



Connectware™

**Digi One™ EM
User's Guide**

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Chapter 1 ***Configuring the IP Address***

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IP Address Configuration Methods

An IP address can be assigned to the device server using any of the following methods:

- Setup, a Digi application that “discovers” the device and then provides a method for assigning an IP address. See "Configuring the IP Address with Setup" on page 7.
- DHCP. The device server’s default configuration is as a DHCP client. See "Configuring the IP Address with DHCP" on page 8.
- ARP-Ping, which enables IP address assignment by updating the ARP tables on a PC with the device server’s MAC address and then pinging the device server. See "Configuring an IP Address with ARP-Ping" on page 8.
- A web browser. This method works only for changing the IP address of a device server that has already been assigned one. See "Changing an IP Address from a Web Browser" on page 9.

Configuring the IP Address with Setup

This procedure describes how to configure an IP address using Setup, an application you can find on the CD that came in your device server package.

Prerequisites

This procedure assumes the following:

- That the device server is connected to the network and powered up
- That the CD will be used on a Microsoft Windows system

Procedure

1. Record the device server's MAC address.
2. Insert the Digi CD in the CD drive.
3. If the CD does not start automatically, double-click My Computer and then the CD icon.
4. Choose Configure Device.
The Digi application finds and lists all of the Digi devices on your network.
5. Locate your device server by its MAC address.
6. Select the device server and then choose Configure.
7. Log into the device server with the user name of `root` and the root password. The default root password is `dbps`.
8. To navigate to the network configuration, choose Configure > Network.
9. Use the Network Configuration page to assign the IP address and other network-related values.

Configuring the IP Address with DHCP

Prerequisite

This procedure assumes the following:

- That the device server is configured as a DHCP client. Since this is the default configuration, this will be the case unless the configuration has been changed.
- That the device server is not powered on

Procedure

1. Set up an entry for the device server on a DHCP server. Ensure that this is a permanent entry if you intend to use RealPort.
2. Connect the device server to the network and power it on. An IP address is assigned automatically.

Configuring an IP Address with ARP-Ping

Prerequisites

This procedure assumes the following:

- That the device server is connected to the network and powered up
- That you have access to a PC on the same LAN as the device server

Procedure

1. Manually update the PC's ARP (Address Resolution Protocol) table using the device server's MAC address and the IP address you want assigned to the device server.

Here is how this is done on a Microsoft Windows system:

- a. Access the command line.
- b. Issue the following command:

```
arp -s ip-address mac-address
```

Example

```
arp -s 192.168.2.2 00-40-9D-00-00-00
```

2. Ping the Digi device using the IP address just assigned.

```
ping 192.168.2.2
```

Note: The ping will probably time out before there is a response from the device server. Wait a few seconds and then ping the device server again, which will respond, indicating that the IP address has been configured.

Changing an IP Address from a Web Browser

Prerequisite

This procedure assumes that the device server already has an IP address and you simply want to change it.

Procedure

1. Open a web browser and enter the device server's current IP address in the URL window.
2. When the device server prompts you to log in, specify the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose `Configure > Network` to access the Network Configuration page.
4. Enter an IP address (and other network-related parameters) and then choose `Submit` to save the configuration.

Testing the IP Address Configuration

Use this procedure to test your IP address configuration.

Prerequisite

This procedure assumes that you have configured the device server with an IP address.

Procedure

1. Access the command line of a PC or other networked device.
2. Issue the following command:

```
ping ip-address
```

where *ip-address* is the address you assigned to the device server.

Example

```
ping 192.168.2.2
```

A reply should be returned.

Chapter 2

Setting Up RealPort Com Redirection

In This Chapter

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- RealPort Setup Overview..... 13
- Configuring the Device Server for RealPort..... 13
- Installing RealPort on a Windows System 14

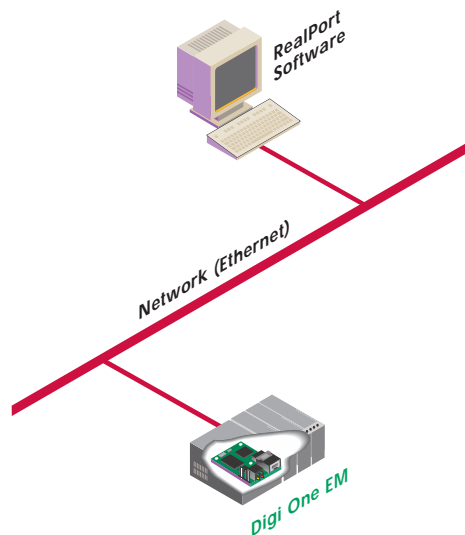
What is RealPort?

With RealPort[®], devices limited to standard serial communication can communicate with the applications that control or monitor them using a TCP/IP network. Many of these devices, including barcode scanners and sensors, don't have an Ethernet port. And even if they did, the applications that run them work on COM1. They know nothing of networking or TCP/IP.

With a Digi One EM, you can connect your device to the network. The legacy application, however, still knows nothing of Ethernet. That's where RealPort comes in.

Installed on a network-based PC, RealPort emulates a serial port. That is, the application "thinks" it is working with a real serial port, such as COM1. When the application sends data to this serial port, RealPort ships the data across the network to the Digi One EM, which routes it to the serial device. The network is transparent to both the application and the device.

In the example that follows, an application on the PC and your device with the embedded Digi One EM communicate as though they were connected with a serial cable.



RealPort Setup Overview

To set up a RealPort configuration, complete the following tasks:

1. Configure the device server for RealPort. See "Configuring the Device Server for RealPort" on page 13.
2. Install the RealPort software on a network-based PC. See "Installing RealPort on a Windows System" on page 14.

For UNIX RealPort software and documentation, see the Digi web site (www.digi.com).

Configuring the Device Server for RealPort

1. Access the configuration by opening a web browser and entering the IP address in the URL window.
2. Sign on as the root user (`root`). The default root password is `dbps`.
3. From the main menu, choose Configure > Port.
4. Set the Device type field to Printer.

Note: No other serial communication settings are required.

5. Choose Submit to commit the configuration.

Installing RealPort on a Windows System

Use this procedure to install RealPort software on Windows NT 4.0, Windows 2000, or Windows XP systems.

1. Place the CD in the CD drive.
2. If the CD menu program does not appear automatically, do the following:
 - a. Choose Start > Run.
 - b. In the run dialog, browse to the root of the CD and then choose setup.exe.
3. When the menu appears, choose Install RealPort.
4. Follow the on-screen prompts and documentation and use the Windows help to complete setup.

Note: See the Digi website for UNIX RealPort drivers and documentation.

Chapter 3 **Configuring Advanced Functions**

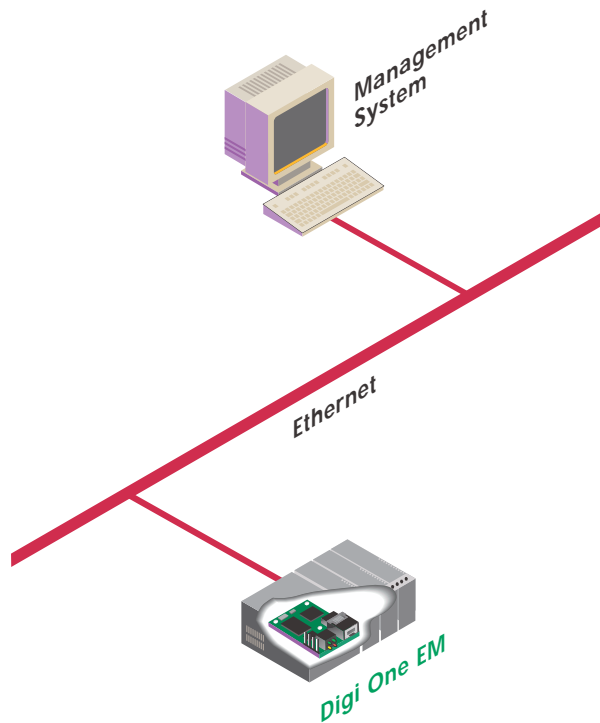
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Configuring the Device Server as a Server

Introduction

This section describes how to configure the device server as a server, providing TCP or UDP socket service. In this type of configuration, another network device initiates the communications. The device server simply waits for incoming traffic and then passes data to the serial device. The following figure illustrates this configuration.



RFC 2217 Support

Digi device servers support RFC 2217, an extension of the Telnet protocol used to access serial devices over the network. RFC 2217 implementations enable applications to set the parameters of remote serial ports (baud rate, flow control, etc.), detect line signal changes, as well as receive and transmit data. The configuration information provided in this section applies to device servers functioning as RFC 2217 servers. No additional configuration is required.

About TCP and UDP Port Numbers

Digi device server use the TCP and UDP port numbering conventions described in the following table:

For this connection type...	Use this Port
Telnet to the serial port	2001 (TCP only)
Raw connection to the serial port	2101(TCP and UDP)

You must ensure that the application or device that initiates communication with the device server uses these ports. If they cannot be configured to use these ports, you can change what is known as the “base socket” on the device server, which allows you to use different port numbers to designate a Telnet or raw connection to the serial port. See "Changing the Base Socket: Procedure" on page 17 for more information.

Changing the Base Socket: Procedure

1. Access the configuration by opening a web browser and entering the device server’s IP address in the URL window.
2. Sign on to the device server as the root user (`root`). The default root password is `dbps`.
3. From the main menu, choose `Configure > Network`.

- Use the base socket field to change the base socket. Specify a multiple of 100 between 2000 and 9000. Telnet connections will use the base socket value plus one. Raw connections will use the base socket value plus one-hundred one. The following table illustrates how this works:

If the base socket is...	Then Telnet uses...	Then Raw uses ...
3000	3001	3101
4500	4501	4601
8100	8101	8201

- Choose Submit to commit the configuration.

Configuring the Device Server as a Server: Procedure

- Access the configuration by opening a web browser and entering the device server's IP address in the URL window.
- Sign on to the device server as the root user (`root`). The default root password is `dbps`.
- From the main menu, choose Configure > Port.
- Set the Device type field to Printer.
- Adjust other settings as required by the peripheral connected to the port. See the online help for information on configuration fields.

Note: The Terminal type field is ignored in this type of configuration.

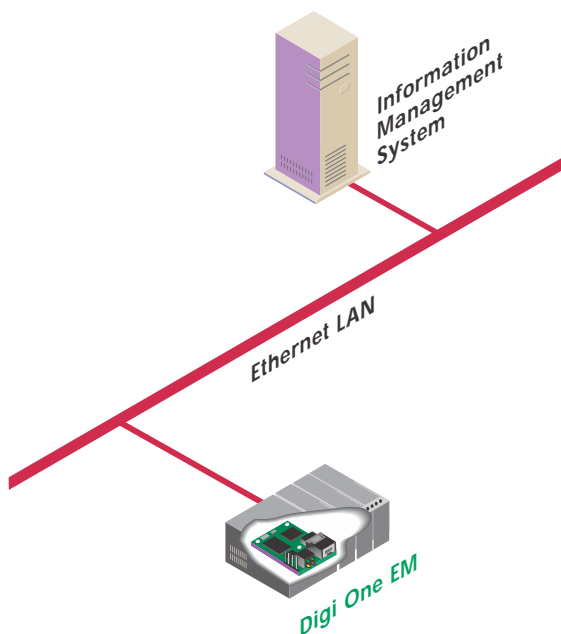
- Choose Submit to commit the configuration.

Autoconnecting to a Network Host (TCP)

Introduction

This section describes how to configure the device server to initiate an autoconnection to a host on the network. In this type of configuration, the device server initiates TCP connections to applications running on servers or serial devices connected to server serial ports (sometimes called TCP socket service).

The following figure provides an example of a device server configured for autoconnection. This connection can be configured to be always up or to be triggered whenever the data is received on the device server port.



Autoconnecting to a Network Host: Procedure

1. Access the configuration by opening a web browser and entering the device server's IP address in the URL window.
2. Sign on to the device server as the root user (`root`). The default root password is `dbps`.
3. From the main menu, choose Configure > Port.
4. On the Port Configuration page, do the following:
 - Set the Device type according to the event you want to open the connection. See the following table for more information.

To trigger a connection when...	Set the Device type to...
The port receives data	Terminal
When the DCD signal is raised	Modem in *

* To configure the port to behave as though DCD were always on, which will keep the connection up all the time, use the Force DCD option on the Advanced Configuration page.

- Adjust serial settings as required by the serial device. See the online help for information on configuration fields.

Note: The Terminal type field is used only when you configure a terminal. In all other cases, this field is ignored.

5. When the port settings are correct, choose Submit to commit the configuration.
6. Choose Advanced to access the Advanced configuration page.
7. On the Advanced Configuration page, do the following:
 - Check Enable AutoConnect.

- Provide the IP address of the server or other device to which the connection should be made.
- Specify the TCP port number for connections. The port number depends on the conventions used on the remote server or device. The following table provides common TCP port numbering conventions. However, the remote device may not use these conventions:

Connection Type	Common TCP Port
Telnet	23
Rlogin	513
Reverse Telnet to the port of a Digi device server	2001
Raw connection to the port of a Digi device server	2101

- Specify a service to use for the connection.
 - Specify other options as required. Use the online help for information on configuration fields. One option, Force DCD, should be specified only in the following circumstances: (1) You want the connection up all the time. (2) The Device type specified on the Port Configuration page is Modem in.
8. When you complete configuration changes, choose Submit to commit the configuration.

Autoconnecting to a Network Host (UDP)

Introduction

This section describes how to configure the device server to initiate an “autoconnection” to one or more hosts on the network. In this type of configuration, the device server initiates UDP communications to applications running on servers or serial devices connected to server serial ports (sometimes called UDP socket service).

This configuration provides multicasting capability. That is, multiple devices can be identified as destinations for a single communication.

Autoconnecting to Network Hosts: Procedure

1. Access the configuration by opening a web browser and entering the device server’s IP address in the URL window.
2. Sign on to the device server as the root user (`root`). The default root password is `dbps`.
3. From the main menu, choose `Configure > Port`.
4. On the Port Configuration page, do the following:
 - Set the Device type to Printer.
 - Adjust serial settings as required by the serial device. See the online help for information on configuration fields.

Note: The Terminal type field is used only when the Device type is Terminal. In all other cases, this field is ignored.

5. When the port settings are correct, choose `Submit` to commit the configuration.
6. Choose `Advanced`, which brings up the Advanced Configuration page, and then `UDP serial`, which brings up the UDP Serial Configuration page.
7. Use the UDP Serial Configuration page to set up UDP

communication on the port. Here is some information on this page:

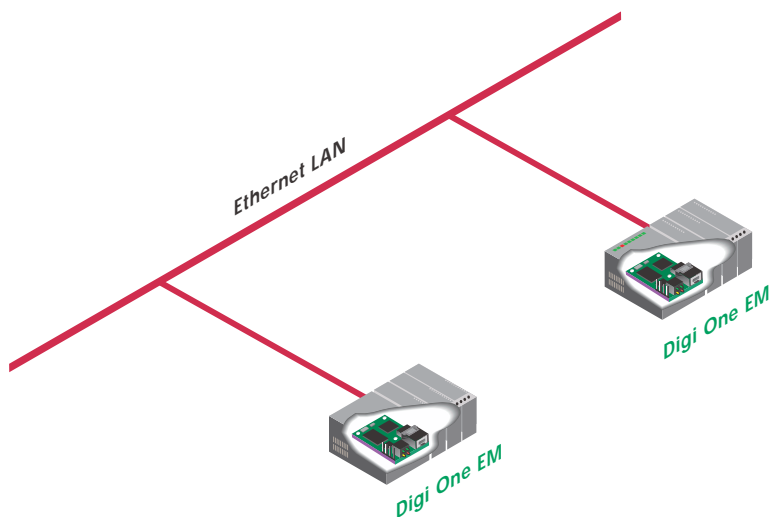
- Use this page to define the event or timing that triggers a UDP communication and the destinations for this communication.
- Use the online help for information on specific configuration fields.
- Choose Submit to commit the configuration.

Configuring a Serial Tunnel

Introduction

A serial tunnel is a network connection between two serial devices, each of which uses a device server. The serial devices “think” they are communicating with each other across a serial cable using serial communication techniques. Neither is aware of the intervening network.

The following figure illustrates this configuration.



Configuring a Serial Tunnel: Procedure

1. Set up one of the device servers as a TCP server. See "Configuring the Device Server as a Server" on page 16 for information.
2. Set up the other device server to autoconnect to the first device server. The details for this configuration can be found in "Autoconnecting to a Network Host (TCP)" on page 19. Here are a few additional tips:
 - Specify one of the following as the Device type:
 - Modem in if you want to initiate a connection when DCD goes high
 - Terminal if you want to initiate the connection when DTR goes high
 - Specify the first device server's IP address as the destination of the autoconnection.
 - Specify one of the following destination TCP ports
 - 2101 for raw connections
 - 2001 for Telnet connections
 - Turn Force DCD on.
 - Ignore the Terminal type and Binary mode fields.

Chapter 4 *Administration*

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Changing the Root Password

For security reason you will want to change the root password immediately. This procedure shows you how.

Prerequisite

This procedure assumes that you are the root user and that you know the current root password.

Procedure

1. Open a web browser and enter the device server's IP address in the URL window.
2. When the device server prompts you to log in, enter the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose Admin > Password from the main menu.
4. Fill in the New Password and Confirm Password fields and then choose Submit.

Upgrading Firmware

This procedure shows you how to download firmware using either HTTP or TFTP.

Note: HTTP, which simply requires a web browser, is the preferred method, and Digi recommends it. TFTP, however, is often used in UNIX environments, so TFTP is supported as well.

Prerequisite

This procedure assumes that:

- You have already downloaded the firmware file from the Digi web site
- TFTP is running (if you are using the TFTP option)

Procedure

1. Open a web browser and enter the device server's IP address in the URL window.
2. When the device server prompts you to log in, enter the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose Admin > Upgrade from the main menu.
4. Follow the prompts.

Upgrading POST Code

This procedure shows you how to upgrade POST code using HTTP or TFTP. Typically, POST upgrades are not required and should only be done if the firmware release notes indicate that this step is required.

Note: HTTP, which simply requires a web browser, is the preferred method, and Digi recommends it. TFTP, however, is often used in UNIX environments, so TFTP is supported as well.

Prerequisite

This procedure assumes that:

- You have already downloaded the firmware file from the Digi web site
- TFTP is running (if you are using the TFTP option)

Procedure

1. Open a web browser and enter the device server's IP address in the URL window.
2. When the device server prompts you to log in, enter the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose Admin > Upgrade from the main menu.
4. Follow the prompts.

Resetting the Configuration to Defaults

Introduction

The two procedures in this section reset the configuration to defaults. The first procedure resets the configuration from a web browser. If you can access the device server from a web browser, this is the best way to reset the configuration because you can also back up the configuration, which provides a means for restoring it after you have worked through configuration issues. See "Copying the Configuration to and from a Server" on page 32 for more information.

The second procedure resets the configuration using the reset button on the device server. Use this method if you cannot access the device from a web browser.

Resetting the Configuration from a Browser

1. Open a web browser and enter the device server's IP address in the URL window.
2. When the device server prompts you to log in, enter the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose Admin > Reset Config from the main menu.
4. Follow the prompts to complete this procedure.

Resetting the Configuration Using the Reset Button

1. Power off the device server.
2. Locate the reset switch between P3 and CR1.
3. Power on the device while holding the reset switch down. (Hold it down for about 20 seconds.)

Copying the Configuration to and from a Server

This procedure shows you how to copy the configuration to a server and to download a configuration from a server using either HTTP or TFTP.

Prerequisite

If you intend to use TFTP, ensure that the TFTP program is running on a server before you begin this procedure.

Procedure

1. Open a web browser and enter the device server's IP address in the URL window.
2. When the device server prompts you to log in, enter the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose Admin > Copy Configuration from the main menu.
4. Follow the prompts to complete the procedure.

Viewing Port Statistics and Settings

Introduction

Use this procedure to view port statistics and configuration settings.

Procedure

1. Open a web browser and enter the device server's IP address in the URL window.
2. When the device server prompts you to log in, enter the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose Report > Port from the main menu.

Viewing Network Statistics

Introduction

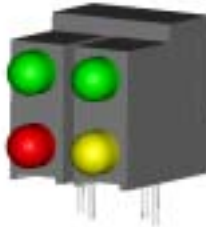
Use this procedure to view network statistics.

Procedure

1. Open a web browser and enter the device server's IP address in the URL window.
2. When the device server prompts you to log in, enter the following:
 - `root` as the user name
 - The root password. The default is `dbps`.
3. Choose Report > Network from the main menu.

Interpreting LED Information

Digi One EM LEDs provide information on port activity, diagnostics, and Ethernet activity.



LED	Color	Function	Interpretation
Top left	Green	Indicates serial port activity	<ul style="list-style-type: none"> • Off means that the serial channel is idle. • Blinking indicates an active connection.
Top right	Green	Network link status	<ul style="list-style-type: none"> • Off means that no link has been detected. • On means that a link has been detected.

LED	Color	Function	Interpretation
Bottom left	Red	Diagnostics	<ul style="list-style-type: none"> • Blinking 1-1-1 means starting the operating system. • Blinking 1-5-1 means configuration has been returned to factory defaults. • Steady blinking means the device is seeking an IP address from a DHCP server. <p>Note: If other blinking patterns appear on this LED, call Digi Technical Support.</p>
Bottom right	Yellow	Reserved	NA

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