



Connectware™

Making
DEVICE NETWORKING
easy

Digi One EM

Users 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 Wizard**
“Discovers” the device and then provides a method for assigning an IP address. See "Configuring the IP Address with the Setup Wizard" 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**
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.
- **Web browser**
This method works only for changing the IP address of a device server that has already been assigned one.

Before you configure your device server, write down the MAC Address located on the bottom of your product.

Configuring the IP Address with the Setup Wizard

This procedure describes how to configure an IP address using the CD that came in your device server package.

Prerequisites

This procedure assumes the following:

- The device server is connected to the network and powered up
- The CD will be used on a system running Microsoft Windows operating system
- The device server's MAC address is recorded for later use in assigning an IP address

Procedure

1. Insert the Digi CD in the CD drive.
2. If the CD does not start automatically, double-click My Computer > CD ROM Drive > setup.exe
3. The wizard will automatically pop up. Click Next. The Digi application finds and lists all of the Digi devices on your network.
4. Locate your device server by its MAC address.
5. Select the device server and then choose Next.
6. Follow the wizard to configure your device server.

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 a permanent entry for the device server on a DHCP server.
2. Connect the device server to the network and power it on. The IP address configured in step 1 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
- No DHCP server is running
- No IP address has been configured

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 system running Microsoft Windows operating 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
```

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. The device server will respond indicating that the IP address has been configured.

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.

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 address bar.
2. When the device server prompts you to log on, specify the following:
 - The username is `root`.
 - The default password is `dbps`.
3. Click Network to access the Network Configuration page.
4. Enter an IP address (and other network-related parameters) and then click Apply to save the configuration.

Chapter 2

Setting Up RealPort (COM Port Redirection)

In This Chapter

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- Configuring the Device Server for RealPort..... 13
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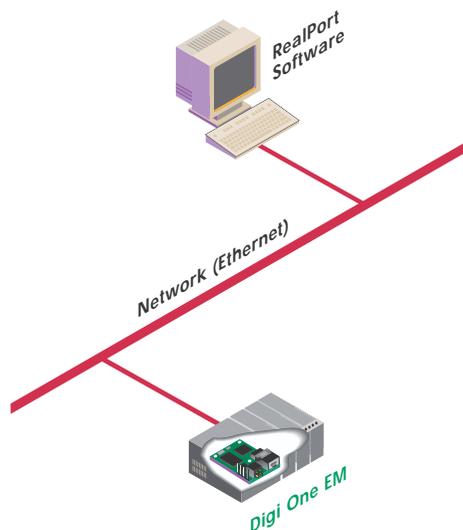
What is RealPort

Many serial 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. Many of these applications were written before TCP/IP and Internet were common.

RealPort® allows you to really network enable your device with our device servers. With a Digi device server, you can connect your device to the network. The legacy application, however, may not support TCP/IP. 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. This is also referred to as COM Port Redirection. 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 your PC. See "Installing RealPort on a System Running Microsoft Windows Operating System from the CD" 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 address bar.
2. Log on as the root user (User Name `root`). The default password is `dbps`.
3. If this is not a new device server, restore the default settings by clicking Administration.

Note: Restoring the Digi One EM to its factory default settings will clear all current settings except the IP address settings and the administrator password.

4. Select Restore Factory Default Settings and click Restore.
5. Verify RealPort is usable, Click Serial Port > RealPort Settings

NOTE: No other serial communication settings are required.

6. Load RealPort driver. See "Installing RealPort on a System Running Microsoft Windows Operating System from the CD" on page 14

Installing RealPort on a System Running Microsoft Windows Operating System from the CD

Use this procedure to install RealPort software.

Note: It is recommended that you check the Digi website for the latest RealPort drivers.

1. Place the CD in the CD drive.
2. If the CD does not start 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. Click Cancel on the wizard (this will close the Setup wizard).
4. Click Install Optional Software.
5. Click RealPort.
6. Follow the on-screen prompts and use the Microsoft Windows Help for assistance.

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

Installing RealPort on a Windows System from the Web

1. Go to www.digi.com
2. Click Support.
3. Click Drivers.
4. Select your product.
5. Select your operating system.
6. Click Latest Driver.
7. Download the driver and follow the 'readme' for download instructions.

Chapter 3 **Configuring Advanced Functions**

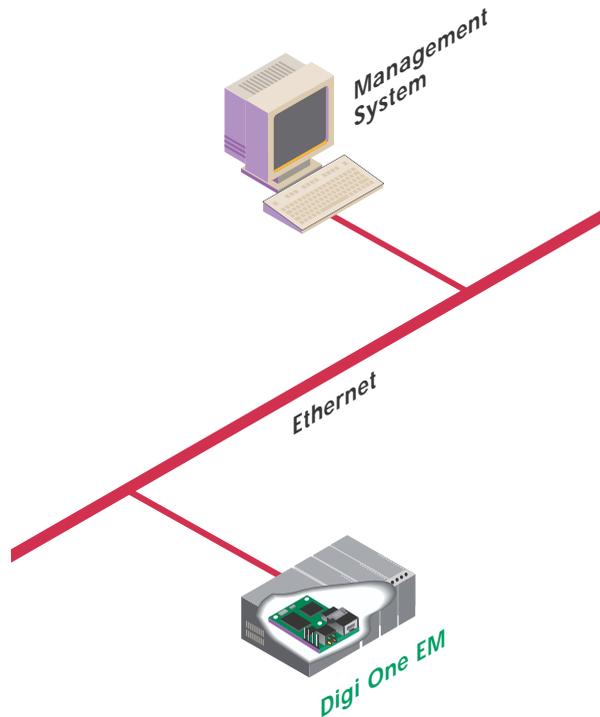
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Configuring the Device Server for Incoming Connections

Introduction

This section describes how to configure the device server for incoming connections 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. If you have altered the device server, restore the factory default settings following the procedure in Chapter 3. No additional configuration is required.

About TCP and UDP Port Numbers

Digi device servers 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. Log on to the device server as the root user (User Name `root`). The default root password is `dbps`.

3. From the main menu, choose Network.
4. Use the base socket field to change the base socket. Specify a multiple of 100 between 1000 and 50000. Telnet connections will use the base socket value plus one. Raw connections will use the base socket value plus 101 (one-hundred one). The following table illustrates how this works:

If the base socket is...	Then Telnet uses...	Then Raw uses...
3000	3001	3101
4100	4101	4201
8000	8001	8101

5. Click Apply.

Configuring the Device Server as a Server: Procedure

1. Access the configuration by opening a web browser and entering the device server's IP address in the URL window.
2. Log on to the device server as the root user (User Name **root**). The default root password is **dbps**.
3. From the main menu, choose Serial Port.
4. Select Restore Factory Serial Port Settings and Click Restore.
5. Select Basic Serial Port Settings and configure the Digi device server to match the settings of the attached serial device. (If using RFC 2217 protocol, do not modify the port settings from the defaults.)
6. Click Apply.
7. Select TCP Client / TCP Server Settings and record the TCP port numbers listed under the TCP Server header. The TCP port number is needed to configure the application or device that accesses the device server's serial port from the network.

If the Digi device server has been altered from the factory settings, restore the factory default settings.

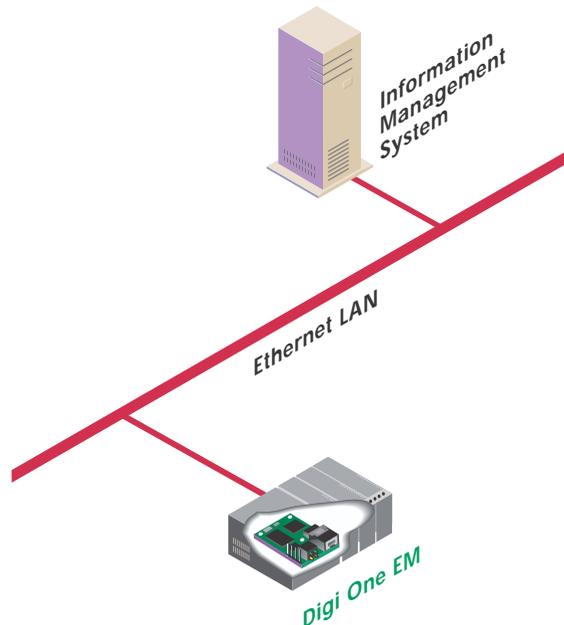
Autoconnecting to a Network Host (TCP Clients)

Introduction

This section describes how to configure the device server to initiate an automatic connection (autoconnect) to a host on the network. The device server initiates TCP connections to applications running on servers or serial devices connected to server serial ports (sometimes called TCP socket service). There are three conditions that use this configuration:

- DCD signal goes high
- Data arrives
- Always

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. Log on to the device server as the root user (User Name `root`). The default root password is `dbps`.
3. Click Serial Port Settings
4. Select Restore Factory Serial Port Settings and Click Restore.
5. Configure the Basic Serial Port Settings to match the settings of the attached serial device.
6. Click Apply to save the configuration.
7. Select TCP Client / TCP Server Settings and check the Automatically establish TCP connections box.
8. Select the Connect option that describes when the TCP connection will be initiated.
9. Enter the IP address or DNS name of the destination server in the Connect To box.
10. Select a Service to use for the connection: Raw, Rlogin, or Telnet.
11. Specify the destination TCP Port Number.

If the Digi device server has been altered from the factory settings, restore the factory default settings.

The Port number depends on the conventions used on the remote server or device. The following table provides common TCP port number 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

In a raw connection to a non-Digi device, you must set the port number to the value determined by the non-Digi device.

12. Click Apply to save the configuration.

Autoconnecting to a Network Host (UDP)

Introduction

This section describes how to configure the device server to initiate an automatic connection (autoconnect) to one or more hosts on the network. 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. Log on to the device server as the root user (User Name `root`). The default root password is `dbps`.
3. From the main menu, choose Serial Port.
4. Select Restore Factory Serial Port Settings and Click Restore.
5. Select Basic Serial Port Settings and configure the Digi device server to match the settings of the attached serial device.
6. Click Apply to save the configuration.
7. Click UDP Client / UDP Server Settings and enter the following for each of the UDP destinations:
 - a description of the destination
 - the destination IP address
 - the destination UDP portClick Add
8. Select the options that define when data is sent.
9. Click Apply to save the configuration.

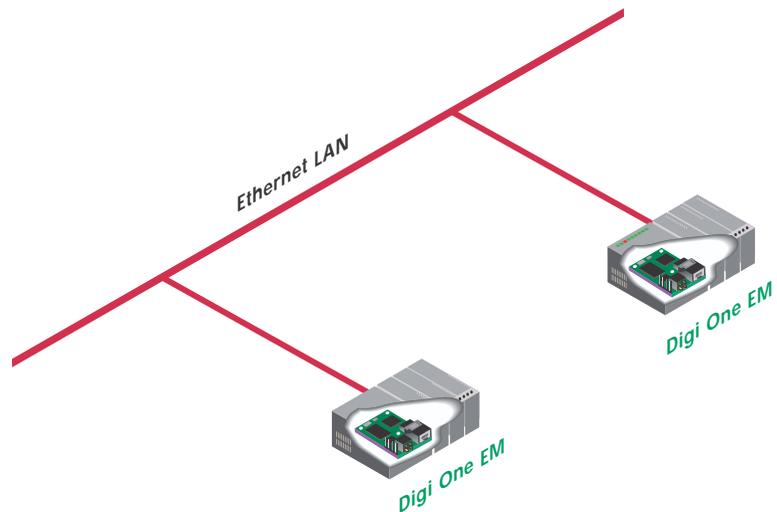
If the Digi device server has been altered from the factory settings, restore the factory default settings.

Configuring a Network Serial Bridge

Introduction

A serial bridge 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. There is no need to reconfigure the server or the serial device. Neither is aware of the intervening network.

The following figure illustrates this configuration.



Configuring a Serial Bridge: Procedure

If the Digi device server has been altered from the factory settings, restore the factory default settings.

1. Access the configuration by opening a web browser and entering the device server's IP address in the URL window.
2. Log on to the device server as the root user (User Name **root**). The default root password is **dbps**.
3. From the main menu, choose Serial Port.
4. Select Restore Factory Serial Port Settings and Click Restore.
5. Configure the Basic Serial Port Settings to match the settings of the attached serial device.
6. Click Apply to save the configuration.
7. Select TCP Client / TCP Server Settings and check the Automatically establish TCP connections box.
8. Select Connect > Bridge/Tunnel (bi-directional).
9. In the Connect To box, type the IP address or DNS name of the other Digi device.
10. In the TCP Port Number box, type the appropriate TCP port number for the destination serial port.
NOTE: The default value is 2101 for RAW and 2001 for ASCII.
11. Click Apply to save the configuration.
12. Follow the same steps to configure the other Digi device server of the bridge, specifying the IP address of the first Digi device in the 'Connect to' box.

Chapter 4 *Administration*

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- Updating Firmware 27
- Updating POST Code..... 29
- Restoring the Configuration to Factory Defaults 30
- Backup/Restore the Configuration 31
- Viewing Port or Network Statistics and Settings 32

Changing the Root Password

For security reasons, we recommend you 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:
 - User Name is `root`
 - The root default password is `dbps`
3. Choose Administrator Password.
4. Fill in the New Password and Confirm Password fields.
5. Click Apply to save the password.
6. Log on using new password (you will receive notification password is changed).

Updating Firmware

This procedure shows you how to update the device servers firmware from a file on your PC or through TFTP.

Note: The recommended method is to download the firmware to your local hard drive. TFTP is supported for those using UNIX systems.

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 for Updating from a File on Your PC

DO NOT
close your
browser
until the
update is
complete
and you
have been
prompted to
reboot

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:
 - User Name is `root`
 - The root default password is `dbps`
3. Choose Upgrade Firmware from the main menu.
4. Click Browse to select the file.
5. Click Update.

Procedure for TFTP

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:
 - User Name is `root`
 - The root default password is `dbps`
3. Choose Upgrade Firmware from the main menu.

4. Click From a TFTP Server
5. Enter the name of the firmware file.
6. Enter the IP address of the TFTP server where firmware file is located.
7. Click Update.

Updating POST Code

This procedure shows you how to upgrade POST code from a file 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: The recommended method is to download the firmware to your local hard drive. TFTP is supported for those using UNIX systems.

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:
 - User Name is `root`
 - The root default password is `dbps`
3. Choose Administration > Update Firmware.
A screen appears with the options to update from a file or with a TFTP server.
4. Choose either:

From a File	From a TFTP Server
<ul style="list-style-type: none"> • Select Boot/POST from the Update dropdown menu. • Browse to locate the file. • Choose Update. 	<ul style="list-style-type: none"> • Select Boot/POST from the Update dropdown menu. • Enter the Firmware Image File name. • Enter the TFTP Server's IP. • Choose Update.

Restoring the Configuration to Factory Defaults

Introduction

The two procedures in this section restore the configuration to defaults. The first procedure resets the configuration from a web browser which will clear all current settings except the IP address settings and administrator password. This is the best way to reset the configuration because you can also back up the settings (which provides a means for restoring it after you have worked through configuration issues). See "Backup/Restore the Configuration" on page 31 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.

Note: Restoring the Digi One EM to its factory default settings will clear all current settings except the IP address settings and the administrator password.

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 on, enter the following:
 - User Name is `root`
 - The root default password is `dbps`
3. Choose Factory Default Settings from the main menu.
4. Click Restore

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.)

Backup/Restore the Configuration

This procedure shows you how to backup or restore the configuration to a server and to download a configuration from a server to a file 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:
 - User Name is `root`
 - The root default password is `dbps`
3. Choose Backup/Restore from the main menu.
4. Choose the appropriate option (Backup or Restore) and select your file.

Viewing Port or Network Statistics and Settings

Introduction

Use this procedure to view port or network statistics and configuration settings.

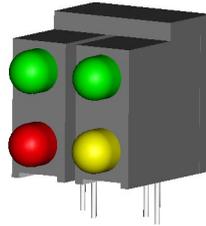
Procedure

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:
 - User Name is `root`
 - The root default password is `dbps`
3. Click System Information from the main menu.
4. Click details for more information.

Use your browser's Refresh option to update the statistics.

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.
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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