Connectware™

Digi CM

Users Guide

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Contents

Chapter 1

Introduction

The Digi CM (console management) device provides for secure, flexible management of UNIX servers, routers, switches, and other networked devices. Key features of the Digi CM include support for:

- SSH v1 and v2 for server and clients
- IP filtering
- authentication using RADIUS, LDAP, TACACS+, and a local database
- custom menuing
- system and port logging

The configuration of these features, and many others, is simplified through the use of a web interface. The web interface enables an administrator to quickly access a configuration menu and configure the Digi CM as desired. The web interface supports both HTTP and HTTPS protocols.

User Groups

The Digi CM comes with built-in user groups. The four groups are defined by their access levels. The table below displays the various user groups, their access rights, and the default built-in user names if applicable.

	Capabilities				**Default Users**	
User Group	Access Ports	Configure Ports	Configure System Settings	Command Line Interface	Login	Default Password
root	yes	yes	yes	yes	**root**	**dbps**
system admin	yes	yes	yes	yes	**admin**	**admin**
port admin	yes	yes	no	no	-	-
user	yes	no	no	no	-	-

Username and Password

Root's password can be modified through the command line interface using the command passwd.

The Digi CM comes with two default users within the user groups, root and system admin.

Username	Default Password
root	dbps
admin	admin

Port administrators and users can easily be added by the system admin or root user through the web interface under System administration > User administration > Add user. Root's password must be modified from the command line using the command `passwd`.

Ways to Configure the Digi CM

There are three ways to configure the Digi CM. The three ways are:

- Web Interface
- Configuration Menu
- Command Line Interface

Web Interface

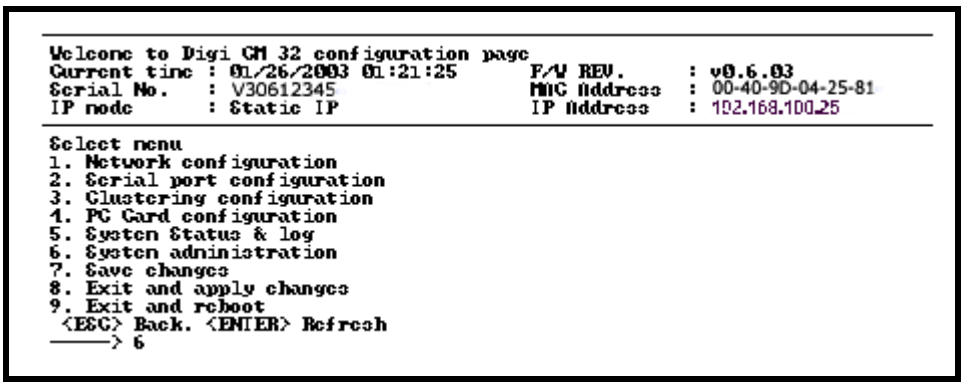
The Digi web interface features HTTPS for secure access.

The web interface provides a simple, convenient way to configure the Digi CM. It is accessible to all users, although not all users have the same access privileges. Root and the system administrator have full access rights to the web interface. The port administrator is allowed to access and configure the ports including port clustering, but cannot modify system settings. Users can also access the web interface, but are only permitted to access the ports.

To access the web interface, enter the IP address or Hostname for the Digi CM in the URL of a browser page. The following page is displayed after you have logged into the Digi CM. The menu on the left side of the page cascades as you select the main heading.

Configuration Menu

The configuration menu is a menu presented to the root user or system administrator from a Telnet session or by establishing a direct serial connection through the console port of the Digi CM. The functionality is similar to the web interface except for the ability to create custom menus. Root and the system administrator have full access rights to this menu. The port admin and user cannot access this menu. Root enters this menu from the command line interface by entering the command `configmenu`.



The Command Line Interface

The command line interface is accessed by the root user from a Telnet session or by direct access to the console port of the Digi CM using the username **root** and the default password **dbps**. A command prompt for the Linux console is displayed. No other users have access permission to the command line interface by default. The system administrator can be assigned command line interface privileges, but will have read only rights.

Ways of Accessing the Digi CM

There are four ways to access the Digi CM. The four ways are:

- Web Interface
- Port Access Menu
- Direct Port Access
- Custom Menus

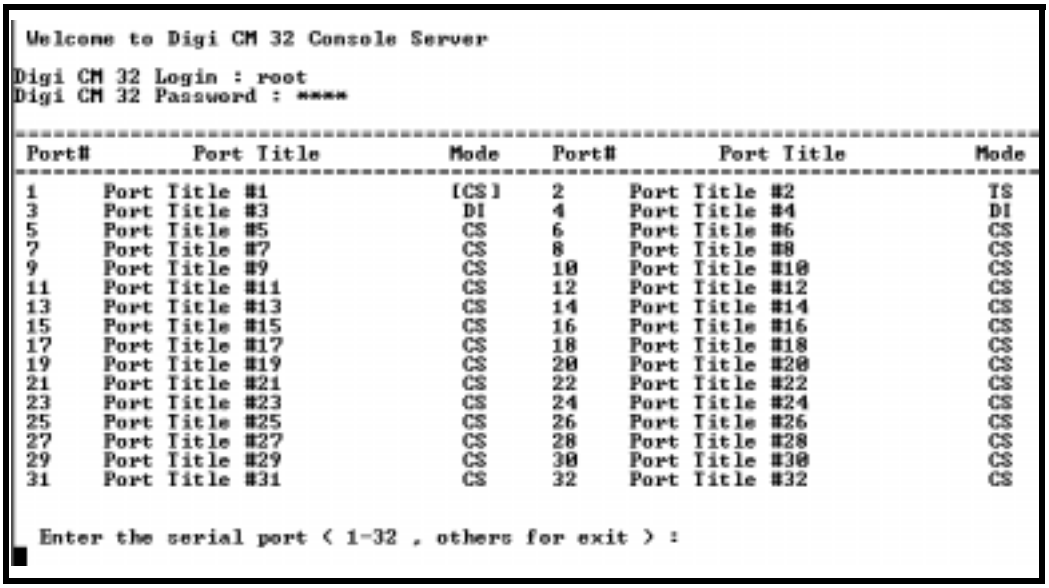
Web Interface Access Menu

The web interface menu also provides an easy and convenient method to access one or more ports. All users have access to this interface and enter the menu by entering the IP address or Hostname of the Digi CM in a web browser's URL. After logging in to the web interface, the user selects Serial Port > Connection and then the port to access.

Port Access Menu

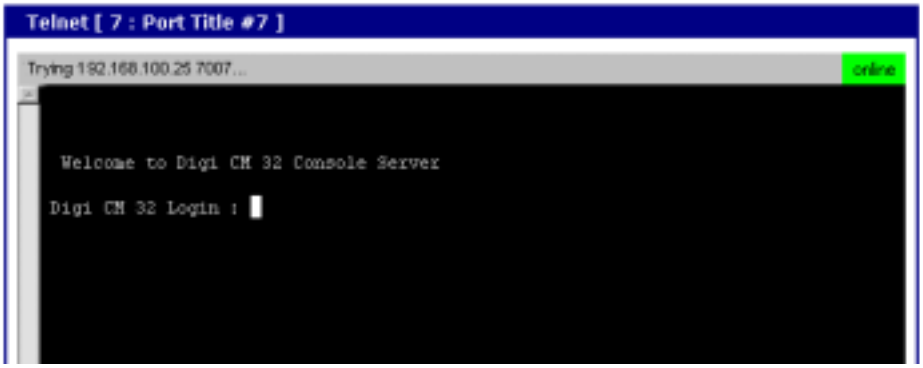
The Port Access Menu provides another option for accessing the serial ports. This menu is accessible to all users and can be accessed through the web interface, a Telnet session, remote access by a modem, and from SSH. Root can access the Port Access Menu through a Telnet session from the command line interface by doing the following:

Telnet to the IP address of the Digi CM with port number 7000. An example of the command is: telnet 192.168.100.200 7000



Accessing A Port Through the web interface

1. Access the web interface.
2. Choose a Port number or the Port Title.
   A Java applet opens with a login prompt.



Direct Port Access

The Digi CM allows you to connect directly to a single port through a Telnet or SSH session. Before you access a port using this method you need to make sure the port you are connecting to has been configured properly. The Host Mode Configuration must be set to Console Server Mode and the Protocol setting must be set to either Telnet or SSH. All ports are set to Console Server Mode and Telnet by default.

Telnet to a Port

Using a Telnet client, establish a connection to the IP address of the Digi CM, followed by the port number of the port you wish to connect. For example, to connect to port 3 of the Digi CM, simply enter the following command:

```
telnet [IP ADDR] 7003
```

This example assumes the base socket port of the Digi CM is 7000 (default).

SSH to a Port

Using an SSH client, establish a connection to the IP address of the Digi CM using the login name and port number of the port you wish to connect. For example, to connect to port 3 of the Digi CM using login name **admin**, simply enter the following command:

```
ssh admin@[IP ADDR]:7003
```

This example assumes the base socket port of the Digi CM is 7000 (default).

Custom Menus

Custom menus are menus created by either root or the system administrator and are designed for specific users or groups of users. The custom menu feature enables root or the system administrator to design menus customized to a user's needs. Custom menus are a method for users to view and access only those devices they have permission to enter. For details on configuring custom menus see "Making Custom Menus" on page 53.

Saving and Applying Changes

Changes to the Digi CM configuration done through the web interface can be saved by choosing Save to flash. These changes are then saved, but the configuration changes are not immediately in effect. To immediately apply the configuration changes select the Apply changes command found on the main menu.

Chapter 2 Getting Started

Introduction

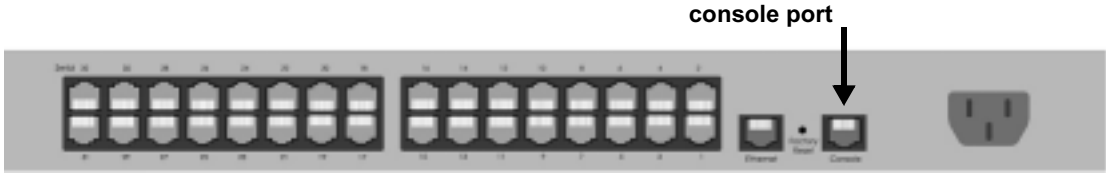
This chapter covers basic information for configuring the Digi CM. Included in this chapter is information on assigning IP settings, enabling the web interface for secure access, accessing the unit through SSH, and adding or removing users. The default IP address for the Digi CM is 192.168.161.5.

Assigning IP Settings

The default IP address is 192.168.161.5.

The initial setup of the Digi CM, including attaching it to the network, is described in the Quick Start Guide included with the product packaging. A copy of the Quick Start Guide is also available online at http://cm.digi.com. The Digi CM can also be assigned IP settings through the console port located on the rear panel. To use the console port to assign IP settings, do the following:

1. Connect the Ethernet cable from the console port on the rear panel of the Digi CM to a serial port on a workstation. Use the Ethernet cable packaged with the Digi CM and attach the DB-9 adapter. The arrow in the following graphic points to the console port.



2. Setup a terminal emulation program, such as HyperTerminal, using the following port parameters: bps=9600, data bits=8, parity=none, stop bits=1, and flow control=none.
3. Press Enter to get a command prompt.
4. The username is **admin** and the default password is **admin**.
5. From the configuration menu, enter the number 1 for Network configuration > enter 1 for IP configuration > enter the numbers for the individual IP settings when the following menu is displayed.

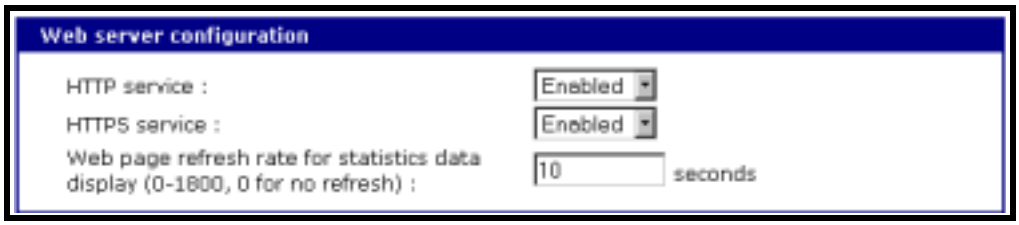
```
Network configuration --> IP configuration

Select menu
1. IP mode : static IP
2. IP address : 192.168.14.12
3. Subnet mask : 255.255.255.0
4. Default gateway : 192.168.0.120
5. Primary DNS : 221.218.110.4
6. Secondary DNS : 10.5.5.114
 <ESC> Back, <ENTER> Refresh
------>
```

6. Press ESC when done to return to the main configuration menu.
7. Enter number 6 to Save changes.
   The values are saved and applied immediately. There is no need to reboot.

Configuring HTTP and HTTPS

By default HTTP and HTTPS are enabled on the Digi CM device. To modify these settings, do the following:

1. Enter the IP address for the Digi CM in a web browser's URL.
2. Choose Web server configuration from the Network Configuration heading on the web interface menu.
3. Choose Enabled or Disabled.
4. Set the desired refresh rate for statistics data.
   The default value is 10 seconds.
5. Choose Save to flash and Apply changes.

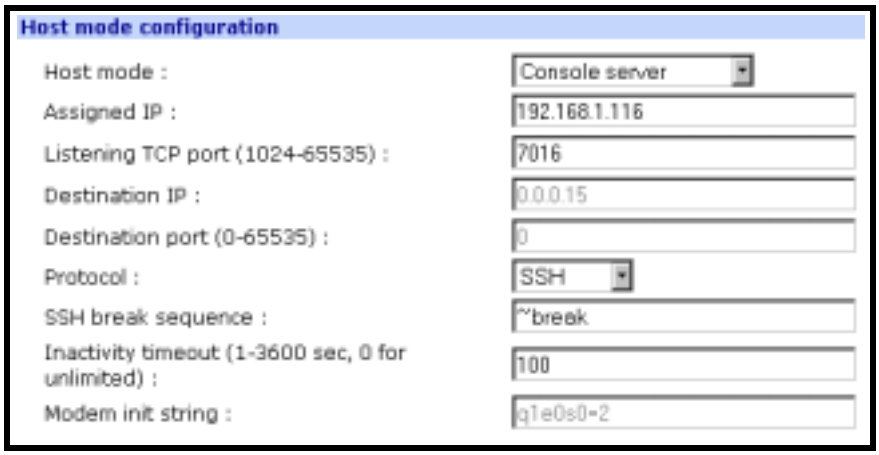


Access Using SSH

The Digi CM supports Blowfish and 3DES encryption methods for SSH.

The Digi CM can also be accessed through an SSH connection. The Port Access Menu and each individual port can be configured for SSH. Access an individual port for SSH by doing the following:

1. Access the web interface.
2. Use the username **admin** and the default password **admin**.
3. Under the Serial Port heading choose Configuration.
4. Choose the port or ports you want to configure for SSH, you can choose either: Port Access Menu, All ports, or an Individual port.



5. Choose Host mode configuration.

6. Under Protocol select SSH.
7. Choose Save to flash and Apply changes.

To access a port that has been configured for SSH, locate your preferred SSH client and initiate a session to the IP address and port as shown:
`ssh username@IPaddress 70XX`

An example for port 3 on a Digi CM would be:

```
ssh root@192.168.100.25 7003
```

Adding, Editing, and Removing Users

The system administrator can add, remove, or edit users from the web interface. To add or remove users or edit user files do the following:

1. Access the web interface.
2. Under the System administration heading choose Users administration.

3. Choose Add User, Edit User, or Remove User.
   - Add a user: Assign a name, user group, and a password
   - Edit user files: Change user group, password, or their shell
   - Remove a user: Remove a user from the system

4. Choose Save to flash and Apply changes.

Note: The root and admin users cannot be removed from the system. The password for root can only be changed from the command line using the command `passwd`.

Shell Options

The shell program selection determines the interface you see when establishing a Telnet or SSH session with the Digi CM.

User Group	Shell Program Options
root	command line
system admin	command line, configuration menu, port access menu, custom menus
port admin	configuration menu, port access menu, custom menus
user	port access menu, custom menus

Using the Configuration Menu

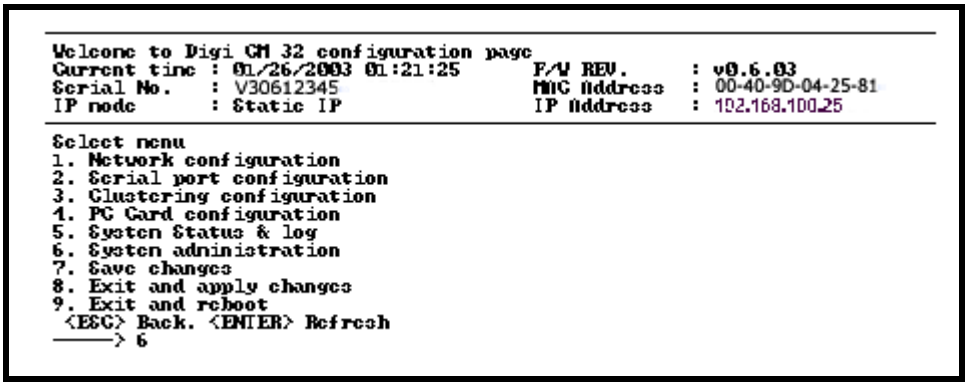
The configuration menu presents the same functionality in configuring the Digi CM as does the web interface excluding the creation of custom menus. The configuration menu is navigated by using the number representing the menu item and the ESC key to return to earlier menus. For the sake of clarity, the menu item names, not their corresponding numbers, will be used to explain the configuration options.

Use the Save changes option when you are done configuring all your parameters, then choose Exit and apply changes to have your changes take effect immediately.

Configuring SSH

The Save changes option saves changes to flash memory only.

1. Access the configuration menu from a Telnet session.
2. Use the username **admin** and the default password **admin**.



3. Choose Serial port configuration > choose an individual port number or 0 (zero) for all ports > Host mode configuration > Protocol > SSH.
4. Use the ESC key to return to the main configuration menu.
5. Choose Save changes.

Adding, Editing, and Removing Users

Choose Exit and apply changes when you have made all your changes.

1. Access the configuration menu.
2. Choose System administration > User administration > Choose Add, Remove, or Edit.
   Each choice will present different menu options.
3. Configure the user as desired.
4. Use the ESC key to return to the main configuration menu.
5. Choose Save changes.

Chapter 3 Installing and Configuring PC Cards

Introduction

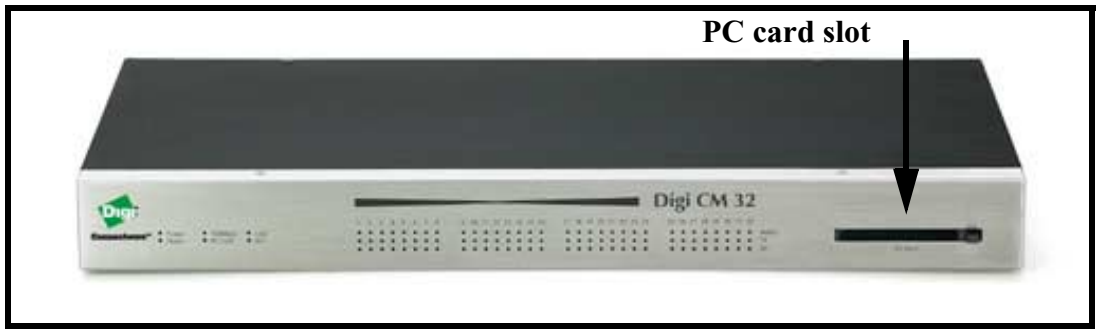
This chapter includes information on adding and configuring PC cards for the Digi CM. PC devices that can be added to the Digi CM include a serial modem, compact-flash card, wireless LAN card, and a network LAN card.

Compatible PC Cards

All compact-flash cards work with the Digi CM, but not all serial modem, wireless LAN, or regular LAN cards do. To see a list of compatible cards that have been tested with the Digi CM, visit the Digi support site at http://cm.digi.com

Adding a Compact-flash Card

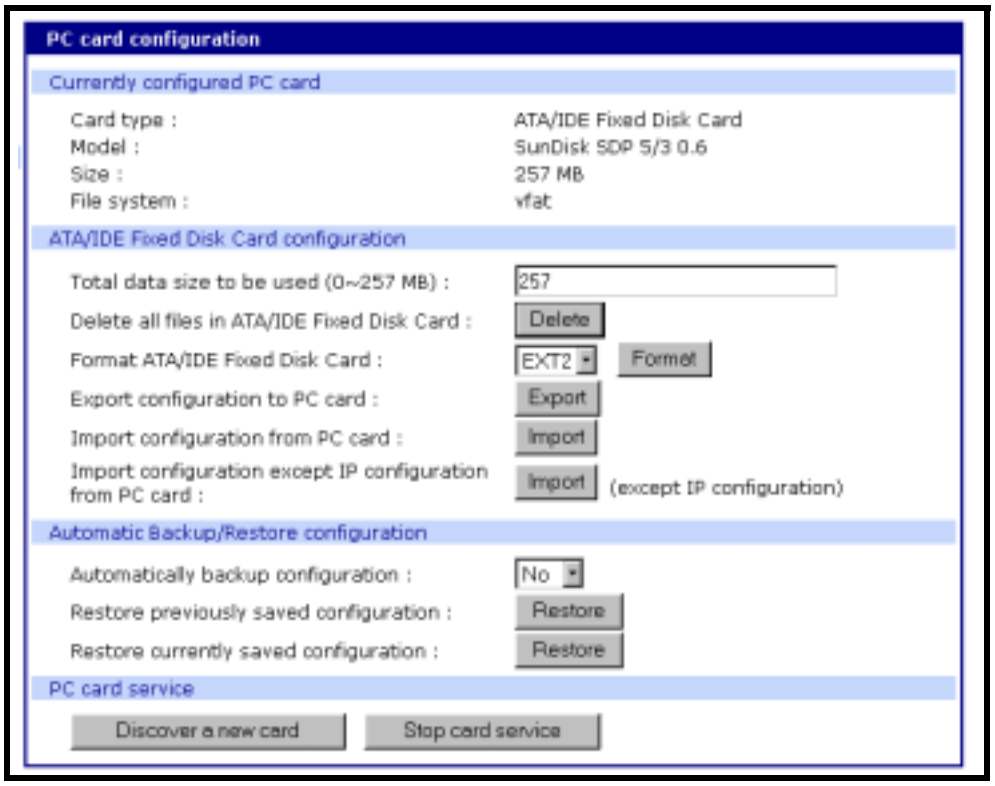
A PC card slot is located on the front panel of the Digi CM. The arrow in the following graphic indicates the PC card slot.



To install and configure the compact-flash card on the Digi CM, do the following.

1. Insert the card into the PC card slot.
2. Access the web interface.
3. Under the PC card heading choose Configuration.
4. Choose Discover a new card.
   The Digi CM searches for a PC card and displays a configuration menu.
5. Enter the appropriate parameters in the configuration menu.

Always select the Stop card service button before removing a PC card.



Configuring the Compact-flash Card

- Total data size to be used: Enter the amount of memory you want to assign to the compact-flash card for configuration files.
- Delete all files in ATA/IDE Fixed Disk Card: Select this button to clear the compact-flash card of all files.
- Format ATA/IDE Fixed Disk Card: The options are EXT2 or FAT formats. Select the format option and then select the Format button.
- Export configuration to PC card: Exports the current configuration to the compact-flash card.
- Import configuration from PC card: Imports the last saved configuration file from the compact-flash card.
- Import configuration except IP configuration: Imports the last saved configuration file from the compact-flash card excluding the IP settings.

Automatic Configuration File Backup

The Digi CM provides for automatic backup and restoration of the configuration files. Enter the parameters for enabling or disabling automatic back up configuration. The parameters are:

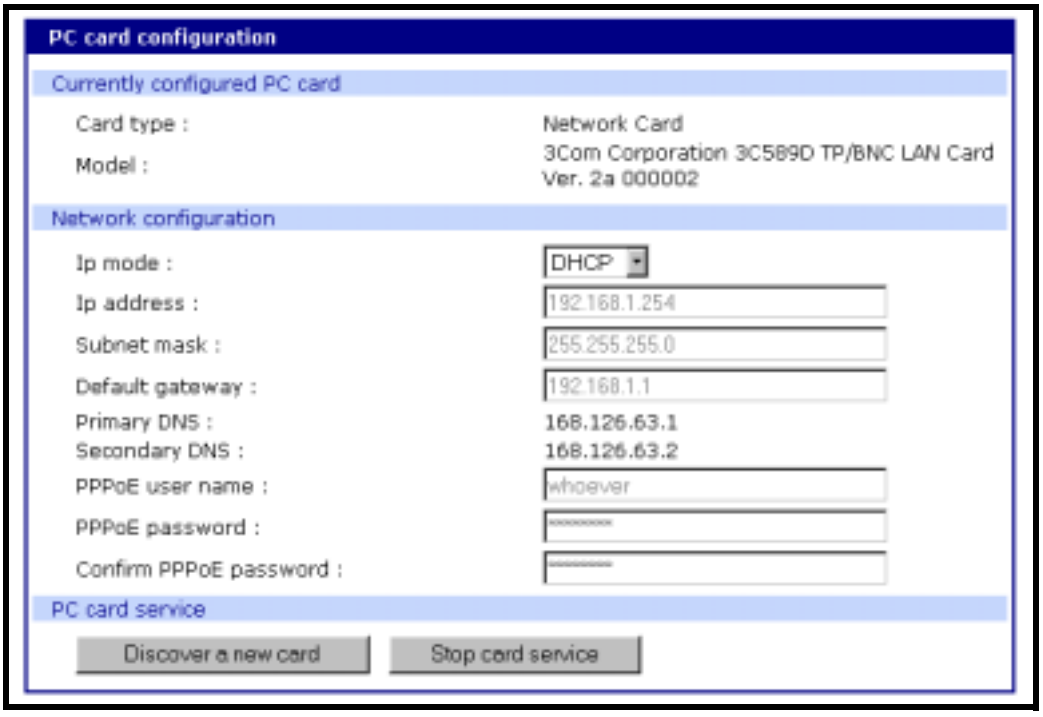
- Automatically backup configuration: The choices are Yes to enable and No to disable automatic backup.
- Restore previously saved configuration: The choice is to Restore.
- Restore currently saved configuration: The choice is to Restore.

6. Save to flash and choose Apply changes.

Adding a Network Card

To install and configure a network card on the Digi CM, do the following.

1. Insert the card into the PC slot.
2. Access the web interface.
3. Under the PC card heading choose Configuration.
4. Choose Discover a new card.
   The Digi CM searches for the PC card and displays a configuration menu.
5. Enter the appropriate parameters in the configuration menu.

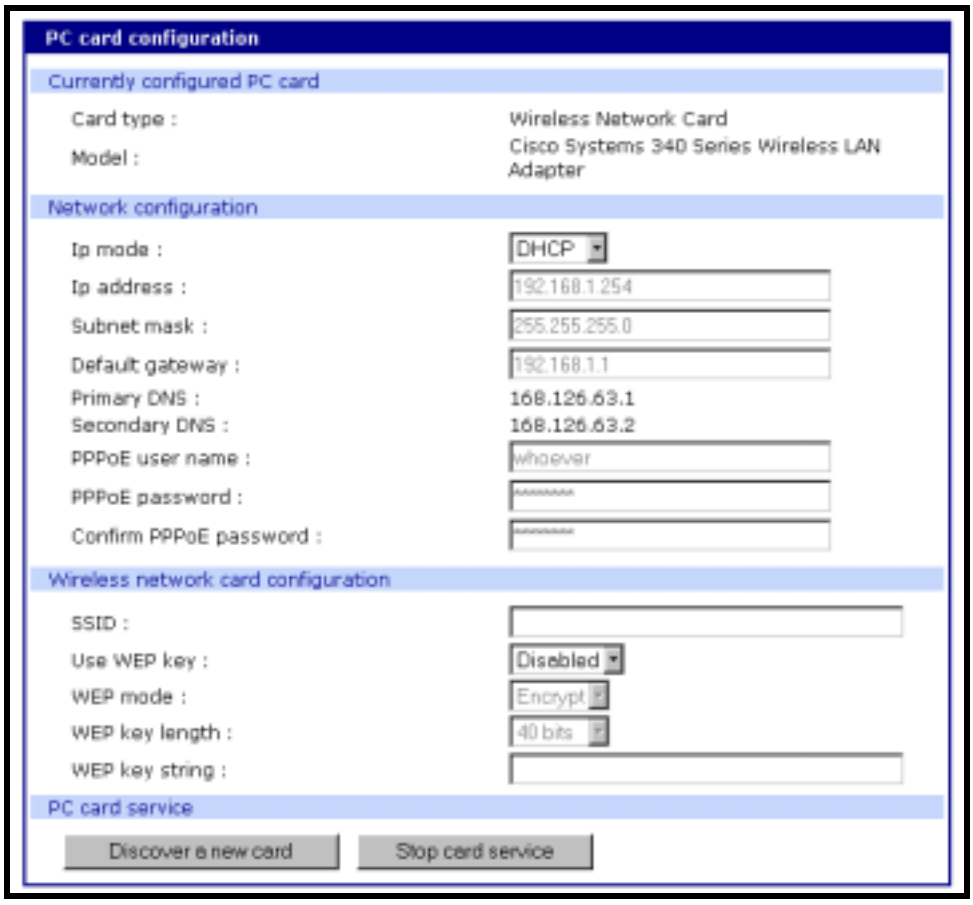


6. Save to flash and choose Apply changes

Adding a Wireless LAN Card

To install and configure a wireless LAN card on the Digi CM, do the following.

1. Insert the card into the PC slot.
2. Access the web interface.
3. Under the PC card heading choose Configuration.
4. Choose Discover a new card.
   The Digi CM searches for the PC card and displays a configuration menu.
5. Enter the appropriate parameters in the configuration menu.
   WEP is the acronymn for Wired Equivalent Privacy and is a security protocol for wireless LANs using encryption to protect data transfers. If you are unsure of the settings for the wireless card, see your network administrator.
   - SSID: Stands for Set Service Identifier and is the name of the wireless LAN network
   - Use WEP key: The options are to enable or disable the WEP key
   - WEP mode: Select the mode, either encrypted or unencrypted
   - WEP key length: The options are 40 or 128 bits if the WEP key is enabled
   - WEP key string: Refer to the wireless network administrator for the wireless encryption key string



6. Save to flash and choose Apply changes.

Adding A Serial Modem

The modem must first be inserted and installed on your system before it can be used. To configure the modem do the following:

1. Access the web interface.
2. From the menu choose Configuration under the PC card heading.
3. Choose Discover a new card.
   The Digi CM searches for a PC card and displays a configuration menu.

4. Modify or accept the default in Init string.
5. Save to flash and choose Apply changes.

Using the Configuration Menu

Adding and Configuring a PC Card

To add a modem card, compact-flash card, wireless LAN card, or a network card to the Digi CM using the configuration menu, do the following:

1. Access the configuration menu.
2. Choose PC Card configuration then Discover a new card.
   The system searches for the card and displays information on the product model number and type of card.
3. Configure the card by choosing Change card configuration.
4. Use the ESC key to backout to the main configuration menu.
5. Choose Save changes.

Chapter 4

Configuring Ports

Introduction

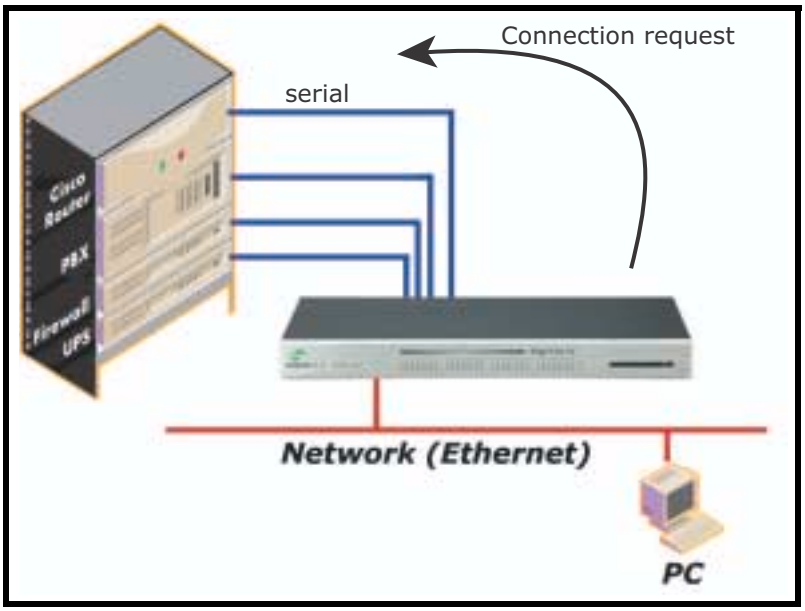
This chapter includes information for configuring the serial ports on the Digi CM. Serial ports can be configured for a particular host mode which defines the type of data communication between the port and a remote host. Ports can also be configured for a particular protocol, authentication method, or user access restriction.

Host Mode Configuration

The Digi CM provides for four modes of data communication between serial devices and remote hosts. The four modes are: console server mode, terminal server mode, dial-in modem mode, and dial-in terminal server mode. Below is a brief description of each mode.

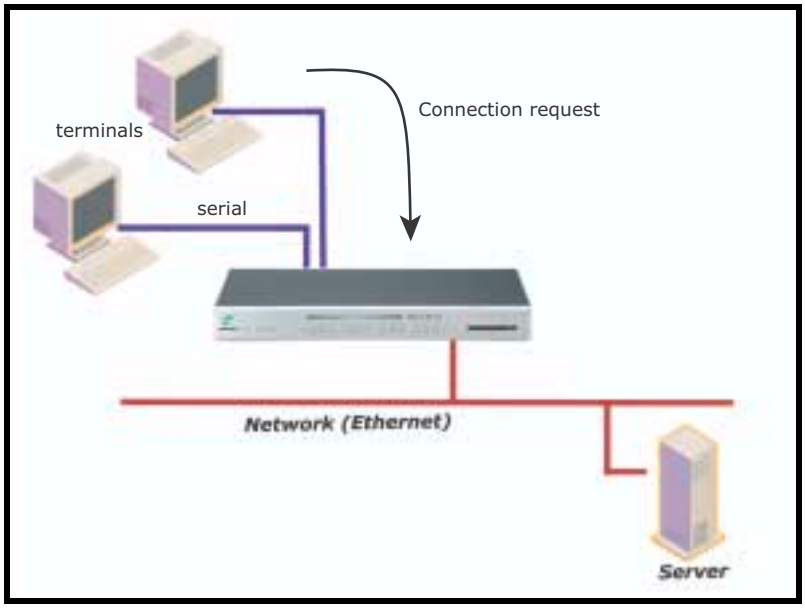
Console Server Mode

Configuring a serial port as a console server creates a TCP socket on the Digi CM that listens for a Telnet or SSH client connection. Users who connect to the TCP socket have access to the device attached to the serial port as though the device were connected directly to the network. RawTCP is also supported with the Console Server Mode.



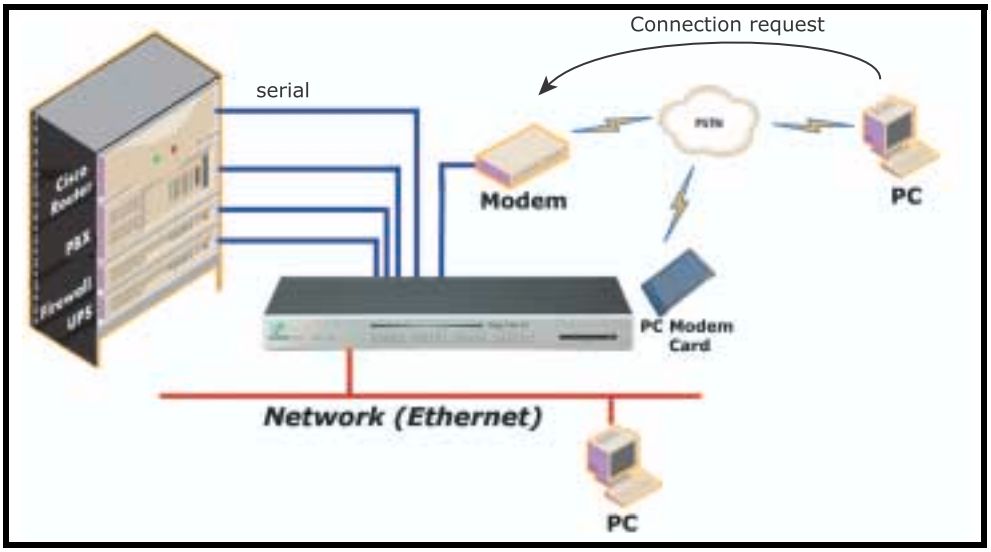
Terminal Server Mode

In terminal server mode, the Digi CM serial port is configured to wait for data from the device connected to the port. If data is detected, the Digi CM starts a TCP session as a Telnet or SSH client to a pre-defined server. The server must be defined by the user before the port can be configured for a Telnet or SSH client. This mode is used when the user wants to access servers on the network from a serial terminal. RawTCP is also supported with the Terminal Server Mode.



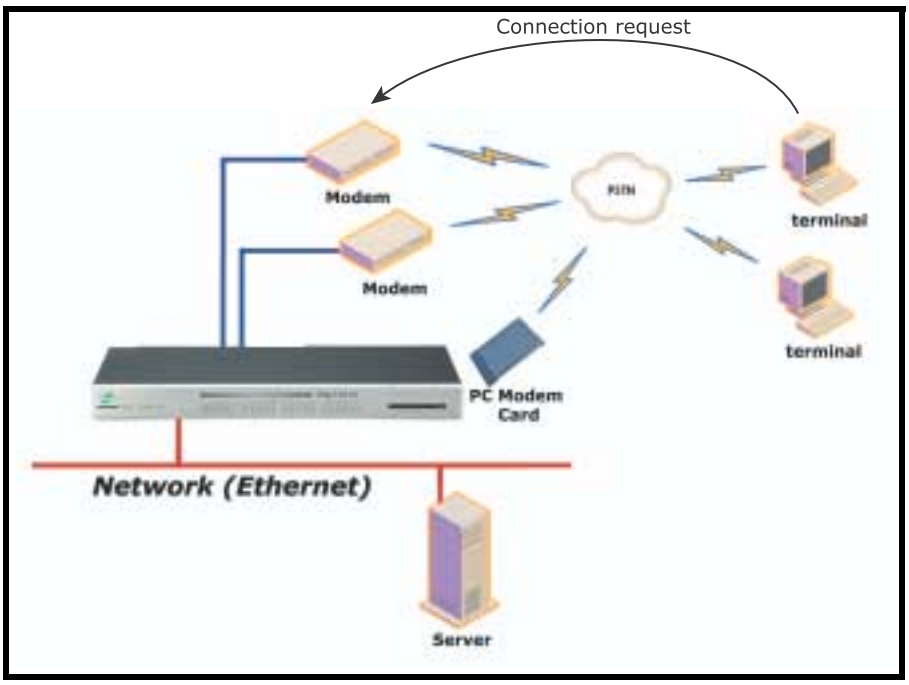
Dial-In Modem Mode

In this mode, the Digi CM assumes an external modem is attached to the serial port and is waiting for a dial-in connection from a remote site. When a user dials-in using a terminal application, the Digi CM accepts the connection and displays a menu listing available serial ports. Users can then select a serial port and access the devices attached to the Digi CM by selecting the serial port number from the menu.



Dial-In Terminal Server

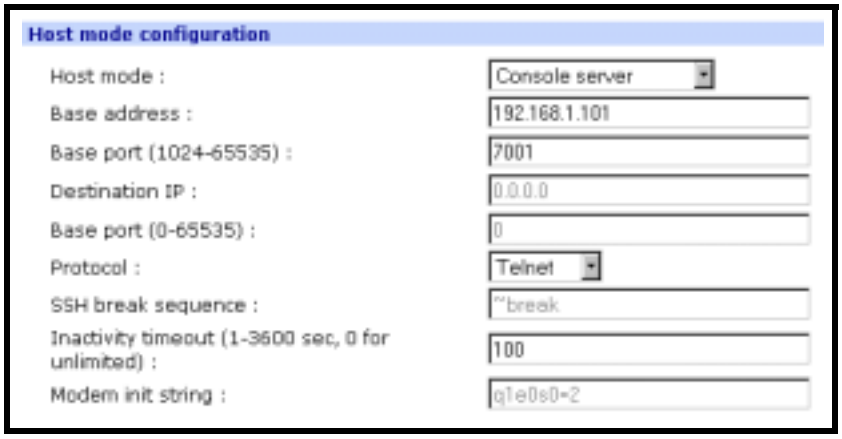
Dial-in terminal server mode is a combination of the terminal server mode and the dial-in modem mode. In the dial-in terminal server mode, the Digi CM assumes the serial port is connected to an external modem and is waiting for a dial-in connection from a remote site. When users dial-in using terminal applications, the Digi CM accepts the connection as a Telnet or SSH client to a pre-defined server. This mode is most frequently used when users want to use modems to access servers on a network.



Configuring Host Mode

To configure a serial port for host mode, enter the values in the applicable fields.To access the Host mode configuration screen, do the following:

1. Access the web interface.
2. Under the Serial Port heading choose Configuration.
3. Choose All or an Individual port > Host mode configuration.



4. Fill in the highlighted fields as they apply to your configuration.
   - Host mode: The options are console server mode, terminal server mode, dial-in modem mode, and dial-in terminal server mode
   - Base address: Also known as alternate IP where the user can Telnet directly to a serial port using an IP address
   - Base port: Also known as reverse Telnet where a user Telnets to a port using an IP address and a port number
   - Destination address: In terminal server mode the user connects directly to a port using an IP address
   - Destination port: In terminal server mode the user connects directly to a port with an IP address and port number
   - Protocol: The options are SSH, RawTCP, and Telnet
   - SSH break sequence: The sequence of characters that sends a break character to a device
   - Inactivity timeout: The timeout length ranging from 1 to 3600 seconds, 0 is unlimited timeout
   - Modem init string: Use the default string or enter your own string
5. Choose Save to flash and Apply changes.

Supported Protocols

The Digi CM supports three protocol options: SSH, Raw TCP, and Telnet.

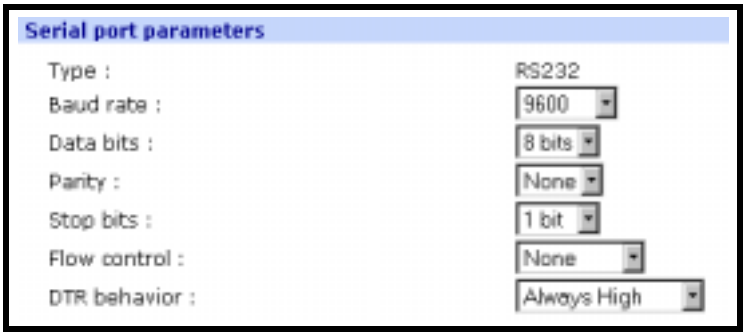
In configuring a serial port, the user has three protocol options. The three protocols available are: RawTCP, SSH, and Telnet. Choose SSH as the protocol for users logging in from an SSH client program to access a port. Choose RawTCP for users connecting directly to a TCP socket. Choose Telnet for users logging in from a Telnet client program and accessing the ports. Use the Host mode configuration page in the web interface to select the correct protocol.

Port Parameters

In attaching a serial device to a Digi CM serial port, the port parameters must match. The serial ports by default are enabled meaning users have full access to the port. To configure the port parameters for the Digi CM, do the following:

1. Access the web interface.
2. Under the Serial Port heading choose Configuration.
3. Choose All or an Individual port > Port parameters.
4. Fill in the following parameters:
   bps=9600, data bits=8, parity=none, stop bits=1, flow control=none, and DTR behavior=always high.

5. Choose Save to flash and Apply changes



DTR Settings

DTR can be set on the serial port to one of three settings: always high, always low, or High when open. Setting the DTR to High when open keeps the DTR high if a TCP connection is established. The DTR setting cannot be set by the user when the host mode is configured for dial-in modem or dial-in terminal server mode.

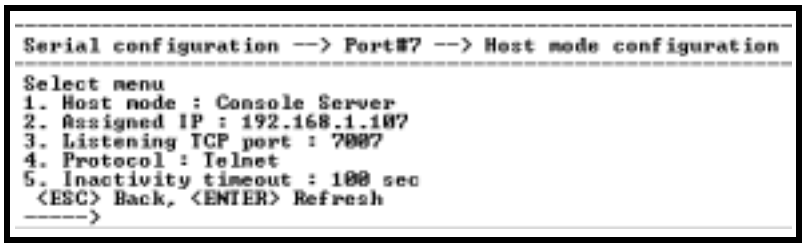
Inter-character Timeout

This setting is only available when the host mode protocol is set for RawTCP. The parameter sets the time value for the Digi CM to transfer data stored in the buffer. The Digi CM transfers data when the buffer is full using the TCP/IP protocol. However, if it is not full, the Digi CM will also transfer data dependent on the timeout value selected.

Using the Configuration Menu

Host Mode Configuration

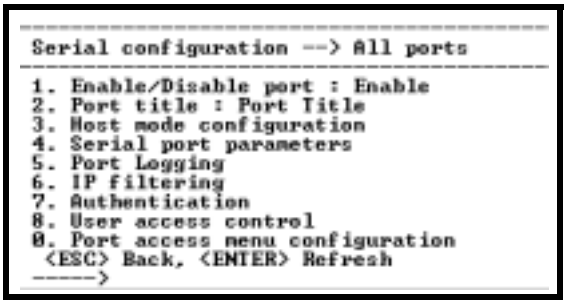
1. Access the configuration menu.
2. Choose Serial port configuration > choose an individual port number or 0 (zero) for all ports > Host mode configuration.



3. Enter the desired parameters for each menu item.
4. Use the ESC key when all parameters are entered to return to the main menu.
5. Choose Save changes.

Port Parameters

1. Access the configuration menu.
2. Choose Serial port configuration > choose an individual port number or 0 (zero) for all ports.



3. Enter the desired parameters for each menu item.
4. Use the ESC key when all parameters are entered to return to the main menu.
5. Choose Save changes.

Chapter 5 System and Port Logging

Introduction

The Digi CM provides four options for saving system and port logs. The options are: a syslog server, NFS server, compact-flash card, and the Digi CM memory. The Digi CM memory is saved to volatile memory, meaning the memory is cleared when the power is turned off. To use a syslog server, an NFS server, or a compact-flash card, you must first enable the devices and enter the required information. Compact-flash cards must be installed before they can be enabled and configured for logging purposes.

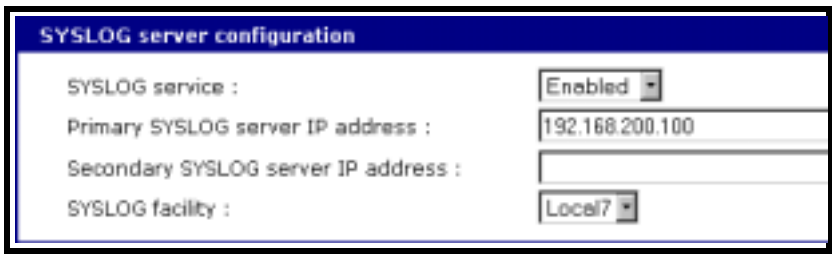
System logs track events such as logins, authentication failures, system configuration changes, and more. Port logs on the other hand document the data flow through the serial ports. Locations for viewing the system and port logs is outlined in this chapter.

Enabling System Logging Services

Enable Syslog Server

To enable the Digi CM for system or port logging on a syslog server, do the following:

1. Access the web interface.
2. Under the Network Configuration heading choose Syslog server configuration.
3. Choose Enabled.
4. Enter the IP address of the syslog server and select the syslog facility from the drop down menu.
5. Choose Save to flash and Apply changes.



Enable NFS Server

Log data can also be saved to an NFS server, but the NFS server must be configured with read and write privileges. To use an NFS server, the user must specify the NFS server's IP address and its mounting path. To enable the NFS server for port or system logging, do the following:

1. Access the web interface.
2. Under the Network Configuration heading choose NFS server configuration.
3. Choose Enabled.
4. Enter the IP address of the NFS server and enter the mounting path on the remote NFS server.
5. Choose Save to flash and Apply changes.

Enable A Compact-flash Card

The compact-flash card must be installed and configured on the Digi CM before it can be used for system logging or storing Digi CM configuration information. See "Adding a Compact-flash Card" on page 21.

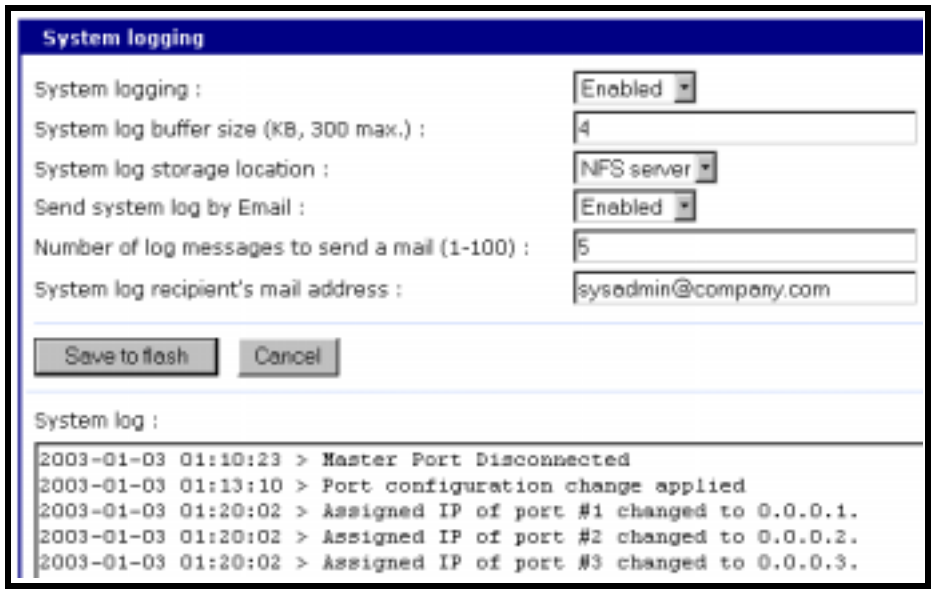
Enable Digi CM Memory

The Digi CM memory is already enabled for port logging and only needs to be configured for system or port logging. See "Configuring System Logging Services" on page 34.

Configuring System Logging Services

To configure the Digi CM for system logging, do the following:

1. Access the web interface.
2. Under System status and log choose System logging.
3. Choose Enabled for System logging and the log buffer size.
4. From the System log storage location choose the location you want from the drop down menu. The choices available are dependent on what you have enabled and/or installed. The Digi CM memory choice is always available.
5. Choose to enable or disable email alerts and the number of log messages to send. The default value is 5 seconds for the delay in log email messages.
6. Enter the contact person’s email address.
7. Choose Save to flash and Apply changes.



Viewing System Logs

The system logs can be viewed from the web interface on the System logging page or from the location where they have been saved. The following table lists the file locations of the system logs.

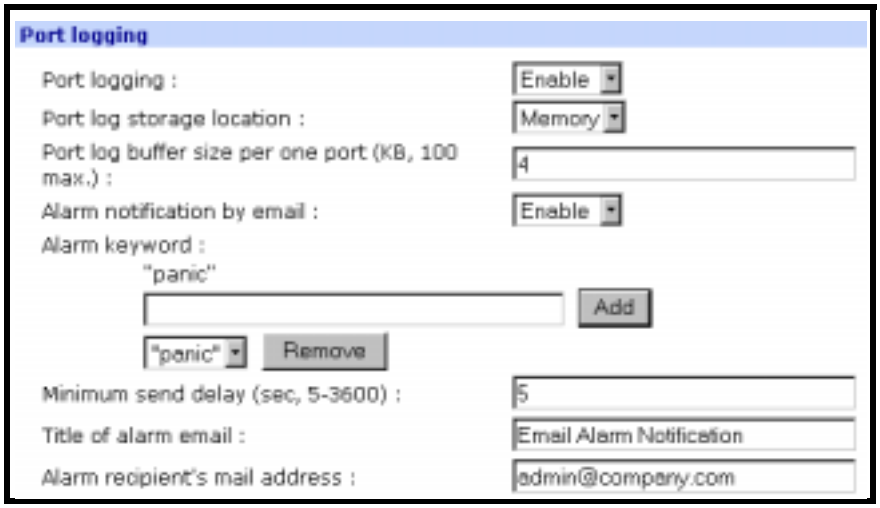
System Logfile	
Log Storage	File Location
Digi memory	/tmp/logs
Compact-flash card	/mnt/flash/logs
Syslog server	must be viewed on the syslog server
NFS server	/mnt/nfs/logs

Port Logging

If a serial port is configured for console server mode, the port logging feature can be enabled. Port logging allows the user to save serial data to the memory of the Digi CM, a compact-flash card, a syslog server, or to an NFS server. If the memory is used for port logging, all data will be cleared when the system's power is turned off.

Users can define alarm keywords for each serial port and send email alerts to enable unattended serial data monitoring. To configure a serial port for port logging in console server mode, do the following:

1. Access the web interface.
2. Under the Serial Port heading choose Configuration.
3. Choose All or the Individual port > Port logging.
4. Configure the settings.
5. Choose Save to flash and Apply changes.



Viewing Port Logs

The port logs can be viewed from the web interface on the Port logging page or from the location where they have been saved. The following table lists the file locations of the system logs.

Port Logfile	
Log Storage	File Location
Digi memory	/tmp/port#data
Compact-flash card	/mnt/flash/port#data
Syslog server	must be viewed from the syslog server
NFS server	/mnt/nfs/port#data

To view the port logs on the NFS server for port number 5, enter the following command:

more /mnt/nfs/port5data

Partial logfiles can also be viewed on the web interface by going to Serial port > Configuration > select a port you want to view > Port logging.

Using the Configuration Menu

System Logging

System logging is a two part process. First, the device being used to record the system logs must be configured. Secondly, system logging must be configured for the system under System status and log. System logs can be saved to the Digi CM system memory (there is no need to configure the memory), a compact-flash card, an NFS server, or a Syslog server.

Configure the System Log Device

To configure the compact-flash card for system logging see "" on page 22. For an NFS or Syslog server, do the following:

1. Access the configuration menu.
2. Choose Network configuration > NFS or SYSLOG server configuration.
3. Enter the desired parameters for the menu items.
4. Use the ESC key when all parameters are entered to return to the main menu.
5. Choose Save changes.

Configure System Logging

To configure the Digi CM for system logging, do the following:

1. Access the configuration menu.
2. Choose System Status and log > System log.

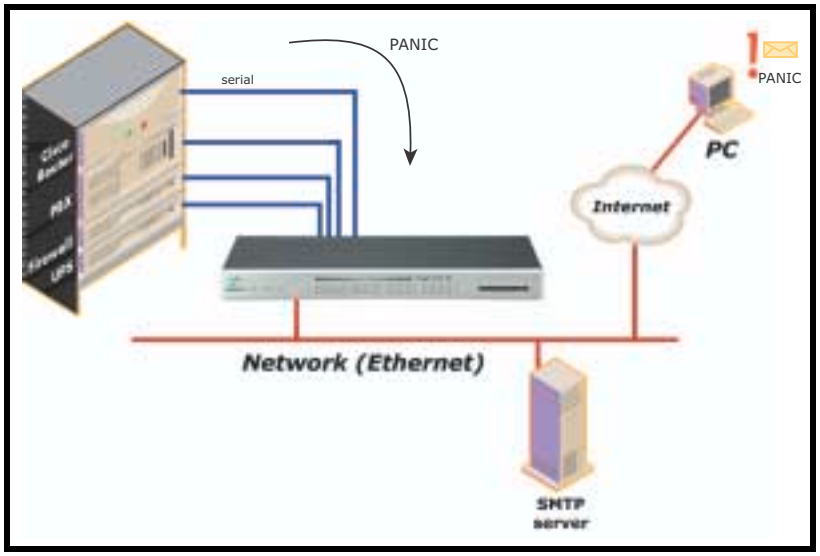
3. Enter the desired parameters for the menu items.
4. Use the ESC key when all parameters are entered to return to the main menu.
5. Choose Save changes.

Chapter 6 Alerts and Notifications

Introduction

The Digi CM can be configured for system alerts and notifications. It is designed to send email messages when the number of system log messages reaches a certain value or when an alarm message is detected in the serial port data. The Digi CM uses SMTP (Simple Mail Transfer Protocol) for sending the notifications. To use SMTP, the system administrator must configure a valid SMTP server for sending the emails. The Digi CM supports three types of SMTP servers: SMTP server without authentication, SMTP server with authentication, and POP before SMTP.

The Digi CM also supports SNMP. SNMP (Simple Network Management Protocol) is a protocol used to manage a network and monitor devices on a network. The Digi CM supports both versions 1 and 2 of the SNMP protocol. The main function of SNMP on the Digi CM is to allow a system administrator to query remote devices for information.



Configuring SMTP Alerts

Most SMTP servers check the sender's email address with the host domain name to verify the address as authentic. Consequently, when assigning an email address for the device email address, any arbitrary username with the registered hostname may be used. An example would be, username@company.com.

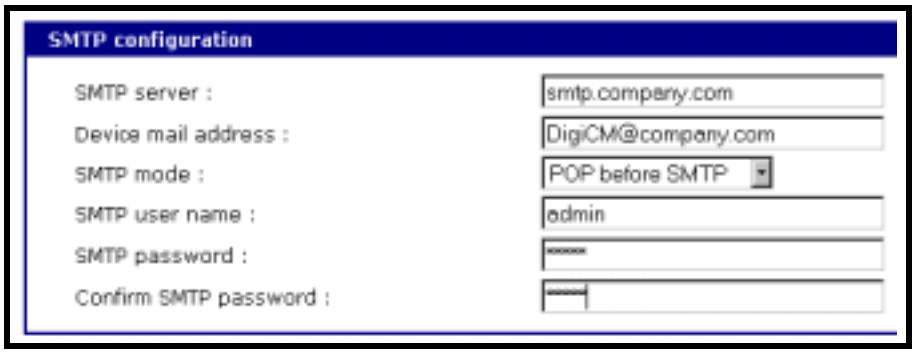
In configuring the Digi CM for SMTP alerts, the following parameters are required:

- SMTP server: Either the hostname or the IP address can be used

- Device mail address: Specifies the sender's email address for the log and alarm delivery
- SMTP mode: The type of SMTP server you want to use
- Username and password: Required for POP before SMTP and SMTP with authentication servers

To configure SMTP alerts on the Digi CM, do the following:

1. Access the web interface.
2. Under the Network Configuration heading choose SMTP configuration.
3. Fill in the required fields. SMTP with authentication and POP before SMTP require usernames and passwords.
4. Choose Save to flash and Apply changes.



SNMP Information

The Digi CM supports SNMP authentication traps.

Applications such as NMS (Network Management System) or an SNMP browser can exchange information with the Digi CM and control actions to the unit. The protocol functions defined for SNMP includes GET, SET, GET-Next, GET-Bulk, and TRAP. Below are the definitions of the protocol functions found in SNMP. Authentication traps are supported by the Digi CM.

Protocol	Function
GET	queries a device for more information
SET	makes changes to a device's state
GET-Next	after an initial GET query, goes to the next value
GET-Bulk	retrieves tables of information and security functions
TRAP	notifies a system administrator of a significant event

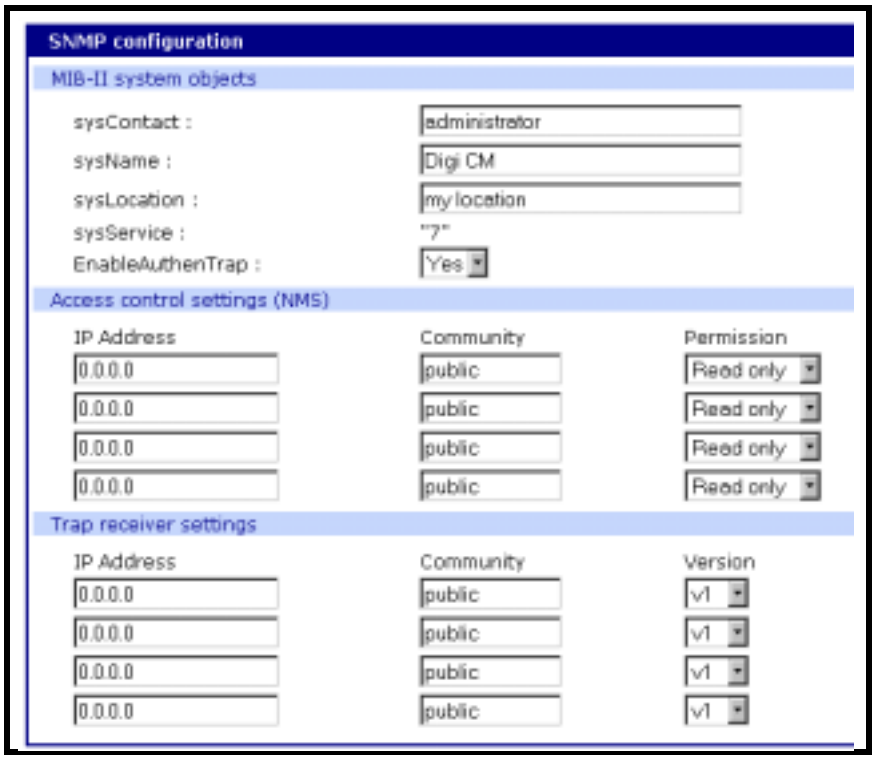
Configuring SNMP

To configure the Digi CM for SNMP do the following:

1. Access the Digi CM web interface.
2. Under the Network Configuration heading choose SNMP configuration.
3. Fill in information for the MIB-II system objects section and choose Yes under EnableAuthenTrap.
   - sysContact: Identity of the contact person managing the MIB-II system.

- sysName: The name identifying the system. By convention, this is the fully qualified domain name of the Digi CM unit. An example is: DigiCM@companyname.com.
- sysLocation: The physical location of the unit such as Room 264 or Engineering Lab.
- sysService (Read only): A series of values, separated by commas, indicating the set of services the system provides. By default the Digi CM only supports Application (7) service level.
- EnableAuthenTraps: Indicates whether the SNMP agent process is permitted to generate authentication failure traps. **This value overrides all other configuration information meaning all other authentication failure traps can be disabled with this setting.**

4. Enter Access control settings.
   - IP Address: Defines what applications can access the Digi CM SNMP agent to exchange information and control actions. If no IP addresses are listed, any application can access the SNMP agent.
   - Community: The options are public or private.
   - Permissions: The options are Read only or Read/Write.
5. Enter Trap receiver settings.
   - IP Address: Enter the IP address of the device receiving the trap alerts.
   - Community: The options are public or private.
   - Version: Choose the SNMP version, either version 1 or version 2c.
6. Choose Save to flash and Apply changes.



Managing the SNMP Protocol

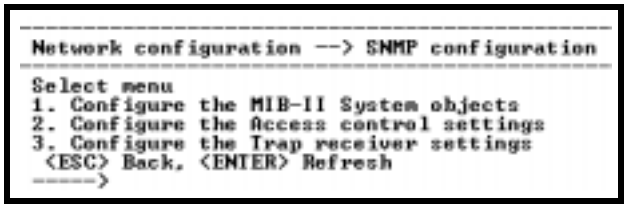
The Digi CM SNMP protocol can be managed using an NMS or SNMP browser. However, before the NMS or SNMP browser can access the data, the Access control settings must list the IP address of the host from which the browser is executed. See the preceding graphic for details.

Using the Configuration Menu

Configuring SNMP

To configure SNMP from the configuration menu, do the following:

1. Access the configuration menu.
2. Choose Network configuration > SNMP configuration.

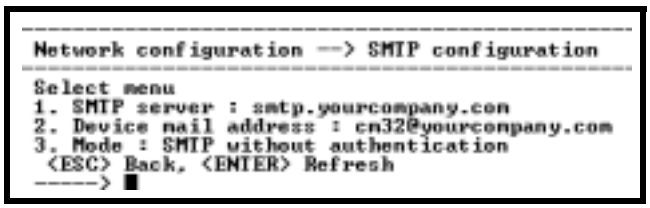


3. Enter the desired parameters for the menu items.
4. Use the ESC key when all parameters are entered to return to the main menu.
5. Choose Save changes.

Configuring SMTP

To configure SMTP from the configuration menu, do the following:

1. Access the configuration menu.
2. Choose Network configuration > SMTP configuration.



3. Enter the desired parameters for the menu items.
4. Use the ESC key when all parameters are entered to return to the main menu.
5. Choose Save changes.

Chapter 7 Configuring Security and Authentication

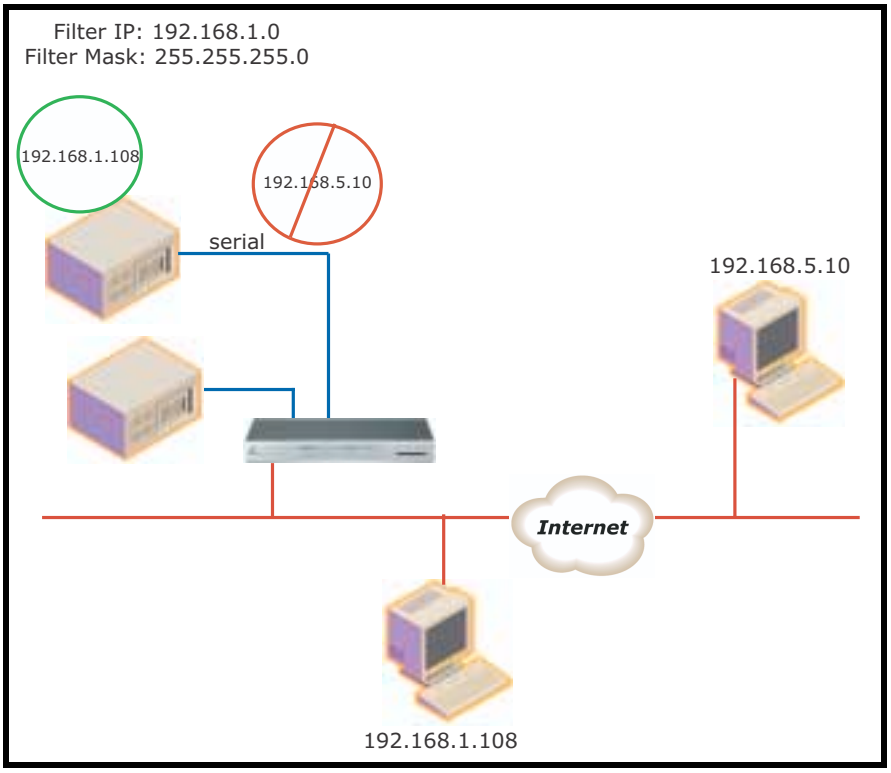
Introduction

The Digi CM provides several ways to control access to the network and the devices on the network. One method for controlling access is through IP filtering which allows or prevents users from specific IP addresses from accessing devices or serial ports on the network. IP filtering can be permitted or restricted for all ports globally or on a per port basis. Another method of controlling access is by restricting or permitting specific users. Users can be easily added or removed from either a restricted or permitted users list. Sniff session access is also discussed.

The Digi CM provides for various authentication methods. The four methods are: Local, RADIUS, TACACS+, and LDAP. Authentication may be configured where a secondary method is attempted if the primary method fails.

Configuring Network IP Filtering

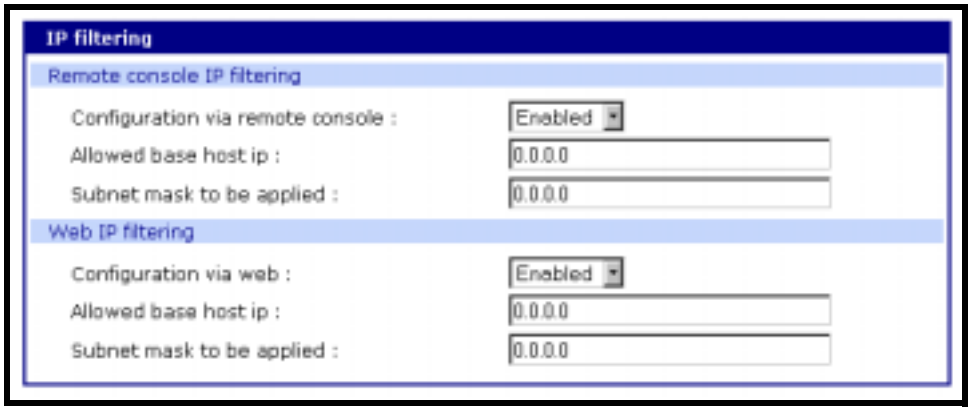
Access to the Digi CM can be controlled through IP filtering. IP filtering controls access to the Digi CM from remote hosts either trying to access from a remote console or a web browser. IP filtering can also be used to control access to individual ports.



Console and Web IP Filtering

IP filtering is a way of controlling access to the Digi CM from remote hosts. If the administrator wants to allow specific remote hosts access to the Digi CM, the administrator must provide the host's IP address and subnet mask. To configure the Digi CM for IP filtering, do the following:

1. Access the web interface.
2. Under the Network Configuration heading choose IP filtering.
3. Choose Enabled for either Remote console or Web IP filtering or both.
4. Enter the IP address and subnet mask for the remote host.
5. Choose Save to flash and Apply changes.



The following table displays examples of allowed remote hosts.

Allowable Hosts	Input format	
	Base Host IP address	Subnet mask
Any host	0.0.0.0	0.0.0.0
192.168.1.120	192.168.1.120	255.255.255.255
192.168.1.1 ~ 192.168.1.254	192.168.1.0	255.255.255.0
192.168.0.1 ~ 192.168.255.254	192.168.0.0	255.255.0.0
192.168.1.1 ~ 192.168.1.126	192.168.1.0	255.255.255.128
192.168.1.129 ~ 192.168.1.254	192.168.1.128	255.255.255.128

Serial Port IP Filtering

You can configure each serial port individually for IP filtering. To configure a serial port for IP filtering, do the following:

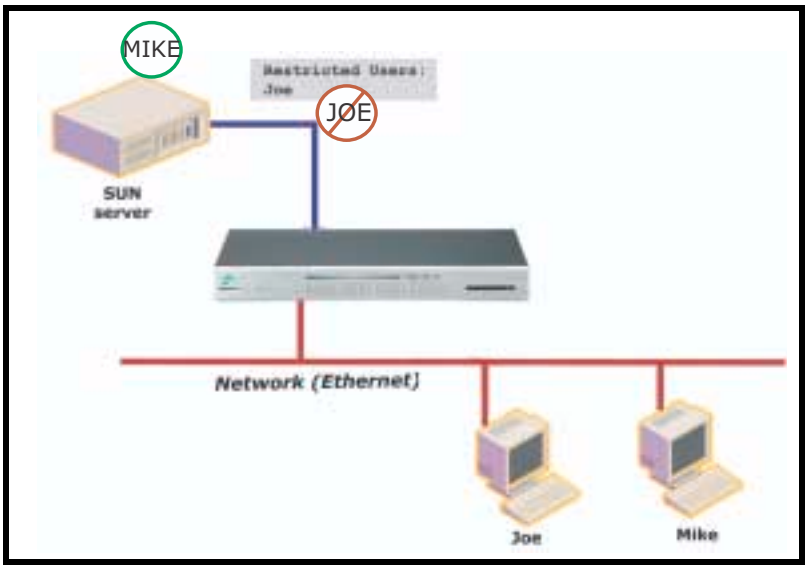
1. Access the web interface.
2. Under the Serial Port heading choose Configuration.
3. Choose All under All port configuration to configure all the ports or a specific port under Individual port configuration > Port IP filtering.
4. Enter the IP address and subnet mask for the remote host that is allowed access.

5. Choose Save to flash and Apply changes.

Using IP Tables

Linux and UNIX systems have an IP filtering program called IPtables. Administrators desiring to add further security by controlling access to the Digi CM should look at this program. Information about IPtables can be found on most Linux or UNIX systems by viewing the **man** pages.

Configuring User Access Control

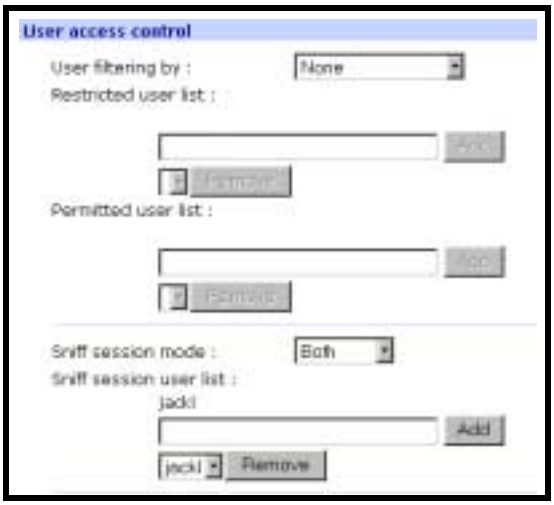


Another method to control access to the serial ports on the Digi CM is through the User Access Control configuration. This configuration can be done on a per port basis or globally by selecting the All Ports option. There are three options for user access control: None, Restricted user list, and Permitted user list. Users must have already been added to the system before they can be entered on a Restricted or Permitted user list or for a Sniff Session user list.

- When None is selected, any user that is registered on the authentication server can access a serial port.
- When Restricted user list is selected, a user cannot access a serial port even if they are registered on an authentication server.
- When Permitted user list is selected, only this user can access a specific serial port.

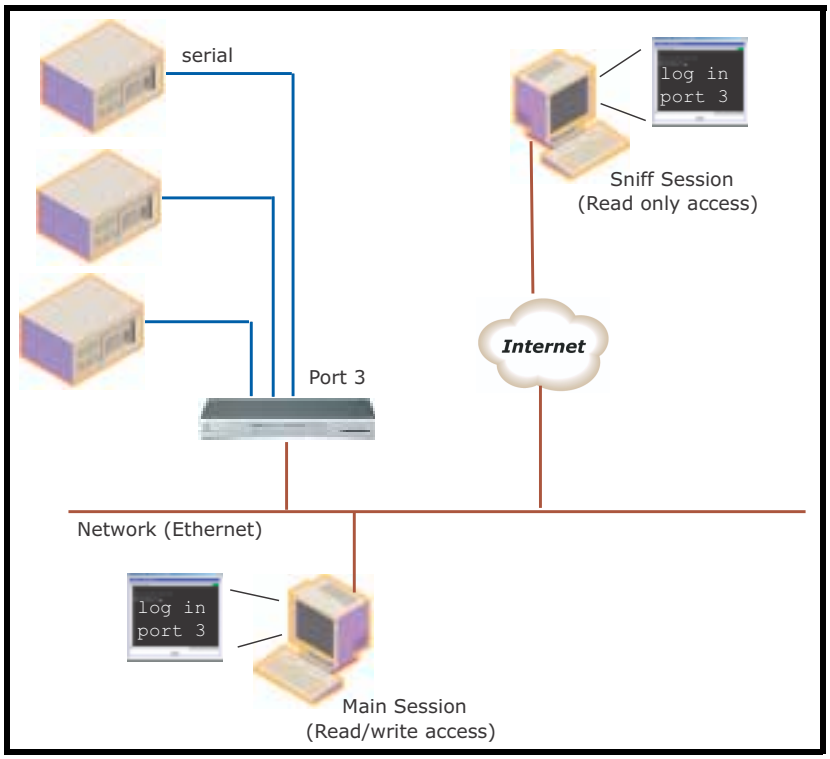
Note: Users do not necessarily need to be local, but can be users on any configured

authentication server.



Sniff Session

A sniff session enables users access to a serial port for viewing the data stream. Users who are registered for a Sniff session can access a specific serial port even if another user is using the port. The Digi CM supports up to four concurrent sniff sessions, three concurrent sniffers on one port, and a total of ten authorized sniff users. (See the preceding screenshot for reference).



There are four options for a Sniff Session mode. The four options are: disabled, input, output, and both.

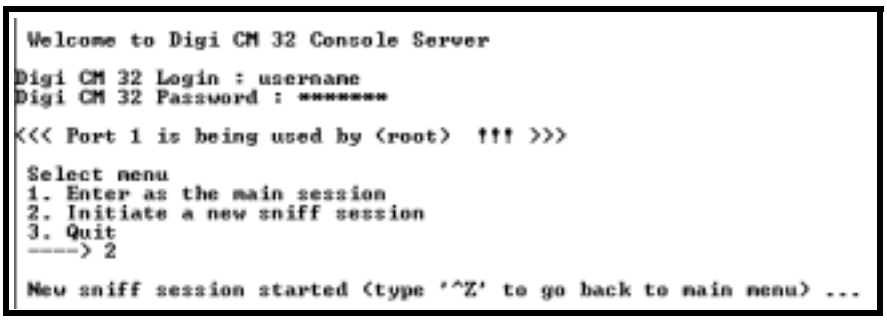
- disabled: The sniff mode is disabled and no user can enter a sniff session

- input: A sniff user can view all data to a serial port from a remote connection
- output: A sniff user can view all data from a serial port to a remote connection
- both: A sniff user can see all data transmitted or received through a serial port

Viewing A Sniff Session

A sniff user enters a sniff session by starting a Telnet session on a specified port. In the following example, a sniff user Telnets to port 7 of a Digi CM. From the command prompt enter the following command:

```
telnet 192.168.100.42 7007
```

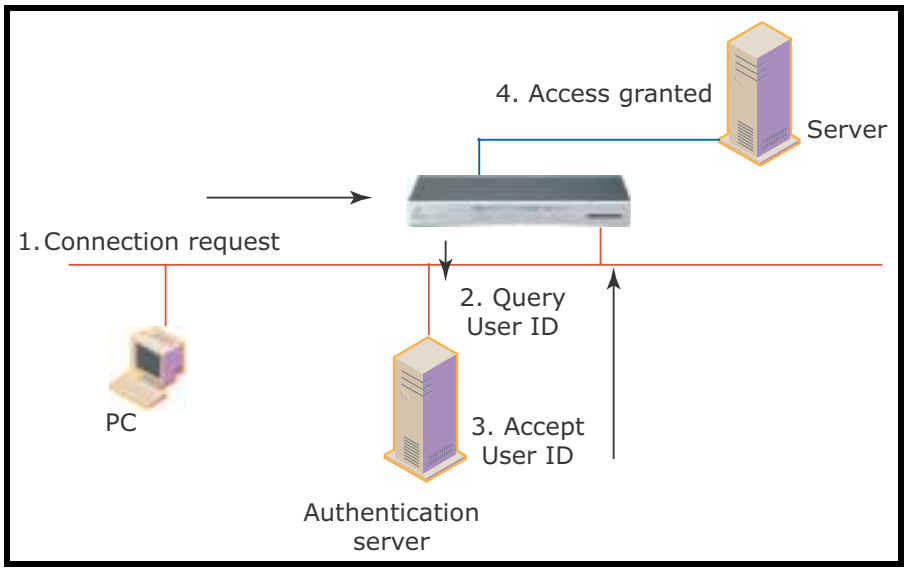


When sniff users login to a port from a Telnet session, a sniff session menu is displayed with three options. The options and the resulting actions are:

- Enter as the main session: Choosing this action disconnects any other user from the port and displays a command prompt to the device on the port. A message “Session killed by administrator” is sent to other users logged on to that port.
- Initiate a new sniff session: This option displays the port logs of the port being sniffed. Pressing Ctrl-Z returns the user to the sniff session menu.
- Quit: This option closes the Telnet session.

Authentication

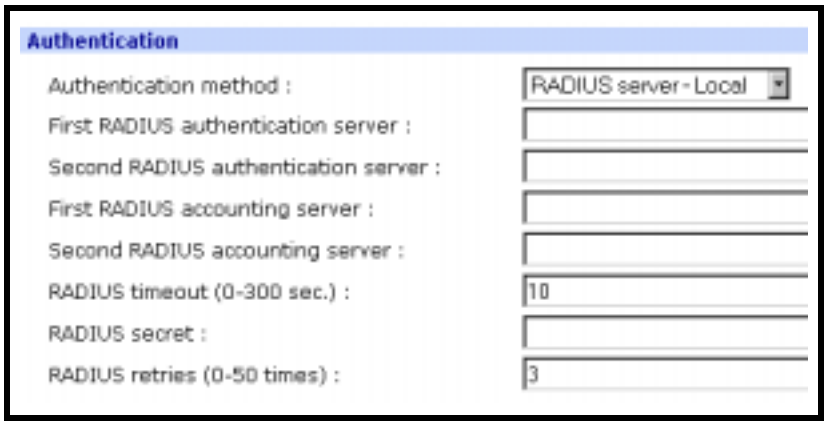
The Digi CM supports four methods of user authentication. The following methods are supported: Local, TACACS+, RADIUS, and LDAP. The type of authentication protocol you use is dependent on your environment.



Configuring Authentication Methods

Users can choose between having a single authentication method such as RADIUS or an authentication method where a Local authentication service is used in addition to the RADIUS, LDAP, or TACACS+ server. These options are listed when you configure the Digi CM for authentication. To configure a Digi CM for authentication, do the following:

1. Access the web interface.
2. Under the Serial Port heading choose Configuration.
3. Choose All or an Individual port > Authentication.
4. From the drop down menu, choose an authentication method. A configuration screen for that particular authentication method is displayed.
   The following screenshot displays the parameters for setting up a RADIUS server as the primary authentication server, then Local authentication if the primary authentication method fails.



5. Fill in the appropriate fields.
6. Choose Save to Flash and Apply changes.

Using the Configuration Menu

Network IP Filtering

To configure the Digi CM for Network IP filtering, do the following:

1. Access the configuration menu.
2. Choose Network configuration > IP filtering.

```
Network configuration --> IP filtering

Select menu
1. Configuration via remote console : Enable
2. Allowed base host IP for remote console : Any
3. Configuration via web : Enable
4. Allowed base host IP for web : Any
 <ESC> Back, <ENTER> Refresh
-----> 2
Enter IP address or network of hosts allowed to access
   Format> IP-address/subnet-mask
   Ex1> 192.168.1.0/255.255.255.0 to allow hosts of 192.168.1.*
   Ex2> 192.168.1.99/255.255.255.255 to allow hosts of 192.168.1.99
   Ex3> 0.0.0.0 / 0.0.0.0  to allow any remote host
----->
```

3. Choose a menu item and enter the desired parameters for the menu items.
4. Use the ESC key to return to the main menu.
5. Choose Save changes.

Port IP Filtering

To configure the Digi CM for Port IP filtering, do the following:

1. Access the configuration menu.
2. Choose Serial port configuration.
3. Choose an individual port number or 0 (zero) for all ports > IP filtering.

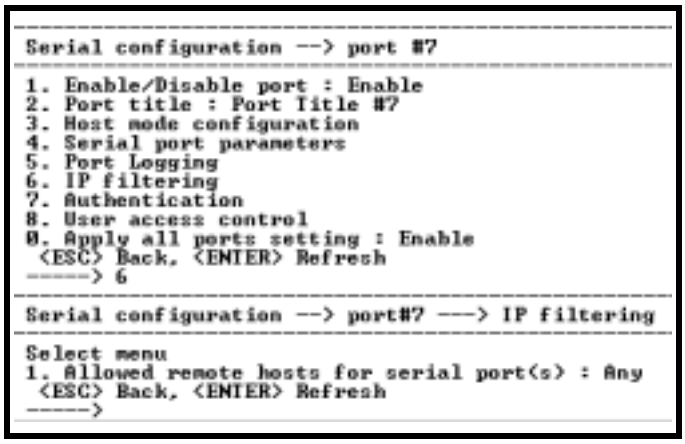
```
Serial configuration --> port #7

1. Enable/Disable port : Enable
2. Port title : Port Title #7
3. Host mode configuration
4. Serial port parameters
5. Port Logging
6. IP filtering
7. Authentication
8. User access control
0. Apply all ports setting : Enable
 <ESC> Back, <ENTER> Refresh
-----> 6

Serial configuration --> port#7 ---> IP filtering

Select menu
1. Allowed remote hosts for serial port(s) : Any
 <ESC> Back, <ENTER> Refresh
----->
```

4. Choose a menu item and enter the desired parameters for the menu items.
5. Use the ESC key when all parameters are entered to return to the main menu.
6. Choose Save changes.

Sniff Sessions

To configure a port or all ports for sniff users, do the following:

1. Access the configuration menu.
2. Choose Serial port configuration.
3. Choose an individual port number or 0 (zero) for all ports > User access control.

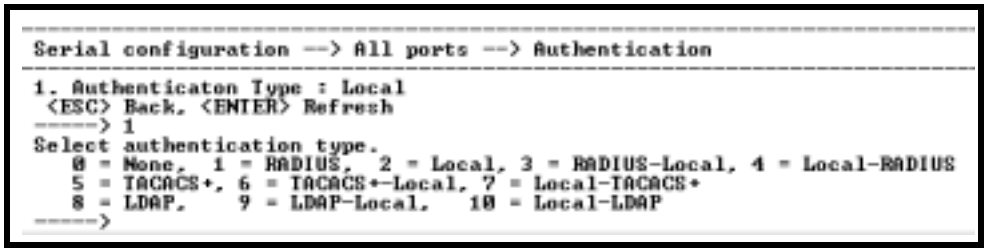


4. Choose a menu item and enter the desired parameters for the menu items.
5. Use the ESC key when all parameters are entered to return to the main menu.
6. Choose Save changes.

To enter a sniff session, see "Viewing A Sniff Session" on page 49.

Authentication

1. Access the configuration menu.
2. Choose Serial port configuration.
3. Choose an individual port number or 0 (zero) for all ports > Authentication.



4. Choose Authentication type.
5. Use the ESC key to return to the main menu.
6. Choose Save changes.

Chapter 8 Custom and Default Menus

Introduction

The Digi CM has several default menus built into the system for easy configuration and access by different users. Depending on access privileges, the menus available are the Web Interface, Configuration Menu, and a Port Access menu. A custom menu feature for creating menus is also available through the web interface.

The Digi CM custom menu feature enables system administrators to create their own menus for specific users. The custom menuing feature also enables the administrator to make several levels of submenus.

Making Custom Menus

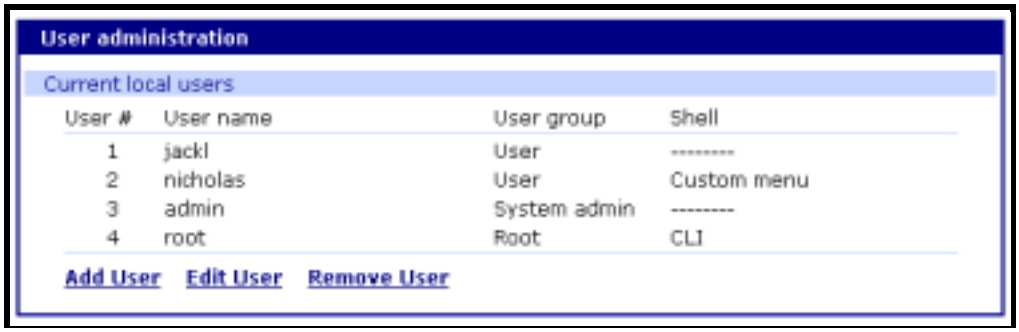
Before you begin making custom menus, you should plan what kind of menus and menu items you want available to your users. A good plan would be to:

1. add users to the system
2. create a menu name with sort and display features
3. add menu items and submenus to the new menu
4. assign users to the menus

Adding Users

You cannot assign users to a menu until you have added users to the system. To add users, do the following:

1. Access the web interface.
2. Choose Users administration under the System Administration heading.
3. Choose Add User > fill in the parameters you want to assign the user.

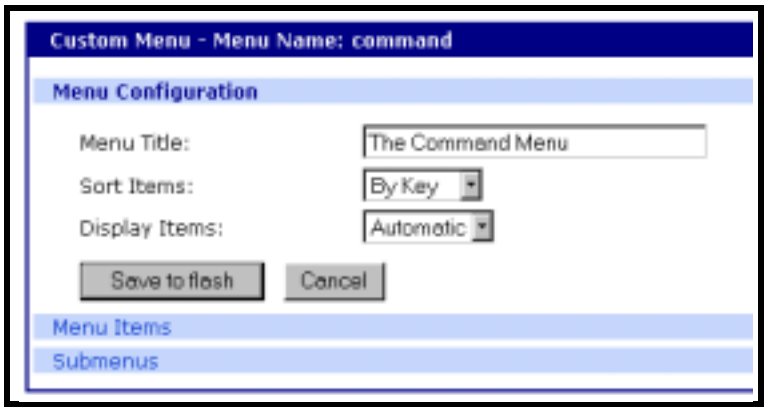


4. Choose Custom menu for the Shell program.
5. Choose Add to add the user.
   Continue to add users as needed.
   You do not need to Save to flash or Apply changes to add users.

Creating Menu Names

To make a custom menu, do the following:

1. Access the web interface.
2. Choose Configuration under the Custom Menus heading.
3. Enter the Menu Name you want to assign and choose the Add Menu button. The menu is added.
4. Choose the hyperlink to the menu you just created. From the drop down menu select the way you want to Sort and Display items.

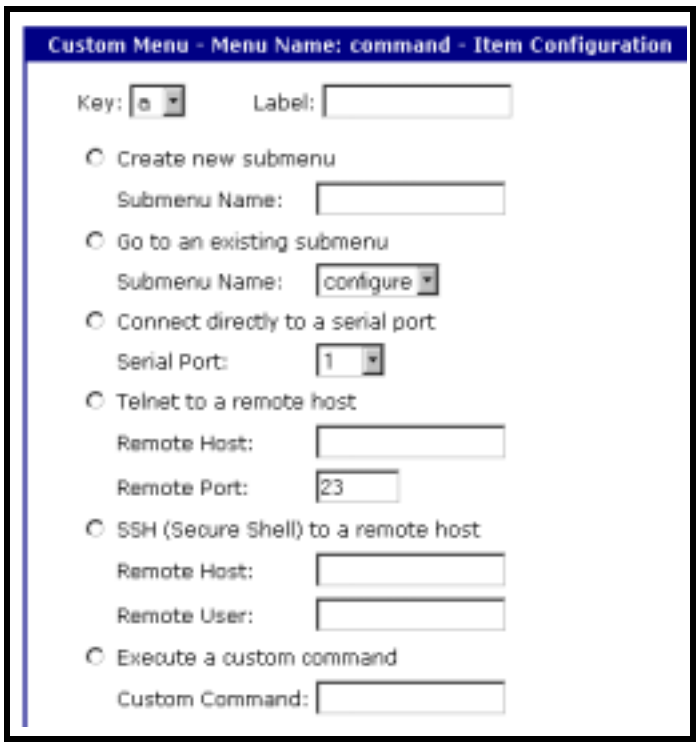


5. Choose Save to flash.
6. Repeat steps 2 through 5 to create additional menus.

Adding Menu Items

Once you have defined a menu name and added users, you can then add menu items. To add menu items to a menu, do the following:

1. Choose Configuration under Custom Menus, then the Menu Name hyperlink for the menu you want to configure.
2. Choose Menu Items > Add Item.
   The following screen appears.



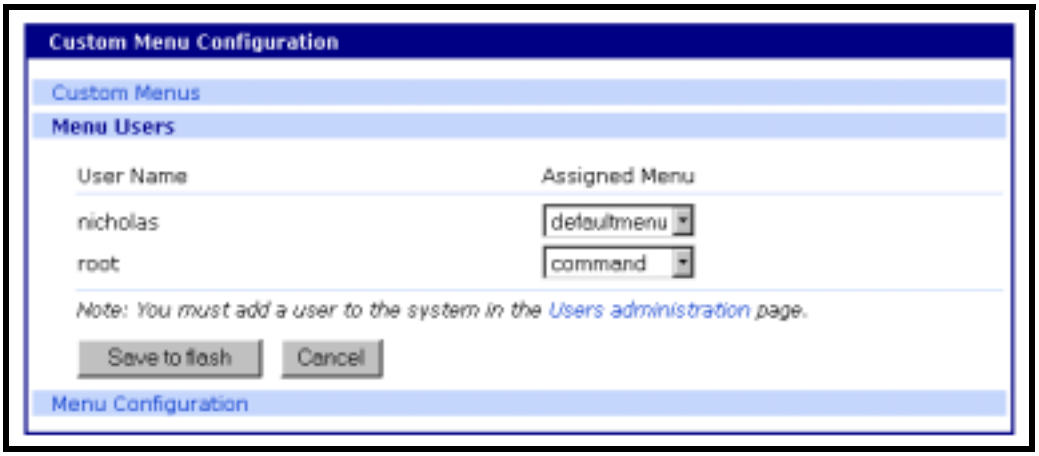
3. Fill in the desired parameters. The parameters are:
   - Key: Any letter or number except a value already used by another menu item
   - Label: Label or name for the menu item
   - Create new submenu: Assign a name for a new submenu that this menu item will be assigned or linked to
   - Go to existing submenu: Choose an existing submenu from the drop down menu that this menu item will be assigned or linked to
   - Connect directly to a serial port: Connects the user to a specified port
   - Telnet to a remote host: Enter the hostname or ip address of a remote host
   - SSH to a remote host: Enter the hostname or ip address of a remote host and the remote username
   - Execute a custom command: Enter a customized command that is any valid command on the command line interface with acceptable user privileges
4. Choose Apply.
   Repeat this procedure to add more menu items.

   Note: You can add or configure submenus by selecting the Submenus hyperlink on the Menu Configuration page.

Assigning Users To A Menu

Once a menu has been created users can be assigned. To assign users to a menu, do the following:

1. Access the web interface.
2. Choose Configuration under the Custom Menus heading > Menu Users. A list of available users is displayed.

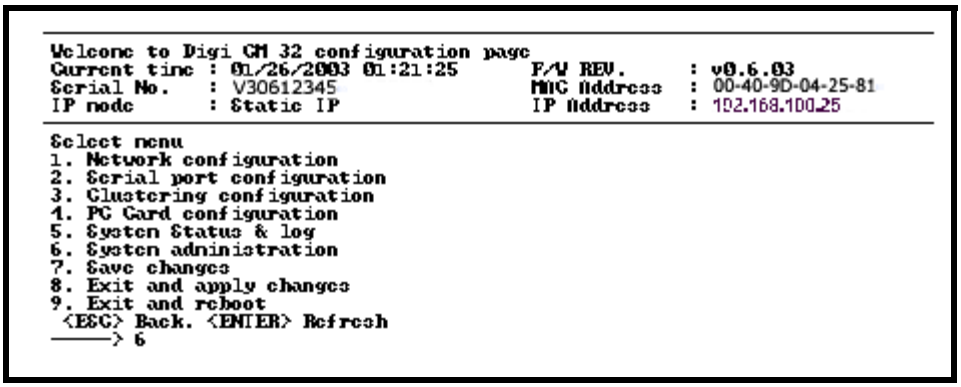


3. Choose a menu for a user by selecting a menu from the drop down Assigned Menu list.
4. Choose Save to flash.

Using the Configuration Menu

The configuration menu is available through a Telnet or SSH session both to the root user and system administrator. The configuration menu enables the authorized users to configure the Digi CM with the same functionality as the web interface. The only functionality missing from the configuration menu is the ability to create custom menus.

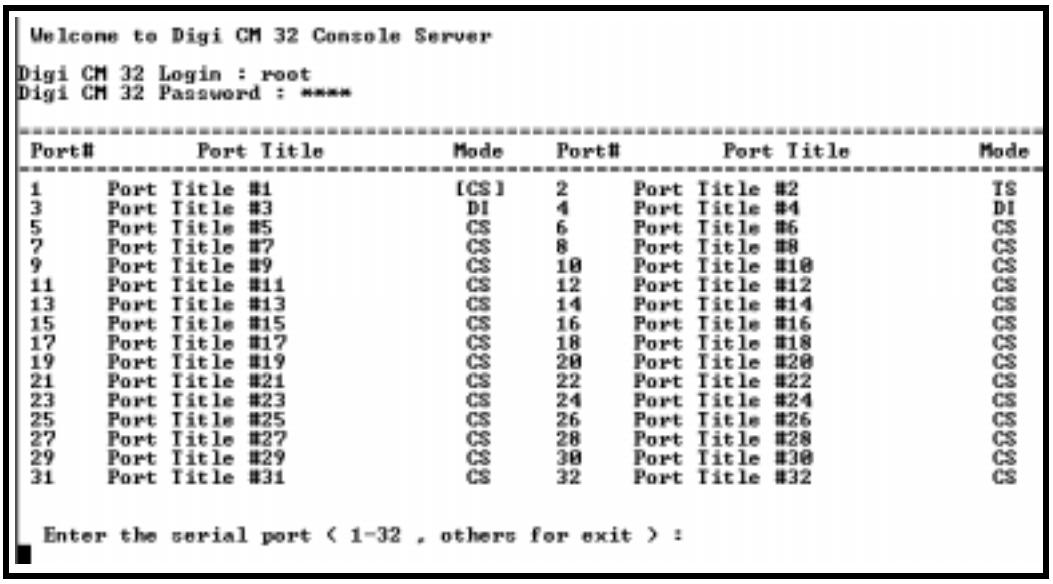
The root user, by default, is connected from a Telnet session to the Linux command line. In order to access the configuration menu, the root user enters `configmenu` at the command prompt. The configuration menu follows the layout of the web interface.



Choices for the configuration menu are made by selecting the number of a menu item. The ESC key allows the user to move back a menu each time it is selected. Sometimes only one menu item is presented, however that single menu item has two or more options needing to be configured.

Port Access Menu

Another default menu is the Port Access Menu. This menu is available to all users. Access to this menu can be established through a Telnet or SSH session, the web interface by selecting Serial ports > Connection > Port access menu connection.



Users access this menu through a Telnet or SSH session using the IP address of the Digi CM followed by the port number 7000. An example is:

```
telnet 192.168.100.200 7000
```

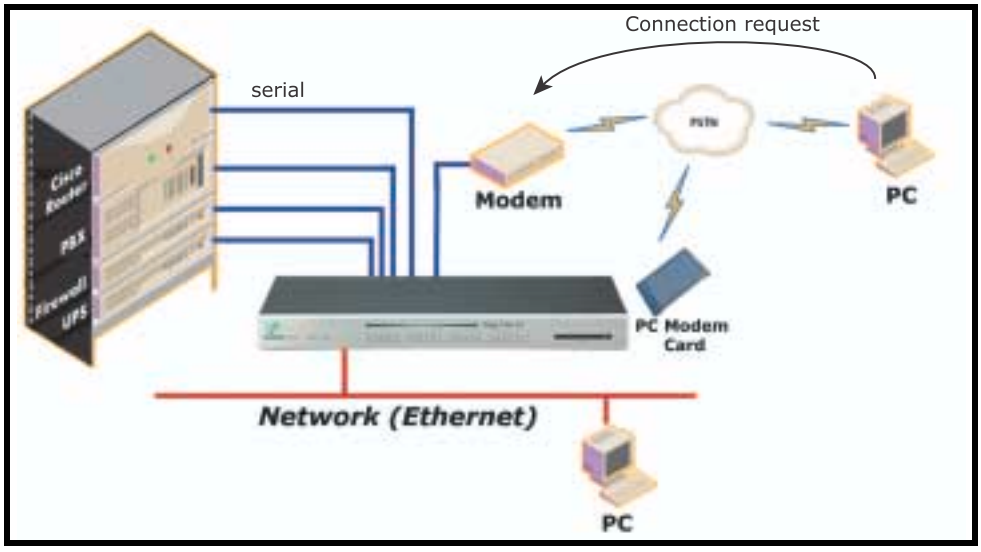
By default root is connected to the command line interface and the preceding option allows the root user access to the port access menu.

Chapter 9 Configuring Remote Dial-In Access

Introduction

The Digi CM supports dial-in connections from remote sites for out-of-band access. In this configuration, the Digi CM has serial ports configured for external modems and waits for dial-in connections from remote sites. If users dial-in using a terminal application, the Digi CM accepts the connection and displays a menu of available serials ports. In a dial-in terminal server mode, the Digi CM makes a TCP connection with either a Telnet or SSH client to a pre-defined server. RawTCP is also an option for dial-in users.

For more information on the different types of Host mode configuration, see "Host Mode Configuration" on page 27.



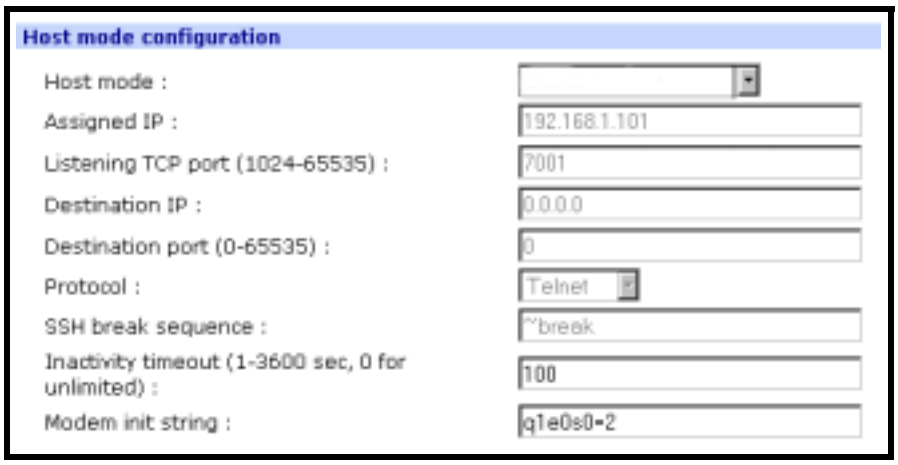
Configuring For Dial-In Modem Access

To configure a serial port for a dial-in modem, enter the values for these fields: Host mode, Modem init string, and Inactivity timeout.To access the Host mode configuration screen, do the following:

1. Access the web interface.
2. Under the Serial Port heading choose Configuration.
3. Choose a specific port under Individual port configuration > choose Host mode configuration.
4. Choose Dial-in modem for the Host mode.
5. Enter the information for Inactivity timeout and Modem init string.
   - Inactivity timeout: The default value is 100 seconds. You can set the timeout for 1 to 3600 seconds, or 0 for unlimited timeout.

- Modem init string: The default modem init string is q1e0s0=2. The init string sets the modem to quiet mode, echo off, and Auto Answer on two rings. The modem init string is used for initializing an external modem attached to a Digi CM serial port. See your modem user manual for more information.

6. Choose Save to flash and Apply changes.



Adding a PC Modem

A PC card slot is provided on the front panel of the Digi CM. The graphic below has an arrow indicating the PC card slot.

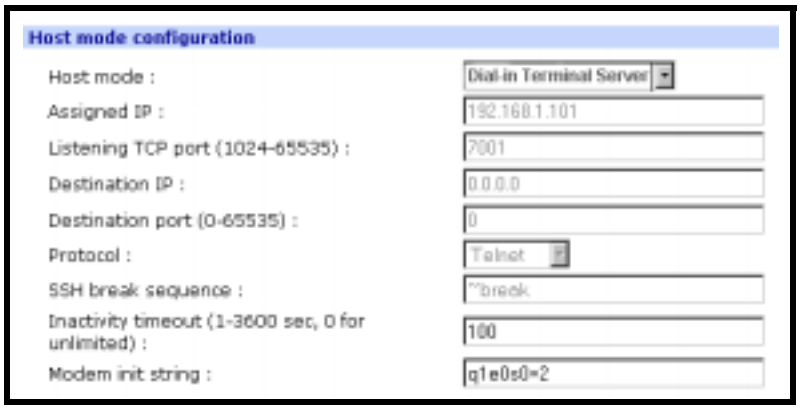
To install and configure the PC modem on the Digi CM, do the following.

1. Insert the card into the PC slot.
2. Access the web interface.
3. From the menu choose Configuration under the PC card heading.
4. Choose Discover a new card.
   The Digi CM searches for a PC card and displays a configuration menu.
5. Enter the appropriate parameters in the configuration menu.
6. Choose Save to Flash and Apply changes.

Configuring For Dial-In Terminal Server Access

To configure a serial port for a dial-in terminal server access, enter the values for these fields: Host mode, Destination IP, Base Port, Protocol, Inactivity timeout, and Modem init string. To access the Host mode configuration screen, do the following:

1. Access the web interface.
2. Under the Serial Port heading choose Configuration.
3. Choose a specific port under Individual port configuration > choose Host mode configuration.
4. Choose Dial-in terminal server for the Host mode.



5. Fill in the appropriate fields as they apply to your configuration.
   - Host mode: The options are console server mode, terminal server mode, dial-in modem mode, and dial-in terminal server mode
   - Assigned IP: Also known as alternate IP where the user can Telnet directly to a serial port using an IP address
   - Listening TCP port: Also known as reverse Telnet where a user Telnets to a port using an IP address and a port number
   - Destination IP: In terminal server mode the user connects directly to a port using an IP address
   - Destination port: In terminal server mode the user connects directly to a port with an IP address and port number
   - Protocol: The options are SSH, RawTCP, and Telnet
   - SSH break sequence: Sequence of characters that sends a break character to a device
   - Inactivity timeout: The timeout length ranging from 1 to 3600 seconds, 0 is unlimited timeout
   - Modem init string: Use the default string or enter your own string
6. Choose Save to Flash and Apply changes.

Using the Configuration Menu

Dial-in Modem Access

Individual serial ports on the Digi CM can be configured for a dial-in modem access. To use dial-in modem mode, an external modem is first attached to a serial port on the Digi CM and then the serial port is configured for dial-in modem access. In the illustration below, port 7 is configured for a dial-in modem.

To configure a serial port for a dial-in modem, do the following:

1. Access the configuration menu.
2. Choose Serial port configuration.
3. Choose an individual port number > Host mode configuration.

4. Choose Dial-in modem and configure the other configuration parameters.
5. Use the ESC key to return to the main menu.
6. Choose Save changes.

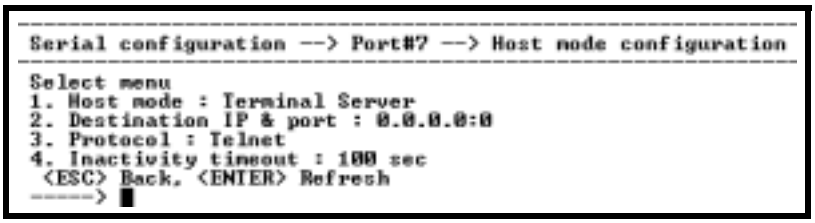
Dial-in Terminal Server Access

Individual serial ports on the Digi CM can be configured for a dial-in terminal server access. To use dial-in terminal server access, an external modem is first attached to a serial port on the Digi CM and then the serial port is configured for dial-in terminal server mode. In the illustration below, port 7 is configured for dial-in terminal server mode.

In terminal server mode, the user is connected directly to a server.

To configure a serial port for a dial-in terminal server, do the following:

1. Access the configuration menu.
2. Choose Serial port configuration.
3. Choose an individual port number > Host mode configuration.



4. Choose Terminal Server and configure the other configuration parameters.
5. Use the ESC key to return to the main menu.
6. Choose Save changes.

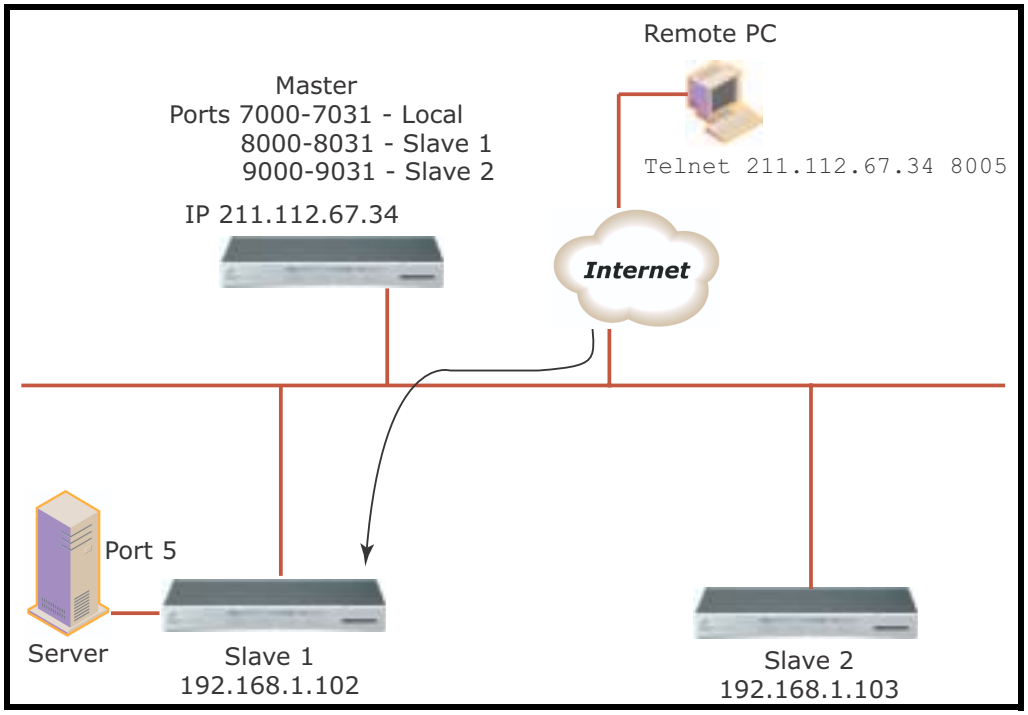
Chapter 10 Port Clustering

Introduction

Port clustering is the ability to manage many serial ports on one or multiple slave devices from one master device using a single IP address. For instance, the Digi CM can manage up to 16 slave devices or a maximum 544 serial ports with one Master device. Ports can be configured either collectively or individually depending on user preference. Each master and slave device is configured separately, they cannot be configured from one master console.

To setup the Digi CM for port clustering you will need to:

- configure all Digi CM serial ports
- assign one Digi CM as the Master clustering device, all other Digi CMs default to slave devices
- import slave configuration to the Digi CM Master device

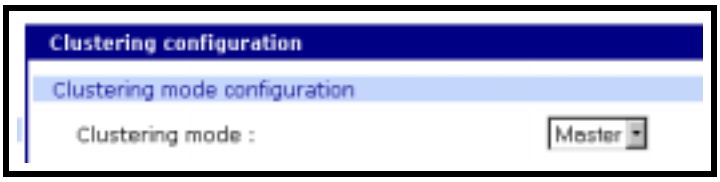


Configuring Port Clustering

Assigning Master Clustering Mode

To assign a Digi CM as the Master cluster device, do the following:

1. Access the Digi CM through the web interface.
   This Digi CM needs to be the unit you want as the Master.
2. Under the Clustering heading choose Configuration.
3. Choose Master from the drop down menu.
   Subsequent units will be configured in Slave mode by default.
4. Choose Save to flash and Apply changes.

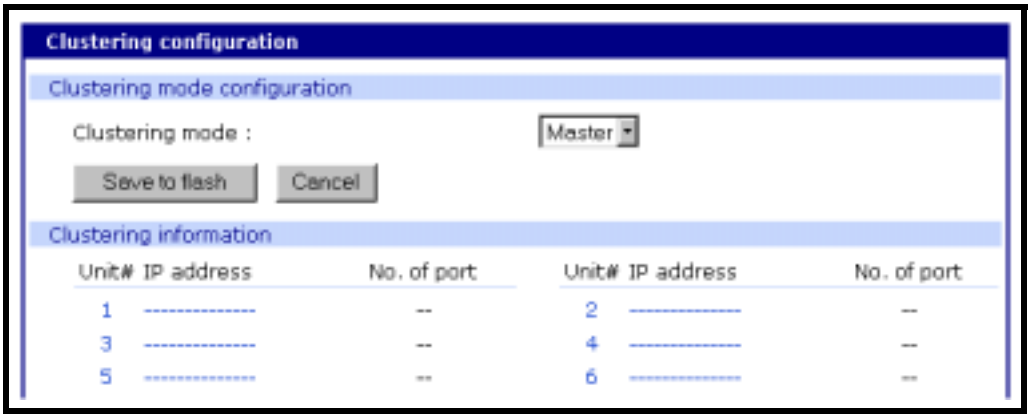


Configuring Slave Ports on the Master Unit

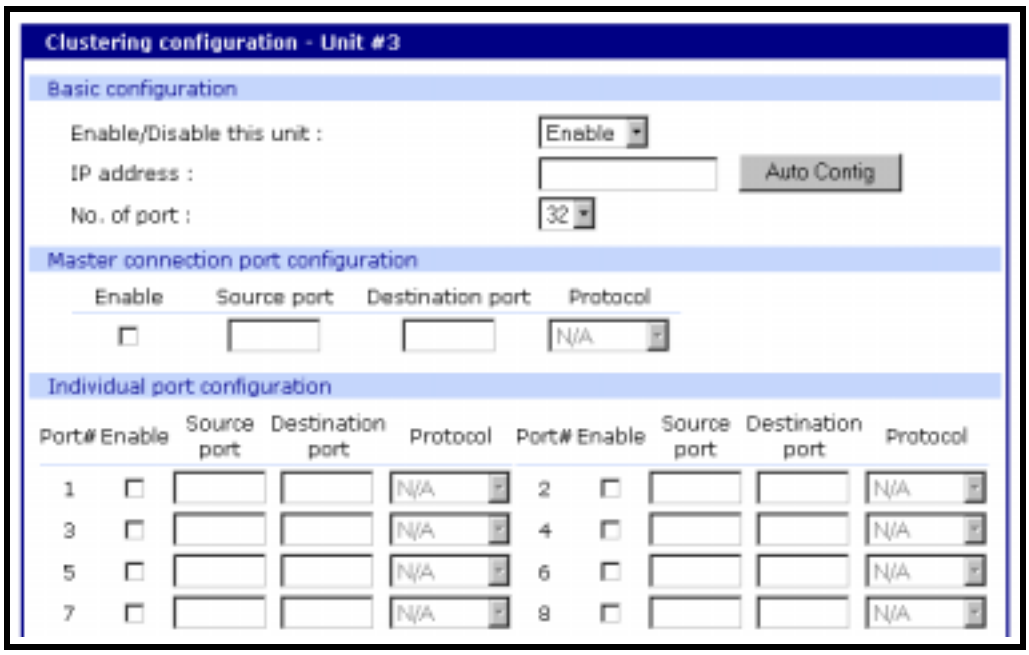
Ports on slave units are automatically Enabled and set to the Telnet protocol. If you want to Disable some or all of the ports or you want to use a different protocol, make these changes to the slave units before you Autoconfigure the the slave ports on the Master unit.

To configure the slave serial ports on the Master unit, do the following:

1. Access the Digi CM through the web interface.
2. Under the Clustering heading choose Configuration.
3. Select the hyperlinked number under Unit# or the dashed line under IP address.



4. Select Enable from the Enable/Disable this unit drop down menu.
   A new configuration screen appears.

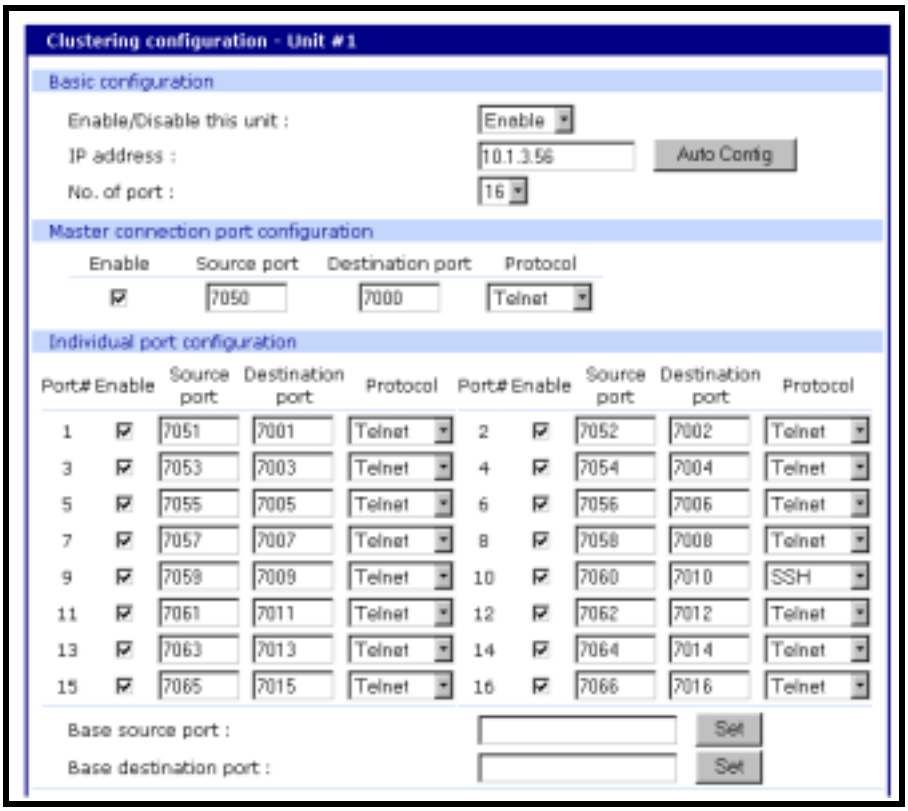


5. Enter the IP address of the Slave unit in the IP address field.
6. Select the Auto Config button and the Master Digi CM automatically imports the configuration of the Slave serial ports to the Master Digi CM. The following screenshot displays serial port configuration imported from a Slave unit.
7. Choose Save to flash and Apply changes.

Clustering Parameters

Below is a list and a brief description of the clustering parameters .

- Enable: This shows whether the port is enabled or disabled. All ports are enabled by default.
- Source port: This is the port number on the Master unit.
- Destination port: The destination port is the corresponding port number on the Slave unit. On a 32 port slave unit, the destination port numbers range from 7001 to 7032.
- Protocol: The four options are N/A (not available), SSH, Telnet, and RawTCP.
- Base source port: This sets the first port number on a Master unit. By default the base source port on the Master unit is 7001. However, you can change the base source port number to another number and the rest of the ports on the unit will be sequentially numbered from the base source port. For example, starting the base source port number with 7010 results in a 32 port unit being numbered from 7010 to 7041.



- Base destination port: This is the physical port number on a remote slave unit. By default the base destination port on the first slave unit is 7001. However, you can change the base destination port number to another number and the rest of the ports on the unit will be sequentially numbered from the base destination port. For example, starting the base destination port number with 7010 results in a 32 port unit being numbered from 7010 to 7041.

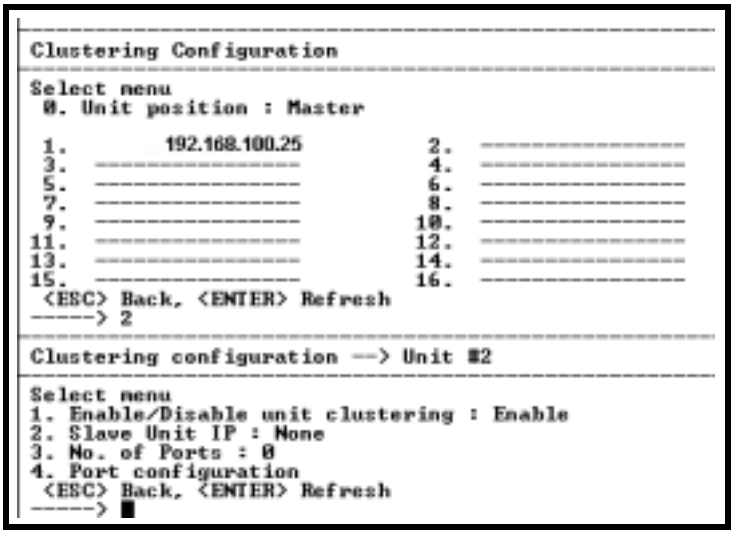
Using the Configuration Menu

Clustering

By default clustered slave devices are configured using the Telnet protocol and with the standard port parameters of: bps=9600, data bits=8, parity=none, stop bits=1, and flow control=none. When the master device autoconfigures a slave device, it simply imports the information from the slave unit. If you want other protocols or other port parameters, you should configure your slave unit first with those parameters before autoconfiguring.

Before you start this configuration procedure, the slave units should already be configured unless you want them set to the default values. To set up the Digi CM for clustering, do the following:

1. Access the configuration menu.
2. Choose Clustering configuration > Unit position.
3. Assign the unit as the master device.
   A new screen is displayed.



4. Enter the number 1 for the first slave unit > choose Enable/Disable unit clustering > choose Enable.
5. Enter the values for Slave Unit IP, No. of ports, and Port configuration.
6. Choose ESC to return to the main menu.
7. Choose Exit and apply changes.

Chapter 11 Command Line Interface

Introduction

The Digi CM runs the embedded Linux Hard Hat operating system. The command line interface for configuration purposes is accessible only by the root user. The system administrator has read only privilelges from the command line. By default the root user is connected to the CLI (command line interface) when they Telnet to the Digi CM. To gain access to the command prompt, the root user uses the username **root** and the default password **dbps**.

This chapter includes the Linux commands available on the embedded Linux operating system and the location of files useful to the root user for administrative purposes.

Note: The root user should be aware that deleting or corrupting files may prevent the Digi CM from booting properly. Before editing any files, be sure to backup your configuration files.

Linux Commands

The purpose of this section is to list the various Linux commands available on the Digi CM. This is simply a listing of commands and does not detail what the commands do or give their particular parameters. If you need more information on a command, consult the `man` pages on a Linux system.

Two commands that are very important for saving and applying changes to the configuration files are:

- `saveconf`: The saveconf command saves the configuration files to flash memory
- `applyconf`: The applyconf command immediately applies the configuration changes

The configuration files are located in /tmp/cnf directory.

Two system utility menus that are important for configuring the Digi CM and the serial ports are the `portaccessmenu` and `configmenu.`

- `portaccessmenu`: This menu allows the user to configure the serial ports on a Digi CM
- `configmenu`: This menu enables the system administrator to configure the Digi CM. It has essentially the same functionality as the web interface for configuring a unit with the exception of the ability to create custom menus

Shell and Shell Utilities				
sh	ash	bash	echo	sed
env	false	grep	more	which

Shell and Shell Utilities				
pwd				
File and Disk Utilities				
ls	cp	mv	rm	mkdir
rmdir	ln	mknod	chmod	touch
sync	gunzip	gzip	zcat	tar
dd	df	du	find	cat
vi	tail	mkdosfs	mke2fs	e2fsck
fsck	mount	umount		
System Utilities				
date	free	hostname	sleep	stty
uname	reset	insmod	rmmod	lsmod
modprobe	kill	killall	ps	half
shutdown	poweroff	reboot	telnet	init
useradd	userdel	usermod	whoami	who
id	su			
Network Utilities				
ifconfig	iptables	route	telnet	ftp
ssh	ping			

Important File Locations

The Digi CM has several files that are important for administrative use. Below is a brief listing of some files that the root user or system administrator might desire to either monitor or edit.

Default Script

The default script file is executed whenever the Digi CM is booted. The file is /usr/rc.user and can be modified with the vi editor. The modified script becomes effective when the system is rebooted.

Booting Sequence

When the Digi CM boots, it uncompresses the /cnf/cnf.tar.gz file to /tmp/cnf/* and unmounts the /cnf file. If the configuration files are modified in the /tmp/cnf file and the configuration is saved to flash (saveconf), the unit mounts the /cnf file and compresses the /tmp/cnf/* to /cnf/cnf.tar.gz.

User Storage Space

The Digi CM comes with 1 megabyte of user storage space. This storage space can be used to store custom scripts. The location is /usr2.

Chapter 12 System Administration

Introduction

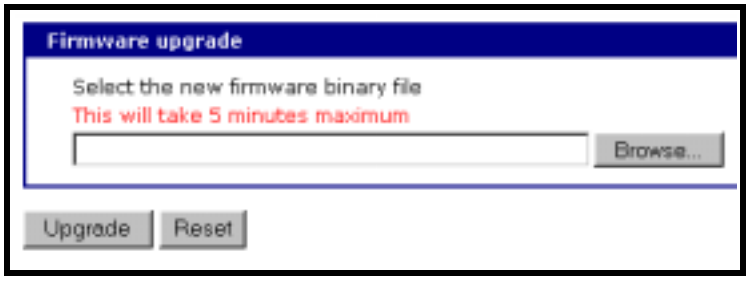
This chapter contains a number of tasks performed either by root or the system administrator. These tasks fall under the general heading of system administration and include firmware upgrades, resetting the unit to factory defaults, and disaster recovery procedures.

Upgrading the Firmware

Web Interface

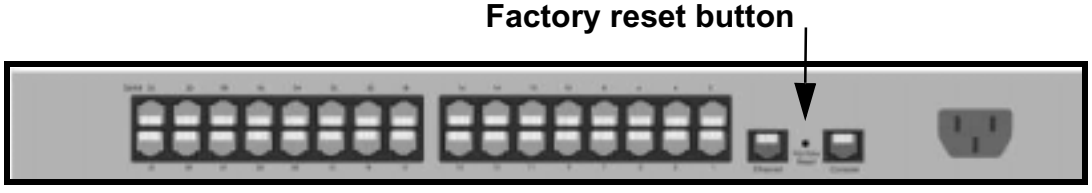
You will need to download the latest firmware version to a system on the same subnet mask as the Digi CM. The latest firmware can be downloaded from the Digi support site at: http://cm.digi.com. Do the following to upgrade the firmware:

1. Access the web interface.
2. Under the System administration heading choose Firmware upgrade.
3. Choose the Browse button and locate the firmware download.
4. Choose Upgrade. The Digi CM will automatically reboot when the upgrade is complete.



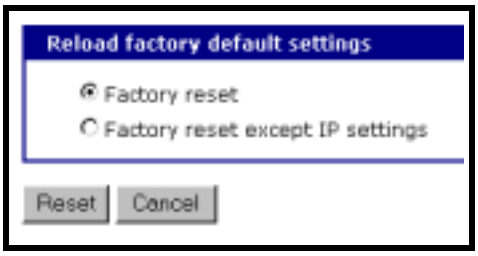
Resetting Factory Defaults

There are two ways to reset the unit to the factory defaults. The quickest and simplest method is to push the hardware factory default reset button. The reset button is located on the back panel of the unit next to the Ethernet port. The arrow points to the reset button's location.



The alternative method to reset the unit is through the web interface. The web interface provides the option of retaining the IP settings. To use the web interface to reset the Digi CM, do the following:

1. Access the web interface.
2. Under the System administration heading choose Factory default settings.



3. Choose Reset. The Digi CM will automatically reboot.

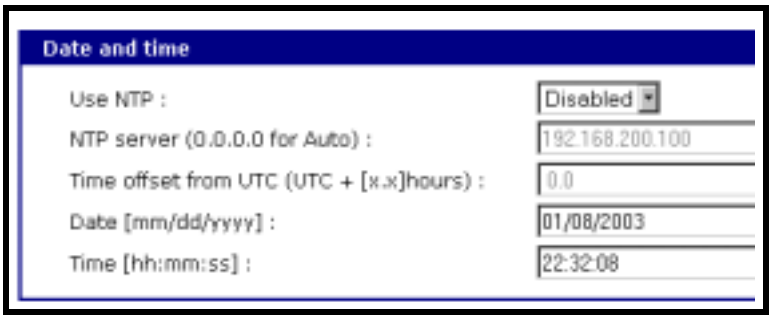
The following are the default values when the Digi CM is reset to the factory defaults.

- Static IP Address: 192.168.161.5
- Port Access Menu IP Address: 192.168.1.100
- Port Access Menu TCP Port Number: 7000
- Serial Port IP Address: 192.168.1.101~
- Serial Port TCP Port Number: 7001~

Setting Date and Time

The Digi CM provides two options for keeping system time. The first is by using an NTP server and the other is through an internal battery backup. To configure the Digi CM for date and time, do the following:

1. Access the web interface.
2. Under the System administration heading choose Date and time.



3. To use an NTP server, choose Enable, the NTP server's IP address, the Time offset, and the Date and Time fields.
   or
   To use the internal battery fill in the Date and Time fields only.
4. Choose Save to flash and Apply changes.

Configuring A Device Name

The system administrator can assign a device name to the Digi CM. This is often helpful for administration purposes in locating the specific Digi CM on the network. To assign the Digi CM a device name, do the following:

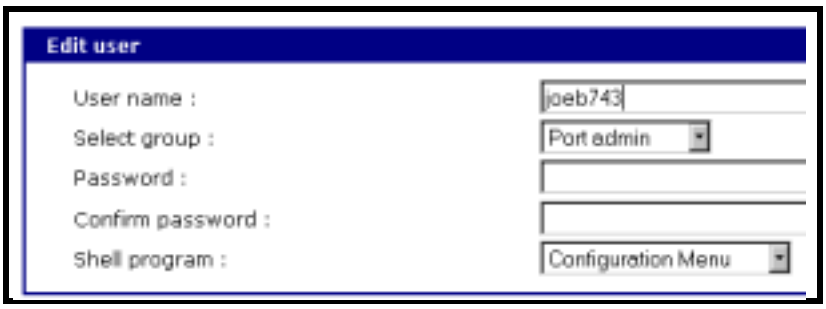
1. Access the web interface.
2. Under the System administration heading choose Device name.
3. Enter the name you want to assign the Digi CM.
4. Choose Save to flash and apply changes.

Adding, Editing, and Removing Users

The system administrator can add, remove, or edit users files easily from the web interface. To add or remove users or edit user files do the following:

1. Access the web interface.
2. Under the System administration heading choose Users administration.

3. Choose to Add User, Edit User, or Remove User. You can:
   - Add a user: Assign a name, user group, and a password
   - Edit user files: Change user group, password, or their shell
   - Remove a user: Remove a user from the system



4. Choose Save to flash and apply changes.

Note: The password for root can only be changed from the command line interface using the command `passwd`.

Using the Configuration Menu

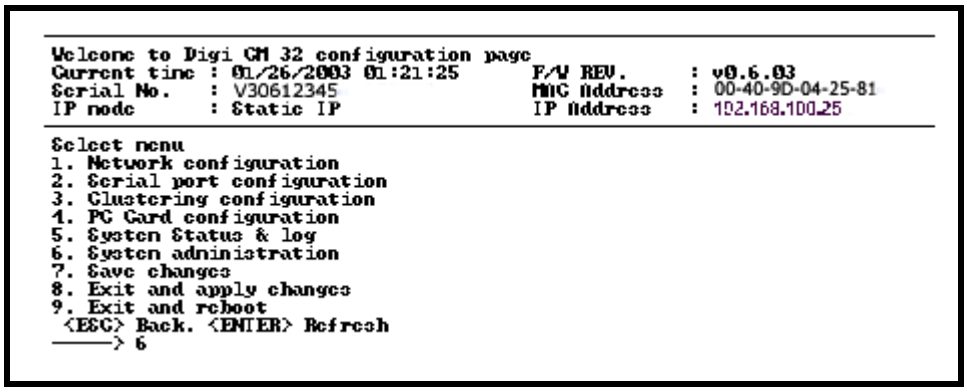
Firmware Upgrade

Before upgrading firmware from the configuration menu you should have:

- downloaded the firmware to a system on the same subnet
- setup a terminal emulation program that supports Zmodem transfer protocol.

To upgrade the firmware with the configuration menu, do the following:

1. Access the configuration menu.

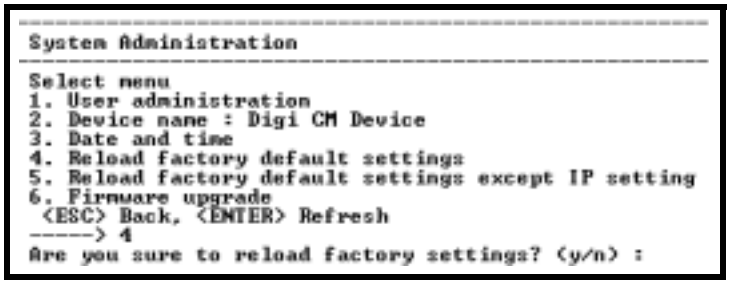


2. Choose System administration.
3. Choose Firmware upgrade. Enter y for Yes when asked if you want to upgrade the firmware.
4. If the firmware upgrade is successful, the Digi CM will reboot automatically. If a **Firmware upgrade failed!** warning appears, do not reboot the unit but repeat the upgrade process.

Restoring Factory Defaults

You have two choices to restore the unit to its factory defaults. The options are reloading all factory defaults or reloading all factory defaults exccept keeping the IP settings. To restore your unit to the factory defaults, do the following:

1. Access the configuration menu.
2. Choose System administration.



3. Choose either Reload factory default settings or Reload factory default settings except IP settings. Enter y for yes when asked to Reload the default settings.

4. The system will restore the factory defaults.
   The unit will automatically reboot.

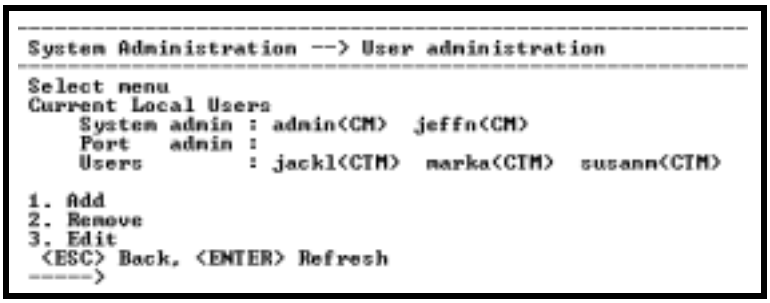
Setting Date and Time

Date and time on the Digi CM can either be kept internally or by an NFS server. To set the parameters for date and time on the Digi CM, do the following:

1. Access the configuration menu.
2. Choose System administration.
3. Choose Date and Time.
   Enter the desired parameters.
4. Choose Save changes.

Adding, Editing, and Removing Users

1. Access the configuration menu.
2. Choose System administration > User Administration.
3. Choose Add, Remove, or Edit.
   Users and the user groups are conveniently listed at the top of the configuration screen. The options are:
   - Add a user: Assign a name, user group, and a password
   - Edit user files: Change user group, password, or their shell
   - Remove a user: Remove a user from the system



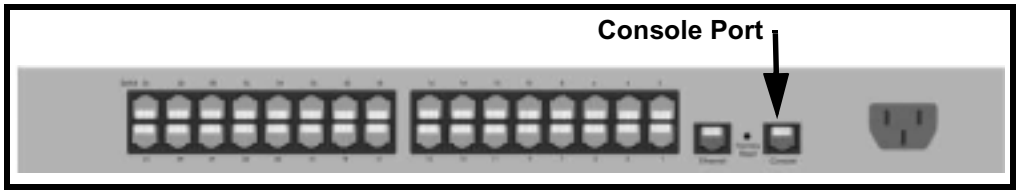
Accessing the Boot Loader Program

The Boot Loader program can be accessed during the boot process. The main function of the program is to provide a backup means for restoring the firmware if the Digi CM will no longer boot. It also provides a hardware testing module which detects and tests hardware components on the unit.

To access the Boot Loader program, do the following:

1. Connect the Ethernet cable from the console port on the rear panel of the Digi CM to a serial port on a workstation. Use the Ethernet cable packaged

with the Digi CM and attach the DB-9 adapter. The arrow in the following graphic points to the Console Port.



2. Setup a terminal emulation program, such as HyperTerminal, using the following port parameters: bps=9600, data bits=8, parity=none, stop bits=1, and flow control=none.
3. Turn the power on to the unit.
4. Press ESC within 3 seconds of booting the unit to get a command prompt.
5. Enter the username **admin** and the default password **admin** to access the Boot Loader menu.

Hardware Test Menu

The Boot Loader program provides a hardware test for detecting and testing hardware components on the Digi CM. From the Boot Loader menu choose the number 3 to access the Hardware test. Options for several components appear.

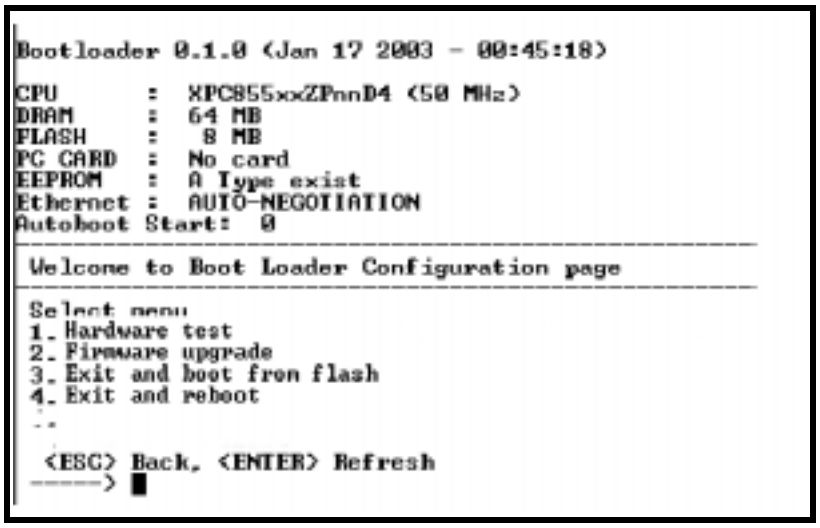
Disaster Recovery

The Digi CM provides a disaster recovery procedure in the event the configuration data is destroyed or corrupted. The Digi CM automatically restores a corrupted configuration file system to the factory default settings. However, if the Digi CM fails to boot in spite of being reset to the factory default settings, the firmware can be restored by using the Boot Loader program.

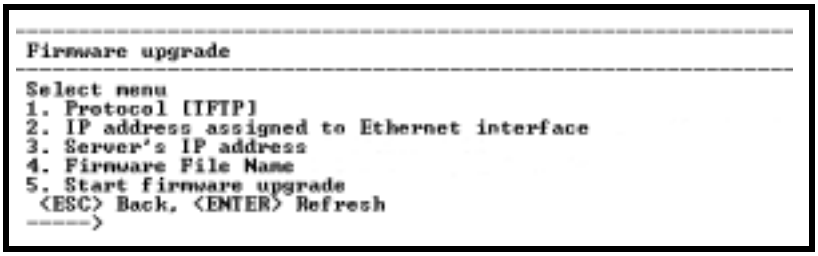
To restore the Digi CM to the factory default configuration settings you will need to use a TFTP or BOOTP server. To use the Boot Loader program to flash new firmware, do the following:

1. Connect the console port on the rear panel of the Digi CM to a serial port on a workstation. Use an Ethernet cable with a DB9 adapter.
2. Setup a terminal emulation program such as HyperTerminal. Use the following port parameters: bps=9600, data bits=8, parity=none, stop bits=1, flow control=none
3. Reboot or power on the Digi CM.
4. Press the Enter key within three seconds of receiving a prompt. The following screen appears.

Use the ESC key to return to an earlier menu screen.



5. Login using the username **admin** and the default password **admin**.
6. Choose Firmware upgrade by entering the number and pressing Enter. The following screen appears.



7. Enter the information for the first first menu items.
   - Protocol: The choices are BOOTP or TFTP
   - IP address assigned: Enter the IP address of the Digi CM
   - Server's IP address: The IP address of the BOOTP or TFTP server
   - Firmware File Name: The filename for the firmware

   Note: Use the ESC key to backup to earlier menu screens.
8. Choose Start firmware upgrade.
   The firmware upgrade will take several minutes to process.
9. When the upgrade process is complete, choose ESC to return to the main menu.
10. Choose Exit and boot from flash.

Chapter 13 Hardware Information

Introduction

This chapter contains information pertinent to Digi CM hardware. Among the topics covered are the pinouts for the Ethernet and serial cables, pinouts for the cable adapters, the meaning of LED indicator lights, and hardware specifications.

The Digi CM uses an embedded Hard Hat Linux operating system with 64 megabytes of SDRAM and 8 megabytes of flash memory.

Hardware Specifications

Specifications	
Operating temperature	40°F to 120°F (5°C to 50°C)
Humidity	10% to 90% non-condensing
Power supply	internal, 100 -240VAC, 50/60 Hz, 1.2A max
Power consumption	0.1A /120VAC (type), 12W
Fuse (internal)	FUSE (Type L) AC250V, 2A
Operating system	Linux Hard Hat embedded
SDRAM	64 megabytes
Flash memory	8 megabytes

Dimensions				
	Length	**Height**	**Width**	**Weight**
Unpackaged	17 inches	1.75	8.5 inches	5.8 lbs
Packaged	20.375 inches	4.75 inches	15.25 inches	8.6 lbs

Serial Port Pinouts

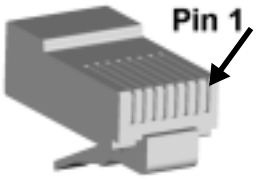
The Digi CM uses an RJ45 connector for serial ports. The pin assignment of the RJ45 connector for serial ports is summarized below. Each pin has a function according to the serial communication type configuration.

Pin	Description
1	Tx+
2	Tx-
3	Rx+
4	NC
5	NC
6	Rx-
7	NC
8	NC

Ethernet Pinouts

The Digi CM uses a standard Ethernet connector which is a shielded connector compliant with AT&T 258 specifications.

Pin	Description
1	Tx+
2	Tx-
3	Rx+
4	NC
5	NC
6	Rx-
7	NC
8	NC



LED Indicators

Use the LED indicators to confirm your attachment to the network and that the Digi CM is able to send and receive data.

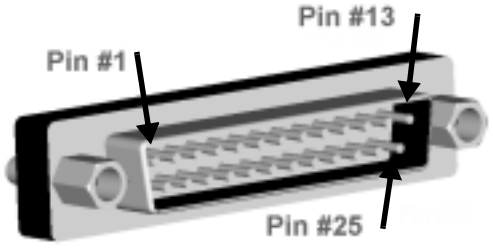
LED		Function
System	Power	On when power is supplied
	Ready	On when system is ready to run
	PC	On when a PC device is running
Ethernet	100Mbps	On when 100Base-TX connection is detected
	LINK	On when connected to an Ethernet network
	Act	Blinks whenever there is any activity through the DIGI CM Ethernet port
Serial port	In use	On when the serial port is ready to run
	Rx/Tx	Blinks whenever there is any incoming or outgoing traffic through the serial port of the Digi CM

Cable Adapters

The Digi CM unit is packaged with four cable adapters. The following illustrations depict the pinouts for the cable adapters. Additional adapters can be purchased from Digi in quantities of 8.

DB-25 Male Console Adapter

(Digi P/N 76000672)

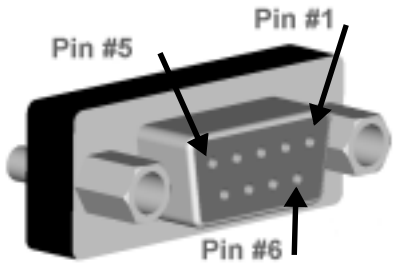


DB-25 Male to RJ-45 Connector Pin Assignments

Signal	Description	DB-25M	RJ-45
GND	Ground	7	4
TxD	Transmitted Data	2	3
RxD	Received Data	3	6
RTS	Request to Send	4	1

CTS	Clear to Send	5	8
DSR DCD	Data Set Ready Data Carrier Detect	8, 6	5, 7
DTR	Data Terminal Ready	20	2

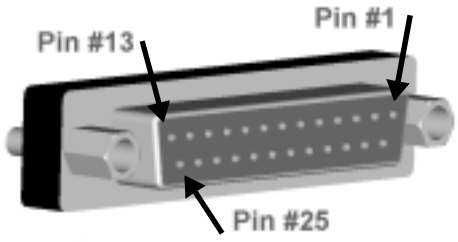
DB-9 Female Console Adapter
(Digi P/N 76000671)



DB-9 Female to RJ-45 Pin Assignments

Signal	Description	DB-9FPin	RJ-45 Pin
GND	Ground	5	4
TxD	Transmitted Data	3	3
RxD	Received Data	2	6
RTS	Request To Send	7	1
CTS	Clear To Send	8	8
DSR, DCD	Data Set Ready Data Carrier Detect	1, 6	5, 7
DTR	Data Terminal Ready	4	2

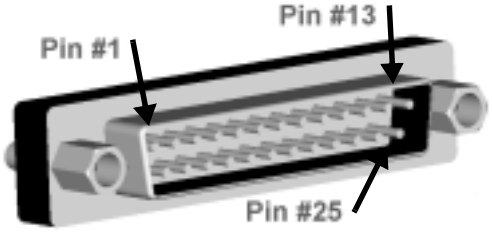
DB-25 Female Console Adapter
(Digi P/N 76000673)



DB-25 Female to RJ-45 Pin Assignments

DB-25F	Signal	RJ-45	Signal
7	GND	4	GND
2	TxD	3	RxD
3	RxD	6	TxD
4	RTS	1	CTS
5	CTS	8	RTS
8, 6	DCD, DSR	5, 7	DCD, DTR
20	DTR	2	DSR

DB-25 Male Modem Adapter (Digi P/N 76000670)



DB-25 Male Modem to RJ-45 Pin Assignments

Signal	Description	DB-25M	RJ-45
GND	Ground	7	4
TxD	Transmitted Data	2	6
RxD	Received Data	3	3
RTS	Request to Send	4	8
CTS	Clear to Send	5	1
DSR	Data Set Ready	6	2
DCD	Data Carrier Detect	8	5
DTR	Data Terminal Ready	20	7

Chapter 14 Certifications

Safety

US: UL1950
Canada: CSA 22.2 No. 60950
Europe: EN60950 (CB Scheme Report)

Emissions

US: FCC part 15, Class A
Canada: ICES 003 Class A
Europe: EN55022, EN61000-3-2, EN61000-3-3
Japan: VCCI
Australia: AS3548

Immunity

Europe: EN55024

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