User Guide

Windows® Vista
Windows Server 2003
Windows XP
Windows 2000

COMTROL

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Introduction

Install the NS-Link™ device driver to use the DeviceMaster® serial ports as native COM ports.

To configure DeviceMaster ports for socket mode or serial tunneling, you do not need to install the NS-Link device driver. See the appropriate *DeviceMaster User Guide* (Page 8) for information about uploading the latest firmware and accessing the SocketServer help system for socket configuration information.

Installation Overview

NS-Link installation and configuration follows these basic steps. If you used the *Software and Documentation CD* to install the hardware and PortVision Plus to program the network information and update SocketServer, skip to Step 3 to start NS-Link driver installation.

1. Install the hardware; if necessary, use the appropriate *DeviceMaster User Guide* (*Locating DeviceMaster User Guides or Quick Starts* on Page 8).
2. Install PortVision Plus (*Locating DeviceMaster Software* on Page 8):
   - *Optionally*, program the network information into the DeviceMaster.
   - If necessary, update SocketServer. Refer to the *Software and Documentation CD* to locate the latest version or see *Locating DeviceMaster Software* on Page 8.
3. Install the NS-Link driver on the host system (*Initial NS-Link Installation* on Page 11).
4. Configure your network information into the DeviceMaster (*NS-Link Configuration* on Page 17).
5. Configure COM port attributes for your serial devices (*Configuring Advanced COM Port Properties* on Page 27).

NS-Link Driver Overview

The following subsections discuss NS-Link features and topics that you may want to review before driver installation.

NS-Link Requirements

The NS-Link driver for DeviceMaster requires at least one of the following host systems running:

- Windows Vista
- Windows Server 2003
- Windows XP
- Windows 2000

IP or MAC Addressing Issues

This is an overview of IP and MAC addressing issues that may affect how you configure the DeviceMaster with a brief discussion of advantages of each method.

The IP addressing scheme (IP mode) has the following advantages:

- Uses an IEEE industry standard protocol.
- Allows you to configure systems to use ports on the DeviceMaster that are outside of the host system's local Ethernet segment.

Note: *This IP address must be a unique reserved IP address. Do not use an address from a dynamic address pool. If necessary, see the system administrator for an IP address.*

The MAC addressing method (MAC mode) has the following advantages:

- Simplifies implementation and ongoing support by eliminating the address administration issues inherent in network protocols. MAC addresses are predefined by DeviceMaster and there is no potential for an "address conflict" at setup.
- It is isolated from foreign LAN segments minimizing potential security issues.
- Maximizes throughput of serial data.

NS-Link Features

During initial installation and configuration of the DeviceMaster, you may want to associate the MAC address to the DeviceMaster. If you do not do so, you will not be able to use the following NS-Link features:

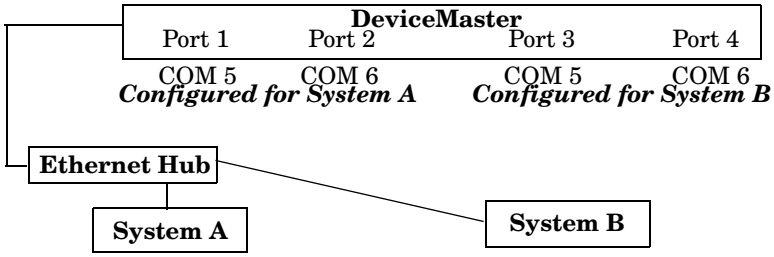
- Change the IP address
- Disable DHCP discovery messages
- Retrieve DeviceMaster network information
- Reset the DeviceMaster
- Use the **Advisor** tab

After associating the MAC address, you can then program the DeviceMaster for IP or DHCP usage.

Using the Port Sharing Feature

The DeviceMaster can be shared with multiple systems on a network. To do so, follow the *Installing NS-Link* discussion for each system that you want to permit access to the serial ports.

You can implement the port sharing feature in several ways. You can share the same port with multiple systems (only one system can have an open connection to a port at any given time) or you can set up multiple systems to share specific ports on the DeviceMaster.



COM port names must be unique to each system.
Multiple systems can use the same COM port names.

Example:

To configure two ports for System A and two ports for System B, you could configure the drivers like this:

1. When installing NS-Link on System A, click "Not Configured" for the COM port names for Ports 3 and 4.
2. When installing NS-Link on System B, click "Not Configured" for the COM port names for Ports 1 and 2.

Port	System A	System B
1	COM5	Not Configured
2	COM6	Not Configured
3	Not Configured	COM5
4	Not Configured	COM6

Note: *Most applications do not release ports, so you may not be able to use port sharing across multiple systems with the same port. Also, if using port sharing, make sure that two computers do not try to access the same port at the same time. Only one computer can control a given port at a given time.*

Connectivity Requirements

An Ethernet connection: either to an Ethernet hub, switch, or router; or to a Network Interface Card (NIC) in the host system using a standard Ethernet cable. See the appropriate *DeviceMaster User Guide* (*Locating DeviceMaster User Guides or Quick Starts* on Page 8) for information regarding hardware installation.

Product Type	Connected to	Connector Name
DeviceMaster[2] 1-port	Hub, switch, router, or NIC	10/100 ETHERNET
DeviceMaster AIR 1-port	Hub, switch, router, or NIC	10/100 ETHERNET
DeviceMaster RTS 1-port	Hub, switch, router, or NIC	10/100 ETHERNET
DeviceMaster RTS Embedded	Hub, switch, router, or NIC	RJ45 port (not labeled)
DeviceMaster RTS 4/8/16-port (*external* power supply)	NIC	DOWN
	Hub, switch, or router	UP
DeviceMaster RTS 16/32RM (*internal* power supply)	Hub, switch, router, or NIC	10/100 NETWORK
DeviceMaster PRO 8/16-port	NIC	DOWN
	Hub, switch, or router	UP
DeviceMaster Serial Hub 8-port	NIC	DOWN
	Hub, switch, or router	UP
DeviceMaster Serial Hub 16-port	Hub, switch, router, or NIC	10/100 NETWORK

Note: *DeviceMaster AIR users, refer to the* DeviceMaster AIR User Guide.

Locating DeviceMaster User Guides or Quick Starts

Use the appropriate *DeviceMaster User Guide* to install the hardware before installing the NS-Link driver. The *DeviceMaster User Guide* is available on the Comtrol CD that ships with your product or you can download the latest version using the table below.

The *DeviceMaster Quick Starts* contain an outline of the installation and configuration procedures with links to the appropriate files.

DeviceMaster	Document	Download
DeviceMaster[2]	User Guide	
	Quick Start	
DeviceMaster AIR	User Guide	
	Quick Start	
DeviceMaster PRO	User Guide	
	Quick Start	
DeviceMaster RTS	User Guide	
	Quick Start	
DeviceMaster Serial Hub	User Guide	
	Quick Start	

Locating DeviceMaster Software

You can download the latest software updates at no charge from the Comtrol web site.

Always check the web site to make sure that you have the current driver and documentation. The software files that you download from the web site are typically self-extracting zipped files that you must extract before installing.

Software	Download
NS-Link Device Driver	
NS-Link User Guide for Microsoft Systems	
PortVision Plus	
Comtrol Utility	

Verifying the DeviceMaster is Ready for NS-Link

Use the appropriate table to verify that your DeviceMaster was installed properly and is ready for NS-Link installation. See the appropriate *DeviceMaster User Guide* (Page 8) if you need to install the hardware.

The LEDs indicate that the default DeviceMaster application, SocketServer is running or after driver installation, that the NS-Link driver loads. If you have loaded PortVision Plus, you can check the DeviceMaster status on-line.

Ports	Model	LEDs
1	**DeviceMaster AIR** **DeviceMaster^2** **DeviceMaster RTS**	• The **Status** LED on the front of the unit is lit, which indicates that it has power and 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.* • The red **Link Act** LED is lit, which indicates a working Ethernet connection. • If the red **Duplex** LED is lit, it indicates full-duplex activity. • If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).
1	**DeviceMaster RTS Embedded**	The LEDs are located between the RJ45 connector and the power terminal block. • The amber **Status** LED (**D1**) on the adapter is lit, which indicates that it has power and 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.* • The red **Link Act** LED (**D2**) is lit, which indicates a working Ethernet connection. • If the red **Duplex** LED (**D3**) is lit, it indicates full-duplex activity. • If the red **100** LED (**D4**) is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).
4 8 16	**DeviceMaster PRO (8)** **DeviceMaster RTS†** **DeviceMaster Serial Hub (8)**	• The **PWR** LED on the front of the unit is lit, which indicates it has power and has completed the boot cycle. ***Note:*** *The **PWR** LED flashes while booting and it takes approximately 15 seconds for the bootloader to complete the cycle.* • The red **LNK/ACT** LED is lit, which indicates a working Ethernet connection. • If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).

Ports	Model	LEDs
16 **32**	**DeviceMaster PRO (16)** **DeviceMaster RTS**†† **DeviceMaster Serial Hub (16)**	• The **Status** LED on the front of the unit is lit, which indicates it has power and 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.* • The red **LNK/ACT** LED is lit, which indicates a working Ethernet connection. • If the red **Duplex** LED is lit, it indicates full-duplex activity. • If the red **100** LED is lit, it indicates a working 100 MB Ethernet connection (100 MB network, only).
† External power supply. †† Internal power supply.		

Initial NS-Link Installation

Use the appropriate subsection to initially install NS-Link on your operating system after verifying that your DeviceMaster is functioning properly (Page 9).

- *Windows Vista: NS-Link Installation* (below)
- *Windows XP and Windows Server 2003: NS-Link Installation* on Page 12
- *Windows 2000: NS-Link Installation* on Page 13

If there is a NS-Link driver already installed on your system, see *Updating, Adding, or Removing DeviceMasters* on Page 15 before installing the new driver.

Windows Vista: NS-Link Installation

Use this procedure to install and configure the NS-Link device driver for your DeviceMaster.

1. If necessary, install the DeviceMaster using the appropriate *DeviceMaster User Guide* (Page 8).
2. If necessary, unzip the self-extracting files from the Comtrol CD or ftp/web site so that the NS-Link driver files are available (Page 8).
3. From the **Start** button, click **Settings**, **Control Panel** and then double-click **Add Hardware**.
4. Click **Next** when the *Add Hardware* wizard starts.
5. Click **Install the hardware that I manually select from a list (Advanced)** and then **Next**.
6. Highlight **Multi-port serial adapters** and then click **Next**.
7. Click **Have Disk**, **Browse** and locate the unzipped driver files, click **Open** and then click **OK**.
8. Highlight the DeviceMaster you are installing from the **Models** list and then click **Next**.
9. Click **Next** to start the driver installation.
10. If necessary, click **Install this driver software anyway** at the prompts to proceed for the DeviceMaster unit and first port.

    Note: *It may take up to several moments for the operating system to load the driver on the first port.*
11. Click **Finish** to complete this part of the installation process.
12. At the *Windows needs to install driver software for your Comtrol NS-Link Port*, click **Locate and install driver software automatically (Recommended)** and then **Next**.
13. If necessary, click **Install this driver software anyway** to proceed.
14. Click **Close** when *The software for this device has been successfully installed screen* appears and close the *Control Panel*.
15. Go to *NS-Link Configuration* on Page 17 complete NS-Link installation. Driver installation is not complete until you have associated the MAC address to the DeviceMaster or a suitable IP address is entered.

    The DeviceMaster default IP address is 192.168.250.250.

    Note: *If you programmed an IP address into the DeviceMaster for your*

network using PortVision Plus before installing the driver and you want to use NS-Link features (Page 6), first associate the MAC address to the DeviceMaster and then configure NS-Link driver with the IP address in the DeviceMaster.

Windows XP and Windows Server 2003: NS-Link Installation

Use this procedure to install and configure the NS-Link device driver for your DeviceMaster.

1. If necessary, install the DeviceMaster using the appropriate *DeviceMaster User Guide* (Page 8).
2. If necessary, unzip the self-extracting files from the Comtrol CD or ftp/web site so that the NS-Link driver files are available (Page 8).
3. From the **Start** button, click **Control Panel** and then double-click **Add Hardware**.
4. Click **Next** when the *Add Hardware Wizard* starts.
5. Click **Yes, I have already connected the hardware** and then **Next**.
6. Highlight **Add a new hardware device** (at the bottom of the list) and click **Next**.
7. Click **Install the hardware that I manually select from a list (Advanced)** and then **Next**.
8. Highlight **Multi-port serial adapters** and then click **Next**.
9. Click **Have Disk**, **Browse** and locate the unzipped driver files, click **Open** and then click **OK**.
10. Highlight the DeviceMaster you are installing from the **Models** list and then click **Next**.
11. Click **Next** to start the driver installation.
12. If necessary, click **Continue Anyway** to proceed for the DeviceMaster and first port.

    Note: *It may take up to several moments for the operating system to load the driver on the first port.*
13. Click **Finish** to complete this part of the installation process for the DeviceMaster.
14. Click **Install the software automatically (Recommended)** and then click **Next**.
15. If necessary, click **Continue Anyway** to proceed.
16. Click **Finish** to complete the driver installation process for this port.

    Note: *You may need to wait a few moments while the operating system creates a port for the DeviceMaster.*
17. Repeat Steps 14 through 16 for each remaining port on the DeviceMaster.
18. If Windows XP, close the *Control Panel*.
19. Go to *NS-Link Configuration* on Page 17 complete NS-Link installation. Driver installation is not complete until you have associated the MAC address to the DeviceMaster or a suitable IP address is entered.

    The DeviceMaster default IP address is 192.168.250.250.

    Note: *If you programmed an IP address into the DeviceMaster for your network using PortVision Plus before installing the driver and you want to use NS-Link features (Page 6), first associate the MAC address to the DeviceMaster and then configure NS-Link driver with the IP address in the DeviceMaster.*

Windows 2000: NS-Link Installation

Use this procedure to install and configure the NS-Link device driver for your DeviceMaster.

1. If necessary, install the DeviceMaster using the appropriate *DeviceMaster User Guide* (Page 8).
2. If necessary, unzip the self-extracting files from the Comtrol CD or ftp/web site so that the NS-Link driver files are available (Page 8).
3. Click **Start**, **Settings**, and **Control Panel**, and then double-click **Add/Remove Hardware**.
4. Click **Next**.
5. Click **Add/Troubleshoot a device** and then **Next**.
6. Highlight **Add a new device** and click **Next**.
7. Click **No, I want to select the hardware from a list** and then **Next**.
8. Click **Multi-port serial adapters** and select then **Next**.
9. Click **Have Disk**.
10. Click **Browse** to locate the unzipped installation files or enter the path and click **OK**.

    Note: *It is not necessary to select a file, just browse to this directory and click* ***Open****.*

    For example, if you extracted the driver to the default subdirectory, enter: **C:\Comtrol**.
11. From the **Models** list, highlight the DeviceMaster you are installing and **Next**.
12. Click **Next** to start the driver installation.
13. Click **Yes** to continue the installation.

    Note: *It may take up to several moments for Windows 2000 to load the driver for each port on the DeviceMaster. A* ***Found New Hardware*** *message will display for each port on the DeviceMaster.*
14. Click **Finish** to complete the driver installation process for this port.
15. Close the *Control Panel*.
16. Go to *NS-Link Configuration* on Page 17 complete NS-Link installation. Driver installation is not complete until you have associated the MAC address to the DeviceMaster or a suitable IP address is entered.

    The DeviceMaster default IP address is 192.168.250.250.

    Note: *If you programmed an IP address into the DeviceMaster for your network using PortVision Plusbefore installing the driver and you want to use NS-Link features (Page 6), first associate the MAC address to the DeviceMaster and then configure NS-Link driver with the IP address in the DeviceMaster.*

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Updating, Adding, or Removing DeviceMasters

This section discusses updating existing installations, adding additional DeviceMasters to an existing installation, and removing the NS-Link driver.

Note: *See the appropriate* DeviceMaster User Guide *if you want to swap one DeviceMaster for another DeviceMaster. See* *Locating DeviceMaster User Guides or Quick Starts on Page 8.*

Updating an Existing Driver

Use the appropriate procedure for your operating system.

Windows Vista

Use the following procedure to update an existing NS-Link driver for the Windows Vista operating system.

1. If necessary, unzip the self-extracting files from the Comtrol CD or ftp/web site. See *Locating DeviceMaster Software* on Page 8, to locate the device driver.
2. Access the **Properties** page for the DeviceMaster (Page 37).
3. Right-click the DeviceMaster for which you want to update the driver, and then click **Update Driver Software**.
4. Click **Install from a list or specific location (Advanced)** and then **Next**.
5. Click **Browse my computer for driver software** and then **Next**.
6. Locate the NS-Link driver files and then click **Next**.
7. If necessary, click **Always trust software from "Comtrol Corp."** and then **Install**.
8. Click **Close**.
9. Click **Yes** to restart the computer.

Note: *Make sure that you reboot the DeviceMaster after rebooting your host PC.*

Windows XP and Windows Server 2003

Use the following procedure to update an existing NS-Link driver for the Windows XP and Windows Server 2003 operating systems.

1. If necessary, unzip the self-extracting files from the Comtrol CD or ftp/web site. See *Locating DeviceMaster Software* on Page 8, if you need to locate the device driver.
2. Access the **Properties** page for the DeviceMaster (Page 37).
3. Right-click the DeviceMaster for which you want to update the driver, and then click **Update Driver**.
4. Click **Install from a list or specific location (Advanced)** and then **Next**.
5. Click **Search for the best driver in these locations**, **Include this location in the search**, **Browse** to locate the unzipped driver assembly, and then click **Next**.

   Note: *When you browse to the directory containing the NS-Link files, you do not need to click a specific file. The driver automatically selects the appropriate file.*
6. If necessary, click **Continue Anyway**.

7. Click **Finish**.
8. Click **Yes** to restart the system.

Note: *Make sure that you reboot the DeviceMaster after rebooting your host PC.*

Windows 2000

Use the following procedure to update an existing NS-Link driver for the Windows 2000 operating system.

1. If necessary, unzip the self-extracting files from the Comtrol CD or ftp/web site. See *Locating DeviceMaster Software* on Page 8, if you need to locate the device driver.
2. Access the **Properties** page for the DeviceMaster (Page 37).
3. Right-click the DeviceMaster for which you want to update the driver, and click **Properties**.
4. Click the **Driver** tab and then **Update Driver...** button.
5. Click **Next** when the *Update Device Driver* wizard appears.
6. Click **Search for a suitable driver for my device (recommended)** and then **Next**.
7. Click **Specify a location** and then **Next**.
8. Click **Browse** to locate the driver update and then **Open**.

   Note: *It is not necessary to select a file, just browse to the directory and click **Open**.*
9. Click **OK** and then **Next**.
10. If necessary, click **Yes** to install the driver.
11. Click **Finish**.
12. Close the **Properties** page.
13. Click **Yes** to reboot the system.

Note: *Make sure that you reboot the DeviceMaster after rebooting your host PC.*

Adding Additional DeviceMasters

Install the DeviceMaster and configure the ports using the same procedures reference in *Initial NS-Link Installation* on Page 11.

Removing an Existing Driver

Use the following procedure to remove an existing NS-Link device driver.

1. From the desktop, right-click **My Computer** (or **Computer**), **Manage**, and then highlight **Device Manager**.
2. Expand the **Multi-port serial adapters** entry to view the list.
3. Right-click the DeviceMaster you want to remove and click **Uninstall**.
4. Click **OK** at the *Confirm Device Removal* (or *Uninstall*) popup.

   If *Windows Vista,* click **Delete the driver software for this device** and then **OK**.
5. Close the *Device Manager* window and resume normal operations.

Note: *This procedure only discusses a single DeviceMaster installation. If there are other DeviceMasters, the driver remains and stays running.*

NS-Link Configuration

If you are installing the DeviceMaster with the NS-Link driver for the first time, use the appropriate procedure in *Initial NS-Link Installation* on Page 11.

During initial NS-Link configuration, you may want to associate the MAC address (Page 18) to the DeviceMaster so that you can use the following NS-Link features:

- Change the IP address
- Disable DHCP discovery messages
- Retrieve DeviceMaster network information
- Reset the DeviceMaster
- Use the **Advisor** tab

Note: *If you do not want to use NS-Link features and do not need to change the DeviceMaster IP address, go to Programming the IP Address on Page 19.*

After associating the MAC address to the DeviceMaster you can change the DeviceMaster IP address or disable DHCP discovery messages.

The default IP address for the DeviceMaster is 192.168.250.250.

Note: *If you programmed an IP address into the DeviceMaster for your network using PortVision Plus before installing the driver and you want to use the NS-Link features discussed above; first associate the MAC address to the DeviceMaster and then configure NS-Link driver with the IP address that you programming into the DeviceMaster using PortVision Plus.*

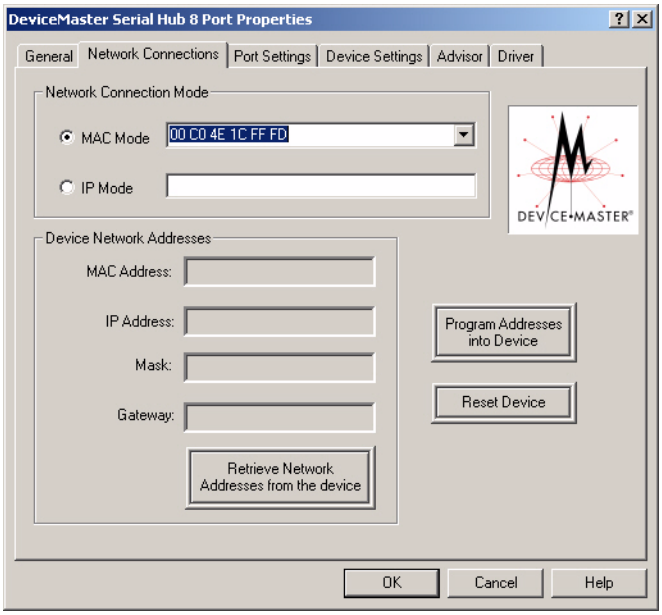
Associating the MAC Address

The DeviceMaster must be connected to the local network segment or directly to a NIC on the host system to operate in MAC mode.

Use the following procedure to associate a MAC address to a DeviceMaster.

1. If necessary, access the Properties page for the DeviceMaster (Page 37).
2. Click the **Network Connections** tab.
3. Enter the address from the MAC address label on the DeviceMaster or select the MAC address from the droplist.

   Note: *If you enter the MAC address, make sure that you use the correct format:* **00 C0 4E xx xx xx**. *A space must separate each pair of digits.*



4. Click **OK** to program the driver with the MAC address of the DeviceMaster.

   The **Properties** page closes automatically.

- To program the DeviceMaster for use with an IP address, see *Programming the IP Address* on Page 19.
- To configure NS-Link to run efficiently using a MAC address, see *Disabling DHCP Requests (MAC Mode)* on Page 22.

Programming the IP Address

After associating the DeviceMaster with the MAC address you can continue NS-Link configuration.

- Program an IP address and network values

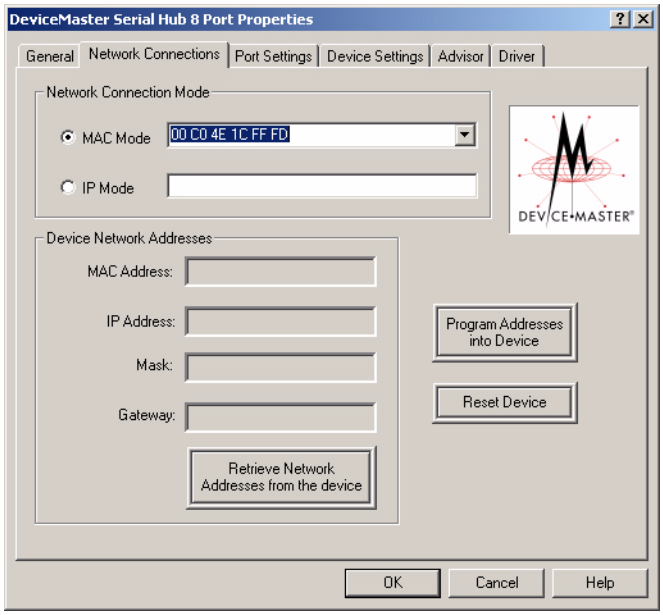
  Note: *The DeviceMaster family default IP address is 192.168.250.250.*

- Change the existing network values
- Program the DeviceMaster for use with DHCP

See your System Administrator if you need to acquire a unique reserved (static) IP address for using DHCP. They will need the MAC address of the DeviceMaster to provide you with a reserved (static) IP address.

Note: *To configure the DeviceMaster with an IP address or for use with DHCP, you must associate a MAC address to the DeviceMaster before you can change the IP address (Page 18).*

1. If necessary, access the Properties page for the DeviceMaster (Page 37).
2. Click the **Network Connections** tab.

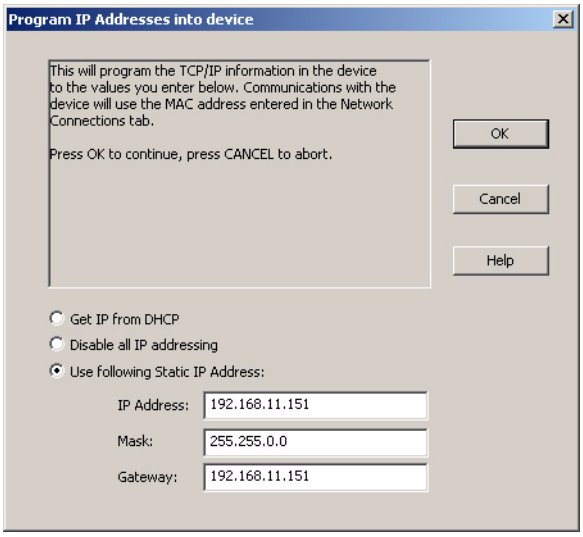


3. Click **Program Addresses into Device**.

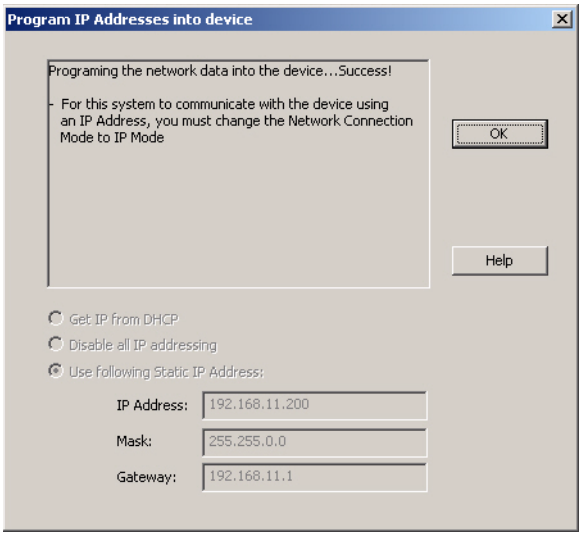
4. Click either **Get IP from DHCP** or the **Use following Static IP Address** option, depending on the type of IP address you want to program into the DeviceMaster.
5. If you clicked **Use following Static IP Address**, enter the appropriate IP address, subnet mask, and default gateway values for your network.
6. Click **OK** to begin programming the DeviceMaster.
7. Click **Yes** to reset the DeviceMaster or **No** if you want to reset it later.

   Note: *The DeviceMaster will not use the new network settings until the DeviceMaster has been reset.*

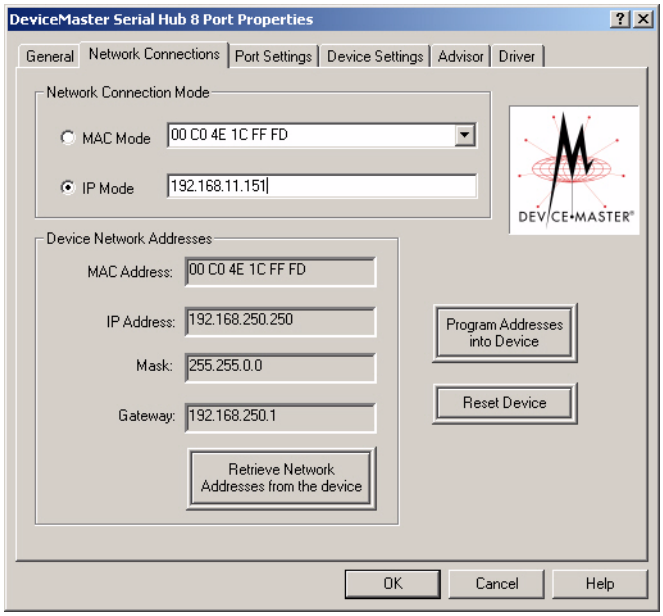
   The 10/100 Network LEDs on the DeviceMaster will cycle when the DeviceMaster reboots.
8. Click **OK** to close the *Program IP Addresses into Device* screen.



This example shows programming a static IP address.



9. Click **IP Mode** in the *Network Connection Mode* group.



10. If you are done configuring the DeviceMaster, click **OK** and close the *Device Manager*.

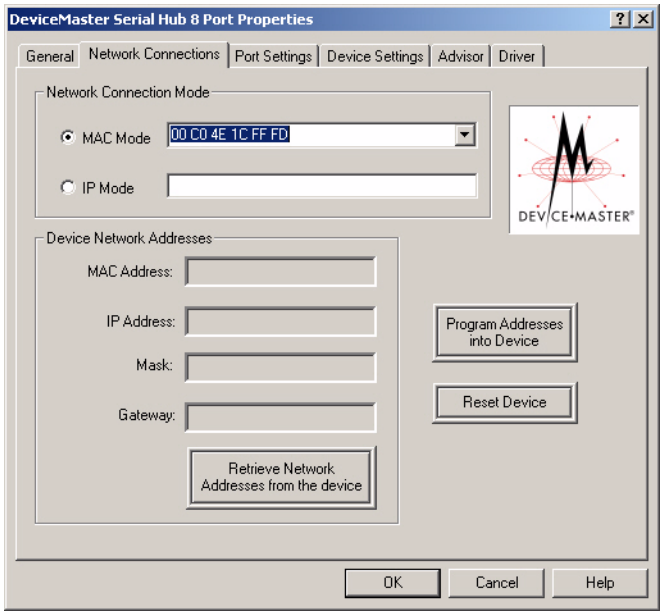
You can use the following information, if you require further installation information:

- Configure advanced COM port properties (Page 27).
- Connect your serial devices to the DeviceMaster. If you need information about connecting your serial devices, see the appropriate *DeviceMaster User Guide* (Page 8).
- Configure any of the DeviceMaster ports as sockets (*Configuring DeviceMaster Ports as Sockets* on Page 25).
- Set up modems or printers see your operating system help system or you can use the *RRAS Configuration Overview for Windows XP*.

Disabling DHCP Requests (MAC Mode)

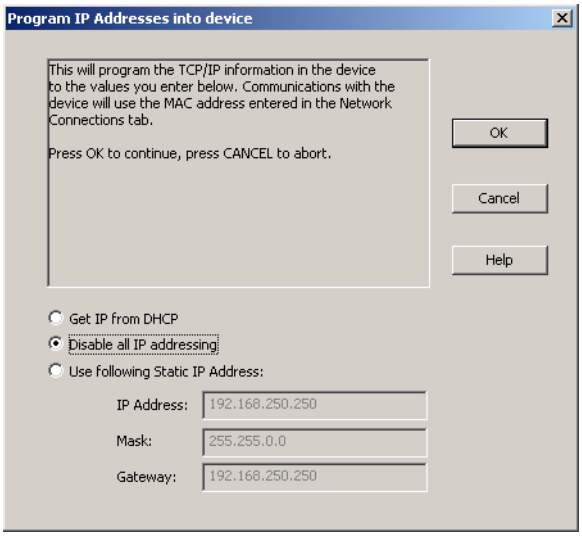
To disable the DHCP requests that are periodically sent from the DeviceMaster when running the DeviceMaster in MAC mode (not using a static IP address), use the following procedure:

1. If necessary, access the Properties page for the DeviceMaster (Page 37).
2. Click the **Network Connections** tab and then click **Program Addresses into Device**.



Note: *You must have a MAC address associated with the DeviceMaster.*

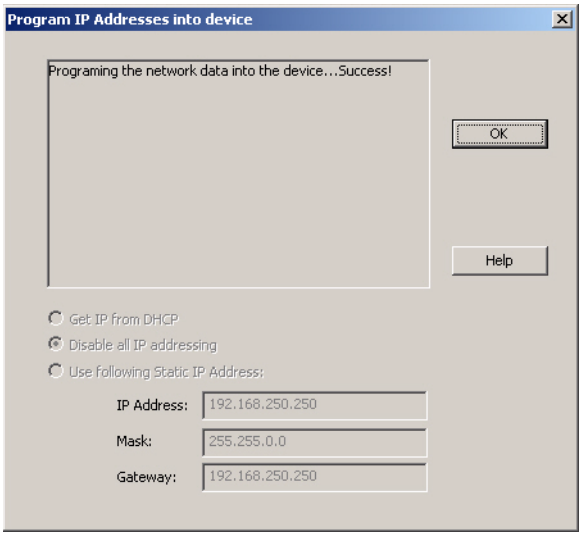
3. Click **Disable all IP Addressing** and then**OK**.



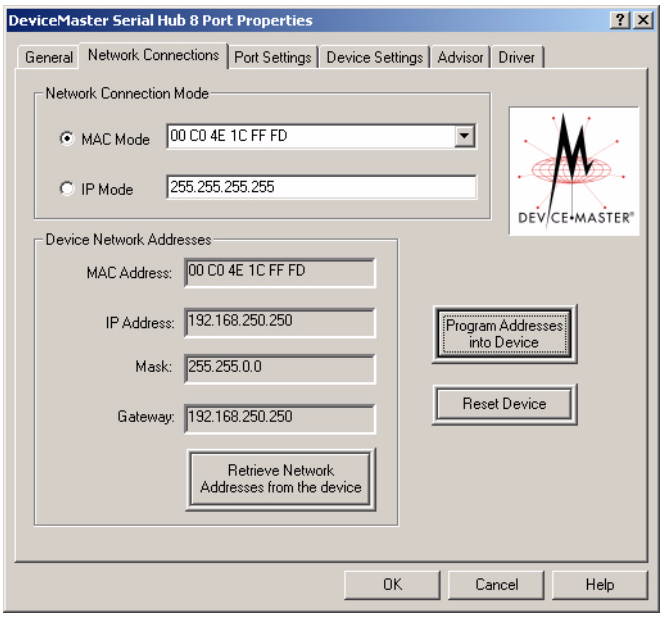
4. Click **Yes** to disable DHCP and static IP addressing.
5. Click **Yes** to reset the DeviceMaster.

   The 10/100 Network LEDs on the DeviceMaster will cycle when the DeviceMaster reboots.

6. Click **OK** to close the **Program IP Addresses into Device** window.



7. If you are done configuring the DeviceMaster, click **OK** and then close the *Device Manager*.



You can use the following information, if you require further installation information:

- Configure advanced COM port properties (Page 27).
- Connect your serial devices to the DeviceMaster. If you need information about connecting your serial devices, see the appropriate *DeviceMaster User Guide* (Page 8).
- Configure any of the DeviceMaster ports as sockets.
- Set up modems or printers see your operating system help system or you can use the *RRAS Configuration Overview for Windows XP*.

Retrieving IP Address Information from the DeviceMaster

Use the following procedure if you want to find out what values are currently programmed into the DeviceMaster.

Optionally, you can view the MAC address and network values if you installed PortVision Plus.

Note: *To retrieve network information on the DeviceMaster, you must associate a MAC address to the DeviceMaster before you can change the IP address (Page 18).*

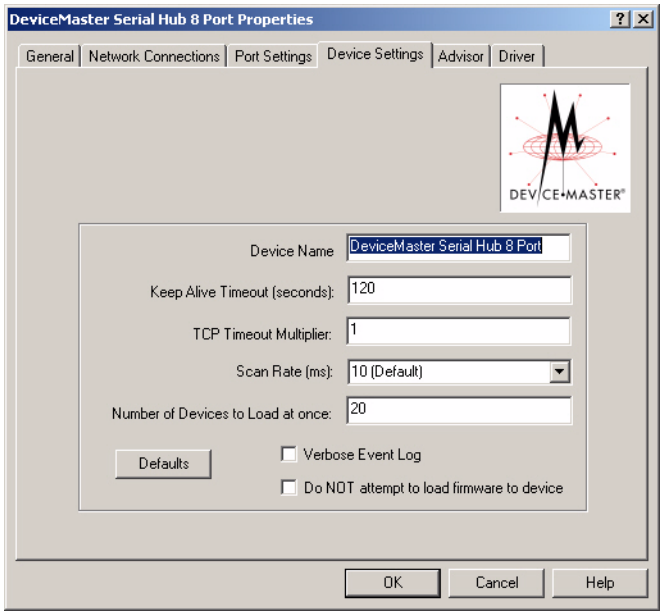
1. If necessary, access the Properties page for the DeviceMaster (Page 37).
2. Click the **Network Connections** tab.
3. Click **Retrieve Network Addresses from the device** to check if the DeviceMaster has been programmed with IP address, gateway, and subnet mask values.

   Note: *The default address for the* DeviceMaster *family is 192.168.250.250.*
4. If necessary, go to *Programming the IP Address* on Page 19 or *Disabling DHCP Requests (MAC Mode)* on Page 22 if you need to change the existing network values.

Changing Device Properties

After installation and configuration, you may want to change DeviceMaster properties, such as the DeviceMaster name or configure the **Keep Alive Time-out Period** or the **TCP Time-out Multiplier**. Use the following to change these values.

1. If necessary, access the Properties page for the DeviceMaster (Page 37).
2. Click the **Device Settings** tab.



3. Optionally, rename the NS-Link default name by entering a unique name in the **Name** field.
4. Optionally, set a different **Keep Alive Timeout Period**.You can set the amount of time in seconds that this DeviceMaster waits until it closes this connection and frees all the ports associated with it. For information about the Keep Alive feature see, *Keep Alive Timeout (seconds)* on Page 45.

5. Optionally, set the **TCP Timeout Multiplier** value. See *TCP Timeout Multiplier* on Page 46 for information about this feature.
6. Optionally, click a different **Scan Rate**. See *Scan Rate (ms)* on Page 46 for more information.
7. Optionally, change the **Number of Devices to Load at once**. See *Number of Devices to Load at Once* on Page 46 for more information.
8. Optionally, click **Verbose Event Log** if you want to log additional DeviceMaster information into the event log.
9. If necessary, click **Do NOT attempt to load firmware in device**. See *Do not attempt to load firmware to the device* on Page 46 for more information.
10. Click **OK** to close the *Device* window.
11. Close the *Device Manager*.

Configuring DeviceMaster Ports as Sockets

DeviceMaster ports can also be configured as sockets. To configure sockets, use the following procedure:

- Enter the IP address of the DeviceMaster in your web browser URL field. You can retrieve the IP address with NS-Link or PortVision Plus.
- Click the port number that you want to configure as a socket.

See the SocketServer help system, if you need help configuring sockets.

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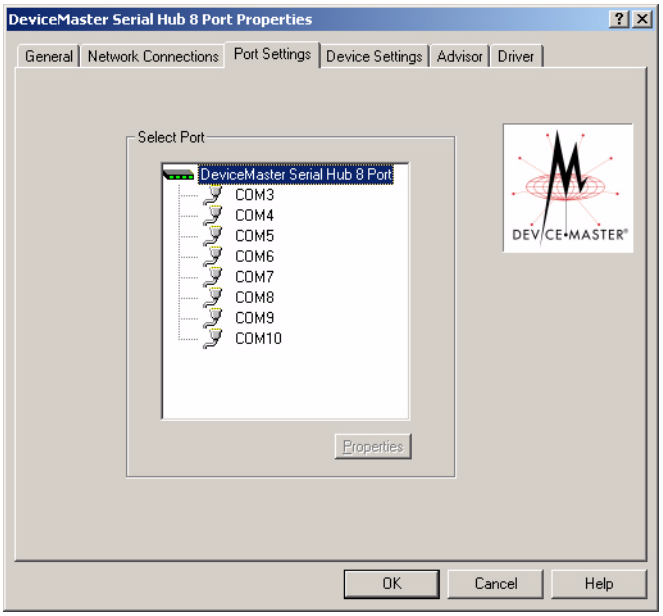
Configuring Advanced COM Port Properties

Use this section to configure advanced COM port properties.

1. If necessary, access the **Properties** page for the DeviceMaster (Page 37).
2. Highlight the **COM port** that you want to configure and click **Properties**.

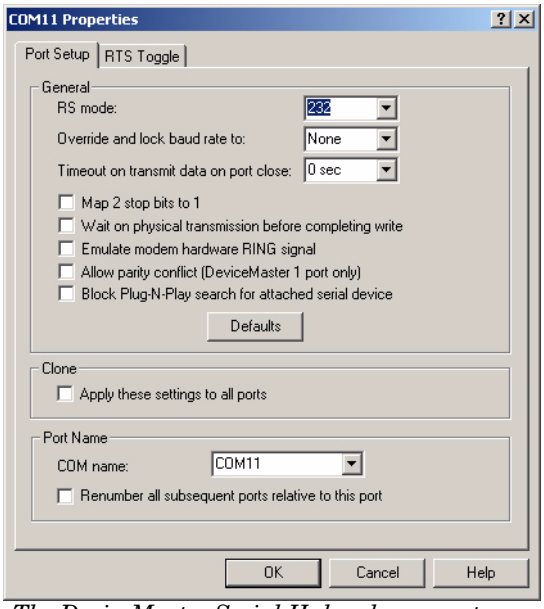


3. If applicable for your model, select the appropriate RS mode to match the communications mode of the peripheral that you are connecting to that particular COM port.
4. Optionally, make any necessary changes to fit your environment.

   Note: *Use the driver help system or refer to the Port Setup Tab subsection starting on Page 42.*

   a. Select a baud rate from the droplist or enter a baud rate value to access higher or lower rates than are normally permitted by your Windows applications.

   b. If applicable, set a time delay on the transmit data before a port closes.



*The DeviceMaster Serial Hub only supports RS-232. The **RTS Toggle** tab only appears on products that support RS-485.*

c. If applicable, click **Map 2 stop bits to 1**.

d. If appropriate, click **Wait for physical transmission before completing write**.

e. If required, click **Emulate modem hardware ring signal**.

f. *DeviceMaster 1-port, only:* if necessary, click **Allow parity conflict (DeviceMaster 1 port only)** to allow a parity conflict on a DeviceMaster 1-port. It may be necessary to use this option after you have determined that the cabling is correct and you are able to transmit data but not receive proper data.

g. Click **Block Plug N Play search for attached serial devices** to disable plug and play from searching for a device attached to the serial port.

h. If you want all ports on this DeviceMaster configured to the same settings, click **Clone**.

i. Change the COM port name of this port by selecting a new name in the **COM name** droplist. If you do not want to allow access to a specific port for this system, scroll up to **Not configured**. When configuring ports among several systems, they can share the same COM port name or be assigned a unique COM port name on each system.

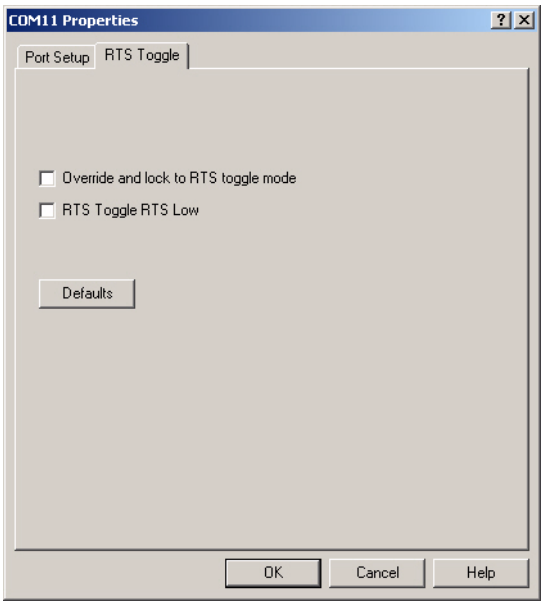
Note: *See Locating DeviceMaster User Guides or Quick Starts on Page 8 for an overview about port sharing.*

j. To renumber all subsequent ports on the DeviceMaster relative to the port displayed in the COM name droplist, click **Renumber all subsequent ports relative to this port**.

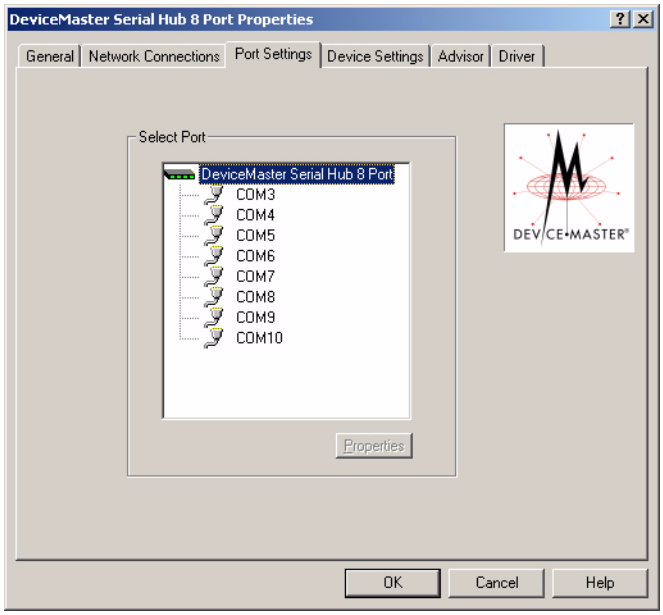
k. If you need to configure RTS (Request to Send) options for RS-485, click the **RTS Toggle** tab.

Configure the port and click **OK** after making the appropriate selections.

See *RTS Toggle Tab (Excludes DeviceMaster Serial Hub)* on Page 44 for more information.



5. After configuring your port (COM) properties, click **OK**. The **Port Settings** tab returns.
6. If you did not clone all the COM ports, repeat Steps 2 through 5 until all of the COM ports that you want to use are configured.
7. Click **OK** after you have configured each port.
8. Close the *Device Manager*.



You may want to refer to *Using the Advisor* on Page 34, which may provide valuable information about the DeviceMaster and your network, in the event that you are having problems.

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Troubleshooting and Technical Support

This section contains troubleshooting information for your DeviceMaster. 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.

If you cannot diagnose the problem, you can contact *Technical Support* on Page 35.

How to Find Diagnostic Tools and Utilities

There are several tools and utilities that Comtrol provides to diagnose serial port problems or to monitor data.

- The **Advisor** tab in NS-Link (*Using the Advisor* on Page 34), which may provide valuable information about the DeviceMaster and your network, in the event that you are having problems.
- The Comtrol Utility (Page 8) that includes:
  - **Test Terminal** program can be used to troubleshoot communications on a port-by-port basis.
  - The **Port Monitor** program can check for errors, modem control, and status signals. In addition, it provides you with raw byte input and output counts.
- PortVision Plus (Page 8) that provides the following features:
  - Auto-discover and organize DeviceMaster servers on your network.
  - Remotely access, manage, and configure DeviceMasters from a central console.
  - Load network configuration settings onto multiple DeviceMasters - quickly and easily.
  - Instantly view connection status, firmware revision, and network settings of all servers.
  - Configure serial ports using TCP sockets, port communication, and interface settings.
  - Visualize each server and port with instant links to connector, power, and serial pinout information.
  - Conveniently customize and save your network view and commands for replication across all servers.
  - Includes the **Test Terminal** and **Port Monitor** programs for easy access.

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 using the hardware documentation.
- Most customer problems reported to Comtrol Technical Support are eventually traced to cabling or network problems.
- Isolate the DeviceMaster from the network by connecting the DeviceMaster directly to a NIC in a host system. See *Connectivity Requirements* on Page 7 for cabling information.
- Reduce network traffic by installing a second NIC in the host and connect directly to the DeviceMaster.
- Verify that the Ethernet hub, switch, or router and any other network devices between the system and the DeviceMaster are powered up and operating.
- Reset the power on the DeviceMaster 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 DeviceMaster has a power switch, turn the DeviceMaster power switch off and on, while watching the LED diagnostics.
- If the DeviceMaster 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 DeviceMaster.
- Verify that the network IP address is correct. If IP addressing is being used, the system should be able to ping the DeviceMaster.
- Verify that the IP address programmed into the DeviceMaster matches the unique reserved IP configured address assigned by the system administrator.
- If using NS-Link with an in-house application, 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.
- Enable the **Verbose Event Log** feature under the **Setup Options** tab and then reboot the system.
- Reboot the system and the DeviceMaster.
- Remove and reinstall NS-Link.
- If you have a spare DeviceMaster, try replacing the DeviceMaster.

General Troubleshooting

This table illustrates some general troubleshooting tips.

Note: *Make sure that you have reviewed the Troubleshooting Checklist on Page 32.*

General Condition	Explanation/Action
PWR or **Status** LED flashing	Indicates that boot program has not downloaded to the DeviceMaster. 1. Make sure that you have downloaded the most current driver from http://support.comtrol.com/download.asp?partnumber=1800288. 2. Install the driver and configure the DeviceMaster 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 DeviceMaster, you can use the procedure outlined in *NS-Link Driver Troubleshooting* on Page 35. 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 DeviceMaster. 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 DeviceMaster 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, switch, or router	Isolate the DeviceMaster from the network. Connect the DeviceMaster directly to the NIC in the host system (see *Connectivity Requirements* on Page 7).

General Condition	Explanation/Action
Cannot ping or connect to the DeviceMaster	The DeviceMaster family 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 10 seconds to disable the bootloader with Redboot to get into the setup utility. See the *User Guide* (Page 8) for your product for the Redboot method of programming an IP address.

Use the appropriate procedure for your environment.

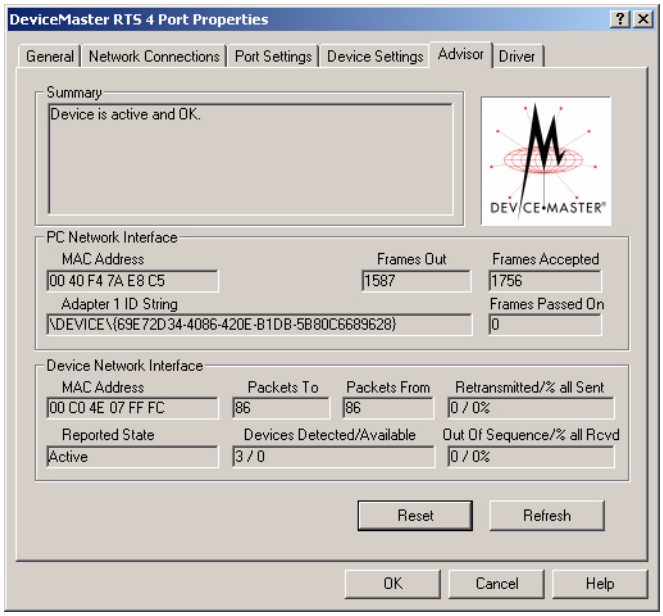
Using the Advisor

You can use the **Advisor** tab to get a summary of the DeviceMaster status. The **Advisor** tab can be useful for troubleshooting network problems with your DeviceMaster.

Note: *To use the **Advisor** tab, you must associate a MAC address to the DeviceMaster before programming an IP address (Page 37).*

Use the following procedure to access the **Advisor** tab.

1. If necessary, access the Properties page for the DeviceMaster (Page 37).
2. Click the **Advisor** tab.



Note: *You must have a MAC address associated with the DeviceMaster.*

See *Advisor Tab* on Page 47 for information about the **Advisor** tab fields and for a list of messages and meanings.

NS-Link Driver Troubleshooting

This table includes some tips related to NS-Link drivers.

NS-Link Condition	Explanation/Action
Need to program IP address into the device.	Before programming an IP address it is critical that the DeviceMaster be operational and passes the power on tests when configured for the MAC address. ***Note:*** *If the DeviceMaster is NOT operational, do NOT attempt to program or use an IP address with the DeviceMaster.* See *Programming the IP Address* on Page 19 for more information.
Cannot open port	1. Verify that MAC address in the NS-Link driver matches the address on the DeviceMaster. 2. Verify that you are using the correct NS-Link driver. If necessary, remove and reinstall a new driver. 3. Isolate the DeviceMaster from the network (see Page 33). 4. Check to see if another program or computer is active on this port.
The Comtrol device has a lower limitation of network bandwidth requirement of 64 Kbps.	At this speed the entire available bandwidth is required for the purpose of uploading the firmware from the driver to the DeviceMaster. At lower speeds, timing issues will prevent the firmware from being successfully installed to the DeviceMaster, thus preventing the DeviceMaster from normal operation. When using the DeviceMaster over a WAN link that is less than the recommended 64 Kbps, a timing modification may be made that will allow uploading of the firmware. Load the driver locally to the DeviceMaster for the purpose of getting the firmware installed. The PC on the other side of the slow link can then “share” the port. The sharing may be exclusive as the firmware loader PC may not need to access the ports.

Technical Support

If you need technical support, contact Comtrol using one of the following methods.

Contact Method	Corporate Headquarters
FAQ/Online	http://support.comtrol.com/support.asp
Downloads	http://support.comtrol.com/download.asp
Web site	http://www.comtrol.com
Phone	(763) 494-4100

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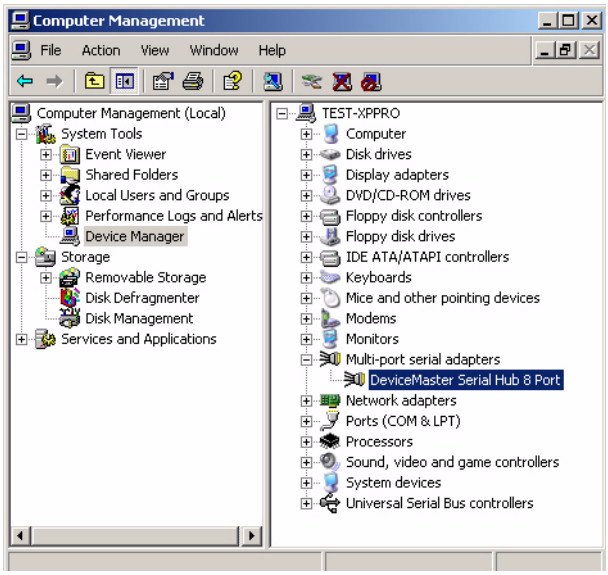
Appendix A. NS-Link Screens

This section provides you with reference information about the NS-Link screens and each option.

Accessing the Properties Page

To change DeviceMaster or COM port configuration, you need to access the **Properties** page for that DeviceMaster. You can use the following procedure to access the **Properties** page.

2. Right-click **My Computer** or **Computer**, click **Manage**, and then highlight **Device Manager**.
3. Expand the **Multi-port serial adapters** entry, right-click the DeviceMaster you want to configure, and then click **Properties**.

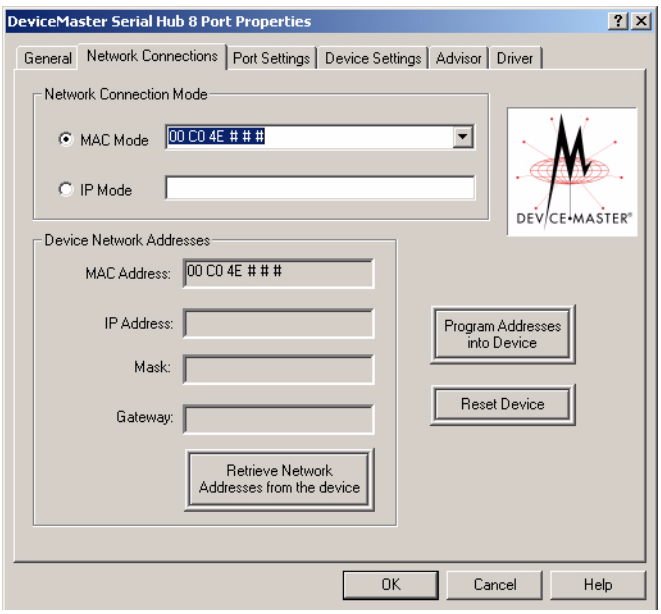


Network Connections Tab

The Network Connections tab is initially used to configure the DeviceMaster to run in MAC mode or IP mode.

If you need to *program* an IP address in the DeviceMaster, you must first associate a MAC address to the DeviceMaster. To associate a MAC address to the DeviceMaster, you must be connected to the local network segment.

Note: *A DeviceMaster that has not been programmed with a MAC address is displayed with # # # as the last three pairs of digits of the MAC address.*



You will also need to associate the MAC address to the DeviceMaster if you want to do any of the following:

- Disable DHCP discovery messages
- Retrieve network address information from the DeviceMaster
- Reset the DeviceMaster on the *Network Connections* tab.
- Use the **Advisor** tab

MAC Mode

To use **MAC Mode**, the DeviceMaster must be connected to a *local network segment*.

You can select or enter the MAC address of the DeviceMaster. The MAC address is limited to the MAC address range of the device type that you selected during the driver installation. If you enter the MAC address, make sure that you use the correct format: **00 C0 4E xx xx xx**. A space must separate each pair of digits.

Note: *If the MAC address does not appear in the droplist, you must manually enter the MAC address.*

See *IP or MAC Addressing Issues* on Page 6 for information about MAC Mode.

IP Mode

You can click **IP Mode** and enter the IP address of the DeviceMaster, if the DeviceMaster has been previously programmed with an IP address.

If you want to change the IP address on the DeviceMaster, you must first associate a MAC address to the DeviceMaster by entering or selecting the MAC address from the droplist, and closing the **Network Connections** tab by clicking **OK**.

When you re-open the **Network Connections** tab, you will be able to program a different IP address into the DeviceMaster.

MAC Address Field

This field contains the MAC address of the DeviceMaster, if a MAC address has been associated to this DeviceMaster. If this field contains **00 C0 4E # # #**, you will be unable to use the features on this screen such as, retrieving network information or programming a different IP address.

IP Address Field

NS-Link will try to retrieve and display the IP address of the DeviceMaster in this field if a MAC address is present when the driver is launched. The DeviceMaster family default IP address is 192.168.250.250.

Mask Field

NS-Link will try to retrieve and display the subnet mask of the DeviceMaster in this field if a MAC address is present when the driver is launched. The DeviceMaster family default subnet mask is 255.255.0.0.

Gateway Field

NS-Link will try to retrieve and display the IP gateway address of the DeviceMaster in this field if a MAC address is present when the driver is launched. The DeviceMaster family default IP address is 192.168.250.1.

Retrieve Network Address from the Device Button

Clicking this button updates the fields in the *Device Network Addresses* group, if a MAC address has been associated to this DeviceMaster.

Note: *If the **Network Connection Mode** is set to IP, then a temporary MAC connection is established to perform this function. If the DeviceMaster is on another network segment, you must manually enter the MAC address.*

Program Addresses into Device Button

Clicking this button opens the *Program IP Addresses into Device Screen*, if a MAC address has been associated to this DeviceMaster.

Note: *If the **Network Connection Mode** is set to IP, then a temporary MAC connection is established to perform this function. If the DeviceMaster is on another network segment, you must manually enter the MAC address.*

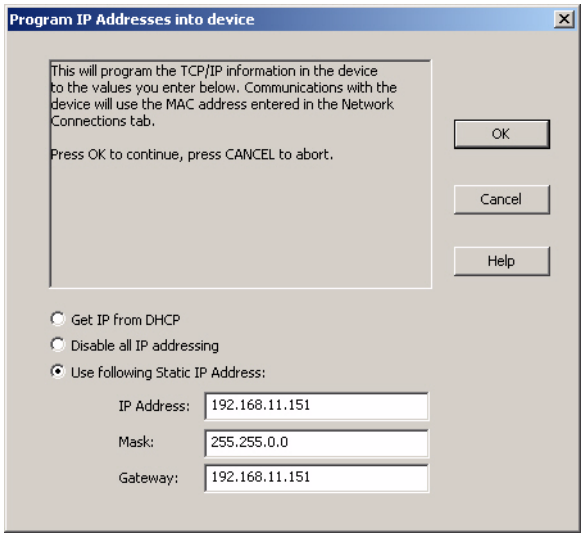
Reset Device Button

Clicking this button resets the DeviceMaster, if a MAC address has been associated to this DeviceMaster.

Note: *If the **Network Connection Mode** is set to IP, then a temporary MAC connection is established to perform this function. If the DeviceMaster is on another network segment, you must manually enter the MAC address.*

Program IP Addresses into Device Screen

The Program IP Addresses into Device screen appears when you click the **Program Addresses into Device** button on the *Network Connections* tab.The screen also



displays status messages when programming IP address information into the DeviceMaster. If there are any problems during programming the DeviceMaster, a check list appears in this screen. Resolve any problems before continuing.

The fields and buttons on the **Program IP Addresses into Device** screen are discussed below.

Get IP from DHCP

Click this option to allow DHCP to assign the IP address. Make sure that you provide the MAC address of the DeviceMaster for the network administrator to assign a static IP address from the pool. The DHCP server should assign the IP address, mask, and IP gateway.

Note: *Make sure an IP gateway is assigned.*

The IP address (0.0.0.0) and subnet mask (255.255.0.0) values are set for NS-Link after rebooting the DeviceMaster.

Disable all IP addressing

Use this option if you are not using IP addressing (DHCP or static) and operating the DeviceMaster in MAC mode. The option disables DHCP discovery messages that are related to IP mode. After the DeviceMaster is rebooted, the IP address displays as disabled in the IP Address field.

The MAC addressing method has the following advantages:

- Simplifies implementation and ongoing support by eliminating the address administration issues inherent in network protocols. MAC addresses are predefined by Comtrol and there is no potential for an “address conflict” at setup.
- Isolated from foreign LAN segments minimizing potential security issues.
- Increases throughput of serial data.

The IP address (255.255.255.255) and subnet mask (255.255.0.0) values are set for NS-Link after rebooting the DeviceMaster.

Use following Static IP Address

Click this option to program a static IP address. If you click this option, you must enter static IP address information in the fields below.

IP Address

Enter a valid IP address for your network. The **IP Address** field is the IP address programmed into the DeviceMaster after applying the changes and rebooting the DeviceMaster. See your network administrator for a valid IP address.

The DeviceMaster family default IP address programmed from the factory is **192.168.250.250**.

Mask

The subnet mask is a 32-bit value (255.x.x.x) that enables IP packets to distinguish the network ID and host ID portions of the IP address that filters traffic.

The DeviceMaster family default subnet mask programmed from the factory is **255.255.0.0**.

Gateway

The default gateway is a TCP/IP configuration item that is the IP address of a directly reachable IP router.

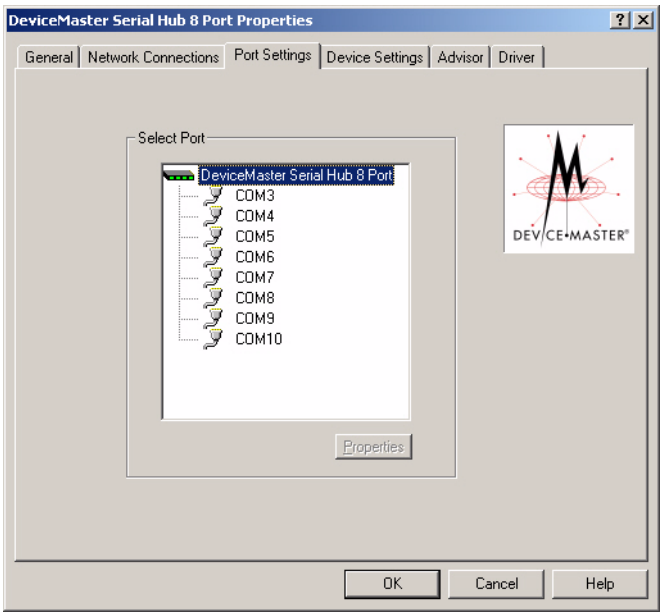
The DeviceMaster family default gateway programmed from the factory is **192.168.250.1**.

Port Settings Tab

Use the **Port Settings** tab to access the configuration screen for a specific COM port or ports.

To configure a port, highlight a COM port and click **Properties**.

After you click **Properties** or double-click a port, the **COM Properties** screen for that port opens. See the *Port Setup Tab* on Page 42 to configure advanced COM port properties.

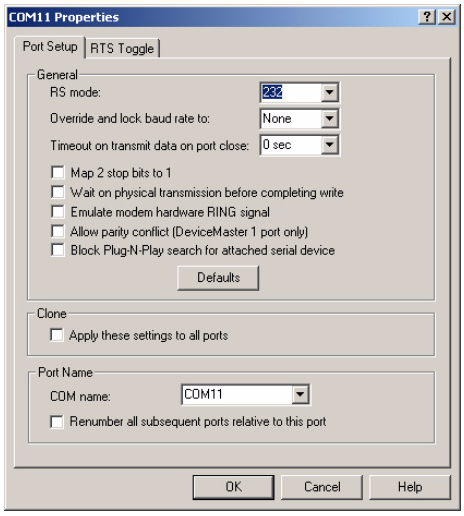


Port Setup Tab

Use the **Port Setup** tab to configure advanced COM port properties.

Note: *DeviceMasters that do not support RS-485, such as, the DeviceMaster Serial Hub, do not display the **RTS Toggle** tab in the **COM Properties** screen.*

The groups, fields and buttons on the **Port Properties** tab are discussed below.



RS mode

RS mode refers to the Comtrol supported communications mode of the serial device that you are connecting to that particular COM port. Make sure that you select the mode that matches the serial device that you will connect to that port.

Note: *The DeviceMaster Serial Hub only supports RS-232.*

Override and lock baud rate to:

Override and lock baud rate to allows you to select a default baud rate from the droplist or enter a default baud rate value to access higher or lower rates than are normally permitted by your Windows applications.

Timeout on transmit data on port close

Timeout on transmit data on port close allows you to set a time delay on the transmit data before a port closes. Select the length of time to wait for data to clear the transmit buffer, before a close request from a host application is completed. If data is still in the transmit buffer, you can set a delay time to allow the buffer to empty before a close request is completed. This is typically used with slower peripheral devices such as printers, to give the data sufficient time to flush through the system.

Map 2 stop bits to 1

Map 2 stop bits to 1 allows you to map 2 stop bits to 1 bit. If the application you are using is hard coded to use two stop bits and you are receiving framing errors, you can implement this option. Leave this box unchecked to enable stop bits to pass through unchanged.

Wait for physical transmission before completing write

Wait for physical transmission before completing write allows you to force all write packets to wait until the transmit data has physically completed the transmission before returning completion to the host application. The default mode (box not checked) is to buffer the data in the transmit hardware buffer and return completion as soon as the packet is in the buffer. This is typically used with slower peripheral devices such as printers, to give the data sufficient time to flush through the system.

Emulate modem hardware ring signal

Emulate modem hardware ring signal allows you to emulate a hardware RI (ring indicator) signal.

Allow parity conflict (DeviceMaster 1 port only)

Use this option to allow a parity conflict on a DeviceMaster 1-port. It may be necessary to use this option after you have determined that the cabling is correct and you are able to transmit data but not receive proper data

Block Plug-N-Play search for attached serial device

The **Block Plug-N-Play search for attached serial device** option disables plug and play from searching for a device attached to the serial port. For example, streaming data during device discovery on a device is assumed to be a mouse to plug and play.

Defaults

Clicking the **Defaults** button returns all the values in the **Port Setup** tab to the default state as illustrated in the following table.

Port Setup Fields and Controls	Default Value
General	RS-232
Override and lock baud rate to	None
Timeout on transmit data on port close	0 sec
Map 2 stop bits to 1	*Disabled*
Wait on physical transmit before completing write	*Disabled*
Emulate modem hardware RING signal	*Disabled*
Allow parity conflict (DeviceMaster 1-port only)	*Disabled*
Block plug-n-play search for attached serial devices	*Disabled*
Clone	*Disabled*
COM name	First available COM port
Renumber all subsequent ports relative to this port	*Disabled*

Clone

Clone allows you to configure all ports on this DeviceMaster to the same settings.

If this box is checked, the changes in the **General** category area are applied to all ports on this DeviceMaster. If this box is not checked, the changes you make to the *Port Setup* options apply to the selected port only.

COM name

The **COM name** droplist allows you to renumber this COM port.

If you see a COM port number followed by (**in use**), this means that *Plug and Play* sees those COM port numbers in use by another device.

If you renumber this COM port and click the **Renumber all subsequent ports relative to this port** option, NS-Link will renumber all of the ports on the DeviceMaster, starting with the number you select in this droplist.

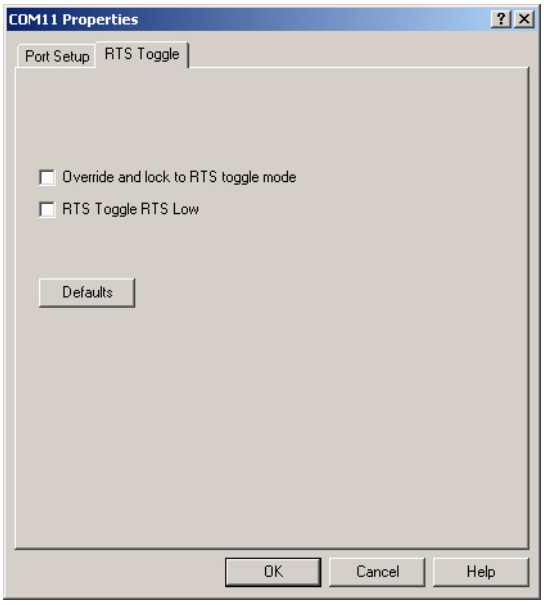
If you rename the port to a COM name used by another port, a dialog appears indicating that the port is already in use.

Renumber all subsequent ports relative to this port

Use the **Renumber all subsequent ports relative to this port** option to renumber all subsequent ports on the DeviceMaster relative to the port displayed in the COM name droplist.

RTS Toggle Tab (Excludes DeviceMaster Serial Hub)

The **RTS Toggle** tab allows you to configure RTS (Request to Send) options for RS-485 mode.



Override and lock to RTS toggle mode

Use the **Override and lock to RTS toggle mode** option to lock the port in RTS (Request to Send) toggle mode, then set the mode (low or high) as desired for RS-485 mode.

RTS Toggle RTS Low

Use the **RTS Toggle RTS Low** to toggle the RTS output signal low during data transmission, which may be needed for relay devices for RS-485.

If the option box is not checked, RTS is toggled high (asserted) during data transmission for RS-485 mode.

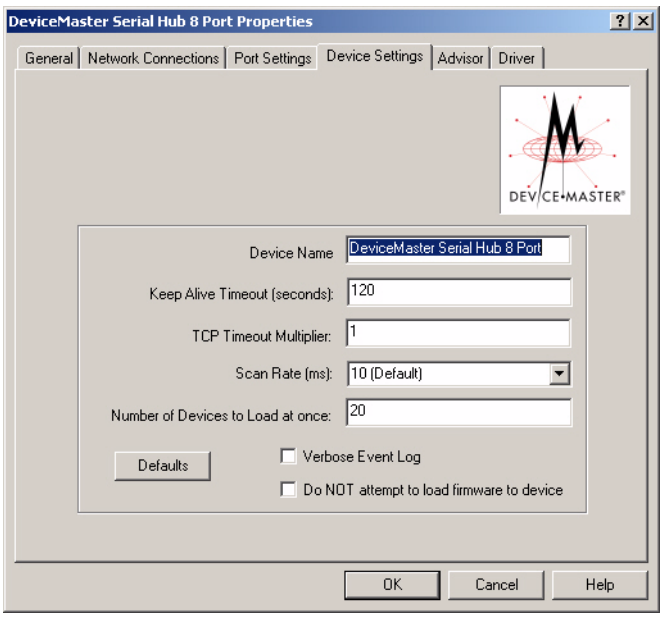
Defaults

Clicking the **Defaults** button returns all the values in the **RTS Toggle** tab to the default state as illustrated in the following table.

RTS Toggle Controls	Default Value
Override and lock to RTS toggle mode	*Disabled*
RTS Toggle RTS Low	*Disabled*

Device Settings Tab

Use the **Device Settings** tab to change the default DeviceMaster values for the name, **Keep Alive Timer**, **TCP Timeout Multiplier**, **Scan Rate**, and active verbose event log messages.The **Device Settings** tab fields are discussed below.



Device Name

This field contains the DeviceMaster name. You can change the default name to a unique DeviceMaster name that you want to use, which will be reflected in the *Device Manager*.

Keep Alive Timeout (seconds)

Use this option to set the amount of time in seconds that this DeviceMaster waits until it closed this connection and frees all the ports associated with it. The *Keep Alive feature* works in the following way.

During normal operation the driver periodically sends a connection check to the DeviceMaster, and the DeviceMaster then returns a response. There are two timers: one in the driver, and one in the DeviceMaster. These timers are reset when a connection check signal is received. If a connection is broken, that is, a check is not received, the data is stored in the computer and/or the DeviceMaster. Depending on the amount of time that has expired since the connection was lost, the following happens:

- When the computer loses its connection to the DeviceMaster but re-establishes it before the time-out period expires, any data transmitted during this period is queued and sent when the connection resumes.
- When the computer loses its connection to the DeviceMaster and does not re-establish it before the time-out period expires; the driver then purges any pending I/O data for ports on that connection and returns all pending, and future I/O commands, with the exception of the **Close** command, to the application with an error indicating the disconnected status.

  This is similar to the processing which occurs when the computer receives a notification from the DeviceMaster that a port release request was processed on a port it owns with the exception that a different status is returned. When the connection is re-established, the computer will attempt to re-acquire the ports that were open when the connection was lost. If the attempt is successful, normal operations resume for the port. If any port fails to be acquired, then the computer will continue to fail all further I/O operations, with the exception of a **Close** request. When the **Close** request is received, the port can then be re-opened.

- If the computer loses its connection and the time period expires, the DeviceMaster places the port into a state that another computer can establish a connection, locking out the original driver when a connection is made. The driver will respond to all I/O commands, with the exception of the **Close** command, with an error indicating the disconnected status. If the port is still available when the driver re-establishes a connection, then it will claim the port and allow I/O to resume.

TCP Timeout Multiplier

Use the **TCP Timeout Multiplier** option to modify two timers used in TCP/IP socket communications. The first identifies how long the TCP protocol should wait before timing out an attempt to open a TCP channel. The **TCP Timeout Multiplier** default is 1 and the timer defaults to 500 ms when the TCP/IP address method is used to communicate with a device. If the **TCP Timeout Multiplier** is set to 2, the timer would now be 1000 ms, or 1 sec. If the multiplier is 4, the new time-out period would be 2000 ms, or 2 sec.

The second timer defines how long the driver will wait for a response from the DeviceMaster when a forced release of a port is requested. This timer defaults to 8 seconds. If the **TCP Timeout Multiplier** is changed to 2, the timer would now be 16 seconds. If the multiplier is 4, the new time-out period would be 32 seconds.

Scan Rate (ms)

Typically, you should leave the scan rate set to the default value (10 ms) for most applications. To adjust latency for time-critical applications, select a longer or shorter interval from the droplist, or type in the rate (1 to 50). If a value larger than 50 is entered, the maximum of 50 is implemented. Changes to **Scan Rate** do not take effect until you restart the system.

Number of Devices to Load at Once

This field determines how many DeviceMasters will have firmware loaded by the NS-Link driver at one time. Increasing the number will increase network traffic, decreasing the number will decrease network traffic but may increase total load time.

Defaults

Resets this screen to its default values.

Device Settings Tab	Default Value
Device Name	NS Link #
Keep Alive Timeout (seconds)	120
TCP Timeout Multiplier	1
Scan Rate (ms)	10
Number of Devices to Load at Once	20
Verbose Event Log	*Disabled*
Do NOT attempt to load firmware to the device	*Disabled*

Verbose Event Log

Click this option if you want to log additional DeviceMaster information into the operating system's event log.

Do not attempt to load firmware to the device

Click this option if you do not want the NS-Link driver firmware to upload to the DeviceMaster. You may want to use this option when custom firmware is loaded as the default application. The custom firmware must support communications with the NS-Link driver if you want to access the ports as Windows COM ports.

Advisor Tab

The **Advisor** tab may be useful when troubleshooting possible network problems.

The **Advisor** tab only works if a MAC address has been associated to the DeviceMaster even if the DeviceMaster is not on the local network segment.

The **Advisor** contains the following fields.

Summary

The **Summary** field displays information regarding the current state of the interface to selected DeviceMaster. This information is updated constantly. See *Advisor Messages* on Page 48, for a list of messages and meanings.

PC Network Interface

The **PC Network Interface** group contains the following fields.

- **MAC Address** is the reported MAC address of the Ethernet network interface card (NIC) card in the server. Since a server may contain more than one NIC, identifying exactly which NIC is being used by NS-Link may help you to identify and resolve problems.
- **Frames Out** is the count of the number of frames output by NS-Link through the identified network interface. This includes all administrative, data, and control frames, and should be incriminated whenever the DeviceMaster and NS-Link are operating, even if the DeviceMaster is idle.
- **Frames Accepted** is the count of the number of received frames accepted by NS-Link for further processing. These must be well-formed packets with the correct protocol identifiers for NS-Link.
- **Adapter 1 ID string** is the NIC binding string. Every network entity that needs to be uniquely identified has a Globally Unique Identifier (GUID), which is used to form unique binding strings. The presence of this string indicates that NS-Link has been bound to a specific NIC.
- **Frames Passed On** is when a NIC receives a packet, it passes the packet around to each driver or application that is bound to the NIC until one of them recognizes and accepts the packet.

  This field shows the count of the number of received frames that have gone into NS-Link and been returned to the NIC layer for processing by other software.

  If a received packet is not accepted by NS-Link or any other driver, it is discarded.

Device Network Interface

The **Device Network Interface** group contains the following fields:

- **MAC address** is the network (MAC) address of the DeviceMaster that is currently selected. It should match both the MAC address on the **Network Connections** tab and the MAC address on the physical DeviceMaster.
- **Packets To Device** is the count of information frames sent to a layer in NS-Link and indicates actual data traffic sent.
- **Packets From Device** is the count of information frames received by a layer in NS-Link, and indicates actual data traffic received.
- **Retransmitted % all sent** is the percentage of information frames requiring retransmission due to network errors. If this value is not zero, you have network problems.
- **Reported State** contains a message showing the status of the NS-Link software interface to the selected DeviceMaster.
- **Devices Detected/Available** is the number of DeviceMasters found on the network and how many of the DeviceMasters are available.
- **Out of Sequence % all Rcvd** is the percentage of information frames received out of order, possibly due to network errors. If this value is not zero, you have network problems.
- **Reset** clears the data values from the fields.
- **Refresh** immediately updates the data displayed in the event that you want review data before the automatic refresh cycle occurs.

Advisor Messages

The following lists **Advisor** messages.

Message	Description
A disruption in communications between the server and the DeviceMaster has occurred.	Check network connections.
A MAC address has not yet been specified for this DeviceMaster. Return to *Device* property page, input the correct MAC address for this DeviceMaster, save configuration, and restart server.	The driver may have only been configured with an IP address. The appropriate MAC address must be input in the MAC field in the **Network Connections** tab in order for the **Advisor** to report the DeviceMaster status.
Can't detect any Comtrol devices. Check Ethernet connectors and ensure the device is powered on.	Network traffic is being received, but not from a DeviceMaster. Check the network connections and verify that the DeviceMaster is powered up.
Can't detect device with specified MAC address on any network. Verify MAC address of unit, check Ethernet connectors and ensure device is powered on.	Network traffic is being received from a DeviceMaster, but not the one specified in the **Network Connection** tab. Check the DeviceMaster to make sure that you are using the correct MAC address.
Check connectors, cabling, and ensure proper LAN termination. Check for indications of low network bandwidth.	Excessive collisions to the DeviceMaster, check for duplicate IP addresses.
Code upload failed due to a timeout and the server is attempting to resynchronize with the device.	NS-Link has not successfully uploaded the microcode to the assigned DeviceMaster.
Code upload has completed.	NS-Link has successfully uploaded the microcode to the assigned DeviceMaster.

Message	Description
Code upload was restarted after a timeout.	The uploading of the microcode did not complete in the expected time frame, and will try again.
Device detected and is configured for this server, but is not yet assigned to this server.	Either the DeviceMaster is currently being controlled by another server or the DeviceMaster power has been cycled and the DeviceMaster is waiting for a server to acquire it.
Device detected, initializing.	The server has acquired the DeviceMaster and is downloading the control program. The DeviceMaster will be available shortly.
Device detected, microcode upload in progress.	NS-Link is attempting to upload the microcode to the DeviceMaster. This should complete momentarily.
Device is active and OK, no data traffic exchanged since last inquiry.	The DeviceMaster and ports are operational. There is currently no active serial traffic.
Device is active and OK.	The DeviceMaster is okay and ready to use.
Device with specified MAC address was detected, but isn't configured for this server. Return to 'Device Setup' dialog, configure, save configuration, and restart server.	Either the DeviceMaster in question is not assigned to this server, or it is not assigned to *any* server, or it has been configured for this server but the configuration has not been saved. If the latter, save and exit, and restart the server.
Initialization complete. Waiting on response from device before making the connection active from the server to the NSLink	Waiting for a response from the DeviceMaster.
Possible bandwidth problems on the network, resulting in packet retransmission, packet loss, and/or excessive latency times.	There has been no response from the DeviceMaster for an extended period. It may be in an idle state. This is an informational type of message only and is not necessarily a networking issue. Ping the DeviceMaster and if the ping responses are normal, troubleshoot the DeviceMaster. It may be that the IP programming is incomplete. If the gateway address has not been installed a ping may succeed while the driver is still unable to load.
The driver is not running. If you just installed the driver you will need to exit the program before the driver starts.	Close the NS-Link properties and then re-open to confirm that the driver starts.
The NSLink device has failed to respond for an extended period of time. The NSLink device may have lost power or is in an unresponsive state.	The NS-Link driver is no longer able to communicate with the DeviceMaster. Check the LED status, see *Verifying the DeviceMaster is Ready for NS-Link* on Page 9 to locate the LED table for your product.
The server is attempting to resynchronize with the NSLink device after the connection with the device timed out.	Check in a few moments to see if has initialized.

Message	Description
Timeout occurred while server was waiting for ADMIN command reply from device.	There may be network traffic problems, an unresponsive DeviceMaster, or a problem with the server sending out network data. NS-Link is trying to locate the DeviceMaster on the network by sending out the ID request and not receiving a response from the DeviceMaster, which may indicate that the DeviceMaster is either not on the network, on a different segment (if using MAC mode of addressing), or the bandwidth of the network (or server) is so saturated that the DeviceMaster response is not received in time
Timeout occurred while server was waiting for Assign Reply response from the NSLink device prior to making the connection active.	There may be network traffic problems, an unresponsive DeviceMaster, or a problem with the server sending out network data. A handshake that occurs after an ID response is received and NS-Link is trying to establish a communication channel with the DeviceMaster.
Unable to find a Network Interface Controller (NIC) card.	Install a NIC in that PC or check that the NIC is operational.
Uninitialized.	Microcode has not uploaded to the DeviceMaster.

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