



Digi CM

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Making
DEVICE NETWORKING
easy™

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Contents

Chapter 1 Introduction

Digi CM™ Model Support.....	11
Feature Overview.....	11
Feature Summary.....	11
User Groups.....	13
Root and Admin Usernames and Passwords.....	13
Adding Port Administrators and Users	13
Access Lists	13
Ways to Configure the Digi CM.....	13
Web Interface	14
Configuration Menu	14
Command Line Interface	15
Ways of Accessing the Digi CM Ports: Overview.....	15
Web Interface Access Menu	15
Port Access Menu	17
Direct Port Access.....	18
Custom Menus	18
Port Escape Menu.....	19
Description of Fields	20
SNMP	21
Saving and Applying Changes	21
One Step: Save and Apply Changes	21
Two-Step: Save to Flash and then Apply Changes	21
Automatic Device Recognition	21
Locator Light.....	22

Chapter 2 Getting Started

Introduction.....	23
Assigning IP Settings from the Console Port	23
Configuring for SSH	25
Options	25
Configuring the Port Access Menu for SSH	25
Configuring a Port for SSH	26
Adding, Editing, and Removing Users.....	27
Procedure	27
About Shell Options	27

Chapter 3 Installing and Configuring PC Cards

Introduction.....	29
Compatible PC Cards.....	29
Adding a Compact-flash Card	29
Adding a Network Card	30

Adding a Wireless LAN Card.....	31
Adding a Serial Modem	32
Chapter 4 System Status and Port Logging	
Introduction.....	35
System Status & Log.....	35
System Information	35
IP Information	35
Enabling Log Storage Location	36
Enable NFS Server	36
Alert for NFS Server Disconnect	37
Enable SYSLOG Server	38
Enable a Compact-flash Card	38
Enable the Digi CM Unit's Memory	39
Configuring System Logging	40
Viewing System Logs	40
Configure Port Logging	41
Viewing Port Logs	42
Chapter 5 Configuring Ports	
Introduction.....	45
Enabling and Disabling the Ports	45
RealPort Support.....	45
Resetting Ports.....	47
Reset Individual Port Settings	47
Port Title	47
Configuring Automatic Device Recognition	47
Apply all Ports Settings	49
Host Mode Configuration.....	50
Console Server Mode	50
Terminal Server Mode	51
Dial-In Modem Mode	51
Dial-In Terminal Server	52
Configuring Host Mode.....	52
Supported Protocols.....	54
Serial Port Parameters	54
DTR Behavior	54
Inter-character Timeout	54
Specialty Use of Port -When Data is Processed in Chunks	55
Remote Ports	56
Configure Remote Ports	56
Accessing a remote port	56
Chapter 6 Alerts and Notifications	
Introduction.....	59
Configuring SMTP Alerts.....	60
SNMP Information	60
Traps	61

Configuring SNMP.....	61
Managing the SNMP Protocol.....	62
Configuring Port Event Handling	63
Config Alerts for Automatic Device Recognition (ADR).....	65
Chapter 7 User Administration	
Administering Users	67
Required Privileges	67
Procedure	67
To Add an Access List to the Digi CM Unit	68
Chapter 8 Configuring Security and Authentication	
Introduction.....	71
Configuring Network IP Filtering.....	71
Configuring User Access Control	74
Configure User Access Privileges	76
Restrict a User's Privileges	77
Change an Access List's Privileges	77
Sniff Session	78
Security Profile	80
Network Security	81
Per Port Security	81
Password Security	81
Authentication.....	82
Configuring Authentication Methods for Port Access	82
Configuring Authentication for the Web Server	83
LDAP Authentication	83
Custom PAM Module	84
Chapter 9 Custom and Default Menus	
Introduction.....	87
Making Custom Menus.....	87
Adding Users	87
Creating Menu Names	88
Adding Menu Items	89
Assigning Users to a Menu	90
Default Menu	90
Port Access Menu	90
Chapter 10 Microsoft SAC Support	
About the Digi CM Unit's Support for Microsoft Windows Server 2003	93
Set Up Overview	94
Setting Up the Windows Server 2003 Port.....	94
Command Syntax	94
Command Example	94
Setting Up the Digi CM Unit for SAC Support	94

Accessing the Windows Server 2003 Console Port from the Digi CM Unit's GUI	96
Chapter 11 Rackable Systems Management Card	
Introduction.....	99
Set up	99
Setup of the Digi CM Unit to Support the Rackable Systems Management Card	99
Configure Serial Port Communication Settings:	99
Assign a Port Name:	100
Accessing the Rackable Systems Management Card from the Digi CM Unit's User Interface	100
Chapter 12 Configuring Remote Dial-In Access	
Introduction.....	103
Configuring for Dial-In Modem Access.....	103
Adding a PC Modem	106
Configuring for Dial-In Terminal Server Access	106
Chapter 13 Power Controller	
Introduction.....	109
Installing Power Controller	110
Configuring Power Controller	110
Configure the Serial Port Parameters to Match the Power Controller ...	110
Add the Power Controller	111
Setting Alarms and Thresholds	112
Outlet Configuration	113
User Access for Power Controller	114
Configuring to Allow Specific Users Access	114
Configuring to Restrict Specific Users	115
Power Controller Management.....	116
Cascading Multiple Digi RPM Units.....	118
Chapter 14 Port Clustering	
Introduction.....	121
Configuring Port Clustering	122
Assigning Master Clustering Mode	122
Configure Slaves to Join a Cluster	122
Advanced Clustering Configuration	123
Accessing the Cluster Ports	125
Chapter 15 System Administration	
Introduction.....	127
Upgrading the Firmware.....	127
Web Interface	127
Configuration Management.....	128
Automatically Saving the Configuration	128
Automatically Upgrading the Digi CM Unit's Firmware or Configuration using	

TFTP	129
DHCP	129
Directly Configure the TFTP Server and the Name of the “hash” File ...	130
The Structure of the Hash File	130
Resetting Factory Defaults	132
Setting Date and Time.....	133
Configuring a Host Name	133
 Chapter 16 Command Line Interface	
Introduction.....	135
Linux Commands	135
Important File Locations	136
Default Script	136
Bootting Sequence	136
Config Files	137
User Storage Space	138
Example Scripts	138
User Administration.....	140
Locator LED Script	141
 Chapter 17 Configuration Menu	
Introduction to the Configuration Menu	143
Accessing the Configuration Menu.....	143
Configuring SSH.....	144
Adding, Editing, and Removing Users.....	145
Adding and Configuring a PC Card	145
Host Mode Configuration.....	145
Port Parameters	146
Port Access Menu	146
System Logging.....	147
Configure the System Log Device	147
Configure System Logging	148
Configuring SNMP.....	148
Configuring SMTP	148
Network IP Filtering	149
Port IP Filtering.....	150
Sniff Sessions.....	150
Viewing A Sniff Session	151
Field Descriptions for Sniff Sessions	152
Authentication.....	153
Upload Server Certificate	153
OpenSSL(SSLeay) Simple CA Usage - Install Openssl	154
Make Root CA (Certificate Authority for Self-signed)	154
Making a Certificate Request	155
Signing a Certificate Request	156

Make Certificate for the Digi CM Unit	157
Dial-in Modem Access.....	157
Dial-in Terminal Server Access	158
Clustering	159
Firmware Upgrade.....	160
Restoring Factory Defaults.....	161
Setting Date and Time.....	161
Accessing the Boot Loader Program.....	161
Hardware Test Menu	162
Disaster Recovery	162
Chapter 18 Hardware Information	
Introduction.....	165
Hardware Specifications.....	165
Digi CM 48	165
Digi CM 16 and Digi CM 32	166
Digi CM 8 AC Powered	166
LED Indicators.....	167
About Serial Port Cabling.....	167
Serial Port Pinouts.....	167
Cable Adapters.....	168
DB-25 Male Console Adapter	168
DB-9 Female Console Adapter	169
DB-25 Female Console Adapter	170
DB-25 Female to RJ-45 Pin Assignments	170
DB-25 Male Modem Adapter (Digi 8-pack reorder P/N 76000670)	171
DB-25 Male Modem to RJ-45 Pin Assignment	171
DB-9 Male Modem Adapter (Digi 8-pack reorder P/N 76000702)	172
DB-9 Male Modem to RJ-45 Pin Assignment	172
Ethernet Pinouts.....	172
Rack Mounting Installation	173
Rack Mounting Safety Precautions	173
Chapter 19 Certifications	
Safety	175
Working Inside the Digi CM Unit	175
Replacing the Battery	175
Rack Mounting Installation Considerations	175
Environmental Considerations and Cautions	176
Safety Instructions	176
Emissions.....	177
Immunity.....	177
Solaris Ready.....	177
Index	179

Chapter 1**Introduction****Digi CM™ Model Support**

This manual offers information on the Digi CM 8-port, 16-port, 32-port, and 48-port models.

Feature Overview

With the Digi CM unit, administrators can securely monitor and control servers, routers, switches, and other network devices from anywhere on the corporate TCP/IP network, over the Internet, or through dial-up modem connections, even when the server is unavailable through the network.

The Digi CM employs SSHv2 encryption, to keep server access passwords safe from hackers, and supports all popular SSH clients, as well as secure access from any Java-enabled browser. It is the first console server to provide a secure graphical user interface for easy out-of-band management of Microsoft Windows Server 2003 systems. It connects to serial console ports using standard CAT5 cables, eliminating the hassles of custom cabling. In addition, the Digi CM unit offers a PCMCIA card slot, for adding dialup modems or wireless network cards. Flash memory cards can be used to save port logs and backup configuration files.

The Digi CM unit is available in 8-, 16-, 32- and 48-port models, in a 1U rack-mount form factor.

Feature Summary

Category	Feature
Security	• SSH v2 server and client • SSL • IP Filtering • Central access to security parameters via the Security Profile including network, port, and password securities.
Authentication	• TACACS+ • RADIUS • LDAP • Custom PAM modules • Kerberos • User access per port • Local user database

Category	Feature
Management	• Command line • WEB --HTTP/HTTPS • SNMP • Custom applications • Port Triggers and Alerts • Multi level menus • Advanced Device Discover Protocol (ADDP) for locating the device on the network • Integrated power management and control • Automatic Device Recognition
Data Capture	• Local port logging • External logging (syslog, NFS, secure NFS, PC card)
Port Access	• Telnet/SSH with custom menu • Reverse Telnet/SSH • HTTP/HTTPS • Raw TCP • Port escape menu
PC Card Support	• CompactFlash memory card • Wireless LAN adapter (802.11b) • Ethernet LAN adapter • PSTN/CDMA modem card See http://cm.digi.com for more information.
Other Features	• RealPort® • Solaris Ready • Multiple users per port • Remote ports • Access lists per port • Flash upgrade able • SSH sessions simultaneously on all ports • Secure Clustering - Single IP for multiple Digi CM devices • IP addresses per port • Automated TFTP firmware and configuration update upon boot • RSA SecurID® support using RADIUS • Find Me locator light (Digi CM 48-port)

User Groups

The Digi CM unit comes with 4 built-in user groups, pre-defined by roles or access levels. The following table lists the 4 user groups, their access rights, and default user names. The Digi CM unit supports access lists for user privileges. These lists can contain multiple users and port rights. If e.g. you have multiple people responsible for the Sun Servers in your company and you want to give them identical access rights you can create a "Sun-admin" access list. Assign this access list rights to every port that is attached to a Sun Server and add all the Sun administrators to the "Sun-admin" Access List.

Group	Access Privileges		Configuration Privileges		Defaults	
	Ports	Command Line	Ports	System	Login	Password

Root	yes	yes	yes	yes	root	dbps
System Admin	yes	yes (read only)	yes	yes	admin	admin
Port Admin	yes	no	yes	no	-	-
User	yes	no	no	no	-	-

Root and Admin Usernames and Passwords

The Digi CM unit comes with two default users; root and system admin. The user names of the the Digi CM unit are case sensitive.

User Name	Default Password
root	dbps
admin	admin

Adding Port Administrators and Users

The system administrator and root user can add port administrators and additional users easily with the web interface by choosing System administration > User administration > Add user.

Access Lists

Multiple users can be defined within Access lists with access privileges or restrictions to the ports. See "Create an Access list" on page 68 for more information.

Ways to Configure the Digi CM

This section discusses the three ways to configure the Digi CM unit using the web interface, configuration menu, or command line interface.

Web Interface

The Digi CM web interface features HTTPS for secure access.

The web interface provides an easy way to configure the Digi CM unit. The root user and system administrator can configure all features through the web. Port administrators can configure ports, including port clustering, but cannot modify system settings. No other users can use the web interface for configuration.

There are two ways to access the web interface - the difference being whether or not the IP address is configured or if DHCP is running.

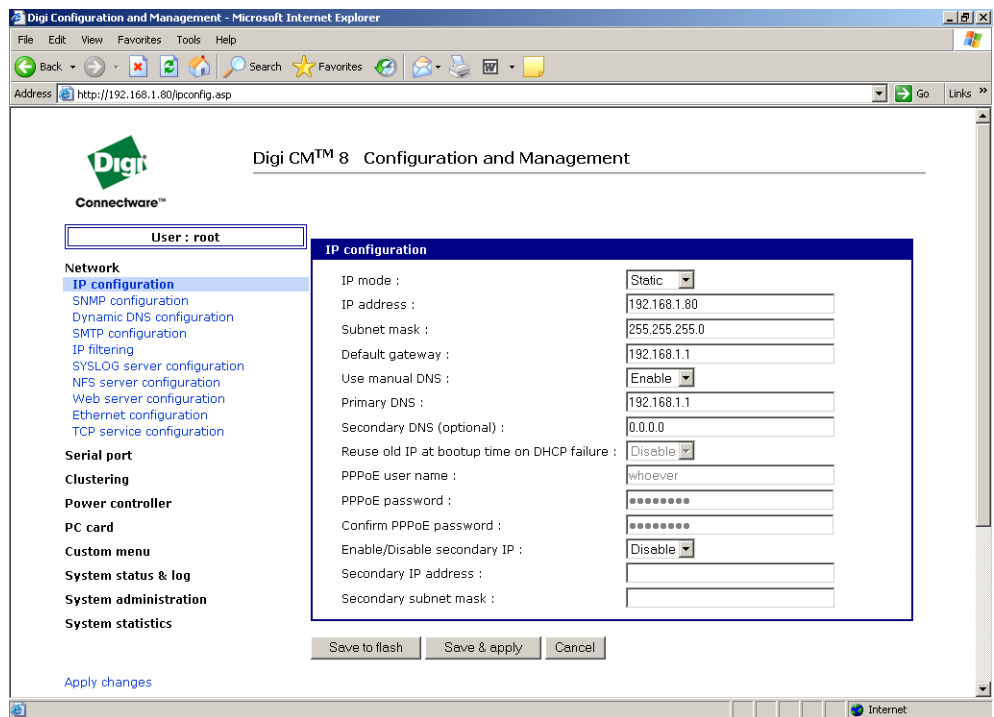
- ADDP (Advanced Device Discover Protocol)

This device discovery tool allows you to find, configure and launch your web configuration and management interface. Find your device and double click it to access the web interface, or select your device and click Configure network settings (on the left navigation bar).

- Directly entering the IP address

You can enter the IP address directly into the URL address bar of your browser. (Of course, the IP address must already be set up)

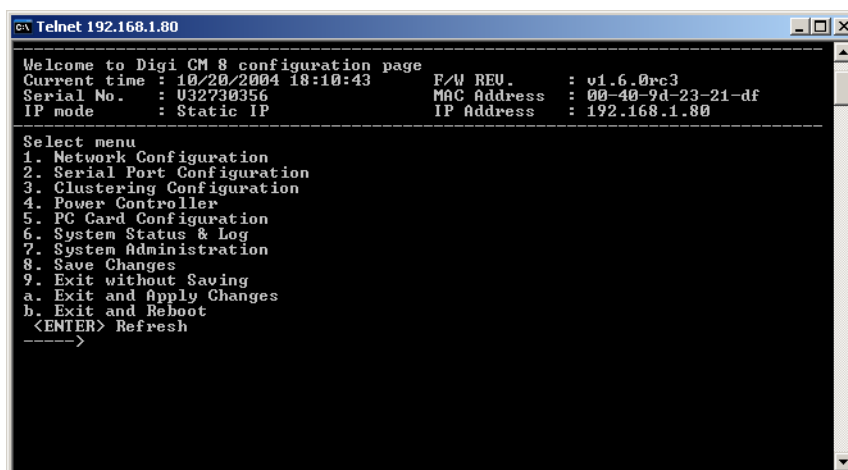
Access the web interface from one of the previous methods. The following page is displayed after login.



Configuration Menu

The root user and system administrator have full access to the configuration menu from a Telnet or SSH session or a serial connection through the console port. Functionality is similar to the web interface, with the exception of custom menus, which can be created only from the web interface. The configuration menu is presented to system administrators automatically. Root users access the menu by entering the command `configmenu`. Port administrators can access this menu but can modify serial port configuration only. No other users

can access this menu.



Command Line Interface

The command line interface can be accessed from a Telnet or SSH session or from the console port. The root user always has access to this interface. The system administrator can be granted read-only permission as well. No other users can access the command line interface.

Ways of Accessing the Digi CM Ports: Overview

There are five ways to access the ports on the Digi CM unit:

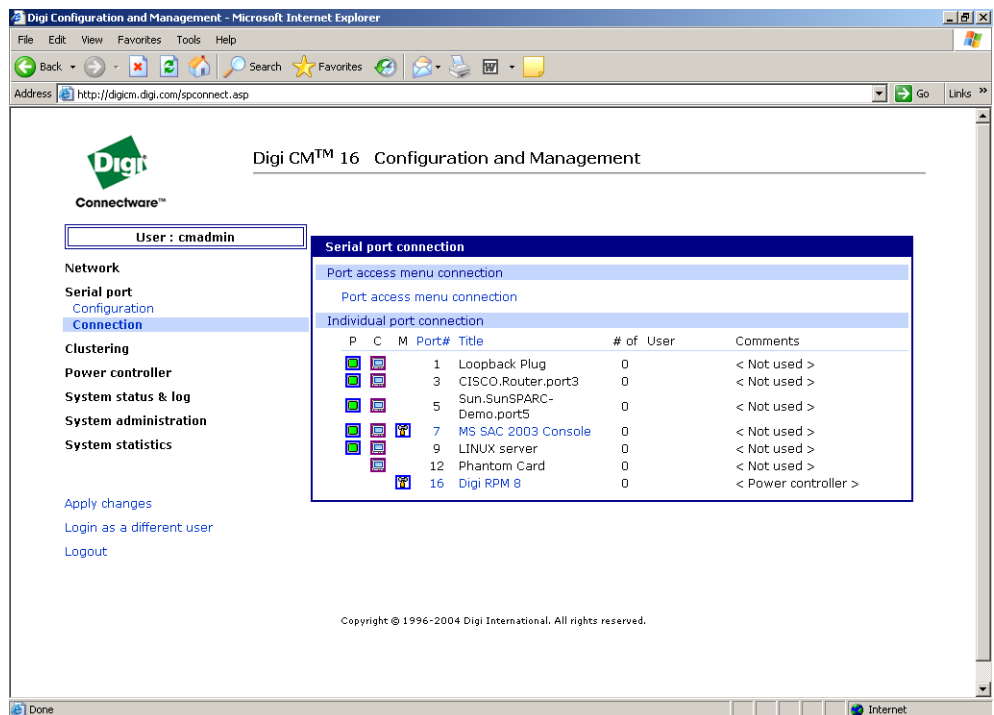
- Web Interface
- Port Access Menu
- Direct Port Access
- Custom Menus
- SNMP

Web Interface Access Menu

The web interface menu provides easy and convenient access to ports. All users can access the menu by entering the the Digi CM unit IP address or host name in a web browser's URL window. You will only be able to see the ports that you are allowed to access.

To access a port from the web interface, do the following:

1. Access the web interface.
2. Click **Serial port** > **Connection**.



The P (Power) column allows you to control power of the attached devices, if a Remote Power Management unit is attached and you have appropriate rights.

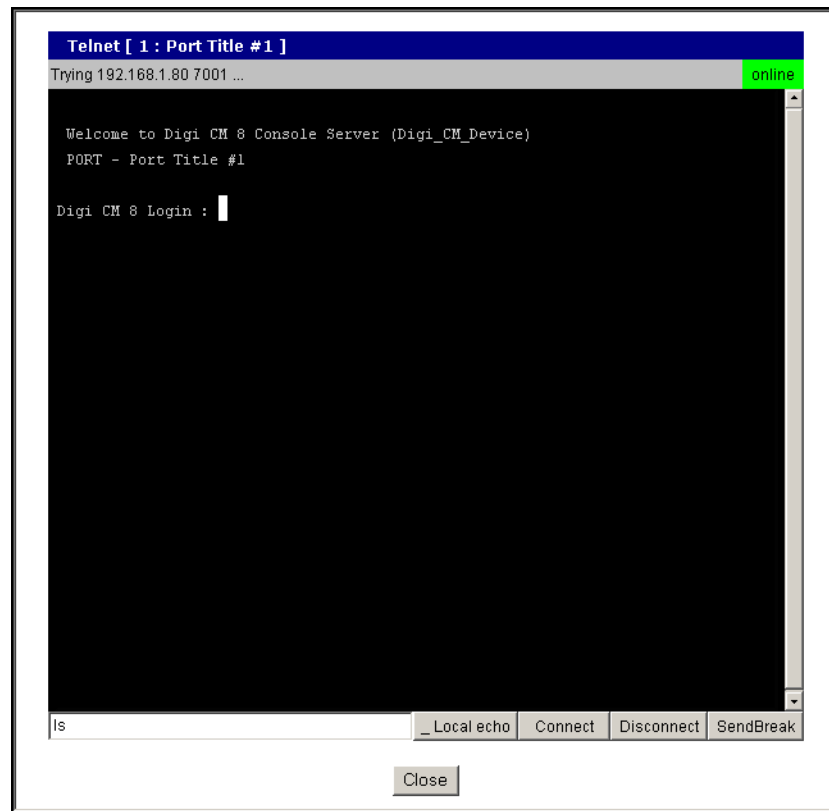
The M (Manage) column offers web based management for Windows Server 2003, Remote Power Management units or Rackable Systems Management Card.

The “# of User” column shows how many users are actually connected to the port and the username of the read/write user.

If you are conducting a special task through the console port, like BIOS upgrade and should not be interrupted, you can notify other users by entering a comment upon connect. This comment is shown here.

3. Select a port by clicking the icon in the C (Console) column.

A Java applet or Telnet window opens with a login prompt.



The web interface can also be configured to call a local Telnet or SSH application, see "Configuring Host Mode" on page 52.

Port Access Menu

The Port Access Menu provides access to ports. It is accessible to all users through the web interface, Telnet and SSH sessions, and remote modem access. The information that follows shows you how to access this menu.

Access Type	Permissions	Procedure
Web interface	Any user can use this method.	1. Access the web interface 2. Choose Serial port > Connection > Port access menu connection 3. Log in
Telnet/SSH	Any user can use this method.	1. Telnet to the Digi CM unit specifying its IP address and port 7000. (7000 is the default socket port for both Telnet and SSH) Example: telnet 192.168.15.7 7000 2. Log in
Command line	Root	From the command line, issue the portaccessmenu command. Example: portaccessmenu
Telnet/SSH	Any user	TCP port 23/22 Example: telnet http://digicm.digi.com If user's shell is configured to "Port access menu", please refer to "Administering Users" on page 67.

Here is a screenshot of the Port access menu.

```

Welcome to Digi CM 32 Console Server
Digi CM 32 Login : root
Digi CM 32 Password : ****

=====
Port#      Port Title      Mode      Port#      Port Title      Mode
=====
1  Port Title #1      [CS]      2  Port Title #2      TS
3  Port Title #3      DI         4  Port Title #4      DI
5  Port Title #5      CS         6  Port Title #6      CS
7  Port Title #7      CS         8  Port Title #8      CS
9  Port Title #9      CS        10  Port Title #10     CS
11 Port Title #11     CS        12  Port Title #12     CS
13 Port Title #13     CS        14  Port Title #14     CS
15 Port Title #15     CS        16  Port Title #16     CS
17 Port Title #17     CS        18  Port Title #18     CS
19 Port Title #19     CS        20  Port Title #20     CS
21 Port Title #21     CS        22  Port Title #22     CS
23 Port Title #23     CS        24  Port Title #24     CS
25 Port Title #25     CS        26  Port Title #26     CS
27 Port Title #27     CS        28  Port Title #28     CS
29 Port Title #29     CS        30  Port Title #30     CS
31 Port Title #31     CS        32  Port Title #32     CS
=====

Enter the serial port < 1-32 , others for exit > :

```

Direct Port Access

You can connect directly to a properly configured port through a Telnet or SSH session. Configuration requirements include setting the Host Mode to Console Server Mode and the Protocol to either Telnet or SSH. Ports, by default are set to Console Server Mode and Telnet. Use the following information to make a Telnet or SSH connection to a port:

Type	Command Syntax	Example: Connection to Port 3
Telnet	telnet <i>ip-address tcp-port</i> where <i>ip-address</i> is the Digi CM unit's IP address and <i>tcp-port</i> is the Listening TCP port for a port	telnet 192.168.15.7 7003 (7000 is the default socket port for both Telnet and SSH)
SSH	ssh <i>user-name@ ip-address tcp-port</i> where <i>user-name</i> is a user's name, <i>ip-address</i> is the Digi CM unit's IP address and <i>tcp-port</i> is the Listening TCP port for a port ssh <i>user-name:"p=port-number"@ip-address</i> or ssh <i>user-name:"t=port-title"@ip-address</i>	ssh admin@ 192.168.15.7 -p 7003 (7000 is the default socket port for both Telnet and SSH) ssh sunadmin:"p=25"@Digi12 ssh ciscoadmin:"t=Cisco-main"@Digi12
WEB	http:// <i>ip-address/connect.asp?t=port-title</i> http:// <i>ip-address/connect.asp?p=port-number</i> where <i>ip-address</i> is the Digi CM unit IP address or NDS name, <i>port-number</i> is the number of the serial port and <i>port title</i> is the name of the port as assigned in serial port, port title.	http://digicm.digi.com connect.asp?t=CISCO.Router.port3 (the port name is case sensitive)

Note: The example assumes that the Listening TCP port is 7003, the default for port 3.

Custom Menus

Custom menus are created by either root or the system administrator to limit your access to specific ports. For more information, see "Making Custom Menus" on page 87.

Port Escape Menu

Port escape is the ability to escape from a port without disconnecting. Port escape is available in main sessions as well as sniff sessions. Every connection method accommodates port escape. You configure the escape sequence per port. Follow the procedure to configure the port escape sequence.

1. **Serial Port > Configuration** > Select the port number or All.
2. **Host mode configuration** > Port escape sequence - enter a letter for the Port escape sequence. The default is <ctrl> z.
3. Click Save to flash and continue with other configurations or click Save & apply for the changes to take effect.

Serial port configuration - 1 : Port Title #1 — Move to —

Enable/Disable this port

Port title

Apply all ports settings

Host mode configuration

Host mode : Console server

Type of console server : Other

Rackable Systems Mgmt Card : Disable

Enable/Disable assigned IP : Disable

Assigned IP : 0.0.0.0

Listening TCP port (1024-65535) : 7001

Protocol : Telnet

Inactivity timeout (1-3600 sec, 0 for unlimited) : 100

Enable/Disable port escape sequence : Enable

Port escape sequence : Ctrl- z

Port break sequence : ~break

Use comment : No

Quick connect via : Web applet

Web applet encoding : English (latin1)

Save to flash Save & apply Cancel

Serial port parameters

Port logging

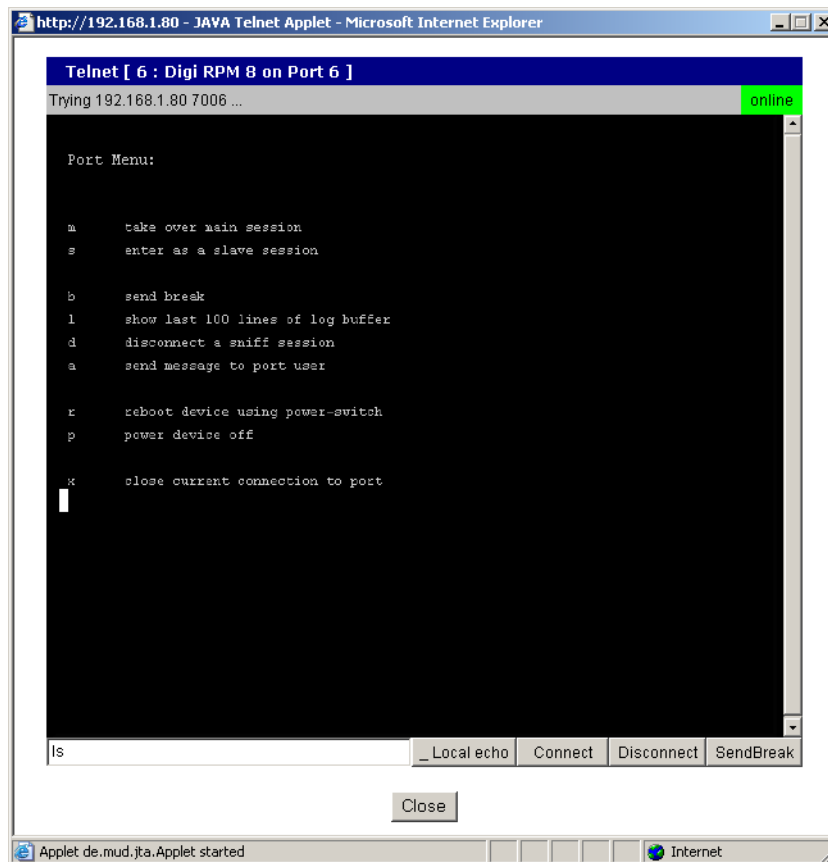
Port IP filtering

The port escape menu is automatically started if there is one active session to the port established and a second user tries to connect.

To open a sniff session:

1. Click **Serial port > Connection**.
2. Select the port you want to access.
3. Log in with your user name and password.

4. Enter the letter of the port escape sequence.



The following table describes the fields and the operations for the port escape feature. You will only see the fields allowed for your permissions.

Description of Fields

Escape Sequence Ctrl+	Description of Action	Occurrence
m	take over main session (read/write)	only presented to users with read/write access upon entering a session
s	enter as a slave session (read only)	only presented to users with read/write access upon entering a session
b	send break	not functional for sniff users
l	show last 100 lines of log buffer	must enable logging for this option
d	disconnect a sniff session	only functional to admin
a	send message to port user(s)	not available to sniff users
r	reboot device using power-switch	only if power management is available on this port
p	power device on/off	(show only on or off) only if power management is available on this port

Escape Sequence Ctrl+	Description of Action	Occurrence
x	close current connection to port	closes the current connection

Note: By entering the port escape sequence twice, it is directly transmitted (once) to the connected device. If the escape sequence is entered twice within 1/2 second, the menu will not be opened.

SNMP

An SNMP MIB to configure the Digi CM unit is available to be downloaded from support.digi.com.

Saving and Applying Changes

In the web interface, you can save and apply configuration changes in two ways. With the one-step method, you choose “Save & apply” and changes are saved and applied (take effect) immediately. With the two-step method, you choose “Save to flash,” which immediately saves changes but the changes do not take effect until you choose **Apply changes**. The following topics describe how to do each of these operations.

One Step: Save and Apply Changes

To save and apply changes immediately, choose the Save & apply button.

Two-Step: Save to Flash and then Apply Changes

To save multiple changes but apply changes once, do the following:

Choose the Save to flash button.

When you finish changing the configuration, choose the **Apply changes** link which is located on the left navigation menu (or the Save & apply button at the bottom of the page.)

Automatic Device Recognition

This feature allows the Digi CM unit to automatically detect and recognize attached devices. The Digi CM unit sends down a probe string, “Enter”, by default then analyzes the response. It then displays the detected OS, device and port number like:

```
CISCO.Router.port3
Sun.nemo.port5
```

To enable Automatic Device Recognition:

1. **Serial Port > Configuration** > Select the port number or All.
2. **Port title**
 - Automatic Detection** - Enable
 - Use detected port title** - Enable
 - Probe String** - \x0D (means <Enter>)
 - Device detection method** - Active
 - Detection initiation** - periodically
 - Detection delay** - every 5 minutes

Locator Light

3. Click Save & apply.

For more details about Automatic Device Recognition please refer to chapter 4, Configuring Ports.

Serial port connection						
Port access menu connection						
Port access menu connection						
Individual port connection						
P	C	M	Port#	Title	# of	User
			1	Loopback Plug	0	
			3	CISCO.Router.port3	0	
			5	Sun.SunSPARC-Demo.port5	0	
			7	MS SAC 2003 Console	0	
			9	LINUX server	0	
			12	Phantom Card	0	
			16	Digi RPM 8	0	

Port 3 shows a real world example of a detected device.

Automatic Device Recognition also monitors each of the configured serial ports. This allows you to receive an e-mail or SNMP trap if there is a change in the expected response from the device connected to the serial port. If the device goes down or is disconnected for any reason, you are notified.

For configuration of this alarm feature please refer to chapter 4, Configuring Ports.

Locator Light

The Digi CM 48-port unit has a locator light on the front panel labeled Find Me. All other Digi CM units flash the serial port lights to indicate where the device is found.

If you access the web interface, log in to the Digi CM unit, and scroll down the page, you'll find additional links.

Click Start device locating and a popup box will appear to confirm. Click okay and the Digi CM unit Find Me light will blink (other Digi CM models blink all LEDs).

To turn off the locator light, click Stop device locating.

Chapter 2

Getting Started

Introduction

This chapter covers basic configuration topics. Included is information on assigning IP settings, enabling secure access with the web interface, accessing the unit through SSH, and adding or removing users.

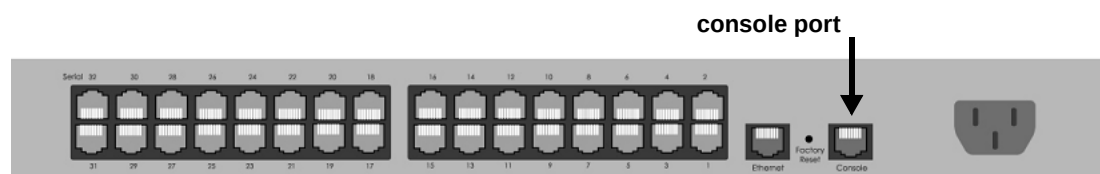
Note: Initial setup is described in the Quick Start Guide included with the product packaging. A copy of this document is also available online at <http://cm.digi.com>.

Assigning IP Settings from the Console Port

The following steps use the console port to assign IP settings.

The default IP address is 192.168.161.5.

1. Connect the console port on the rear panel of the Digi CM unit to a serial port on a workstation using the Ethernet console cable and the appropriate console adapter packaged with the the Digi CM unit. The arrow in the following graphic points to the console port.



CM 32 back panel shown

2. Configure a terminal emulation program, such as HyperTerminal, using the following settings:
 - bps=9600
 - data bits=8
 - parity=none
 - stop bits=1
 - flow control=none.
3. Establish a connection to the console port and press Enter to get a command prompt.
4. At the login prompt, log in as `admin`. The default password for admin is `admin`.
The Configuration menu appears.
5. Enter the number for Network configuration.
6. Enter the number for IP configuration.
7. Enter the appropriate parameters for the IP settings.
8. Press ESC when done to return to the main configuration menu.

```
Telnet 10.8.16.39

login: admin
Password:

-----
Welcome to Digi CM 48 configuration page
Current time : 01/01/1970 04:48:24   F/W REV.   : v1.7.0b9
Serial No.   : U34751584             MAC Address : 00-40-9d-23-84-36
IP mode      : DHCP                  IP Address  : 10.8.16.39
-----

Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
c. Start Device Locating
<ENTER> Refresh
----->
```

```
Telnet 10.8.16.39

-----
Network configuration
-----
Select menu
1. IP configuration
2. SNMP configuration
3. Dynamic DNS configuration
4. SMTP configuration
5. IP filtering
6. SYSLOG server configuration
7. NFS server configuration
8. Web server configuration
9. Ethernet configuration
a. TCP service configuration
<ESC> Back, <ENTER> Refresh
-----> 1

-----
Network configuration --> IP configuration
-----
Select menu
1. IP mode : DHCP <10.8.16.39>
2. Use Manual DNS : Enable
3. Primary DNS : 0.0.0.0
4. Secondary DNS : 0.0.0.0
5. Reuse Old IP At Bootup Time On DHCP Failure : Disable
6. Enable/Disable Secondary IP : Disable
<ESC> Back, <ENTER> Refresh
----->
```

9. Enter the number to exit and apply changes.

Changes are saved and applied immediately. There is no need to reboot.

Configuring for SSH

Accessing the Digi CM unit's command line via SSH is enabled by default (TCP port 22).

Options

The Port Access Menu and individual ports can be configured for SSH.

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

Configuring the Port Access Menu for SSH

1. Access the web interface.
2. Log in as root, admin, or a member of the port administration group. The default password for root is `dbps`, and the default password for admin is `admin`.
3. Under **Serial port > Configuration > Port access menu configuration**.
The Port access configuration menu appears.
4. Select SSH as the Port access menu protocol.

Port access menu configuration		
Port access menu :	Enable ▾	
Port access menu port number (1024-65535) :	7000	
Port access menu protocol :	SSH ▾	
Port access menu inactivity timeout (1-3600 sec, 0 for unlimited) :	100	
Enable/Disable port access menu local IP :	Disable ▾	
Port access menu local IP :	0.0.0.0	
Port access menu quick connect via :	Web applet ▾	
Port access menu web applet encoding :	English (latin1) ▾	
Login on port access :	Disable ▾	
Port access menu authentication method :	Local ▾	
[Email alert configuration]		
Enable/Disable email alert for port login :	Disable ▾	
Title of email :		
Recipient's email address :		
[SNMP trap configuration]		
Enable/Disable port login trap :	Disable ▾	
Use global SNMP configuration :	Disable ▾	
Trap receiver settings :		
IP Address	Community	Version
0.0.0.0	public	v1 ▾
0.0.0.0	public	v1 ▾

Note: Login on port access requires logging in twice (once for access to the port and once for port access menu) when enabled. Disabled allows one log in directly to the port.

5. Click Save & apply.

Configuring a Port for SSH

1. Access the web interface.
2. Log in as root, admin, or a member of the port administration group. The default password for root is `dbps`, and the default password for admin is `admin`.
3. Under **Serial port > Configuration**.
4. Select All or one individual port you want to configure for SSH.
5. Click **Host mode configuration**.
6. Specify SSH as the Protocol as shown in the following screenshot.

The screenshot displays the 'Serial port configuration - 1 : Port Title #1' web interface. The 'Host mode configuration' section is active, showing various settings for the port. The 'Protocol' is set to 'SSH'. Other settings include 'Host mode' as 'Console server', 'Type of console server' as 'Other', 'Rackable Systems Mgmt Card' as 'Disable', 'Enable/Disable assigned IP' as 'Disable', 'Assigned IP' as '0.0.0.0', 'Listening TCP port (1024-65535)' as '7001', 'Inactivity timeout (1-3600 sec, 0 for unlimited)' as '100', 'Enable/Disable port escape sequence' as 'Enable', 'Port escape sequence' as 'Ctrl- z', 'Port break sequence' as '~break', 'Use comment' as 'No', 'Quick connect via' as 'Web applet', and 'Web applet encoding' as 'English (latin1)'. At the bottom of the configuration section are three buttons: 'Save to flash', 'Save & apply', and 'Cancel'. Below the configuration section are three tabs: 'Serial port parameters', 'Port logging', and 'Port IP filtering'.

Serial port configuration - 1 : Port Title #1	
Enable/Disable this port	
Port title	
Apply all ports settings	
Host mode configuration	
Host mode :	Console server
Type of console server :	Other
Rackable Systems Mgmt Card :	Disable
Enable/Disable assigned IP :	Disable
Assigned IP :	0.0.0.0
Listening TCP port (1024-65535) :	7001
Protocol :	SSH
Inactivity timeout (1-3600 sec, 0 for unlimited) :	100
Enable/Disable port escape sequence :	Enable
Port escape sequence :	Ctrl- z
Port break sequence :	~break
Use comment :	No
Quick connect via :	Web applet
Web applet encoding :	English (latin1)
Save to flash Save & apply Cancel	
Serial port parameters	
Port logging	
Port IP filtering	

7. Click Save & apply.

Adding, Editing, and Removing Users

The root user and system administrator can add, remove, or edit users from the web interface.

Procedure

1. Access the web interface.
2. Log in as root or admin. The default password for root is `dbps`, and the default password for admin is `admin`.
3. Under the **System administration** heading click **Users administration**.

The screenshot shows the 'User administration' web interface. At the top, there are input fields for 'User name' and 'User group' (set to 'All group'), and a 'Search' button. Below this is a section titled 'Current local users' containing a table with columns: '#', 'User name', 'User group', and 'Shell'. The table lists two users: 'admin' (System admin, Configuration menu) and 'root' (Root, CLI). At the bottom of the table are 'Add', 'Edit', and 'Remove' buttons.

#	User name	User group	Shell
1	admin	System admin	Configuration menu
2	root	Root	CLI

4. Select Add, Edit, Remove or click the username to edit a user.
 - Add: Assign a user name, user group, password, and shell.
 - Edit: Change user group, password, or their shell
 - Remove: Remove a user from the system

The screenshot shows the 'Add user' web interface. It contains several form fields: 'User name' (filled with 'Test'), 'Select group' (dropdown menu with 'User' selected), 'Password', 'Confirm password', 'Shell program' (dropdown menu with 'Custom menu' selected), 'SSH public key authentication' (dropdown menu with 'Disable' selected), 'Select SSH Version' (dropdown menu with 'SSH v2' selected), and 'SSH public key file' (input field with a 'Browse...' button). At the bottom are 'Add' and 'Cancel' buttons.

5. Click Save & apply.

Note: The root and admin users cannot be removed from the system.

For more information about configuring access rights for specific users see "Configuring User Access Control" on page 74.

About Shell Options

The shell program selection determines the interface you see when establishing a Telnet or SSH session or connecting via the console port with

the Digi CM unit.

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

Chapter 3**Installing and Configuring PC Cards****Introduction**

This chapter includes information on adding and configuring PC cards for the Digi CM unit. PC card devices that can be added to the the Digi CM unit 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 unit, 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 unit, 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 unit. The arrow in the following graphic indicates the PC card slot.



Digi CM 32 shown

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

1. Insert the card into the PC card slot.
2. Access the web interface.
3. Under the **PC card** heading click **Configuration**.

Adding a Network Card

PC card configuration

Currently configured PC card

Card type : None

PC card service

Configure the detected card Stop card service

Detected PC card

Card type : ATA/IDE Fixed Disk Card
Model : TOSHIBA THNCF064MMA
New PC card is detected.

Save to flash Save & apply Cancel

4. Click Configure the detected card.

The following fields appear on the configuration page.

— ATA/IDE Fixed Disk Card configuration

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 the Delete 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.

PC card configuration

Currently configured PC card

Card type : ATA/IDE Fixed Disk Card
Model : TOSHIBA THNCF256MMA
Size : 256 MB
File system : vfat

ATA/IDE Fixed Disk Card configuration

Total data size to be used (0~237 MB) : 237

Delete all files in ATA/IDE Fixed Disk Card : Delete

Format ATA/IDE Fixed Disk Card : EXT2 Format

PC card service

Configure the detected card Stop card service

Save to flash Save & apply Cancel

5. Enter the appropriate parameters on the configuration page.
6. Click Save to flash or Save & apply.

Adding a Network Card

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

1. Insert the card into the PC slot.
2. Access the web interface.
3. Under the **PC card** heading, click **Configuration**.

Installing and Configuring PC Cards

Note: The card is automatically discovered and a configuration menu is displayed.

4. Enter the appropriate parameters in the configuration menu.

The screenshot shows the 'PC card configuration' window. It has three main sections: 'Currently configured PC card', 'Network configuration', and 'PC card service'. In the 'Currently configured PC card' section, the 'Card type' is 'Network Card' and the 'Model' is 'corega K.K. corega FEtherII PCC-TXD'. The 'Network configuration' section includes fields for 'IP mode' (set to 'DHCP'), 'IP address' (192.168.1.254), 'Subnet mask' (255.255.255.0), 'Default gateway' (192.168.1.1), 'Primary DNS' (204.221.114.1), and 'Secondary DNS' (168.126.63.2). The 'PC card service' section has two buttons: 'Configure the detected card' and 'Stop card service'. At the bottom of the window are three buttons: 'Save to flash', 'Save & apply', and 'Cancel'.

5. Click Save & apply.

Note: If DHCP is active the IP address will appear after the configuration is saved and applied.

Adding a Wireless LAN Card

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

1. Insert the card into the PC slot.
2. Access the web interface.
3. Under the **PC card** heading, click **Configuration**.

Note: The card is automatically discovered and a configuration menu is displayed.

The screenshot shows the 'PC card configuration' window. The 'Currently configured PC card' section shows 'Card type' as 'None'. The 'PC card service' section has 'Configure the detected card' and 'Stop card service' buttons. The 'Detected PC card' section shows 'Card type' as 'Wireless Network Card' and 'Model' as 'Cisco Systems 350 Series Wireless LAN Adapter'. A red message 'New PC card is detected.' is displayed. At the bottom are 'Save to flash', 'Save & apply', and 'Cancel' buttons.

4. Click Configure the detected card.
5. Enter the appropriate parameters in the configuration menu.
WEP is the acronym for Wired Equivalent Privacy and is a security protocol

Adding a Serial Modem

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 - Set Service Identifier and is the name of the wireless LAN network

Use WEP key - Enable or disable the WEP key

WEP mode - 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

The screenshot shows a 'PC card configuration' window with the following sections and settings:

- Currently configured PC card**
 - Card type : Wireless Network Card
 - Model : Cisco Systems 350 Series Wireless LAN Adapter
- Network configuration**
 - IP mode : DHCP (dropdown)
 - IP address : 192.168.1.254
 - Subnet mask : 255.255.255.0
 - Default gateway : 192.168.1.1
 - Primary DNS : 192.168.1.1
 - Secondary DNS : 0.0.0.0
 - Reuse old IP at bootup time on DHCP failure : Disable (dropdown)
- Wireless network card configuration**
 - SSID : test
 - Use WEP key : Enable (dropdown)
 - WEP mode : Encrypt (dropdown)
 - WEP key length : 128 bits (dropdown)
 - WEP key string : [masked]
- PC card service**
 - Buttons: Configure the detected card, Stop card service

At the bottom of the window are three buttons: Save to flash, Save & apply, and Cancel.

6. Click Save to flash.

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 click **Configuration** under the **PC card** heading.

Note: The card is automatically discovered and a configuration menu is displayed.

Installing and Configuring PC Cards

PC card configuration

Currently configured PC card

Card type : None

PC card service

Detected PC card

Card type : Serial Modem Card
Model : Zoom PCMCIA V92 DataFax

New PC card is detected.

3. Click Configure the detected card.

PC card configuration

Currently configured PC card

Card type : Serial Modem Card
Model : Zoom PCMCIA V92 DataFax

Serial Modem Card configuration

Init string :
Inactivity timeout (1-3600 sec, 0 for unlimited) :

PC card service

Detected PC card

Card type : Serial Modem Card
Model : Zoom PCMCIA V92 DataFax

Card service is successfully configured. Save the PC card service configurations.

4. Edit any appropriate parameters and Click Save & apply.

Chapter 4**System Status and Port Logging****Introduction**

The Digi CM unit provides four options for saving system and port logs. The options are: a syslog server, NFS server, compact-flash card, and the Digi CM unit's memory. When memory is selected as the storage location, log files are saved to volatile memory, meaning files are lost 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 are outlined in this chapter.

System Status & Log

For basic system information Click System status & log. The parameters for the system status are described in the following list.

System Information

- Model No.** - Identification of Digi device
- Serial No.** - Serial number of product
- F/W Rev.** - Revision number of firmware
- B/L Ver.** - Bootloader version
- MAC address** - MAC address of Digi device
- Uptime** - Amount of time since last reboot
- Current time** - : Time based on time set for Digi device
- System logging** - :Status of system logging either Enabled or Disabled
- Send system log by email** - Condition for notification:
- PC card type** - :Description of PC card if configured
- PC card model** - :Model of PC card if configured
- Power status** - :Dual power (1 - Normal , 2 - Normal)

IP Information

- IP mode** - Method for setting IP address either Static, DHCP, PPPoE, or Disable
- IP expiration** - When the IP address will expire
- IP address** - Actual IP address

Enabling Log Storage Location

Subnet mask - Address of the Subnet mask

Gateway - Address of the Gateway

Receive/Transmit errors - Number of errors from receiving or transmitting

Primary DNS - IP address of the primary DNS

Secondary DNS - IP address of the secondary DNS

Enabling Log Storage Location

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, you must specify the NFS server's IP address and its mounting path. Encrypted NFS is using a SSH connection to tunnel all data. To enable the NFS server for port or system logging, do the following:

1. Access the web interface.
2. Under the Network heading, Click **NFS server configuration**.

NFS service - Enabled or disabled.

Primary NFS server name -IP address of NFS server or DNS name

Mounting path on primary NFS server - Directory to primary NFS server

Primary NFS timeout - Interval in seconds before timeout (5-3600)

Primary NFS mount retrying interval - Interval in second between attempts to connect (5-3600)

Enable/Disable encrypted primary NFS server - If server supports encrypted NFS server

Encrypted primary NFS server user - User name of server

Encrypted primary NFS server password - Password

Secondary NFS service - Enabled or Disabled

Secondary NFS server name - Name of server

Mounting path on secondary NFS server - Directory to server

Secondary NFS timeout (sec, 5-3600) - Timeout in seconds

Secondary NFS mount retrying interval (sec, 5-3600) - Retry interval in seconds

Enable/Disable encrypted secondary NFS server - If secondary server supports encrypted NFS server

Encrypted secondary NFS server user - User name

Encrypted secondary NFS server password - Password

Confirm secondary NFS server password - Repeat password

NFS server configuration	
NFS service :	Enabled ▾
Primary NFS server name :	192.168.200.100
Mounting path on primary NFS server :	/
Primary NFS timeout (sec, 5-3600) :	5
Primary NFS mount retrying interval (sec, 5-3600) :	5
Enable/Disable encrypted primary NFS server :	Enabled ▾
Encrypted primary NFS server user :	Gilligan
Encrypted primary NFS server password :	••••••••
Confirm primary NFS server password :	••••••••
Secondary NFS service :	Disabled ▾
Secondary NFS server name :	
Mounting path on secondary NFS server :	
Secondary NFS timeout (sec, 5-3600) :	5
Secondary NFS mount retrying interval (sec, 5-3600) :	5
Enable/Disable encrypted secondary NFS server :	Disabled ▾
Encrypted secondary NFS server user :	
Encrypted secondary NFS server password :	
Confirm secondary NFS server password :	

3. Choose Enabled.
4. Enter the IP address of the primary and secondary (if applicable) NFS server and the mounting path of each.
5. Click Save & apply.

Alert for NFS Server Disconnect

You can also set up an email alert and/or an SNMP trap configuration for an NFS server disconnect. Use the following procedure to configure this feature.

1. Further down the NFS Configuration screen, at the Email alert configuration select Enable.
2. Enter the Title of email and the Recipient's email address.
3. For an SNMP trap configuration select Enable NFS disconnection trap
4. Select Enable for Use global SNMP configuration and enter the IP information for Trap receiver settings.
5. Click Save & apply.

Confirm secondary NFS server password :		
[Email alert configuration]		
Enable/Disable email alert for NFS disconnection :	Disable ▾	
Title of email :		
Recipient's email address :		
[SNMP trap configuration]		
Enable/Disable NFS disconnection trap :	Disable ▾	
Use global SNMP configuration :	Disable ▾	
Trap receiver settings :		
IP Address	Community	Version
0.0.0.0	public	v1 ▾
0.0.0.0	public	v1 ▾

Enable SYSLOG Server

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

1. Access the web interface.
2. Under the **Network** heading, click **SYSLOG server configuration**.
3. Choose Enable.
4. Enter the IP address of the primary and secondary (if applicable) syslog server and select the syslog facility from the drop down menu.
5. Click Save & apply.

SYSLOG server configuration	
SYSLOG service :	Enabled ▾
Primary SYSLOG server IP address :	192.168.200.100
Secondary SYSLOG server IP address :	192.168.200.199
SYSLOG facility :	Local0 ▾

Enable a Compact-flash Card

The compact-flash card must be installed and configured on the Digi CM unit before it can be used for system logging or storing the Digi CM unit's configuration information. When storing log files to an external flash card, the size of the available storage is dependent on both the size of the card and the port counts of the Digi CM unit used. The maximum settings for log file sizes are listed in the following table. See also Adding a Compact-flash Card on page 29.

Total Flash Card Size	Digi CM	System Log	Port Log (per port)	Total Memory Used
32	8	4.6	3.1M	29M
	16	4.6	1.53M	
	32	4.6	762K	
	48	4.6	500K	
64	8	9.2	6.2M	58M
	16	9.2	3.1M	
	32	9.2	1.53M	
	48	9.2	1.02M	
128	8	18.4	12.3M	118M
	16	18.4	6.2M	
	32	18.4	3.1M	
	48	18.4	2.0M	
256	8	36.8	24.6M	236M
	16	36.8	12.3M	
	32	36.8	6.2M	
	48	36.8	4.1M	

Enable the Digi CM Unit's Memory

The Digi CM unit's memory is already enabled for port logging and only needs to be configured for system or port logging. When storing log files to the Digi CM unit's local memory, a total of 3.5M is available. The amount of memory per serial port is dependent on the port count of the Digi CM unit used. The log file sizes are shown in the following table are maximum settings. See also Configuring System Logging on page 40.

Digi CM	System Log	Port Log (per port)	Total Memory Used
8	300K	400K	3.5M
16		200K	
32		100K	
48		66K	

Configuring System Logging

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

1. Access the web interface.
2. Under **System status & log**, click **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 unit's memory choice is always available.

System logging - Enable or Disable

System log storage location - Memory or NFS server

System log to SYSLOG server - Enable to store system logs to a SYSLOG server

System log buffer size (KB, 300 max) - Log buffer size in KB

Automatic backup on mounting This parameter defines the action taken if a NGFS partition of a CF card or NFS server is mounted or re-mounted.

- Enable: rename the existing log file by adding a -xx with xx being a incremented number.
- Disable: keep writing to the existing log file. Send system log by Email

-Number of log messages to send a mail (1-100) - Number of messages

System log recipient's mail address - Email address for log recipient

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 email address.
7. Click Save & apply.

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

System logging

System logging :

System log storage location :

System log to SYSLOG server :

System log buffer size (KB, 300 max.) :

Automatic backup on mounting :

Send system log by Email :

Number of log messages to send a mail (1-100) :

System log recipient's mail address :

System log :

```

01-01-1970 00:00:46 > Boot up System Start
01-01-1970 00:00:46 > Start with DHCP IP by 10.8.16.39
01-01-1970 00:00:47 > NTP - Server connection error
01-01-1970 00:01:19 > Web - LOCAL authentication for 'root' passed.
01-01-1970 00:06:34 > Web - LOCAL authentication for 'root' passed.
01-01-1970 00:08:26 > Port #8 LOCAL authentication for 'root' passed.
01-01-1970 00:08:26 > Port #8 connected by 'root'(10.8.16.42)
01-01-1970 00:08:40 > Port #8 disconnected by 'root'(10.8.16.42)
01-01-1970 00:17:01 > Web - LOCAL authentication for 'root' passed.
01-01-1970 00:27:00 > Web - LOCAL authentication for 'root' passed.
01-01-1970 00:28:30 > User 'root' logged on 'pts/0' from '10.10.32.68'
01-01-1970 00:33:59 > Web - LOCAL authentication for 'root' passed.

```

Configure Port Logging

If a serial port is configured for console server mode, the port logging feature can be enabled. Port logging allows you to save serial data to the memory of the Digi CM unit, 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.

You can also define alarm keywords for each serial port and send email alerts or SNMP traps to enable unattended serial data monitoring. The following steps configure a serial port for port logging in console server mode.

1. Access the web interface.
2. Under the **Serial port** heading, Click **Configuration**.
3. Choose All or the Individual port and then **Port logging**.
4. Configure the settings:

Logging direction - Specify what to log. Options are:

- Server – only server output,

Configure Port Logging

- User – only user output,
- Both with/without arrows – server and user output with/without directional arrows.
- Default: server output.

Security advice: When logging user output passwords will be saved into the log file!

Port log to SYSLOG server - Enable to store port logs to a SYSLOG server

Port logging filename - Options are to specify your own or use the port title for the port log filename

Show last 10 lines of a log upon connect -Show previous last 10 lines of log when connecting to this port

Strip the ^M from SYSLOG -For logging to a SYSLOG server, strip out all ^M

Automatic backup on mounting This parameter defines the action taken if a NGFS partition of a CF card is mounted or re-mounted.

- Enable: rename the existing log file by adding a -xx with xx being a incremented number.
- Disable: keep writing to the existing log file.

Monitoring interval -The frequency in seconds to update the port log

5. Click Save & apply.

Note: When port logging is enabled, a Port Event Handling page is available to create alarm keywords and send alerts. See Chapter 6 Alerts and Notifications on page 59 for more information.

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**.

Serial port parameters

Port logging

Port logging :

Enable

Logging direction :

Server output

Port log storage location :

Memory

Port log to SYSLOG server :

Disable

Port log buffer size (KB, 3150 max.)

50

Port logging filename :

Specify below

(null as default file name[portXXdata])

port1 data

Time stamp to port log :

Enable

Show last 10 lines of a log upon connect :

Enable

Strip the ^M from SYSLOG :

Disable

Automatic backup on mounting :

Enable

Monitoring interval (sec, 5-3600) :

5

Save to flash

Save & apply

Cancel

Port log :

Clear

Refresh

Port IP filtering

Authentication

Chapter 5

Configuring Ports

Introduction

This chapter provides information on configuring serial ports. Key port configuration attributes include whether or not the port is enabled or disabled, the host mode, which defines a type of communication between the port and a remote host, the protocol, authentication, user access restrictions, and serial communication attributes. It also covers remote port support.

Enabling and Disabling the Ports

All serial ports may be enabled or disabled individually or as a group from the web interface.

1. Click **Serial port** > **Configuration** > Port number or all
2. Select Enable or Disable from the drop down menu.
3. Click Save to flash and continue with other configurations or click Save & apply.

Serial port configuration - 1 : Port Title #1 — Move to —

Enable/Disable this port

Enable/Disable this port : Enable ▾

RealPort support : Disable ▾

Save to flash Save & apply Cancel

Reset this port : Reset

Set this port as factory default : Set

Port title

Apply all ports settings

Host mode configuration

Serial port parameters

Port logging

Port IP filtering

Authentication

User access control

Alert configuration

RealPort Support

RealPort software provides a virtual connection to serial devices, no matter where they reside on the network. The software is installed directly on the host

and allows applications to talk to devices across a network as though the devices were directly attached to the host. In actuality, the devices are connected to a Digi device server or terminal server somewhere on the network.

RealPort is unique among COM port re-directors because it is the only implementation that allows multiple connections to multiple ports over a single TCP/IP connection. Other implementations require a separate TCP/IP connection for each serial port. Unique features also include full hardware and software flow control, as well as tunable latency and throughput.

When you use RealPort (configured on a per port basis) the Digi CM unit functionality is unavailable. That is to say that the Digi CM unit can be used for console management or for COM re-direction but not both. An example of RealPort use would be remote kernel debugging of Microsoft Windows Servers. To enable RealPort use the following procedure.

Note: RealPort does not support authentication and user rights are not validated.

1. To enable RealPort click **Serial port > Configuration > Port number**.
2. Select Enable this port from the drop down menu.
3. Select Enable RealPort support from the drop down menu.
4. Click Save to flash and continue with other configurations or click Save & apply.

Serial port configuration - 1 : Port Title #1 — Move to —

Enable/Disable this port

Enable/Disable this port :

RealPort support :

Reset this port :

Set this port as factory default :

Port title

Apply all ports settings

Host mode configuration

Serial port parameters

Port logging

Port IP filtering

Authentication

User access control

Alert configuration

Resetting Ports

The Digi CM unit allows you to restart all processes associated with a port and to disconnect all sessions.

To reset an individual port:

1. Click **Serial port** > **Configuration** > Port number.
2. Click Reset this port: Reset.

Reset Individual Port Settings

Individual ports can be reverted to factory defaults.

1. Click **Serial port** > **Configuration** > Port number.
2. Click Set this port as factory default: Set.

Port Title

The Digi CM unit offers multiple ways to configure the port title; both manually and automatically. The default is set to “Port Title # xx” with xx being the port-number.

Automatic Device Recognition allows the Digi CM unit to evaluate the attached devices and populate the port title. Additionally the Digi CM unit can generate a SNMP trap or send an e-mail in case the response of the device changes or it stops responding.

If **Active detect** is selected, a configurable probe string (carriage return =0x0d by default) is sent to the console port and the response is saved to a file at /var/run/systemrep_raw.portxx with xx being the port number.

This file is parsed using a script /tmp/cnf/active_detect and the operating system and device name are written to files: /var/run/HostnamePortxx and /var/run/OSPortxx.

The commands to parse the system response are user customizable, so if a device is not recognized immediately by the Digi CM unit, add a rule to the file.

If **Passive detect** is selected, no probe string is sent to the attached device but the port buffer is analyzed.

The script /tmp/cnf/passive_detect is executed and the results are saved to files: /var/run/HostnamePortxx and /var/run/OSPortxx.

After editing the scripts as either active_detect or passive_detect, save them to flash using the saveconf command so they are not lost after a reboot.

Configuring Automatic Device Recognition

Configure a serial port for Automatic Device Recognition.

1. Access the web interface.
2. Under the **Serial Port** heading, Click **Configuration**.
3. Choose All or an Individual port > **Serial port parameters**.
4. Edit the fields as they apply to your configuration.

Serial port configuration - 1 : Port Title #1 [Move to]

Enable/Disable this port

Port title

Automatic detection :

Use detected port title :

Port title :

Probe string :

Detected OS :

Device detection method :

Detection initiation :

Detection delay : every minutes

Apply all ports settings

Host mode configuration

Serial port parameters

Port logging

Port event handling

Port IP filtering

Authentication

User access control

Alert configuration

Automatic detection - Enable or disable automatic detection of devices

Use detected port title - Enable if you want the Digi CM unit to automatically use the results of the detection mechanism to populate the port title. Disable if you want the default port title. If you choose Disable, you can still use the alarm feature.

Port title - Manually entered or automatically populated title of the port.

The Digi CM unit allows access to a port by using only the number of the port title, making it unnecessary to know the serial port number.

The default is set to "Port Title xx" with xx being the port number.

Probe string - The probe string is an ASCII string that is sent to the device.

Special characters are coded in hexadecimal values like:

CR	\x0d
LF	\x0a
ESC	\x1B

Examples are:

Parse string	output
root\x0d\x0a	root<CR><LF>
\x1Btest\x0d	<ESC>test<CR>
\x1B test\x0d	<ESC><Space>test<CR>

\x1b\x20test\x0D <ESC><Space>test<CR>

\x1B\x20\x74\x65\x73\x74\x0d <ESC><Space>test<CR>

Detected OS - Displays the result of the Active or Passive detection process.

Device detection method - If Active is selected a probe string is periodically sent to the device and the response is analyzed. If Passive is selected, the port logging is parsed to determine the device name and the OS.

Detection initiation - Active only if automatic detection is Enabled. Periodically or If new device is detected are the choices in the drop down menu. If Periodically is selected, the probe string is sent once every n minutes to the device while no connection is active to the serial port. When If new device is detected is selected, the probe string is only sent if a change on the DSR signal on the serial port is detected. Normally a device will activate the DSR signal if the serial port becomes active.

Detection delay - The delay before the first active detect process is started and between active detections.

5. Click Save & apply.

Apply all Ports Settings

The Digi CM unit supports managing all ports simultaneously. If changes are made to the page “all ports”, they are automatically applied to all ports. You can choose to exclude ports from this feature.

To enable/disable this feature for a port:

1. Access the web interface.
2. Under the **Serial Port** heading, click **Configuration**.
3. Choose an individual port > **Host mode configuration**.
4. Select Enable or Disable from the drop down menu.
5. Click Save to flash and continue with other configurations or click Save & apply.

Note: When changing a parameter for all ports, all settings of the complete page are applied to all ports.

Serial port configuration - 4 : Port Title #4 — Move to —

[Enable/Disable this port](#)

[Port title](#)

Apply all ports settings

Apply all ports settings : Enable

Save to flash Save & apply Cancel

[Host mode configuration](#)

[Serial port parameters](#)

[Port logging](#)

[Port event handling](#)

[Port IP filtering](#)

[Authentication](#)

[User access control](#)

[Alert configuration](#)

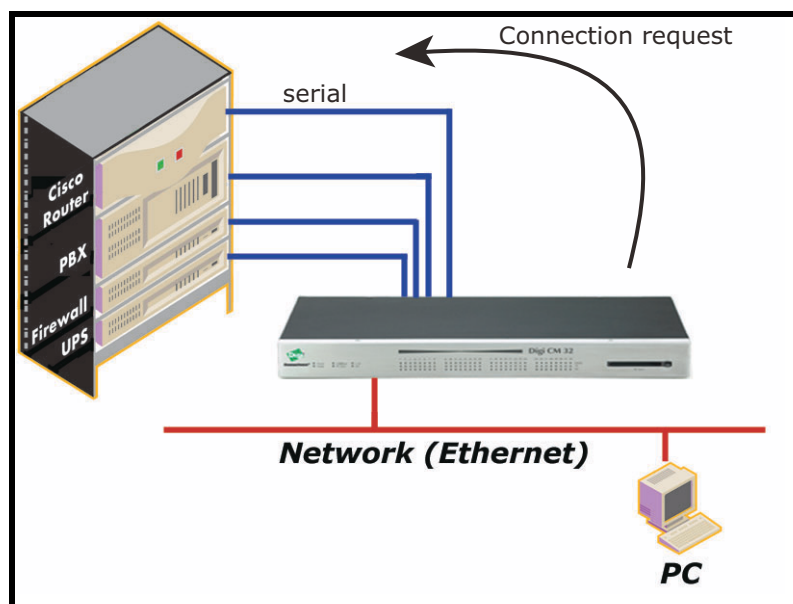
[Power control configuration](#)

Host Mode Configuration

The Digi CM unit provides four modes of communication between serial devices and remote hosts. Console server, terminal server, dial-in modem, and dial-in terminal server. These are described in the following sections.

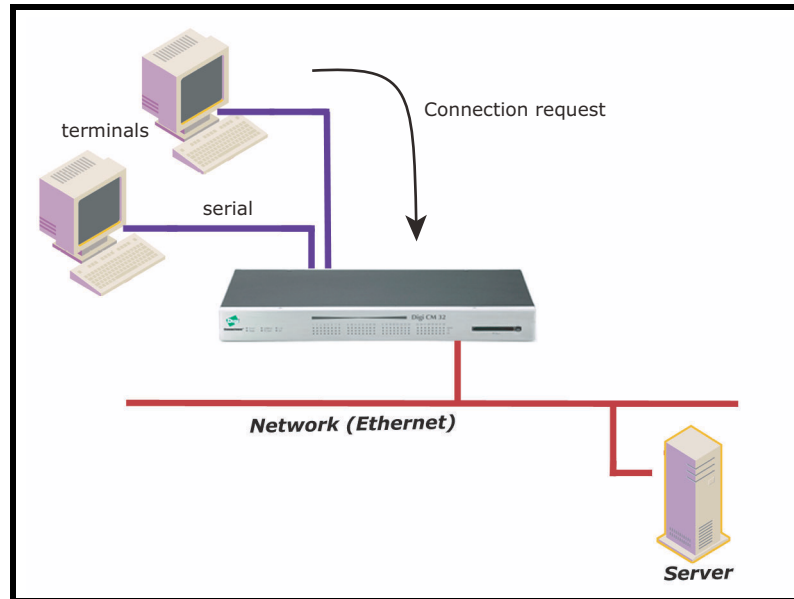
Console Server Mode

Configuring a serial port as a console server creates a TCP socket on the Digi CM unit that listens for a Telnet or SSH client connection. When you connect to the TCP socket, you 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.



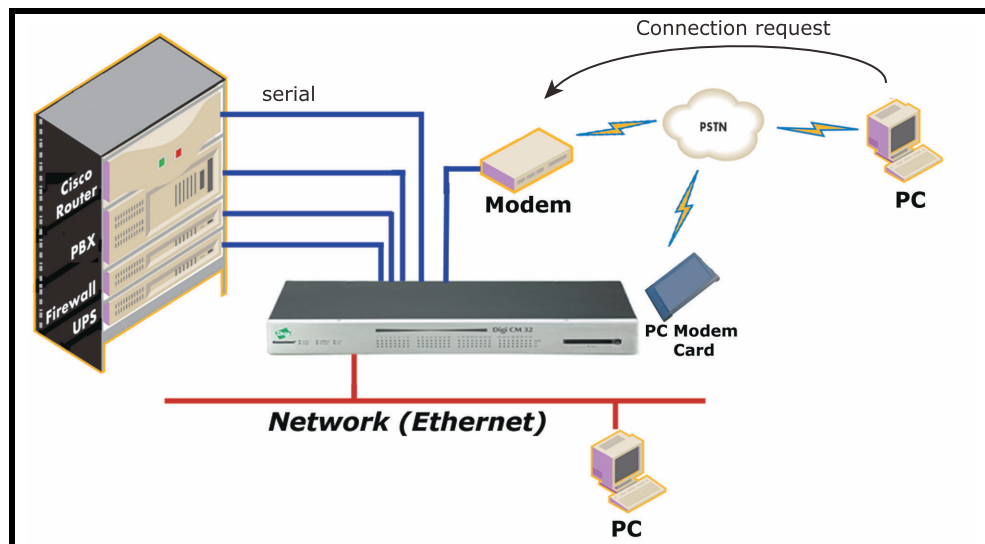
Terminal Server Mode

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



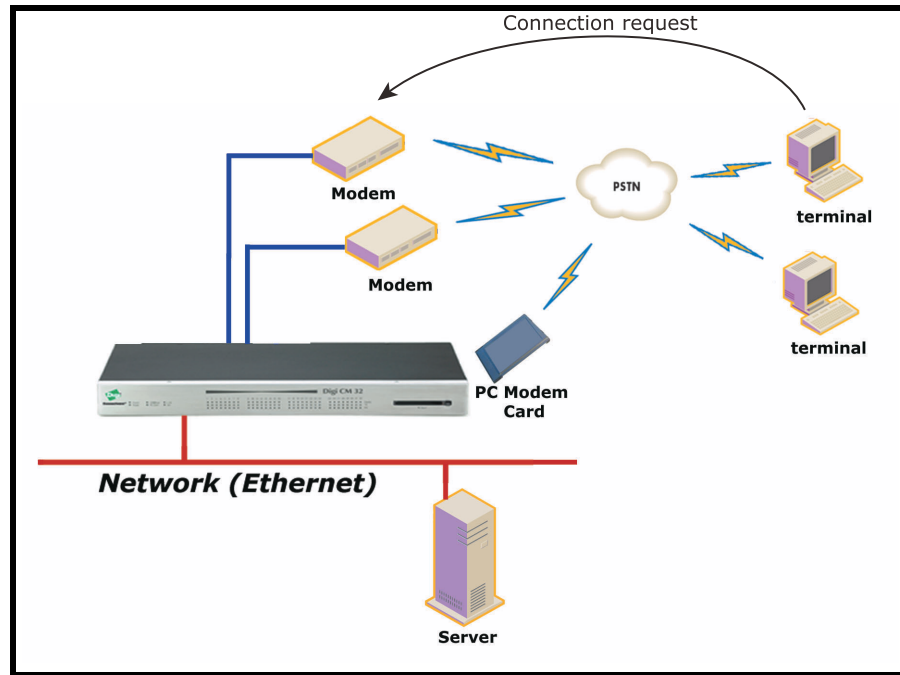
Dial-In Modem Mode

In this mode, the Digi CM unit 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 unit accepts the connection and displays the appropriate prompt or menu for you that logged in. Example: User 'root' would see the command line interface (CLI), whereas the user 'admin' would see the config menu or CLI depending on the shell for that user.



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 unit assumes the serial port is connected to an external modem and is waiting for a dial-in connection from a remote site. When you dial-in using terminal applications, the Digi CM unit accepts the connection as a Telnet or SSH client to a pre-defined server. This mode is most frequently used when you 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, click **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.

Type of console server - The options are MS SAC console -English or Japanese which you use to provide a graphic user interface to the Windows Server 2003 Special Administration Console (see "Microsoft SAC Support" on page 93) and Other, which you use in all other cases.

Rackable Systems Mgmt Card - Enable to use Rackable's Management card.

Enable/Disable assigned IP - Determines whether an IP address will be assigned to the port. The default is Disabled.

Assigned IP - Also known as alternate IP, this field assigns an IP address to the port, enabling you to Telnet directly to the serial port using an IP address (without having to specify a TCP port).

Serial port configuration - All ports : Port Title — Move to —

Enable/Disable this port

Port title

Host mode configuration

Host mode : Console server

Type of console server : Other

Rackable Systems Mgmt Card : Disable

Enable/Disable assigned IP : Disable

Assigned IP : 0.0.0.0

Listening TCP port (1024-65535) : 7001

Protocol : SSH

Inactivity timeout (1-3600 sec, 0 for unlimited) : 100

Enable/Disable port escape sequence : Enable

Port escape sequence : Ctrl- z

Port break sequence : ~break

Use comment : No

Quick connect via : Web applet

Web applet encoding : English (latin1)

Save to flash Save & apply Cancel

Serial port parameters

Port logging

Port IP filtering

Authentication

User access control

Alert configuration

Listening TCP port - This is the TCP port you will specify when connecting directly to the port using Telnet or SSH.

Protocol - The options are SSH, RawTCP, and Telnet.

Inactivity timeout - In seconds, the time set for inactivity to trigger an action. Setting the timeout to 0 (zero) means no timeout.

Enable/Disable port escape sequence - Allows the port escape sequence to function.

Port escape sequence - The key combination to initiate port escape.

Port break sequence - The sequence of characters that sends a break character to a device.

Use comment - Determines whether a port user is prompted to add a comment each time the port is accessed.

Quick connect via - Determines method for connecting to a port when in console server mode. Available with Telnet/SSH.

Web applet encoding - Supported languages for Java terminal.

5. Click Save & apply.

Supported Protocols

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

In configuring a serial port, you have three protocol options. The three protocols available are: RawTCP, SSH, and Telnet. Choose SSH as the protocol when logging in from an SSH client program to access a port. Choose RawTCP when connecting directly to a TCP socket. Choose Telnet when 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.

Serial Port Parameters

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

1. Access the web interface.
2. Under the **Serial Port** heading, Click **Configuration**.
3. Choose All or an Individual port > **Serial port parameters**.
4. Fill in the serial port parameters. The following are the defaults: bps=9600, data bits=8, parity=none, stop bits=1, flow control=none, and DTR behavior=High when open.

Serial port configuration - All ports : Port Title

Enable/Disable this port

Port title

Host mode configuration

Serial port parameters

Type : RS232

Baud rate : 9600

Data bits : 8 bits

Parity : None

Stop bits : 1 bit

Flow control : None

DTR behavior : High when open

Save to flash Save & apply Cancel

Port logging

Port IP filtering

Authentication

User access control

Alert configuration

5. Click Save & apply

DTR Behavior

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 you 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 unit to transfer data stored

in the buffer. The Digi CM unit transfers data when the buffer is full using the TCP/IP protocol. However, if it is not full, the Digi CM unit will also transfer data dependent on the timeout value selected.

Specialty Use of Port -When Data is Processed in Chunks

Some applications are written to process only chunks of data rather than continuous streams of data.

The Digi CM unit supports '*chunking*' holding back data from the serial device to the application on the network until it detects a delimiter - at which point it sends the data to the application.

To configure a port for this mode:

1. Open a web connection to the Digi CM unit.
2. Click Serial Port > Configuration.
3. Select All ports to configure.
4. Click Host Mode configuration.
5. Under Protocol, select RawTCP.
- 6) Select Serial port parameters

Serial port configuration - All ports : Port Title — Move to —

Enable/Disable this port

Port title

Host mode configuration

Serial port parameters

Type : RS232

Baud rate : 19200

Data bits : 8 bits

Parity : None

Stop bits : 1 bit

Flow control : None

DTR behavior : High when open

Enable/Disable delimiter : Disable

Delimiter :

Delimiter option : with delimiters

Inter character time-out (100-10000 msec) : 100

Save to flash Save & apply Cancel

Port logging

Port IP filtering

Authentication

User access control

Alert configuration

7) Configure the delimiter and supporting settings. Descriptions of the options follow.

Enable/Disable delimiter --Allows delimitator to function.

Delimiter - Define the sequence that should be received before forwarding the data to the application

Delimiter option - with delimiters - sends the delimiter as part of the data to the application

without delimiters - remove the delimiter before sending the data to the application

Inter character time-out timeout - In msec (1-10000) If no delimiter is detected the data is delivered after this timeout has elapsed.

Remote Ports

The Digi CM unit supports remote ports. Remote ports are any type of port that can be accessed using Telnet or SSH protocol. Types of ports include ports that are provided using PortServer Terminals Servers or Sun ILOM ports. This feature establishes the Digi CM unit as the central access system for any kind of text based out-of-band management. Using the Digi CM unit as a central access system has multiple advantages:

- Central point of access
- Central user authentication
- Capturing of every user transaction on the remote system
- Keyword monitoring and alarm while connection is up.

Configure Remote Ports

To configure a remote port use the following procedure.

1. Access the Digi CM unit's web interface
2. Under the Serial Port heading click Configuration.
3. Scroll down the page to the section called Remote port configuration.
4. Enter the port title and click Add.

A pop-up window will appear to confirm the action.

5. Click the port title to access the configuration menus.
6. Select Remote port parameters
7. Enter the IP address, port number, and protocol to use.
8. Confirm you selections by clicking Save &apply . A pop-up window will appear to confirm the successful execution.

Note: If you want to use a Digi PortServer TS 2 as remote device you would configure: IP address as assigned, IP port 2001 for port 1 or 2002 for port 2 and telnet or 2501/ 2502 when using SSH as protocol.

All other settings of the remote port are equivalent to the settings of a local serial port.

Accessing a remote port

You can connect to a remote port using the web, Telnet or SSH client. You can

Also use the port access menu or a custom menu to simplify navigation

Web Access

Click Serial ports > **Connection** > Port number.

Remote ports are sorted below the physical serial ports as V1...

Telnet

Telnet to the IP and the port number (the specific port number is defined on the 'Host mode configuration' page).

```
telnet 143.191.3.9 7051
```

SSH to the port number

SSH to the IP and the port number (the specific port number is defined on the 'Host mode configuration' page).

SSH to the port name

SSH to the IP and the port number (the specific port number is defined on the 'Host mode configuration' page).

Ssh user-name:'t=port-title'@ip-Address

Ssh sunadmin:'t=Switch3level':@MainDigi

You can access a remote port just like any local port:

- directly using the portnumber

Note: The parameters of the remote port are equivalent to regular serial ports. Enter any additional parameters for the remote and click Save & apply or Apply all changes.

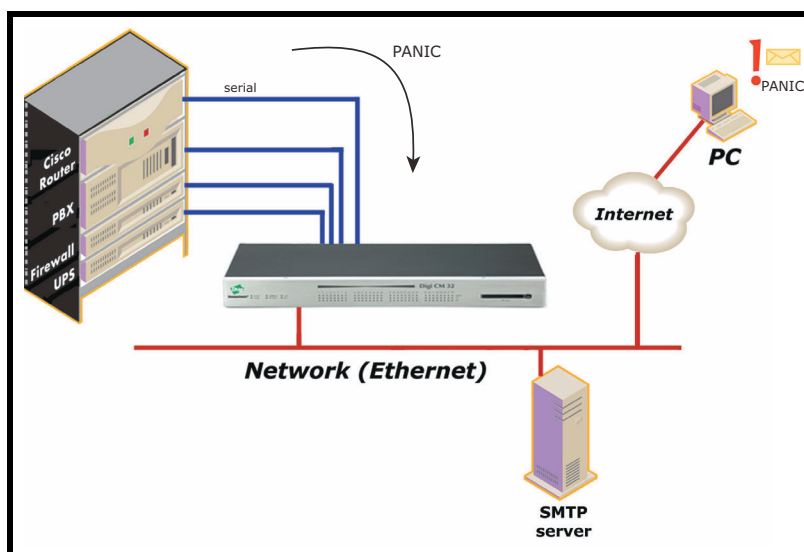
Chapter 6

Alerts and Notifications

Introduction

The Digi CM unit can be configured for system alerts and notifications. It sends 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 unit 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 unit supports three types of SMTP servers: SMTP server without authentication, SMTP server with authentication, and POP before SMTP.

The Digi CM unit also supports SNMP (Simple Network Management Protocol), a protocol used to manage a network and monitor devices on a network. System and port alerts can also be sent using SNMP traps. The Digi CM unit supports both versions 1 and 2 of the SNMP protocol. The main function of SNMP on the Digi CM unit 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 is username@company.com.

To configure the Digi CM unit for SMTP alerts, the following parameters are required:

SMTP server - Use either the hostname or the IP address.

Device mail address - Specify the sender's email address for the log and alarm delivery.

SMTP mode - Specify the type of SMTP server to use.

Username and password - These fields are required for POP before SMTP and SMTP with authentication servers.

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

1. Access the web interface.
2. Under the **Network** heading, choose **SMTP configuration**.
3. Fill in the required fields. SMTP with authentication and POP before SMTP require usernames and passwords.
4. Click Save & apply.

SMTP configuration

Primary SMTP server :

Primary SMTP server name :

Primary SMTP mode :

Primary SMTP user name :

Primary SMTP password :

Confirm primary SMTP password :

Secondary SMTP server :

Secondary SMTP server name :

Secondary SMTP mode :

Secondary SMTP user name :

Secondary SMTP password :

Confirm secondary SMTP password :

Device mail address :

SNMP Information

The Digi CM unit supports SNMP authentication, power on, and link up traps.

Applications such as NMS (Network Management System) or an SNMP browser can exchange information with the Digi CM unit 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, power on, and link up traps are supported.

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

Protocol	Function
TRAP	Notifies a system administrator of a significant event

Traps

There are additional traps that can be set at the port level. The following table shows where the trap is under **Serial port > Configuration** on the web interface, trap name, configure options, and the trap functions. The MIBs for login traps can be found at <http://ftp.digi.com/support/utilities/digicm/>

Trap Location	Trap Name	Function
Port access menu	Port login trap	Notify about any login action to the port access menu (succeed and fail)
Alert configuration	Port login trap	Notify about login to this specific port (succeed and fail) (only available if host mode is set to "Console server")
Alert configuration	Device connection trap	Notify about a change of the DTR signal line (only available if host mode is set to "Console server")
Alert configuration	Active detection trap	Notify about changes in the device's response to the probe string (see also "Automatic Device Recognition" on page 21, only available if host mode is set to "Console server")
Alert configuration	Dial-in modem test trap	Notify about modem test (succeed and fail) (only available if host mode is set to "Dial-in modem")
Port event handling	Keyword notification trap	Notify about the occurrence of a keyword in the port log (only available if host mode is set to "Console server")

Configuring SNMP

To configure the Digi CM unit for SNMP do the following:

1. Access the Digi CM unit's web interface.
2. Under the **Network** heading, choose **SNMP configuration**.
3. Fill in information for the MIB-II system objects section and choose Yes under EnableAuthenTrap. The fields are described in the following section:

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 unit only supports Application (7) service level.

EnablePowerOnTrap. - Determines whether the SNMP agent generates a trap each time the Digi CM unit is started.

EnableAuthenTrap. - Indicates whether the SNMP agent process is permitted to generate authentication failure traps.

EnableLinkUpTrap. - Determines whether the SNMP agent generates a trap each time the network connection comes up.

EnableLoginTrap - Determines whether the SNMP agent generates a trap for each login.

Note: Trap values override all other configuration information, meaning all other authentication failure traps can be disabled with this setting.

4. Enter Access control settings based on the following field descriptions:

IP Address - Defines what applications can access the Digi CM unit's 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 based on the following field descriptions:

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.

The image shows a screenshot of the 'SNMP configuration' window. It is divided into three main sections: 'MIB-II system objects', 'Access control settings (NMS)', and 'Trap receiver settings'. At the bottom are three buttons: 'Save to flash', 'Save & apply', and 'Cancel'.

MIB-II system objects		
sysContact :	administrator	
sysName :	Digi CM	
sysLocation :	my location	
sysService :	"7"	
EnablePowerOnTrap :	No	
EnableAuthenTrap :	Yes	
EnableLinkUpTrap :	No	
EnableLoginTrap :	Yes	

Access control settings (NMS)		
IP Address	Community	Permission
192.168.100.101	digicm	Read only
0.0.0.0	public	Read only
0.0.0.0	public	Read only
0.0.0.0	public	Read only

Trap receiver settings		
IP Address	Community	Version
0.0.0.0	public	v1
0.0.0.0	public	v1
0.0.0.0	public	v1
0.0.0.0	public	v1

6. Click Save & apply.

Managing the SNMP Protocol

The Digi CM unit's 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.

Configuring Port Event Handling

Once an SMTP or SNMP server has been configured, it can be used to send port-related alerts and notifications. The following describes how to configure a port for port event handling.

1. Access the web interface.
2. Choose **Serial port > Configuration**.
3. Choose a port to configure and then **Port logging**.
4. Select Enable.

The screenshot displays the 'Serial port parameters' configuration window. The 'Port logging' tab is active, showing the following settings:

- Port logging : Enable (dropdown)
- Logging direction : Server output (dropdown)
- Port log storage location : Memory (dropdown)
- Port log to SYSLOG server : Disable (dropdown)
- Port log buffer size (KB, 3150 max.) : 50 (text input)
- Port logging filename : Specify below (dropdown)
- (null as default file name[portXXdata]) : port1 data (text input)
- Time stamp to port log : Disable (dropdown)
- Show last 10 lines of a log upon connect : Disable (dropdown)
- Strip the ^M from SYSLOG : Disable (dropdown)
- Automatic backup on mounting : Enable (dropdown)
- Monitoring interval (sec, 5-3600) : 5 (text input)

Below the settings are three buttons: 'Save to flash', 'Save & apply', and 'Cancel'. The 'Port log' section contains a text area with the text 'ÿ<ÿ+žøž<' and a vertical scrollbar. Below the text area are 'Clear' and 'Refresh' buttons. At the bottom, there are two tabs: 'Port event handling' and 'Port IP filtering'.

5. Choose Save & apply.
 6. Choose **Port event handling**.
- The following page appears.

Port event handling

Check	Keyword #	Keyword	Reaction
No keyword list...Please, add new keyword.			

Action on keyword : ☒ Add ☐ Edit ☐ Remove

Keyword :

Case sensitive :

Email notification :

Title of email :

Recipient's email address :

SNMP trap notification :

Title of SNMP trap :

Use global SNMP configuration :

SNMP trap receiver IP address :

SNMP trap community :

SNMP trap version :

Secondary SNMP trap receiver IP address :

Secondary SNMP trap community :

SNMP trap version :

[Port IP filtering](#)
[Authentication](#)
[User access control](#)
[Alert configuration](#)

7. Select an action and enter the keyword for the port event handling.

8. Enable Email notification.

Note: It is assumed that SMTP is configured first. If not, see "Configuring SMTP Alerts" on page 60.

9. Enter the title of the Email (subject line).

10. Enable or Disable Case sensitive.

11. Enter the Email recipient's address.

12. Enable SNMP trap notification.

13. Enter the title of the trap.

14. Choose either to use the global SNMP settings by enabling "Use global SNMP configuration" or specify special settings for this port.

15. Enter the IP address of the trap receiver.

16. Enter the SNMP community

17. Select the version.

18. Complete configuration and then choose Save & apply.

Note: Key word is any text string that will trigger an alert when it traverses the serial port.

Config Alerts for Automatic Device Recognition (ADR)

Before configuring the alerts for Automatic Device Recognition, be sure you have configured the port for ADR as described in "Configuring Automatic Device Recognition" on page 47.

1. Access the web interface.
2. Under the **Serial Port** heading, Click **Configuration**.
3. Choose All or an Individual port > **Alert Configuration**.
4. Follow the Email Alert steps to configure the email alert or follow the SMTP Notification to configure SMTP.

Email Alert

Enable "Email Alert for active detection"
Enter the Title of email
Enter Name and email address where the email should be sent.

SMTP Notification

Enable "Active detection trap"
Configure the trap receiver by one of the following two ways:
Enter "Use global SNMP configuration"
OR
Enter the IP address of the trap receiver, the SNMP trap community and select the version

5. Complete configuration and choose Save & apply.

Alert configuration

[Email alert configuration]
Email alert for port login : Disable ▾
Title of email :
Recipient's email address :
Email alert for device connection : Disable ▾
Title of email :
Recipient's email address :
Email alert for active detection : Enable ▾
Title of email :
Recipient's email address :

[SNMP trap configuration]
Port login trap : Disable ▾
Device connection trap : Disable ▾
Active detection trap : Enable ▾
Use global SNMP configuration : Enable ▾
Trap receiver settings :

IP Address	Community	Version
0.0.0.0	public	v1 ▾
0.0.0.0	public	v1 ▾

Save to flash Save & apply Cancel

Power control configuration

Chapter 7

User Administration

Administering Users

Required Privileges

Only root and admin can administer users. The root user has unlimited administration privileges. Admin can view and change all attributes except those that belong to the root user.

There are several ways to manage users. A user can be added, edited, or removed. Multiple users can be managed in Groups or Access lists. The difference between Groups and Access lists are that Groups are established in the operating system on the Digi CM unit and privileges are predefined such as Root or Admin and are used most often for configuration. Access lists allow access to the ports and are created by defining the privileges of the lists.

Access Lists manage rights of multiple users at the same time. Multiple users with the same rights are associated with an access list. This allows the administrator to simplify the overall administrative process.

Procedure

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

The following screen appears.

#	User name	User group	Shell
☐ 1	Gilligan	Port admin	Configuration menu
☐ 2	Skipper	System admin	CLI
☐ 3	admin	System admin	Configuration menu
☐ 4	root	Root	CLI

Note: The username on the Digi CM unit is case sensitive.

3. Do one of the following:

To...	Do the Following...
Add a user	1. Click Add. 2. Fill in the attribute fields. See the table that follows for information on attribute fields. 3. Click Add.

To...	Do the Following...
Edit a user	1. Click on the username. 2. Fill in the attribute fields. See the table that follows for information on attribute fields. 3. Click Submit.
Remove a user	1. Check the box that corresponds to the user you want to remove. 2. Click Remove. 3. Choose OK at the prompt.
Create an Access list	1. Under System administration, click Access List. 2. Enter the name of the Access List and click Add. 3. Click on the access list name to add users 4. Add the users to the access list Note: The name field in the Access list allows you to add users that are not locally configured on the Digi CM unit but use a centralized authentication method like RADIUS, LDAP etc.. To change the privileges of an Access list, see "Change an Access List's Privileges" on page 77

4. Click **Apply changes**.

To Add an Access List to the Digi CM Unit

1. Access the web interface of the Digi CM unit.
2. Under System Configuration choose **Access Lists**
3. Enter the access list name into the edit-box and click [ADD].

A pop-up windows will appear confirming the successful addition of an access list. Now you can add users to the access list by:

1. Click the name of the access list; a configuration windows will open
2. Add one user at a time to the list by:

Entering the name into the edit-box and clicking on [ADD].

Note: **Caution!** Spelling is not verified against the local user database. This allows you to add externally configured users that only exist in the RADISU, LDAP or other central databases.

After an access list has been added to the system, port rights can be associated with it. See chapter 8.

User Fields

Field	Description
User name	Name for the user, which must be between 3 and 29 characters and cannot include colons (:), less than or greater than signs (< >), ampersand (&), spaces, or quotation marks. The at sign @ and period . are acceptable. The username on the Digi CM unit is case sensitive.
Select group	Group to which the user is assigned. Groups include Root, System Admin, Port Admin and User. See "User Groups" on page 13 for more information
Password	Password to assign to the user. This must conform to the rules stipulated above for a user name.
Confirm password	Confirms the password.
Shell program	Interface presented to the user when he/she logs on to the system from a Telnet or SSH connection.
SSH public key authentication	Alternative method of identifying yourself to a login server. More secure than just a password.
SSH public key to use	Current public file key or create a new public file key
Select new SSH public key version	SSH1 only supports one type of key SSH2 supports both RSA and DSA key types
Select new SSH public key file	Location for the SSH public key file

Chapter 8 Configuring Security and Authentication

Introduction

The Digi CM unit provides several ways to control access to the network and the devices on the network. One method is through IP filtering, which allows or prevents users with 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 access control method involves restricting or permitting specific users. Users can be easily added or removed from either a restricted or permitted users list. Sniff session access, which allows multiple users to access a single port, is also discussed. Finally, there is a central point (System administration > Security profile) where security parameters can be established on a network, port, or password basis.

The Digi CM unit provides for various authentication methods. They are: Local, RADIUS, TACACS+, LDAP, Kerberos (see following note), and Custom PAM. Authentication may be configured where a secondary method is attempted if the primary method fails.

Note: The Kerberos module is not part of the normal firmware due to memory constraints. It can be downloaded from Digi web site at <http://support.digi.com> and placed onto /usr2/ if required.

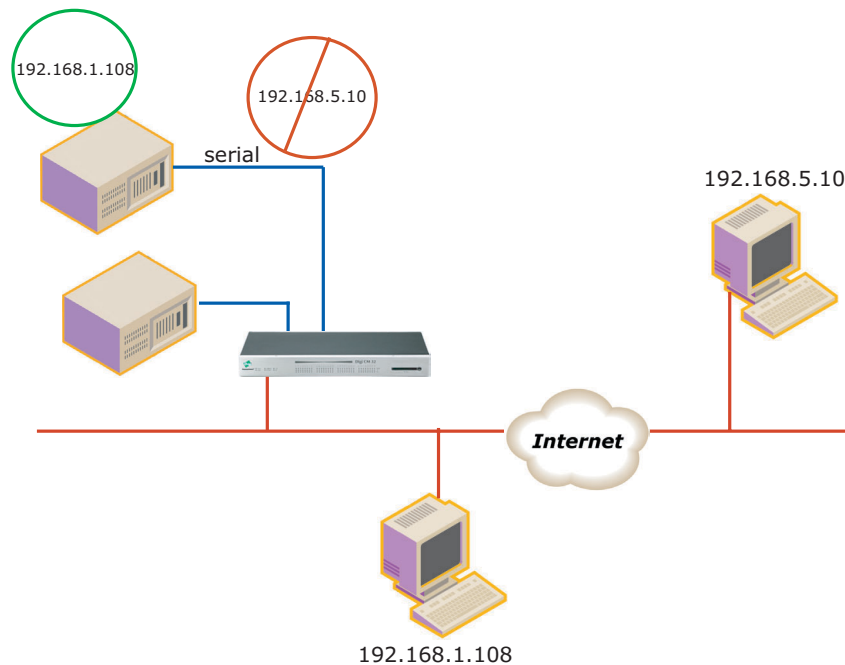
To copy files to /usr2/ use a scp tool like WinSCP.

Configuring Network IP Filtering

The Digi CM unit offers built-in firewall functionality to limit TCP/IP traffic to and from certain networks, TCP ports and interfaces. The functionality implemented is based on the Linux tool IP tables.

Configuring Network IP Filtering

Filter IP: 192.168.1.0
Filter Mask: 255.255.255.0



It is also possible to enable or disable specific services of the Digi CM unit:

Telnet console (TCP/IP port 23)

SSH console (TCP/IP port 22)

Web configuration (TCP/IP port 80)

#	Interface	Option	IP address/Mask	Port	Chain rule	Action
1	all	Normal	192.168.0.0/255.255.0.0	22	ACCEPT	Remove
2	all	Normal	192.168.0.0/255.255.0.0	23	ACCEPT	Remove
3	all	Normal	0.0.0.0/0.0.0.0	80	ACCEPT	Remove
4	all	Normal	192.168.1.0/255.255.0.0	80	ACCEPT	Remove
5	all	Normal	192.168.2.0/255.255.0.0	80	ACCEPT	Remove
	all	Normal			ACCEPT	Add

Save to flash Save & apply Cancel

Interface - The interface is the name of the network interface via which a packet is received. It can be one of these three values:

eth0: the default Ethernet interface of the Digi CM unit

eth1: the secondary interface added by using a PC card or wireless card

all: both interfaces

Option - The Option determines that this rule will be applied to the IP address/Mask specified or to its inverse -meaning the rule will be applied to all except those specified.

Normal: applied to the hosts included

Invert: applied to the hosts excluded

IP address/Mask - The IP address/Mask specifies the host range by entering base host IP address followed by "/" and subnet mask. The host range can be

one of the following scenarios by changing the value:

- Only one host of a specific IP address
- Hosts on a specific subnet
- Any host

Specified host range	Input format
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

Port - A TCP/IP Port on the Digi CM unit that other hosts try to access. The port can be specified using a single value or a range of ports in the form of: port1:port2, where *port1* defines the lowest port and *port2* the highest port.

Chain rule - The Chain rule determines whether access from the hosts is allowed or not. It can be one of these two values:

ACCEPT: access allowed

DROP: access not allowed

A user can add a new IP filtering rule by entering the values for the parameters and clicking the Add button on the right hand side of the table. A user can remove a rule by using the Remove button. After having finished editing the table be sure to save the settings to flash using the Save to flash button or to save and apply them using the Save & apply button. Be aware that the changes need to be applied before becoming active.

9. Select an authentication method for accessing the web interface. The default is local.

10. To save and apply changes, click Save & apply.

Web server configuration

HTTP service :

Enable

HTTPS service :

Enable

Web page refresh rate for statistics data display (0-1800, 0 for no refresh) :

10

seconds

Login timeout (0-1440, 0 for unlimited) :

60

minutes

Authentication method :

Local

Eliminate root access :

Disable

Save to flash

Save & apply

Cancel

Configuring User Access Control

This screen shot shows 5 IP rules that have been established.

#	Interface	Option	IP address/Mask	Port	Chain rule	Action
1	all	Normal	192.168.0.0/255.255.0.0	22	ACCEPT	Remove
2	all	Invert	192.168.0.0/255.255.0.0	23	DROP	Remove
3	all	Normal	0.0.0.0/0.0.0.0	80	DROP	Remove
4	all	Normal	192.168.1.0/255.255.255.0	80	ACCEPT	Remove
5	all	Normal	192.168.2.0/255.255.255.0	80	ACCEPT	Remove
	all	Normal			ACCEPT	Add

Service	Status	Action
Telnet console	Enabled	Enable Disable
SSH console	Enabled	Enable Disable
Web configuration	HTTP disabled : HTTPS enabled	Enable Disable

Save to flash Save & apply Cancel

Rule #1 defines SSH access to the Digi CM unit (port 22). The Normal option specifies that the rule applies to all addresses listed. The rule says to Accept traffic from these addresses for Port 22.

Rule #2 defines Telnet access to the Digi CM unit (port 23). The Invert option specifies that the rule applies to all addresses except those listed. The rule says to Drop traffic from all addresses not listed.

Rule #s 3, 4, and 5 define access to the Digi CM unit using HTTP (port 80). However, rule 3 blocks all traffic, rule 4 allows access from IP address 192.168.1.0. and rule 5 allows access from IP address 192.168.2.0.

Configuring User Access Control

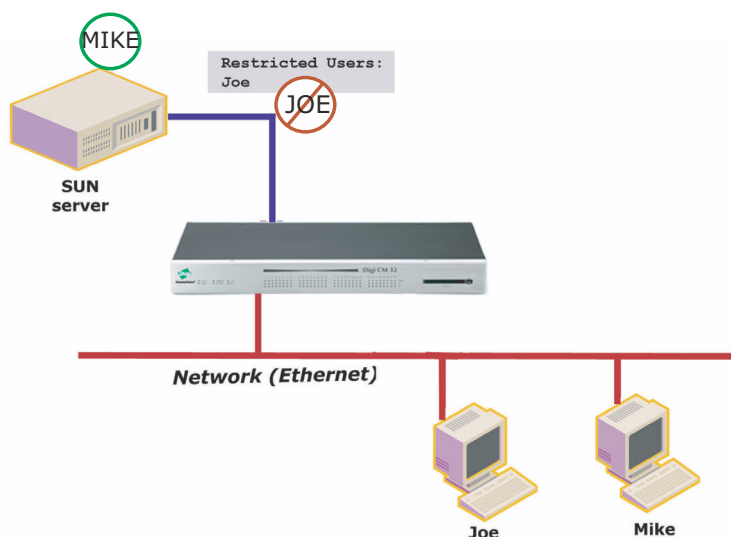
Another method to control access to the serial ports on the Digi CM unit is through the User Access Control configuration. This configuration can be done on a per port basis or globally by selecting the All Ports option. It is not necessary to have users added to the system to assign rights. However, for the permissions or restrictions to be enforced, **the username must match exactly** or the application will not recognize any misspellings and is also case-sensitive. If you want to add users, click on "System administration > Users administration". For more details how to add users refer to "Administering Users" on page 67.

Note: Users do not need to be authenticated locally; they can be users on any configured authentication server.

The Digi CM unit allows you to add rights to a single user or to multiple users at the same time using Access lists. You can group multiple users together and assign port access rights, port monitor rights, and/or power management rights to an access list. See "Create an Access list" on page 68 for more information.

The following scenario shows a configuration with a restricted user - Joe does

not have access to the Sun server while Mike does.



An administrator can choose a strategy to assign rights to a port:

- Allowing <<Everyone>> access to a port and then restricting access to certain users -or-
- Specifying each individual user and their specific rights to a port
- Adding a user to an established group (Access list) with preconfigured rights to a port.

If <<Everyone>> is checked, all users configured locally or that are using a remote authentication mechanism like LDAP or Kerberos have access to this port. If <<Everyone>> is not checked, no one is allowed to access this port unless individually listed.

When entering usernames for access permission or restrictions, **the username must be entered exactly as the username found on the remote authentication server or configured locally.** The username is case sensitive.

In the following example, there are three users configured on the Digi CM unit: Jeff, Tim and Paul.

If you want to give Tim and Paul read/write access and power access to this port, you could either

- Grant rights to Paul and Tim
- Restrict Jeff's rights
- Add user's to an Access list (sun-users in this example) found under System administration > Access list. See "Create an Access list" on page 68

Serial port configuration - All ports : Port Title
Move to —

Enable/Disable this port
Port title
Host mode configuration
Serial port parameters
Port logging
Port IP filtering
Authentication
User access control

User or Access list	Access type			Action
	Port	Monitor	Power	
<<Everyone>>	☒	☐	☐	
Paul	☒	☐	☒	Remove
Tim	☒	☐	☒	Remove
	☒	☐	☐	Add user
— Select an access list —	☒	☐	☐	Add access

Move to [Access lists](#) to edit access list.

Enable/Disable sniff mode : Disable
Sniff session display mode : Server output
Display data direction arrows : Disable
Permit monitoring only mode : Disable

Save to flash
Save & apply
Cancel

Alert configuration

Configure User Access Privileges

1. Select Serial Port Configuration > All Ports (or Port #)
2. Click User access mode
3. Enter the users and their privileges and click Add user.

Restrict a User's Privileges

1. Under Port configuration > User access control
2. Enter privileges for <<Everyone>>.
3. Enter restricted user's name (Here it is Jeff).
4. Enter the privileges this user has. (Notice <<Everyone>> has more access than Jeff)

User or Access list	Access type			Action
	Port	Monitor	Power	
<<Everyone>>	☒	☒	☒	
Jeff	☐	☒	☐	Remove
	☒	☒	☒	Add user
— Select an access list —	☒	☒	☒	Add access

Move to [Access lists](#) to edit access list.

Enable/Disable sniff mode :

Sniff session display mode :

Display data direction arrows :

Permit monitoring only mode :

Save to flash Save & apply Cancel

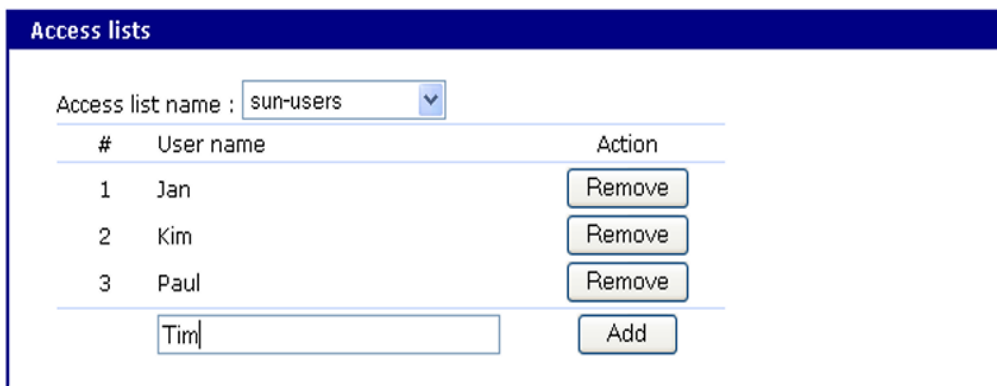
Note: The usernames and passwords on the Digi CM unit are case sensitive. Notice <<Everyone>> has access to Port, Monitor, and Power while Jeff is only able to Monitor - no Port or Power access.

Change an Access List's Privileges

1. On the same screen above, Select an access list from the drop down box.
2. Click Add access and Save & apply.

When the Access list is added it will include Paul and Tim.

In the following screen shot, the Access group named 'sun-users' has access

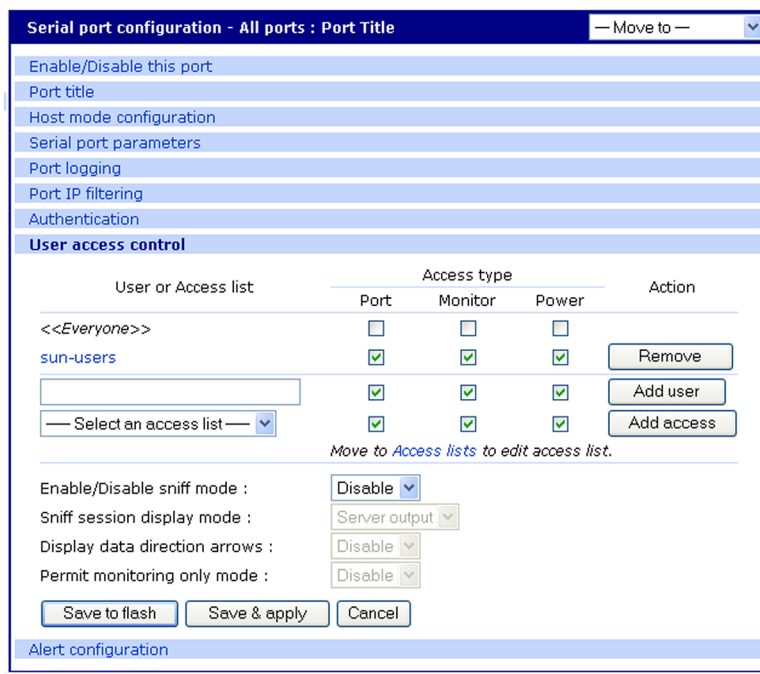


Access lists

Access list name : sun-users

#	User name	Action
1	Jan	Remove
2	Kim	Remove
3	Paul	Remove
	Tim	Add

to Port, Monitor, and Power, while any other users (<<Everyone>>) do not have access.



Serial port configuration - All ports : Port Title — Move to —

Enable/Disable this port

Port title

Host mode configuration

Serial port parameters

Port logging

Port IP filtering

Authentication

User access control

User or Access list	Access type			Action
	Port	Monitor	Power	
<<Everyone>>	☐	☐	☐	
sun-users	☒	☒	☒	Remove
	☒	☒	☒	Add user
— Select an access list —	☒	☒	☒	Add access

Move to [Access lists](#) to edit access list.

Enable/Disable sniff mode : Disable

Sniff session display mode : Server output

Display data direction arrows : Disable

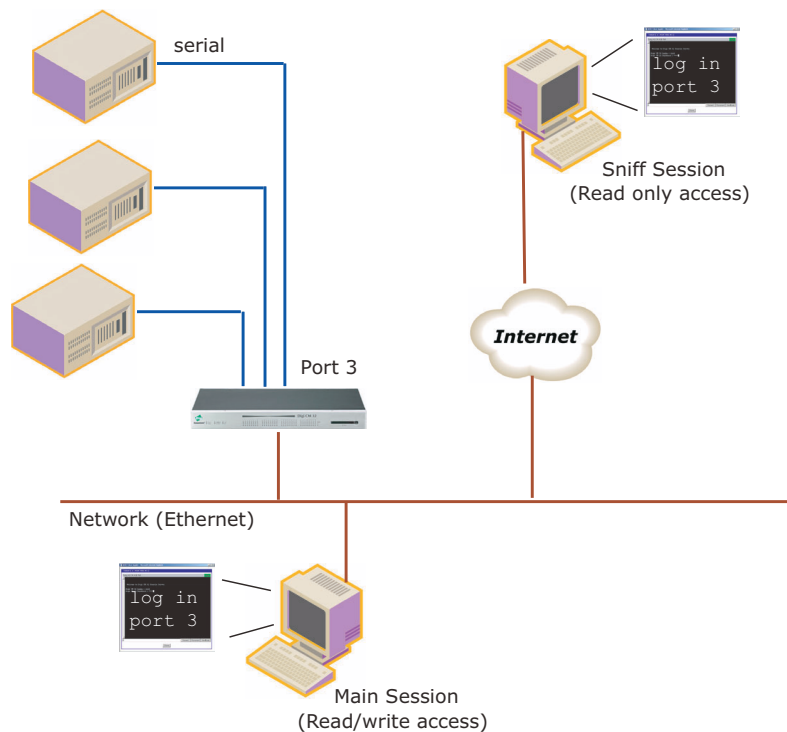
Permit monitoring only mode : Disable

Save to flash Save & apply Cancel

Alert configuration

Sniff Session

A sniff session enables multiple users to access a single serial port for viewing the data stream. Anyone that is registered for a sniff session can access a specific serial port even if someone else is using the port. The Digi CM unit supports multiple concurrent sniff sessions.



There are four options for a Sniff Session mode, disabled, input, output, and both. You can configure the sniff session modes on a per-port basis from the Serial port configuration page.

Enable/Disable sniff mode

- Disabled - The sniff mode is disabled and no one can enter a sniff session after the first person is logged on.
- Enabled - - Allows everyone with access the following options while in sniff mode:

Sniff session display mode

- server output - View all data to a serial port from a remote connection
- user input - View all data from a serial port to a remote connection
- both - See all data transmitted or received through a serial port

Display data direction arrows

- Enable/Disable - displays arrows to indicate direction of data to or from the server. When accessing the port as a second user the global "Port escape menu" will be displayed. See "Port Escape Menu" on page 19.

Permit monitor only mode

- **Enable:** A user with "Monitor" permissions can only connect to the port in read only mode any time.
- **Disable:** A user with "Monitor" permissions can connect if a read/write user has a connection to the port. A read only session is automatically disconnected if the main user (read/write session) disconnects from the port.

Security Profile

The Security Profile found under System administration, is a central location to establish minimum security parameters. In the security profile you can enable or disable services. The following services can be accessed to change the status.

- **SNMP**
Globally disables any SNMP queries (traps may always be sent if configured)
- **Discovery (ADDP)**
Convenient for initial discovery of units on the network. This capability is often disabled once the system is fully configured unless deployment is on a controlled LAN.
- **Telnet**
Enabled by default for simple testing, this feature is often disabled afterwards.
- **SSH**
This service is usually left enabled, however there are some environments where authorized access is only allowed via a totally out-of-band connection (such as hard-wired serial and/or dial-up modem.) In these scenarios, the Ethernet connection is only used for reports and alerts
- **HTTP**
Enables or disables access to the Digi CM unit via the web interface. By default, HTTP and HTTPS are enabled.
- **HTTPS**
Also enables or disables access to the Digi CM unit via the web interface, however it is often disabled if the unit will be deployed outside of a controlled LAN to limit the number of services available. By default, HTTPS and HTTP are enabled.
- **All ports**
Enables or disables access to any port using any protocol

Security profile

Services

SNMP (get/set) :	Enable ▾
Discovery (ADDP) :	Enable ▾
Telnet :	Enable ▾
SSH :	Enable ▾
HTTP :	Enable ▾
HTTPS :	Enable ▾
All ports :	Enable ▾

Save to flash Save & apply Cancel

Network security
Per port security
Password security

Network Security

The network security tab allows you to enable or disable the Stealth mode. Stealth mode makes the Digi CM unit 'invisible' on the network and only exposes ports that are used to provide services. In Stealth mode, the Digi CM unit will not reply to pings or traceroutes and will not respond to any attempts to open TCP/UDP sockets when no service is listening.

The network security tab also allows you to enable or disable SSH V1 (Secure Shell Version 1). SSH V1 uses server and host keys to authenticate systems.

Per Port Security

Forces all port Telnet connects to be set for SSH. The only remaining Telnet access is to the Digi CM unit (which can be eliminated on the Services tab)

Password Security

Passwords can be set up slightly more complicated to increase the password security. Under Password security, user's have the following options:

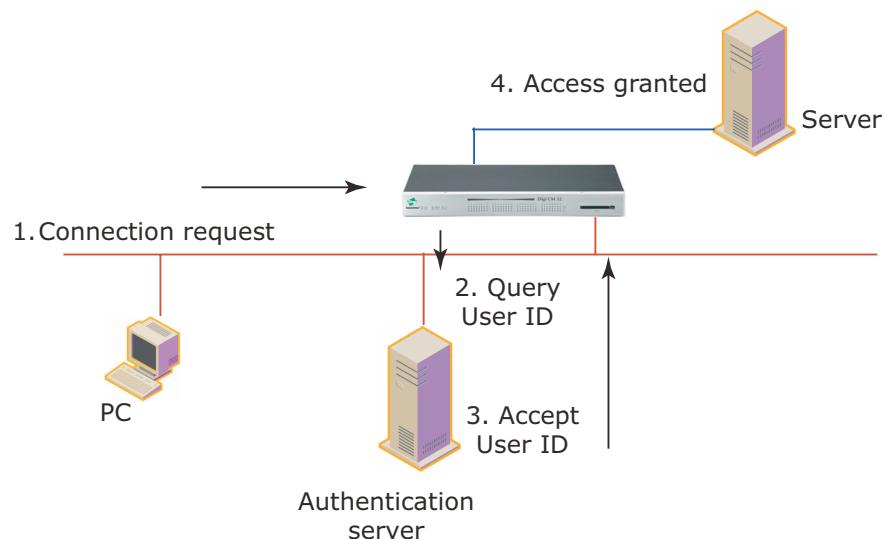
- Minimum password length
3-255 characters
- Maximum password age (in days)
Set the number of days. Zero to disable.
- Enforce password complexity
 - Cannot contain all or part of the user's account name
 - Must be at least eight (8) characters in length. (If enabled, minimum password length is 8-255.)
 - Must include 3 of the 4 categories:
 - ~Upper case A-Z (English)
 - ~Lower case a-z (English)
 - ~Numbers 0-9
 - ~Non-alphabetic characters (!,\$,#,%, etc.)

Authentication

- Enforce password history
Cannot reuse last 9 passwords

Authentication

The Digi CM unit supports multiple methods of user authentication. The following methods are supported: Local, TACACS+, RADIUS, RADIUS Down-Local, LDAP, Kerberos, and Custom PAM. The type of authentication protocol you use is dependent on your environment.



Configuring Authentication Methods for Port Access

You 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, TACACS+ server, or Kerberos. These options are listed when you configure the Digi CM unit for authentication. To configure the Digi CM unit 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 figure displays the parameters for setting up a RADIUS server as the primary authentication server and Local authentication if the primary authentication method fails.

Configuring Security and Authentication

Authentication	
Authentication method :	RADIUS server- Local
First RADIUS authentication server :	
Second RADIUS authentication server :	
First RADIUS accounting server :	
Second RADIUS accounting server :	
RADIUS timeout (0-300 sec.) :	10
RADIUS secret :	
RADIUS retries (0-50 times) :	3

Note: Remote authentication to Port access menu can be obtained from Serial port > Configuration > Port access Menu

5. Fill in the appropriate fields.
6. Choose Save & apply changes.

Configuring Authentication for the Web Server

1. Access the web interface.
2. Choose **Network > Web server configuration**.

The following screen appears.

Web server configuration	
HTTP service :	Enable
HTTPS service :	Enable
Web page refresh rate for statistics data display (0-1800, 0 for no refresh) :	10 seconds
Login timeout (0-1440, 0 for unlimited) :	60 minutes
Authentication method :	Local
Eliminate root access :	Disable

Save to flash Save & apply Cancel

3. Choose an authentication method and then Save & apply.

When using remote authentication for the web server, such as RADIUS, RADIUS Down-local, TACACS+, LDAP, Kerberos, or Custom PAM, you must also be added to the local database. The **user password** must be different from local authentication or it will do local authentication instead of remote. See "Administering Users" on page 67 for details.

Once your password is approved by the authentication server, the Digi CM unit uses the local permission rights to provide proper access privileges for you to ports and the configuration.

LDAP Authentication

The Digi CM unit supports authenticating against an LDAP based database. This includes LDAP systems running on Linux servers as well as Microsoft Active Directory together with the LDAP gateway ADAM (Active Directory

Application Mode).

If the Digi CM unit authenticates against an LDAP directory, all users must be configured in one container. The Digi CM unit will extend the username using the LDAP search base and authenticate the user.

In the following example the domain is called `dilbert.com`, the LDAP server is at `10.1.1.1`, and all users with access to the Digi CM unit are located in the container: `USA Users`

Configure the LDAP authentication as follows:

Authentication method: LDAP server

First LDAP Server `10.1.1.1`

Second LDAP Server

LDAP search base: `ou=users,ou=usa,dc=dilbert,dc=com`

Domain name for active directory:

If your LDAP database resides on a Microsoft system you also have to configure the Domain name for the active directory as: `dilbert.com`.

Do not use this setting if you are using a non-Microsoft system as it changes the LDAP to comply with Microsoft syntax.

Custom PAM Module

The Digi CM unit supports custom PAM modules for remote authentication. This allows you to create your own authentication schema or use any other third party PAM module. The module has to be compiled for the Digi CM unit's environment.

Digi offers an SDK for the Digi CM family.

To download the SDK please contact technical support at <mailto:support.wizards@digicom.com>.

1. The custom PAM modules have to be placed onto: `/usr2` on the Digi CM unit.
2. Use an scp client (like WinSCP) to copy data to the `/usr2` directory, or download the ftp client for the Digi CM unit from support.digicom.com.
3. Make sure the module is flagged to be executable (`chmod 755 ...`)

Note: To activate the custom PAM module it has to be configured in the custom file located in `/etc/pam.d`

4. Create a file called: `/etc/pam.d/custom` and add these lines:

```
auth required /usr2/my_pam_auth.so
```

```
session required /usr2/my_pam_auth.so
```

(with the `my_pam_auth.so` being the "custom pam" module's name)

5. To keep this file permanently copy it to `/usr2` and add a line to `/usr2/rc.user`.

```
Cp /usr2/custom /etc/pam.d/
```

Example of an rc.user file: `#!/bin/bash`

```
#
```

```
# rc.user : Sample script file for running user programs at boot time
```

```
#  
#PATH=/bin:/usr/bin:/sbin:/usr/sbin  
# Add shell command to execute from here  
cp /usr2/custom /etc/pamd/  
exit 0
```


Chapter 9**Custom and Default Menus****Introduction**

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

The Custom Menu feature enables system administrators to create menus for specific users; in other words, system administrators can create a customized interface to selected ports. Custom menus can only be configured via the web however, they can only be accessed via the shell (command line).

Making Custom Menus

Before making custom menus, plan the kind of menus and menu items you want available to your users. A good plan would include the following:

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:

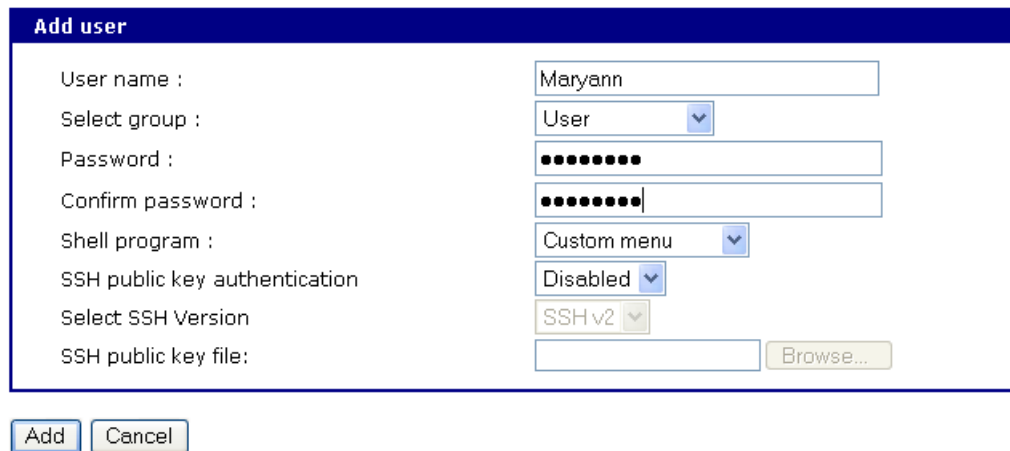
1. Access the web interface.
2. **System administration > Users administration > Add**

The screenshot shows the 'User administration' web interface. At the top, there is a header bar with the title 'User administration'. Below the header, there are input fields for 'User name' and 'User group' (set to 'All group'), and a 'Search' button. The main content area is titled 'Current local users' and contains a table with the following data:

☐ #	User name	User group	Shell
☐ 1	Gilligan	Port admin	Configuration menu
☐ 2	Skipper	System admin	CLI
☐ 3	admin	System admin	Configuration menu
☐ 4	root	Root	CLI

At the bottom of the table, there are three buttons: 'Add', 'Edit', and 'Remove'.

3. Enter the User name and User group from the drop down menu. Select Custom menu from the drop down menu for the Shell program.



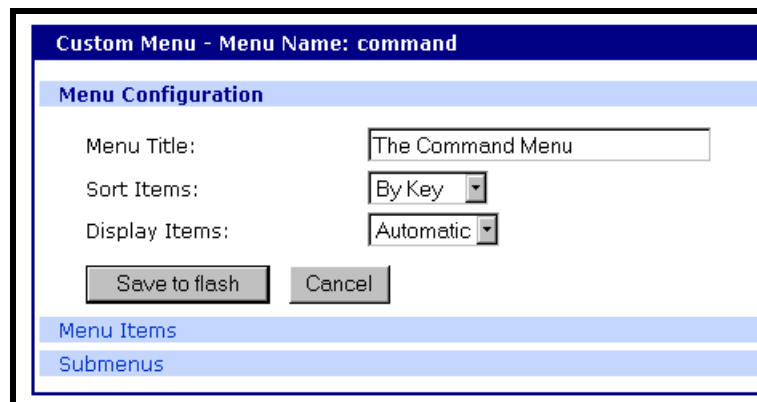
4. Click Add to add the user.
5. Continue to add users as needed.

Note: 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. **Custom Menu > Configuration.**
3. Enter the Menu Name to assign and click the Add Menu button.
The menu is added.
4. Click the hyperlink to the menu you just created.
5. From the drop down menu, select the way to Sort and Display items.



6. Click Save & apply.
7. Repeat as required 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, do the following:

1. **Custom Menu > Configuration > Menu Name** hyperlink for the menu you want to configure.
2. Choose **Menu Items > Add Item**.

The following screen appears.

Custom Menu - Menu Name: Master - Item Configuration

Key: Label:

☐ Create new submenu
 Submenu Name:

☒ Go to an existing submenu
 Submenu Name:

☐ Connect to serial port
 Serial Port:

☐ Connect to clustered serial port
 Clustered Slave:
 Serial Port:

☐ Telnet to a remote host
 Remote Host:
 Remote Port:

☐ SSH (Secure Shell) to a remote host
 Remote Host:
 Remote User:

☐ Execute a custom command
 Custom Command:

3. Fill in the desired parameters. The parameters are:

Key - Assign any letter or number except a value already used by another menu item.

Label - Assign a 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 to serial port - Connects you to a specified port.

Connect to clustered serial port - Connects you to a clustered port.

Telnet to a remote host - Enter a remote host's IP address or hostname.

SSH (Secure Shell) 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 with acceptable user privileges.

4. Choose Apply.
5. Repeat this procedure to add more menu items.

Note: To add or configure submenus, select the Submenus hyperlink on the Menu Configuration page.

Assigning Users to a Menu

Once a menu has been created, users can be assigned to the menu by doing the following:

1. Access the web interface.
2. **Configuration > Custom Menu > Menu Users.**

A list of available users is displayed.

User Name	Assigned Menu
nicholas	defaultmenu
root	command

Note: You must add a user to the system in the [Users administration](#) page.

Save to flash Cancel

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

Default Menu

Port Access Menu

The Port Access menu is a flat (one level) menu showing all ports, port titles and the mode of each port.

Using the Port Access menu you have a complete overview of all ports and can initiate a connection to any of them.

When you choose to connect to a specific port, you are prompted again for the username and password.

```
[Digi_CM_Device]
=====
Port#      Port Title      Mode      Port#      Port Title      Mode
-----
1      Port Title #1      CS      2      Port Title #2      CS
3      Port Title #3      CS      4      Port Title #4      CS
5      Port Title #5      CS      6      Port Title #6      CS
7      Port Title #7      CS      8      Port Title #8      CS
Enter command (1-8 serial port, P passwd, others for exit)
----->
```

There are multiple ways to access the PortAccess menu:

- Assigned IP address (see "Configuring Host Mode" on page 52)
- TCP/IP port 7000
- TCP/IP port 22 or 23 if the "Shell program" is set to "port access menu" for this specific user (see chapter "Administering Users" on page 67)
- By calling "portaccessmenu" from the command line

The PortAccess menu allows simple access to each port.

By typing the number of the port to connect to, the Digi CM unit initiates a connection to this port using the appropriate protocol (Telnet or SSH).

You can also change your own password by using the "P" Key.

If the Digi CM unit is configured to be the master in a master-slave scenario, the "S" key will bring up a list of all slaves. Selecting a slave will then spawn a connection to the Port Access Menu of the slave.

When using a Digi CM 48, not all ports can be displayed on one screen. Ports 33-48 can be viewed after hitting the <Enter> key.

Chapter 10

Microsoft SAC Support

About the Digi CM Unit's Support for Microsoft Windows Server 2003

The Digi CM unit provides a browser-based user interface to Microsoft's text-based Special Administration Console (SAC), an integral part of Windows Server 2003 Emergency Management Services (EMS). Both the English and Japanese versions of SAC are now supported. When a server running Windows Server 2003 is connected to the Digi CM unit's serial port, key SAC functions--normally accessed from the command line--are available from a graphical user interface (GUI). SAC features accessible from this interface include:

- Reset and shutdown
- Show performance values like memory utilization
- Show and configure IP settings per interface
- Show the process list and kill processes

Note: While the EMS port is available at all times using Telnet or SSH, the special GUI is available only while SAC is active.

Manage [MS SAC] on port 1	
System	
System Name:	WHQLED
Operating System:	Windows Server 2003 Enterprise Edition
OS Version:	5.2
Service Pack:	None
System date/time:	04/30/2003 20:31:04 (GMT)
Time since last restart:	2 seconds.
Control	
Connect	Connect to Microsoft SAC console
Restart	Restart system
Shutdown	Shutdown system
Performance	
Processes	
Serial Port Log	
IP Settings	

Set Up Overview

Set up for the Digi CM unit SAC support is a three-step process:

1. Set up the Windows Server 2003 for SAC support. To do this, ensure that the COM port used for console traffic is properly set up. This includes designating a COM port for console communication and setting the port speed (baud) appropriately. For further information please refer to Setting Up the Windows Server 2003 Port below.
2. Cable the console port on the Windows Server 2003 to the Digi CM unit's port. See the cabling information in Chapter 18.
3. Set up the Digi CM unit for SAC support. See "Setting Up the Digi CM Unit for SAC Support" on page 94.

Setting Up the Windows Server 2003 Port

1. Sign on to the Windows Server 2003 as the administrator.
2. Access the command line.
3. Use the `bootcfg` command to redirect console traffic to the correct COM port. The following is the command syntax and an example. See the Microsoft documentation for additional information on the SAC feature.

Command Syntax

```
bootcfg /ems on /port com# /id # /baud 115200
```

where *com#* is the COM port to which console traffic will be redirected, *#* is the is the number of the boot entry, and the port speed is set to the recommended rate (although you can use any rate supported by Windows Server 2003).

Command Example

In this example, console output is redirected to COM 2, the boot entry is specified as 1, and the port speed set to 115200.

```
bootcfg /ems on /port com2 /id 1 /baud 115200
```

Setting Up the Digi CM Unit for SAC Support

To set up a serial port to provide access to the Windows Server 2003 console port, do the following:

1. Access the web interface.
2. Choose **Serial port > Configuration**.
3. Choose a port.
4. Choose **Host mode configuration**.
The Host mode configuration page appears.
5. Set the Host mode to Console server and the Type of console server to MS SAC -English (or Japanese) console as shown in the following figure.

Serial port configuration - 1 : Port Title #1 — Move to —

Enable/Disable this port

Port title

Apply all ports settings

Host mode configuration

Host mode : Console server

Type of console server : MS SAC console - English

Rackable systems MGMT card : MS SAC console - English
MS SAC console - Japanese
Other

Enable/Disable assigned IP :

Assigned IP : 192.168.1.101

Listening TCP port (1024-65535) : 7001

Terminal server option : Remote connection

Terminal server shell program path :

Destination IP : 0.0.0.0

Destination port (0-65535) : 0

Protocol : Telnet

Port escape sequence : Ctrl- [z

Port break sequence : ~break

Inactivity timeout (1-3600 sec, 0 for unlimited) : 100

Modem init string : q1e0s0=2

Enable/Disable dial-in modem callback : Disable

Dial-in modem callback phone number :

Enable/Disable dial-in modem test : Disable

Dial-in modem test phone number :

Dial-in modem test interval : every 24 hour(s)

Use comment : No

Quick connect via : Web applet

Web applet encoding : English (latin1)

Save to flash Save & apply Cancel

Serial port parameters

Port logging

Port event handling

Port IP filtering

Authentication

User access control

Alert configuration

6. Set other fields as appropriate.
7. Click Save & apply.
8. Configure serial port communication settings, by doing the following:
 - a. Choose Serial port parameters from the menu.
 - b. Adjust settings as required. This includes ensuring that the Baud rate matches the setting on the Windows Server 2003 serial port and Flow control is set to None. Ignore the DTR behavior field.
 - c. Click Save & apply.

Accessing the Windows Server 2003 Console Port from the Digi CM Unit's GUI

To access the Windows Server 2003 console port, do the following:

- 1. Access the web interface.
- 2. Choose **Serial port > Connection.**

A screen similar to the following appears.

Serial port connection							
Port access menu connection							
Port access menu connection							
Individual port connection							
P	C	M	Port#	Title	# of	User	Comments
			1	Port Title #1	0		< Not used >
			2	Port Title #2	0		< Not used >
			3	Port Title #3	0		< Not used >
			4	Port Title #4	0		< Not used >
			5	Port Title #5	0		< Not used >
			6	Port Title #6	0		< Not used >
			7	Port Title #7	0		< Not used >
			8	DIGI RPM on Port 8	0		< Power controller >

- 3. Click on the title of the port to which the Windows Server 2003 console port is connected.

Note: If support for "Windows Server 2003" and "Rackable Systems Management Card" is selected a menu will appear and you must choose between the two functions.

A screen similar to the following appears.

Manage [MS SAC] on port 1	
System	
System Name:	WHQLED
Operating System:	Windows Server 2003 Enterprise Edition
OS Version:	5.2
Service Pack:	None
System date/time:	04/30/2003 20:31:04 (GMT)
Time since last restart:	2 seconds.
Control	
Connect	Connect to Microsoft SAC console
Restart	Restart system
Shutdown	Shutdown system
Performance	
Processes	
Serial Port Log	
IP Settings	

- 4. Use the Digi CM unit's GUI to perform SAC functions. The following table describes attributes of the controls on the GUI.

Field	Description
Connect	Connects to the SAC console port via the command line interface.
Restart	Reboots the Microsoft Server 2003.
Shutdown	Shuts down the Microsoft Server 2003. Caution! This switches off the server and you can no longer access it remotely.
Performance	Provides access to Microsoft Server 2003 status information.
Process	Provides access to the process list, which allows you to view and kill active processes.
Serial Port Log	Provides access to port logging information.
IP Settings	Provides access to IP settings, enabling you to verify and change settings.

Introduction

Rackable Systems manufactures a management card that is built into some of their servers. It interfaces between the Digi CM unit and the server's serial port. In normal mode, it allows transparent communication between the Digi CM unit and the server. After detecting an escape sequence, it allows you to control functions from the server independently of the main processor. The controllable functions are listed below:

- Switching power on or off
- Rebooting
- Turning the status LED on or off
- Programming the LCD panel
- Reading the temperature from inside the server
- Setting the power on delay

The Digi CM unit offers a graphical web based user interface to manage the Rackable Systems Management Card.

Set up**Setup of the Digi CM Unit to Support the Rackable Systems Management Card**

To set up the serial port to provide access to the Rackable Systems Management console, do the following:

1. Access the Digi CM unit's web interface.
2. Under the **Serial Port** heading choose **Configuration**.
3. Choose a port.
4. Choose **Host mode configuration**.

The Host mode configuration page appears.

5. Set the Host mode to Console server.
6. Set the "Rackable Systems Mgmt Card" support to Enable.
7. Click Save & apply.

Configure Serial Port Communication Settings:

1. Choose **Serial port parameters** from the menu.
2. Adjust the settings as required. The defaults for the Rackable Systems Management Card are identical to these of the Digi CM unit:

Baud rate	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None

DTR behavior High when open

- 3. Click Save & apply.

Assign a Port Name:

- 1. Choose port title from the menu.
- 2. Enter a port title.
- 3. Click Save & apply.

Accessing the Rackable Systems Management Card from the Digi CM Unit's User Interface

- 1. Access the Digi CM unit's web interface.
- 2. Under the **Serial Port** heading choose **Connection**.

A screen similar to the following appears.

Serial port connection						
Port access menu connection						
Port access menu connection						
Individual port connection						
P	C	M	Port#	Title	# of User	Comments
			2	Port Title #2	0	< Not used >
			3	Port Title #3	0	< Not used >
			4	Rackable Server	0	< Not used >
			5	Port Title #5	0	< Not used >
			6	Port Title #6	0	< Not used >
			7	Port Title #7	0	< Not used >
			8	Port Title #8	0	< Not used >

- 3. Click on the icon in the M (Manage) column or on the title of the port to which the Rackable Server is connected.

A screen similar to the following appears.

Rackable Systems Mgmt Card - 4 : Port Title #4				
Control				
Manufacturer :	Rackable Systems			
Power status :	ON	Power on Power off Reboot		
Connect to Rackable Systems Mgmt Card console :	Connect			
LED/LCD management				
Rackable Systems Mgmt Card properties				

4. Use the Digi CM unit's user interface to perform Rackable Systems Management Card functions. The following describes attributes of the user interface controls.

Rackable Systems Mgmt Card - 4 : Port Title #4

Control

LED/LCD management

[LED management]
 Status : OFF

[LCD management]
 Currently displayed message :
 Server 25
 Linux

Enter message :

Show saved LCD upon startup : Yes to No

Contrast (0-100): 50

Rackable Systems Mgmt Card properties

Rackable Systems Mgmt Card - 4 : Port Title #4

Control

LED/LCD management

Rackable Systems Mgmt Card properties

[Temperature]
 Temperature : 26 °C (78 °F)

[Power on characteristics]
 Power on delay (sec, 0-99) : 1 sec. (99 for off)

Power sense : Other to Reset

[Communication parameters]
 Baud rate : 19200

Field	Description
Control	
Power status	The first column shows the current state. Three buttons are available to initiate an action to either, power on, power off or restart the server. Dependant on the current status Power on or Power off is disabled.
Reboot	Reboot the Rackable Server by sending a 500ms reset signal to the server.
Connect	Spawn the Java Telnet applet or the local Telnet/SSH application to connect directly to the port.
LED Mgmt	
LED Management	To control the LED in the front of the Rackable Server. The first columns shows the current status of the LED. Three buttons are available to select the activity of the status LED: turn on, turn off and blinking. Either of these buttons is disabled.
LCD Mgmt	
Currently displayed message	Shows the message that is currently displayed on the LCD display.
Erase	This function clears the LCD display. The saved message stays saved to flash.
Save	Save currently displayed message to flash memory.

Field	Description
Show saved LCD message upon startup	The first column shows the current status: Yes or No. This parameter defines which message is displayed upon startup of the server, either the saved message or the standard: "Rackable Systems Phantom Vx.xx".
Contrast	Set a contrast for the LCD panel. The default is 50, the range is 0 – 100.
Phantom Properties	
Temperature	Indicates current temperature inside the Rackable Systems Server.
Power delay	Time in seconds before the server starts up after applying power (0-98 seconds, 99 means no power on delay).
Power sense	The power sense option toggles between sensing server power on the reset header or on the J7 connector. Most applications will use the "Reset" option. This option should be set before shipping from Rackable Systems, but may need to be reset if somehow changed after shipping.
Communication settings Baud Rate	Configure the baud rate used to communicate with the Rackable Systems Management Card. For this change to become effective reset or power-cycle the Management card, and be sure to switch the port settings in the Digi CM unit's port settings.

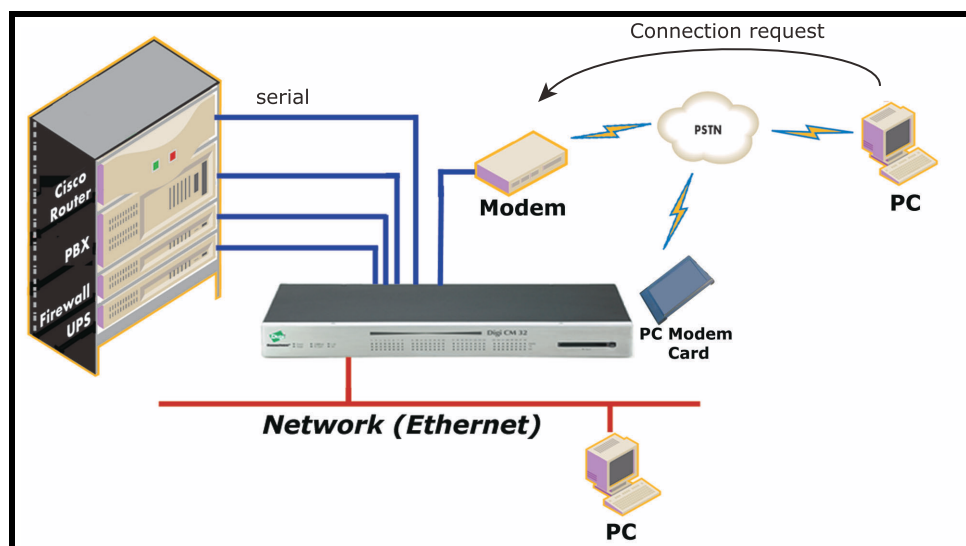
Chapter 12

Configuring Remote Dial-In Access

Introduction

The Digi CM unit supports dial-in connections from remote sites for out-of-band access. In this configuration, the Digi CM unit has serial ports configured for external modems and waits for dial-in connections from remote sites. If you dial-in using a terminal application, the Digi CM unit accepts the connection and displays a menu of available serial ports. In a dial-in terminal server mode, the Digi CM unit 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 50.



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 and then choose **Host mode configuration**.
4. Select Dial-in modem for the Host mode in the drop down menu.
5. Fill in the appropriate fields as they apply to your configuration.

Modem init string - The default modem init string is q1e0s0=2. The init string

Serial port configuration - 1 : Port Title #1 — Move to —

Enable/Disable this port

Port title

Apply all ports settings

Host mode configuration

Host mode : Dial-in modem

Modem init string : q1e0s0=2

Enable/Disable dial-in modem callback : Disable

Dial-in modem callback phone number :

Enable/Disable dial-in modem test : Disable

Dial-in modem test phone number :

Dial-in modem test interval : every 24 hour(s)

Save to flash Save & apply Cancel

Serial port parameters

Port logging

Port event handling

Port IP filtering

Authentication

User access control

Alert configuration

Power control configuration

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 the Digi CM unit's serial port. See your modem user manual for more information.

Callback - For security reasons, the callback feature can be activated.

Enable/Disable dial-in modem callback : Enable

Dial-in modem callback phone number : 1234444567

If callback is enabled, the Digi CM unit does not accept any incoming calls. After the incoming call is rejected, a callback is initiated to the phone number configured in the "Dial-in modem callback phone number".

Modem test - To ensure the proper functionality of the modem, the Digi CM unit has the ability to test the modem connection in a configurable interval.

Enable/Disable dial-in modem test : Enable

Dial-in modem test phone number : 1234444567

Dial-in modem test interval : every 24 hour(s)

The modem test allows you to specify a phone number and an interval.

Configuring Remote Dial-In Access

After the system has booted, the interval has elapsed, and the modem is not in use, the specified dial number is called. The modem trains and receives a login prompt from the other side (normally another Digi CM unit). If the login-in prompt (*login:*) is detected the line is disconnected again and the modem test is considered successful.

Two ports can call each other using this modem test procedure.

Please be aware that the tests will fail if the other modem is in use.

There are multiple ways to review the information about the mode test:

- syslog in the Digi CM unit:

```
07-16-2004 12:45:01 > Port #16 - Modem Test started. Calling to 1234444567.
```

```
07-16-2004 12:45:22 > Modem connected through Port #15
```

```
07-16-2004 12:45:22 > Port #16 - Modem Test succeeded
```

In this example a modem connected to port 16 is calling another modem connected to port 15.

Any errors occurring are captured in the syslog file as well.

- e-mail based notification

The **Alert configuration** dialog of the port configuration, contains multiple settings:

Serial port configuration - 1 : Port Title #1

Enable/Disable this port

Port title

Apply all ports settings

Host mode configuration

Serial port parameters

Alert configuration

[Email alert configuration]

Email alert for dial-in modem test : Enable

Title of email : Modem test port 1

Recipient's email address : modemtest@example.com

[SNMP trap configuration]

Dial-in modem test trap : Disable

Use global SNMP configuration : Disable

Trap receiver settings :

IP Address	Community	Version
0.0.0.0	public	v1
0.0.0.0	public	v1

Save to flash Save & apply Cancel

The title of the e-mail and the address can be configured.

To be able to configure e-mail notifications, a primary SMTP server has to be configured under **Network > SMTP configuration**.

- SNMP configuration

It is also possible to receive notifications using SNMP traps.

When using SNMP traps the global settings for IP address, Community

Adding a PC Modem

and Version can be used, or specified separately.

The Trap MIB can be downloaded from support.digi.com (select your product and go to Diagnostics, Utilities and MIBs).

6. Click Save & apply.

Adding a PC Modem

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



Digi CM 32 shown

To install and configure the PC modem on the Digi CM unit, 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 unit searches for a PC card and displays a configuration menu.

5. Enter the appropriate parameters in the configuration menu.
6. Click Save & apply.

Configuring for Dial-In Terminal Server Access

The host mode Dial-In Terminal Server is identical to the host mode Terminal Server but allows you to configure a modem init string. In this mode an incoming modem connection is automatically connected to an IP address.

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 and then choose **Host mode configuration**.
4. Select Dial-in terminal server for the Host mode from the drop down menu.
5. Fill in the appropriate fields as they apply to your configuration.

Destination IP - The IP address of the system that you will be automatically

Serial port configuration - 1 : Port Title #1 — Move to —

Enable/Disable this port

Port title

Apply all ports settings

Host mode configuration

Host mode : Dial-in terminal server

Destination IP : 0.0.0.0

Destination port (0-65535) : 0

Protocol : Telnet

Inactivity timeout (1-3600 sec, 0 for unlimited) : 100

Modem init string : q1e0s0=2

Save to flash Save & apply Cancel

Serial port parameters

connected to when you access the port.

Destination port - The TCP port that will be used when the port you accessed is automatically connected to a system on the network.

Protocol - The protocol that will be used to establish the connection to Destination IP: port. The options are SSH, RawTCP, and Telnet.

Inactivity timeout - The timeout length ranges from 1 to 3600 seconds; 0 is unlimited timeout.

Modem init string - Use the default string or enter your own string.

6. Click Save & apply.

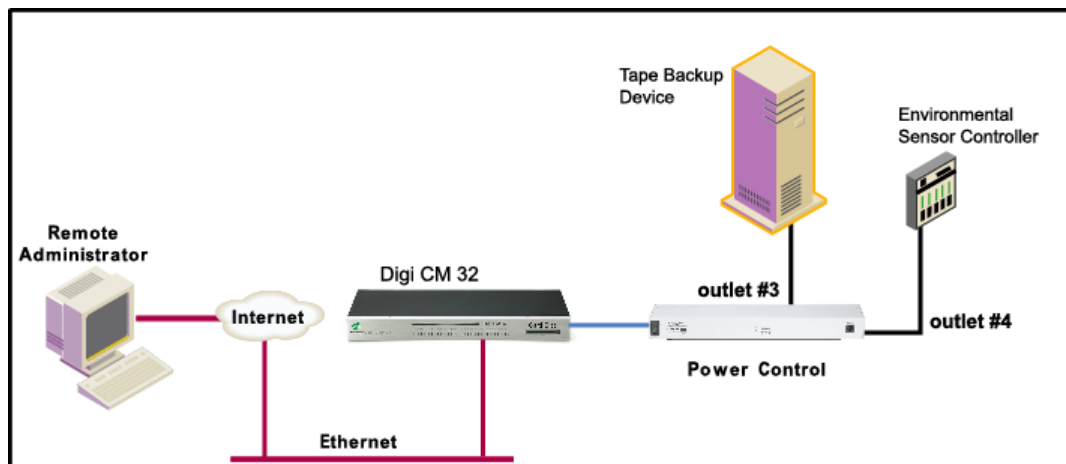
Chapter 13

Power Controller

Introduction

The Power Controller feature allows the administrators of the Digi CM unit to use console management to control power functions. Power control consists of three basic functions: on, off, and reboot (power cycle). There are two typical scenarios when using a power controller. The simplest scenario is a non-serial device connected to a power controller (for example, an environmental sensor controller or a tape backup device). The power controller is configured and accessed through the Digi CM unit.

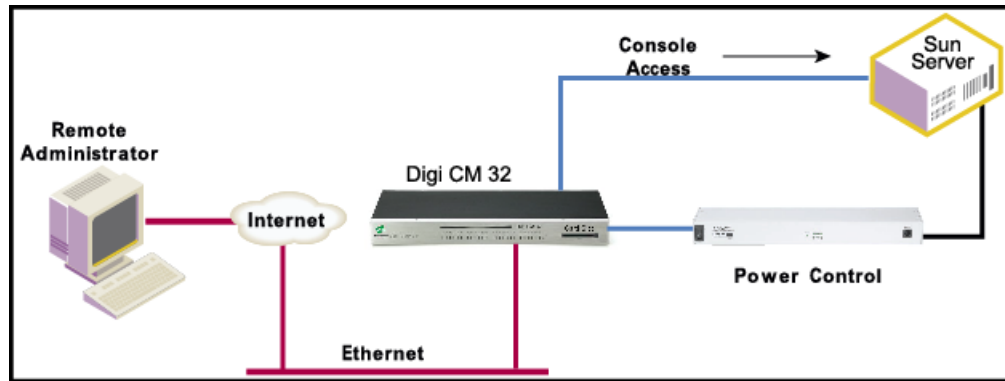
This illustration shows the a power controller configured through the Digi CM unit for non-serial devices.



The second scenario is a serial device (such as a router or server) managed through a port on the Digi CM unit with its power supply mapped through the power control feature. After configuration is complete, you need only reference the console management port on the Digi CM unit to also manage power. The Power Controller feature handles the relationship of a specific outlet to a serial device as if the power supply was also connected to the same port as the serial device. In other words, you don't need to see the physical connection or remember which outlet controls a specific serial device after configuration - the Digi CM unit does that for you.

Installing Power Controller

The following illustration shows a Sun server configured through a serial port connection on the Digi CM 32.



Installing Power Controller

To connect the Digi RPM power controller to the Digi CM unit use the straight-thru cable provided with the Digi RPM unit. Plug one side into the "Console" port of the Digi RPM unit and the other into any port of the Digi CM unit. If you plan to connect multiple power controllers, set up all of them as described before proceeding. For details on how to configure the Digi RPM unit for cascading refer to "Cascading Multiple Digi RPM Units" on page 118.

If you are using any other manufacturer of power controllers, please refer to "About Serial Port Cabling" on page 167 for more information.

Before proceeding, plug the power controller into an appropriate power source and turn it on.

Note: The DIP switches on the Digi RPM unit are used for cascading. Make sure that the dip switches of the first unit are set to off. For more information about cascading refer to "Cascading Multiple Digi RPM Units" on page 118.

Configuring Power Controller

Only system administrators can add a power controller although authorized users may reconfigure outlets or serial ports.

Configure the Serial Port Parameters to Match the Power Controller

1. Log in to the Digi CM unit (username root, password dbps).
2. Click **Serial port > Configuration**.
3. Select the port number of the serial port you want to connect to the power controller.
4. Select the **Serial port parameters**:

Baud rate	9600
Data bits	8
Parity	None
Stop bits	1
Flow control	None
DTR behavior	High when open
5. Click Save & apply.
6. Continue by adding the power controller.

Add the Power Controller

1. Log in to the Digi CM unit (username root, password dbps).
2. Click **Power Controller > Configuration**.

Power controller configuration

Add power controller

Port :

Manufacturer :

The number of cascaded units :

Power controllers

Port#	Manufacturer	Title	Outlets	Action
No power controller added...				

3. Select the port number of the serial port you want have connected to the power controller(s), the manufacturer of the power controller, and the number of units to be cascaded (1 means that one unit will be connected (no cascading)).

Note: The number of cascaded units cannot be changed later, so make sure you have all power controllers connected before proceeding.

The default title is the manufacturer brand and the port number it is connected to. You have the ability to change this title in step 5 if needed.

4. Click Add controller.
5. After the controller is detected automatically, you can correct the number of ports if necessary or edit the port title.
6. Click Save & apply.
7. Continue by setting the alarms and thresholds.

Setting Alarms and Thresholds

Power Controller allows administrators to set an alert via E-mail notification or an SNMP trap when environmental conditions exceed specifications.

The screenshot shows the 'Power controller configuration - Digi RPM 8' window. The 'Alarms & thresholds' tab is selected. It contains the following fields and options:

- Alarm threshold :** 14.0 amps (maximum value)
- Temperature threshold :** 90.0 °F (radio button selected, °C is also available)
- Send email alert (** ☐ **On alarm threshold** ☐ **On temperature threshold** **)**
To : [Empty text field]
- Send SNMP trap (** ☐ **On alarm threshold** ☐ **On temperature threshold** **)**
- Use global SNMP configuration :** Disable (dropdown menu)
- Trap receiver settings :**

IP Address	Community	Version
0.0.0.0	public	v1
0.0.0.0	public	v1

At the bottom, there is a tab labeled 'Outlets'.

1. Under **Power Controller** click **Alarms & thresholds**.
2. Enter the appropriate parameters. Select the condition(s) for an alert and enter the information for the alert (E-mail or SNMP trap or select both).

Note: If multiple power management units are cascaded, the alarm threshold is set for the sum of all outlets.

Note: To set up an E-mail alert it is assumed that the mail server has already been set up. If not, go to "Configuring SMTP Alerts" on page 60. If the SMTP server is not set up, the E-mail option will not be available.

3. Click Save & apply
4. Continue by configuring the outlets.

Outlet Configuration

The following procedure allows you to setup the power supplied to your device from the power controller.

1. From **Power controller**, click **Outlets**.
2. Click the outlet number to configure.

Outlet	Port	Title	Unit#	Outlet#
1	None	None	0	1
2	None	None	0	2
3	None	None	0	3
4	None	None	0	4
5	None	None	0	5
6	None	None	0	6
7	None	None	0	7
8	None	None	0	8

User	Power access	Action
<<Everyone>>	☒	Add
	☐	Add

Buttons: Save to flash, Save & apply, Cancel

3. Select the serial port number that controls the device connected to the Digi CM unit (if any). If the port number has a title, it will appear.

Note: If you want to add a title or change the existing title, go to Serial port > Configuration and select the port number that you want to add or change the title. Enter the title and click Save & apply. Go back to Power Controller > Configuration > Title > Outlets and select the outlet you are configuring to continue.

4. If you are not selecting a serial port number, you can modify a user's access on this screen. Enter the User Access Control parameters - see "User Access for Power Controller" on page 114.
5. Click Save to flash and repeat steps 2- 4 for each outlet you want to configure.
6. Click Save & apply.

Power controller configuration - DIGI RPM on Port 8

Power controller

Alarms & thresholds

Outlets

Outlet	Port	Title	Unit#	Outlet#
1	1	Sun Server	0	1
2	2	Sun Server	0	2
3	None	None	0	3
4	None	None	0	4
5	None	None	0	5
6	None	None	0	6
7	None	None	0	7
8	None	None	0	8

Serial port :

Move to serial port configuration to change [title] or [power access]

Outlet title :

User access control :

User	Power access	Action
<<Everyone>>	☒	
Gilligan	☒	Remove
	☒	Add

Note: The screen above shows that serial port one on the Digi CM unit is connected to a Sun Server that is supplied power from outlets 1 and 2 on the power controller. In the example above, Gilligan has access to the power outlets.

- To select the parameters for the User Access Control, click the **User Access** link. You may grant specific users permission to access an outlet or restrict access for specific users from an outlet. For more information see "User Access for Power Controller" on page 114.

User Access for Power Controller

The Digi CM unit can be configured to allow all users or specific users access to the power controller feature as well as restricting specific users to the power controller feature. User Access is configured on an outlet by outlet basis.

Note: User Access to a serial device that is connected to the power controller in configured under Serial Port > Configuration > Port # > User Access

Configuring to Allow Specific Users Access

To configure the Digi CM unit for specific users, you must deselect <<Everyone's>> access and add the specific user and access as in the following steps.

- Log in to the Digi CM unit (username root, password dbps)
- Click **Power Controller > Configuration > Outlets** > Select the outlet # to configure.
- Select the port to configure to the outlet. If it is a non-serial device select None.
- Edit the outlet title. If there is a serial port, the port title will appear and cannot be edited from this screen.
- Click Save & apply.

6. Under Everyone uncheck the Access type and click Save to flash.
7. Enter the user that will have access and check the Access type.
 Note: Port is access to the port. Monitor is access to sniff. Power is access to the power management.
8. Click Save to flash. Repeat steps 7 and 8 for additional users.
9. Click Save & apply after all users have been entered.

Power controller configuration - DIGI RPM on Port 8

Power controller

Alarms & thresholds

Outlets

Outlet	Port	Title	Unit#	Outlet#
1	1	Sun Server	0	1
2	1	Sun Server	0	2
3	None	Backup Tape Device	0	3
4	None	Light display	0	4
5	None	None	0	5
6	None	Test	0	6
7	None	None	0	7
8	None	None	0	8

Serial port :

Outlet title :

User access control :

User	Power access	Action
<<Everyone>>	☐	
Gilligan	☒	Remove
	☐	Add

Note: The screen above shows outlets 1 & 2 control power to the Sun Server configured on port 1 of the Digi CM unit. Outlets 3 and 4 are not serial devices. Gilligan has been designated the specific user to control outlet # 3.

Configuring to Restrict Specific Users

To restrict specific users, you must select access for << Everyone>> and add the restricted user by deselecting his or her access.

1. Log in to the Digi CM unit (username root, password dbps).
2. Click **Power Controller > Configuration > Outlets** > Select the outlet # to configure.
3. Select the port to configure to the outlet. If it is a non-serial device select None.
4. Edit the outlet title. If there is a serial port, the port title will appear and cannot be edited from this screen.
5. Click Save & apply.
6. Check Everyone and click Save to flash.
7. Enter the username that will NOT have access, uncheck the Access types that are restricted, and click Add.

Power Controller Management

Note: Port is access to the port. Monitor is access to sniff. Power is access to the power management.

- 8. Click Save to flash and repeat steps 7 and 8 for additional users.
- 9. When all users have been added Click Save & apply.

Power controller configuration - DIGI RPM on Port 8

Power controller

Alarms & thresholds

Outlets

Outlet	Port	Title	Unit#	Outlet#
1	1	Sun Server	0	1
2	2	Sun Server Backup	0	2
3	None	Backup Tape Device	0	3
4	None	Environmental Sensor	0	4

Serial port :
Outlet title :
User access control :

None

Environmental Sensor

User	Power access	Action
<<Everyone>>	☒	
Gilligan	☐	Remove
	☒	Add

Save to flash

Save & apply

Cancel

5	None	None	0	5
6	None	None	0	6
7	None	None	0	7
8	None	None	0	8

Note: Gilligan does not have access to Outlet # 4.

Power Controller Management

The Power Controller Management option allows you to change outlet settings or get a quick update of the power controller status.

- 1. Under **Power Control** click **Management**.

Power controller management				
Power controller				
Port#	Manufacturer	Title	Outlets	Status
8	DIGI RPM	DIGI RPM on Port 8	8	Connected

The Power controller management screen gives a quick view of all the power controllers and the current status of the connection. The Port # and Manufacturer fields are a link to the specific power controller statistic page which displays information for the power controller. If the status is 'Disconnected' the links are inactive.

- Click either the Port # or the power controller title.

Power controller management - DIGI RPM on Port 8

Power controller

Model : RPM8

Alarm threshold : 30.0 amps

Temperature : 86.0 °F (30.0 °C)

Circuit breaker : Good

RMS voltage : 120.0 volts

RMS current : 0.0 amps

Max current detected : 0.0 amps

Outlets

The Power controller statistics screen appears to show the Alarm threshold, Current temp, Circuit breaker condition, RMS voltage, RMS current, and Max current detected.

The Clear button will reset the Max current detected to 0.0 amps. From this screen click Outlets.

- Select the outlet number that you would like to manage.

Note: The screen below shows that all the outlets are powered On and outlet 3 is Rebooting, therefore the Backup Tape Device is power cycling.

Power controller management - DIGI RPM on Port 8

Power controller

Outlets

	Outlet	Port	Title	Unit#	Outlet#
ON	1	1	Sun Server	0	1
ON	2	2	Sun Server Backup	0	2
Rebooting	3	None	Backup Tape Device	0	3
Power on Power off Reboot					
ON	4	None	Environmental Sensor	0	4
ON	5	None	None	0	5
ON	6	None	None	0	6
ON	7	None	None	0	7
ON	8	None	None	0	8

- Click Power on, Power off, or Reboot depending on what you want the outlet to do.

Cascading Multiple Digi RPM Units

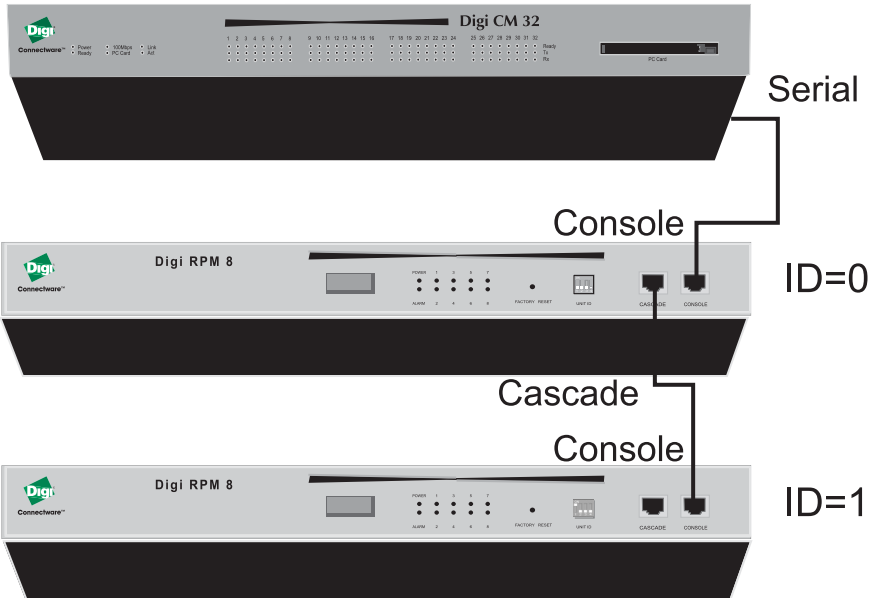
The Digi RPM power controllers can be cascaded when used with the Digi CM unit.

The DIP switches on the front panel of the Digi RPM allow configuring unique identities (ID) to the Digi RPMs so they can be identified. In a cascaded environment each unit has to be configured to a unique ID.

To cascade the Digi RPM units, connect a serial port of the Digi CM unit to the Console Port of the first Digi RPM unit using a straight-thru cable. Connect the “Cascade” Port of the first Digi RPM unit to the “Console” Port of the second.

Following an example of two cascaded Digi RPM units connected to a Digi CM unit.

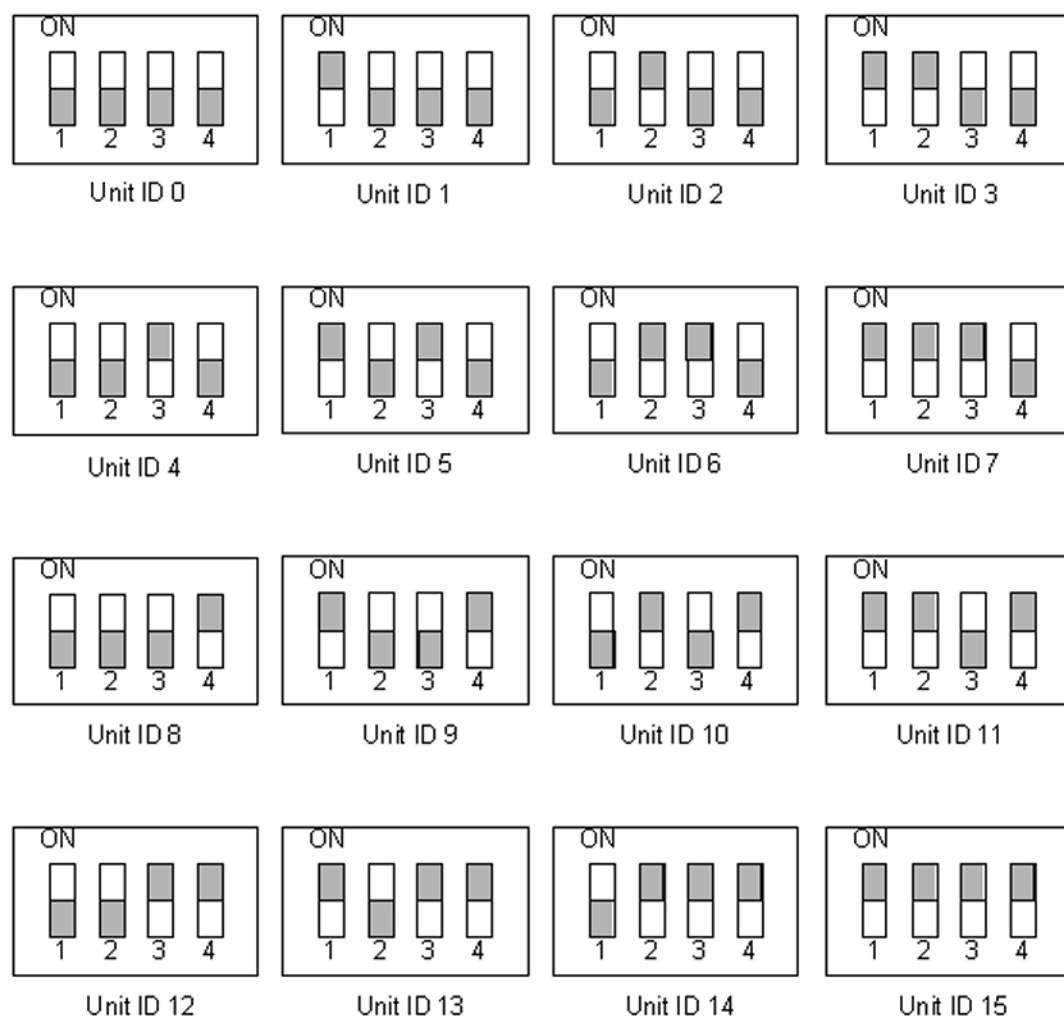
Please note that the ID for the first unit is set to 0 and for the second unit it is set to 1.



The next table shows all possible IDs that can be configured on the Digi RPM

unit.

Unit ID Switch Configuration



Chapter 14

Port Clustering

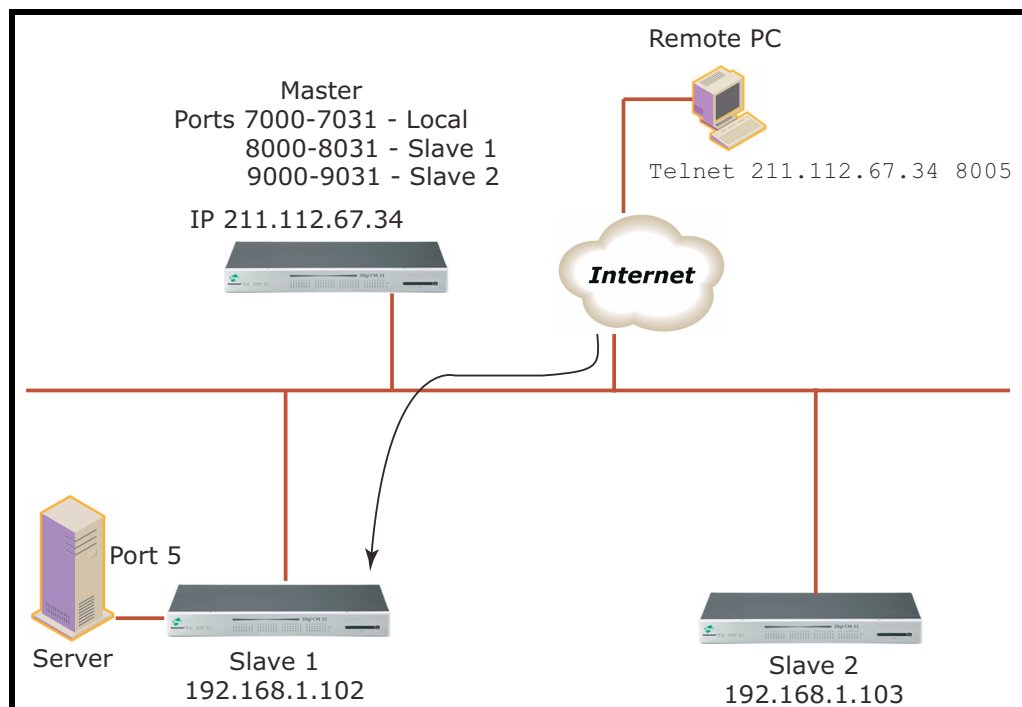
Introduction

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 unit can manage up to 16 slave devices or a maximum 816 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.

A secondary IP address can be specified to put all slaves on a private network. The secondary IP option can be found under **Network → IP configuration**.

To set up the Digi CM unit for port clustering you will need to:

- Configure all the Digi CM serial ports
- Assign one Digi CM unit as the master clustering device; all other Digi CM units default to slave devices.
- Import slave configuration to the Digi CM unit's master device



Configuring Port Clustering

Assigning Master Clustering Mode

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

1. Access the Digi CM unit through the web interface. This Digi CM unit 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 & apply.

Clustering configuration

Clustering mode configuration

Clustering mode : Master

Authentication mode : Local

Update master on changes : No

Save to flash Save & apply Cancel

Clustering information

Unit ID	Slave unit address	No. of port	Unit ID	Slave unit address	No. of port
A	10.8.200.10	16	B	-----	--
C	-----	--	D	-----	--
E	-----	--	F	-----	--
G	-----	--	H	-----	--
I	-----	--	J	-----	--
K	-----	--	L	-----	--
M	-----	--	N	-----	--
O	-----	--	P	-----	--

Configure Slaves to Join a Cluster

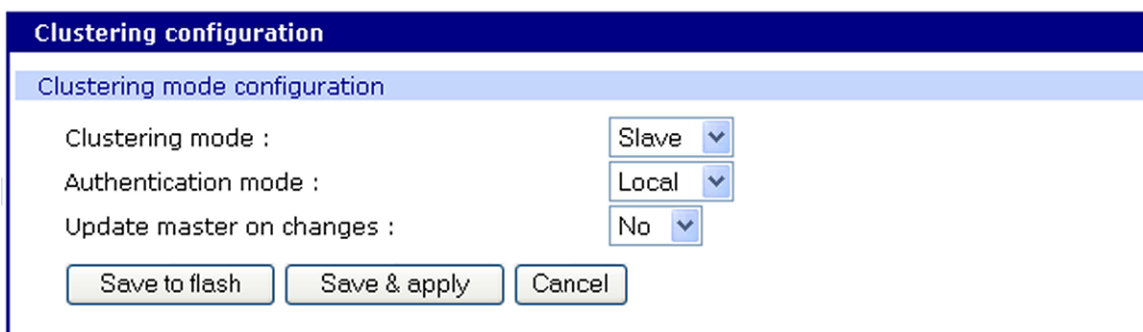
Digi CM units can be configured as basic slaves without any additional configuration, however there are two settings available which enhance the clustering capability.

Authentication mode -Local authentication is the slave independently authenticating all port access.

Master authentication is the master performs port authentication. Users do NOT need to be defined on the slave unit. Password verification will be done by the master unit.

Update Master on Changes -Automatically updates port name changes, port settings, and user permission settings to the master unit. Generally, Update Master on changes should be yes.

Select the appropriate settings then click **Save and apply**.



Clustering configuration

Clustering mode configuration

Clustering mode : Slave ▼

Authentication mode : Local ▼

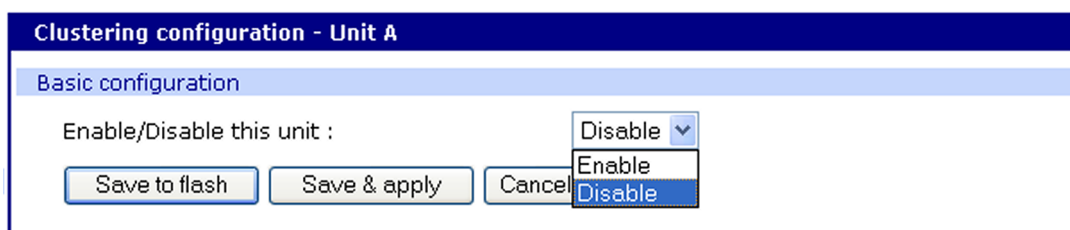
Update master on changes : No ▼

Save to flash Save & apply Cancel

Advanced Clustering Configuration

To refine a cluster environment, use the following parameters for advanced configuration of a cluster. To access the Advanced menu follow the procedure listed below.

1. Select Clustering > Configuration > Master > Save & apply.
2. Select the port number > Enable > Save & apply.



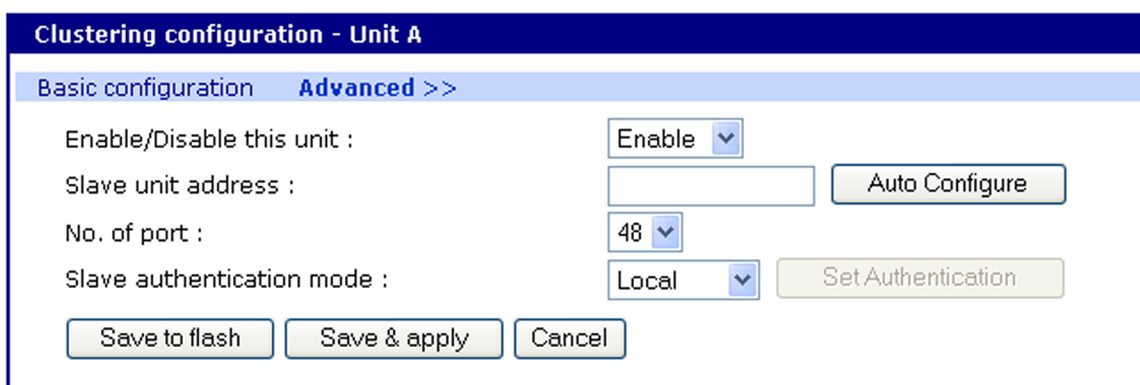
Clustering configuration - Unit A

Basic configuration

Enable/Disable this unit : Disable ▼

Save to flash Save & apply Cancel

3. Select Advanced from the Clustering > Master mode.



Clustering configuration - Unit A

Basic configuration **Advanced >>**

Enable/Disable this unit : Enable ▼

Slave unit address : Auto Configure

No. of port : 48 ▼

Slave authentication mode : Local ▼ Set Authentication

Save to flash Save & apply Cancel

Enable - This shows whether the port is enabled or disabled. All ports are enabled by default.

Slave unit address - IP address of slave.

No. of ports - Number of ports on slave.

Slave authentication mode - To specify if your database is controlled by the master unit, or locally by the slaves themselves.

Update Master on Changes -Automatically updates port name changes, port settings, and user permission settings to the master unit. Generally, Update Master on changes should be yes.

Connect to slave unit to change configuration - A quick access method to connect to the slave.

Source port - This is the port number that you would access to get to the slave on the master unit. The first slave port defaults to 7100 for the port access menu and the port numbers increase according to the number of ports on the Digi CM 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 -If you choose not to use AutoConfig, you can set these ports manually. Base source port is the first port number on a master unit. By default the base source port on the master unit is 7001. The base source ports extend the master's ports via the slave ports. For example, starting the base source port number with 7101 results in a 32-port unit being numbered from 7101 to 7082. Port number 7100 is the port access menu of the slave. If you configure the device manually, the port access menu must also be configured separately.

Base destination port - The physical port numbers of the slave device.

Note: 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.

Clustering configuration - Unit A

Basic configuration << Basic

Enable/Disable this unit :

Slave unit address :

No. of port :

Slave authentication mode :

Update master on changes :

Connect to slave unit to change configuration : Please, Do [Auto Configure] after changing

Enable	Source port	Destination port	Protocol
☒	7149	80	HTTP

[\[Connect to slave unit\]](#)

Port access menu configuration

Enable	Source port	Destination port	Protocol
☒	7100	7000	Telnet

Individual port configuration

Port #	Enable	Title	Source port	Destination port	Protocol
1	☒	Port Title #1	7101	7001	SSH
2	☒	Port Title #2	7102	7002	SSH
3	☒	Port Title #3	7103	7003	SSH
4	☒	Port Title #4	7104	7004	SSH
5	☒	Port Title #5	7105	7005	SSH
6	☒	Port Title #6	7106	7006	SSH
7	☒	Port Title #7	7107	7007	SSH

Accessing the Cluster Ports

You can connect to the slave port using the web, Telnet or SSH client. You can access the port access menu or custom menu of each slave device or connect directly to each slave port.

— Web Access

1. Click **Clustering > Connection > Port number**.
2. Log in to the port
3. Enter the port escape sequence (listed on page)

— Telnet

1. Telnet to the IP and the port number of the device.

```
telnet 143.191.3.9 7101
```

2. Login and enter your password

```
root
```

```
dbps
```

3. Enter the port escape sequence (listed on page).

— SSH

1. Click on the port with SSH protocol
2. Login

3. Enter the port escape sequence (listed on the page)

Depending on your access rights you can sniff (read only) or monitor (read/write), or manage power of the ports.

Introduction

This chapter describes how to perform tasks performed either by root or the system administrator. These tasks fall under the general heading of system administration and include firmware upgrades, saving configurations, resetting the unit to defaults, and disaster recovery procedures.

Upgrading the Firmware

Web Interface

The web interface allows you to download the latest firmware version to the Digi CM unit. The latest firmware can be found 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. Select Local machine or CF card (if configured)
4. Choose the Browse button and locate the firmware download.
5. Choose Upgrade. The Digi CM unit will automatically reboot when the upgrade is complete.

Firmware upgrade

Select the new firmware binary file
This will take 8 minutes maximum

Location : Local machine

Local machine : Browse...

Upgrade Reset

Automatic firmware and configuration upgrade at boot time : Disable

Protocol : TFTP

Use DHCP option for remote server and hash file : Yes

IP address of remote server :

Hash file name :

Save to flash Save & apply Cancel

Note: Do not power cycle the unit for five minutes after the firmware upgrade is completed, as the unit is writing the firmware to flash!

Configuration Management

Configuration management allows you to save all or parts of your configuration. You can also establish the time frame to save the configuration either periodically or 10 minutes after the latest changes. The Digi CM unit saves all configurations when the Save & apply button is used or the **Apply changes** link is used. These configurations are saved to the local Digi CM unit in /tmp/cnf directory by default. Manage these configurations by exporting the files to your location of choice.

1. Click **System administration > Configuration management**. The Configuration management screen appears.
2. Under Configuration Export, select the file locations that you wish to save enter a name and click Export.

The screenshot shows the 'Configuration management' window. It has two main sections: 'Configuration export' and 'Configuration import'.

Configuration export section:

- Location: Radio buttons for CF Card, Primary NFS server, User space(/usr2) (selected), and Local machine.
- Encrypt: A dropdown menu set to 'Yes'.
- File name: A text input field with '.syscm' as a placeholder.
- An 'Export' button.

Configuration import section:

- Location: Radio buttons for CF Card, Primary NFS server, User space(/usr2) (selected), and Local machine. There is also a 'Factory default' option with a radio button.
- Configuration selection: A list of checkboxes:
 - Select all (checked)
 - System configuration ([] Including IP configuration) (checked)
 - Serial port configuration (checked)
 - Clustering configuration (checked)
 - Custom menu configuration (checked)
 - System user configuration (checked)
- Encrypt: A dropdown menu set to 'Yes'.
- File selection: A dropdown menu set to 'Select file' and a 'Local' section with a text input field and a 'Browse...' button.
- An 'Import' button.

Automatically Saving the Configuration

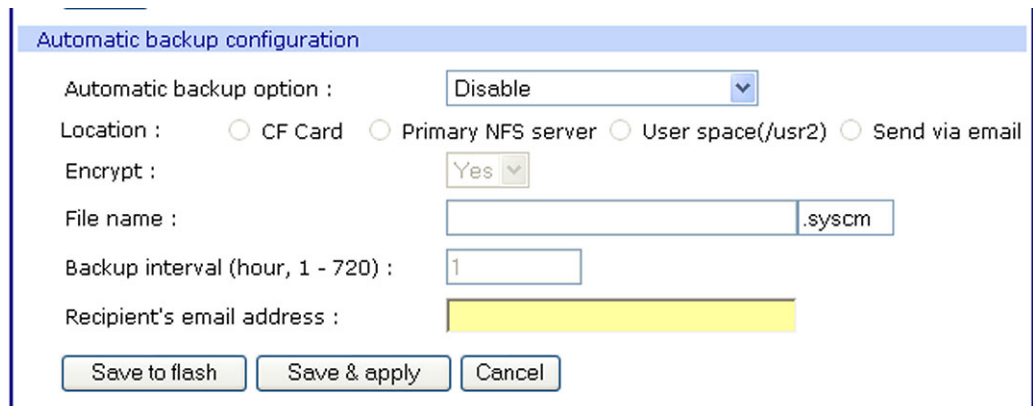
Further down the screen are the options for automatically saving the configuration either periodically or 10 minutes after the latest changes. The following list contains the parameter descriptions.

- Automatic backup option
 - Disable - if you do not want to use an automatic save option
 - Periodic - used to set the save option per your time frame
 - 10 minutes after last change - as described
- Location
 - CF card, Primary NFS server, User space, Send via email - options for where to save the configuration
- Encrypt
 - Yes - file will be encrypted (.syscm)
 - No - file will not be encrypted (.tar.gz) in a tar and a gzip'd format
- File Name
 - The name of the configuration file

- Backup interval
The periodic hourly interval to back up the configuration files.
- Recipient's email address
The email address to send the configuration file.

To setup the automatic backup option follow the procedure.

1. Select Periodic or 10 minutes after latest change from the drop down menu.
2. Select the location to save the file.
3. Select Yes or No to encrypt and enter the file name.
4. Enter the number of hours for the backup interval (if periodic)
5. Enter the recipient's email address to send the configuration file (if the location is sent via email).
6. Click Save & apply.



The image shows a screenshot of the 'Automatic backup configuration' dialog box. It has a title bar with the text 'Automatic backup configuration'. Inside the dialog, there are several fields and options:

- 'Automatic backup option :' with a dropdown menu currently set to 'Disable'.
- 'Location :' with four radio button options: 'CF Card', 'Primary NFS server', 'User space(/usr2)', and 'Send via email'.
- 'Encrypt :' with a dropdown menu currently set to 'Yes'.
- 'File name :' with a text input field containing '.syscm'.
- 'Backup interval (hour, 1 - 720) :' with a text input field containing '1'.
- 'Recipient's email address :' with a yellow-highlighted text input field.

At the bottom of the dialog, there are three buttons: 'Save to flash', 'Save & apply', and 'Cancel'.

Automatically Upgrading the Digi CM Unit's Firmware or Configuration using TFTP

The Digi CM unit supports upgrading the firmware, configuration, or any other files in the file system using a TFTP-based mechanism.

During boot, the Digi CM unit can verify a "hash" file and determine if it needs to download upgrades from the TFTP server.

There are multiple ways to configure the TFTP upgrade function.

DHCP

The DHCP server can automatically assign a TFTP upgrade server and file to the Digi CM unit during boot. The options implemented are:

- (66) TFTP server address
- (67) TFTP filename (this is the filename of the hash file)

To enable DHCP firmware upgrade:

1. Click **System administration > Firmware upgrade**.

2. Set "Automatic firmware and configuration upgrade at boot time" to Enable.
3. Set "Use DHCP option for remote server and hash file" to Yes.
4. Click Save & apply.

The next time the Digi CM unit reboots, it will analyze the hash file and upgrade the firmware, configuration, or other files if required.

Directly Configure the TFTP Server and the Name of the "hash" File

To configure the IP address of the TFTP server and the filename of the hash file on the Digi CM unit, follow the steps below:

1. Click **System administration > Firmware upgrade**.
2. Set "Automatic firmware and configuration upgrade at boot time" to Enable.
3. Set "Use DHCP option for remote server and hash file" to No.
4. Configure the "IP address of remote server".
5. Configure the "Hash file name".
6. Click Save & apply.

The next time the Digi CM unit reboots, it will analyze the hash file and upgrade the firmware, configuration, or other files if required.

If you have trouble with the TFTP upgrade process, please verify that the hash file and the other files are accessible using TFTP.

The Structure of the Hash File

The hash file is an ASCII configuration file with one line per entry. Each entry defines one upgrade action.

There are 3 actions defined:

1. Upgrade firmware
2. Upgrade configuration
3. Upgrade any file
4. Execute an application.

The action is the first entry in the line and it also defines the syntax of the line.

Syntax for action 1: firmware upgrade

`<image name>,<model name>,<version>`

<image name>. specifying the path and the filename of the firmware on the TFTP server

<model name>. specifying the product name especially the port count e.g. DigiCM48, DigiCM32, DigiCM16 or DigiCM8

This allows you to have one hash file for different models.

<version>. the version number of the firmware

The Digi CM unit will download the firmware if the version number of the running firmware is different than the firmware version in the hash file (the current firmware version is saved in file /tmp/cnf/version).

Note: Make sure the firmware version in the hash file matches the firmware version on the FTP directory, otherwise you will start a continuous upgrade process.

Example: `cm48.img,DigiCM48,v1.6.0.`

After the firmware was upgraded the Digi CM unit boots again.

Syntax for action 2: configuration upgrade

<image name>, <model name>, <version>

<image name> . specifying the path and the filename of the configuration file on the TFTP server

<model name>. specifying the product name especially the port count e.g. DigiCM48, DigiCM32, DigiCM16 or DigiCM8

This allows you to have one hash file for different models.

<version> . the version number of the firmware

The Digi CM unit will download the configuration if the version in the hash file is different from the version saved in the file /tmp/cnf/.cnfversion. This file does not exist until you do the first automatic configuration upgrade. It is also deleted if the unit is reset to factory defaults. If the /tmp/cnf/.cnfversion file does not exist, no download will occur. The file /tmp/cnf/.cnfversion is a hidden file.

Example: config.tar.gz,DigiCM48,v1.6.0.

After the firmware configuration is upgraded the Digi CM unit boots again.

A sample hash file can be downloaded from: <http://cm.digi.com>.

Syntax for action 3: file upgrade

<file name>, <options>, <destination>

<file name> . specifying the path and the filename of the file on the TFTP server

<options>. - F: forced copy (override existing file)

- X: decompress

- Z: unzip

- U: default option for file uploading

<destination> . directory on the Digi CM unit to place the file

These files are downloaded every time the Digi CM unit boots and there is no reboot after downloading.

Example: snmpd.conf , FU, /tmp/cnf.

The file snmpd.conf is copied from the TFTP server and placed into /tmp/cnf. The file is used as is and the previous version is overwritten.

Syntax for action 4: execute a command

<command> <parameters>

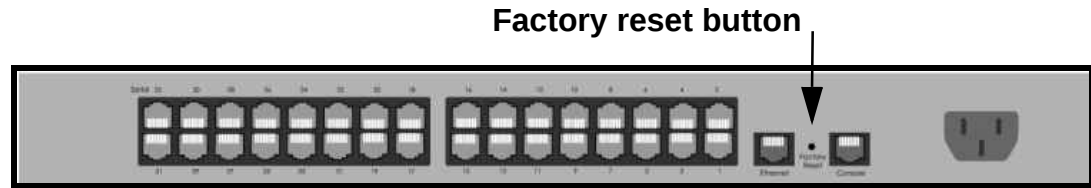
<command> . any application resigin on the Digi CM unit that is executalbe by root

<parameter> . all parameters this application requires

Example: touch /tmp/test

Resetting Factory Defaults

There are two ways to reset the unit to the factory defaults. The quickest and simplest method is to push and hold the hardware factory default reset button until the Ready light on the front panel goes out. 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.



Digi CM 32 shown

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 unit, do the following:

1. Access the web interface.
2. **System administration > Configuration management**
3. Under Configuration import select Factory default.

A screenshot of the 'Configuration management' web interface. The 'Configuration import' section is active, showing options for 'Location' (CF Card, Primary NFS server, User space(/usr2), Local machine) and 'Factory default' (selected). Below this, a 'Configuration selection' checklist includes 'Select all', 'System configuration (Including IP configuration)', 'Serial port configuration', 'Clustering configuration', 'Custom menu configuration', and 'System user configuration'. The 'Encrypt' dropdown is set to 'Yes'. At the bottom, there is a 'File selection' dropdown set to 'Select file', a 'Local' text input field, and a 'Browse...' button. An 'Import' button is at the bottom left.

4. Select the Configuration factory default options you want to restore from the checklist.
5. Click Import. The Digi CM unit will automatically reboot.

The following are the default values when the Digi CM unit 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 unit 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 unit for date and time, do the following:

1. Access the web interface.
2. **System administration > 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.

Note: If you change your time zone, you must go back and reconfigure your time for the time zone change to be effective.

4. Choose Save & apply.

Configuring a Host Name

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

1. Access the web interface.

Configuring a Host Name

2. **System administration > Device name.**
3. Enter the name you want to assign the Digi CM unit.
4. Choose Save & apply.

Chapter 16**Command Line Interface****Introduction**

The Digi CM unit runs the embedded Hard Hat Linux operating system. The command line interface for configuration purposes is accessible only by the root user. The system administrator has read only privileges from the command line. By default the root user is connected to the CLI (command line interface) when accessing the Digi CM unit through Telnet or SSH. To gain access to the command prompt, the root user uses the username **root** and the root password. The default root password is **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 unit from booting properly. Before editing any files, be sure to back up your configuration files.

Linux Commands

The purpose of this section is to list the various Linux commands available on the Digi CM unit. 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, see 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 accessing and configuring the Digi CM unit and the serial ports are the portaccessmenu and configmenu.

- **portaccessmenu**: This menu allows the user to access the serial ports on the Digi CM unit.
- **configmenu**: This menu enables the system administrator to configure the Digi CM unit. It has essentially the same functionality as the web interface for configuring a unit with the exception of the ability to create custom menus.
- **portreset #**: This command allows the user to reset a specific port. It restarts all processes associated with the port.

Important File Locations

Shell and Shell Utilities				
sh	ash	bash	echo	sed
env	false	grep	more	which
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	scp	
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 unit 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 unit is booted. The file is `/usr2/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 unit boots, it decompresses 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`.

Config Files

All config files are in /tmp/cnf and /tmp/cnf subdirectories. The following table lists the filenames and a brief description.

File Name	Description
active_detect	Active auto detection of serial devices
chap-secrets	Chap authentication information when using “PPPoE”
client.pem	Web certificate
./cluster/cluster.conf	Cluster “Master” port information
./cluster/unit#.conf	Cluster “Slave” port information
.cnfversion	Version of current configuration. Used for TFTP update only
dhcpd.opt	DHCPD information
ez-ipupdate.conf	“Dynamic DNS” information for IP assigning
group	User group information
host.cnf	Host name look up order
hosts	Host name table
interfaces	Basic loopback (lo) and ethernet interface (eth0) information (IP, gateway, etc.)
krb5.conf	Kerberos information
./keywords	Keywords for alert configuration
./menu	All custom menu information, .xml files
pap-secrets	PAP auth via PPPoE
passive.detect	Passive auto detection of serial devices
passwd	User password file
./power/power.cnf	Power management configuration
pppoe.conf	Config file for PPPoE
redirect.cnf	Basic port and portaccessmenu config information
resolv.conf	DNS information
server.pem	Private key for SSH with key certification information
shadow	Secure password file
snmpd.conf	SNMP information
./ssh	Directory for SSH information

File Name	Description
system.cnf	Basic network config information (IP, gateway, etc.)
timezone	Time zone configuration
./usracctl	Directory containing user access control information
version	Firmware version

User Storage Space

The Digi CM unit comes with 1 megabyte of user storage space. This storage space can be used to store custom scripts. The location is /usr2. Custom scripts such as simple commands, are simply dropped into /usr2. If a file needs to be edited, copy the file into usr2/rc.user, kill the process, then restart the process from the new file. Scripts from the user storage may be created to run during boot after the network is up. The following are some examples of various ways to create a script stored in the user storage space.

- Saving IP tables options permanently
- Changing radius socket ports
- Limiting root access to the console on Digi CM products
- Sending a break

Example Scripts

Example Script: -Saving IP tables options permanently

Add the following command in the '/usr2/rc.user' script file just above "exit 0". Disabling Telnet is just shown as one example.

1. Create a new script file '/usr2/run.user' which includes the commands you want.

```
iptables -A INPUT -p tcp --dport 23 -j DROP
```

2. Run the following command to make the script executable

```
chmod 755 /usr2/run.user
```

3. Add the following command in the '/usr2/rc.user' script, just above "exit 0"

```
ln -s /usr2/run.user /etc/rc.d/rc2.d/S60runuser
```

4. Reboot

```
reboot
```

Note: If you factory default the unit, the '/usr2/rc.user' script file is moved to '/usr2/rc.user.old#' and the default rc.user file will be restored.

Example Script: -Changing radius socket ports

The radius client obtains the radius socket ports to use via the '/etc/services' file. The client only looks up the lines starting with 'radius' and 'radacct'.

1. Modify the /etc/services file as follows. Change lines starting with 'radius' and 'radacct' to the socket numbers you wish. For example:

```
radius 1645/tcp
radius 1645/ucp
radacct 1646/tcp
radacct 1646/ucp
```

2. After editing /etc/services copy it to /usr2

```
cp /etc/services /usr2
```

3. Edit /usr2/rc.user and add the following line just above "exit 0":

```
cp -a /usr2/services /etc/services
```

4. Reboot

```
reboot
```

Note: If you factory default the unit, the '/usr2/rc.user' script file is moved to '/usr2/rc.user.old#' and the default rc.user file will be restored.

Example Script: -Limiting root access to the console on Digi CM products (for SSH only)

This prevents root access from any means except physically logging in on the Digi CM console.

1. Modify '/etc/inetd.conf' and append -f /usr2/sshd_config to the sshd line.

```
cp /etc/inetd.conf /usr2/inetd.conf
```

2. Edit '/etc/ssh/sshd_config'. Change "PermitRootLogin" to no.

```
cp /etc/ssh/sshd_config /usr2
```

3. Add the following commands in the '/usr2/rc.user' script. Add these commands just above "exit 0":

```
cp -a /usr2/inetd.conf /etc/inetd.conf
while killall inetd 2>/dev/null;
do sleep 5;
done
/usr/sbin/inetd
```

4. Reboot

```
reboot
```

Note: If you factory default the unit, the '/usr2/rc.user' script file is moved to '/usr2/rc.user.old#' and the default rc.user file will be restored.

Example Script: -Sending a break from an existing session with the Digi CM unit from a Telnet session

If the Telnet was initiated from a UNIX command line Telnet client. Issuing the Telnet escape sequence '^]' (control-right_square_bracket) will take you to the 'telnet>' prompt.

```
telnet>send brk
```

Note: Other Telnet clients often have a "send break" option.

From an ssh session - Type the [tilde-break] which is the default ssh break characters.

```
~break
```

The ssh break can be changed from the Web UI or config menu under **Serial ports > Configuration > Host mode configuration > SSH break sequence**

Additional binaries or applications can be added to /usr2 such as:

- crontab
- netstat
- fuser

To download these utilities go to: <http://ftp.digi.com/support/utilities/digicm/>

User Administration

Add, edit or delete users with the Digi CM unit's command line interface.

```
root@Digi_CM_Device:~# useradd -d/tmp-g 502 -s/bin/editconf -p test1 test1
usage: useradd [-u uid [-o]] [-g group] [-G group,...]
               [-d home] [-s shell] [-e comment] [-m [-k template]]
               [-f inactive] [-e expire ] [-p passwd] name
               useradd -D [-g group] [-b base] [-s shell]
               [-f inactive] [-e expire ]
```

- Add user

Example: `useradd -d /tmp [-g groupid] [-s shellprogram] [username]`

groupid = Options are: Sys admin, Port admin, or Standard User.

500 = Sys admin

501 = Port admin

502 = Standard User

These are the three types of groups supported by the Digi CM unit. You must use one of these.

shellprogram = Options are: CLI (Command Line Interface), Config menu, Port access menu, or Custom menu.

/bin/bash = CLI

/bin/editconf = Configuration menu

/bin/vts.master = Port access menu

/bin/menu = Custom menu

These are the four types of shells supported by the Digi CM unit. You must use one of these four.

- passwd [username]
- saveconf
- applyconf

- Modify user

Example: `usermod -d /tmp [-g groupid] [-s shellprogram] [username]`

Syntax is the same as it is for *useradd* mentioned above.

- saveconf
- applyconf

- Delete user

Example: `userdel [username]`

- saveconf
- applyconf

Locator LED Script

The Find Me LED on the Digi CM 48 can be deactivated and reactivated with the following file and command.

Note: All other Digi CM units have the locator feature without a Find Me LED. To identify another Digi CM unit, all the LEDs blink when the feature is activated.

The file and syntax for the locator LED is `/bin/blinkled [start|stop]`

Example to stop and start locator LEDS -

```
root@mankato:~# /bin/blinkleds stop
```

```
root@mankato:~# /bin/blinkleds start
```


Introduction to the Configuration Menu

The configuration menu presents the same functionality in configuring the Digi CM unit 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. Telnet to the Digi CM unit, log in (username `root`, password `dbps`) and enter `configmenu` to start any configuration. If you log in as `admin`, the configuration menu will automatically appear.

Accessing the Configuration Menu

The configuration menu is available through a Telnet or SSH session to the root user, system administrator, or port administrator. (Port administrator can only change serial port parameters.) The configuration menu enables the authorized users to configure the Digi CM unit with the same functionality as is available with the web interface. The only functionality missing from the configuration menu is the ability to create custom menus.

1. Telnet into the Digi CM unit. The root user, by default, is connected from a Telnet session to the Linux command line.
2. Enter `configmenu` at the command prompt. The configuration menu follows the layout of the web interface.

```
login: root
Password:
root@Digi_CM_Device:~# configmenu

-----
Welcome to Digi CM 48 configuration page
Current time : 01/02/1970 04:43:01      F/W REV.      : v1.7.0b9
Serial No.   : U34751584                MAC Address   : 00-40-9d-23-84-36
IP mode      : DHCP                     IP Address    : 10.8.16.39
-----

Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
c. Start Device Locating
<ENTER> Refresh
----->
```

Choices for the configuration menu are made by selecting the number of a menu item. The ESC key allows you 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 that have to be configured.

Configuring SSH

The Save changes option saves changes to flash memory only.

1. Choose Serial Port Configuration and then an individual port number or 0 (zero) for all ports.
2. Choose Host mode configuration > Protocol > SSH.

```

4 Port Title #4      CS  0.0.0.0      7004 Telnet RS232-19200-N-8-1-No
5 Port Title #5      CS  0.0.0.0      7005 Telnet RS232-19200-N-8-1-No
6 Port Title #6      CS  0.0.0.0      7006 Telnet RS232-19200-N-8-1-No
7 Port Title #7      CS  0.0.0.0      7007 Telnet RS232-19200-N-8-1-No
8 Port Title #8      CS  0.0.0.0      7008 Telnet RS232-19200-N-8-1-No
9 Port Title #9      CS  0.0.0.0      7009 Telnet RS232-19200-N-8-1-No
10 Port Title #10     CS  0.0.0.0      7010 Telnet RS232-19200-N-8-1-No
11 Port Title #11     CS  0.0.0.0      7011 Telnet RS232-19200-N-8-1-No
12 Port Title #12     CS  0.0.0.0      7012 Telnet RS232-19200-N-8-1-No
13 Port Title #13     CS  0.0.0.0      7013 Telnet RS232-19200-N-8-1-No
14 Port Title #14     CS  0.0.0.0      7014 Telnet RS232-19200-N-8-1-No
15 Port Title #15     CS  0.0.0.0      7015 Telnet RS232-19200-N-8-1-No
16 Port Title #16     CS  0.0.0.0      7016 Telnet RS232-19200-N-8-1-No

Enter port number to configre
< 0 - all ports, a - add remote port, d - delete remote port >
<ESC> Back, <ENTER> More
----> 1

Serial configuration --> port #1

1. Enable/Disable Port : Enable
2. Port Title : Port Title #1
3. Host Mode Configuration
4. Serial Port Parameters
5. Authentication
0. Apply all ports setting : Enable
a. Port Management
r. RealPort Support : Disable
<ESC> Back, <ENTER> Refresh
----> 3

Serial configuration --> Port#1 --> Host mode configuration

Select menu
1. Host mode : Dial-In Terminal Server
3. Destination IP & port : 0.0.0.0:0
3. Protocol : Telnet
4. Inactivity timeout : 100 sec
5. Modem init string : q1e0s0=2
<ESC> Back, <ENTER> Refresh
----> 3
Select Protocol :
1 = Telnet, 2 = SSH, 3 = Raw TCP
----> 2

Serial configuration --> Port#1 --> Host mode configuration

Select menu
1. Host mode : Dial-In Terminal Server
3. Destination IP & port : 0.0.0.0:0
3. Protocol : SSH
4. Inactivity timeout : 100 sec
5. Modem init string : q1e0s0=2
<ESC> Back, <ENTER> Refresh
---->

```

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

3. Use the ESC key to return to the main configuration menu.
4. Choose Exit and apply changes.

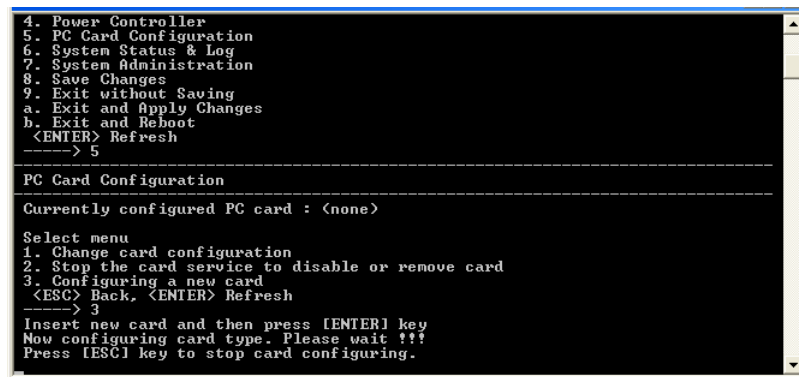
Adding, Editing, and Removing Users

1. Choose System administration > User administration and then choose an operation to perform (Add, Remove, or Edit)
2. Configure the user as required.
3. Use the ESC key to return to the main configuration menu.
4. Choose Exit and apply changes.

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 unit using the configuration menu, do the following:

1. Access the configuration menu.
2. Choose PC Card configuration



```

4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
<ENTER> Refresh
----> 5

PC Card Configuration
-----
Currently configured PC card : <none>

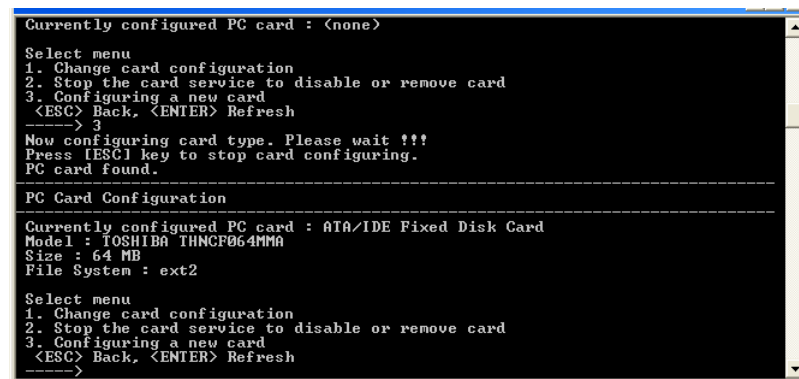
Select menu
1. Change card configuration
2. Stop the card service to disable or remove card
3. Configuring a new card
<ESC> Back, <ENTER> Refresh
----> 3

Insert new card and then press [ENTER] key
Now configuring card type. Please wait !!!
Press [ESC] key to stop card configuring.

```

3. Configure the card by choosing Change card configuration.

Note: The system searches for the card and displays information on the product model number and type of card.



```

Currently configured PC card : <none>

Select menu
1. Change card configuration
2. Stop the card service to disable or remove card
3. Configuring a new card
<ESC> Back, <ENTER> Refresh
----> 3

Now configuring card type. Please wait !!!
Press [ESC] key to stop card configuring.
PC card found.

PC Card Configuration
-----
Currently configured PC card : ATA/IDE Fixed Disk Card
Model : TOSHIBA THMCF064HMA
Size : 64 MB
File System : ext2

Select menu
1. Change card configuration
2. Stop the card service to disable or remove card
3. Configuring a new card
<ESC> Back, <ENTER> Refresh
---->

```

4. Use the ESC key to back out to the main configuration menu.
5. Choose Save Changes.

Host Mode Configuration

1. Access the configuration menu.

Port Parameters

2. Choose Serial Port Configuration > an individual port number or 0 (zero) for all ports > Host Mode Configuration.

```
11 Port Title #11      CS 192.168.1.111  7011 SSH  RS232-9600-N-8-1-No
12 Port Title #12      CS 192.168.1.112  7012 SSH  RS232-9600-N-8-1-No
13 Port Title #13      CS 192.168.1.113  7013 SSH  RS232-9600-N-8-1-No
14 Port Title #14      CS 192.168.1.114  7014 SSH  RS232-9600-N-8-1-No
15 Port Title #15      CS 192.168.1.115  7015 SSH  RS232-9600-N-8-1-No
16 Port Title #16      CS 192.168.1.116  7016 SSH  RS232-9600-N-8-1-No

Enter port number to configure < 0 for all port configuration >
<ESC> Back, <ENTER> Refresh
-----> 0

Serial configuration --> All ports
-----
1. Enable/Disable Port : Enable
2. Port Title : Port Title
3. Host Mode Configuration
4. Serial Port Parameters
5. Port Logging
6. IP Filtering
7. Authentication
8. User Access Control
9. SNMP Trap Configuration
0. Port access menu configuration
<ESC> Back, <ENTER> Refresh
----->
```

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 > an individual port number or 0 (zero) for all ports.

```
11 Port Title #11      CS 192.168.1.111  7011 SSH  RS232-9600-N-8-1-No
12 Port Title #12      CS 192.168.1.112  7012 SSH  RS232-9600-N-8-1-No
13 Port Title #13      CS 192.168.1.113  7013 SSH  RS232-9600-N-8-1-No
14 Port Title #14      CS 192.168.1.114  7014 SSH  RS232-9600-N-8-1-No
15 Port Title #15      CS 192.168.1.115  7015 SSH  RS232-9600-N-8-1-No
16 Port Title #16      CS 192.168.1.116  7016 SSH  RS232-9600-N-8-1-No

Enter port number to configure < 0 for all port configuration >
<ESC> Back, <ENTER> Refresh
-----> 0

Serial configuration --> All ports
-----
1. Enable/Disable Port : Enable
2. Port Title : Port Title
3. Host Mode Configuration
4. Serial Port Parameters
5. Port Logging
6. IP Filtering
7. Authentication
8. User Access Control
9. SNMP Trap Configuration
0. Port access menu configuration
<ESC> Back, <ENTER> Refresh
----->
```

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 Access Menu

Another default menu is the Port Access Menu, which is available to all users.

1. Access Configuration menu
2. Select Serial Port Configuration.
3. Select 0 for all ports.
4. Select Port access menu configuration.

```

Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
<ENTER> Refresh
----> 2

Serial configuration
-----
Port#      Title      Mode  Dest/AssignedIP  Port    Proto    Serial-Settings
1 Port Title #1      DI
2 Port Title #2      CS    0.0.0.0          7002    Telnet   RS232-9600-N-8-1-No
3 Port Title #3      CS    0.0.0.0          7003    Telnet   RS232-9600-N-8-1-No
4 Port Title #4      CS    0.0.0.0          7004    Telnet   RS232-9600-N-8-1-No
5 Port Title #5      CS    0.0.0.0          7005    Telnet   RS232-9600-N-8-1-No
6 Port Title #6      CS    0.0.0.0          7006    Telnet   RS232-9600-N-8-1-No
7 Port Title #7      CS    0.0.0.0          7007    Telnet   RS232-9600-N-8-1-No
8 Port Title #8      CS    0.0.0.0          7008    Telnet   RS232-9600-N-8-1-No

Enter port number to configre < 0 for all port configuration >
<ESC> Back, <ENTER> Refresh
----> 0

Serial configuration --> All ports
-----
1. Enable/Disable Port : Enable
2. Port Title : Port Title
3. Host Mode Configuration
4. Serial Port Parameters
5. Port Logging
6. IP Filtering
7. Authentication
8. User Access Control
9. Alert Configuration
0. Port access menu configuration
<ESC> Back, <ENTER> Refresh
----> 0

```

You can access this menu through a Telnet or SSH session using the IP address of the Digi CM unit followed by the port number 7000 as in the following example:

```
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.

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 unit's 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 "Adding a Compact-flash Card" on page 29. Adding a Compact-flash Card For an NFS or SYSLOG server, do the following:

1. Access the configuration menu.
2. Choose Network configuration > NFS or SYSLOG server configuration.

```

Network configuration
-----
Select menu
1. IP configuration
2. SNMP configuration
3. Dynamic DNS configuration
4. SMTP configuration
5. IP filtering
6. SYSLOG server configuration
7. NFS server configuration
8. Web server configuration
9. Ethernet configuration
a. TCP service configuration
<ESC> Back, <ENTER> Refresh
----> 7

```

Configuring SNMP

3. Disable or enable the server.
4. Use the ESC key when all parameters are entered to return to the main menu.
5. Choose Save changes.

Configure System Logging

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

```
System status & log
-----
Select menu
1. System status
2. System logging
3. User logged on list
<ESC> Back, <ENTER> Refresh
----> 2

System status & log --> System logging
-----
Select menu
1. Enable/Disable system logging : Enable
2. System log buffer size : 50 KB
3. System log storage location : Memory
4. Display system logs
5. Clear system logs
6. Send system log by Email : Disable
<ESC> Back, <ENTER> Refresh
---->
```

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 SNMP

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

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

```
Network configuration
-----
Select menu
1. IP configuration
2. SNMP configuration
3. Dynamic DNS configuration
4. SMTP configuration
5. IP filtering
6. SYSLOG server configuration
7. NFS server configuration
8. Web server configuration
9. Ethernet configuration
a. TCP service configuration
<ESC> Back, <ENTER> Refresh
----> 2

Network configuration --> SNMP configuration
-----
Select menu
1. Configure the MIB-II System objects
2. Configure the Access control settings
3. Configure the Trap receiver settings
<ESC> Back, <ENTER> Refresh
---->
```

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.

```
Select menu
1. IP configuration
2. SNMP configuration
3. Dynamic DNS configuration
4. SMTP configuration
5. IP filtering
6. SYSLOG server configuration
7. NFS server configuration
8. Web server configuration
9. Ethernet configuration
a. TCP service configuration
<ESC> Back, <ENTER> Refresh
-----> 4

Network configuration --> SMTP configuration

Select menu
1. Send mail : Enable
2. SMTP server : None
3. Mode : SMTP without authentication
4. Secondary SMTP server : None
5. Device mail address :
<ESC> Back, <ENTER> Refresh
----->
```

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.

Network IP Filtering

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

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

```
Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
<ENTER> Refresh
-----> 1

Network configuration

Select menu
1. IP configuration
2. SNMP configuration
3. Dynamic DNS configuration
4. SMTP configuration
5. IP filtering
6. SYSLOG server configuration
7. NFS server configuration
8. Web server configuration
9. Ethernet configuration
a. TCP service configuration
<ESC> Back, <ENTER> Refresh
-----> 5

Network configuration --> IP filtering

# Iface Option IP/Mask Port Command
1 all Invert 192.168.0.0/255.255.0.0 22 DROP
2 all Invert 192.168.0.0/255.255.0.0 23 DROP
3 all Normal 192.168.1.0/255.255.255.0 80 ACCEPT
4 all Normal 192.168.2.0/255.255.255.0 80 ACCEPT
5 all Normal 0.0.0.0/0.0.0.0 80 DROP
6 all Normal 192.168.1.0/255.255.255.0 443 ACCEPT
7 all Invert 192.168.2.0/255.255.255.0 443 DROP

a. Telnet Console : Enabled
b. SSH Console : Enabled
c. Web Configuration : HTTP Disabled : HTTPS Enabled

1. Add a Rule
2. Remove a Rule
3. Edit a Rule
<ESC> Back, <ENTER> Refresh
----->
```

3. Choose a menu item and enter the desired parameters for the menu items.

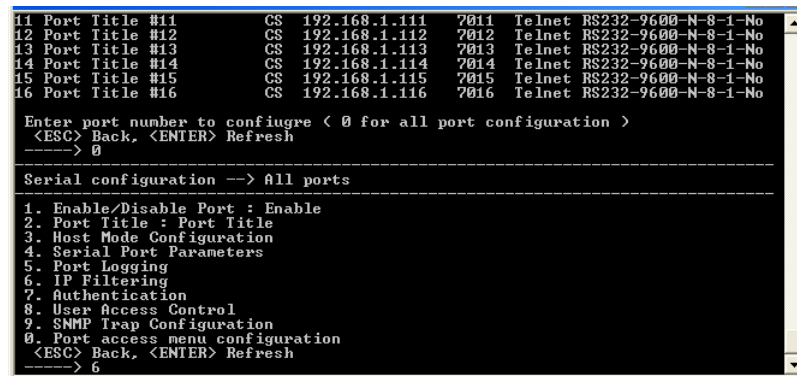
Port IP Filtering

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

Port IP Filtering

To configure the Digi CM unit 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.



```
11 Port Title #11      CS  192.168.1.111  7011  Telnet RS232-9600-N-8-1-No
12 Port Title #12      CS  192.168.1.112  7012  Telnet RS232-9600-N-8-1-No
13 Port Title #13      CS  192.168.1.113  7013  Telnet RS232-9600-N-8-1-No
14 Port Title #14      CS  192.168.1.114  7014  Telnet RS232-9600-N-8-1-No
15 Port Title #15      CS  192.168.1.115  7015  Telnet RS232-9600-N-8-1-No
16 Port Title #16      CS  192.168.1.116  7016  Telnet RS232-9600-N-8-1-No

Enter port number to configure < 0 for all port configuration >
<ESC> Back, <ENTER> Refresh
----> 0

Serial configuration --> All ports
-----
1. Enable/Disable Port : Enable
2. Port Title : Port Title
3. Host Mode Configuration
4. Serial Port Parameters
5. Port Logging
6. IP Filtering
7. Authentication
8. User Access Control
9. SNMP Trap Configuration
0. Port access menu configuration
<ESC> Back, <ENTER> Refresh
----> 6
```

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 User Access Control.
5. Choose Enable/Disable Sniff Mode.

```

Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
<ENTER> Refresh
----> 2

Serial configuration
-----
Port#      Title      Mode  Dest/AssignedIP  Port  Proto  Serial-Settings
1 Port Title #1      DI
2 Port Title #2      CS  0.0.0.0          7002  Telnet RS232-9600-N-8-1-No
3 Port Title #3      CS  0.0.0.0          7003  Telnet RS232-9600-N-8-1-No
4 Port Title #4      CS  0.0.0.0          7004  Telnet RS232-9600-N-8-1-No
5 Port Title #5      CS  0.0.0.0          7005  Telnet RS232-9600-N-8-1-No
6 Port Title #6      CS  0.0.0.0          7006  Telnet RS232-9600-N-8-1-No
7 Port Title #7      CS  0.0.0.0          7007  Telnet RS232-9600-N-8-1-No
8 Port Title #8      CS  0.0.0.0          7008  Telnet RS232-9600-N-8-1-No

Enter port number to configre < 0 for all port configuration >
<ESC> Back, <ENTER> Refresh
----> 0

Serial configuration --> All ports
-----
1. Enable/Disable Port : Enable
2. Port Title : Port Title
3. Host Mode Configuration
4. Serial Port Parameters
5. Port Logging
6. IP Filtering
7. Authentication
8. User Access Control
9. Alert Configuration
0. Port access menu configuration
<ESC> Back, <ENTER> Refresh
----> 8

Serial configuration --> All ports --> User access control
-----
1. User Permissions
2. Enable/Disable Sniff Mode : Disable
<ESC> Back, <ENTER> Refresh
----> 2
Select enable/disable sniff mode < 1 = Enable, 2 = Disable > :

```

6. Choose a menu item and enter the desired parameters.
7. Use the ESC key when all parameters are entered to return to the main menu.
8. Choose Save changes.

For information on entering a sniff session, see the next section, "Viewing A Sniff Session" on page 151.

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 the Digi CM unit. From the command prompt enter the following command:

```
telnet 192.168.100.42 7007
```

1. Log in and enter your password
2. Enter the port escape sequence.

```

Port Menu:
b      send break
d      disconnect a sniff session
a      send message to port user
x      close current connection to port

```

When sniff users login to a port from a Telnet session, a sniff session menu is

displayed with your permitted options. The first user (with port access rights) to login to the port is in the main session.

```
Port Menu:
<Port Title #1> <Port 1> is being used by <Gilligan>
The <Skipper> is connected in monitoring mode.

m      take over main session
s      enter as a slave session

d      disconnect a sniff session
a      send message to port user

x      close current connection to port
```

The next user (with port access rights) to enter the port will be given the option to take over the main session. This user is given the option to take over the main session by either terminating the first user or switching the first user to sniff (read only).

```
Port Menu:
<Port Title #7> <Port 7> is being used by <Gilligan>
The <Skipper> is connected in monitoring mode.

m      take over main session
s      enter as a slave session

l      show last 100 lines of log buffer
d      disconnect a sniff session
a      send message to port user

x      close current connection to port

Take over master session and
t      terminate session of main session
s      switch main session to sniff mode
```

Field Descriptions for Sniff Sessions

Escape Sequence Ctrl+	Description of Action	Occurrence
m	take over main session (read/write)	only presented to users with read/write access upon entering a session
s	enter as a slave session (read only)	only presented to users with read/write access upon entering a session
b	send break	not functional for sniff users
l	show last 100 lines of log buffer	must enable logging for this option
d	disconnect a sniff session	only functional to admin
a	send message to port user(s)	not available to sniff users
r	reboot device using power-switch	only if power management is available on this port
p	power device on/off	(show only on or off) only if power management is available on this port

Escape Sequence Ctrl+	Description of Action	Occurrence
x	close current connection to port	closes the sniff session connection

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.

```

Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
<ENTER> Refresh
----> 2

Serial configuration
-----
Port#      Title      Mode  Dest/AssignedIP  Port  Proto  Serial-Settings
1 Port Title #1      DI
2 Port Title #2      CS  0.0.0.0          7002  Telnet  RS232-9600-N-8-1-No
3 Port Title #3      CS  0.0.0.0          7003  Telnet  RS232-9600-N-8-1-No
4 Port Title #4      CS  0.0.0.0          7004  Telnet  RS232-9600-N-8-1-No
5 Port Title #5      CS  0.0.0.0          7005  Telnet  RS232-9600-N-8-1-No
6 Port Title #6      CS  0.0.0.0          7006  Telnet  RS232-9600-N-8-1-No
7 Port Title #7      CS  0.0.0.0          7007  Telnet  RS232-9600-N-8-1-No
8 Port Title #8      CS  0.0.0.0          7008  Telnet  RS232-9600-N-8-1-No

Enter port number to configre < 0 for all port configuration >
<ESC> Back, <ENTER> Refresh
----> 0

Serial configuration --> All ports
-----
1. Enable/Disable Port : Enable
2. Port Title : Port Title
3. Host Mode Configuration
4. Serial Port Parameters
5. Port Logging
6. IP Filtering
7. Authentication
8. User Access Control
9. Alert Configuration
0. Port access menu configuration
<ESC> Back, <ENTER> Refresh
----> 7

Serial configuration --> All ports --> Authentication
-----
1. Authentication Type : Local
<ESC> Back, <ENTER> Refresh
----> 1
Select authentication type.
0 = None, 1 = RADIUS, 2 = Local, 3 = RADIUS-Local, 4 = Local-RADIUS
5 = TACACS+, 6 = TACACS+-Local, 7 = Local-TACACS+
8 = LDAP, 9 = LDAP-Local, 10 = Local-LDAP
11 = Kerberos, 12 = Kerberos-Local, 13 = Local-Kerberos
14 = RADIUS Down-Local
---->

```

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

Upload Server Certificate

To upload your own certificate, you can use one of following two methods,

1. Use Upload Server Certificate menu.

But please note that this menu is displayed only when you run configmenu on the serial console of the Digi CM unit. (configmenu run on CLI via Telnet

or SHI will not display this menu)

2. Copy your own server.pem file to /tmp/cnf/ using scp.

Please don't forget to run saveconf command in CLI if you want to keep this change permanently.

You can use your own certificate for your Digi CM unit after replacing the original server.pem on /tmp/cnf/ with your server.pem. The following procedure is to import an SSL certificate for the HTTPS interface.

OpenSSL(SSLeay) Simple CA Usage - Install Openssl

1. Download latest openssl package
2. Install openssl package

```
# cd /work/
# tar -xvzf openssl-0.9.7c.tar.gz
# cd openssl-0.9.7c
# ./config
# make
# make test
# make install
```

Make Root CA (Certificate Authority for Self-signed)

1. Edit openssl configuration file

```
# vi /usr/share/ssl/openssl.cnf
```

Note: Modify [req_distinguished_name] section of "openssl.cnf" Please refer to sample openssl.cnf file(openssl.cnf.digi). Modify [req_attributes] section of "openssl.cnf"

```
challengePassword_min =0
```

```
challengePassword_max =0
```

2. Make self-signed Root CA(Certificate Authority)

```
# cd /work/openssl-0.9.7c/
# mkdir CA
# cd CA
# sh /usr/local/ssl/misc/CA.sh -newca
```

CA certificate filename (or enter to create)

; (Press Enter to use default value)

Making CA certificate ...

; openssl is called here as follow from CA.sh

```
; openssl req -new -x509 -keyout ./demoCA/private/./cakey.pem \
```

```
; -out ./demoCA/./cacert.pem -days 365
```

3. Use configuration from

```
/usr/local/ssl/lib/ssleay.cnf
```

4. Generate a 1024 bit RSA private key.

```
.....++++++
```

```
.....++++++
```

5. Write new private key to './demoCA/private/.cakey.pem'

6. Enter PEM pass phrase:

```
; CA Password (Enter password and remember this)
Verify password - Enter PEM pass phrase: ; CA Password
-----
```

Note: The following information will be incorporated into your certificate.

You will enter text for a field call Distinguished Name or a DN. Although there are many fields, some can be left blank, use a default, or enter '.' and the field will be left blank.

```
----- ; CA's Information
Country Name (2 letter code) [AU]: US
State or Province Name (full name) [Your-State]: Minnesota
Locality Name (eg, city) []: Minneapolis
Organization Name (eg, company): Digi International
Organizational Unit Name (eg, section) [] (Enter)
Common Name (eg, YOUR name) []: Bob Alou
Email Address []: (Enter)
#
```

7. Verify the CA key file(demoCA/private/cakey.pem) and CA certificate (demoCA/cacert.pem) is generated

```
# ls demoCA/
cacert.pem certs crl index.txt newcerts
private serial

# ls demoCA/private
cakey.pem
```

Making a Certificate Request

To make new certificates, you should make a certificate request first.

1. Enter the following

```
# cd /work/openssl-0.9.7c/CA
```

2. Run the following commands:

```
# openssl genrsa -out key.pem 1024
# openssl req -new -key key.pem -out req.pem
```

It is assumed that you are using sample configuration file - "openssl.conf.digi")

3. Use configuration from /usr/share/ssl/openssl.cnf

You are about to be asked to enter information that will be incorporated into your certificate request.

What you are about to enter is what is called a Distinguished Name or a DN.

There are quite a few fields but you can leave some blank

For some fields there will be a default value,

If you enter '.', the field will be left blank.

```
-----
```

Note: The following information will be incorporated into your certificate.

You will enter text for a field call Distinguished Name or a DN. You may enter a default or '.' to leave the field blank.

```
----- ; CA's Information
Country Name (2 letter code) [AU]:  US
State or Province Name (full name) [Your-State]:  Minnesota
Locality Name (eg, city) []:  Minneapolis
Organization Name (eg, company):  Digi International
Organizational Unit Name (eg, section) [] (Enter)
Common Name (eg, YOUR name or your server's hostname) []:  Digi CM
Email Address []: (Enter)
```

Enter the following 'extra' attributes to be sent with your certificate request

A challenge password []: (Press Enter - Do not enter any other characters)

An optional company name []: (Press Enter - Do not enter any other characters)

Signing a Certificate Request

1. To sign a certificate request, enter the following:

```
# cd /work/openssl-0.9.7c/CA
# cp req.pem newreq.pem
# sh /usr/local/ssl/misc/CA.sh -sign
```

Use configuration from /usr/share/ssl/openssl.cnf

2. Enter PEM pass phrase: CA Password (Enter CA Password from "Make Root CA (Certificate Authority for Self-signed)" on page 154

3. Check that the request matches the signature

Signature ok

The Subjects Distinguished Name is as follows

countryName :PRINTABLE:'US'

stateOrProvinceName :PRINTABLE:'Minnesota'

localityName :PRINTABLE:'Minneapolis'

organizationName :PRINTABLE:'Digi International'

commonName :PRINTABLE:'Digi CM'

Certificate is to be certified until Oct 6 09:39:59 2013 GMT (3653 days)

Sign the certificate? [y/n]:y

1 out of 1 certificate requests certified, commit? [y/n]y

Write out database with 1 new entries

Data Base Updated

Certificate:

Data:

Version: 3 (0x2)

Serial Number: 1 (0x1)

Signature Algorithm: md5WithRSAEncryption

Issuer: C=US, ST=Minnesota, L=Minneapolis, O=Digi International, CN=Digi International

Validity

Not Before: Oct 6 09:39:59 2003 GMT

```

Not After : Oct 6 09:39:59 2013 GMT
Subject: C=US, ST=Minnesota, L=Minneapolis, O=Digi International, CN=Digi CM
Subject Public Key Info:
Public Key Algorithm: rsaEncryption
RSA Public Key: (1024 bit)

```

```

....
-----BEGIN CERTIFICATE-----
....
-----END CERTIFICATE-----

```

Signed certificate is in newcert.pem

4. Verify signed certificate(newcert.pem) is generated.

```

# ls
demoCA key.pem newcert.pem newreq.pem req.pem

```

Make Certificate for the Digi CM Unit

1. Removing headings in newcert.pem file

```

# cd /work/openssl-0.9.7c/CA
# cp newcert.pem server.pem
# vi server.pem

```

Certificate:

Data:

```

Version: 3 (0x2)
Serial Number: 1 (0x1)
Signature Algorithm: md5WithRSAEncryption
Issuer: C=US, ST=Minnesota, L=Minneapolis, O=Digi International, CN=Digi CM
Validity
Not Before: Oct 6 09:39:59 2003 GMT
Not After : Oct 6 09:39:59 2013 GMT
Subject: C=US, ST=Minnesota, L=Minneapolis, O=Digi International, CN=Digi CM
Subject Public Key Info:
Public Key Algorithm: rsaEncryption
RSA Public Key: (1024 bit)
. . . .
== Removing above lines ==
-----BEGIN CERTIFICATE-----
....
-----END CERTIFICATE-----

```

2. Concatenating key.pem file to server.pem

```

# cat key.pem >> server.pem

```

Dial-in Modem Access

Individual serial ports on the Digi CM unit can be configured for dial-in modem access. To use dial-in modem mode, an external modem is first attached to a serial port 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 and then Host Mode Configuration.
4. Select Host mode and then Dial-in modem.

```

Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
<ENTER> Refresh
--> 2

Serial configuration
-----
Port#    Title           Mode  Dest/AssignedIP  Port    Proto  Serial-Settings
1 Port Title #1         TS    0.0.0.0          0       Telnet RS232-9600-N-8-1-No
2 Port Title #2         CS    0.0.0.0          7002    Telnet RS232-9600-N-8-1-No
3 Port Title #3         CS    0.0.0.0          7003    Telnet RS232-9600-N-8-1-No
4 Port Title #4         CS    0.0.0.0          7004    Telnet RS232-9600-N-8-1-No
5 Port Title #5         CS    0.0.0.0          7005    Telnet RS232-9600-N-8-1-No
6 Port Title #6         CS    0.0.0.0          7006    Telnet RS232-9600-N-8-1-No
7 Port Title #7         CS    0.0.0.0          7007    Telnet RS232-9600-N-8-1-No
8 Port Title #8         CS    0.0.0.0          7008    Telnet RS232-9600-N-8-1-No

Enter port number to configure < 0 for all port configuration >
<ESC> Back, <ENTER> Refresh
--> 1

Serial configuration --> port #1
-----
1. Enable/Disable Port : Enable
2. Port Title : Port Title #1
3. Host Mode Configuration
4. Serial Port Parameters
5. Authentication
0. Apply all ports setting : Enable
a. Port Management
<ESC> Back, <ENTER> Refresh
--> 3

Serial configuration --> Port#1 --> Host mode configuration
-----
Select menu
1. Host mode : Terminal Server
2. Terminal Server Option : Shell Program
3. Shell Program Path :
<ESC> Back, <ENTER> Refresh
--> 1
Select Host mode :
1 = Terminal Server, 2 = Console Server, 3 = Dial-in modem,
4 = Dial-In Terminal Server
--> 3

```

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 unit 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 unit 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, you are 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 and then Host Mode Configuration.

```

Select menu
1. Host mode : Dial-in moden
2. Inactivity timeout : 100 sec
3. Modem init string : qle0s0=2
<ESC> Back, <ENTER> Refresh
-----> 1
Select Host mode :
1 = Terminal Server, 2 = Console Server, 3 = Dial-in moden,
4 = Dial-In Terminal Server
-----> 1

```

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

Clustering

By default clustered slave devices are configured using the Telnet protocol and port parameters of the following: bps=9600, data bits=8, parity=none, stop bits=1, 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 unit 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.

```

Select menu
1. Network Configuration
2. Serial Port Configuration
3. Clustering Configuration
4. Power Controller
5. PC Card Configuration
6. System Status & Log
7. System Administration
8. Save Changes
9. Exit without Saving
a. Exit and Apply Changes
b. Exit and Reboot
<ENTER> Refresh
-----> 3
-----
Clustering Configuration
-----
Select menu
0. Unit position : Master
1. ----- 2. -----
3. ----- 4. -----
5. ----- 6. -----
7. ----- 8. -----
9. ----- 10. -----
11. ----- 12. -----
13. ----- 14. -----
15. ----- 16. -----
<ESC> Back, <ENTER> Refresh
----->

```

4. Enter the number 1 for the first slave unit.
5. Choose Enable/Disable unit clustering > Enable.

```

Clustering configuration --> Unit #1
-----
Select menu
1. Enable/Disable unit clustering : Disable
<ESC> Back, <ENTER> Refresh
-----> 1
Select unit clustering option ( 1 = Enable, 2 = Disable ) : 1

```

6. Enter the values for Slave Unit IP, No. of ports, and Port configuration.

7. Select the port number to configure or 0 for all ports.

```
Select menu
1. Enable/Disable unit clustering : Enable
2. Slave Unit IP : None
3. No. of Ports : 0
4. Port configuration
<ESC> Back, <ENTER> Refresh
----> 2
Enter slave unit IP : 143.191.4.101
Clustering configuration --> Unit #2

Select menu
1. Enable/Disable unit clustering : Enable
2. Slave Unit IP : 143.191.4.101
3. No. of Ports : 0
4. Port configuration
<ESC> Back, <ENTER> Refresh
----> 3
Enter no. of ports < 1 = 4, 2 = 8, 3 = 16, 4 = 32, 5 = 48 > : 4
Clustering configuration --> Unit #2

Select menu
1. Enable/Disable unit clustering : Enable
2. Slave Unit IP : 143.191.4.101
3. No. of Ports : 32
4. Port configuration
<ESC> Back, <ENTER> Refresh
----> 4
Clustering configuration --> Unit #2
```

Port#	S. Port	D. Port	Enb	Proto	Port#	S. Port	D. Port	Enb	Proto
1	0	0	D	UNKNOWN	2	0	0	D	UNKNOWN
3	0	0	D	UNKNOWN	4	0	0	D	UNKNOWN
5	0	0	D	UNKNOWN	6	0	0	D	UNKNOWN
7	0	0	D	UNKNOWN	8	0	0	D	UNKNOWN
9	0	0	D	UNKNOWN	10	0	0	D	UNKNOWN
11	0	0	D	UNKNOWN	12	0	0	D	UNKNOWN
13	0	0	D	UNKNOWN	14	0	0	D	UNKNOWN
15	0	0	D	UNKNOWN	16	0	0	D	UNKNOWN
17	0	0	D	UNKNOWN	18	0	0	D	UNKNOWN
19	0	0	D	UNKNOWN	20	0	0	D	UNKNOWN
21	0	0	D	UNKNOWN	22	0	0	D	UNKNOWN
23	0	0	D	UNKNOWN	24	0	0	D	UNKNOWN
25	0	0	D	UNKNOWN	26	0	0	D	UNKNOWN
27	0	0	D	UNKNOWN	28	0	0	D	UNKNOWN
29	0	0	D	UNKNOWN	30	0	0	D	UNKNOWN
31	0	0	D	UNKNOWN	32	0	0	D	UNKNOWN

```
Enter port number to configure < 0 for all port configuration >
----> 0
```

8. Select Enable configuration
9. Select Auto Configuration
10. Choose Exit and apply changes.

Firmware Upgrade

Before upgrading firmware from the configuration menu you should have:

- Downloaded the firmware to a system on the same subnet
- Set up 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.

```
System Administration
-----
Select menu
1. User administration
2. Device name : Digi_CM_Device
3. Date and time
4. Configuration management
5. Firmware upgrade
<ESC> Back, <ENTER> Refresh
----> 5
*** Firmware upgrade will RESTART your device. ***
Do you want to start firmware upgrade ? (y/n) : 
```

3. Choose Firmware upgrade. Enter y for Yes when asked if you want to upgrade the firmware.

If the firmware upgrade is successful, the Digi CM unit 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 restoring all factory defaults or restoring all factory defaults except IP settings. To restore your unit to the factory defaults, do the following:

1. Access the configuration menu.
2. Choose System administration.
3. Select Configuration import.
4. Select Location

```

System Administration
-----
Select menu
1. User administration
2. Device name : Digi_CM_Device
3. Date and time
4. Configuration management
5. Firmware upgrade
<ESC> Back, <ENTER> Refresh
----> 4

System Administration --> Configuration Management
-----
Select menu
1. Configuration export
2. Configuration import
<ESC> Back, <ENTER> Refresh
----> 2

System Administration --> Configuration Management --> Configuration import
-----
Select menu
1. Location : None
2. Filename : None
3. Encrypt : Yes
4. Configuration Selection (Press A-E to select each option)
  A. [X] System configuration
  B. [X] Serial port configuration
  C. [X] Clustering configuration
  D. [X] System user configuration
  E. [X] Custom menu
<ESC> Back, <ENTER> Refresh
----> 1
Select location.
< 1 = CF Card
  2 = Primary NFS
  3 = User Space (/usr2),
  4 = Local Machine,
  5 = Factory Default >
----> 5

```

5. Select Factory Default.

The system will restore factory defaults, and the unit will automatically reboot.

Note: Use System Administration to save your configuration in case you need to reload it later or onto another system. See "Adding and Configuring a PC Card" on page 145 for more information.

Setting Date and Time

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

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

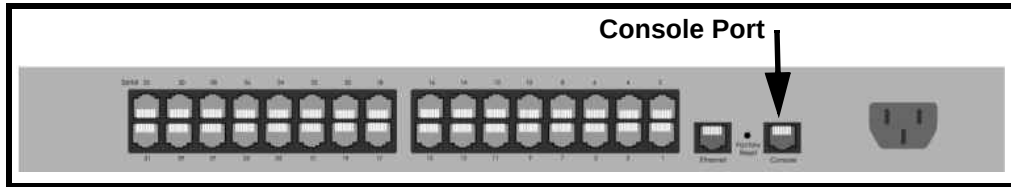
Accessing the Boot Loader Program

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 unit will no longer boot. It also provides a hardware

testing module that 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 unit to a serial port on a workstation. Use the Ethernet cable packaged with the Digi CM unit and attach the DB-9 adapter. The arrow in the following graphic points to the Console Port.



back of Digi CM 32 shown

2. Set up 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 Boot Loader menu.

Hardware Test Menu

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

Disaster Recovery

The Digi CM unit provides a disaster recovery procedure in the event the configuration data is destroyed or corrupted. The Digi CM unit automatically restores a corrupted configuration file system to the factory default settings. However, if the Digi CM unit 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 unit 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 unit to a serial port on a workstation. Use an Ethernet cable with a DB-9 adapter.
2. Set up 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 unit.
4. Press the ESC key within three seconds of applying power to the device.

The following screen appears.

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

```

Bootloader<48port> 1.1.1 (Jun  2 2004 - 15:07:26)
CPU       : XPC855xxZPnnD4 (65 MHz)
DRAM      : 256 MB
FLASH     : 32 MB
PC CARD   : No card
EEPROM    : A Type exist
Ethernet  : AUTO-NEGOTIATION
Autoboot Start: 0

=====
Welcome to Boot Loader Configuration page
=====
Select menu
1. RTC configuration [ Oct 29 2004 - 10:54:22 ]
2. Hardware test
3. Firmware upgrade [S/W Version : v1.5.3.1]
4. Exit and boot from flash
5. Exit and reboot
<ESC> Back, <ENTER> Refresh
----->

```

5. Choose Firmware upgrade by entering 3.
The following screen appears.

```

-----> 3
=====
Firmware upgrade
=====
Select menu
1. Protocol [BOOTP]
2. IP address assigned to Ethernet interface [192.168.161.5]
3. Server's IP address [192.168.0.128]
4. Firmware File Name [cm48.bin]
5. Start firmware upgrade
<ESC> Back, <ENTER> Refresh
-----> 1
Select protocol < 1 = BOOTP, 2 = TFTP> : 2
=====
Firmware upgrade
=====
Select menu
1. Protocol [TFTP]
2. IP address assigned to Ethernet interface [192.168.161.5]
3. Server's IP address [192.168.0.128]
4. Firmware File Name [cm48.bin]
5. Start firmware upgrade
<ESC> Back, <ENTER> Refresh
----->

```

6. Enter the information for the first menu items.
 - Protocol: The choices are BOOTP or TFTP
 - IP address assigned: Enter the IP address of the Digi CM unit
 - 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 back up to earlier menu screens.

7. Choose Start firmware upgrade.
The firmware upgrade will take several minutes to process.
This will factory default the unit.
8. When the upgrade process is complete, choose ESC to return to the main menu.
9. Choose Exit and boot from flash.

Chapter 18**Hardware Information****Introduction**

This chapter provides information on Digi CM hardware. Among the topics covered are the hardware specifications, LED descriptions, pinouts for the Ethernet cable, pinouts for the cable adapters, and rack mounting specifications.

Hardware Specifications**Digi CM 48**

Hardware Specifications		
Attribute	Value AC Powered	Value DC Powered
Operating temperature	40°F to 120°F (5°C to 50°C)	40°F to 120°F (5°C to 50°C)
Storage temperature	-20°F to 140°F (-29°C to 60°C)	-20°F to 140°F (-29°C to 60°C)
Humidity	10% to 90% non-condensing	10% to 90% non-condensing
Power supply	Internal, 100 -240VAC, 50/60 Hz, 1.2A (max)	Internal, 36 - 72 Vdc, 1.2A (max)
Power consumption	0.37A /120VAC, 45W (typical), 150W (max)	0.4A /48Vdc, 19W (typical), 40W (max)
Fuse (internal)	FUSE (Type L) AC250V, 2A	Fuse (Type L) 250V, 5A
Operating system	Linux Hard Hat embedded	Linux Hard Hat embedded
SDRAM	256 megabytes	256 megabytes
Flash memory	16 megabytes	16 megabytes
Dimensions: unpackaged	17.5" x 10.0" x 1.75" (44.5 x 25.4 x 4.5 cm)	17.5" x 10.0" x 1.75" (44.5 x 25.4 x 4.5 cm)
Dimensions: packaged	20.375" x 15.25" x 4.75 (517.5 mm 387.3 mm x 120.6 mm)	20.375" x 15.25" x 4.75 (517.5 mm 387.3 mm x 120.6 mm)
Weight: unpackaged	6.5 lbs (2.95 kg)	6.7 lbs (3.05 kg)
Weight: packaged	9.95 lbs (4.51 kg)	10.2 lbs (4.61 kg)

Digi CM 16 and Digi CM 32

Attribute	AC Powered Value	DC Powered Value
Operating temperature	40°F to 120°F (5°C to 50°C)	40°F to 120°F (5°C to 50°C)
Storage temperature	-20°F to 140°F (-29°C to 60°C)	-20°F to 140°F (-29°C to 60°C)
Humidity	10% to 90% non-condensing	10% to 90% non-condensing
Power supply	Internal, 100 - 240VAC, 50/60 Hz, 1.2A (max)	Internal, 36 - 72 Vdc, 1.2A (max)
Power consumption	0.1A /120VAC (type), 12W (typical), 40W (max)	0.25A /48Vdc, 12W (typical), 40W (max)
Fuse (internal)	FUSE (Type L) AC250V, 2A	
Operating system	Linux Hard Hat embedded	Linux Hard Hat embedded
SDRAM	64 megabytes	64 megabytes
Flash memory	8 megabytes	8 megabytes
Dimensions: unpackaged	17" x 8.5" x 1.75" (431.8 cm x 215.9 cm x 44.5 cm)	17" x 8.5" x 1.75" (431.8 cm x 215.9 cm x 44.5 cm)
Dimensions: packaged	20.375" x 15.25" x 4.75 (517.5 cm x 387.3 cm x 120.6 cm)	20.375" x 15.25" x 4.75 (517.5 cm x 387.3 cm x 120.6 cm)
Weight: unpackaged	5.8 lbs (2.63 kilograms)	5.8 lbs (2.63 kilograms)
Weight: packaged	8.6 lbs (3.9 kilograms)	8.6 lbs (3.9 kilograms)

Digi CM 8 AC Powered

Attribute	Value
Operating temperature	40°F to 120°F (5°C to 50°C)
Storage temperature	-20°F to 140°F (-29°C to 60°C)
Humidity	10% to 90% non-condensing
Power supply	External, 100 - 240VAC, 50/60 Hz, 1.0A (max)
Power consumption	AC input: 0.05A /120VAC, 6W (typical), 12W (max) DC input: 0.8A/5VAC, 4.5 W (typical), 8W (max)
Operating system	Linux Hard Hat embedded
SDRAM	64 megabytes
Flash memory	8 megabytes
Dimensions	9.5" x 6.25" x 1.25" (241.3 cm 158.75 x 31.75 cm)
Weight	2.5 lbs (1.13 kilograms)

LED Indicators

Use the LED indicators to confirm your attachment to the network and that the Digi CM unit 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 when there is activity on the Ethernet port
Serial port*	In use	On when the serial port is ready to run
	Rx/Tx	Blinks when there is traffic on the serial port

*Not available on the Digi CM 48

About Serial Port Cabling

The Digi CM unit simplifies cabling. The RJ-45 8-pin configuration matches all SUN and Cisco RJ-45 console port configurations, enabling CAT 5 cabling without pinout concerns. Three DB-25 and one DB-9 adapters come in the package. A DB-25 male, a DB-25 female, and a DB-9 adapter support console management applications. A DB-25 male adapter provides a modem connection. See the cable adapter information that follows later in this chapter.

Note: The cable length restrictions common to RS-232 cables apply to the Digi CM serial cable as well.

Serial Port Pinouts

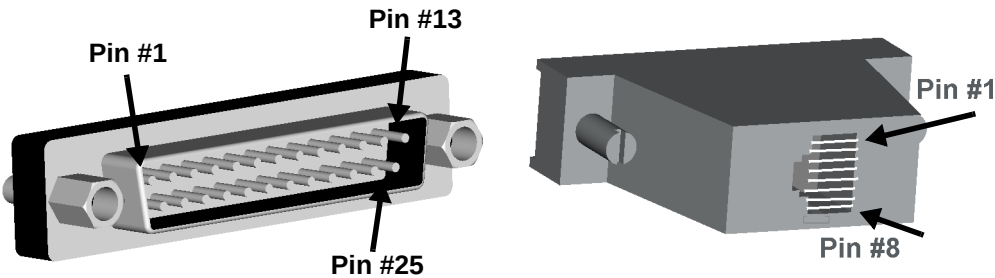
The Digi CM unit uses an RJ-45 connector for serial ports. Pin assignments are listed in the following table.

Pin	Description
1	CTS
2	DSR
3	RxD
4	GND
5	DCD Note: Inbound signal can also be used as a second ground.
6	TxD
7	DTR
8	RTS

Cable Adapters

The Digi CM unit comes with four cable adapters. The following illustrations show cable adapter pin outs. Additional adapters can be purchased from Digi in quantities of 8.

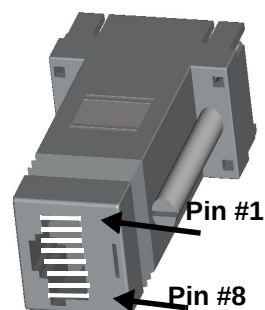
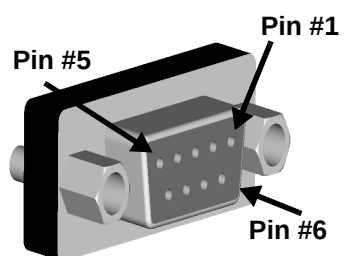
DB-25 Male Console Adapter
(Digi 8-pack reorder P/N 76000672)



DB-25 Male to RJ-45 Connector Pin Assignments

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

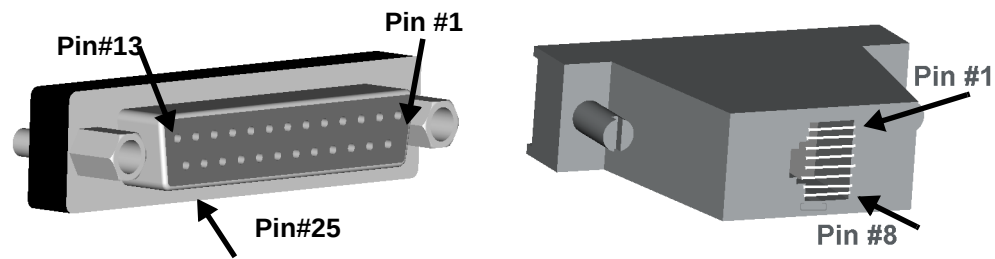
DB-9 Female Console Adapter
 (Digi 8-pack reorder P/N 76000671)



DB-9 Female to RJ-45 Pin Assignments

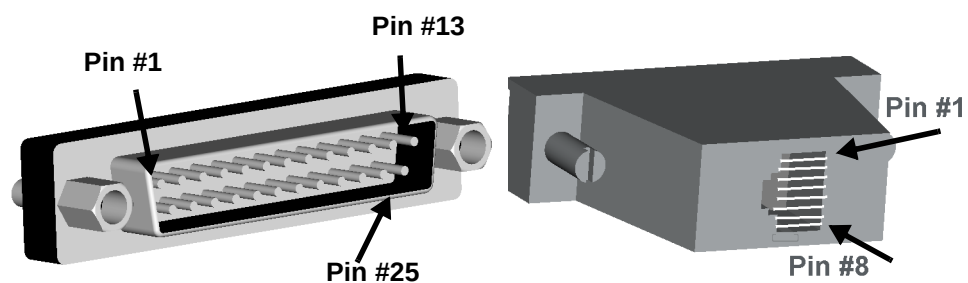
RJ-45	Signal		DB-9F	Signal
1	CTS	Connected to	7	RTS
2	DSR	Connected to	4	DTR
5	DCD			
3	RxD	Connected to	3	TxD
4	GND	Connected to	5	GND
6	TxD	Connected to	2	RxD
7	DTR	Connected to	1	DCD
			6	DSR
8	RTS	Connected to	8	CTS

DB-25 Female Console Adapter
(Digi 8-pack reorder P/N 76000673)



DB-25 Female to RJ-45 Pin Assignments

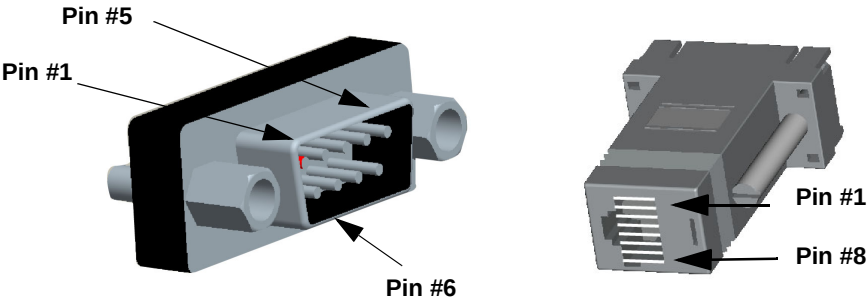
RJ-45	Signal		DB-25M	Signal
1	CTS	Connected to	4	RTS
2	DSR	Connected to	20	DTR
5	DCD			
3	RxD	Connected to	2	TxD
4	GND	Connected to	7	GND
6	TxD	Connected to	3	RxD
7	DTR	Connected to	6	DCD
			8	DSR
8	RTS	Connected to	5	CTS

DB-25 Male Modem Adapter (Digi 8-pack reorder P/N 76000670)**DB-25 Male Modem to RJ-45 Pin Assignment**

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

DB-9 Male Modem Adapter (Digi 8-pack reorder P/N 76000702)

(Available but not included)

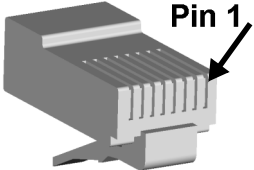


DB-9 Male Modem to RJ-45 Pin Assignment

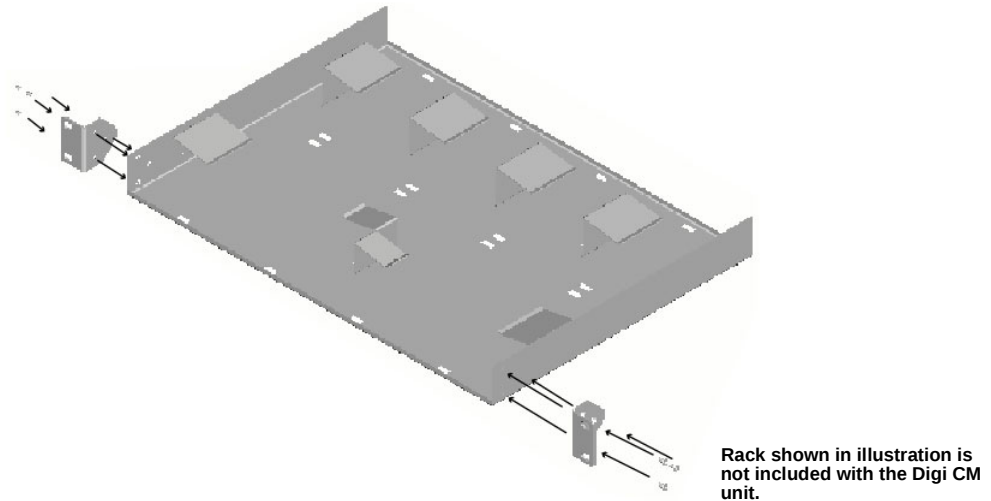
RJ-45	Signal		DB-9M	Signal
1	CTS	Connected to	8	CTS
2	DSR	Connected to	6	DSR
3	RxD	Connected to	2	RxD
4	GND	Connected to	5	GND
5	DCD	Connected to	1	DCD
6	TxD	Connected to	3	TxD
7	DTR	Connected to	4	DTR
8	RTS	Connected to	7	RTS

Ethernet Pinouts

The Digi CM unit uses a standard Ethernet connector, that is a shielded and compliant with AT&T 258 specifications.

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

Rack Mounting Installation



1. Attach enclosed bracket ears to rack as shown in illustration.
2. Follow safety precautions when placing the Digi CM unit on the rack.

Rack Mounting Safety Precautions

- Distribute weight evenly in the rack to avoid overloading.
- Ensure proper ventilation with at least 12 inches (30 centimeters) of clearance on all sides.
- Check equipment nameplate ratings before connecting to the supply circuit to avoid overloads which may damage over-current protection devices and supply wiring.
- Maintain reliable earthing for rack-mounting equipment, especially for supply connections.
- Install equipment in Restricted Access Areas only (dedicated equipment rooms/closets) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA 70.
- Connect equipment to a DC supply source (reliably earthed) that is electrically isolated from the AC source.
- Directly connect the equipment chassis to the DC supply system-grounding electrode conductor or a bonding jumper from a grounding terminal bar (or bus) that is connected to the DC supply system grounding electrode conductor.
- Contain equipment that has a connection between the grounded conductor of the same DC supply circuit, the grounding conductor, and also the point of grounding of the DC system in the same immediate area. Do not ground the equipment elsewhere.

Rack Mounting Installation

- Locate the DC supply source within the same premises as the equipment.
- Route away and secure all DC input wiring from sharp edges to prevent chaffing as well as provide strain relief.
- Provide a readily accessible disconnect device and protective device a fixed wiring for a DC power supply suitable for the specified rated voltage and current. Disconnect and protective devices to be rated 2A Amps maximum.

Chapter 19**Certifications****Safety**

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

Working Inside the Digi CM Unit

NOTICE: Do not attempt to service the Digi CM unit yourself, except when following the instructions from Technical Support personnel. In such a case, first perform the following actions:

- Turn off the Digi CM unit.
- Ground yourself by touching an unpainted metal surface at the back of the equipment before touching anything inside your equipment.

Replacing the Battery

A coin-cell battery maintains date and time information. If you have to repeatedly reset time and date information after turning on the Digi CM unit, replace the battery.

CAUTION: A new battery can explode if it is incorrectly installed. Replace the 3 Volt CR2032 battery only with the same or equivalent type recommended by the battery manufacturer. Discard used batteries according to the battery manufacturer's instructions.

Rack Mounting Installation Considerations

For a rack setup with forced air, the device can run 0-55° C with no extra space above or below the device (default design of the Digi CM Rack provides 1/16" = 2mm between devices).

For a rack setup with no forced air, make sure that the air in-between devices does not get warmer than 55°C by the following measures:

- Providing space between the devices, or
- controlling the ambient temperature on the rack.
- Distribute weight evenly in the rack to avoid overloading.
- Check equipment nameplate ratings before connecting to the supply circuit to avoid overloads which may damage over-current protection devices and supply wiring.
- Maintain reliable earthing for rack-mounting equipment, especially for supply connections.

Environmental Considerations and Cautions

The following is a list of environmental considerations that will ensure safe and efficient operation of the Digi CM unit:

- Do not position the Digi CM unit near high-powered radio transmitters or electrical equipment, such as electrical motors or air conditioners. Interference from electrical equipment can cause intermittent failures.
- Avoid exceeding the maximum cabling distances discussed in the online cable guide.
- Do not install the Digi CM unit in areas where condensation, water, or other liquids may be present. These may cause safety hazards and equipment failure.

For DC powered equipment:

- Install equipment in Restricted Access Areas only (dedicated equipment rooms/closets) in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA 70.
- Connect equipment to a DC supply source (reliably earthed) that is electrically isolated from the AC source.
- Directly connect the equipment chassis to the DC supply system grounding electrode conductor or a bonding jumper from a grounding terminal bar (or bus) that is connected to the DC supply system grounding electrode conductor.
- Contain equipment that has a connection between the grounded conductor of the same DC supply circuit, the grounding conductor, and also the point of grounding of the DC system in the same immediate area. Do not ground the equipment elsewhere.
- Locate the DC supply source within the same premises as the equipment.
- Route away and secure all DC input wiring from sharp edges to prevent chaffing as well as provide strain relief.
- Provide a readily accessible disconnect device and protective device a fixed wiring for a DC power supply suitable for the specified rated voltage and current. Disconnect and protective devices to be rated 2A Amps maximum.

Note: The Digi CM unit is intended to connect to networking devices. Do not attempt connecting to a telephone line.

Safety Instructions

CAUTION: Do not operate the Digi CM unit with the cover removed.

- To avoid shorting out the Digi CM unit when disconnecting the network cable, first unplug the cable from the equipment and then from the network jack. When reconnecting a network cable to the equipment, first plug the cable into the network jack and then into the equipment.
- To help prevent electric shock, plug the Digi CM unit into a properly grounded power source. The cable is equipped with 3-prong plug to help ensure proper grounding. Do not use adapter plugs or remove the

grounding prong from the cable. If you have to use an extension cable, use a 3-wire cable with properly grounded plugs.

- To help protect the Digi CM unit from transients in electrical power, use a surge suppressor, line conditioner, or a continuous-protected (a power supply that cannot be interrupted) power supply.
- Be sure that nothing rests on the Digi CM unit cables and that the cables are not located where they can be stepped on or tripped over.
- Do not spill food or liquids on the Digi CM unit. If it gets wet, contact Technical Support.
- Do not push objects into the openings of the Digi CM unit. Doing so can cause fire or electric shock by shorting out interior components.
- Keep the Digi CM unit away from heat sources and do not block cooling vents.

Emissions

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

Immunity

Europe: EN55024:1998
EN61000-3-2: 2000
EN61000-3-3: 1998

Solaris Ready



All Digi CM products are Solaris Ready certified. This certification identifies these products have met the stringent testing requirements for system compatibility, inter operability, ease-of-installation, functionality, and network interpretability as defined and controlled by Sun Microsystems.

3DES 25

A

accessing a port
 web interface 15

ADDP 80

ADDP (Advanced Device Discover Protocol) 14

administration See system administration

alerts and notifications

 for Power Controller 112

 port event handling 63

 SMTP alerts 60

 SNMP information 60

 traps 61

apply all ports settings 49

applyconf 135

assigning IP settings 23

authentication 81

 configuration menu 153

 configuring 82

 local 82

automatic device recognition 21

 configuring 47

B

Blowfish 25

Boot Loader program 161

 accessing 162

boot sequence 136

C

cable adapters 168

callback 104

Cascading multiple Digi RPM units 118

certifications

 Emissions 177

 Immunity 177

 Safety 175

 Solaris Ready 177

command line interface 15

 example scripts 138

 important file locations 136

 Linux commands 135

 user administration 140

compact-flash card

 adding 29

 configuring 30

 formatting the card 30

configmenu 14, 135

configuration management 128

configuration menu 14

 description 14

 using 28

configuring automatic device recognition 47

configuring host mode 52

configuring system logging 40

console server mode 50

custom menus 18, 87

D

date and time

 configuration menu 161

 setting 133

default menu

 port access menu 90

default password 13

defaults See factory defaults

device name

 configuring 133

device recognition

 configuring 47

dial-in modem

 configuring access 103, 110, 157

 mode 51

dial-in terminal server 52

 configuring access 106

 configuring access (configuration menu) 158

Digi CM

 access methods 15

 adding and configuring PC cards 29

 certifications 175

 configuration menu interface 143

 configuration methods 13

 configuring ports 45

 feature overview 11

 hardware information 165

 port clustering 121

 power controller 109

 system administration 67

 web interface for 14

Digi RPM

 cascading multiple units 118

direct port access 18

disaster recovery 162

DTR settings 54

E

emissions certifications 177

- EMS support 93
- enabling system logging 35
- encryption
 - SSH 25
 - wireless LAN 32

F

- factory defaults
 - reset button 132
 - resetting 132
 - restoring (configuration menu) 161
 - values 132
- firmware
 - automatically upgrading 129
 - upgrade (configuration menu) 160
 - upgrading 127

H

- hardware specifications 165
- hardware test menu 162
- host mode
 - configuring (configuration menu) 145
- host name configuration 133
- HyperTerminal 23

I

- immunity certifications 177
- inter-character timeout 54
- IP filtering
 - configuring network 71
 - examples 74
 - network (configuration menu) 149
 - port (configuration menu) 150
- IP settings 23

L

- LDAP 82
- LED Indicators 167
- Linux
 - commands 135
 - default script 136
 - file and disk utilities 136
 - Hard Hat 135
 - network utilities 136
 - shell utilities 136
 - system utilities 136

M

- menus
 - adding menu items 89
 - assigning users 90
 - creating menu names 88
 - creating submenu 89
 - port access menu 146
 - using the configuration menu 143
- Microsoft Server 2003 SAC support 93
- modem

- adding 106
- modem init string 103
- modem test 104

N

- network card
 - adding 30
- NTP server 133

P

- password 13
- PC card
 - adding and configuring (configuration menu) 145
- PC cards
 - compact-flash 29
 - compatible cards 29
 - installing and configuring 29
 - network 30
 - serial modem 32
 - wireless LAN 31
- port
 - apply all settings 49
 - reset 47
- port access menu 17, 146
- port clustering
 - assigning master unit 122
 - configuration menu 159
 - configuring slave ports 122, 123
- Port Escape Menu 19
- port logging 41
 - enabling 36
- port parameters 23
 - configuration menu 146
- port title 47
- portaccessmenu 135
- portreset # 135
- Power Controller
 - overview 109
- power controller
 - alarms and thresholds 112
 - configuring 110
 - installing 110
 - managing 116
- protocols 54
 - RawTCP 54
 - Telnet 54

R

- Rackable Systems MGMT Card 99
 - set up 99
- RADIUS 82
- RealPort 45
- resetting ports 47

S

- SAC support 93

- safety certifications 175
- saveconf 135
- saving and applying changes 20
- serial modem
 - adding 32
- serial port parameters 54
- serial port pinouts 167
- SMTP
 - alerts 60
 - configuring 148
- sniff session
 - configuration menu 150
 - viewing 151
- SNMP 60
 - configuring 61, 148
 - configuring (configuration menu) 148
 - managing the SNMP protocol 62
- Solaris Ready 177
- SSH 18
 - accessing a port 25
 - configuring (configuration menu) 144
 - encryption methods 25
- SYSLOG server
 - enabling 38
- system administration
 - configuration management 128
 - firmware upgrades 127
 - host name configuration 133
 - resetting factory defaults 132
 - user administration 67
- system logging 146
 - configuration menu 146
 - configuring device (configuration menu) 147
- system logs 40

T

- TACACS+ 82
- Telnet 18
- terminal server mode 51
- TFTP 129
- traps 61

U

- user access control
 - to Power Controller 114
 - to serial ports 74
- user groups 13
- user storage space 138
- username 13
- users
 - adding 87
 - adding, editing, and removing 27, 67
 - admin username and default password 13
 - administration 67
 - root username and default password 13, 135

- system admin 13

W

- web interface menu 15
- WEP 31
- wireless LAN card 31



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