicates, as well as between access points, residential gateways (routers), and computers. A wall that is 1.5 feet thick (0.5 meters), at a 45-degree angle appears to be almost 3 feet (1 meter) thick. At a 2-degree angle it looks over 42 feet (14 meters) thick. Position access points and Adapters so that the signal will travel straight through a wall or ceiling (instead of at an angle) for better reception.

3. Building Materials can impede the wireless signal. A solid metal door or aluminum studs may have a negative effect on range. Try to position the DeviceMaster AIR, the access points, and computers with wireless adapters so that the signal passes through drywall or open doorways and not other materials.

4. Keep your product away (at least 3-6 feet or 1-2 meters) from electrical devices or appliances that may generate extreme RF noise.

WLAN Configuration Requirements

The following requirements must be fulfilled to configure the DeviceMaster AIR.

- You must use a Java Script-enabled web-browser such as Internet Explorer 6.0 or later, Netscape Navigator 6.0 or later, Mozilla FireFox 8 or later, and Konqueror 3.2 or later.

- The computer that you are using for initial configuration must have an IP address within the same subnet as the WLAN IP address of the DeviceMaster AIR. The DeviceMaster AIR has a default WLAN IP address of **192.168.0.30** with a subnet mask of 255.255.255.0

- If you are setting up Ad Hoc mode, other wireless devices must be configured for Ad Hoc mode using the same channel.

- If you are setting up Infrastructure mode, a wireless access point or wireless router is required.

You will need to assign a static IP address to the computer that you are using to configure the DeviceMaster AIR, within the IP address range of the default DeviceMaster AIR IP address. For example, you can assign a static IP address of 192.168.0.2 with a subnet mask of 255.255.255.0. If you need assistance configuring your PC within the same range, see *Assigning a Static IP Address* on Page 65.

Installation Quick Start

You can use the following links to quickly access and print specific procedures.

1. Configure the wireless settings using *Hardware Installation and WLAN Configuration* on Page 9.

2. Configure the network and serial port attributes using the appropriate method for your environment.

   - TCP/IP socket mode, see *Network Configuration for the Serial Portion* on Page 27.

     Note: *Only, use this procedure if you want to configure only the DeviceMaster AIR port for TCP/IP socket use. If you want to configure both COM or tty usage and socket, install an NS-Link device driver.*

   - COM port, see *Locating Software and Documentation* on Page 8 to locate the *NS-Link User Guide for Microsoft Systems*, which contains installation and configuration information for Windows Server 2003, Windows XP, Windows 2000, and Windows NT.

   - tty port, see *Locating Software and Documentation* on Page 8 to locate the *NS-Link Installation and Configuration for Linux* document.

   Note: *NS-Link device drivers that provide COM or tty support, also provide socket configuration.*

3. Attach the serial device. See *Connecting Serial Devices* on Page 31 for information about the connectors and building cables.

4. Configure TCP/IP socket port characteristics using SocketServer or PortVision Plus (see the appropriate help system if you need assistance).

5. Configure the DeviceMaster AIR services using SocketServer or PortVision Plus (see the appropriate help system if you need assistance).

Locating Software and Documentation

You can use the software and documentation on the CD or access the latest files through the <u>internet</u>.

Applications	Download from Web
Comtrol Utilities	
LCOM	
PortVision Plus, which can be used to upload firmware and manage the DeviceMaster AIR	
RTS Updater	

Firmware	Download from Web
Bootloader (**.bin**), which refers to the operating system that runs on the DeviceMaster AIR 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**), which is the DeviceMaster AIR default application that is loaded on the unit	

NS-Link Drivers and User Documentation	Download from Web
NS-Link Driver for Linux Systems, which is the Linux NS-Link™ driver if you want to use tty ports.	
NS-Link User Guide for Linux Systems, which contains installation and configuration procedures for a Linux NS-Link.	
NS-Link Device Driver for Windows 2000, Windows XP, and Windows Server 2003, which is the NS-Link driver if you want to use COM ports.	
NS-Link Device Driver for Windows NT, which is the NS-Link driver if you want to use COM ports.	
NS-Link User Guide for Microsoft Systems, which contains installation and configuration procedures for an NS-Link driver if you want to use COM ports.	
DeviceMaster AIR User Guide	
DeviceMaster AIR Quick Start, which contains an outline of the installation and configuration procedures with links to the appropriate documentation	

Hardware Installation and WLAN Configuration

Use the *Connecting the Hardware and Initial Configuration* discussion to initially set up the DeviceMaster AIR so that you can configure the wireless settings.

The second step to installing and configuring the DeviceMaster AIR is to set up the wireless communications (WLAN). After configuring the wireless settings, you can configure the serial portion. See *Network Configuration for the Serial Portion* on Page 27.

Connecting the Hardware and Initial Configuration

Use this procedure to initially set up the DeviceMaster AIR so that you can configure the wireless portion. If the wireless settings and IP address have been previously configured, go to *Network Configuration for the Serial Portion* on Page 27. Initial configuration of the wireless portion does not include configuring the IP address.

1. Assign a static IP address to the computer that you are using to configure the DeviceMaster AIR, within the IP address range of the DeviceMaster AIR.

    Note: *The computer that you are using for initial configuration must have an IP address within the same range as the WLAN IP address of the DeviceMaster AIR*, see *Assigning a Static IP Address* on Page 65 for assistance.

2. Record the LAN MAC address, model, and serial number of the DeviceMaster AIR unit on the customer service label provided.

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

3. Disconnect the 4" Ethernet jumper cable from the WLAN connector.

    Note: *You will need to reconnect the 4" Ethernet cable after configuring the WLAN network information.*
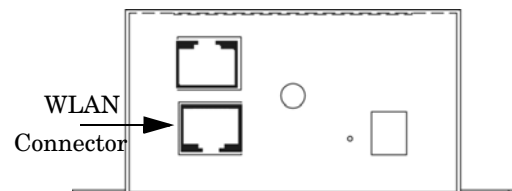
4. Attach the antenna.

5. Place the DeviceMaster AIR on a stable surface or optionally mount the AIR using the DIN rail adapters or mounting flanges.

6. Connect the DeviceMaster AIR port labeled **WLAN** to the same Ethernet network segment as the host PC using a standard network cable. An Ethernet cable is shipped with the DeviceMaster AIR.

7. Apply power to the DeviceMaster AIR by connecting the AC power adapter to the DeviceMaster AIR and a power source. If you want to provide your own power supply, see *Power Supply Specifications* on Page 57.

Caution

WLAN Connector

8. Open the web browser and enter the DeviceMaster AIR WLAN IP address (*default* IP address is **192.168.0.30**).

    Note: *If you do not know the IP address of the DeviceMaster AIR, you can use the **Reset** button, which is between the antenna and the power receptacle to reset it to the factory defaults.*

9. Type **admin** in the **User Name** field and select **Ok**.
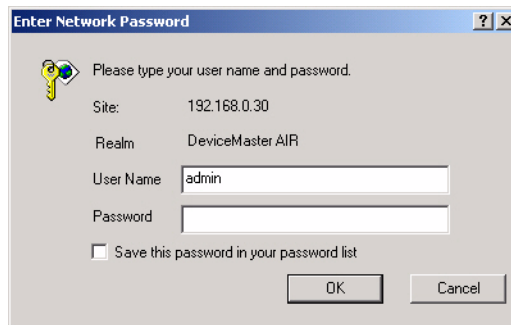
This illustrates a Windows 2000 screen.

Note: *Do not enter a password during the initial installation. A password is configured later in this procedure.*

10. Select the **Run Wizard** button when the **Home** screen appears.
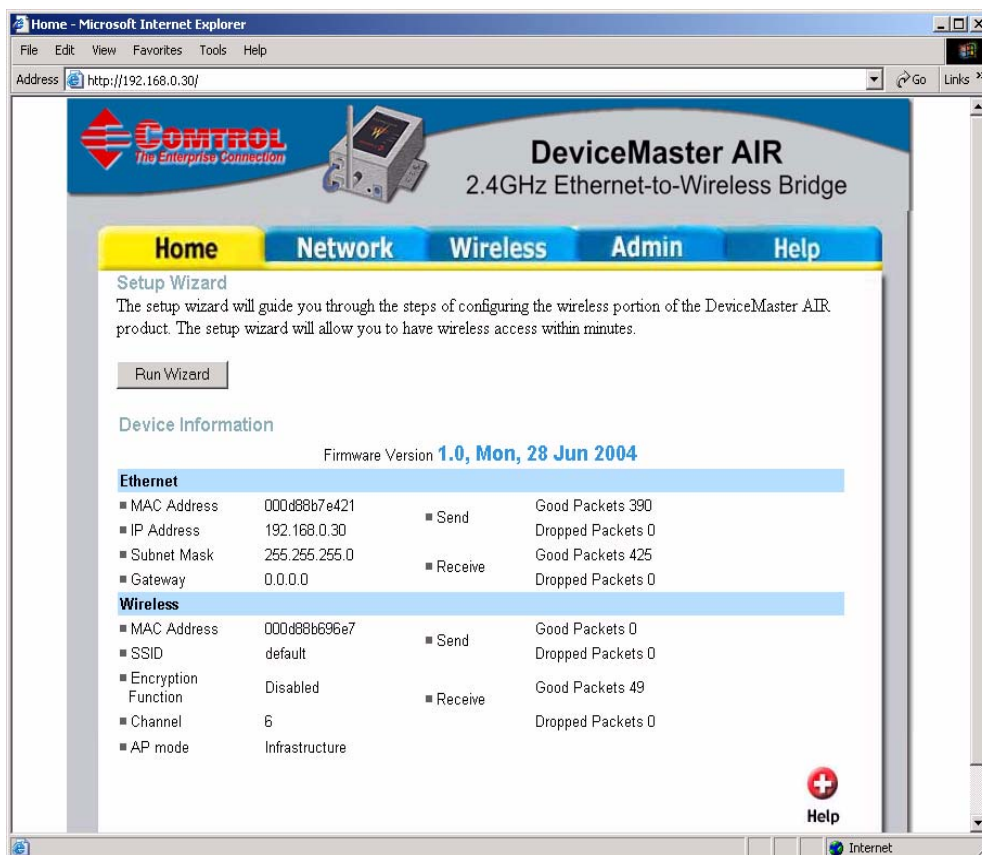
Note: *Optionally, you can configure the DeviceMaster AIR using the **Network**, **Wireless**, and **Admin** tabs. Running the Wizard does not include configuring the IP address. Configuring the IP address is discussed in* <u>*Network Configuration for the Serial Portion*</u> *on Page 27.*

11. Select **Next** when the **Welcome** screen appears.

12. Optionally, enter a password in the **Set Password** screen, and select **Next**.

Note: *It is recommended for security purposes, to define a password for the DeviceMaster AIR.*

13. To configure the DeviceMaster AIR to operate in Infrastructure mode (default), use the following procedure.

    Note: *See* [Ad Hoc Mode](#) *on Page 14 if you want to configure the DeviceMaster AIR to operate in Ad Hoc mode.*

    Infrastructure Mode

    Infrastructure mode requires an access point or wireless router for operation.

    a. Enter the SSID for the access point.

    b. Select **Site Survey** to select a wireless network.

       Note: *Optionally, you can enter the MAC address of the access point or wireless router and skip to* [Step e](#) *on Page 13.*

    c. Select the appropriate network and **Connect**.
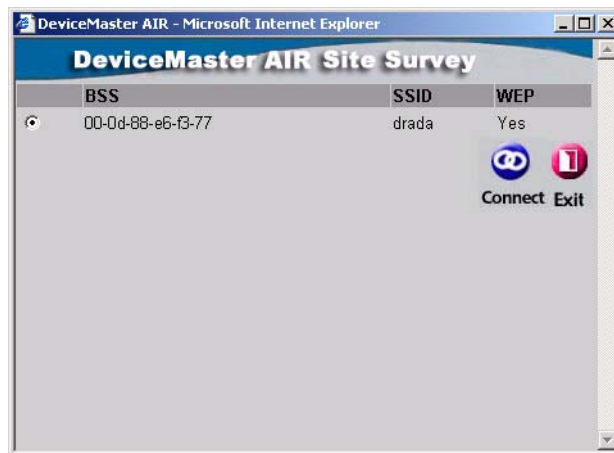
    Your site may have multiple networks available.

d. Select **Close**.

e. Select **Next** in the **Set Wireless LAN Connection** screen to continue.

f. Go to to continue the installation.

Ad Hoc Mode

Use this procedure to configure the DeviceMaster AIR for Ad Hoc mode.

a. Select **Ad-hoc** for the Operating Mode.

b. Enter the SSID.

c. Enter the Channel from the drop list. Remember, all members must use the same channel number.

Note: *For a description of Ad Hoc mode, see the* Product Overview *on Page 5.*

14. Optionally, select **Enabled**, the appropriate values for the encryption method, WEP Mode, keys, and select **Next**.

⚠️
Caution

Encryption is disabled by default but it is recommended that you enable encryption on all wireless devices to eliminate security problems with the network.

15. Select **Restart** when the **Setup Completed** screen appears.

16. Select **Close**.

17. To complete the wireless configuration, go to *Configuring an IP Address (Static or DHCP)*.

   Note: *If there are other characteristics that you need to configure such as, wireless settings or changes through the **Admin** tab, you should do so before setting the DeviceMaster AIR to use DHCP; unless you are provided with the IP address that is reserved in DHCP.*

18. After configuring an IP address for the wireless portion of the DeviceMaster AIR, you will need to configure the serial portion.

Configuring an IP Address (Static or DHCP)

Use the following procedure to configure a static IP address for the wireless portion of the DeviceMaster AIR.

1. Verify that the first phase of the configuration process occurred. See *Connecting the Hardware and Initial Configuration* on Page 9 and perform that procedure if necessary.

2. If necessary, start your web browser, and enter the DeviceMaster AIR WLAN IP address. The default WLAN IP address is **192.168.0.30**.

   Note: *The computer that you are using for initial configuration must have an IP address within the same range as the WLAN IP address of the DeviceMaster AIR, see* Assigning a Static IP Address *on Page 65 for assistance.*

3. Enter **Admin** as the **User Name**, enter the password, and select **Ok**.

*This illustrates a Windows XP
connection. Windows Server 2003
and Windows 2000 are similar.*

4. Select the **Network** tab.
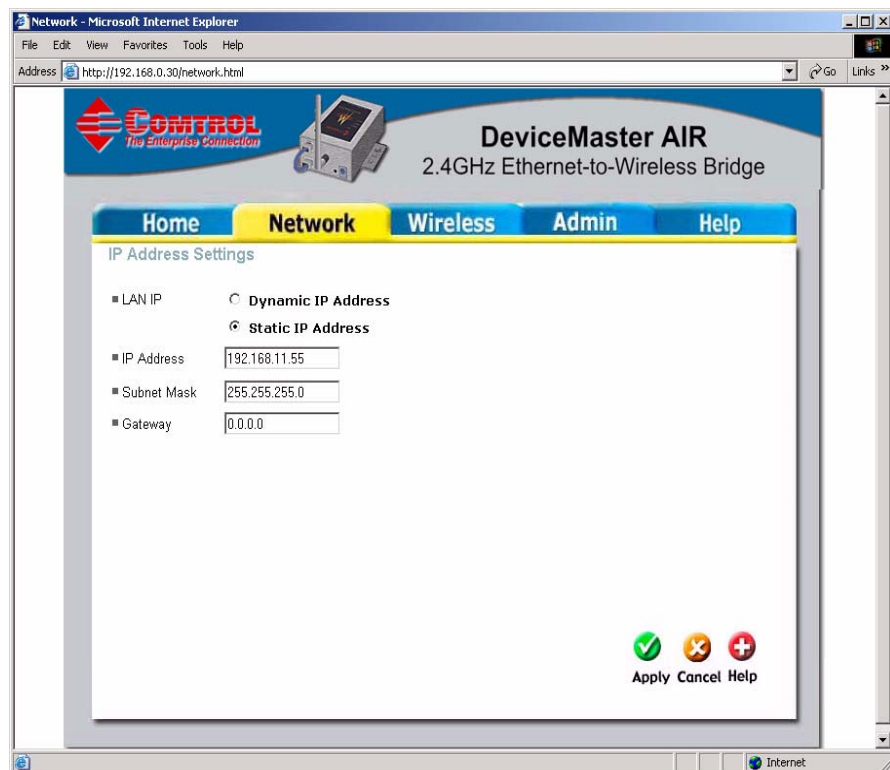
This screenshot illustrates a static IP address installation.

5. Select the appropriate type of IP addressing for your environment.

    DHCP IP Addressing

    Select **Dynamic IP Address** and select **Apply**.

    Note: *If you have not done so, give your System Administrator the WLAN
    MAC address of the DeviceMaster AIR so that they can assign an IP
    address from the DHCP pool of reserved addresses.*

    Static IP Addressing

    Select Static IP Address and enter appropriate values for your network and
    select **Apply**.

6. Select **Continue**.

7. Close the web browser.

8. If necessary, reset your computer's IP address back to its original values.

9. Ping the new IP address and verify that it responds.
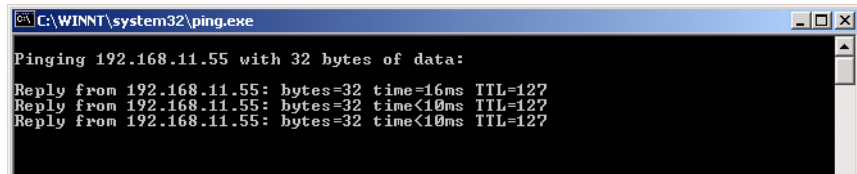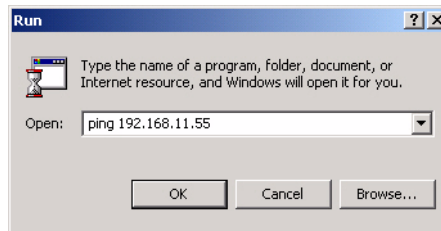
10. Remove the Ethernet cable from the network port and use the appropriate procedure for your environment:

   • *1-Port Serial Device Server Connection* on Page 18
   • *Ethernet-to-Wireless Bridge Connection* on Page 19

1-Port Serial Device Server Connection

Use the following procedure to connect cables to use the DeviceMaster AIR as a wireless 1-port serial device server.

1. Reconnect the 4" Ethernet jumper cable between the **WLAN** and **LAN** port of the DeviceMaster AIR.
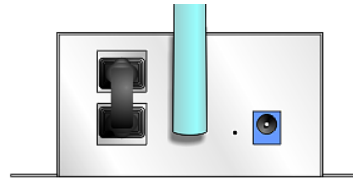
2. Verify that the LEDs on the top of the unit are lit.

    Note: *The **Status** LED flashes while booting and it takes approximately 15 seconds for the bootloader to complete the cycle. See LEDs on Page 60 for more information.*

3. Ping the IP address that you pinged in Step 9 in *Configuring an IP Address (Static or DHCP)*.

    If the ping fails, re-connect the WLAN port to the Ethernet network, open your web browser, enter the IP address, and check other configuration settings. See *Troubleshooting WLAN Port Problems* on Page 63 for troubleshooting procedures.

4. Go to the appropriate discussion or document to configure network information for the serial portion of the DeviceMaster AIR depending on your serial port requirements:

    • TCP/IP socket configuration only, see *Network Configuration for the Serial Portion* on Page 27

    • COM or tty port (also supports TCP/IP socket) configuration, use the appropriate *NS-Link User Guide* to install the NS-Link device driver for your operating system. See *Locating Software and Documentation* on Page 8, to locate the appropriate device driver and User Guide.
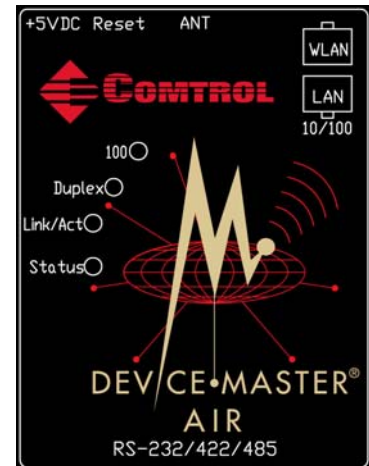
Ethernet-to-Wireless Bridge Connection

Use the following procedure to use the DeviceMaster AIR as an Ethernet bridge with another DeviceMaster, for example, a DeviceMaster RTS 16-port.

Note: When the DeviceMaster AIR is used as a wireless bridge with devices with a single Ethernet connection, the serial port on the AIR is no longer available.

1. Connect an Ethernet cable between the **WLAN** port of the DeviceMaster AIR and an Ethernet-enabled device such as another DeviceMaster.

   For example, to bridge the AIR to a DeviceMaster 4/8/16-port (with two Ethernet ports), connect the cable between the **WLAN** port on the AIR and the **UP** port on the other DeviceMaster model. Optionally, you can connect an Ethernet cable between the **LAN** port on the AIR and the **Down** port on a DeviceMaster 4/8/16-port to use the single serial port on the AIR.

   To bridge the AIR to a DeviceMaster 16 or 32-port (with an internal power supply), connect the cable between the **WLAN** port on the AIR and the **Network** port on a DeviceMaster 16 or 32-port.

2. Verify that the **Status** LEDs on the other DeviceMaster unit are lit.

   *Note: The **Status** LED flashes while booting and it takes approximately 15 seconds for the bootloader to complete the cycle. See LEDs on Page 60 for more information. If the AIR is connected as a bridge, only the **Status** LED is lit.*

3. Ping the IP address that you pinged in Step 9 in *Configuring an IP Address (Static or DHCP)*.

4. If the ping fails, re-connect the WLAN port to the Ethernet network, open your web browser, enter the IP address, and check other configuration settings. See *Troubleshooting WLAN Port Problems* on Page 63 for troubleshooting procedures.

5. Go to the appropriate discussion or document to configure network information for the serial portion of the DeviceMaster AIR depending on your serial port requirements:

   • TCP/IP socket configuration only, see *Network Configuration for the Serial Portion* on Page 27

   • COM or tty port (also supports TCP/IP socket) configuration, use the appropriate *NS-Link User Guide* to install the NS-Link device driver for your operating system. See *Locating Software and Documentation* on Page 8, to locate the appropriate device driver and User Guide.
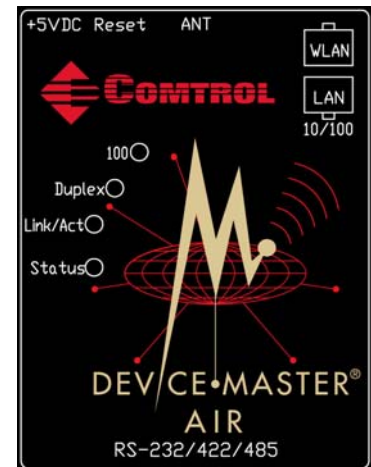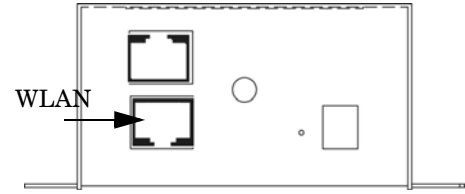
Changing the Wireless Operating Mode Settings

Use your web browser and the **Wireless** tab to change the DeviceMaster AIR wireless settings. Use the following steps to access the **Wireless** tab.

1. Open the web browser and enter the DeviceMaster AIR IP address.

2. Select or type in user name in the **User Name** field.

3. Enter the password, if a password was configured during initial installation.

4. Select the **Wireless** tab.

5. Select **Ad-hoc** or **Infrastructure**. Infrastructure is the default setting.

6. Optionally, change the **AP Name** to rename your access point. This is recommended if you have more than one access point on your network.

7. If necessary, change the **SSID** (Service Set Identifier), **default** is the default setting. The SSID is a unique name that identifies a wireless network. All devices on a network must share the same SSID name in order to communicate on the wireless network. If you choose to change the SSID from the default setting, input your new SSID name in this field. The SSID can be up to 32 characters in length.

8. If necessary, change the Channel value (the default is Channel 6). Enter a new number if you want to change the default setting. All devices on the network must be set to the same channel to communicate on the network.

9. If necessary, set the WEP Encryption.

   a. Select **Enable Encryption** to use WEP (Wired Equivalent Privacy) on the network.

   b. Make sure that all devices on the network, and the access point share the same WEP selection (either Enable or Disable) and they must share the same WEP key. The WEP key is generated from ASCII or Hexadecimal entries that are either 64, 128, or 256 bits in length.

   c. Select the **Key Type** (ASCII or Hexadecimal)

   d. Enter the appropriate digits or letters for up to 4 keys. Select the key you wish to use. Hexadecimal digits consist of the numbers 0 - 9 and letters A - F. ASCII is a code representing English letters as numbers from 0 - 128.

10. Select the **Transmission Rate** for the network (default setting is 1-2-5.5-11-22 (Mbps).

11. Select the appropriate **Authentication** method:

    • **Open System** - communicates the key across the network

    • **Shared Key** - devices must have identical WEP settings to communicate

    • **Auto** - automatically adjusts to the Authentication mode of the wireless client

12. Select **Apply** if you have made any changes or additions.

Changing the Wireless Web Interface Password

Use your web browser and the **Admin** tab to change the password that supports the wireless port.

1. Open the web browser and enter the DeviceMaster AIR IP address.

2. Select or type in user name in the **User Name** field.

3. Enter the password, if a password was configured during initial installation.

4. Select the **Admin** tab.
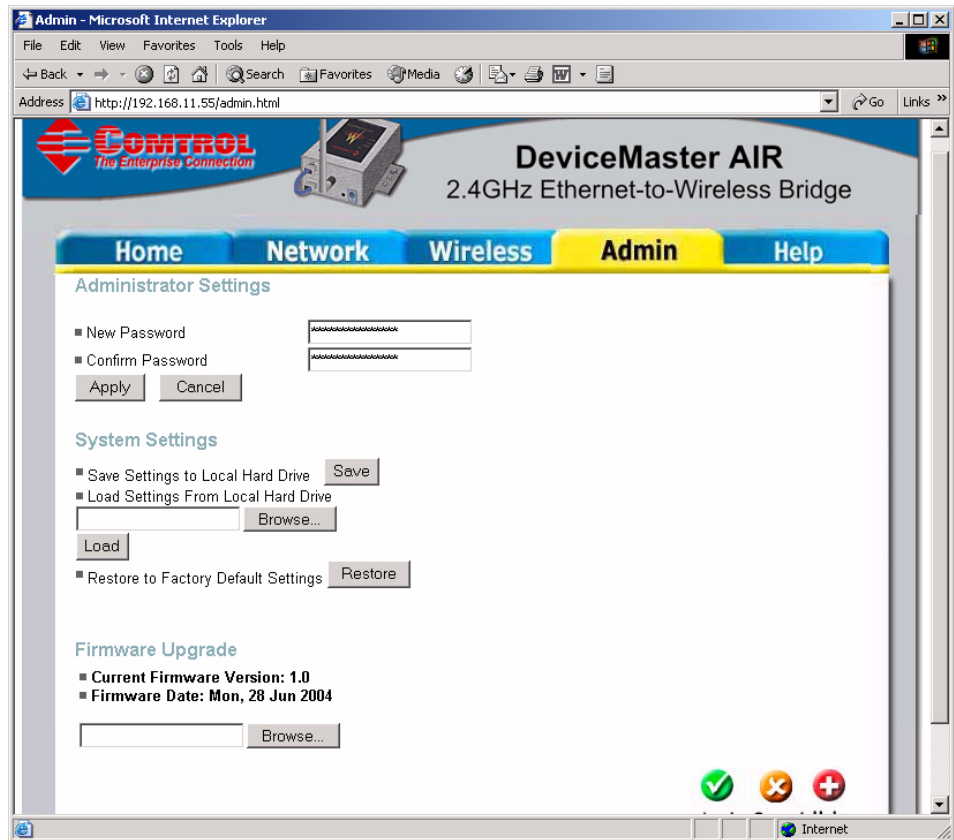
5. Enter a new password. Passwords can be up to 14 characters in length.

6. Re-enter the new password in the Confirm Password box and select **Apply**.

Saving the Wireless Configuration System Settings

Use your web browser and the **Admin** tab to save the current settings onto the local hard drive.

1. Open the web browser and enter the DeviceMaster AIR IP address.

2. Select or type in user name in the **User Name** field.

3. Enter the password, if a password was configured during initial installation.

4. Select the **Admin** tab.

5. Select **Save** from the *System Settings* group.

6. Select the **Save** button.
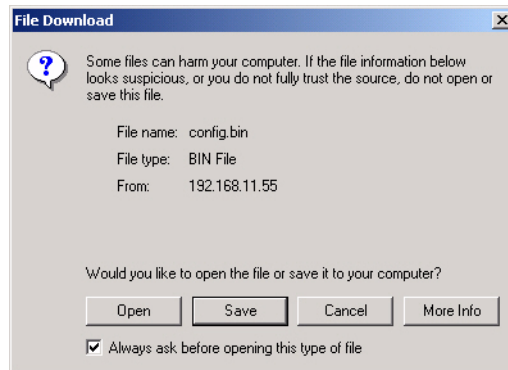
7. Browse to an appropriate location and select **Save**.

8. Select **Close**.
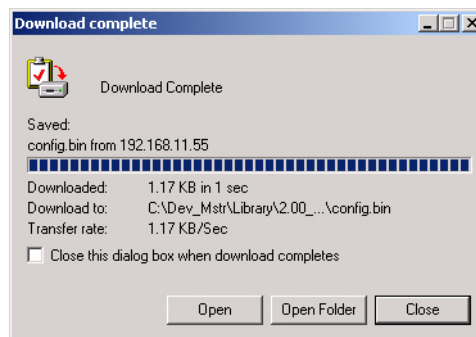
Loading Wireless Configuration System Settings

Use your web browser to access the **Admin** tab to load previously saved system settings.

If you updated the wireless firmware and want to load the configuration settings that you saved, make sure that the computer has an IP address within the same range as the WLAN IP address of the DeviceMaster AIR. After updating the wireless firmware, the DeviceMaster AIR is reset to the default IP address, 192.168.0.30.

1. Open the web browser and enter the DeviceMaster AIR IP address.

2. Select or type in user name in the **User Name** field.

3. Enter the password, if a password was configured during initial installation.

4. Select the **Admin** tab.

5. Select **Browse** from the *System Settings* group, highlight the configuration file you want to load, and select **Open**.
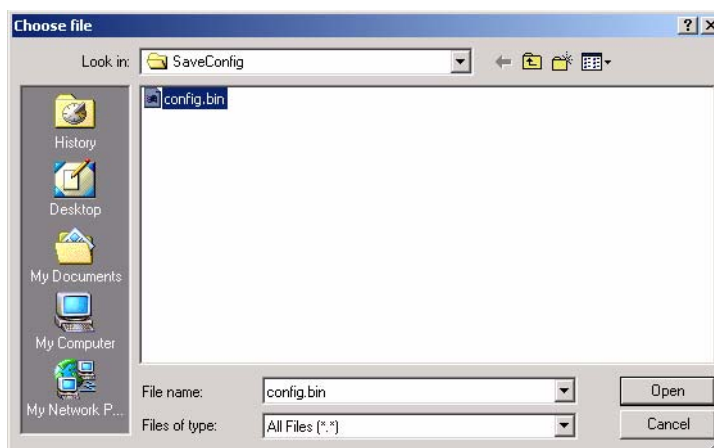
6. Select **Load** from the *System Settings* group and **Ok**.

7. Select **Continue**.
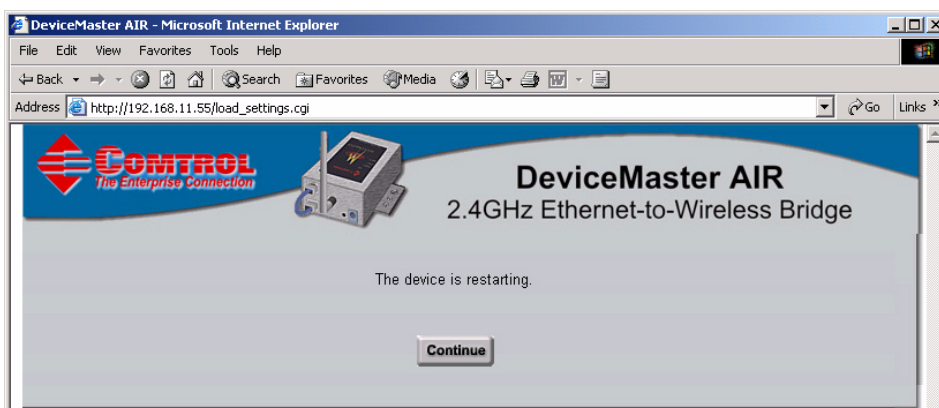
Restoring Default Wireless Configuration System Settings

There are two ways to restore the default settings on the DeviceMaster AIR:

- **Reset** button
- Use a web browser and the **Admin** tab

Using the Reset Button

Use the **Reset Button** between the antenna and the power receptacle. Press the button for a few moments to revert to the factory default settings of the DeviceMaster AIR. For a list of the defaults, see *Factory Default Settings for the WLAN Port* on Page 59.
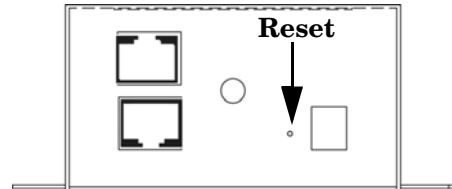
Using a Web Browser

Use your web browser to access the **Admin** tab to load previously saved system settings.

1. Open the web browser and enter the DeviceMaster AIR IP address.
2. Select or type in user name in the **User Name** field.
3. Enter the password, if a password was configured during initial installation.
4. Select the **Admin** tab.
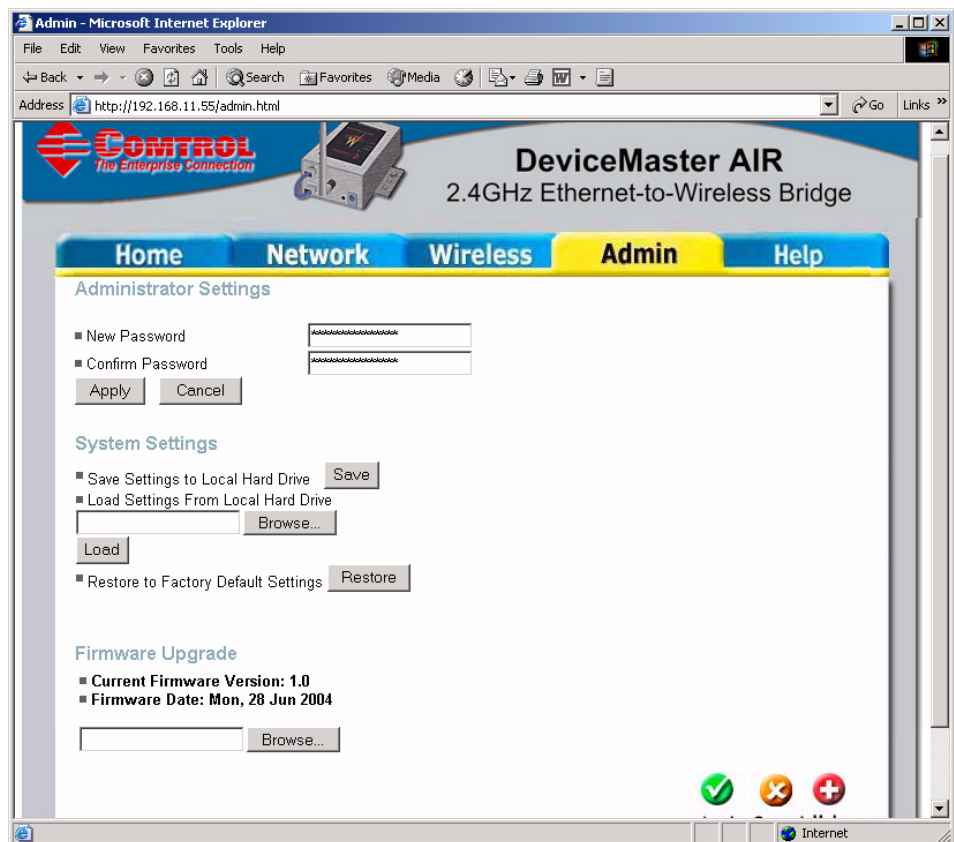
5. Select **Restore** from the *System Settings* group and **Yes**.
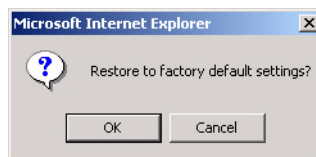
6. Select **Continue**.

Network Configuration for the Serial Portion

Use this section to configure DeviceMaster AIR network information for the serial portion.

There are many ways to configure network information, which method you choose depends on your operating system and how you plan on using the DeviceMaster AIR serial port.

Configuration Software

There are two distinct uses for the serial port, which affects the type of software that you can use to configure the serial characteristics:

- *TCP/IP socket mode*, *without* COM or tty support
- *COM or tty port*, with optional TCP/IP socket mode support

It is best to determine how you want to use the serial ports before you program the network settings in the DeviceMaster AIR.

TCP/IP Socket Use (No COM or tty Support)

To configure the DeviceMaster AIR for use as only a TCP/IP socket does not require installation of additional software. There are many methods that you can use to configure the network settings. Select the method that suits your environment.

- PortVision Plus is the fastest and easiest way to configure network information if you have access to a Windows 2000, Windows XP, or Windows Server 2003 system.

  PortVision Plus requires that you connect the DeviceMaster AIR to the same network segment as the Microsoft system during the configuration process.

- Redboot configuration works on any supported operating system and provides two ways to configure network information *Serial connection* or *Telnet connection*. See *Configuring the Network Settings* on Page 49 for procedures.

COM or tty Port with Optional Socket Mode

To use any of the DeviceMaster AIR ports as COM ports (Microsoft environment) or tty ports (Linux), you should install the NS-Link device driver and configure DeviceMaster AIR network information for the serial portion during the driver installation.

If you are reading this from the CD, use the menu system to locate the *NS-Link User Guide* for your operating system or download the latest version through the internet.

Installing, Updating, and Removing PortVision Plus

You can install PortVision Plus from the *Software and Documentation* CD that came with your product or download the latest version (*Locating Software and Documentation* on Page 8).

Note: *PortVision Plus requires that you connect the DeviceMaster AIR to the same network segment as the Microsoft system during the configuration process.*

PortVision Plus Installation

Use this procedure to install PortVision Plus from a *Software and Documentation* CD or download the latest from the internet.

1. Install from CD, use the menu system on the CD to start the installation or browse to the appropriate CD drive and locate the **\Dev_Mstr\PortVision_Plus** directory.

2. Execute the **PVPlus.MSI** file and follow the installation wizard.

3. Optionally, launch PortVision Plus from the last installation screen and allow PortVision Plus to create shortcuts for the COM port utilities (Test Terminal and Port Monitor).

4. Select the **Scan** button so that PortVision Plus locates the DeviceMaster AIR units on the network.

See *Using PortVision Plus to Configure the Network Settings* on Page 29 to program the DeviceMaster AIR network settings. For additional information about PortVision Plus, see the help system.

Updating PortVision Plus

Use the following procedure to update PortVision Plus.

1. Download the latest version of PortVision Plus (*Locating Software and Documentation* on Page 6).

2. Execute the **PVPlus.MSI** file and follow the installation wizard.

PortVision Plus updates the application automatically using the installation wizard.

Removing PortVision Plus

You can remove PortVision Plus by executing the **PVPlus.msi** installation file or by using the **Add/Remove** control panel:

1. Open the **Add or Remove** control panel.

2. Highlight PortVision Plus and select the **Remove** button.

To fully remove PortVision Plus from your system, also remove the **\Program Files\Comtrol\PortVision_Plus** directory.

Using PortVision Plus to Configure the Network Settings

You can use PortVision Plus to identify, configure, update, and manage the DeviceMaster AIR from Windows 2000, Windows XP, and Windows Server 2003 systems. PortVision Plus automatically detects and identifies DeviceMaster AIR products physically attached to the network for configuration, if they are in the same network segment.

Note: *You must have SocketServer 5.10 or NS-Link 5.04 or higher for all of the property pages to appear. See Locating Software and Documentation on Page 6 to locate the latest firmware or NS-Link driver.*

Use the following procedure to change the network settings on the DeviceMaster AIR.

1. If you have not done so, install PortVision Plus (*Installing, Updating, and Removing PortVision Plus* on Page 28).

2. Start PortVision Plus from the **Start** button, **Programs**, **Comtrol**, **PortVision Plus** or the **PortVision Plus** desktop shortcut. If this is the first time you have opened PortVision Plus:

   a. Select whether or not you want PortVision Plus to create shortcuts for the COM port utilities; Test Terminal and Port Monitor.

   b. Select the **Scan** button and **Yes** to locate DeviceMaster AIR units on the network.

3. Highlight the DeviceMaster AIR for which you want to program network information and open the **Configure Device** screen using one of these methods:

   • Double-click on the DeviceMaster AIR in the *List View* pane

   • Select the **Config** button

   • Right-click and select **Configure Device** from the popup menu

   Note: *See the PortVision Plus help system for information about using PortVision Plus.*

4. Optionally, rename the device in the **Device Name** field.
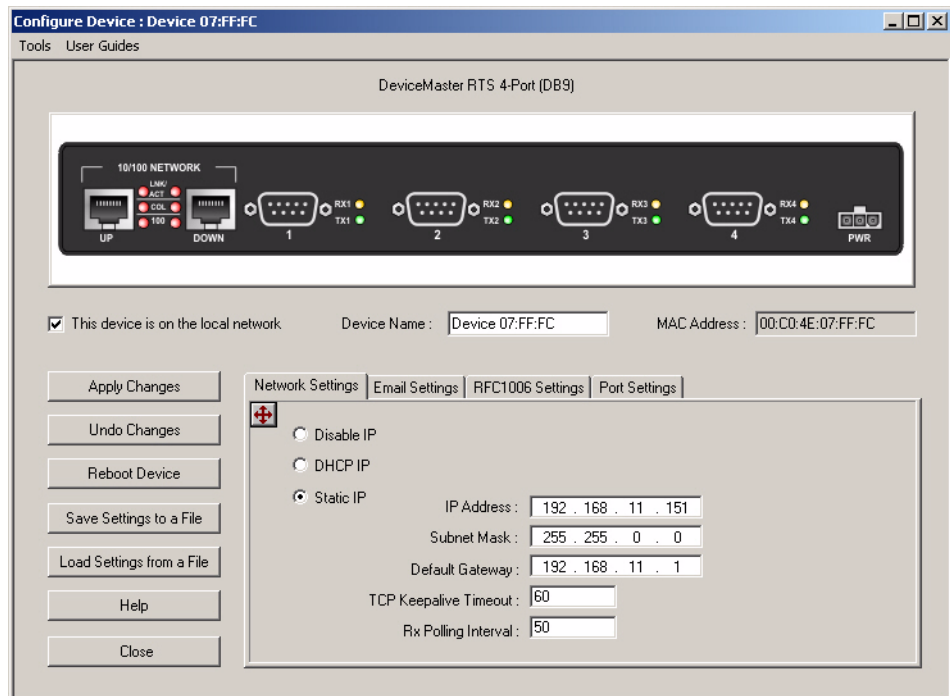
5. Change the device network properties as required for your site.

    •   If you want to run the device using the MAC addressing scheme, select **Disable IP**.

    •   To use the device with DHCP, select **DHCP IP**, and make sure that you provide the MAC address of the device to the network administrator.

    •   To program a static IP address, select **Static IP** and enter the appropriate values for your site.

    Note: *If you need additional information about using this screen, open the PortVision Plus help system. You can access the help system using the **Help** button or go directly to the help for this property page by select the **Network Settings** help option the **Context** menu button (right),*

6. Optionally, select the **Email Settings** property page to configure email notification services.

7. Optionally, select the **RFC1006 Settings** property page to configure RFC1006 settings.

8. Optionally, select the **Port Settings** property page to configure serial port characteristics for socket services.

9. Optionally, select **Save Settings to a File** to create a configuration file that you can use to configure other DeviceMaster AIR units.

10. After entering the changes, select **Apply Changes**.

11. Close the **Configure Device** window.

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.

Connecting Devices

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

⚠️
Caution

Make sure that you have configured the ports using the NS-Link driver or SocketServer for the correct communications mode before connecting any devices. The default mode in the NS-Link drivers is RS-232. There is a remote possibility that connecting a peripheral for the wrong mode could damage the peripheral.

1. Connect your serial devices to the appropriate port on the DeviceMaster AIR using the appropriate cable. You can build your own DB9 cables using *DB9 Serial Cables and Loopback Plugs* on Page 33.

   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 AIR 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).

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.*
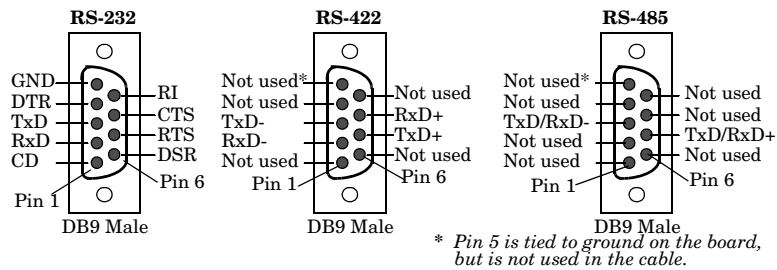
DB9 Loopback Plugs

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 AIR is shipped with a a single loopback plug (RS-232/422).

Note: See the appropriate NS-Link guide for information about using Test Terminal or Minicom to test the serial ports (see [Locating Software and Documentation](#) on Page 8).

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
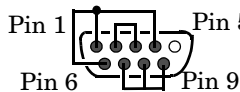
RS-232 Only (Back View) *The RS-232 loopback plug also works for RS-422.*

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

- Pins 2 to 3
- Pins 7 to 8
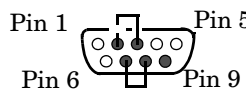
RS-422 Only (Back View)

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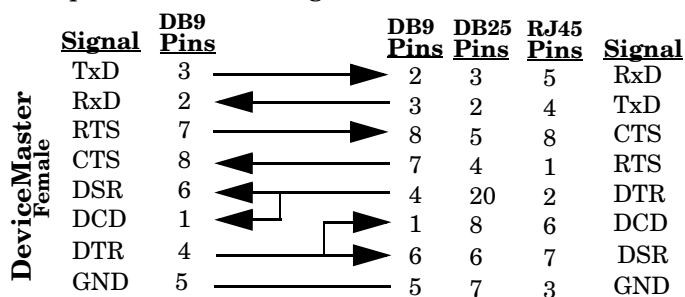
Note: *You may want to purchase or build a straight-through cable and purchase a null-modem adapter. For example, a null-modem cable can be used to connect COM2 of one PC to COM2 of another PC.*

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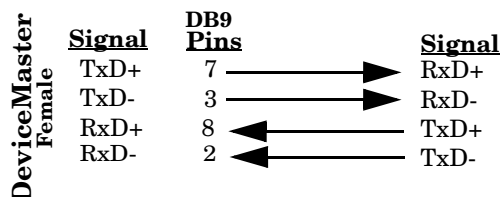
Note: *RS-422 pinouts are not standardized. Each peripheral manufacturer uses different pinouts. Please refer to the documentation for the peripheral to determine the pinouts for the signals above.*

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
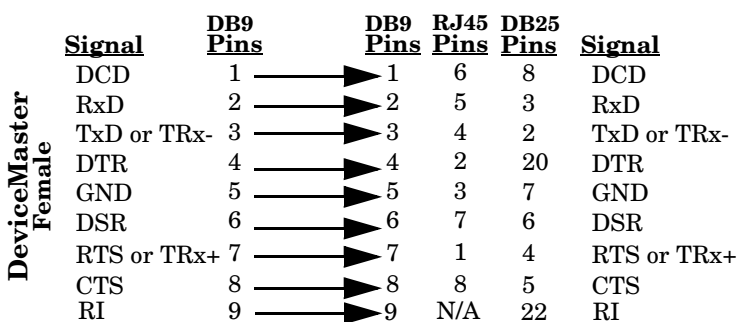
Configuring SocketServer

SocketServer is integrated in the firmware that comes pre-installed on your DeviceMaster AIR. DeviceMaster AIR ports can be configured for *TCP/IP socket* access from the other hosts or for *serial tunneling* using the SocketServer *Server Configuration* page.

If you want to use any of the ports as COM or tty ports, you should install the NS-Link driver, configure the COM or tty ports, and then access the *Server Configuration* page for the ports that you want to use as TCP/IP sockets.

.If you install and enable an NS-Link device driver, NS-Link loads on the DeviceMaster AIR.

The default operation of the DeviceMaster AIR SocketServer is to buffer network-bound data and transmit the buffered data to the network once every 50ms. This is intended to provide a reasonable trade-off between latency and network utilization.

If more control is desired when the serial port receive data is transmitted to the network, there are two user configurable features that can be used: **EOL Detect** and **Serial Rx Timeout** on the *Edit Port Configuration* page (SocketServer) or *Port Settings* property page (PortVision Plus).

You can access the web configuration page using one of the following methods:

- Enter the IP address of the DeviceMaster AIR in a web browser
- Open PortVision Plus, access the **Configure Device** screen using one of the following methods, and configure the appropriate property pages:
    - Highlight the DeviceMaster AIR and select the **Config** button
    - Double-click on the DeviceMaster AIR
    - Right-click on the DeviceMaster AIR and select **Configure Device** from the popup menu

Note: For socket service configuration procedures, see the SocketServer help system or the PortVision Plus help system.

SocketServer Overview

TCP/IP socket mode operation is used to connect serial devices with an application that supports TCP/IP socket communications addressing.

TCP/IP Socket Mode
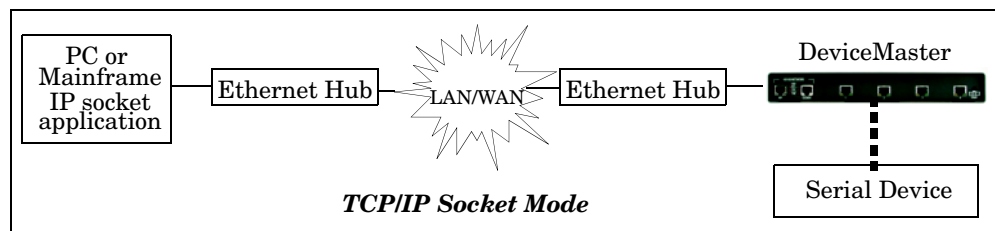
Serial tunneling mode is used to establish a socket connection between two DeviceMaster AIR units through an ethernet network.
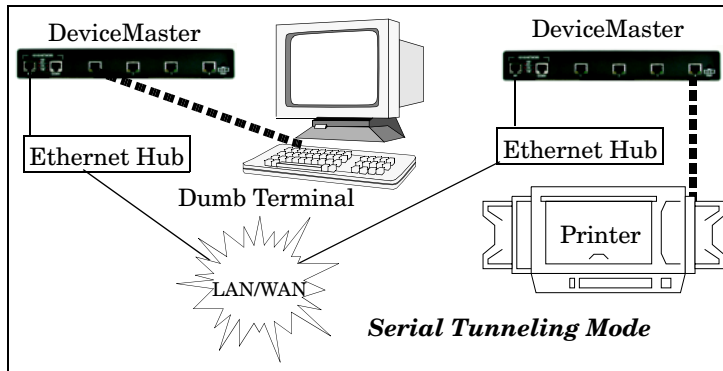
UDP mode is designed for applications that need faster data transmission, or that make use of UDP's broadcast capabilities. UDP differs from TCP in that a UDP transmission does not first require a connection to be opened before sending data and the receiving device does not issue acknowledgements to the sender.
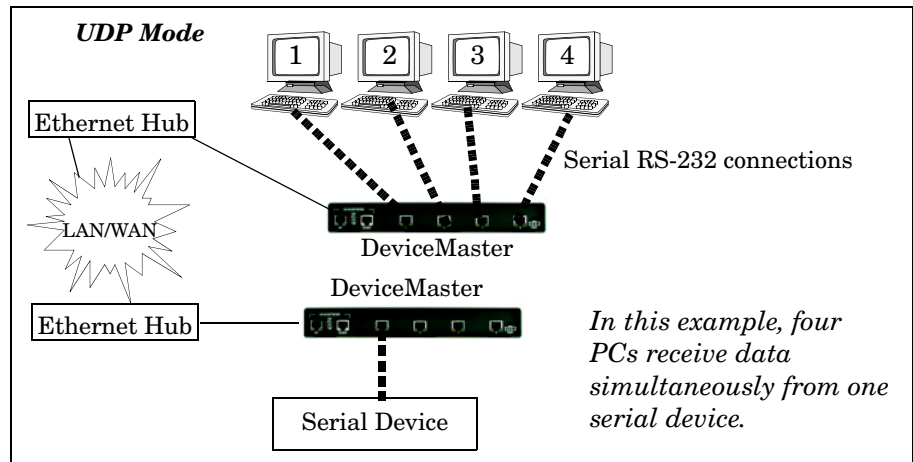
SocketServer Versions

The functionality of the SocketServer integrated in the firmware is the same as the NS-Link. If the NS-Link driver is running on the DeviceMaster AIR, the NS-Link loads when you open a web browser session.

If the NS-Link driver is not running (not installed or not enabled), the default SocketServer loads when you open a web browser session. See *Preparing to Update Firmware* on Page 39 to locate the latest firmware for the DeviceMaster AIR.
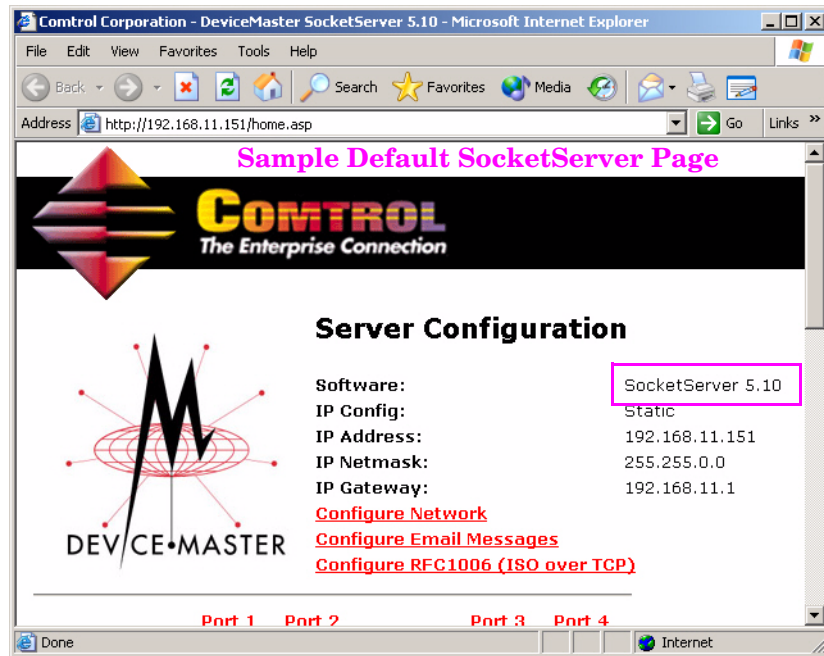
Your SocketServer or NS-Link version may be different than these examples.
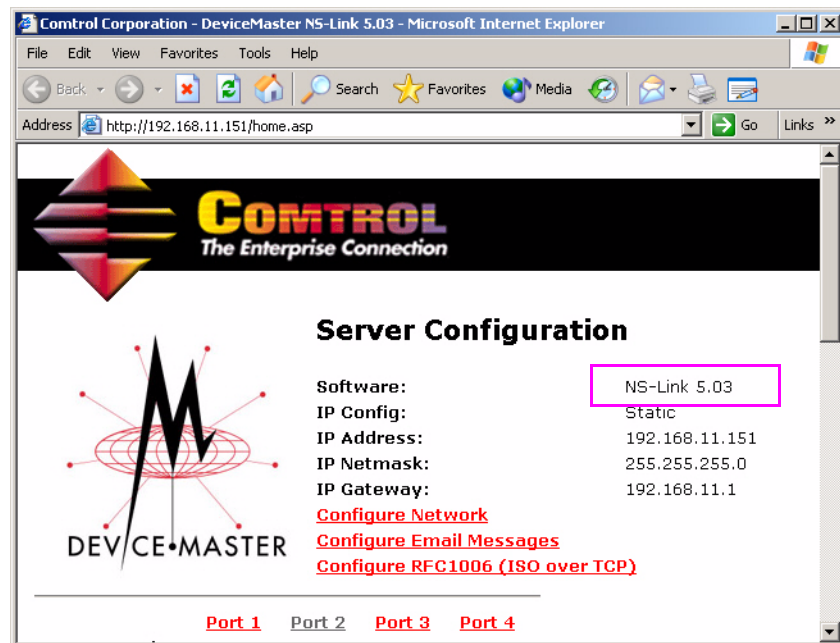
Updating Firmware

Use this section to update firmware on the DeviceMaster AIR. The DeviceMaster AIR has three upgradable sets of firmware on the device from the factory.

- The wireless firmware provides a web interface to configure the wireless Ethernet port. See *Updating the Wireless Firmware* on Page 43.

- *Bootloader* refers to the operating system that runs on the DeviceMaster AIR hardware during the power on phase, which then starts SocketServer and the wireless firmware. The bootloader can be disabled and you can communicate to the device using Redboot.

  Note: *Make sure that power is not interrupted while uploading Bootloader. Power interruption while uploading Bootloader will require that the DeviceMaster AIR must be sent in so that it can be reflashed.*

- *SocketServer* is integrated in the firmware that comes pre-installed on your DeviceMaster AIR platform which provides an interface to TCP/IP socket mode configuration and services.

Note: *This section contains SocketServer update information for installations that are NOT running an NS-Link driver.*

If you are using an NS-Link driver, you should upgrade the driver, which automatically updates the latest SocketServer version. You can download the latest driver (see *Locating Software and Documentation* on Page 8).

⚠ Caution

If you are not successful uploading SocketServer to the DeviceMaster AIR the first time, do not upload Bootloader. If Bootloader fails the upload process, you will need to send the unit in to be reflashed.

Preparing to Update Firmware

Depending on what firmware you want to update will affect how to update the firmware.

Methods and Tools

There are several methods and tools that you can use to update the firmware.

- **PortVision Plus** is the easiest way to update the Bootloader or SocketServer using Windows 2000, Windows XP, or Windows Server 2003 system. See *Updating Firmware with PortVision Plus* on Page 40 for this method.

- **RTS Updater Utility** is the easiest way to upgrade firmware if you have a Windows NT system. See *Using the Updater Utility (SocketServer and Bootloader)* on Page 41 for this method.

- Redboot configuration works on any supported operating system and provides two ways to configure network information *Serial connection* or *Telnet connection*. See *Serial Method (SocketServer and Bootloader))* on Page 51 or *Telnet Method (SocketServer and Bootloader))* on Page 53 for the method you want to use.

- You must use web browser to update the wireless firmware (see *Updating the Wireless Firmware* on Page 43).

Latest Firmware

You may also need to download the latest firmware file.

- **Wireless Firmware** http://support.comtrol.com/download.asp?partnumber=1800256

- **Bootloader** http://support.comtrol.com/download.asp?partnumber=1800110
- **SocketServer** http://support.comtrol.com/download.asp?partnumber=1800111

If necessary, unzip (unpackage) the file, if the file extension is **.tgz**. If the downloaded file has a **.bin** extension, it is not necessary to unpackage the file.

Note: *You can use the latest version of Winzip to unzip the firmware in a Microsoft environment. The .tgz file extracts to a .tar file and the .tar file extracts to the .bin file.*

Updating Firmware with PortVision Plus

You can use this procedure to upload firmware.

Note: *PortVision Plus cannot upload the wireless firmware. See Updating the Wireless Firmware on Page 43.*

1. Make sure that you have downloaded and if necessary, unzipped the firmware. See *Latest Firmware* (above), if you need to download the firmware.

2. Highlight the device that you want to update or shift-click and select multiple devices.
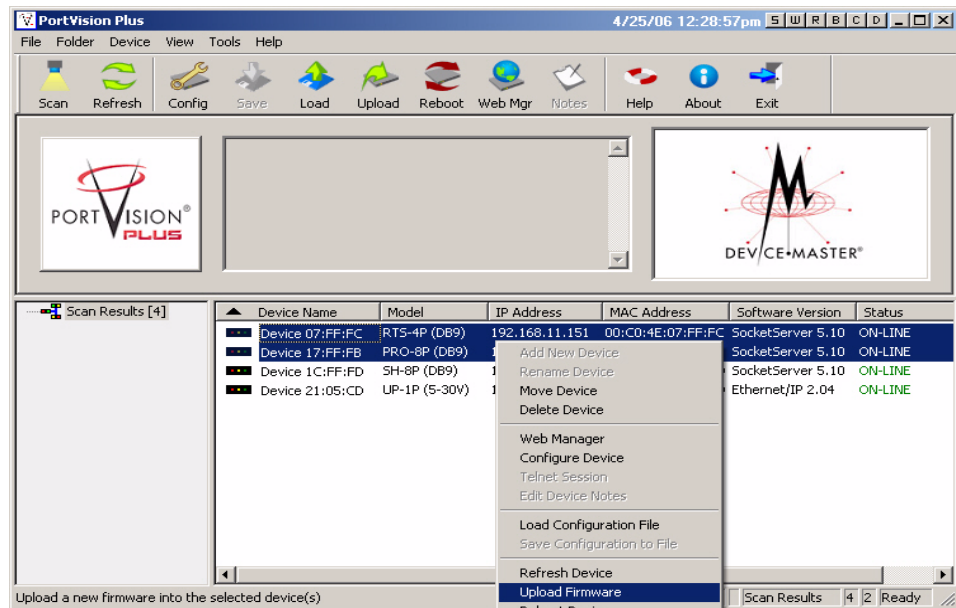
3. Right click and select **Upload Firmware** (or the **Upload** button), browse to the bootloader or SocketServer **.bin** file, and select **Open**.

4. Select **Yes** to the *Upload Firmware* message that warns you that this is a sensitive process.

    It may take a few moments for the firmware to upload onto the device. The device will reboot itself during the upload process.

5. Select **Ok**.

6. In the next minute, PortVision Plus updates the *List View* pane and displays the new firmware version.

Using the Updater Utility (SocketServer and Bootloader)

After you have installed the **RTS Updater Utility**, use the following procedures to update the Bootloader or SocketServer firmware.

Installing the RTS Updater Utility

If you do not have the RTS Updater Utility installed, you can install from the Comtrol CD shipped with your product or download the latest version from: http://support.comtrol.com/download.asp?partnumber=1800165.

Note: Windows 2000, Windows XP, and Windows Server 2003 users can use PortVision Plus. The RTS Updater Utility mainly supports Windows NT.

Use the following procedure to install or update the RTS Update utility.

1. Unzip the **1800165#.exe** file if you downloaded or unzip the utility from the Comtrol CD, which automatically starts the Installation wizard.

   where # represents a file version, such as, A or B

2. Follow the Installation wizard.

Upload Procedure

Use the following procedure to update the Bootloader firmware on the DeviceMaster AIR.

1. Verify that you have the **.bin** file and RTS Updater utility discussed in *Preparing to Update Firmware* on Page 39.

2. From the **Start** button, select **Programs>Comtrol Utility>DeviceMaster RTS Update Utility>dmrtsupd.exe**.

3. Enter IP address of DeviceMaster AIR that you want to update.

4. Go to the appropriate discussion to update the firmware:
   - *Bootloader* on Page 43
   - *SocketServer* on Page 42

SocketServer

Use this procedure to upload SocketServer.

1. Select the **Query** button. If you have an NS-Link driver running, it will display the NS-Link version.

    Note: If you did not close the application after updating the Bootloader, the application will respond with the Bootloader version. If this occurs, close the application and restart it.

2. Select **Ok** after you confirm that it is the DeviceMaster AIR that you want to update.

    Note: If it is not the correct DeviceMaster AIR, enter correct IP address and repeat Step 1.

3. Browse to the location of the **.bin** file for SocketServer.

4. Select the **Download** button to start the update procedure.

5. Select the **Close** button after the download has completed.
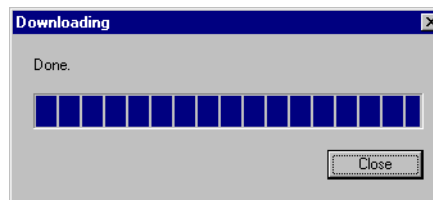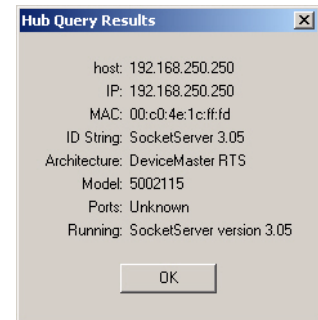
6. Verify the new SocketServer version:

    a. Select the **Reset** button.

    Note: There will be no screen change. If the DeviceMaster AIR is local, watch the Ethernet LEDs to confirm that the DeviceMaster AIR did reset.

    b. After the DeviceMaster AIR loads, select the **Query** button and confirm that version numbers did change.
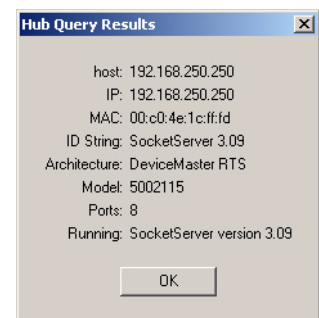
Bootloader   Use this procedure to upload Bootloader.

1. Select the **Reset** button and *quickly* select the **Query** button.

    Note: *If it displays the NS-Link or SocketServer version, repeat Step 1.*

2. Select **Ok** after you confirm that it is the DeviceMaster AIR that you want to update.

    Note: *If it is not the correct DeviceMaster AIR, enter the correct IP address and perform Steps 1 and 2.*

3. Browse to the location of the **.bin** file for Bootloader.
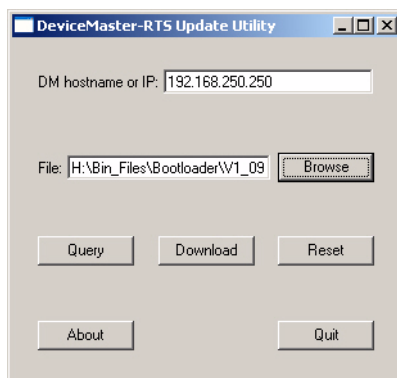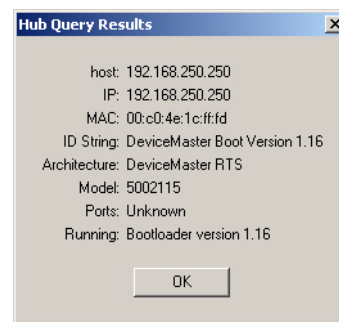
4. Select the **Download** button to start the update procedure.

5. Select the **Close** button after the download has completed.
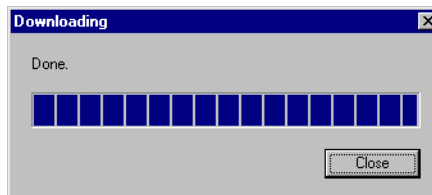
6. Verify the new Bootloader version:

    a. Select the **Reset** button and *quickly* select the **Query** button.

        Note: *If it displays the NS-Link or SocketServer version, repeat Step a.*

    b. Exit the application after resetting the device, even if you plan on updating the SocketServer.

        If you do not close the application you may not be able to query for the SocketServer version.
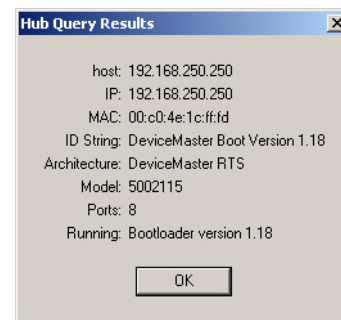
Updating the Wireless Firmware

Use your web browser and the **Administrator** tab to upgrade the firmware that supports the wireless port.

When you update the firmware, the wireless configuration settings are reset to the

default settings (*Factory Default Settings for the WLAN Port* on Page 59).

You may want to save the wireless configuration settings but to upload the settings, you will need to configure a host within the same range as the default WLAN IP address of the DeviceMaster AIR (192.168.0.30). To save the configuration settings, see *Saving the Wireless Configuration System Settings* on Page 23.

1. Make sure that you have downloaded and, if necessary, unzipped the wireless firmware (*Latest Firmware* on Page 39).

2. Connect the DeviceMaster AIR directly to a LAN network using an Ethernet cable between the WLAN connector on the DeviceMaster AIR and the Ethernet network.

3. Open the web browser and enter the DeviceMaster AIR IP address.

4. Select or type in user name in the **User Name** field.

5. Enter the password, if a password was configured during initial installation.
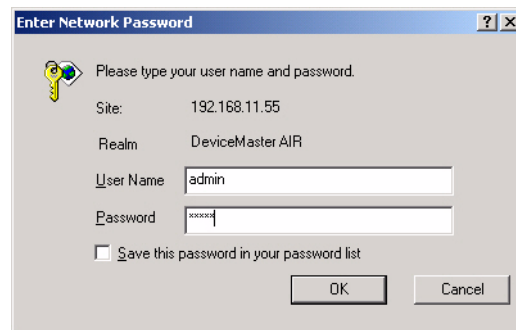
6. Select the **Admin** tab.
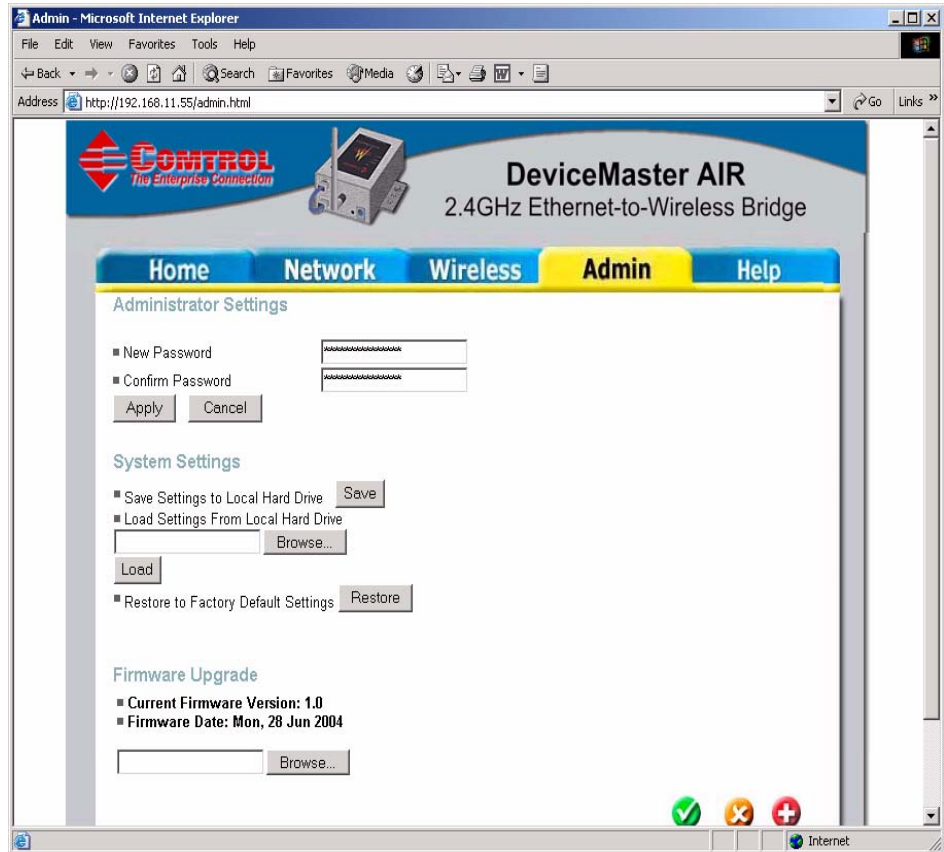
7. Select **Browse** from the *Firmware Upgrade* group.
8. Locate the file that you downloaded and select **Open**.
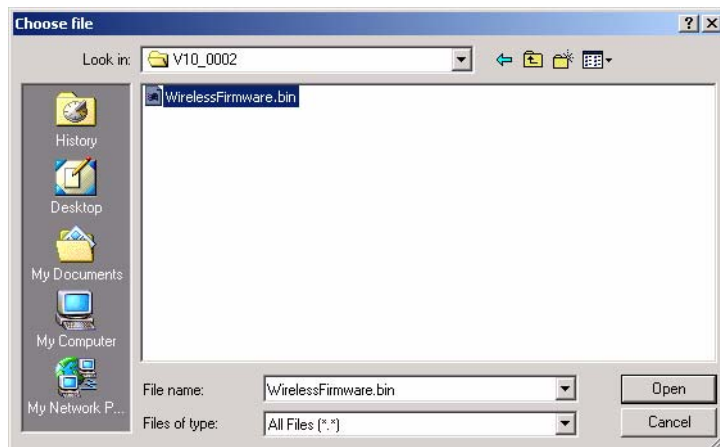
9. Select **Apply**.
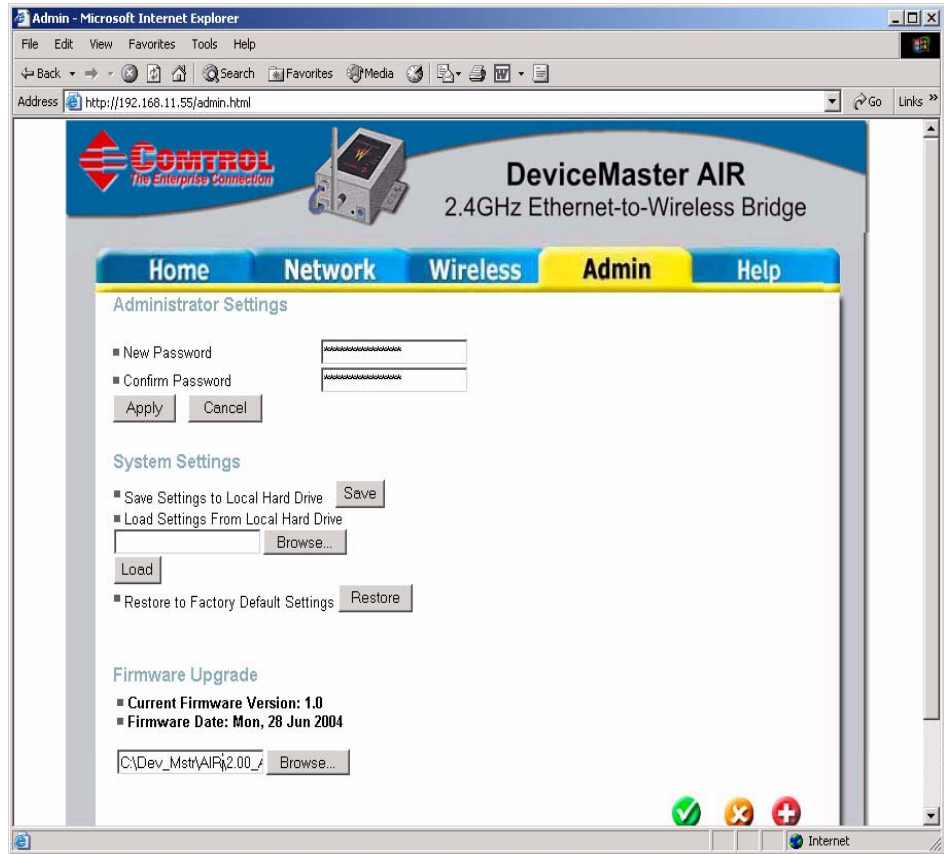
10. Select **Continue**.

11. You will need to reconfigure the wireless settings of the DeviceMaster AIR.

- If you saved the configuration settings, see *Loading Wireless Configuration System Settings* on Page 24.

- To reconfigure the wireless settings you can use the **Run Wizard** on the Home page, see *Connecting the Hardware and Initial Configuration* on Page 9.

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 AIR 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 AIR is not on the same Ethernet network segment as the PC.*

You can use a *telnet* connection, if the DeviceMaster AIR 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 47 or *Establishing a Telnet Connection* on Page 48 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 AIR.

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

   Note: *If you cannot locate the cable shipped with the DeviceMaster AIR, see DB9 Serial Cables and Loopback Plugs on Page 33.*

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 AIR.

   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 49
   - *Configuring the Network Settings* on Page 49
   - *Determining the Bootloader Version* on Page 50
   - *Resetting the DeviceMaster AIR* on Page 50
   - *Uploading Firmware* on Page 51
   - *Configuring Passwords* on Page 54
   - *Redboot Command Overview* on Page 55.

Establishing a Telnet Connection

Use the following procedure to telnet to the DeviceMaster AIR.

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

1. Open a telnet session, enter the DeviceMaster AIR IP address, and the webserver password, if required.

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

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

3. Open a new telnet session, enter the DeviceMaster AIR 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 49
   - *Configuring the Network Settings* on Page 49
   - *Determining the Bootloader Version* on Page 50
   - *Resetting the DeviceMaster AIR* on Page 50
   - *Uploading Firmware* on Page 51
   - *Configuring Passwords* on Page 54
   - *Redboot Command Overview* on Page 55.

Determining the Network Settings

Default Network Settings

IP address:
  192.168.250.250

Subnet mask:
  255.255.0.0

Gateway address:
  192.168.250.1

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

1. Establish communications with the DeviceMaster AIR using the serial (Page 47) or telnet (Page 48) method.

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 AIR, by using one of these methods:

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

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

- *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 AIR default IP.

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

1. Establish communications with the DeviceMaster AIR using the serial (Page 47) or telnet (Page 48) 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 AIR, 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 AIR.

1. Establish communications with the DeviceMaster AIR using the serial (Page 47) or telnet (Page 48) 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 AIR, make sure that you download the latest version and see *Updating Firmware* on Page 39.

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

Resetting the DeviceMaster AIR

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

Note: *The LEDs on the DeviceMaster AIR 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 (SocketServer and Bootloader))* on Page 51
- *Telnet Method (SocketServer and Bootloader))* on Page 53

Serial Method (SocketServer and Bootloader))

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 39) and cable *Establishing a Serial Connection* on Page 47).

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

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 AIR (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 39.

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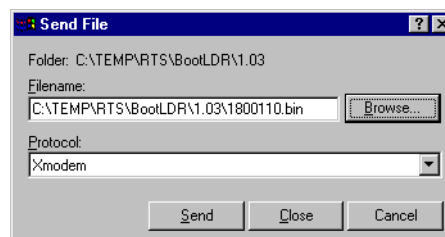
The file name in this screen shows the Bootloader.

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**.
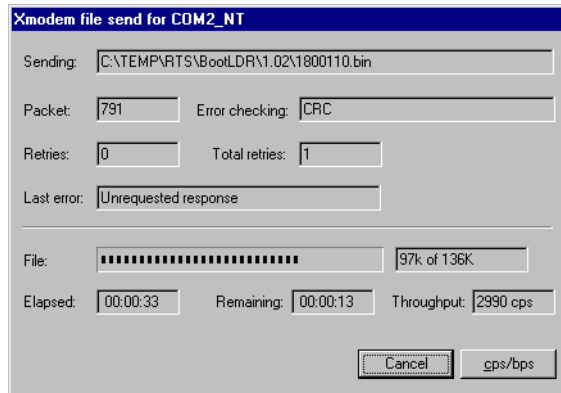
```
CCCCCCRaw load done: 542721 bytes read
Address range:  00000000-00084800, Entry point:  00000000,
xyzModem - CRC mode, 4241(SOH)/0(STX)/0(CAN) packets, 8 tries
RedBoot> go
... Erase from 0x05030000-0x050c0000: .........
... Program from 0x00000000-0x00084801 at 0x05060000: ...
... Erase from 0x050f0000-0x05400000:  .
... 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 [Step 6]().*

12. Reset the DeviceMaster AIR 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 AIR to verify that the new version of SocketServer loads.

Telnet Method (SocketServer and Bootloader))

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

1. Verify that you have the **.bin** file (*Latest Firmware* on Page 39).

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

3. Open a new telnet session and enter the DeviceMaster AIR 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 AIR 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 AIR 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 AIR password for the Web and telnet server. Establishing a password prevents unauthorized changes to the DeviceMaster AIR configuration.

1. Establish communications with the DeviceMaster AIR using the serial (Page 51) or telnet method (Page 48).

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 AIR may be different than the version displayed in this graphic.*

See the **auth** command in the *<u>Redboot Command Overview</u>* on Page 55 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.

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\AIR\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.
loop 232|422|int port-number	Runs loopback test on port.
mac†	Displays ethernet MAC address.
model†	Shows model number.
password {password}	Sets the password.
reset	Resets the DeviceMaster AIR. 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.
t485 port #1 port #2	Runs port-to-port RS-485 test.
version	Displays RedBoot version information.

† *Do not use these commands to change the values. Doing so may cause the DeviceMaster AIR to stop functioning.*

Hardware Specifications and Compliance Notices

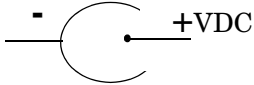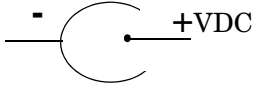The following subsections contain specifications and safety notices for the DeviceMaster AIR.

Electromagnetic Compliances

This table lists electromagnetic compliances for the DeviceMaster family.

Electromagnetic Compliances	Status

Emission:
    Canadian EMC requirements ICES-003
    CISPR-22: 1997
    European Standard EN55022: 1998
        Amendment A1: 2000
    FCC Part15 Subpart B: Class A limit
	Yes

Immunity: EN55024: 1998
    IEC 1000-4-2: EN61000-4-2: 1995 ESD
    IEC 1000-4-3: EN61000-4-3: 1996 RF
    IEC 1000-4-4: EN61000-4-4: 1994 Fast Transient
    IEC 1000-4-5: EN61000-4-5: 1995 Surge
    IEC 1000-4-6: EN61000-4-6: 1996 Conducted disturbance
    IEC 1000-4-8: EN61000-4-8: 1994 Magnetic field
    IEC 1000-4-11: EN61000-4-11: 1994 Dips and Voltage Variations
	Yes

Safety:
    IEC 60950/EN60950
    CSA C22.2 No. 60950/UL 60950, Third Edition
	Yes

Power Supply Specifications

This table provides the external power supply specifications.

Power Connector	External Power Supply	Specification
Standard model: Coaxial 5.5±0.1 x 2.1 mm - +VDC	Input line frequency Input line voltage Output voltage Output current	60 Hz 100 - 120VAC 5VDC 2.0A (Min) @ 5VDC
IAD and International models: Coaxial 5.5±0.1 x 2.1 mm - +VDC	Input line frequency Input line voltage Output voltage Output current	50 - 60 Hz 100 - 240VAC 5VDC 2.0A (Min) @ 5VDC

Hardware Specifications and Standards

The following table lists hardware specifications for the DeviceMaster AIR. See *Power Supply Specifications* on Page 57 for detailed power supply specification information.
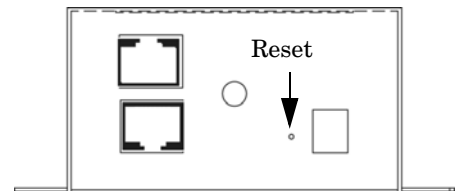
Item	Specification
Current consumption	1.1A @ 5VDC
Power consumption	5.5 W
Processor type	ARM7
Memory	8MB SDRAM/4MB flash
Serial interface	RS-232, RS-422, and RS-485
Serial connector type	DB9
Serial baud rate/port (maximum)	230.4 Kbps

NS-Link control:
    Data bits
    Parity
    Stop bits
	7 or 8
	Odd, Even, None
	1 or 2

LAN Ethernet interface	10/100 Mbps Fast Ethernet Auto MDI/MDIX

LAN Ethernet network default values:
    IP address
    Subnet mask
    Gateway
	192.168.250.250
	255.255.0.0
	192.168.250.1

LAN Ethernet network protocols	TCP, UDP, BOOTP, TFTP, ICMP, ARP, SNMP (MIB-II), Telnet, HTTP
WLAN Ethernet interface	10/100 Mbps Fast Ethernet Auto MDI/MDIX
WLAN Ethernet network default	See *Factory Default Settings for the WLAN Port* on Page 59.
WLAN Ethernet protocols	IEEE 802.11, IEEE 802.11b, IEEE 802.3 Ethernet, IEEE 802.3u
WLAN data rates with automatic fallback	22Mbps, 11Mbps, 5.5Mbps, 2Mbps, 1Mbps
WLAN port encryption	64-bit RC4, 128-bit RC4, 256-bit RC4
WLAN port media access control	CSMA/CA with ACK
WLAN port frequency range	2.4 GHz to 2.4385 GHz
WLAN port operating range	Indoors - Up to 328 ft. (100m) Outdoors - Up to 1,312 ft. (400m) *Environmental factors may adversely affect range*
WLAN port modulation technology	PBCC - Packet Binary Convolutional Coding DSSS - Direct Sequence Spread Spectrum 11-chip Barker sequence

Item	Specification
WLAN port modulation techniques	PBCC (22Mbps/8.5db) PBCC (11Mbps/4.5db) CCK (11Mbps/8.5db) PBCC (5.5Mbps/1.5db) CCK (5.5Mbps/5.5db) Barker (2Mbps/3db) Barker (1Mbps/0db)
WLAN port transmitter output power	15dBm ± 2dB
WLAN port external antenna type	Detachable 1.0dB gain with reverse SMA connector
WLAN port over-driving levels	Tolerates up to +17dBm at the antenna
SNMP support	Monitoring only.
Dimensions (without antenna)	4.57" x 5.5" x 1.94"
Weight (device, only; excluding power supply)	15 oz

Factory Default Settings for the WLAN Port

This table illustrates the DeviceMaster AIR WLAN port defaults. You can reset the DeviceMaster AIR to the factory defaults by selecting the **Reset** button.

WLAN Port	Default Setting
Operating Mode	Infrastructure
SSID	default
Channel	6
Transmission rates	Auto
Encryption	No
Administrator password	Blank (no password needed)
IP address mode	Static
IP address	192.168.0.30
Subnet mask	255.255.255.0
Username	admin (all lower case)

Environmental Specifications

This table list environmental conditions.

Environmental Conditions	Value

Air temperature:
    System on (operational)*
    System off (storage)
	0°C to 55°C (32°F to 131°F)
	-20°C to 75°C (4°F to 167°F)

Altitude	0 to 10,000 feet
Heat output	17.66 BTU/Hr

Humidity (non-condensing):
    System on (operational)
    System off (storage)
	20% to 80%
	8% to 80%

Mean time between failures (MTBF):	17.8 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.*

LEDs

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

Note: *If you are using the DeviceMaster AIR as a bridge, only the Status LED is functional.*

• 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.*

• If the red **Link Act** LED is lit, it indicates a working Ethernet connection between the LAN and WLAN port on the AIR.

• If the red **Duplex** LED is lit, it indicates full-duplex activity between the LAN and WLAN port on the AIR.

• If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection between the LAN and WLAN port on the AIR.
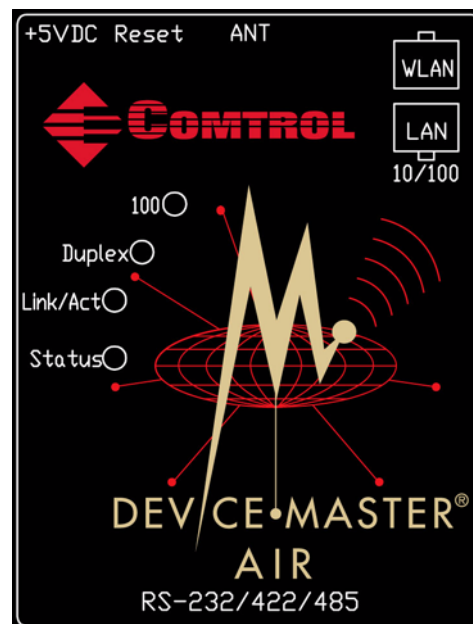
Connections

The DeviceMaster AIR has four connectors on the back of the unit:

- **LAN**: this RJ45 auto-sensing MDI/MIDX port provides connection to a network device using a *Category 5 Ethernet cable*. The auto-sensing MDI/MIDX port can use either a straight-through or cross-over cable.

  Comtrol provides an Ethernet jumper cable that is connected between the LAN and WLAN connectors to support one serial port.

  If you use the DeviceMaster AIR as a bridge, you will not have any cables connected to the LAN connector.

- **WLAN**: this RJ45 auto-sensing MDI/MIDX port provides connection to a network device using a *Category 5 Ethernet cable*. The auto-sensing MDI/MIDX port can use either a straight-through or cross-over cable.

  Note: Category 5 is the most reliable grade of twisted pair cable. Always check to make sure that you have selected the correct type of cable for your other devices on the network.

  An Ethernet cable is connected between the WLAN connector and the same network segment as a PC during initial installation to configure the wireless settings. The default IP address for the WLAN port is 192.168.0.30.

  After configuration, you will need to reconnect the Ethernet jumper cable between the LAN and WLAN connectors to use the DeviceMaster AIR as a 1-port serial device. To use the DeviceMaster AIR as a bridge, connect an Ethernet cable between the WLAN port and an Ethernet port of another device, such as a DeviceMaster RTS 8 to create eight wireless serial ports.

- **Reset Button**: press this internal button for a few moments to revert to the factory default settings of the DeviceMaster AIR. See *Factory Default Settings for the WLAN Port* on Page 59.

- **Power Receptor**: connect one end of the 5 VDC power adapter (included) to the power receptor on the DeviceMaster AIR and connect the other end of the power adapter to a power outlet.
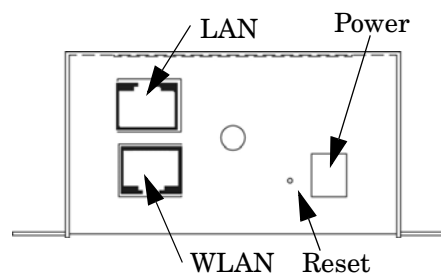
Notices

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.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of about eight inches (20cm) between the radiator and your body.

This transmitter must not be co-located or operate in conjunction with any other antenna or transmitter.

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 WLAN Port Problems
- *Troubleshooting Checklist* on Page 66, for overall troubleshooting of the DeviceMaster AIR
- *General Troubleshooting* on Page 68

If you cannot diagnose the problem, you can contact *Technical Support* on Page 70.

Troubleshooting WLAN Port Problems

The following subsections only discuss troubleshooting information for the WLAN Ethernet port on the DeviceMaster AIR.

FAQs

This section provides solutions to situations that can occur during the installation and operation of the DeviceMaster AIR Ethernet-to-Wireless Bridge. Read the following descriptions if you are having problems.

Questions/Problem	Answers
How do I assign a static IP address in Windows 2000/XP/2003?	See *Assigning a Static IP Address* on Page 65.
I cannot connect to another wireless client in Ad-hoc mode.	The DeviceMaster AIR has a default SSID of default. Make sure that the SSID on the DeviceMaster AIR is exactly the same as the SSID on the other wireless client.
	The DeviceMaster AIR has a default channel of 6. Make sure that the channel on the DeviceMaster AIR is exactly the same as the channel on the other wireless client.
I cannot connect to an access point or wireless router.	Make sure that the SSID on the DeviceMaster AIR is exactly the same as the SSID on the access point or wireless router.
	Move the DeviceMaster AIR and access point or Wireless router into the same room and then test the wireless connection.
	Disable all security settings. (WEP, MAC address Control, AES)
	Turn off your access point and the device with the DeviceMaster AIR. Turn on the access point, and then turn on the device with the DeviceMaster AIR.
	Make sure that the DeviceMaster AIR is set to **Infrastructure** mode.

Questions/Problem	Answers
I forgot my encryption key.	Reset the access point to its factory default settings and restore the DeviceMaster AIR to its factory default settings. You may do this by pressing the **Reset** button on the back of the unit. You will lose the current configuration settings.
I cannot connect the DeviceMaster AIR to my network.	Check that the LED indicators for the broadband modem are indicating normal activity. If not, there may be a problem with the broadband connection.
	Check that the LED indicators on the wireless router are functioning properly. If not, check that the AC power and Ethernet cables are firmly connected.
	Check that the IP address, subnet mask, gateway, and DNS settings are correctly entered for the network.
	In Infrastructure mode, make sure the same Service Set Identifier (SSID) is specified on the settings for the wireless clients and access points. The SSID factory default setting for the DeviceMaster AIR units is default.
	In Ad-Hoc mode, both wireless clients will need to have the same SSID. Please note that it might be necessary to set up one client to establish a BSS (Basic Service Set) and wait briefly before setting up other clients. This prevents several clients from trying to establish a BSS at the same time, which can result in multiple singular BSSs being established, rather than a single BSS with multiple clients associated to it.
	Check that the Network Connection for the wireless client is configured properly. Select Infrastructure when connecting to a wireless router and select Ad-Hoc mode when connecting without an access point.
	If Security is enabled, make sure that the correct encryption keys are entered on both the DeviceMaster AIR and the wireless router or ad-hoc client.
What variables may cause my wireless products to lose reception?	The positioning of the products within your environment will affect the wireless range. See *Installation Considerations (Wireless)* on Page 6 for further information about the most advantageous placement of your wireless products.
Why does my wireless connection drop?	Antenna orientation - try different antenna orientations for the DeviceMaster AIR. Try to keep the antenna at least 6 inches away from the wall or other objects.
	If you are using 2.4GHz cordless phones, X-10 equipment or other home security systems, ceiling fans, and lights, your wireless connection will degrade dramatically or drop altogether. Try changing the Channel on your wireless router, access point, and all other devices on the network to avoid interference.
	Keep your product away (at least 3-6 feet) from electrical devices that generate RF noise, like microwaves, Monitors, electric motors, etc.

Assigning a Static IP Address

Residential gateways/broadband routers automatically assign IP addresses to the computers on the network, using DHCP (Dynamic Host Configuration Protocol) technology. If you are using a DHCP-capable Gateway/Router you do not need to assign static IP addresses.

If you are not using a DHCP capable Gateway/Router, or you need to assign a static IP address, use the appropriate discussion for your operating system.

Windows 2000/XP/ 2003

Use the following procedure if you need to assign a static IP address so that your computer can communicate with the DeviceMaster AIR during the configuration process.

1. From the **Start** button, select **Control Panel**, and double-click on **Network Connections**.

2. Right-click on **Local Area Connections**, select **Properties**, highlight **Internet Protocol (TCP/IP)**, and select **Properties**.

3. Select **Use the following IP address**, enter a temporary IP address and subnet mask value that allows this system to communicate to the DeviceMaster AIR.

   The default wireless IP address for the DeviceMaster AIR is **192.168.0.30**. The IP addresses on your network must be within the same range. For example, you could enter an IP address of **192.168.0.3**.

   The subnet mask must be the same for all the computers on the network, for example, **255.255.255.0**.

   A default gateway is not required.

   Note: *You may want to note the original IP information to return the PC to it's original IP configuration.*

4. Select **Ok** on the TCP/IP Properties page, select **Close** on the Local Area Connections Properties page, and close the control panel.

If necessary, you can use this procedure to return your system to it's original IP configuration.

Windows 2000   Use the following procedure if you need to assign a static IP address so that your computer can communicate with the DeviceMaster AIR during the configuration process.

1. From the **Start** button, select **Settings**, **Control Panel**, **Network and Dial-up Connections**, and **Local Area Connections**.

2. Select the **Properties** button.

3. Select **Use the following IP address**, enter a temporary IP address and subnet mask value that allows this system to communicate to the DeviceMaster AIR.

   The default wireless IP address for the DeviceMaster AIR is **192.168.0.30**. The IP addresses on your network must be within the same range. For example, you could enter an IP address of **192.168.0.3**.

   The subnet mask must be the same for all the computers on the network, for example, **255.255.255.0**.

   A default gateway is not required.

   Note: *You may want to note the original IP information to return the PC to it's original IP configuration.*

4. Select **Ok** on the TCP/IP Properties page, select **Close** on the Local Area Connections Properties page, and close the control panel.

If necessary, you can use this procedure to return your system to it's original IP configuration.

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.

- 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 hardware MAC address in NS-Link matches the address on the Comtrol device.
- 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.
- If using a driver for Microsoft systems, verify that you are addressing the port correctly. In many applications, device names above COM9 require the prefix **\\.** in order to be recognized. For example, to reference COM20, use **\\.\COM20** as the file or port name.
- If using NS-Link for a Microsoft system, you can use one of the Comtrol tools, which are discussed in the NS-Link User Guide.
  - Device Advisor, which helps identify problems is a tab in the **Advisor** window of the driver.
  - Test Terminal program, which can be used to troubleshoot communications on a port-by-port basis.
  - Port Monitor program, which checks for errors, modem control, and status signals. In addition, it provides you with raw byte input and output counts.
  - Peer Tracer program, which traces driver events.
- If using NS-Link for Windows hosts, enable the **Verbose Event Log** feature under the **Options** tab and then reboot the system.
- Reboot the system and the Comtrol device.
- Remove and reinstall NS-Link.
- 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* <u>*Troubleshooting Checklist*</u> *on Page 66.*

General Condition	Explanation/Action
PWR or **Status** LED flashing	Indicates that boot program has not downloaded to the unit. 1. Make sure that you have downloaded the most current driver from: <u>http://support.comtrol.com/download.asp</u>. 2. Install the driver and configure the device using the MAC address. Make sure that you reboot the system. *Note:* *If the PWR or Status LED is still flashing, contact Technical Support.* 3. If you want to program an IP address into the Comtrol device, you can use the procedure outlined in the *NS-Link User Guide* (Page 8). 4. Remove the NS-Link driver.
PWR or **Status** LED not lit	Indicates that power has not been applied or there is a hardware failure. Contact Technical Support.
Can ping the Comtrol device, but cannot open the ports from a remote location. (You must have previously programmed the IP address, subnet mask, and IP gateway.)	The NS-Link driver uses Port 4606 (**11FE** h) to communicate with the Comtrol device. When using a "sniffer" to track NS-Link packets, filtering for Port 4606 will easily track the packet. The packet should also contain the MAC address of the device and the originating PC so that it can be determined if the packet is able to travel the full distance one way or not. If the 4606 packet is found on one side of a firewall or router, using sniffer, and not on the other side, then that port needs to be opened up to allow the 4606 to pass. This will most often be seen with firewalls, but is also seen in some routers.
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 66).
Cannot ping or connect to the DeviceMaster AIR	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. If you do not use the NS-Link driver to program the IP address, you only have 15 seconds to disable the bootloader with Redboot to get into the setup utility.

General Condition	Explanation/Action
DeviceMaster AIR continuously reboots when connected to some Ethernet switches	The problem is caused by a L2 bridging feature called Spanning Tree Algorithm (STA) in the Switch. This feature is enabled by default in some switches. This features causes time-out problems on certain L2 protocols, such as our MAC mode. *Resolution*: There will be no firmware fix for this problem. Only *one* of the following fixes is required for resolution. 1. Disable STA in the switch. 2. Enable STA fast forwarding on the port. 3. Change the STA Forward Delay and Message Age to minimum time values. 4. On the device, set the time-out value to 0 (to disable loading of SocketServer) or 120. The command from the redboot prompt is "Timeout 120" without the quotes. *Problem Details*: STA by default blocks packets for 30 seconds after an ethernet port auto negotiates. Blocking of these packets causes the NS-Link driver load process to fail. The normal NS-Link load process is: 1. If NS-Link determines that it needs to load a device, it resets the device. It does this to get the device into Redboot mode. Only Redboot accepts "load binary" commands, which are needed to load the NS-Link binary into the device. 2. After a 6 second delay, NS-Link sends an ID query to the device. This query is to verify that the device is in Redboot and can accept "load binary" commands. 3. The device sends an ID query response. 4. NS-Link loads the device. If the device is not loaded after "timeout" seconds (default 15) , it loads SocketServer. The above process fails when STA is running because the switch blocks packets for 30 seconds after the RTS is rebooted. Therefore, the ID query is not received by the RTS and after 15 seconds the device loads SocketServer. After 30 seconds, NS-Link finally can do an ID query, which reveals that the device is not in Redboot. NS-Link therefore reboots the device, and the process repeats.
DeviceMaster AIR 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.

Technical Support

If you are using an NS-Link driver for a Microsoft system, you should review the troubleshooting section in the *NS-Link User Guide for Microsoft Operating Systems* (Page 8) before contacting 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

Index