



CiM

Quick-Start Guide

For IP-Enabled Satellite Modems

Part Number: CD/CIMQSTART.IOM

Rev. 1

Sept. 9, 2002



CiM

Quick-Start Guide

For IP Enabled Satellite Modems

Part Number CD/CIMQSTART.IOM

Rev. 1

Sept. 9, 2002

Comtech EF Data is an ISO 9001
Registered Company.



CUSTOMER SUPPORT

Contact Comtech EF Data Customer Support for:

- ▶ Product support or training
- ▶ Information on upgrading or returning a product

A Customer Support representative may be reached at:

Comtech EF Data
Attention: Customer Support Department
2114 West 7th Street
Tempe, Arizona 85281 USA

(480) 333-2200 (Main Comtech EF Data Number)

(480) 333-4357 (Customer Support Desk)

(480) 333-2161 FAX

or, E-Mail can be sent to the Customer Support Department at:

fsservice@comtechedata.com

1. To return a Comtech EF Data product (in-warranty and out-of-warranty) for repair or replacement:
2. Request a Return Material Authorization (RMA) number from the Comtech EF Data Customer Support Department.
3. Be prepared to supply the Customer Support representative with the model number, serial number, and a description of the problem.
4. To ensure that the product is not damaged during shipping, pack the product in its original shipping carton/packaging.
5. Ship the product back to Comtech EF Data. (Shipping charges should be prepaid.)

Table of Contents

CHAPTER 1. GETTING STARTED	1
1.1 Introduction.....	1
1.2 Typical Point-to-Point System Configuration.....	1
1.3 Equipment List.....	2
1.4 Equipment Setup.....	2
1.5 PC Configuration	2
1.6 Transmit and Receive IF Configuration.....	3
1.7 Basic IP Configuration	3
1.7.1 Main Menu.....	4
1.7.2 Restoring factory Default Configuration	4
1.7.3 CiM 1 Configuration.....	5
1.7.4 CiM 2 Configuration.....	6
1.7.5 Verification	7
1.8 Using Encryption	8
1.8.1 CiM 1 Configuration.....	8
1.8.2 Configuration.....	9
1.8.3 Verification	10
1.9 Other Configuration Items.....	11
1.9.1 User Names & Passwords.....	11
1.9.2 Access Lists	11
1.9.3 Enabling/Disabling Telnet	13

Figures

Figure 1. Typical Point-to-Point System Configuration	1
Figure 2. Main Menu	4

OVERVIEW OF CHANGES TO PREVIOUS EDITION

CD/CIMQSTART.IOM Rev. 1 replaces part number CD/CIMQSTART.IOM Rev. -.

A summary of the changes made for Rev. 1 includes:

Chapter 1 Changed addresses in Figure 1 and through out the procedure.

ABOUT THIS MANUAL

This manual provides installation and operation information for the Comtech EF Data CiM-IP Enabled Modems. This is a technical document intended for earth station engineers, technicians, and operators responsible for the operation and maintenance of the CiM-IP Enabled Modems.

CONVENTIONS AND REFERENCES

CAUTIONS AND WARNINGS



Indicates information critical for proper equipment function.



Indicates a hazardous situation that, if not avoided, may result in minor or moderate injury. CAUTION may also be used to indicate other unsafe practices or risks of property damage.



Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

METRIC CONVERSION

Metric conversion information is located on the inside back cover of this manual. This information is provided to assist the operator in cross-referencing English to Metric conversions.

RECOMMENDED STANDARD DESIGNATIONS

Recommended Standard (RS) Designations have been superseded by the new designation of the Electronic Industries Association (EIA). References to the old designations are shown only when depicting actual text displayed on the screen of the unit (RS-232, RS-485, etc.). All other references in the manual will be shown with the EIA designations (EIA-232, EIA-485, etc.) only.

TRADEMARKS

All product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

REPORTING COMMENTS OR SUGGESTIONS CONCERNING THIS MANUAL

Comments and suggestions regarding the content and design of this manual will be appreciated. To submit comments, please contact the Comtech EF Data Customer Support Department.

EMC COMPLIANCE

This is a Class A product. In a domestic environment, it may cause radio interference that requires the user to take adequate protection measures.

EN55022 COMPLIANCE

This equipment meets the radio disturbance characteristic specifications for information technology equipment as defined in EN55022.

EN50082-1 COMPLIANCE

This equipment meets the electromagnetic compatibility/generic immunity standard as defined in EN50082-1.

FEDERAL COMMUNICATIONS COMMISSION (FCC)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference; in which case, users are required to correct the interference at their own expense.

Note: To ensure compliance, properly shielded cables for DATA I/O shall be used. More specifically, these cables shall be shielded from end to end, ensuring a continuous shield.

SAFETY COMPLIANCE

EN 60950

Applicable testing is routinely performed as a condition of manufacturing on all units to ensure compliance with safety requirements of EN60950.

This equipment meets the Safety of Information Technology Equipment specification as defined in EN60950.

LOW VOLTAGE DIRECTIVE (LVD)

The following information is applicable for the European Low Voltage Directive (EN60950):

<HAR>	Type of power cord required for use in the European Community.
	<p>CAUTION: Double-pole/Neutral Fusing. ACHTUNG: Zweipolige bzw. Neutralleiter-Sicherung.</p>

International Symbols:

Symbol	Definition
	Alternating Current.
	Fuse.

Symbol	Definition
	Protective Earth.
	Chassis Ground.

Note: For additional symbols, refer to “Cautions” listed earlier in this preface.

WARRANTY POLICY

This Comtech EF Data product is warranted against defects in material and workmanship for a period of two years from the date of shipment. During the warranty period, Comtech EF Data will, at its option, repair or replace products that prove to be defective.

For equipment under warranty, the customer is responsible for freight to Comtech EF Data and all related custom, taxes, tariffs, insurance, etc. Comtech EF Data is responsible for the freight charges **only** for return of the equipment from the factory to the customer. Comtech EF Data will return the equipment by the same method (i.e., Air, Express, Surface) as the equipment was sent to Comtech EF Data.

LIMITATIONS OF WARRANTY

The foregoing warranty shall not apply to defects resulting from improper installation or maintenance, abuse, unauthorized modification, or operation outside of environmental specifications for the product, or, for damages that occur due to improper repackaging of equipment for return to Comtech EF Data.

No other warranty is expressed or implied. Comtech EF Data specifically disclaims the implied warranties of merchantability and fitness for particular purpose.

EXCLUSIVE REMEDIES

The remedies provided herein are the buyer's sole and exclusive remedies. Comtech EF Data shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

DISCLAIMER

Comtech EF Data has reviewed this manual thoroughly in order that it will be an easy-to-use guide to your equipment. All statements, technical information, and recommendations in this manual and in any guides or related documents are believed reliable, but the accuracy and completeness thereof are not guaranteed or warranted, and they are not intended to be, nor should they be understood to be, representations or warranties concerning the products described. Further, Comtech EF Data reserves the right to make changes in the specifications of the products described in this manual at any time without notice and without obligation to notify any person of such changes.

If you have any questions regarding the equipment or the information in this manual, please contact the Comtech EF Data Customer Support Department

Chapter 1. Getting Started

Introduction	1
Sample Configuration	1
Equipment List	1
Equipment Setup	2
PC Configuration	2
Transmit and Receive IF Configuration	3
Basic IP Configuration	3
Using Encryption	8
Using QoS	11
Other Configuration Items	11

1.1 INTRODUCTION

This quick start guide will allow a user to configure a pair of CiM-550 or CiM-300L (referred to CiM in rest of the document) from beginning (i.e. starting from factory default settings) and be able to pass traffic within minutes. It is assumed that the user is familiar with the configuration of the base satellite modem.

1.2 TYPICAL POINT-TO-POINT SYSTEM CONFIGURATION

The steps in this guide will lead to following configuration:

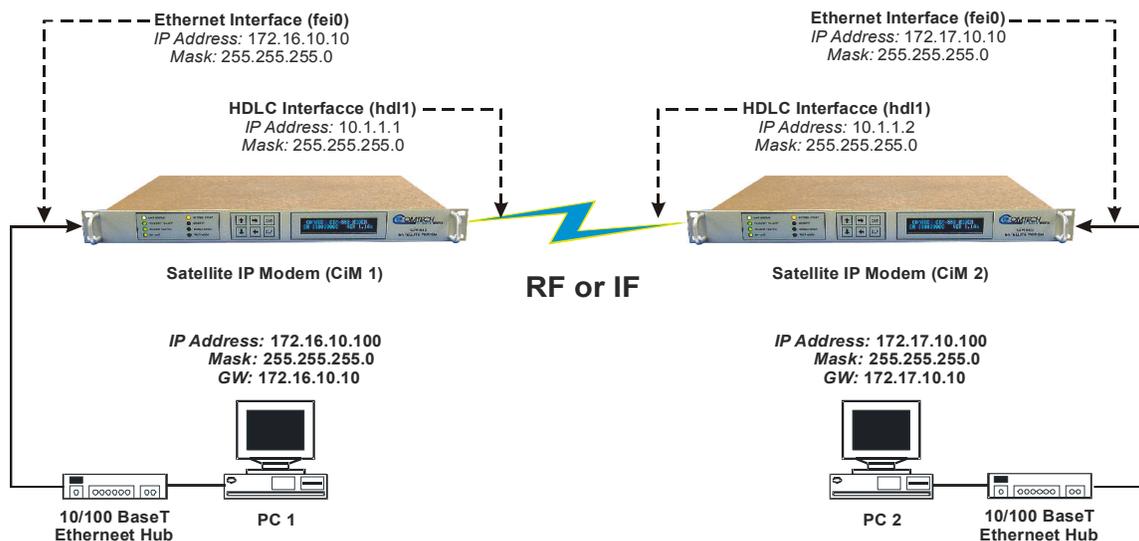


Figure 1. Typical Point-to-Point System Configuration

1.3 EQUIPMENT LIST

Following equipment is required:

Item	Equipment	Quantity	Comments
1	CiM-550 Modem	2	
2	10/100baseT Ethernet Hub	2	Provided by customer
3	PC with NIC and a terminal emulation program	2	Provided by customer
4	Console cable (DB-9 to RJ-11)	1	Can be procured from Comtech EF Data
5	Ethernet cables	4	Provided by customer
6	IF cables	2	Provided by customer (For IF loopback only. Additional equipment required for RF connectivity.)
7	Traffic Generator such as SmartBits	1	Provided by customer

1.4 EQUIPMENT SETUP

Step	Description
1	Connect each CiM to the PC via the Ethernet Hub.
2	Connect the TX IF on CiM 1 to RX IF of CiM 2 and vice-versa.
3	Connect the DB-9 end of the console cable to the COM1 or COM2 port of the PC and the RJ-11 end to the console port at the back of CiM 1.
4	Connect CiM 1 and CiM 2 to suitable power supply and turn them ON.

1.5 PC CONFIGURATION

Step	Description
1	Set the IP address on PC 1 to 172.16.10.100 , mask to 255.255.255.0 and gateway to 172.16.10.10 .
2	Set the IP address on PC 2 to 172.17.10.100 , mask to 255.255.255.0 and gateway to 172.17.10.10 . Reboot the PCs (if required).

1.6 TRANSMIT AND RECEIVE IF CONFIGURATION

Step	Description
------	-------------

- | | |
|---|--|
| 1 | Configure the transmit and receive IF parameters on CiM 1 and CiM 2 via the front panel. |
|---|--|

Note: The IF parameters can also be set via console menu, Telnet, web interface and SNMP - but for this exercise, it is recommended that the front panel be used.

- | | |
|---|---|
| 2 | Set the TxPower to minimum level. |
| 3 | Before proceeding to next step, make sure that each CiM is locked to the other CiM. |

1.7 BASIC IP CONFIGURATION

Step	Description
------	-------------

- | | |
|---|---|
| 1 | Launch the terminal emulation program - such as HyperTerminal on Microsoft Windows. |
|---|---|

- | | |
|---|---|
| 2 | Select the appropriate COM port (to which the DB-9 end of the console cable is connected) and configure it for: |
|---|---|

- ▶ 38,400 bps
- ▶ 8 data bits
- ▶ no parity
- ▶ 1 stop bit
- ▶ no hardware flow control

- | | |
|---|---|
| 3 | Press return and to bring up the Main menu. |
|---|---|

1.7.1 MAIN MENU

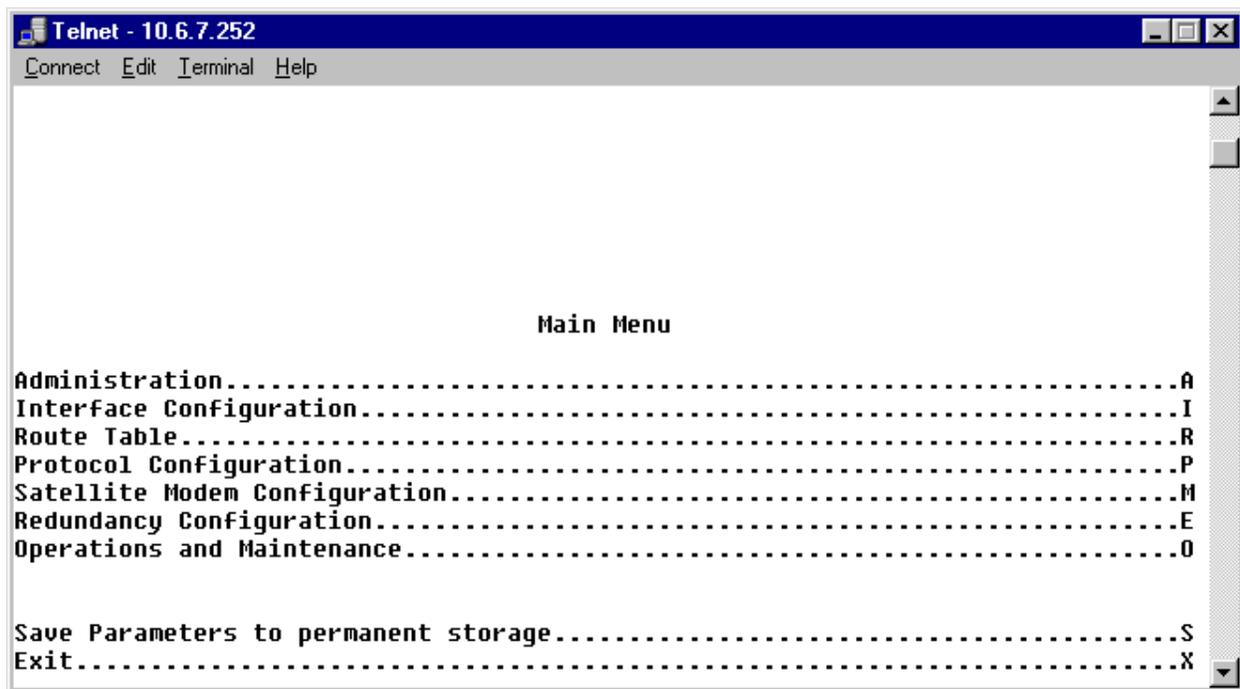


Figure 2. Main Menu

To use this interface, select the appropriate sub-menu or the entry by pressing the character indicated at the right. Enter *x* to return to the previous menu.

1.7.2 RESTORING FACTORY DEFAULT CONFIGURATION

The following sections in this guide assume that the CiM is still in factory default configuration for IP. If that's not the case, the factory default configuration can be restored from the menu:

- | Step | Description |
|------|---|
| 1 | From the Main Menu , select Administration sub-menu. |
| 2 | From the Administration menu, select Operations and Maintenance sub-menu. |
| 3 | From the Operations and Maintenance menu, select Database Operations sub-menu |
| 4 | From the Database Operations menu, select Restore Factory Default option |
| 5 | Confirm when prompted. |

This will erase any user configuration and restore the CiM to factory default configuration.

1.7.3 CIM 1 CONFIGURATION

CiM has 2 data interfaces - a LAN interface and a WAN interface. The LAN interface is a 10/100baseT Ethernet port (**fei0**). The WAN interface is the serial synchronous HDLC interface (**hdl0**). The Ethernet MAC address is factory assigned and cannot be changed.

1.7.3.1 SETTING IP ADDRESS(ES)

Step	Description
1	From the Main Menu select Interface Configuration sub-menu.
2	From the Interface Configuration Menu select Ethernet Interface (fei0)
3	Set IP Address to 172.16.10.10
4	Set Subnet Prefix Length to 24
5	From the Interface Configuration Menu select Satellite/HDLC Interface (hdl0) .
6	Set IP Address to 10.1.1.1
7	Set Subnet Prefix Length to 24
8	Set RX – Enable/Disable and TX – Enable/Disable to Enable .
9	From Receive HDLC Channel Address menu set HDLC Addr 1 to 1 (0x0001)

The other parameters can be left to their factory default settings.

At this point you should be able to ping CiM 1 from PC 1:

- 10 **ping 172.16.10.10**
- 11 **ping 10.1.1.1**

1.7.3.2 ROUTE TABLE

Step	Description
1	From Main Menu , select Route Table sub-menu.
2	Enter 1 to configure the first route
3	Enter a suitable name
4	Set IP Address to 172.17.10.0
5	Set Number of Subnet Bits to 24
6	Enter the next hop IP address which is CiM 2's HDLC IP Address, 10.1.1.2

1.7.3.3 SAVE CONFIGURATION

Save parameters to permanent storage.

1.7.4 CIM 2 CONFIGURATION

Disconnect RJ-11 end of the console cable from CiM 1 and connect it to CiM 2.

1.7.4.1 SETTING IP ADDRESS(ES)

Step	Description
1	From the Main Menu select Network Configuration sub-menu.
2	Set Ethernet IP Address to 172.17.10.10 .
3	Set Subnet Prefix Length to 24 .
4	Set HDLC IP Address to 10.1.1.2 .

The other parameters can be left to their factory default settings.

At this point you should be able to ping CiM 2 from PC 2:

- 5 **ping 172.17.10.10**
- 6 **ping 10.1.1.2**

1.7.4.2 ROUTE TABLE

Step	Description
1	From Transmitter Configuration , sub-menu select Route Table sub-menu.
2	Enter 1 to configure the first route
3	Enter a suitable name
4	Set IP Address to 172.16.10.0
5	Set Number of Subnet Bits to 24
6	Enter the next hop IP address which is CiM 1's HDLC IP Address, 10.1.1.1

1.7.4.3 SAVE CONFIGURATION

Save parameters to permanent storage.

1.7.5 VERIFICATION

At this point the basic configuration is over and you should be able to:

- ▶ Ping PC 1 from PC 2 and vice versa
- ▶ Ping CiM 2 from PC 1 and vice versa
- ▶ Pass any other data between the 2 PCs

1.8 USING ENCRYPTION

CiM supports *optional* DES 56 encryption and decryption for additional security over the satellite link. Each CiM supports 2 user configurable keys for encryption and 2 user configurable keys for decryption. Each route can be assigned to be encrypted by Key 1 or Key 2 or Random (i.e. CiM selects Key 1 or Key 2 randomly on a per IP datagram basis) or transmitted in Clear (i.e. no encryption).

1.8.1 CIM 1 CONFIGURATION

1.8.1.1 DES CONFIGURATION

Step	Description
------	-------------

- | | |
|----|--|
| 1 | From the Main Menu select Administration sub-menu |
| 2 | From the Administration Menu , select the Feature Configuration sub-menu |
| 3 | Enable Transmit DES Encryption by pressing T |
| 4 | Enable Receive DES Dencryption by pressing R |
| 5 | From the Administration Menu , select the DES Configuration sub-menu |
| 6 | Set Transmit Key 1 to 0123456789ABCDEF ¹ |
| 7 | Set Transmit Key 2 to FEDCBA9876543210 ² |
| 8 | Set Receive Key 1 to ABCDEF0123456789 |
| 9 | Set Receive Key 2 to FEDCBA0123456789 |
| 10 | From Main Menu , select Route Table sub-menu |
| 11 | Select QOS/DES sub-menu |
| 12 | Select first route by pressing 1 |
| 13 | Press Enter for Minimum and Maximum Bandwidth |
| 14 | Set DES Key to 2 (i.e. Key 2 - FEDCBA9876543210 will be used to encrypt all datagrams on this route) |

¹ Customer may select another 16 hex digit key. This key must match the receive Key 1 on the other CiM.

² Customer may select another 16 hex digit key. This key must match the receive Key 2 on the other CiM.

1.8.2 CONFIGURATION

1.8.2.1 DES CONFIGURATION

Step	Description
1	From the Main Menu select Administration sub-menu
2	From the Administration Menu select the Feature Configuration sub-menu
3	Enable Transmit DES Encryption by pressing T
4	Enable Receive DES Decryption by pressing R
5	From the Administration Menu select the DES Configuration sub-menu
6	Set Transmit Key 1 to ABCDEF0123456789 ³
7	Set Transmit Key 2 to FEDCBA0123456789 ⁴
8	Set Receive Key 1 to 0123456789ABCDEF
9	Set Receive Key 2 to FEDCBA9876543210
10	From Main Menu select Route Table sub-menu
11	Select QOS/DES sub-menu
12	Select first route by pressing 1
13	Press Enter for Minimum and Maximum Bandwidth
14	Set DES Key to 1 (i.e. Key 2 – ABCDEF0123456789 will be used to encrypt all datagrams on this route)

1.8.2.2 SAVE CONFIGURATION

Save parameters to permanent storage.

³ Customer may select another 16 hex digit key. This key must match the receive Key 1 on the other CiM.

⁴ Customer may select another 16 hex digit key. This key must match the receive Key 2 on the other CiM.

1.8.3 VERIFICATION

At this point all IP datagrams using route 1 on CiM 1 or CiM 2 are encrypted.

Step	Description
------	-------------

- | | |
|---|---|
| 1 | First verify connectivity by: <ul style="list-style-type: none">▶ Pinging PC 1 from PC 2 and vice versa▶ Pinging CiM 2 from PC 1 and vice versa▶ Passing any other data between the 2 PCs |
| 2 | Setup a continuous ping from PC 1 to PC 2 (ping 172.17.10.100 -t) |
| 3 | Disable decryption (Main Menu -> Administration -> DES Configuration -> Disable Decryption) on CiM 1 and the ping will start timing out. |
| 4 | Enable decryption and the ping will resume. |
| 5 | Alternatively disable encryption (Main Menu -> Administration -> DES Configuration -> Disable Encryption) on CiM 2 and the ping will resume |

1.9 OTHER CONFIGURATION ITEMS

1.9.1 USER NAMES & PASSWORDS

Step	Description
1	From the Main Menu select Administration sub-menu.
2	Select Name/Password Configuration sub-menu.

1.9.2 ACCESS LISTS

Access lists can be used to regulate access to CiM to one or more devices or networks. If access list enforcement is enabled, only devices with IP address within the configured range are allowed access with:

- ▶ ICMP ping
- ▶ Telnet
- ▶ FTP
- ▶ SNMP
- ▶ HTML

If enabled, access list restrictions apply to both Ethernet and HDLC interface.

1.9.2.1 CiM 1 CONFIGURATION

Step	Description
1	From the Main Menu select Administration sub-menu.
2	Select Access Lists sub-menu
3	Set AccessClient1 <ol style="list-style-type: none">a Set IP Address to 172.16.10.0b Set Number of subnet bits to 24c Set Access List Enforcement to Enabled

Now CiM 1 can only be pinged from PC 1 (and any other device on network 172.16.10.0/24) or accessed via Telnet or FTP or web interface. PC 2 will not be able to ping CiM 1 or access via any other means. To allow PC 2 access to CiM 1:

- 4 Set **AccessClient2**
 - a Set **IP Address** to **172.17.10.0**
 - b **Number of subnet bits** to **24**

Now PC 2 (and any other device on network 172.17.10.0/24) will be able to ping CiM 1 or access CiM 1 via Telnet or FTP or web interface.

1.9.2.2 CIM 2 CONFIGURATION

- | Step | Description |
|------|---|
| 1 | From the Main Menu select Administration sub-menu. |
| 2 | From the Administration menu, select Access Lists sub-menu |
| 3 | Set AccessClient1 <ol style="list-style-type: none">a Set IP Address to 172.16.10.0b Set Number of subnet bits to 24c Set Access List Enforcement to Enabled |

Now CiM 2 can only be pinged from PC 1 (and any other device on network 172.16.10.0/24) or accessed via Telnet or FTP or web interface. PC 2 will not be able to ping CiM 2 or access via any other means. To allow PC 2 access to CiM 2:

- 3 Set **AccessClient2**
 - a Set **IP Address** to **172.17.10.0**
 - b Set **Number of subnet bits** to **24**

Now PC 2 (and any other device on network 172.17.10.0/24) will be able to ping CiM 2 or access CiM 2 via Telnet or FTP or web interface.

1.9.3 ENABLING/DISABLING TELNET

The Telnet service can be enabled or disabled - as desired, as follows:

Step	Description
1	From the Main Menu select Administration sub-menu.
2	From the Administration menu, select Features sub-menu
3	Enable/Disable Telnet

Once enabled, the console menu can also be accessed via Telnet.

METRIC CONVERSIONS

Units of Length

Unit	Centimeter	Inch	Foot	Yard	Mile	Meter	Kilometer	Millimeter
1 centimeter	—	0.3937	0.03281	0.01094	6.214×10^{-6}	0.01	—	—
1 inch	2.540	—	0.08333	0.2778	1.578×10^{-5}	0.254	—	25.4
1 foot	30.480	12.0	—	0.3333	1.893×10^{-4}	0.3048	—	—
1 yard	91.44	36.0	3.0	—	5.679×10^{-4}	0.9144	—	—
1 meter	100.0	39.37	3.281	1.094	6.214×10^{-4}	—	—	—
1 mile	1.609×10^5	6.336×10^4	5.280×10^3	1.760×10^3	—	1.609×10^3	1.609	—
1 mm	—	0.03937	—	—	—	—	—	—
1 kilometer	—	—	—	—	0.621	—	—	—

Temperature Conversions

Unit	° Fahrenheit	° Centigrade
32° Fahrenheit	—	0 (water freezes)
212° Fahrenheit	—	100 (water boils)
-459.6° Fahrenheit	—	273.1 (absolute 0)

Formulas
$C = (F - 32) * 0.555$
$F = (C * 1.8) + 32$

Units of Weight

Unit	Gram	Ounce Avoirdupois	Ounce Troy	Pound Avoir.	Pound Troy	Kilogram
1 gram	—	0.03527	0.03215	0.002205	0.002679	0.001
1 oz. avoir.	28.35	—	0.9115	0.0625	0.07595	0.02835
1 oz. troy	31.10	1.097	—	0.06857	0.08333	0.03110
1 lb. avoir.	453.6	16.0	14.58	—	1.215	0.4536
1 lb. Troy	373.2	13.17	12.0	0.8229	—	0.3732
1 kilogram	1.0×10^3	35.27	32.15	2.205	2.679	—



2114 WEST 7TH STREET TEMPE ARIZONA 85281 USA
480 • 333 • 2200 PHONE
480 • 333 • 2161 FAX