



Connectware™

Digi Flex

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Making
DEVICE NETWORKING
easy™

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About This Guide

Purpose

This guide provides the following:

- Configuration and administration procedures
- Configuration examples

Audience

This manual is intended for the person responsible for configuring and administering device server. It assumes that this person has experience configuring network devices and is familiar with networking concepts.

Scope

This manual provides step-by-step instructions for configuring and administering device server's main features. It does not address how to configure every option, or provide complete information on commands. These topics are covered in other documents in the device server library.

About the Device Server

Features

The device server is a full functioning remote access server and router that offers two EIA-232/422A/485A serial ports. Key features include:

- A 10Base-T Ethernet connection
- Configurable dial-in and dial-out PPP connections with internal modem (optional)
- Support for RealPort, a feature that allows LAN-based host systems to use the ports of the device server as though they were the host system's own ports, appearing and behaving as local ports to the LAN-based host
- An SNMP agent implementation, enabling management of the device server from an SNMP manager
- Support for both static and RIP-based routing
- Support for RADIUS authentication

Package Contents

Each device server package includes the following items:

- The device server unit
- A power supply
- A standard 10Base-T cable for connection to the Ethernet
- A network crossover cable that enables you to connect the device server Ethernet port to the Ethernet port on a PC, enabling Telnet and web browser sessions across the cable.

- An Access Resource CD that holds RealPort drivers, other software, and the device server online documentation
- The Access Resource Card, which describes the contents of the Access Resource CD and provides CD mounting instructions for UNIX systems.
- The device server Setup Card

Configuration Methods

General Configuration Methods

The Digi Flex is shipped with a default static IP address of 192.168.1.251 and DHCP enabled. The DHCP settings will override the default IP address if the network has a DHCP server.

You can configure the device server in any of the following ways:

- Using the command line from a terminal connected to one of the serial ports
- Using the command line from a Telnet session. To configure the device server this way, you must use the default IP address or re-configure a new IP address.

You can Telnet to the device server across a standard Ethernet network or by a connection between the device server and a PC using both device's Ethernet interfaces and the special cable that is shipped with the device server unit.

- Using a browser and the device server's web interface. Enter the Digi Flex's default IP address in the browser's url address bar. This type of access is provided across a standard Ethernet network or using the special network cable supplied with your device server unit.

Methods for Configuring an IP Address

The device server enables you to configure an IP address in any of the following ways:

- Using a DHCP server. The factory default for the unit is to function as a DHCP client, so if you want to use DHCP to configure the IP address, simply connect the unit to the network and then to power.
- Using the Digi Administrator software that comes on the Access Resource CD.
- Connecting a terminal to one of the serial ports on the unit and then accessing the command line.

Methods for Changing the IP Address

You can change the IP address of the unit using the web interface, by accessing the command line from a Telnet session, or by using the Digi Administrator program.

Accessing the Configuration as Root

To change the configuration you must sign on as the administrator, with the user name of root. The default administrator password is dbps.

Connecting a Terminal to a Serial Port

This section provides information you will need if you intend to configure the device server from a terminal connected to one of the serial ports.

Cabling Requirements

To connect a terminal to a device server serial port, you will need a null-modem cable that supports software flow control.

Configuring the Terminal

Configure the terminal to work with the device server default port configuration:

- 9600 bps
- None parity
- 8-bit characters
- 1 stop bit
- Xon/Xoff flow control

Using the Web Interface

Known problems exist when configuring the Digi Flex with web browsers. It might be necessary to refresh the cache and/or disable proxy settings with the web browser if you detect any configuration problems.

The Digi Administrator

This section discusses the Digi Administrator.

About the Digi Administrator

The Digi Administrator installs on Microsoft Windows XP, Windows 2000, Windows NT 4.0, Windows 98, Windows ME, and Windows 95, provides the following functions:

- Easy configuration of a static IP address.
- A TFTP server implementation, enabling efficient installation of the latest device server firmware.

Installing the Administrator Software: All Windows Systems

1. Start the Digi CD.
2. Choose English > OK and follow the prompts.
3. You will be prompted to install Sun Java VM (virtual machine). Sun Java VM is needed by the Digi software driver.
4. Choose Digi Administrator and RemoteCOM > Install.
5. Reboot your system if prompted.

Setting Up the Hardware

1. Plug the serial devices into the Digi Flex device serial ports.
2. Connect the Digi device to the network using an Ethernet cable.
3. Connect the power supply to an outlet and then to the Digi device.

Hardware Information

DB9 Pin Settings

DB9 Pin	RS232	RS 422 / RS485 full duplex	RS485 half duplex
2	RxD	RxD+	RxD+
3	TxD	TXD+	TxD+
7	RTS	RTS+	Not used
8	CTS	CTS+	Not used
5	GND	GND	GND
6	DSR	RXD-	RxD-
1	DCD	CTS-	Not used
4	DTR	RTS-	Not used
9	Not used	TxD-	TxD-

MEI Switch Settings

Function	Switch Settings			
	1	2	3	4
EIA-232	Down	Up	Up	Up
EIA-422/485 Full-duplex	Up	Down	Up	If down, termination. If up, no termination
EIA-485 half-duplex	Up	Up	Down	

LED Indicator Lights

The table below lists the Digi device's LED indicator lights and their meaning.

LED	Color	Status	Meaning
Power	Green	On Off	Power detected No power detected
Link	Red	On Off	No physical network detected Physical network detected
Setup	Red	On Blinking Off	Setup mode activated Locate function activated Normal mode

LED	Color	Status	Meaning
TX	Green		Data transmission from the network
RxD	Green		Data reception from the network

Homologation Information

Regulatory Notices

This product complies with the following standards:

Electromagnetic Emissions

- FCC Part 15 Subpart B Class A
- EN55022 Class A

Electromagnetic Immunity

- EN55024: 1998

Power Supply

External 110 - 240vac

47-63 Hz @ 15 w

Important Safety Information

To avoid contact with electrical current:

Never install electrical wiring during an electrical storm.

Never install telephone jacks in wet locations unless that jack is specifically designed for wet locations.

Use caution when installing or modifying telephone lines.

Use a screwdriver and other tools with insulated handles.

You and those around you should wear safety glasses or goggles.

Do not place telephone wiring or connections in any conduit, outlet or junction box containing electrical wiring.

WARNING

Do not work on your telephone wiring if you wear a pacemaker. Telephone lines carry electrical current.

Installation of inside wire may bring you close to electrical wire, conduit, terminals and other electrical facilities. Extreme caution must be used to avoid electrical shock from such facilities. You must avoid contact with all such facilities.

Telephone wiring must be at least 6 feet from bare power wiring or lightning rods and associated wires, and at least 6 inches from other wire (antenna wires, doorbell wires, wires from transformers to neon signs), steam or hot water pipes, and heating ducts.

Before working with existing inside wiring, check all electrical outlets for a square telephone dial light transformer and unplug it from the electrical

outlet. Failure to unplug all telephone transformers can cause electrical shock.

Do not place a jack where it would allow a person to use the telephone while in a bathtub, shower, swimming pool, or similar hazardous location.

Protectors and grounding wire placed by the service provider must not be connected to, removed, or modified by the customer.



Do not touch uninsulated telephone wiring if lightning is likely!



External Wiring

Any *external* communications wiring you may install needs to be constructed to all relevant electrical codes. In the United States this is the National Electrical Code Article 800. Contact a licensed electrician for details.

Options for Configuring the IP Address and Mask

You can configure the IP address and mask in any of the following ways:

- Using a DHCP server. The device server functions as a DHCP client by default, which means that it will send out a DHCP request immediately on start up unless the configuration is changed to prevent this behavior.
- Using the Digi Administrator.
- Using the command line, which requires a terminal connection to one of the device server ports.

In addition, the device server IP address and mask can be changed by command from a Telnet session or by using the Web interface.

Configuring an IP Address with DHCP

This section describes how to configure device server to use a DHCP server for IP address and subnet mask configuration, which can be done from the command line or the Web interface.

Configuring an IP Address with DHCP: Command Line

Use this procedure to configure device server's IP address from the command line using DHCP. Telnet to the Digi Flex device and login with the username `root` and the password `dbps`.

1. Record the device server MAC address located on the bottom of the unit.
2. If you have not changed the default DHCP client setting, go to the next step. Otherwise, turn on the DHCP client implementation by issuing the following command from the root prompt:

```
dhcp client mode dhcp
```

3. If you want to direct DHCP requests to a particular DHCP server, issue the following command from the root prompt:

```
dhcp client server ip-address
```

where *ip-address* is the IP address of the DHCP server

```
dhcp client 192.168.2.101
```

4. Save the configuration by issuing the following command from the root prompt:

```
save
```

5. Reboot the device server by issuing the following command:

```
system reboot
```

The device server reboots and is automatically configured with an IP address and mask.

6. If want to turn DHCP off issue the following commands:

```
dhcp client mode none
```

```
save
```

Note: If you did not assign an IP address, but it was automatically assigned by the DHCP server, you can find the IP address by using the Digi Administrator. Go to Explore > Open and use the Digi Flex's MAC address to identify its assigned IP address.

Changing an IP Address with DHCP: Web Interface

Use this procedure to change the device server's IP address. This procedure will not work for assigning an initial IP address.

1. Record the device server's MAC address located on the bottom of the unit.
2. Update the DHCP table on the server. Reserve a permanent address if you intend to use RealPort.
3. Access the web interface by entering the device server's current IP address in the URL window.
4. Log on as `root`. The default password is `dbps`.
5. Choose Advanced Configuration > Network.

The Network Configuration screen appears.

6. Locate the DHCP client section of the screen (shown below) and specify the following:

- DHCP as the Client mode
- An IP address, if you want to use the services of a particular DHCP server

DHCP client			Default	Cancel	OK
Client mode	Server IP	Timeout			
dhcp	255.255.255.255	30 s			

7. Choose OK and then Save.
8. At the prompt, choose OK.
9. Choose System from the Advanced Configuration Menu.
10. Choose Reboot.
11. Choose OK at the prompt.

When the device server reboots, it is automatically configured with an IP address and mask.

Once the device server has an IP address, if you want to turn off DHCP, do the following: Access the Network Configuration screen, specify "none" as the DHCP Client mode and Click OK > Save > OK.

Configuring an IP Address Using Digi Administrator

Use this procedure to configure an IP address and subnet mask using the Digi Administrator. This procedure assumes the Digi Administrator software program has been installed.

1. Record the device server's MAC address located on the bottom of the unit.
2. Start the Digi Administrator program.
3. From the menu, choose Explorer > Open.
4. Double-click the IP address cell and enter an IP address for your unit. The MAC address is located at the far right in the same row.
5. Press Enter after filling the IP address cell.
6. Reboot the device server.

The Digi device is configured for an IP address.

Configuring an IP Address from the Command Line

Use this procedure to configure an IP address using a terminal to access the device server command line.

1. Enter the following command to configure an IP address:

```
ifconfig ip eth0 ip-address
```

where *ip-address* is the IP address to assign the unit

```
ifconfig ip eth0 192.168.2.154
```

2. Enter the following command to configure a subnet mask:

```
ifconfig netmask eth0 mask
```

where *mask* is the subnet mask for the network

```
ifconfig netmask eth0 255.255.255.0
```

3. If you want to turn DHCP off client (the default is on) so that this remains the IP address, issue the following command:

```
dhcp client mode none
```

4. Save the configuration by entering the following command:

```
save
```

Configuring a Default Gateway

Configuring a Default Gateway: Command Line

1. Enter the following command to configure a default gateway

```
route add net eth0 0.0.0.0 gateway-ip-address 0.0.0.0
```

where *gateway-ip-address* is the IP address of the router to use as a default gateway. The two 0.0.0.0 fields instruct the device server to forward to the default gateway all packets bound for a destination to which there is not an explicit route.

```
route add net eth0 0.0.0.0 191.192.2.100.2 0.0.0.0
```

2. Save the configuration by issuing the following command:

```
save
```

Configuring Default Gateway: Web Interface

1. From the main menu, choose Advanced Configuration > Network
2. In Static Routes section, specify the following:
 - 0.0.0.0 in both the destination and netmask fields
 - The IP address of the default gateway in the Gateway field
 - Eth0 in the Interface field
 - Net in the Type field
3. Choose Add > Save > OK.

About DNS and the Host Table

Introduction

The device server can be set up to use the domain name system (DNS), which enables users to access resources by names rather than IP addresses. DNS can be set up using:

- One or more DNS servers, which centralizes the DNS IP address-to-name mappings
- A host table in which name-to-IP address mappings are maintained on the device server
- Both a DNS server and a host table

Search Order

The process the device server uses to determine the correct name-to-IP address-mapping is this:

1. It looks in the host table to see if there is an IP address specified for the name supplied.
2. If no mapping is found in the host table, device server queries the primary DNS server.
3. If the primary DNS server does not respond, device server queries the secondary DNS server.

About Domain Names

Names in the domain name system are hierarchical and unique. Each domain name consists of the following parts:

- The name itself, followed by a period
- The names of all superior nodes, each of which is followed by a period.

Example

The following is an example of a domain name, consisting of the following three parts:

- The first field, dgflex, is the name assigned to the device server, but this could be anything. It could be call “sales-server” or “first-floor-sys”, or anything else because naming authority for it resides with the “owners” of the amx domain.
- The second field, amx, indicates that this device is part of the amx domain.
- The third field indicates that the amx domain is part of the com domain.

dgflex1.amx.com

Configuring device server To Use a DNS Server

Use the procedures in this section to configure a device server for DNS servers. Configuration can be done from the command line or from the web interface.

Configuring DNS: Command Line

Use this procedure to configure the device server for a DNS server

1. To assign a DNS name to the device, enter the following command:

```
domain hostname digi-device-name
```

where *digi-device-name* is the name to assign to this device server.

```
domain hostname moe.companyname.com
```

2. To configure a primary DNS server for the device server, enter the following command:

```
domain server1 ip-address
```

where *ip-address* is the IP address of the DNS server

```
domain server1 192.168.20.10
```

3. To configure a second DNS server, enter the following command:

```
domain server2 ip-address
```

where *ip-address* is the IP address of the second DNS server

```
domain server2 192.168.20.12
```

4. To save the configuration, enter the following command:

```
save
```

Configuring DNS: Web Interface

Use this procedure to configure the device server for a DNS server.

1. From the main menu, choose Advanced Configuration > Network
2. Locate the DNS section of the Network Configuration page and then use the following figure for guidance in filling in the DNS configuration fields:

DNS [menu]				Default	Cancel	OK
Local name	Domain suffix	DNS 1	DNS 2			
<input type="text" value="vangogh"/>	<input type="text" value="xcell.com"/>	<input type="text" value="158.225.120.5"/>	<input type="text" value="158.225.80.5"/>			

3. Choose OK > Save.

Adding Entries to the Host Table

Use the procedures in this section to configure entries to the host table. Configuration can be done from the command line or from the web interface.

Configuring Name-to-IP Address Mappings in the Host Table: Command Line

Use this procedure to configure name-to-IP address mappings in the host table.

1. Enter the following command:

```
domain add host-name ip-address
```

where *host-name* is the name to assign the host and *ip-address* is the IP address of that host

```
domain add dogbert.acme.com 207.241.30.22
```

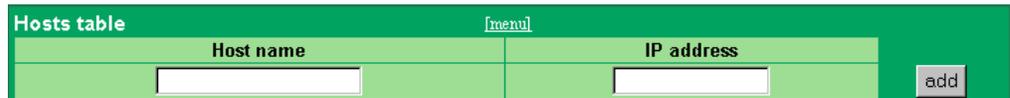
2. Save the configuration by entering the following command:

```
save
```

Configuring Name-to-IP Address Mappings in the Host Table: Web Interface

Use this procedure to use the web interface to configure name-to-IP address mappings in the host table.

1. From the main menu, choose Advanced Configuration > Network.
2. Locate the Hosts table section and then fill in the configuration fields.



The screenshot shows a web interface for the 'Hosts table'. It features a green header bar with the text 'Hosts table' and a '[menu]' link. Below the header is a table with two columns: 'Host name' and 'IP address'. Each column has a corresponding text input field. To the right of the 'IP address' field is a button labeled 'add'.

3. Choose Add > Save > OK.

About User Configuration

Introduction

The device server can be configured to accommodate the requirements of particular users. Typical configurable user attributes include the following:

- The password a user is to supply in order to access the device server
- The IP address and mask of PPP users
- Whether the user will use inbound or outbound ports
- Autoconnection attributes, such as the system to which the user should be automatically connected at login

Configuration Methods

You can configure users in the following ways:

- With the user command. See the user command in the *device server Command Reference*.
- With the web interface
- With a RADIUS server. See the system radius command in the *device server Command Reference*.

Configuring Users

Use this section for information on configuring users from the command line and from the web interface.

Configuring Users: Command Line

Use this topic to configure users from the command line. This topic addresses common user features. For information on other features, see the user command in the *device server Command Reference*.

1. Add a user to the device server configuration by entering the following command:

```
user add user-name password
```

where *user-name* is the name and *password* the password to assign the new user.

```
user add jerryj hushpuppy
```

2. To configure the user for dial-out access, enter the following command:

```
user out user-name yes
```

where *user-name* is the name of the user

```
user out jerryj yes
```

3. To configure the user for dial-in access, enter the following command:

```
user in user-name yes
```

where *user-name* is the name of the user

```
user in jerryj yes
```

4. To configure an IP address for a PPP user, enter the following command:

```
user netaddr user-name ip-address
```

where *user-name* is the name of the user and *ip-address* is the address to assign to this PPP user

```
user netaddr jerryj 192.181.3.4
```

5. To configure a subnet mask for a PPP user, enter the following command:

```
user netmask user-name mask
```

where *user-name* is the name of the user and *mask* is the subnet mask to assign to this PPP user

```
user netmask jerryj 255.255.225.0
```

6. To set up an automatic Telnet session to a particular host, enter the following command:

```
user telnetaddr user-name ip-address
```

where *user-name* is the name of the user and *ip-address* is the address of the host to which the user should be automatically connected

```
user telnetaddr jerryj 192.168.34.9
```

7. Save the configuration by entering the following command:

```
save
```

Configuring Users: Web Interface

1. From the main menu, choose Security > User.
2. Choose Add and then enter a name for the user.
3. Fill in the user form as required. Here are a few tips:
 - In the IP Addressing section, the IP address and Netmask fields are to define the IP address and subnet mask of PPP users only.
 - The Automatic Connection section is for users who are automatically connected using Telnet to a server. The IP address field is the IP address of the server to which this user should be connected and the Telnet Mode is the TCP port to use for this connection. Normally, the default works for the TCP port.
4. Choose OK > Save OK.

Web Interface Example: PPP User

The screen below shows you a user form filled out for a PPP user.

The screenshot shows a web interface titled '>> Users Accounts' with a 'Menu' and 'Save' button in the top right. Below the title is a 'User form' section with a dropdown menu set to 'CGuzman' and buttons for 'Next >>', 'Add', 'Delete', 'Cancel', and 'OK'. The form is divided into several sections: 'Password' (masked), 'Mode' (set to 'shell'), 'Audit' (checked), and 'Comments' (empty). Below this is a '--Callback--' section with a dropdown set to 'No callback' and three input fields for 'Callback #1', 'Callback #2', and 'Callback #3'. The '--IP addressing--' section has 'IP address' (192.168.56.102) and 'Netmask' (255.255.255.0). The '--Automatic connexion--' section has 'IP address' (192.168.5.114). The '--Telnet mode--' section has 'Port' (23) and 'Script' (empty). The bottom section is '--SSH mode--' with 'Authentication' (password), 'Cipher' (des), 'Compression' (unchecked), and 'SSH public key' (empty).

Web Interface Example: Automatic Telnet Connection User

The screen below shows you a user form filled out for an automatic Telnet connection user.

The screenshot shows a web interface titled 'User form' with a dropdown menu set to 'jacklynch' and buttons for 'Add', 'Delete', 'Cancel', and 'OK'. The form is divided into several sections: 'Password' (masked), 'Mode' (set to 'telnet'), 'Audit' (checked), and 'Comments' (empty). Below this is a '--Callback--' section with a dropdown set to 'No callback' and three input fields for 'Callback #1', 'Callback #2', and 'Callback #3'. The '--IP addressing--' section has 'IP address' (143.191.2.152) and 'Netmask' (255.255.255.255). The '--Automatic connexion--' section has 'IP address' (143.191.27.101). The '--Telnet mode--' section has 'Port' (23) and 'Script' (empty). The bottom section is '--SSH mode--' with 'Authentication' (password), 'Cipher' (des), 'Compression' (unchecked), and 'SSH public key' (empty).

Using RADIUS to Authenticate Users

This section provides a description of RADIUS and explains how to configure device server to use RADIUS.

What is RADIUS?

RADIUS (remote authentication dial-in user service) is a method of maintaining a database of profiles of dial-in users. These profiles can include login and password information, as well as other user attributes.

RADIUS Components

RADIUS requires two components, an authentication host server and client protocols. The device server implements the client protocol. A host must implement the authentication server application.

How RADIUS Works

Here is how authentication works when device server is configured for RADIUS:

1. A user logs into device server.
2. device server collects login information and then checks to see if the user is in the local database of users.
3. If the user is in the local database, device server handles authentication.
4. If the user is not in the local database, device server submits an authentication request to the RADIUS server.
5. The RADIUS server does one of the following:
 - If the user is validated, it passes this information to device server and the user is permitted access.
 - If the user is not validated, the RADIUS server returns an access reject message to device server, which then denies access to the user.

RADIUS Table Key

The numbers in the following tables have the following meaning:

#	Meaning
0	This attribute must <u>not</u> be present.
0-1	Zero or one instance of this attribute <u>may</u> be present.
1	Exactly one instance of this attribute <u>must</u> be present.

RADIUS Attributes (RFC 2138) Supported

The following attributes are supported in the Digi device server RADIUS client implementation.

Attribute	Request	Accept	Reject	Challenge
User-Name	1	0	0	0
User-Password	0-1	0	0	0
CHAP-Password	0-1	0	0	0
NAS-Port	0-1	0	0	0
Service-Type	0-1	0-1	0	0
Framed-Protocol	0-1	0-1	0	0
Framed-IP-Address	0-1	0-1	0	0
Login-IP-Host	0	0	0	0
Login-TCP-Port	0	0-1	0	0

RADIUS Accounting Attributes (RFC 2139)

The following RADIUS accounting attributes are supported in the Digi device server.

#	Attribute	#	Attribute
0-1	User-Name	0-1	Login-TCP-Port
0	User-Password	0-1	Session-Timeout
0	CHAP-Password	0-1	Idle-Timeout
0-1	NAS-IP-Address	1	Acct-Status-Type
0-1	NAS-Port	0-1	Acct-Delay-Time
0-1	Service-Type	0-1	Acct-Input-Octets
0-1	Framed-Protocol	0-1	Acct-Output-Octets
0-1	Framed-IP-Address	1	Acct-Session-Id
0	Login-IP-Host	0-1	Port-Limit
0-1	Login Service		

Configuring RADIUS Authentication: Command Line

Here is how you use the command line to configure device server to function as a RADIUS authentication client.

1. Configure the IP address of the RADIUS authentication server by entering the following command:

```
system radius auth ip-address
```

where *ip-address* is the IP address of the authentication server. (Note: You can also use a DNS node name as in the second example.)

```
system radius auth 192.168.23.4
```

```
system radius auth server-radius
```

2. If you need to change the default TCP port number (1645) for communication with the RADIUS server, enter the following command:

```
system radius authport port-num
```

where *port-num* is the TCP port to use for communication with the RADIUS authentication server

```
system radius authport 1812
```

3. Configure the secret (key) to use for communication with the RADIUS authentication server by entering the following command:

```
system radius secret key
```

where *key* is the secret to use

```
system radius secret chocolate
```

4. Save the configuration by entering the following command:

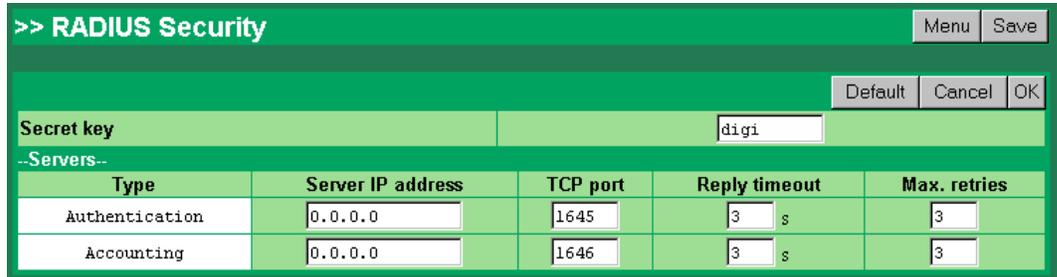
```
save
```

Configuring RADIUS Authentication and Accounting: Web Interface

Use this procedure to use the web interface to configure device server as a RADIUS client.

1. From the main menu, choose Security > RADIUS.

The following screen appears:



Type	Server IP address	TCP port	Reply timeout	Max. retries
Authentication	0.0.0.0	1645	3 s	3
Accounting	0.0.0.0	1646	3 s	3

2. Fill in the fields as required.
3. Choose OK > Save > OK.

What is RealPort?

RealPort is a feature that allows LAN-based host systems to use the ports of the Digi Flex as though they were the host system's own ports, appearing and behaving as local ports to the LAN-based host.

RealPort Advantages

RealPort provides the following advantages:

- It expands the number of ports available to the host system.
- It enables Digi Flex ports to be treated as if they were directly connected to the host, which means they use all standard operating system interfaces that control baud rate, parity, stop bits, and flow control.
- It enables host administrators to do most of the required configuration on the host, the system with which the administrator is most familiar.
- It dramatically reduces host CPU overhead because multiple terminal or printer sessions are multiplexed over the same TCP/IP connection.

Configuring RealPort

Use the topics in this section for information on configuring RealPort using either the command line or the web interface.

Configuring RealPort: Command Line

Use this procedure to configure Digi Flex for RealPort from the command line.

1. To enable RealPort, enter the following command:

```
realport enable
```

2. To set up a port for RealPort, enter the following command:

```
serial mode realport port-num
```

where *port-num* is the number of the port configured for RealPort

```
serial mode realport 1-2
```

3. To initialize the RealPort service, enter the following command:

```
realport reset
```

4. To save the configuration, enter the following command:

```
save
```

5. To complete RealPort setup, install and configure the RealPort driver. See the RealPort driver documentation on the Access Resource CD for more information.

Configuring RealPort: Web Interface

Use this procedure to configure Digi Flex for RealPort from the web interface.

1. From the main menu, choose Advanced Configuration > Serial Port.
2. Choose a serial port to configure and then ensure that the Mode specified is RealPort. See the following figure.

Modification of port: 1						Default	Cancel	OK
Mode	Flow control	Baud Rate	Parity	Char. size	Stop bit	Fifo		
realport	xon/xoff	9600	none	8	1	<input checked="" type="checkbox"/>		
Flush on	Line Ctrl	Quick	Idle Timeout	RTS	DTR			
both	local	<input checked="" type="checkbox"/>	0 s	up	up			

Note: Do not be concerned about flow control, baud rate, parity, character size and stop bit settings. These attributes must be configured on the RealPort host, not on the Digi Flex.

3. Choose OK.
4. If you want both Digi Flex ports configured, repeat the preceding steps for the other port.
5. Choose OK > Save.
6. From the Table of Contents menu, choose Diagnostic > RealPort.
7. Choose Enable service > Reset > Save > OK.
8. To complete RealPort setup, install and configure the RealPort driver. See the RealPort driver documentation on the Access Resource CD for more information.

Configuring a Port for a Printer

Use the information in this section to configure a device server port for a printer, which can be done from the command line or from the web interface.

Configuring a Port: Command Line

Use this topic to configure a printer from the command line.

1. To set the serial port's mode for a printer, enter the following command:

```
serial mode printer port-num
```

where *port-num* is the port to which the printer will be connected

```
serial mode printer 2
```

2. To set the port for local control, enter the following command:

```
serial linctrl local port-num
```

where *port-num* is the port to which the printer will be connected

```
serial linctrl local 2
```

3. To set serial port communications parameters to work with your printer, use the table below to identify the commands required to adjust these parameters. For more information on commands, see the *device server Command Reference*.

To Change...	Command	Example
Character size	serial csize <i>size port</i>	serial csize 8 2
Flow control	serial flowctrl <i>flow port</i>	serial flowctrl hard 2
Parity	serial parity <i>parity port</i>	serial parity odd 2
Line speed	serial speed <i>bps port</i>	serial speed 19200 2
Stop bits	serial stopb <i>bits port</i>	serial stopb 1 all

4. To save the configuration, enter the following command:

```
save
```

Configuring a Port for a Printer: Web Interface

Use this topic to configure a printer from the web interface.

1. From the main menu, choose Advanced Configuration > Serial Port.
2. In the Modification of port section, set the Mode to printer and adjust other serial communication parameters as required by your printer. The following screen is an example.

General configuration														
Port	Interface	Mode	Baud rate	Parity	Char. size	Stop bit	Flow control	Fifo	Flush on	Line Ctrl	Quick	Idle Timeout	RTS	DTR
1	232c	term	9600	none	8	1	xon/xoff	Yes	both	local	Yes	0	up	up
2	232c	term	9600	none	8	1	xon/xoff	Yes	both	local	Yes	0	up	up
3	pstn	ppp	115200	none	8	1	RTS/CTS	Yes	both	modem	Yes	0	up	up

Modification of port: 1 Default Cancel OK

Mode	Flow control	Baud Rate	Parity	Char. size	Stop bit	Fifo
printer	xon/xoff	9600	none	8	1	<input checked="" type="checkbox"/>

Flush on	Line Ctrl	Quick	Idle Timeout	RTS	DTR
both	local	<input checked="" type="checkbox"/>	0 s	up	up

3. Choose OK > Save > OK.

Configuring a Port for a Terminal

Use the information in this section to configure a device server port for a terminal, which can be done from the command line or from the web interface.

Configuring a Port for a Terminal: Command Line

Use this topic to configure a terminal from the command line.

1. To set the serial port's mode for a terminal, enter the following command:

```
serial mode term port-num
```

where *port-num* is the port to which the terminal will be connected

```
serial mode term 2
```

2. To configure device server for the appropriate terminal emulation, enter the following command:

```
serial term termtyp port
```

where *type* can be ansi, vt300, vt200, vt220, vt100, wyse50, wyse60, wyse100, wyse350, wyse120 and where *port* is the port to configure

```
serial term termtyp wyse50 2
```

3. To set the port for local control, which is typically required for terminal connections, enter the following command:

```
serial linectl local port-num
```

where *port-num* is the port to which the terminal will be connected

```
serial linectl local 2
```

4. To set serial port communications parameters to work with your terminal, use the table below to identify the commands required to adjust these parameters. For more information on commands, see the *device server Command Reference*.

To Change...	Command	Example
Character size	serial <i>csize</i> <i>size</i> <i>port</i>	serial <i>csize</i> 8 2
Flow control	serial <i>flowctrl</i> <i>flow</i> <i>port</i>	serial <i>flowctrl</i> hard 2
Parity	serial <i>parity</i> <i>parity</i> <i>port</i>	serial <i>parity</i> odd 2
Line speed	serial <i>speed</i> <i>bps</i> <i>ports</i>	serial <i>speed</i> 19200 2
Stop bits	serial <i>stopb</i> <i>bits</i> <i>ports</i>	serial <i>stopb</i> 1 all

5. To save the configuration, enter the following command:

```
save
```

Configuring a Port for a Terminal: Web Interface

Use this topic to configure a terminal from the web interface.

1. From the main menu, choose Advanced Configuration > Serial Port.
2. In the Modification of port section, set the Mode to terminal and adjust other serial communication parameters as required by your terminal. The following screen is an example.

Modification of port: 2							Default	Cancel	OK
Mode	Flow control	Baud Rate	Parity	Char. size	Stop bit	Fifo			
term	xon/xoff	9600	none	8	1	<input checked="" type="checkbox"/>			
Flush on	Line Ctrl	Quick	Idle Timeout	RTS	DTR				
both	local	<input checked="" type="checkbox"/>	0 s	up	up				

3. Choose OK >.

The screen expands to display additional terminal-related parameters as shown below:

Parameters dedicated to the TERM mode												
Port	Auto	Telnet Local Echo	Telnet Local Flow	Modem Name	Eof Char	Kill Char	Erase Char	Telnet In Binary Mode	Telnet Out Binary Mode	Terminal Type	Welcome Enable	
1	termauto	Yes	Yes		^D	^C	^H	Yes	No	ansi	Yes	
2		Yes	Yes		^D	^C	^H	Yes	No	ansi	Yes	
3		Yes	Yes		^D	^C	^H	Yes	No	ansi	Yes	

Modification of port: 2		Default	Cancel	OK
Auto (Allocate this port to a predefined user)	termauto			
Telnet Local Echo	<input checked="" type="checkbox"/>			
Telnet Local Flow	<input checked="" type="checkbox"/>			
Modem	-NONE-			
EOF character	^D			
Kill character	^C			
Erase character	^H			
Telnet input binary mode	<input checked="" type="checkbox"/>			
Telnet output binary mode	<input type="checkbox"/>			
Term (Terminal emulation)	ansi			
Welcome enable	<input checked="" type="checkbox"/>			

4. Choose OK > Save > OK.

Configuring Ports for Reverse Telnet Connections

Use the information in this section to configure ports for reverse Telnet connections, that is, Telnet connections to a device server port. This type of connection is usually used in a console management configuration to access a device, such as a Cisco router, connected to a serial port.

You can configure these connections using the command line or the web interface.

Configuring Ports for Reverse Telnet Connections: Command Line

1. To set the serial port's mode for reverse Telnet, enter the following command:

```
serial mode rtelnet port-num
```

where *port-num* is the port to which the device will be connected

```
serial mode rtelnet 2
```

2. To set the port for local control, which is typically required for these connections, enter the following command:

```
serial linectl local port-num
```

where *port-num* is the port being configured as in the example:

```
serial linectl local 2
```

3. To set serial port communications parameters to work with the serial device, use the table below to identify the commands required to adjust these parameters. For more information on commands, see the *device server Command Reference*.

To Change...	Command	Example
Character size	serial csize <i>size port</i>	serial csize 8 2
Flow control	serial flowctrl <i>flow port</i>	serial flowctrl hard 2
Parity	serial parity <i>parity port</i>	serial parity odd 2
Line speed	serial speed <i>bps ports</i>	serial speed 19200 2
Stop bits	serial stopb <i>bits ports</i>	serial stopb 1 all

4. To save the configuration, enter the following command:

```
save
```

Configuring Ports for Reverse Telnet Connections: Web Interface

1. From the main menu, choose Advanced Configuration > Serial Port.
2. In the Modification of port section, set the Mode to Rtelnet and adjust other serial communication parameters as required by the connected device. The following screen is an example.

Modification of port: 2							Default	Cancel	OK
Mode	Flow control	Baud Rate	Parity	Char. size	Stop bit	Fifo			
rtelnet	xon/xoff	9600	none	8	1	<input checked="" type="checkbox"/>			
Flush on	Line Ctrl	Quick	Idle Timeout	RTS	DTR				
both	local	<input checked="" type="checkbox"/>	0 s	up	up				

3. Choose OK > Save > OK.

Configuring Ports for Modem-Connected Terminals

Use this section to configure a port for an inbound-modem that will connect a terminal to the device server. Do not use this procedure for PPP connections. For information on configuring PPP connections, see "" on page 33.

Configuring Ports for Modem-Connected Terminals: Command Line

Use this procedure to configure a port from the command line for an inbound modem-connected terminal.

1. To set the serial port's mode for a terminal, enter the following command:

```
serial mode term port-num
```

where *port-num* is the port to configure

```
serial mode term 2
```

2. To configure device server for the appropriate terminal emulation, enter the following command:

```
serial term termtype type port-num
```

where *type* can be ansi, vt300, vt200, vt220, vt100, wyse50, wyse60, wyse100, wyse350, wyse120 and where *port* is the port to configure

```
serial term termtype wyse50 2
```

3. To add a modem form to the configuration, enter the following command:

```
modem add name
```

where *name* is a user-configurable name for the form

```
modem add 56k-ultra
```

4. To define a modem initialization string for the modem form, enter the following command:

```
modem init name init-string
```

where *name* is the name of the form just created and *init-string* is an AT command string to initialize the modem

```
modem init 56k-ultra "ate0&k3&d2s0=2"
```

5. To assign a modem form to the port, enter the following command:

```
serial term modem modem-name port-num
```

where *modem-name* is the name of the form that was just created

```
serial term modem 56k-ultra 2
```

6. To set the port for modem control, enter the following command:

```
serial linectl modem port-num
```

where *port-num* is the port to configure

```
serial linectl modem 3
```

7. To set serial port communications parameters to work with your modem, use the table below to identify the commands required to adjust these parameters. For more information on commands, see the *device server Command Reference*.

To Change ...	Command	Example
Flow control	serial flowctrl <i>flow port</i>	serial flowctrl hard 2
Line speed	serial speed <i>bps ports</i>	serial speed 19200 2

8. To save the configuration, enter the following command:

```
save
```

Configuring Ports for Modem-Connected Terminals: Web Interface

Use this procedure to configure a port from the web interface for an inbound modem-connected terminal.

1. From the Advanced Configuration menu, choose Modem.

- When the Modem screen appears, choose Add and then supply a name for the new form.
- Fill in the initialization string as required by your modem. The following is an example.

MODEM form		dialin	Add	Delete	Cancel	OK
Comments						
Init string	ate0&k3&d2s0=2					
Dial string	atd					

- Choose OK.
- From the main menu, choose Advanced Configuration > Serial Port.
- In the Modification of port section, set the Mode to terminal and adjust other serial communication parameters as required by the modem. The following screen is an example.

Modification of port: 1							Default	Cancel	OK
Mode	Flow control	Baud Rate	Parity	Char. size	Stop bit	Fifo			
term	xon/xoff + RTS/CTS	115200	none	8	1	<input checked="" type="checkbox"/>			
Flush on	Line Ctrl	Quick	Idle Timeout	RTS	DTR				
both	local	<input checked="" type="checkbox"/>	0 s	up	up				

- Choose OK.
- In the Parameters dedicated to Terminals sections of the same screen, enter information about the terminal as required and associate the modem form to this port in the Modem field. The following is an example.

Parameters dedicated to the TERM mode											
Port	Auto	Telnet Local Echo	Telnet Local Flow	Modem Name	Eof Char	Kill Char	Erase Char	Telnet In Binary Mode	Telnet Out Binary Mode	Terminal Type	Welcome Enable
1		Yes	Yes		^D	^C	^H	Yes	No	ansi	Yes
2		Yes	Yes		^D	^C	^H	Yes	No	ansi	Yes

Modification of port: 2		Default	Cancel	OK
Auto (Allocate this port to a predefined user)	autouser			
Telnet Local Echo	<input checked="" type="checkbox"/>			
Telnet Local Flow	<input checked="" type="checkbox"/>			
Modem	dialin			
EOF character	^D			
Kill character	^C			
Erase character	^H			
Telnet input binary mode	<input checked="" type="checkbox"/>			
Telnet output binary mode	<input type="checkbox"/>			
Term (Terminal emulation)	ansi			
Welcome enable	<input checked="" type="checkbox"/>			

- Choose OK > Save > OK.

Configuring Outbound (Dialout) PPP Connections: Web Interface

When using the Web Interface to configure the Digi Flex, be sure to set the cache on your browser to Every Visit to the Page.

To configure the Digi Flex for a PPP dialout connection, do the following:

1. Enter the Digi Flex's IP address in a browser's address bar.
2. Login as `root` with the password `dbps`.
3. Choose Quick Install > Remote Access.
4. Choose Host > Outgoing > Next.

Type of the remote equipment	network <input type="radio"/>	host <input checked="" type="radio"/>	
Direction of connection	incoming <input type="radio"/>	outgoing <input checked="" type="radio"/>	bi-directional <input type="radio"/>

5. Select port 3 > choose dialout for Modem type > Next.
6. Choose Next to leave the default of zero minutes for the timeout setting.
7. Enter the information requested in the four fields and choose Next.

Menu
>> >> Remote Access >> Outgoing Ppp

Remote access configuration (connection from a remote host or network)

If the router located on the remote network is protected, specify here your access name and password

Remote phone number	9-701-555-5555
IP address of remote host (ex: 192.168.3.1)	192.168.25.2
Access login	username
Access password	password

8. Choose Terminate to save the dialout PPP configuration.
The Digi Flex reboots automatically.

Configure Inbound (Dialin) PPP Connections: Web Interface

When using the Web Interface to configure the Digi Flex, be sure to set the cache on your browser to Every Visit to the Page.

1. Enter the Digi Flex's IP address in a browser's address bar.
2. Login as `root` with the password `dbps`.
3. Choose Quick Install > Remote Access.

Type of the remote equipment	network <input type="radio"/>	host <input checked="" type="radio"/>	
Direction of connection	incoming <input checked="" type="radio"/>	outgoing <input type="radio"/>	bi-directional <input type="radio"/>

4. Choose Host > Incoming > Next.
5. Select Port 3 > dialin > Next.

6. Choose Next.
Choosing Next leaves the timeout value at the default setting of zero minutes.
7. Choose a PPP authentication method from the drop down menu and enter an available IP address in the IP address field.
The default IP address is the IP address of the Digi Flex plus 1.
8. Choose Next.
9. Choose Users > Add > enter a username at the User Prompt screen > OK.

User form				jacklynch	Next >>	Add	Delete	Cancel	OK
Password	Mode	Audit	Comments						
XXXXXXXXXX	telnet	<input checked="" type="checkbox"/>							
--Callback--									
No callback	Callback #1	Callback #2	Callback #3						
--IP addressing--									
IP address	143.191.2.152	Netmask	255.255.255.255						
--Automatic connexion--									
IP address	143.191.27.101								
--Telnet mode--									
Port	23	Script							
--SSH mode--									
Authentication	Cipher	Compression	SSH public key						
password	des	<input type="checkbox"/>							

10. Enter a password > fill in other fields as needed > OK.
To add additional users, choose Add and repeat the last two steps.
11. Choose Next > Next.
12. Choose Terminate.
The Digi Flex saves the new configuration and reboots.
Your Digi Flex is configured for inbound PPP connections.

About the device server SNMP Agent

Introduction

device server implements an SNMP agent, a component that responds to requests from an SNMP manager—that retrieves network management information from its node and notifies the manager when significant events occur.

MIB Support

The agent supports the following MIBs:

- Read-write for MIB II (RFC 1213), which is an Internet-standard MIB, consisting of managed objects from the systems, interfaces, IP, ICMP, TCP, UDP, transmission, and SNMP group
- Read-write for the character-stream devices using SMIv2 MIB (RFC 1658)
- Read-write for the RS-232-like hardware devices MIB (RFC 1659)
- Read-write for the device server IP Network Control Protocol of the Point-to-Point Protocol MIB (RFC 1473)

Message Support

The SNMP agent supports the Set, Get, GetNext, and Trap messages as defined in RFC 1157. These messages are used as follows:

- Set, which means set the value of a specific object from one of the supported MIBs
- Get, which means retrieve the value of a specific object from one of the supported MIBs
- GetNext, which means retrieve the value of the next object in the MIB
- Trap, which means send traps to the manager when a particular type of significant event occurs

Supported Traps

The agent can send traps when any of the following occur:

- Cold starts (device server initializes)
- Authentication failures

Configuring the SNMP Agent

Configuring the SNMP Agent: Command Line

Use this procedure to configure the SNMP agent from the command line.

1. To configure an SNMP manager for this agent, enter the following command:

```
snmp manager ip-address
```

where *ip-address* is the IP address of the SNMP management station

```
snmp manager 192.168.3.150
```

2. To configure a password that the agent will use for get requests, enter the following command:

```
snmp public password
```

where *password* is a password. The default is "public."

```
snmp public button8
```

3. To configure a password that the agent will use for set requests, enter the following command:

```
snmp private password
```

where *password* is a password. The default is "private."

```
snmp private buddy10
```

4. To configure information about the SNMP administrator, enter the following commands:

```
snmp contact admin-name
```

```
snmp location admin-location
```

where *admin-name* and *admin-location* are a user-definable name and address. If there are spaces in the name and address, surround the entry with quotation marks.

```
snmp contact "Joe Smith"
```

```
snmp location "Main MIS Station"
```

```
snmp name product-name
```

where *product-name* is a user configurable name. If this names has spaces in it, enclose the name in quotation marks.

```
snmp name "DigiFlex--Marketing"
```

5. To save the configuration, enter the following command:

```
save
```

Managing the Configuration

The Digi Flex allows you to store the configuration file on a server and then restore it to the unit. This section discusses how to transfer the configuration file to the server and how to restore it to the device server.

Copying the Configuration to a Server: Command Line

1. Ensure that TFTP is running on the server.
2. Name the configuration file by entering the following command:

```
system config path filename
```

where *filename* is the name to call the configuration file

```
system config path dg1-flex-config
```

3. To specify a server to which the configuration will be copied, enter the following command:

```
system config server ip-address
```

where *ip-address* is the IP address of the server to which the configuration will be copied

```
system config server 143.191.3.100
```

4. To save this configuration, enter the following command:

```
save
```

5. To copy the configuration to the server, enter the following command:

```
system config store
```

Copying the Configuration to a Server: Web Interface

1. Ensure that TFTP is running on the server.
2. From the main menu, choose Advanced Configuration > System.
3. Access the Configuration File section (as shown below)

Configuration file [menu]		Store	Load	Default	Cancel	OK
Remote TFTP server	<input type="text" value="0.0.0.0"/>					
Name of configuration file	<input type="text" value="/tftp/digi.cfg"/>					
Save (To save configuration file on remote TFTP server, click on 'Store' button.)						
Restore (To restore configuration file from remote TFTP server, click on 'Load' button)						

4. Enter an IP address for the server to which the configuration file will be transferred and a name for the configuration file.
5. To transfer the configuration file, choose Store.
6. To save the configuration, choose Save.

Copying the Configuration from a Server: Command Line

1. Ensure that TFTP is running on the server.
2. Name the configuration file by entering the following command:

```
system config path filename
```

where *filename* is the name of the configuration file to restore

```
system config path dg1-flex-config
```

3. To specify the server from which the configuration will be copied, enter the following command:

```
system config server ip-address
```

where *ip-address* is the IP address of the server from which the configuration will be copied

```
system config server 143.191.3.100
```

4. To save this configuration, enter the following command:

```
save
```

5. To copy the configuration from the server, enter the following command:

```
system config load
```

Copying the Configuration from a Server: Web Interface

1. Ensure that TFTP is running on the server.
2. From the main menu, choose Advanced Configuration > System.
3. Access the Configuration File section (as shown below)

Configuration file [menu]		Store	Load	Default	Cancel	OK
Remote TFTP server	<input type="text" value="0.0.0.0"/>					
Name of configuration file	<input type="text" value="/tmp/digi.cfg"/>					
Save (To save configuration file on remote TFTP server, click on 'Store' button.)						
Restore (To restore configuration file from remote TFTP server, click on 'Load' button)						

4. Enter an IP address for the server from which the configuration file will be transferred and the name of the configuration file.
5. To transfer the configuration file to the device server, choose Load.

Upgrading the Firmware Using the Digi Administrator

This section tells you how to upgrade the device server firmware using the Digi Administrator. The procedure that follows assumes that you have installed the Administrator on a server.

1. Download the firmware to the server on which the Digi Administrator resides.
2. Start the Digi Administrator.
3. Choose Admin > Update firmware.
4. Enter the unit's IP address, the root login, and the root password.
5. Choose Next.
6. Navigate to the firmware files and then choose Update.
7. Follow the prompts.