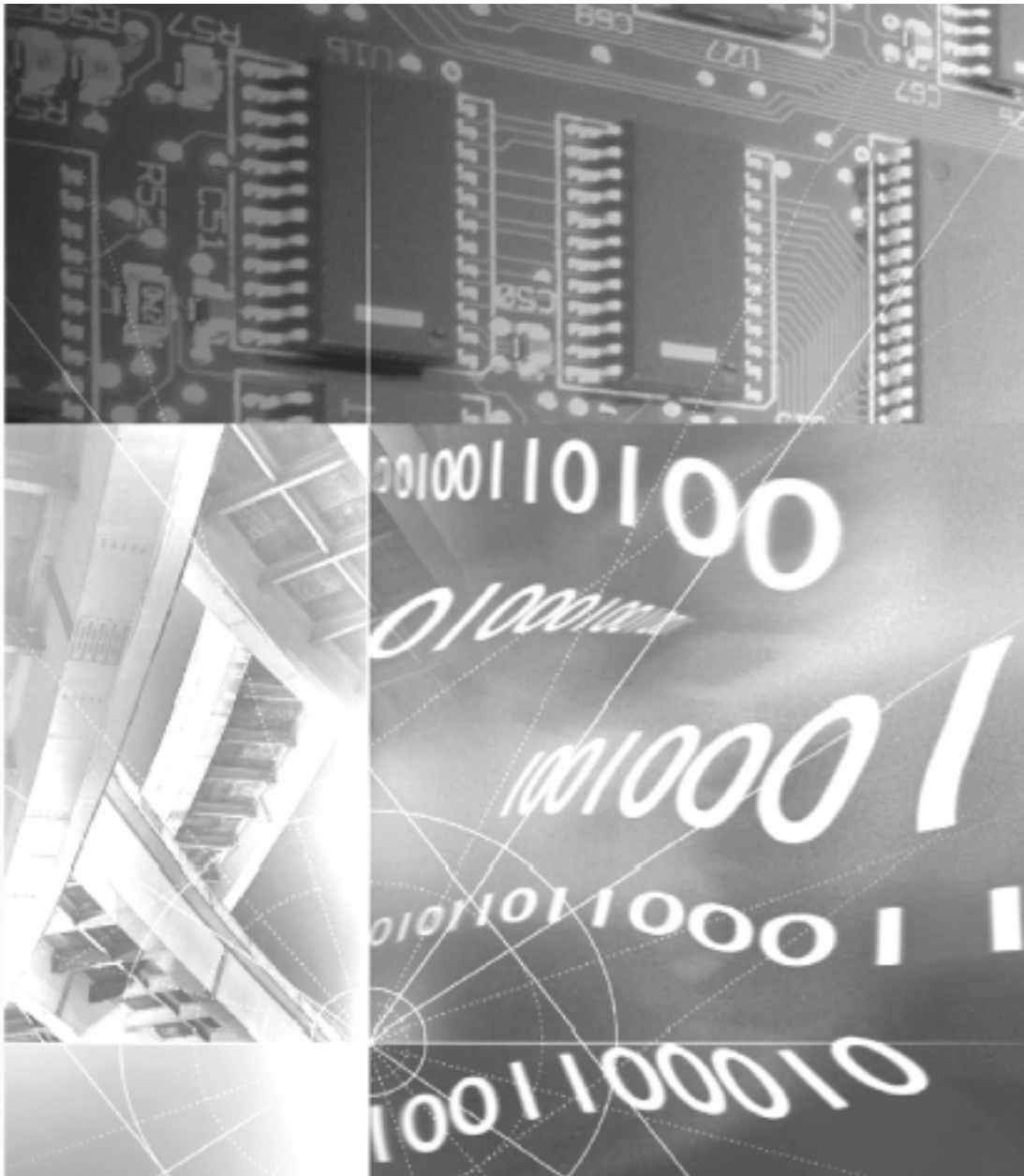
Cable Management System User's Guide



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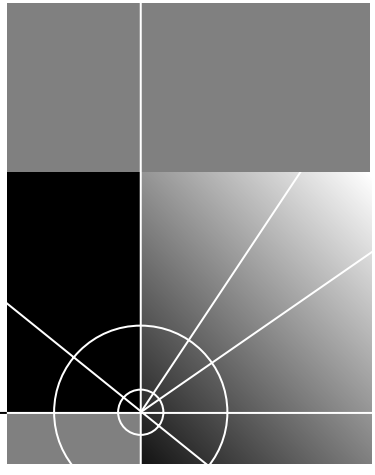

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3 Working with Cable Modems at the Customer End

4 RUNNING CMTS COMPONENT-LEVEL OPERATIONS

5 WORKING WITH THE 3COM CMTS

6 USING CMS TO MAXIMIZE PERFORMANCE

About This Guide

The *Cable Management System User's Guide* is intended for experienced cable data network administrators who have purchased the optional Cable Management System (CMS) to set up, and maintain the following 3Com® data over cable products:

- cable modems, and
- Cable Modem Termination System (CMTS).

If the information in the Release Notes shipped with your product differs from the information in this guide, follow the instructions in the Release Notes.

Finding Specific Information in This Guide

This table lists the location of specific information in this guide.

UPDATE

If you are looking for	Turn to
CMS features	Chapter 1
Install requirements	Chapter 1
How to install or uninstall CMS	Chapter 1
How to define a Chassis View	Chapter 1
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How to analyze data traffic for optimum performance	Chapter 6

Conventions

The tables below describe conventions that are used in this guide.

Notice Icons

Icon	Notice Type	Description
	Information note	Important features or instructions
	Caution	Information to alert you to potential damage to a program, system, or device
	Warning	Information to alert you to potential personal injury

Text Conventions

Convention	Description
The words "Enter" and "type"	When you see the word "enter" in this guide, you must type something, and then press the **Enter** key.
Menu commands and *buttons*	Menu commands or button names appear in italics. Example: See the *Help* menu.
Words in *italicized* type	Italics emphasize a point or denote new terms at the place where they are defined in the text.
Words in **bold-face** type	Denotes a command you need to type, or click. Example: Click **OK**.

Related Documentation

The following 3Com documents provide additional information on the 3Com data over cable system and its components.

- *Cable Access Router Release Notes*
  Contains helpful information and tips for the latest release of the CAR and CMTS components.
- *Cable Access Router User Guide*
  Contains product descriptions, installation, management, and troubleshooting information.
- *Cable Access Router Command Line Interface Reference Guide*
  Contains descriptions and examples of all CAR CLI commands.
- Cable Access Router Software Upgrade Guide
  Lists procedures for updating Generation 1.0 software to Generation 2.0 or greater software
- *QAM Modulator Network Interface Card Getting Started Guide*
  Provides information required to install and configure the Single Channel QAM Modulator NIC.
- *Upstream Receiver Card Network Application Card Getting Started Guide*
  Provides information required to install and configure the Upstream Receiver Card to work with the Cable Access Router.
- *Cable Management System User Guide (this guide)*
  Describes how to install and use the CMS software to configure, monitor, and troubleshoot all 3Com CMTS equipment and connected cable modems.

Product Compatibility

The CMS Graphical User Interface (GUI) supports 3Com cable data products associated with Release 2.5.0 and Release 2.5.1. It is important to note that CMS works in conjunction with any DOCSIS compliant cable modems.

In addition, please note that CMS version 1.2.6 works only with the DOCSIS specified Cable Device 4 MIB. CMS version 1.2.6 will not work with cable modems that use a newer version of the MIB (as defined in RFC 2669).

Contacting 3Com

Before contacting 3Com Technical Support, obtain this information:

- Contract number
- Problem description
  - Symptoms
  - Known causes
- 3Com products
  - Software and hardware versions
  - Serial numbers
- Troubleshooting attempts

3Com Support Numbers

Call the appropriate toll free number listed below for Technical Support.

Country	Toll Free Number
Canada	1-888-326-3844
United States	1-888-326-3844
All other locations	1-800-231-8770

For European countries that do not have a toll free number listed, call +31 30 602 9900.

For information about Customer Service, including support, training, contracts, and documentation visit our website at **http://totalservice.3com.com**.

1 CMS BASICS

Read this chapter for a complete overview of 3Com Cable Management System (CMS) software and features. This chapter also includes,

- Setting up CMS in your cable data network
- CMS install requirements
- Hardware compatibility checklist
- CMS install and uninstall procedures
- An introduction to CMS toolbars and buttons
- Selecting components via the *Chassis View Display.*

CMS Overview

CMS is an easy-to-use Graphical User Interface (GUI) that enables you to set up, monitor, and maintain the 3Com cable modem Termination System (CMTS) and connected 3Com cable modems in your network.

CMS uses a Windows-based GUI and the Simple Network Management Protocol (SNMP) to help you manage your 3Com cable data equipment. CMS runs using Windows 95, Windows 98, or Windows NT. An integrated on-line help system is included to guide you through the configuration process.

CMS Lite

3Com also offers a read-only version of this software, called CMS Lite. CMS Lite provides an excellent resource for technicians, system administrators, and third party vendors whose primary role is to monitor the network. CMS Lite lets you gather real time status, check current software versions, and view all settings without the ability to make changes to the existing configuration.

Contact your 3Com sales representative for information on how to purchase CMS Lite.

Reviewing Features

CMS software provides these features.

- CableLabs® Compliant
- Manages all cards in CMTS, including One-way, Two-way, and Three- way devices
- SNMP-based management
- Easy-to-use CMTS Setup wizard
- Provides a unique inventory feature, that lists software and hardware version numbers, also indicates device run time
- Cable modem discovery
- Cable modem configuration
- Software upgrade feature for all CMTS cards, including CableLabs compliant cable modems connected to the chassis.
- Class of Service (CoS) customization
- Customer Premise Equipment (CPE) Address Resolution Protocol (ARP) for Two-way systems
- Concatenation for improved performance
- Easy clock mode setup
- Multiple chassis management
- Multiple CAR operations
- Individual cable modem status
- IP filtering
- Performance and graphing capabilities

Read the following section for a description of each feature.

CableLabs Certified

3Com cable data products have been tested rigorously by Cable Television Laboratories, Inc. (also known as CableLabs). When you see the "CableLabs Certified" seal on 3Com products, you can be assured the following.

- 3Com equipment follows CableLab's strict industry-standard cable data equipment guidelines.
- The 3Com CMTS interoperates with all brands of CableLabs certified modems.

One-way, Two-way, and Three-way Management

CMS allows you to manage your cable data network regardless of which data over cable architecture is deployed. For example, CMS functionality is compatible with One-way (telco return), Two-way (RF return), and Three-way (combined telco and RF return) cable modems.

SNMP Management

CMS uses SNMP to manage your cable modems. CMS uses some standard Management Information Base (MIB) II objects, some CableLabs MIB objects, and 3Com-specific MIBs that are required to support the 3Com data-over-cable architecture. CMS also allows you to configure various SNMP access parameters for cable modem management.

CMTS Setup Wizard

The Setup Wizard is an automated feature that allows you to enter basic IP addressing information for the CMTS. You can use this feature to configure new Cable Access Router cards in the CMTS, or to modify existing configurations.

Cable Modem Discovery

CMS allows you to enter a range of cable modem IP addresses and then detect the active 3Com cable modems within that range that are currently connected to the CMTS.

After a cable modem discovery, all active IP addresses and statistics are displayed in the *Connected CMs Status* window.

Cable Modem Configuration

CMS allows you to configure individual One-way cable modems remotely without redefining the Telephony Channel Descriptor (TCD) configured in the Cable Access Router at the headend. CMS also provides you with the ability to configure all SNMP access parameters for Two-way cable modems from a remote location.

Software Upgrade

CMS allows you to download the latest software version to cable modems from a remote location. You can use this feature to upgrade a single cable modem, or you can choose to upgrade multiple cable modems simultaneously.

Class of Service Customization

You can define up to eight Class of Service (CoS) entries per customer site. Using CMS, define basic CoS parameters for cable modems connecting to the CMTS. For example, depending on customer requirements, you can increase or decrease data transfer rates per upchannel and downchannel.

CPE ARP for Two-way Systems

CMS lets you enable or disable Customer Premise Equipment (CPE) Address Resolution Protocol (ARP) for Two-way systems. This allows you to control the way CPEs connected to cable modems obtain IP addresses from the headend.

Concatenation for Improved Performance

In networks that have low upstream contention, concatenation can improve overall system performance. Applying concatenation improves audio and video applications that are not running smoothly in a non-concatenated CMTS. It also helps you use the maximum upstream transmit burst defined for each upstream channel more efficiently.

Easy Clock Mode Setup

CMS makes it easy to define one CAR in the CMTS as the system clock master. All other components (QAM Modulators, URCs, or another CAR) will then obtain their clock signal from the CAR master.

Multiple Chassis Management

Use CMS to manage multiple chassis in your data cable network. View CMTS status, customer and chassis connection information.

Multiple CAR Operations

Apply operations simultaneously to all the Cable Access Routers installed in your network. You can perform multiple card resets, reboots, software upgrades, and configuration save and restores.

Individual Cable Modem Status

Double-click the *Connected Modems* icon in the *Chassis View Display* for a quick status overview, including

- MAC address
- IP address
- Registration state
- Upstream channel
- Customer name
- Customer address.

IP Filtering

CMS lets you configure IP filters that restrict access and services to cable modems based on the following characteristics.

- Source and destination IP addresses
- Source and destination MAC addresses
- Logical port or application
- IP protocol

You can use this feature to configure either IP CableLabs filters (filters based on the industry standard MIBs), or 3Com-specific filters (filters based on 3Com-proprietary MIBs).

Performance Monitoring Capabilities

CMS provides these charting and graphing capabilities, which help you monitor the performance of individual cable modems:

- *Downstream Signal to Noise Ratio Graph*
- *Upstream Power Level Graph*
- *Downstream Power Level Graph.*

Reviewing CMS Tools

The CMS GUI provides basic tools to help you manage your cable data network. For example, the software's main screen is divided into five distinct areas. Each area serves a different function in getting your CMTS and cable modems up and running, as follows.

- Menu bar and Toolbar
- Chassis View Display
- Workspace
- Card Details
- Status Bar

Each element is shown in the following illustration. See the next section for specific information on how to use CMS tools.

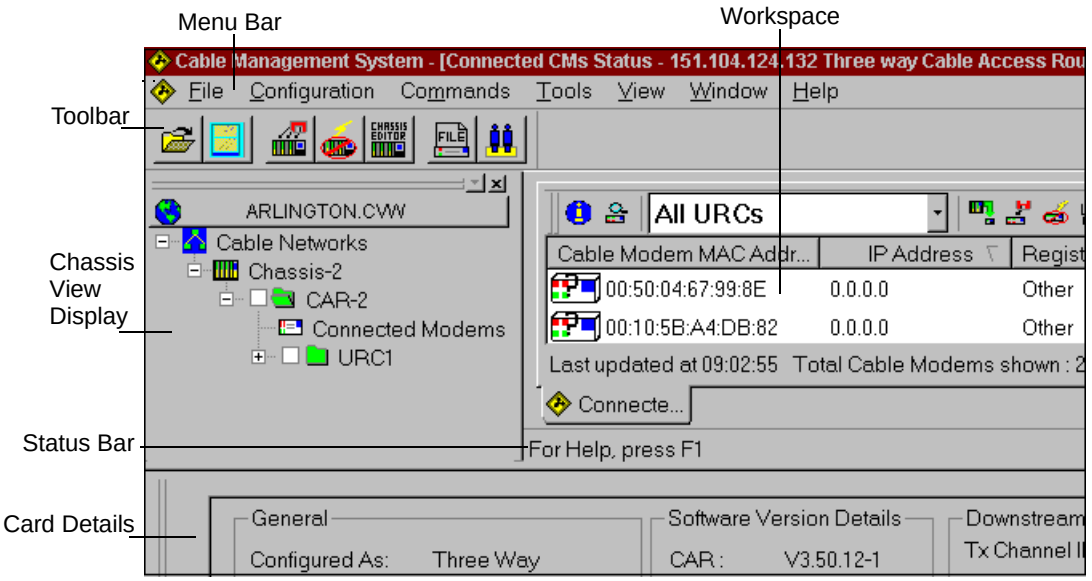


Figure 1-1 CMS Tools

CMS Tool Descriptions

GUI Element	Description
Menu Bar and Toolbar	Located at the top of your screen. Use to set commands via command text, or CMS buttons.
Chassis View Display	Located at the far left of the screen, displays a graphical, multi-level breakdown of the CMTS and all cards installed in a hierarchical file structure. Once you define a chassis view, the *Chassis View Display* provides a graphical means of selecting hardware installed in the CMTS.
Workspace	Displays all CMS windows and dialog boxes.
Card Details	Lists general information about the cards installed in the CMTS (CAR, URC, NMC). Information includes Slot, Port, Version Number and Return Frequency (RF) characteristics. You'll find *Card Details* near the bottom of the CMS window.
Status Bar	This area at the bottom of the screen shows the status of the CMS program, including commands which are pending and alerts that are generated by the attached CMTS.

Using the Main Toolbar

The Main Toolbar provides easy access to the CMS features used most frequently. Refer to the following table for the Main Toolbar button descriptions.

Figure 1-2 Main Toolbar

CMS Main Toolbar Buttons

Icon	Icon Name	Function
	Open Chassis View	Opens the *Chassis View Display* window, where all defined CMTS devices appear. From this window, access all configuration and status information for each CMTS at the headend.
	Close Chassis View	Closes the *Chassis View* (.cvw), for a selected CMTS device.
	Software Download	Upgrades URC and CAR software to latest version. Saves a new or edited CMTS configuration as a file to a local disk. **Note**: Click *Save to NVRAM* before clicking *Save Configuration* if you want the saved configuration file on disk to match the configuration on the Cable Access Router.
	Reboot the CMTS	Use to reset the entire CMTS, or individual URCs and CARs.
	Chassis Editor	Lets you edit current Chassis View (or CMTS) information including Chassis name, IP address, Read/Write community and device type.
	Configuration File Editor	Creates and edits .cfg files used for setting up cable modems.
	Customer Management	Defines customer profile information including name, location, contact person and system parameters.

Using the CAR Configuration Toolbar

The CAR is the main component in your CMTS. You'll use the *CAR Configuration* tool to set the card's values. Access the *CAR Configuration* tool from the *Command* pull-down menu, for example.

Read the descriptions in the table shown next for a better understanding of the *CAR Configuration* Toolbar.

Figure 1-3 CAR Configuration Toolbar

*Like most Windows-based applications, exit the CAR Configuration window by clicking **x** in the top right corner of the window.*

CAR Configuration Toolbar Buttons

Button	Description
	Requests, or gets the latest CMTS configuration and status information from the Cable Access Router.
	Configures the system with the information you entered. The *Set* button sends any changes you made to the Cable Access Router. **Note:** After making changes to the configuration, you must click the **Set** button for the new settings to be applied.
	Creates a new entry.
	Modifies existing configuration setting(s).
	Removes an entry.

CAR Configuration Toolbar Buttons

Button	Description
	Do not use, disabled button.
	Saves to non-volatile memory (NVRAM).
	Saves the configuration.
	Restores the previous configuration.
	Launches online Help.

Using the Configuration File Editor Toolbar

When you click the *Configuration File Editor* button  , the *Configuration File Editor* Toolbar appears. Read the descriptions in the table shown next for a better understanding of Toolbar buttons.

Figure 1-4 Configuration File Editor Toolbar

Configuration File Editor Toolbar Buttons

Icon	Icon Name	Function
	Create a New Configuration File	Use to set properties for a new configuration file.
	Open Existing Configuration File	Use to open a predefined Configuration File.
	Save Configuration File	Saves current Configuration File.
	Save As	Uses *Save As* feature to rename current Configuration File,

Using the Connected Modems Toolbar

When you click the *Connected Modems* icon , the *Connected CMs Status* window appears. The *Connected Modems* Toolbar displays at the top of the window. Read the descriptions in the table shown next for a better understanding of Toolbar buttons.

Figure 1-5 Connected Modems Toolbar

Connected Modems Toolbar Buttons

Icon	Icon Name	Function
	Refresh CM Status View	Click to display the most up-to-date status of the cable modems in your network.
	Download Software to Multiple CMs	Click to update cable modems with the latest software version.
	Reboot Multiple cable modems	Click to power off, then power on cable modems.

Connected Modems Toolbar Buttons

Icon	Icon Name	Function
	Issue USR Message to Multiple CMs	Click to send User Station Request (USR) messages to selected cable modems.
	Change SNMP Settings for Multiple Cable Modems	Click to update SNMP settings on selected cable modems.
	Move Cable Modems to a New Upstream Channel	Click to connect the selected cable modems to a different Upstream Receiver Channel.
	Delete Inactive Cable Modems	Click to remove all cable modems not responding.

Chassis View Display Overview

Before you begin to manage your cable data network using CMS, you need to associate each CMTS chassis with a *Chassis View*. You will define a separate *Chassis View* for each CMTS installed in your network.

When you finish, the *Chassis View* icon displays in the *Chassis View Display* area in CMS. Here, your predefined Chassis View provides a graphical means of selecting hardware installed in the CMTS. Here is an example

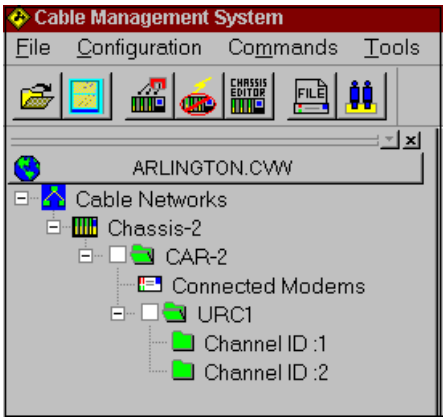


Figure 1-6 Chassis View Display

As shown in the previous figure, you can easily identify a Chassis View by the extension .cvw.

Chassis View Wizard

For first time setup, the automated *Chassis View Wizard* tool guides you through defining a Chassis View, prompting you for the most basic networking parameters. These include the CAR Name, IP Address, Community String and Device Type. Once you create a *Chassis View*, you can configure all CMTS parameters.

Note that although you can define multiple Chassis Views (.cvw), only one CMTS or Chassis View is active at a time.

Chassis Editor Tool

You will use the *Chassis View Editor* tool 

, in the Main Toolbar to update your Chassis Views (for instance if you need to add a chassis, delete a Cable Access Router, etc.)

Using the Chassis Editor Toolbar

When you click the *Open Chassis View* button 
, the Chassis View Toolbar appears. Read the descriptions in the table shown next for a better understanding of Toolbar buttons.

Figure 1-7 Chassis View Toolbar

Chassis View Toolbar Buttons

Icon	Icon Name	Function
	Create a New Chassis View	Define properties for a newly installed *Chassis View* (CMTS).
	Open Chassis View	Opens a predefined *Chassis View*. A *Chassis View* is the graphical equivalent of a CMTS in your network.
	Save Chassis View	Saves the Chassis View properties.
	Create a New chassis.	Add a chassis to your current cable data network.

Chassis View Toolbar Buttons

Icon	Icon Name	Function
	Create a New CAR	Add a new CAR to your current cable data network.
	Edit Chassis View	Edit Chassis View properties.
	Delete a CAR	Remove a CAR from a CMTS.
	Help	Launches online Help.

Now that you are familiar with CMS tools, complete steps 1 through 6 in the following sections to install CMS in your network.

Step One — Getting CMS Up and Running

Read this section to learn how to integrate the software into your network.

Tasks to Complete Prior to Installing CMS

If you have not already configured the CMTS to work with cable modems at the customer's site, you will need to do so now, using the Cable Access Router's Command Line Interface (CLI).

Establish Initial CMTS Connection Via the CLI

Use the CAR CLI to configure CMTS parameters for a One-way, Two-way or Three-way cable data network. Follow the detailed instructions in your *Cable Access Router User Guide*, Part Number 1.024.1740-01, and complete the following.

- Connect the special console port cable that ships with the Cable Access Router, to the RS-232 port on the Cable Access Router's Network Interface Card (NIC)
- For Three-way systems only, enable the Three-way feature key
- Set cable mode
- Set Ethernet IP interface

- Add Cable IP network
- Add default gateway
- Set SNMP Community Name

After completing these tasks, see the next section to check CMS install requirements.

Step Two — Review Installation Requirements

Please review the following CMS installation recommendations before installing the software.

- Provision and install the CMTS according to the procedures outlined in the latest version of the *Cable Access Router User Guide*.
- Also, 3Com recommends that the computer where you're installing CMS operates with the following.
  - — Windows 95, Windows 98, or Windows NT or higher
  - — Intel Pentium processor
  - — 32 MB RAM
  - — 10 MB available disk space
  - — Ethernet Network Interface Card (NIC) installed
  - — Installed on same Ethernet Local Area Network (LAN) as the CMTS

Next, check CMTS component version numbers, described next.

Hardware Compatibility Checklist

Make sure that the 3Com hardware installed in the network matches, or exceeds the version numbers listed next.

- Cable Access Router versions 3.1.17 or higher
- Internal Telco Return cable modems, CMCC software versions 1.7 and higher
- External Two-way cable modems, version 12.30 or higher
- Internal Two-way cable modems, version 12.30 or higher
- External Telco Return Modems, version 0.79 or higher

Now you are ready to install CMS.

Step 3 — Install

Use these steps to install and launch CMS software.

Always uninstall previous versions of CMS before reinstalling or upgrading the software.

1. Insert the CMS CD in your computer's CD drive. CMS automatically starts to load.
2. Click **OK** to launch the installation wizard.
3. When prompted, click **Next** to continue the installation. Follow the on-screen prompts.
4. To launch the program, double-click the CMS program button,  , in the CMS Program group directory.

Uninstalling CMS

Use these steps to uninstall CMS.

Always uninstall previous versions of CMS before reinstalling or upgrading the software.

1. Double-click the **Uninstall CMS** button,  , in the CMS program group.
2. The *Uninstall Shield* appears and proceeds to remove files related to the application.
3. When the uninstall is complete, CMS prompts you to manually delete some files from the CMS program directory. Do so at this time.
4. If you need to reinstall CMS software, reboot your workstation first.

Step Four — Create and Install Cable Modem Configuration File

Go to Chapter 2, *Creating Cable Modem Configuration Files*, for detailed instructions on creating the configuration file.

You must create and install the configuration file before you can use CMS to manage your CMTS and connected modems.

After following the steps outlined in Chapter 2, return to this chapter to complete Step 5 "Define a Chassis View," listed next.

Step 5 — Define a Chassis View for Each 3Com CMTS

Complete the following steps to define a separate *Chassis View* for each CMTS installed in your network.

Name the Chassis View

First use the *Chassis View Editor* tool to name the Chassis View associated with the CMTS in the network.

If you do not specify a filename, CMS automatically names the Chassis View default.cvw.

1 Click the **Chassis View Editor** button 

, from the CMS Main Toolbar.

2 Click the **Create a New Chassis** button 
, from the Chassis View Editor Toolbar. The *Chassis Name* dialog box appears

3 Type a name to help you identify your CMTS in your network.

4 Click **OK**.

Set CAR Properties for the Chassis View

Next, use the *Chassis View Editor* tool to add a CAR to the Chassis View as follows.

1 Click the **Chassis View Editor** button 

, from the CMS Main Toolbar.

2 Click the **Create a New CAR** button 
, from the Chassis View Editor Toolbar. The *CAR Properties Definition* dialog box appears.

3 Type the entries as follows.

Chassis — Select the previously defined chassis name from the pull-down menu.

Device Type — Select the appropriate cable technology used by your CMTS, as follows.

- Telco Return (also One-way), select if your system passes data over cable using an upstream path only.
- Two-way, select if your system passes data over cable using both upstream and downstream paths, (RF return).
- Three-way, select if your system passes data using the combined Telco return and RF return.

Caption — Type a short description to identify the CAR, by facility or geographic region.

IP address — Type the unique number (in x.x.x.x format) assigned to the CAR. ***Tip:*** You can obtain the CAR's IP address from your Network Administrator.

Community — Type the password required for SNMP access to this CMTS device, (up to 32 characters).

4 Click **OK**.

You are now ready to manage your CMTS via the Chassis View you just created. See the next section, *Navigating the Chassis View Display* for specific information on accessing the *Chassis View*.

Navigating the Chassis View Display

Read this section for common *Chassis View Display* operations.

How to Open a Chassis View

Use these steps to begin a Chassis View session.

1 Click the **Open Chassis View** button,  .

2 In the *File type* box, select Chassis Views (*.cvw). Next, browse your system files and select the appropriate Chassis View file.

3 Click **Open**.

How to Close a Chassis View

Use these steps to end a Chassis View session.

1 Click **Close Chassis View** button,  .

2 A list of Chassis Views appears. Click a checkmark in the box next to the Chassis View you would like to close.

3 Click **OK**.

How to Save a Chassis View

After making changes to your current *Chassis View(s)*, save the .cvw file as follows.

1 Click the **Chassis View Editor** button  , from the CMS Main Toolbar.

2 Add a new Chassis View, or update CAR properties as necessary.

3 Click the **Save Chassis View** button  , from the Chassis View Editor Toolbar.

How to Select an Item from the Chassis View Display

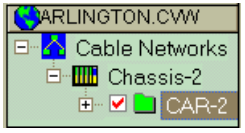
Basically, there are two ways to select items and components as shown in the following examples.

To set system parameters using the *CAR Configuration* tool, first select the appropriate CAR as follows.

1 Click a red checkmark in the checkbox.

2 Click on the name of the CAR, highlighting the component's name.

For example:



3 In the same way, to check modems' status, simply select or highlight the words, "Connected Modems."

For example:

How to Refresh the Chassis View Display

If you want your configuration changes reflected immediately in the *Chassis View Display*, you'll need to refresh the display by opening and closing it, as follows.

1 If the Chassis View display is already open, click the **Close Chassis View** button,  .

2 Next, re-open by clicking the **Open Chassis View** button,  .

Your latest changes now show in the *Chassis View Display*.

Updating Chassis View Properties

Read this section if you need to revise the current Chassis View to reflect a change in hardware, or networking environment.

Editing CAR Properties in a Chassis View

Use these steps to revise current CAR properties in a *Chassis View*.

1. Click the **Chassis View Editor** button 

, from the CMS Main Toolbar.
2. Click the **Open Chassis View** button,  .
3. Browse for the appropriate .cvw file. Click **Open**. A minimized *Chassis View Display* appears.
4. Expand the minimized *Chassis View Display* and select the appropriate CAR.
5. Click the **Edit** button  , from the *Chassis View Editor* Toolbar. The *CAR Properties Definition* dialog box appears.
6. Update the appropriate entries. If necessary, refer to the entry definitions listed previously in the *Set CAR Properties for the Chassis View* section.
7. Click **OK**.

How to Remove a CAR from a Chassis View

If a CAR is physically removed from the CMTS, you must update the corresponding Chassis View within CMS also. Use the *Chassis View Editor* tool to delete a CAR as follows.

1. Click the **Chassis View Editor** button 

, from the CMS Main Toolbar.
2. Click the **Open Chassis View** button,  .
3. Browse for the appropriate .cvw file. Click **Open**. A minimized *Chassis View Display* appears.
4. Expand the minimized *Chassis View Display* and select the CAR you need to remove.
5. Click the **Delete CAR** button,  . The CAR disappears from the from the *Chassis View Editor* work area.
6. Click the **Save Chassis View** button,  .

Step 6— Set Up Customer Profiles

The first time you set up the system, and any time you add a new client, use the *Customer Management* tool as follows.

1. Click the **Customer Management** button,  from the Main Toolbar.
2. The *Customer Management* window displays. Type the following customer information.
   - Last Name, First Name
   - Customer Cable Modem MAC Address
   - Customer Address including City, State and Zip Code
   - Telephone Number
3. Click **Apply**. Or, click **Reset Values** to clear present data from the fields.

In order for the updated customer information to register, you must first refresh the Chassis View Display. To refresh, open and close the Chassis View Display.

What's Next?

If you have not already, go to Chapter 2 and follow the instructions for creating the Configuration File.

2 Creating Cable Modem Configuration Files

CMS provides you with a simple way to create and install a new or updated CMTS Configuration File via the *Configuration File Editor* tool on the Main Toolbar.

This chapter lists procedures for creating a configuration file.

Why Do I Need to Create a Configuration File?

The cable modems installed at your client site require a set of customized instructions to receive data from the 3Com CMTS chassis installed at the headend. These instructions, or configuration files, contain predefined properties based on your client's needs and present networking environment.

Each time a cable modem attempts to connect to the 3Com CMTS, the Configuration File supplies the following.

- Authentication and initialization data
- Encryption parameters
- Provisioning data
- Downstream frequency and bandwidth allocation
- Upstream frequency and bandwidth allocation
- Access restrictions
- Connection phone numbers

In addition, the file is installed on the cable headend TFTP server, and is downloaded to every cable modem that registers with the CMTS. All parameters in the Configuration File are used by the cable modem until it powers down or reboots. Also, there is no limit on the number of files you can create for a given CMTS.

Components of the Configuration File

The cable modem Configuration File contains some or all of the settings described in the table that follows.

Components of the Cable Modem Configuration File

Component	Description
General Configuration Parameters and Flags	General configuration information that is required by all cable modems regardless of the data over cable network architecture (One-way, Two-way or Three-way). For example: ■ Upstream frequency ■ Downstream frequency ■ Shared secret ■ Maximum number of CPEs allowed
QoS Configuration	Defines basic Quality of Service (QoS) throughput and encryption restrictions based on the type of user and data being transmitted by cable modems. For example: ■ Maximum downstream data throughput rate ■ Minimum upstream data throughput rate ■ Maximum upstream data throughput rate
SNMP Write Access Configuration	Defines the type of SNMP access allowed to the SNMP MIB objects sent to client cable modems. Provides a low-level way of constructing the SNMP MIB information that client cable modem SNMP agent software will use to initialize itself.
Telephony Channel Descriptor Configuration	***For One-way cable modems only.*** Defines the basic dialing and access instructions required by the analog component of One-way cable modems to establish a dial-up session with the Telco Return Access Concentrator (TRAC). For example: ■ TRAC phone numbers ■ PPP authentication type ■ Login username and password
Baseline Privacy Configuration	Defines data encryption parameters if the cable modem supports Baseline Privacy.
MIB Object Configuration	Provides a low-level method of initializing the cable modem SNMP agent software. For example, you can construct IP data filters, SNMP access restrictions, cable modem software download instructions, and other SNMP command sequences.
MAC Address Configuration	Defines which cable modem Customer Premises Equipment (CPE) Media Access Control (MAC) addresses are authorized to access the CMTS.

Creating the Configuration File

Read each of the following sections *carefully* before you begin to create a configuration file. For example, you will only need to follow the instructions in the *Telephony Descriptor Configuration* section if you are running a One-way (Telco Return) cable network.

General Configuration Parameters and Flags

Use these steps to set General Configuration Parameters and Flags.

1 Click the *Configuration File Editor* button 

, from the Main toolbar. The *General Configuration Parameters and Flags* window displays.

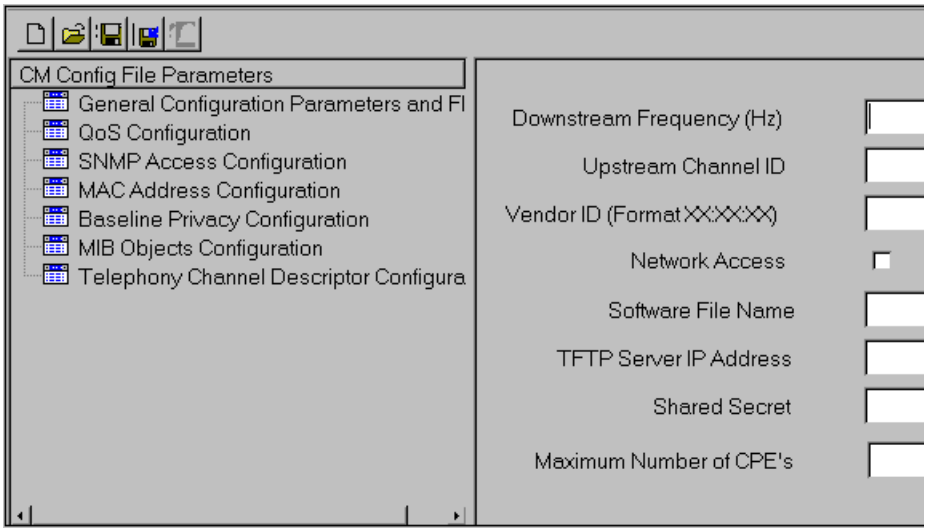


Figure 2-1 General Configuration Parameters and Flags

2 Type the appropriate entries, as follows.

- **Downstream Frequency (Hz)** — Enter the frequency (in Hz) to be used by the cable modem to receive downstream transmissions from the CMTS. It must be a multiple of 625000 Hz. If you do not specify a downstream frequency, the cable modem will use the first available downstream frequency it finds.
- **Upstream Channel ID** — For Two-way (RF return) systems enter the upstream channel ID which the cable modem must use. For One-way (telco return) systems, you must enter 0 (zero). The cable modem must listen on the defined downstream channel until an

upstream channel description with this ID is found. It is an override for the upstream channel selected by the cable modem during its original scanning. If you do not specify an upstream channel ID, the cable modem will use the first available upstream frequency.

- **Vendor ID** — Type the vendor identification specified by the three-byte vendor-specific organization identifier of the cable modem MAC address.
- **Network Access** — Place a check in this box to enable the cable modem to access the cable data network. If you do not enable Network Access, cable modems will be able to lock onto upstream and downstream frequencies, but will not be able to communicate with the headend LAN or the Internet.
- **Software File Name** — Type the software upgrade file name for the cable modem. This allows the cable modem to check for software upgrades each time it registers with the CMTS.
- **TFTP Server Address** — Type the IP address of the TFTP server on which you will place a copy of this Configuration File. Enter the address in the nnn.nnn.nnn.nnn format.
- **Shared Secret** — The Shared Secret is an authorization string common to the 3Com CMTS and the person who creates the Configuration File. It ensures that cable modems abide by the provisioning information they received from the Configuration File on the TFTP server at the headend during registration.

  Note: The Shared Secret **must** be identical to the one set in the Cable Access Router in the CMTS.
- **SNMP Manager IP Address** — Type the IP address of the workstation being used to receive SNMP Trap messages from cable modems.
- **Maximum Number of CPEs** — Type the maximum number of Customer Premises Equipment (CPE) devices that are allowed access to a single cable modem.

3 Continue with the next section, *QoS Configuration*.

QoS Configuration Use these steps to set Qos settings for the Configuration File.

1. Click the **Configuration File Editor** button from the Main Toolbar.
2. Click the **QoS Configuration** folder. The *QoS* table displays. To create a new QoS, click the **Add** button. The *QoS* dialog box displays.

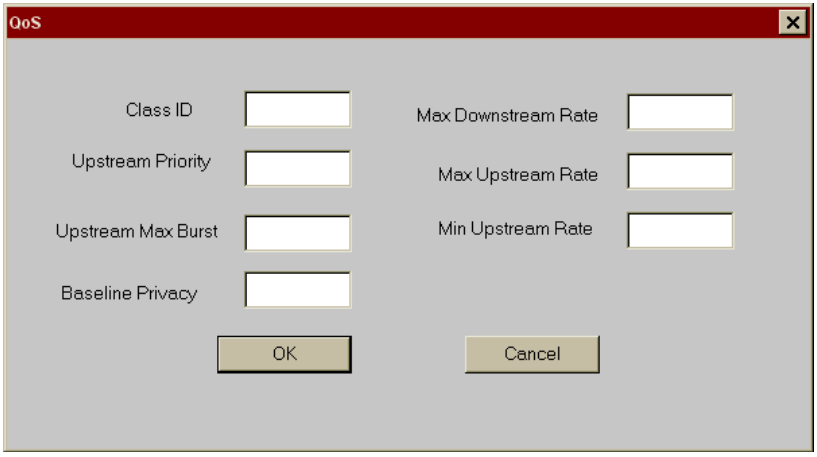


Figure 2-2 QoS Configuration Dialog Box

3. Type the appropriate entries, as follows.

   Class ID — Type a value which specifies the identifier for the class of service to which the encapsulated string applies. The ID class must be in the range of 1 to 16.

   - **Upstream Priority** — Type a value which specifies the relative priority assigned to this class of service for data transmission in the upstream channel. The upstream priority must be in the range of 0 to 7. Higher numbers indicate higher priority.
   - **Upstream Max Burst** — Type a value which specifies the maximum data rate (in bits per second) allowed from this service class on the upstream channel.
   - **Baseline Privacy** — Type 1 to enable, or 0 to disable Baseline Privacy.
   - **Maximum Downstream Rate** — Enter a value which specifies the maximum data rate (in bits per second) allowed for this class of service on the downstream channel.
   - **Maximum Upstream Rate** — Enter a value which specifies the maximum transmit burst (in units of mini-slots) which this class of service is allowed on the upstream channel. The max upstream rate must be in the range of 0 to 255.

- **Minimum Upstream Rate** — Enter a value which specifies (in bits per second), the data rate that will be guaranteed to this service class on the upstream channel.

4. To revise the current QoS, click on the appropriate entry in the QoS table, and click the **Edit** button. For an explanation of each entry, refer to the descriptions in the previous step
5. To remove a QoS setting, click on the appropriate entry in the QoS table, and click the **Delete** button.
6. Click the *Save Configuration File* button  , in the *Configuration File Editor* toolbar to save your changes.

Continue with the next section, *SNMP Access Configuration*.

SNMP Access Configuration

Use these steps to set SNMP Access settings for the Configuration File.

1. Click the **Configuration File Editor** button  , from the Main Toolbar.
2. Click the **SNMP Access Configuration** folder. The MIB object ID table displays.
3. To set up SNMP access, click the **Add** button. The *SNMP Access* dialog box appears.

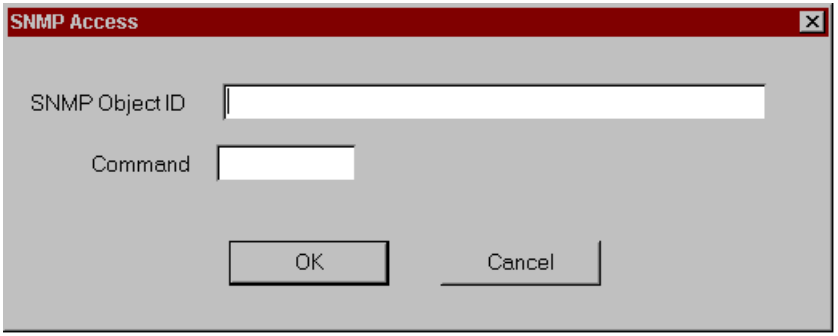


Figure 2-3 SNMP Access Dialog Box

4 Type the entries as follows.

- **SNMP Object ID** — Enter the MIB Object ID for which you want to define SNMP access control.
- **Command** — Specifies the type of access allowed to this SNMP MIB Object. Type 0 for read/write access. Type 1 for read access only.

5 Click **OK**.

6 Repeat steps 3 and 4 until you have entered all SNMP MIB Object access information. Click **OK** when finished.

Continue with the next section, *Baseline Privacy Configuration*.

Baseline Privacy Configuration

Use these steps to set Baseline Privacy values for the Configuration File.

1 Click the **Configuration File Editor** button 

.

2 Click the **Baseline Privacy Configuration** folder. The *Baseline Privacy* dialog box displays.

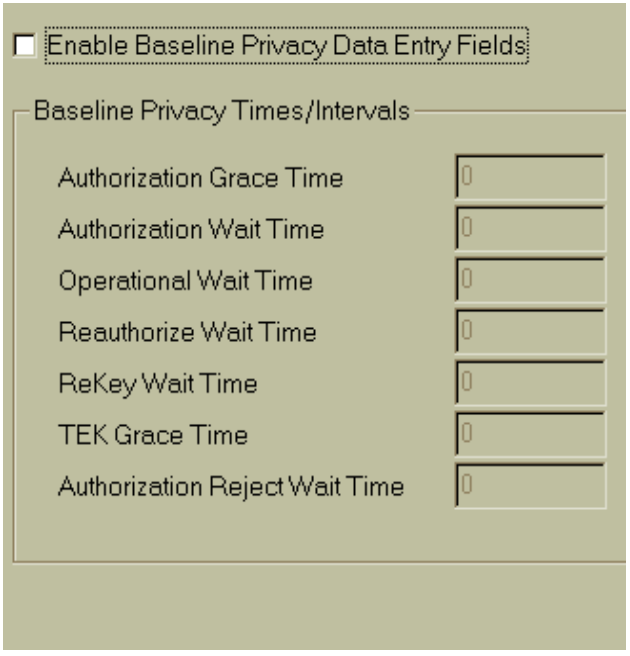


Figure 2-4 Baseline Privacy Dialog Box

3 Click a checkmark in the *Enable Baseline Privacy Data Entry Fields* checkbox.

4 Type the entries as follows.

- **Authorization Grace Time** — Enter the amount of time (in seconds) before authorization is scheduled to expire. After this time, the cable modem starts re-authorization.
- **Authorization Wait Time** — Enter the timeout period (in seconds) between sending Authorization Request messages from the Authorize Wait state.
- **Operational Wait Time** — Enter the timeout period (in seconds) between the sending of Key Request messages from the Operation Wait state.
- **Reauthorize Wait Time** — Enter the timeout period (in seconds) between sending Authorization Request messages from the Reauthorize Wait state.
- **Rekey Wait Time** — Enter the timeout period (in seconds) between the sending of Key Request messages from the Rekey Wait state.
- **TEK Grace Time** — Enter the amount of time (in seconds) before the TEK expires that the cable modem begins re-keying.
- **Authorized Reject Wait Time** — Enter the amount of time (in seconds) before the system rejects an authorization request from a cable modem.

Telephony Channel Descriptor Configuration

Use these steps to set Telephony Channel Descriptor (TCD) values for the Configuration File.

TCD configuration is required for telco return data over cable, One-way systems only.

1 Click the **Configuration File Editor** button , 

.

2 Click the **Telephony Channel Descriptor Configuration** folder. The *TCD* dialog box displays.

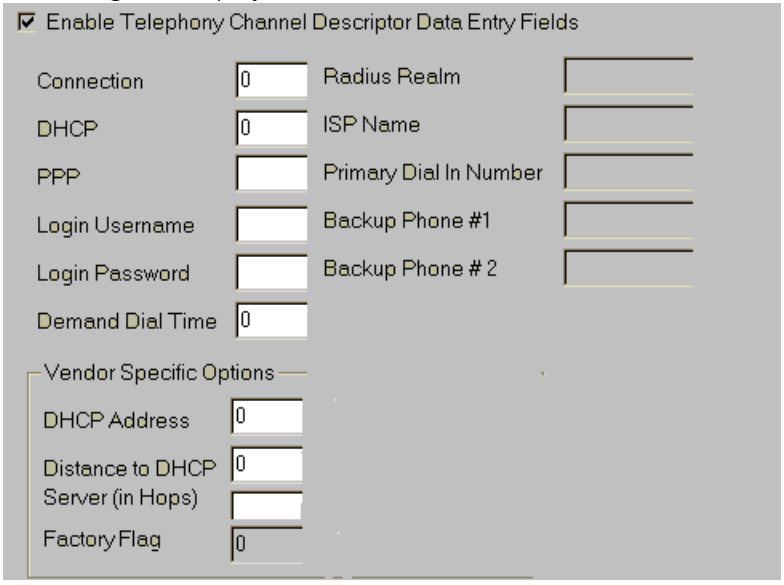


Figure 2-5 Telephony Channel Descriptor Dialog Box

3 Place a checkmark in the *Enable Telephony Channel Descriptor Data Entry Fields* check box.

4 Type the entries as follows.

- **Connection** — Enter the amount of time (in seconds) before authorization is scheduled to expire. After this time, the cable modem starts re-authorization.
- **DHCP** — Enter a value which determines whether DHCP must be used by the dial-in host. There are two options:
  - 1 = Use DHCP when dialing in
  - 0 = Do not use DHCP when dialing in

- **PPP** — Enter a value which specifies the type of PPP authentication. There are four options:
  - Not Set: Do not use any PPP authentication (PAP or CHAP).
  - Negotiate: Negotiate with the peer machine whether to use PAP or CHAP.
  - PAP: Use PAP for authentication. If the peer machine can only use CHAP or no authentication, the connection will be refused
  - CHAP: Use CHAP for authentication. If the peer machine can only use CHAP or no authentication, the connection will be refused
- **Login Username** — Enter the PAP/CHAP authentication username, if PAP or CHAP are used.
- **Login Password** — Enter the PAP/CHAP password if PAP or CHAP are used.
- **Demand Dial Time** — Currently not used.
- **RADIUS Realm** — If the RADIUS authentication server is not in the same domain as the TRAC, enter the full qualified domain name of the dial-in user, in the format *username@name.xxx*. For example:

  joe_doakes@company.com

  Otherwise, leave this field blank.
- **ISP Name** — Enter the name of the Internet Service Provider.
- **Primary Phone** — Enter the primary telephone number the cable modem must dial to establish a connection with the ISP. You can include a standard modem command string (these differ by modem vendor).
- **Backup #1** — Optional. Enter an alternate phone number the cable modem must dial to establish an ISP connection in case *Primary Phone* is unavailable.
- **Backup #2** — Optional. Enter an alternate phone number the cable modem must dial to establish an ISP connection in case *Backup # 1* is unavailable.
- **Vendor Specific Options** — Type the following vendor specific options.
  - **DHCP Address** — Enter the IP address of the DHCP server, if DHCP is used.

- **Distance to DHCP Server** — Type the number of hops to the DHCP server.
- **Factory Flag** — Set this SDP as the default. For example, type **0** to disable, or type **1** to set as the default.

5 Continue with *MIB Object Configuration*, next.

MIB Objects Configuration

Use these steps to set MIB Object values.

1 Click the **Configuration File Editor** button, 

.

2 Click the **MIB Objects Configuration** folder. The dialog box displays.

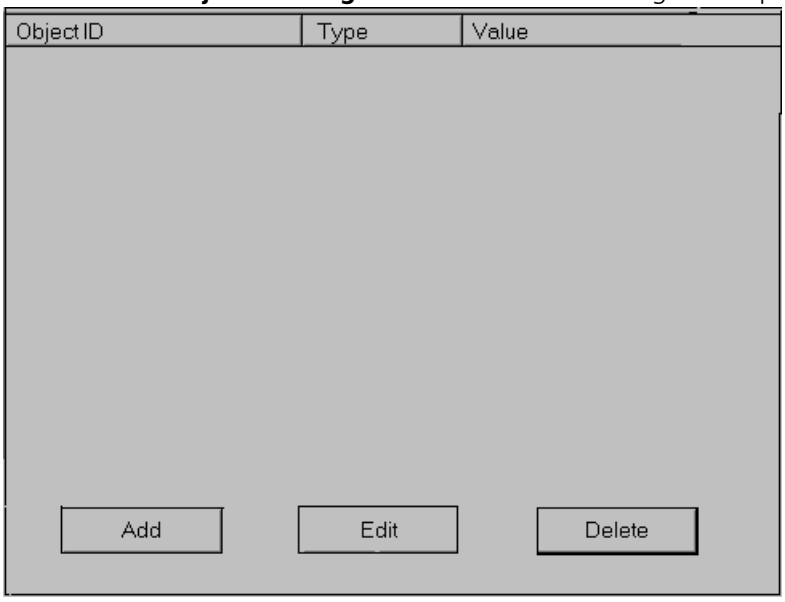


Figure 2-6 MIB Objects Configuration

3 Type the entries as follows.

- **MIB Object ID** — MIB Object OID
- **Type** — Select the type of MIB Object you specified with the MIB Object ID. Options are:
  - Counter
  - Gauge
  - Integer
  - IP Address

- Octet string
- SNMP IOD
- Time ticks.

- **Values** — Enter the actual value for this object. For example, if you selected IP Address as the Type, you would enter the IP address (in the nnn.nnn.nnn.nnn format).

4 When you have finished making all the required entries, click **OK**.

5 Continue with *MAC Address Configuration*, next.

MAC Address Configuration

You need to identify the MAC address assigned to each computer in your customer's cable data network before saving the Configuration File. Use these steps to set the MAC addresses for all computers residing at the Customer Premises Equipment (CPE) end.

1 Click the **Configuration File Editor** button, 

from the Main Toolbar.

2 Click the **MAC Address Configuration** folder.

3 Click the **Add** button. The *CPE Ethernet MAC Address* dialog box displays.

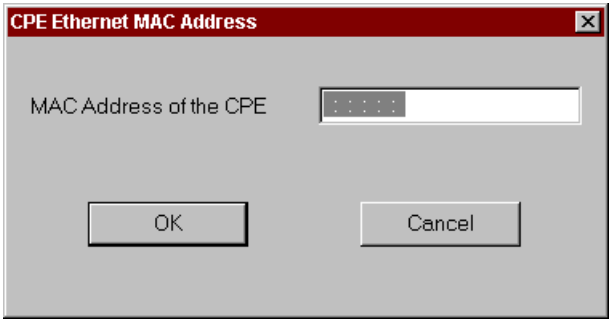


Figure 2-7 CPE Ethernet MAC Address Dialog Box

4 Type the Ethernet MAC Address of the Customer Premises Equipment (CPE) device operating within this cable data network.

5 Click **OK**.

6 Repeat steps 2 through 5 for each additional computer residing in the network.

Continue with *Saving the Configuration File*, next.

Saving the Configuration File

Use these steps to save the Configuration File.

1 Click the **Save As** button from the *Configuration File Editor* toolbar. The *Save As* dialog box appears.

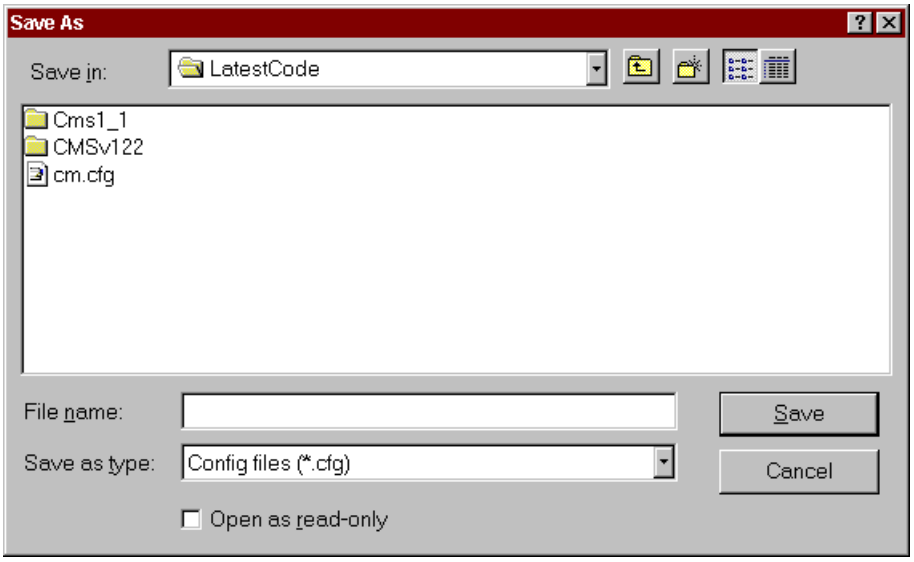


Figure 2-8 Save As Dialog Box

2 Select a destination for your file.

3 Type a filename. CMS automatically adds the .cfg extension. Click the **Save** button.

3Com recommends that you save an extra copy of the Configuration File to another drive.

Editing a Configuration File

The *Configuration File Editor* tool allows you to edit existing Configuration Files. Use the following steps:

1 Click the **Configuration File Editor** tool 

, from the CMS Main Toolbar.

2 Click the **Open Existing Configuration File** button,  . The *Open an Existing File* dialog box appears.

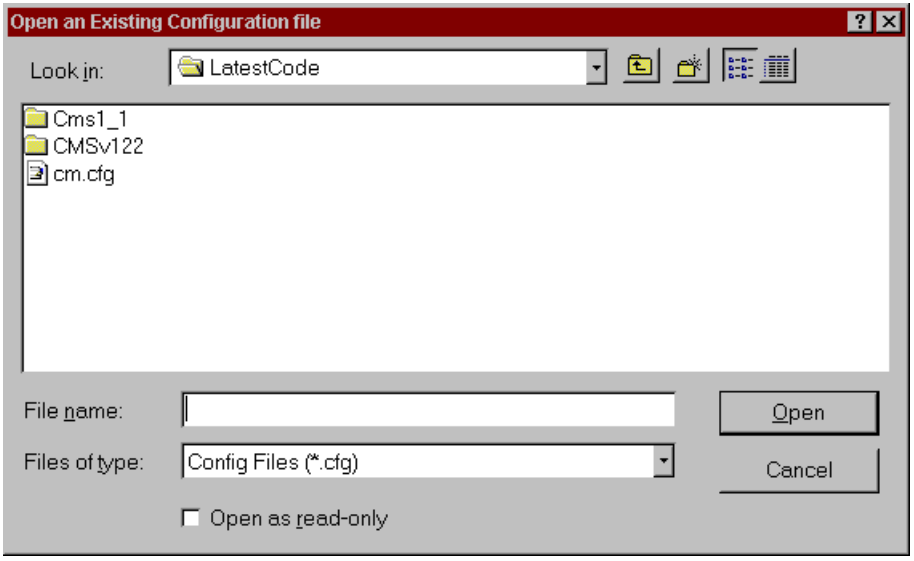


Figure 2-9 Open an Existing File Dialog Box

3 Locate and select the cable modem Configuration File you want to modify and then click **Open**.

4 Click each folder that contains parameters you want to change and make your modifications. If necessary, refer to the *Creating the Configuration File* section in this chapter for detailed information on each dialog box.

5 Before you save your changes, click the **General Configuration Parameters and Flags** folder.

6 In the *Shared Secret* field, re-enter the correct authorization string for this Configuration File. Note that the string is case-sensitive.

CAUTION: *You must re-enter the Shared Secret, even if it has not changed, every time you edit an existing Configuration File.*

Installing the Configuration File

To install the cable modem Configuration File you must perform procedures on both the TFTP and DHCP servers assigned to the CMTS for which you designed the Configuration File(s).

TFTP Server

Refer to your TFTP server software documentation for more specific instructions.

1. Save a copy of each Configuration File(s) to the TFTP server assigned to the cable data network for which you designed the file(s).
2. Make a note of each of the file name(s).
3. Make a note of the TFTP server IP address.
4. Continue with *DHCP Server*.

DHCP Server

Refer to your DHCP server software documentation for more specific instructions.

1. Enter the file name(s) of the Configuration File(s) you installed on the TFTP server. The file name(s) must be identical to those you installed in step 1 of the *TFTP Server* section above.
2. Enter the IP address of the TFTP server on which you installed the Configuration Files in the *TFTP Server* section above.
3. Save your changes.

Ready to Start Managing Your Cable Data Network via CMS

Configuration File installation is complete. The Configuration File is now ready to register and authenticate client cable modems.

3 Working with Cable Modems at the Customer End

Read this chapter for instructions on performing basic cable modem maintenance tasks, including

- Viewing cable modem status
- Getting detailed cable modem information
- Verifying that cable modems are passing data
- Rebooting cable modems
- Upgrading cable modems software.

Viewing Cable Modem Status

This section describes two methods for listing status. These include,

- Checking basic statistics, and
- Obtaining detailed configuration information.

Checking Cable Modem Status

Once you set up a *Chassis View* for a corresponding CMTS, it's easy to view all current cable modem status and statistics, using these steps.

1. Open the appropriate Chassis View.
2. Next, click on the plus signs to expand the *Chassis View Display*.
3. Double-click the **Connected Modems** icon,  . The *Connected CMs Status* window displays, listing the latest statistics for each cable modem.

Connected CMs Status Windows

The following statistics are listed in the *Connected CMs Status* window.

- **MAC Address** — Shows the MAC address of this cable modem. If the cable modem has multiple MAC addresses, the displayed one is the same as that of the Cable IP Network interface defined in this CMTS Device.

- **IP Address** — Shows the IP address of this cable modem. If the cable modem has no IP address assigned, or the IP address is unknown, 0.0.0.0 displays. If the cable modem has multiple IP addresses, the displayed address is associated with the Cable IP Network interface defined in this CMTS Device.
- **Registration State** — This field displays the cable modem's current connection status, as follows.
  - Ranging: The cable modem has sent a ranging request to the CMTS (as a result of being powered up for the first time, or if the cable modem has been rebooted).
  - Ranging Aborted: The cable modem ranging process has been aborted, either due to a problem with the cable connection, or the ranging parameters sent by the CMTS to the cable modem.
  - Ranging Complete: The cable modem has successfully completed ranging with the CMTS.
  - IP Complete: The cable modem has received a network address from a DHCP server that is connected to the Ethernet side of the CMTS.
  - Registration Complete: The cable modem has successfully registered with the CMTS and is authorized to transmit and receive data.
  - Access Denied: The CMTS has denied access to the cable modem associated with this MAC address. This indicates that the Message Integrity Check (MIC) has failed, or that the authorization string is incorrect.
- **Connected to Upstream Channel** — Interface index number of the upstream channel this cable modem is connected to. If the upstream channel is unknown, this object returns a value of 0.
- **Customer Name** — Shows name of client assigned to this cable modem.
- **Customer Address** — Shows address of client assigned to this cable modem.

Getting Detailed Cable Modem Information

Use these steps to obtain detailed cable modem information, including

- DHCP and TFTP server IP Addresses
- Current Configuration File
- Downstream RF Signal Details
- Upstream RF Signal Details.

1. Open the appropriate Chassis View.
2. Next, click on the plus signs to expand the *Chassis View Display*.
3. Double-click the **Connected Modems** icon,  . The *Connected CMs Status* window displays, listing the latest statistics for each cable modem.
4. Click the **Get Detailed CM Info.** button,  .

Running Multiple Cable Modem Operations Via CMS

CMS provides a unique *Connected Modems* tool that lets you perform operations on multiple cable modems simultaneously. To locate the *Connected Modems* tool icon  , expand the *Chassis View Display*.

Moving Cable Modems to a New Upstream Channel

Use these steps to change cable modems' upstream channels.

1. Open the appropriate *Chassis View*.
2. Next, click on the plus signs to expand the *Chassis View Display*.
3. Double-click the **Connected Modems** icon. The *Connected CMs Status* window displays, listing the latest statistics for each cable modem.

4 Click the **Move CMs to a New Upstream Channel** button  . The *Change Upstream Channels for the Cable Modems* window appears.

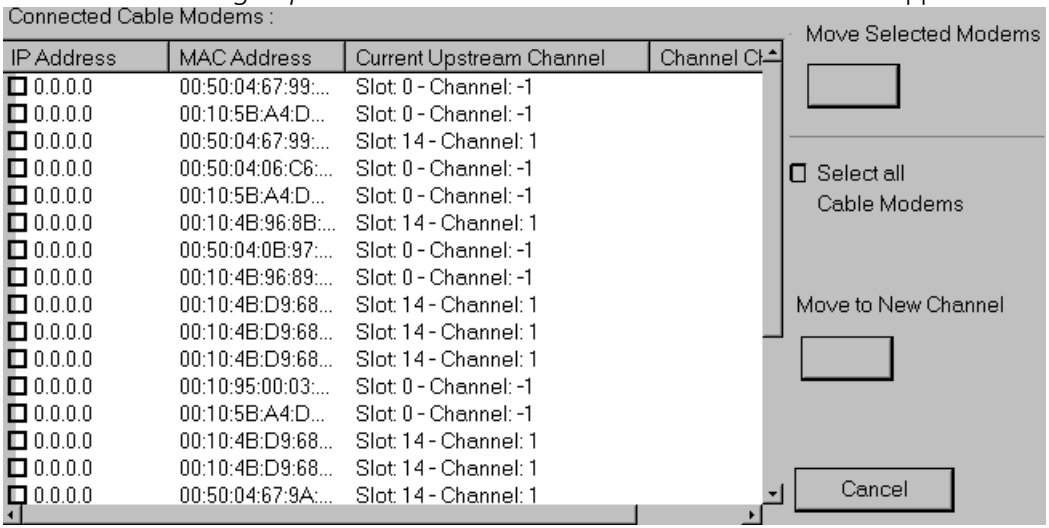


Figure 3-1 Change Upstream Channels for the Cable Modems

5 Select the appropriate cable modems' IP and MAC address. Or click a checkmark in the *Select All Cable Modems* checkbox.

6 Select the appropriate channel from the pull-down menu.

7 Click the **Move to New Channel** button.

8 Check the *Channel Change Status* column to verify that the cable modems moved to the correct upstream channel.

Rebooting Multiple Cable Modems

Use these steps to reboot multiple cable modems connected to the 3Com CMTS.

1 Open the appropriate *Chassis View*.

2 Next, click on the plus signs to expand the *Chassis View Display*.

3 Double-click the **Connected Modems** icon. The *Connected CMs Status* window displays, listing the latest statistics for each cable modem.

4 Click the **Reboot Multiple CMs** button from the Toolbar,  . The *Reboot Multiple CMs* window appears.

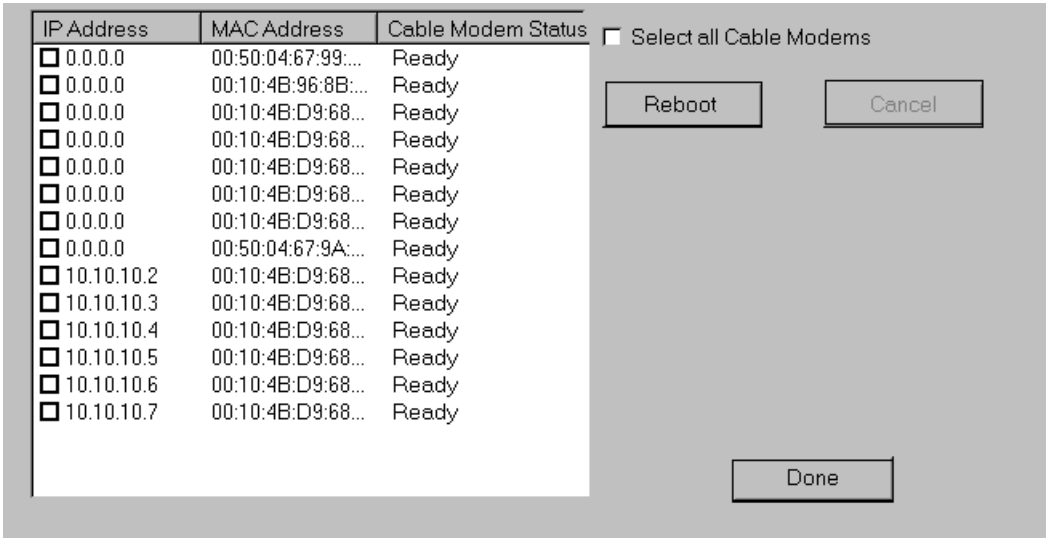


Figure 3-2 Reboot Multiple CMs

5 Select the appropriate cable modems' IP and MAC address. Or click a checkmark in the *Select All Cable Modems* checkbox to reboot all displayed cable modems.

6 Click **Reboot**.

7 Check the *Operation Messages* window to verify that the cable modems rebooted properly.

8 Click **Done**.

Downloading Software to Multiple Cable Modems

Use these steps to download software to multiple cable modems.

1 Open the appropriate *Chassis View*.

2 Next, click on the plus signs to expand the *Chassis View Display*. Double-click the **Connected Modems** icon. The *Connected CMs Status* window displays, listing the latest statistics for each cable modem.

3 Click the **Download Software to Multiple CMs** button  . The *Download Software to Cable Modems* window appears.

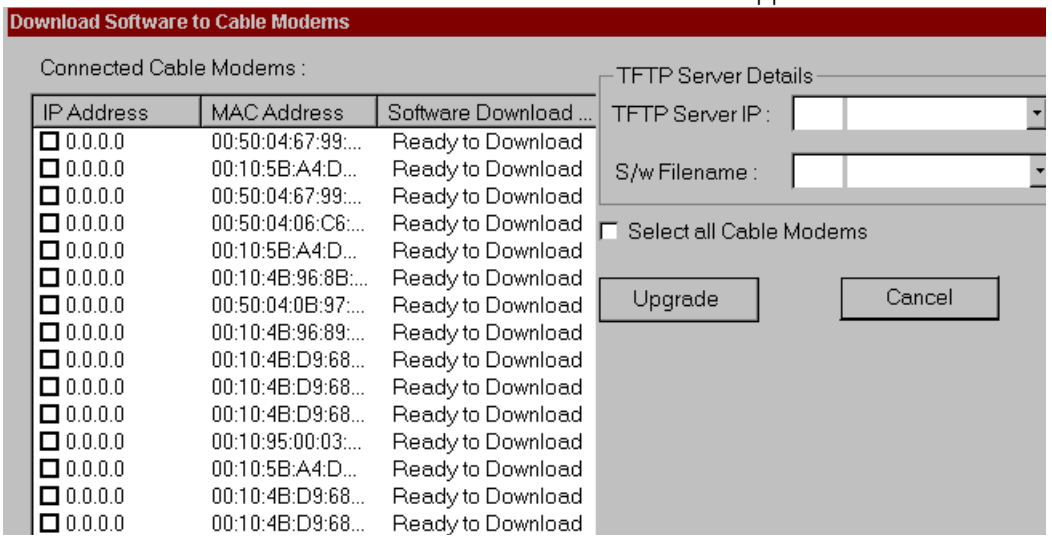


Figure 3-3 Download Software to CMs

4 Select the appropriate cable modems' MAC address. Or click a checkmark in the *Select All Cable Modems* checkbox to upgrade all displayed cable modems.

5 Select the TFTP Server IP address from the pull-down menu.

6 Select the filename of the software you need to download from the pull-down menu.

7 Click **Upgrade**.

8 Check the *S/W Download Status* column to verify that the software downloaded properly.

Deleting Inactive Cable Modems

Use these steps to delete inactive cable modems.

1 Open the appropriate *Chassis View*.

2 Next, click on the plus signs to expand the *Chassis View Display*. Double-click the **Connected Modems** icon. The *Connected CMs Status* window displays, listing the latest statistics for each cable modem.

3 Click the **Delete Inactive Cable Modems** button,  .

4 Click **Yes** at the "Are you sure you want to delete all inactive cable modems from the Cable Access Router" prompt.

5 Check the *Status* window at the bottom of the screen to verify that the inactive cable modems do not display.

Sending USR Messages to Cable Modems

CMS allows you to send User Station Request (USR) messages to One-way (also Telco Return) cable modems assigned to the CMTS device.

Use these steps to send USR messages to one or more cable modems.

Sending USR messages is an operation that applies to Telco Return (also One-way) cable modems only.

1 Open the appropriate *Chassis View*.

2 Next, click on the plus signs to expand the *Chassis View Display*.

3 Double-click the **Connected Modems** icon. The *Connected CMs Status* window displays.

4 Click the **USR Message** button from the Toolbar, 

. The *Issue User Station Request Messages to the Cable Modems* window appears.

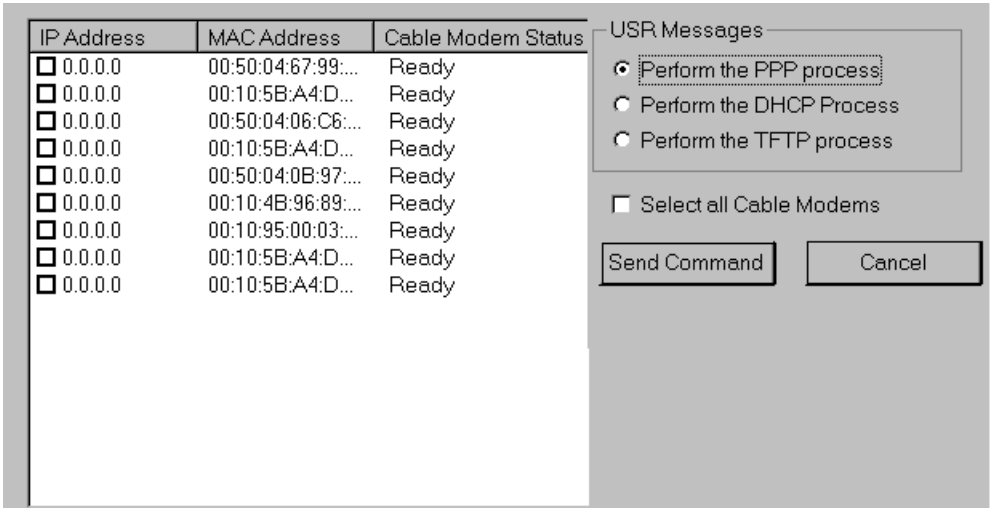


Figure 3-4 Issue User Station Request Messages to the Cable Modems

5 Select the appropriate cable modem(s). Or, click a checkmark in the *Select all Cable Modems* checkbox if all connected modems need to receive the message.

6 Determine the message type, and select one of the following.

- Perform the PPP process
- Perform the DHCP process
- Perform the TFTP process

7 Click **Send Command**.

CMS provides no confirmation that the cable modem received the USR message. If the cable modem has a status message log, that log will notify you if the USR message was received.

Changing Cable Modem SNMP Settings

Use these steps to change SNMP settings.

1 Open the appropriate *Chassis View*.

2 Next, click on the plus signs to expand the *Chassis View Display*.

3 Double-click the **Connected Modems** icon. The *Connected CMs Status* window displays, listing the latest statistics for each cable modem.

4 Click the **Change SNMP Settings** button, . The *Change SNMP Settings for the Cable Modems* window appears.

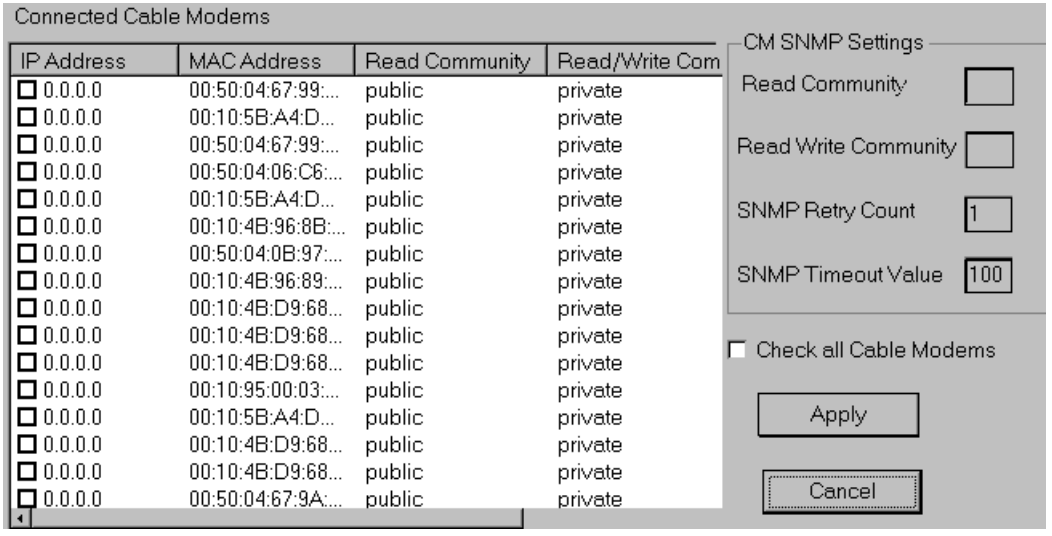


Figure 3-5 Change SNMP Settings for the Cable Modems

5. Select the appropriate cable modems' IP and MAC address. Or click a checkmark in the *Select All Cable Modems* checkbox to change all displayed cable modem settings.
6. Type the required entries. See CMS Online Help for a description of terms.
7. Click **Apply**.

4 RUNNING CMTS COMPONENT-LEVEL OPERATIONS

As you know, there are two primary components, or cards installed in the CMTS that transmit data across the cable network. These include the Cable Access Router Card (also CAR), and the URC (also URC). Read this chapter for information on

- URC operations
- CAR operations
- Using CMS to check card software versions
- Using CMS to add new cards
- Why you may need to reboot the cards
- Using CMS to update a connection between the CAR and the URC.

Reviewing URC Operations

The URC works to transmit data from the cable modems at the client end to the 3Com CMTS. More specific operations include

- Terminating RF traffic
- Decrypting data
- Identifying packet types
- Allocating upstream bandwidth to cable modems
- Providing diagnostic information via front panel LEDs.

Managing the URC via CMS

Read the following sections for URC procedures.

Checking the URC's Software Version

Use these steps to determine a specific URC's software version.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*.
3. To select the appropriate URC, double-click on the card's name in the *Chassis View Display*. The *Card Details* window displays at the bottom of the screen.

   You'll find the *Software*, *Boot Code* and *Hardware Versions* in the *URC Details* section of the window.

Adding a New URC

Use the *CAR Configuration* tool from the *Command* pull-down menu, to establish a connection between the URC and CAR.

If this is first time setup, use the Setup Wizard to define the connection between the CAR and URC. To access the Setup Wizard, from the Command Menu bar click ***File*** | ***Setup Wizard***.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the **Chassis Connection Details** icon. The *Chassis Connection Info.* window appears. For details on the terms in the *Chassis Connection Info.* window, refer to CMS Online Help.
5. Select the slot number, where the new URC is located.
6. Click the **Edit** button. The *Chassis Connection Info. Edit* window displays.
7. From the *Command* pull-down menu select **Connect**.
8. Click **OK**.
9. After making any changes, click **Set** to send your settings to the CAR.

Moving a URC to a Different Slot

Use the *CAR Configuration* tool from the *Command* pull-down menu, to move an URC to a new slot.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display.* Select the CAR icon in the *Chassis View Display.*
3. Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.
4. Click the *Chassis Connection Details* icon. The *Chassis Connection Info.* window appears. For details on the terms in the *Chassis Connection Info.* window, see CMS Online Help.
5. Locate and select the slot number, of the URC that you need to move.
6. Click the **Edit** button. The *Chassis Connection Info. Edit* window displays.
7. From the *Command* pull-down menu select **Disconnect**.
8. Click **OK**.
9. Locate and select the slot number where you'd like to move the URC.
10. Click the **Edit** button. The *Chassis Connection Info. Edit* window displays.
11. From the *Command* pull-down menu select **Connect**.
12. Click **Set** to send the new settings to the CAR.

Rebooting URCs

Use these steps to reboot all URCs installed in the CMTS. You may need to reboot URCs under the following conditions,

- if the LEDs on the URC show amber
- during a software upgrade.

1. Click **Command** from the *Command Menu* bar located at the very top of the screen. Click **Reboot** from the pull-down menu.
2. The *Reboot* window displays. Note the minimized *Chassis View Display* under the *CMTS* column. Click on the plus signs to expand the small *Chassis View Display.*
3. Click a checkmark in the *All URC* checkbox.
4. Click **Reboot**. A prompt displays indicating that the reboot operation completed successfully.

Reviewing CAR Operations

The CAR is the main component in the CMTS, and performs these functions,

- Receives and processes data from the URC
- Receives and processes data from the external network via the CAR NIC
- Processes and forwards data to the CAR NIC and QAM Modulator NIC
- Routes data to the external network or to the QAM Modulator
- Provides diagnostic information via the LEDs on the front panel
- Provides interfaces for the cable headend LAN, the QAM Modulator, and the CAR Command Line Interface.

Managing the CAR Card via CMS

Read the following sections for CAR procedures.

Checking the CAR Software Version

Use these steps to determine the software version for a specific CAR, including the corresponding Network Interface Card's (NIC) software version.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*.
3. To select the appropriate CAR, double-click on the CAR's name in the *Chassis View Display*. The *System Details* window displays at the bottom of the screen.

   You'll find the CAR, NIC and QAM software versions in the *Software Version Details* section of the window.

Checking Network Services Running on the CAR

Use the *CAR Configuration* tool to check network services, as follows.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the Chassis View display. Select the CAR icon in the *Chassis View Display*.
3. From the Menu bar, click **Configuration** | **Cable Access Router**. The *CAR Configuration* window displays.

4 Click the plus sign next to the *Globals* folder.

5 Click the **Network Services** icon. A list of Network Services displays. For details on the terms in the *Network Services* list, see CMS Online Help.

Using the Setup Wizard to Configure a New CAR in your CMTS

Follow these steps to start the *Setup Wizard* tool. Then follow the easy on-screen instructions to set CAR parameters.

1 From the *Command* Menu bar click **File** | **Setup Wizard**.

2 Click **New CAR**. The *Setup Wizard* prompts you for all required CAR data.

3 When finished typing parameters, click **Exit**.

The Setup Wizard defines basic CAR settings. If your cable data network requires additional settings, see Configuring CAR Advanced Settings, discussed later in this chapter.

Rebooting Multiple CARs

Use these steps to reboot the CARs installed in the CMTS. You only need to reboot the CAR during a software upgrade.

1 Click **Command** from the Menu bar. Click **Reboot**.

2 Note the Chassis View displayed under the CMTS column. Click on the plus signs to expand the *Chassis View Display*.

3 Click a checkmark in the *All CAR* checkbox.

4 Click **Reboot**. A prompt displays indicating that the reboot operation completed successfully.

Updating a Connection Between the CAR and URC

Use the *CAR Configuration* tool to establish a connection between the CAR and URC, under the following conditions.

- If you're installing a new URC in the CMTS chassis.
- If you're moving a URC from one slot to another.

If this is first time setup, use the *Setup Wizard* to define the connection between the CAR and URC.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the **Chassis Connection Details** icon. The *Chassis Connection Info* window appears. For details on the terms in the *Chassis Connection Info* window, see CMS Online Help.

5 Select the slot number, where the new URC is located.

6 Click the **Edit** button. The *Chassis Connection Info Edit* window displays.

7 Update the connection as follows.

- If you're removing the URC from the slot, select **Disconnect** from the *Command* pull-down menu.
- If you're installing the URC in the slot, select **Connect** from the **Command** pull-down menu.
- If you're removing a card, leaving the slot empty, select **None** from the *Command* pull-down menu.

8 Click **OK**.

9 After making any changes, click the **Set** button, to send your settings to the CAR.

Configuring DHCP Attributes on the CAR

Use the *CAR Configuration* tool in the Menu bar to configure DHCP attributes.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the plus sign next to the *IP Configuration* folder in the display area.

5 Double-click the *DHCP Configuration* sub-folder. The *DHCP Configuration* window displays.

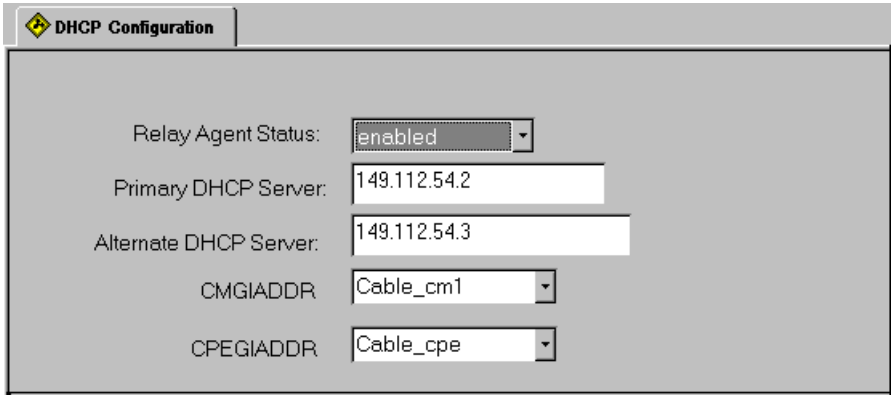


Figure 4-1 DHCP Configuration Dialog Box

6 Type the required entries. For details on the terms in the *DHCP Configuration* window, refer to CMS Online Help.

7 Click **OK**.

8 Click **Set** to send your changes to the CAR.

Configuring CAR Advanced Settings

Refer to the following sections for advanced CAR procedures.

How to Configure an Ethernet Network

Use the *CAR Configuration* tool in the Menu bar to define the properties for your Ethernet Network.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.

4 Click the plus sign next to the *IP Configuration* folder in the display area.

5 Click the *Ethernet IP Networks* sub-folder. The *Ethernet IP Network Configuration* dialog box displays.

6 Select the appropriate properties from the pull-down menus. Then, click a checkmark next to each *Routing Policy* you would like applied to the network.

7 For an explanation of the terms in the Ethernet IP Network Configuration dialog box, refer to CMS Online Help.

8 Click **OK**.

9 Click the **Set** button to send the settings to the CAR.

Configuring Cable IP Network Settings

Use the *CAR Configuration* tool in the *Command* Menu bar to view and/or edit the current Cable IP Network configuration settings on the CMTS selected in the *Chassis View Display*.

1 First, open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.

4 Click the plus sign next to the *IP Configuration* folder in the display area.

5 Click the **Cable IP Networks** sub-folder. The *Cable IP Networks* table displays.

6 Select the cable interface you need to change from the table.

7 Click the **Edit** button from the *CAR Configuration* Menu bar. The *Cable IP Network Configuration* dialog box displays.

8 Type the required entries. For details on the terms in the *Cable IP Network Configuration* dialog box, refer to CMS Online Help.

9 Click **OK**.

10 Click the **Set** button to send the settings to the CAR.

Adding or Revising an IP Route

Use the *CAR Configuration* tool in the Menu bar to add or edit an IP static route.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.

4 Click the *IP Configuration* folder in the display area.

5. Click the *IP Routes* sub-folder. The *IP Routes* table displays. For details on the terms in the *IP Routes* table, refer to CMS Online Help.
6. To add an IP route click the **Create** button,  . The *IP Route Configuration* dialog box displays.
7. Type the required entries. Or, to edit an existing IP route, select the route from the *IP Routes* table. Click the **Edit** button,  .
8. Type the IP route changes.
9. Click **OK**.
10. Click the **Set** to send the settings to the CAR.

Adding an Entry in the CAR ARP Table

Use the *CAR Configuration* tool in the *Command* Menu bar to add an entry to the CAR's ARP table.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.
4. Click the *IP Configuration* folder in the display area.
5. Click the *ARP Info* sub-folder. The *ARP* table displays. Refer to CMS Online Help for details on terms in the *ARP* table.
6. Click the **Create** button,  . The *Update ARP Table* dialog box displays.
7. Select the interface to which you want to map this network device. Choices are:
   - **eth:1 —** The CAR's Ethernet IP Network interface.
   - **qam:1 —** The CAR's Cable IP Network interface.
8. Enter the IP address of the device you want to add to the *ARP* table, in the xxx.xxx.xxx.xxx format.
9. Enter the MAC address of the device. Enter it in the following format:

   xx-xx-xx-xx-xx-xx

10. Click **OK**.
11. Click **Set**, to send the settings to the CAR.

Defining Filters

Refer to the following sections for information on creating filters for the CAR.

Adding a Filter

Use the *CAR Configuration* tool to add a filter.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.
4. Click the **Filters** icon.
5. Click the **Create** button,  . The *Filter File Name* window appears.
6. Type the Filter name, and click **Save**.
7. Click **Set** to send the settings to the CAR.
8. Click the **Exit** button **x**, in the top right corner of the window to return to the *Chassis View Display*.

Viewing a Filter

Use the *CAR Configuration* tool to view and edit any IP filters.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the *Command Menu* bar.
4. Click the **Filters** icon.
5. To modify an existing entry, select it from the list and click the **Edit** button,  .
6. After making any changes, click **Set** to send your settings to the CAR.
7. Click the Exit button **x**, in the top right corner of the window to return to the *Chassis View Display*.

Editing Upstream IP Filters

Use the *CAR Configuration* tool to view and edit any IP filters currently applied to the upstream interface in the CMTS selected in the *Chassis View Display*.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.
4. Click the plus sign next to the Interface folder.
5. Double-click the *Ethernet* sub-folder in the display area. The *Ethernet* window displays.
6. Select the appropriate entry from the Ethernet list.
7. Click the **Edit** button,  . The *Ethernet Interface Configuration* window appears.
8. Select the *Input Filter*, and *Output Filter* from the pull-down menu.
9. Click a checkmark to enable Traps. Or leave the checkbox empty to disable Traps.
10. Click **OK**.
11. Click **Set** to send the settings to the CAR.

Editing Cable Downstream IP Filters

Use the *CAR Configuration* tool to view and edit any IP filters currently applied to the downstream interface in the CMTS selected in the *Chassis View Display*.

1. Open the appropriate Chassis View, (.cvw) for the CMTS.
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.
4. Click the plus sign next to the *Interface* folder.
5. Double-click the *Cable Downstream* sub-folder in the display area. The *Cable Downstream* window displays.
6. Select the appropriate entry from the Cable Downstream list.

7 Click the **Edit** button,  . The *Cable Interface Configuration Downstream* window appears.

8 Select the *Input Filter*, and *Output Filter* from the pull-down menu.

9 Click a checkmark in the checkbox to enable Traps. Or leave the checkbox empty to disable Traps.

10 Click **OK**.

11 Click **Set** to send the settings to the CAR.

12 Click the **Exit** button **x**, in the top right corner of the window to return to the *Chassis View Display*.

Setting Baseline Privacy

Refer to the following sections for Baseline Privacy procedures.

Setting Baseline Privacy Attributes

Use the *CAR Configuration* tool to modify the Baseline Privacy authorization keys.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the Chassis View Display. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.

4 Click the plus sign next to the *Baseline Privacy* folder in the display area.

5 Click the **Attributes** sub-folder. The *Privacy Attributes* window displays.

6 Select the *Index* that corresponds with the *Privacy Attributes* table item you need to edit. Click the **Edit** button,  .

7 Type the *Privacy Attributes* data.

- Authentication Life Time
- TEK Life Time
- Authentication Grace Time
- TEK Grace Time

For details on the terms in the *Privacy Attributes* window, refer to CMS Online Help.

8 Click **Set** to send the settings to the CAR.

9 Click the **Exit** button **x**, in the top right corner of the window to return to the *Chassis View Display*.

Setting Baseline Privacy Timing

Use the *CAR Configuration* tool to modify the time attributes used by the CMTS and cable modems to make Baseline Privacy authorization requests during registration.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.

4 Click the **Baseline Privacy** folder in the display area.

5 Click the **Authorization** sub-folder. The *Authorization Table* window displays.

6 Select the *Index* that corresponds with the *Authorization Table* item you need to edit. Click the **Edit** button,  .

7 Type the *Authorization Table* data. For details on the terms in the *Authorization Table* window, refer to CMS Online Help.

8 Click **OK**.

9 Click **Set** to send your changes to the CAR.

Setting Baseline Privacy TEK Table Attributes

Use the *CAR Configuration* tool to modify the lifetime of authorization keys used by the CMTS and cable modems to make Baseline Privacy authorization requests during registration.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the *Command* Menu bar.

4 Click the **Baseline Privacy** folder in the display area.

5 Double-click the **TEK Table** sub-folder. The *TEK Table* window displays.

6 Select the *Index* that corresponds with the *TEK Table* item you need to edit. Click the **Edit** button,  .

7 Type the *TEK Table* data. After making any changes, click **Set** to send your changes to the CAR. For details on the terms in the *TEK Table* window, refer to CMS Online Help.

8 Click **OK**.

9 Click **Set** to send your changes to the CAR.

5 WORKING WITH THE 3COM CMTS

Read this chapter for instructions on performing CMTS management tasks via CMS, including

- Accessing a CMTS via CMS
- Configuring system information
- Viewing a list of connected users
- Restoring factory defaults
- Rebooting a CMTS
- Defining the Class of Service (CoS)
- Upgrading cable modems software
- Saving and restoring the CMTS configuration.

Running Basic CMTS Operations via CMS

CMS uses Simple Network Management Protocol (SNMP) to send configuration information to the CMTS. You can initiate most headend operations right from CMS, including changing CMTS parameters, restoring factory defaults, or setting the Class of Service, (COS).

Verifying that the CMTS is Working Properly

Use these steps to check that the CMTS is functioning properly.

1. First, open the appropriate *Chassis View*, (.cvw).
2. Next, click on the appropriate component in the *Chassis View Display*.
3. Use the *Chassis View Display* to verify connection as follows.
   - A green folder icon next to a device indicates that the cable modems are connected to the CMTS, and passing data.
   - A red folder icon next to a device indicates that the cable modems are not connected to the CMTS, and therefore, not passing data.

Accessing a CMTS

Use these steps to access a CMTS in your cable data network. Make sure that you know the Chassis View filename (with .cvw extension) assigned to your particular chassis.

1. Click the **Open Chassis View** button,  .
2. In the *File type* box, select Chassis Views (*.cvw). Next, browse your system files and select the appropriate CMTS Chassis View file.
3. Click **Open**.

Configuring CMTS System Information

Use the *CAR Configuration* tool to set basic identification information about the selected CMTS. Set CAR Global settings as follows.

Remember that the term CMTS refers to the chassis that houses the cable data components at the headend. When you configure CMTS parameters, you are actually configuring the main system component, the CAR.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*.
3. To select the appropriate CAR double-click, and highlight the name of the CAR in the *Chassis View Display*. The *CAR Configuration* window displays.
4. Click the plus sign next to the *Globals* folder.
5. Click the **System Information** sub-folder. The *Global Setup* window displays. Here, you can,
   - Click the **Get** button to obtain the latest Global System information from the CAR.
   - Make any changes, then click **Set** to send your changes to the CAR.

   For details on the terms in the *Global Setup* window, see *Global Setup* in CMS Online Help.

Viewing CMTS System Information

Use these steps to obtain general system information about the CMTS you're running.

1. First, open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display*.

3 To view specific chassis information, double-click on the appropriate Chassis View name, and CAR in the *Chassis View Display*. The *Details* window displays at the bottom of the screen.

The *System Details* window is divided into four sections, as follows.

- *General*
- *Software Version Details*
- *Downstream RF Characteristics*
- *Connected Modems*

Viewing a List of Users Connected to the CMTS

Use the *CAR Configuration* tool to view an up-to-date list of users.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*.

3 To select the appropriate CAR, double-click and highlight the name of the CAR in the *Chassis View Display*. The *CAR Configuration* window displays.

4 Click the plus sign next to the *Globals* folder.

5 Click the **Users** sub-folder. A list of current users displays. For details on the terms in the *Users* list, refer to CMS Online Help.

Updating CMTS Basic Settings

Use these steps to edit current CMTS parameters.

1 Click **Chassis Editor** button, 

.

2 Click **Open a Chassis View** button,  .

3 Select the appropriate .cvw file from list. Click **Open**. You'll see a minimized *Chassis View Display* in the *Device* column.

4 Select the CAR/CMTS you need to edit as follows.

- Click a checkmark in the checkbox
- Highlight the name of the CAR.

5 Click the **Edit** button from the *Chassis View Editor* toolbar. The *CAR Properties Definition* window displays. You can change the following parameters.

- Previously defined CMTS name
- Device type
- Previously defined CAR name
- IP address
- Community string

6 Click **OK**.

PINGing a CMTS To PING a CMTS on the cable data network follow these steps.

The computer where CMS is installed (also known as the management station) sends the PING command.

1 Click **Tools** on the Menu bar.

2 Click **Ping**. The *Ping* dialog box appears.

3 Type the:

- Destination IP address
- Retry count
- Timeout.

For details on these terms, see PING in CMS Online Help.

4 Click **Ping**. The status of the operation displays in the *PING Status* field. If the CMTS is fully operational, and connected to your customer's cable modems, you'll see the prompt,

x.x.x.x. is alive.

If there is a dropped connection, you'll see the prompt,

x.x.x.x is not alive.

5 Once you receive the results of the operation. You can either:

- Enter a Destination IP address and perform another PING, or
- Click **Cancel** to exit the *Ping* dialog box.

Restoring CMTS Factory Defaults

Use these steps to reset the CAR parameters to the default settings.

1. Click **Command** from the Menu bar. Click **Restore Factory Defaults**.
2. Note the Chassis View displayed under the *CMTS* column. Click on the plus signs to expand the *Chassis View Display*.
3. Click a checkmark in the checkbox that corresponds with the specific CAR you need to restore to default settings.
4. Click **Restore**. A prompt displays indicating that the restore process completed successfully.

Restoring Factory Defaults to Multiple CMTSs

Use these steps to reset the CAR parameters to the default settings.

1. Click **Command** from the Menu bar. Click **Restore Factory Defaults**.
2. Note the Chassis View displayed under the CMTS column. Click on the plus signs to expand the *Chassis View Display*.
3. Click a checkmark in the *All CAR* checkbox.
4. Click **Restore**. A prompt displays indicating that the restore process completed successfully.

Rebooting the CMTS

Use these steps to reboot the CMTS.

1. Click **Command** from the Menu bar. Click **Reboot**.
2. Note the Chassis View displayed under the *CMTS* column. Click on the plus signs to expand the *Chassis View Display*.
3. Click a checkmark in the checkbox that corresponds with the specific URC or CAR you need to reboot.
4. Click **Reboot**. A prompt displays indicating that the reboot operation completed successfully.

Removing a CMTS from the Network

Use these steps to remove a CAR from the current configuration.

WARNING: *Make sure that you need to remove the CMTS from your cable data network before proceeding with these steps. After you remove the CMTS, you cannot undo the operation.*

1. Click the **Chassis View Editor** button, 

.
2. Click **Open a Chassis View** button,  .
3. Select the appropriate .cvw file from list. Click **Open**. You'll see a minimized *Chassis View Display* in the *Device* column.
4. Select the CAR you need to remove, and click a checkmark in the checkbox.
5. Click the **Delete CAR** button  , from the *Chassis View Editor* toolbar.
6. Click the **Save** button.

If you want these changes reflected immediately in the Chassis View Display, you'll need to refresh the display. To do this, open and close the Chassis View Display, by first clicking the ***Open Chassis View*** *button, then clicking the* ***Close Chassis View*** *button.*

Saving the CMTS Configuration

There are two ways to save the current CMTS configuration,

- saving to a local file, and
- saving to NVRAM.

Read the following sections for procedures.

Saving the CMTS Configuration to a Local File

3Com recommends that you keep a backup of the current CMTS configuration file on your system's disk, or on separate media in the event of file corruption, or a system emergency.

Use the *CAR Configuration* tool to save the current CMTS configuration to a local file as follows.

1. Open the appropriate Chassis View, (.cvw) for the CMTS.
2. Next, click the plus signs to expand the *Chassis View Display*.
3. Select the CAR icon in the *Chassis View Display*.

4. Click **Configuration** | **Cable Access Router** from the Menu bar. The *CAR Configuration* window appears.
5. Click the **Save** button. The *Save as* dialog box displays.
6. Select a file folder to store the configuration file. Type a filename.
7. Click the **Save** button.
8. Click **OK** at the "Do you want to save the configuration to the file?" prompt.

Saving the CMTS Configuration to NVRAM

Use the CAR Configuration tool to save the current CMTS configuration to the CAR's non-volatile Random Access Memory (NVRAM), also known as flash memory.

1. Open the appropriate Chassis View, (.cvw) for the CMTS.
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar. The *CAR Configuration* window appears.
4. Click the **Save to NVRAM** button. The *Save to NVRAM* dialog box displays.
5. Click the **Save** button to permanently save the current CMTS configuration. If you do not want to save the configuration, click the **Cancel** button.

*Click **Save to NVRAM** before using the Save Configuration feature if you want the saved configuration file on disk to match the configuration on the CAR.*

Restoring the CMTS Configuration

Use the *CAR Configuration* tool to restore a CMTS configuration saved previously in a local file. This feature is especially useful for restoring a CMTS whose configuration file has become damaged or unusable, or to clone multiple CMTS devices with the same configuration.

Restoring a configuration from a local file requires you to reboot the CAR. When you reboot a CAR defined as the System Clock Master, all URCs also reboot.

However, any CARs defined as System Clock Backup Masters in the chassis do not reboot.

1 Open the appropriate Chassis View, (.cvw) for the CMTS.

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar. The *CAR Configuration* window appears.

4 Click the **Restore Configuration** button,  . The *Restore* dialog box displays.

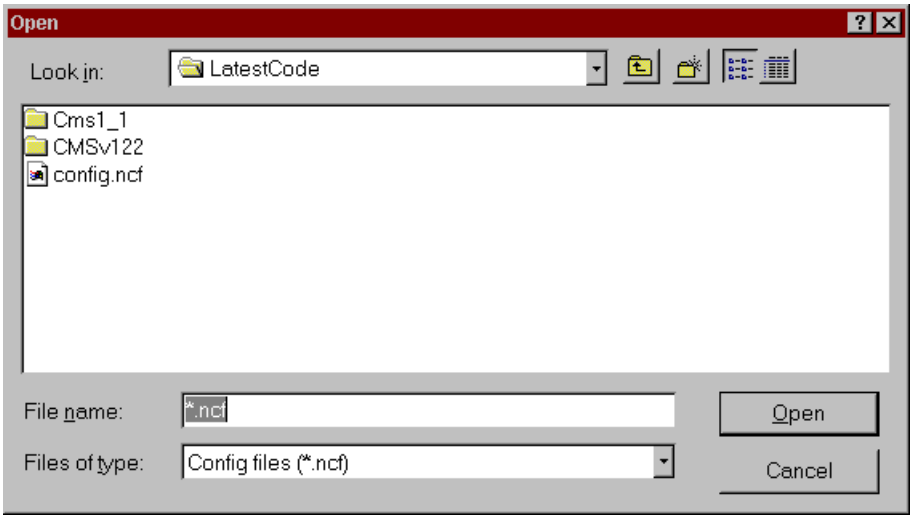


Figure 5-1 Restore Dialog Box

5 Select the appropriate .ncf filename.

6 Click **Open**.

7 At the "Do you want to restore configuration from the file," prompt click **OK**.

8 Click **OK**. The *Reboot* window displays.

9 Click a checkmark in the checkbox that corresponds with the specific CAR you need to reboot.

10 Click **Reboot**.

Class of Service Overview

CMTS software now allows you to define basic Class of Service (CoS) parameters for cable modems connecting to the CMTS.

- You can define up to eight CoS entries that limit the maximum upstream and downstream data transfer rate allowed to cable modems.
- The upstream and downstream bandwidth parameters are aggregate bandwidth totals that will be shared among all CPE devices attached to the cable modem.
- There always must be at least one CoS defined as the default. This allows authorized cable modems to access the CMTS even if they are not assigned a custom CoS at registration, or if the CoS they were assigned was configured improperly.

The CAR comes with one defined CoS. This default CoS defines no restriction on upstream or downstream bandwidth. It is used as the default CoS until you specify otherwise.

Setting the CoS

Use the *CAR Configuration* tool in the Menu bar to set CoS properties for the CMTS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the **Class of Service** icon.

5 Click the **Create** button,  . The *Class of Service* window displays.

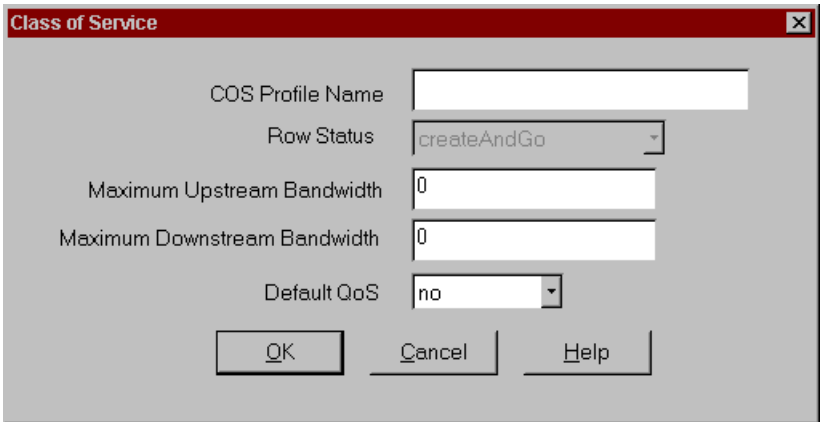


Figure 5-2 CoS Dialog Box

6 Type the required entries. For details on the terms in the *Class of Service* dialog box, see Class of Service in CMS Online Help.

7 Click **OK**.

8 Click the **Exit** button  , in the top right corner of the window to return to the **Chassis View Display**.

Editing the Current Class of Service

Use the *CAR Configuration* tool in the Menu bar to change or remove Class of Service (CoS) properties for the CMTS.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the **Class of Service** icon.

5 Select the appropriate entry from the *Class of Service List*.

6 Click the **Edit** button,  . The *Class of Service* window displays.

7 Type the changes. For details on the terms in the *Class of Service* dialog box, refer to CMS Online Help.

8 Or, to remove the current CoS, click a red checkmark next to the appropriate CoS Name.

9 Next, click the **Delete** button,  . The CoS is no longer active.

Configuring Systems to Work with the CMTS

Read the following sections for procedures on configuring systems to work with the CMTS as

- servers
- log hosts, and
- TFTP clients.

Configuring an NTP Server

Use the CAR Configuration tool to configure the Network Time Protocol (NTP) server (also known as the Time of Day (TOD) server assigned to the CMTS at the headend.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. From the Menu bar, click **Configuration** | **Cable Access Router**. The *CAR Configuration* window displays.
4. Click on the plus sign next to the *Globals* folder.
5. Double-click the **NTP** sub-folder. The *NTP* window displays. Here you can,
   - click **Get** to obtain the latest NTP configuration information from the CAR.
   - type any changes, then click **Set** to send your changes to the CAR.

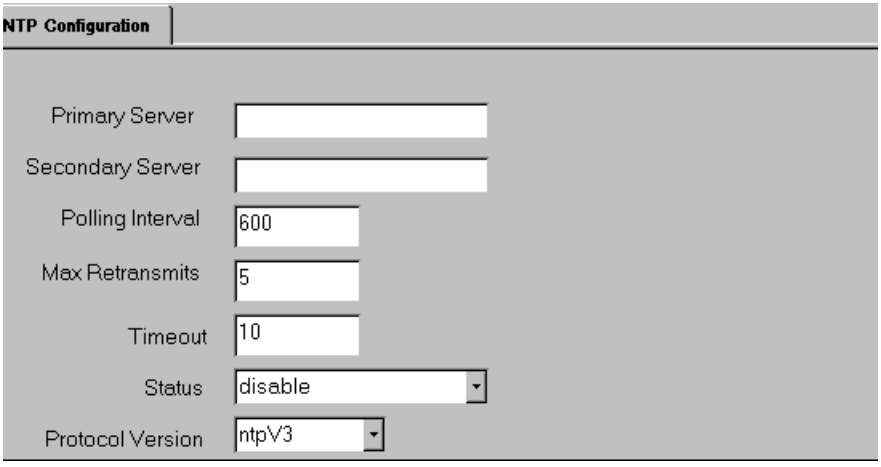


Figure 5-3 NTP Configuration Dialog Box

For details on the terms in the *NTP Configuration* window, refer to NTP Configuration in CMS Online Help.

Adding or Deleting a Log Host

CMS can send Syslog messages to a host workstation that you define on your network. Use these steps to add or update a System Event Log Host.

You must define your CMS management station or pc, as a Log Host for each CMTS device that sends their Syslog messages to CMS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*. Select the CAR folder in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar. The *CAR Configuration* window displays. Note that the *CAR Configuration* window includes a minimized *Chassis View Display*.
4. Click the plus sign next to the *Host*s folder.
5. Double-click the *Log Hosts* sub-folder.
6. Click the **New** button from the toolbar. The *Log Host Configuration* dialog box appears.
7. Type the CMS management station's IP address.
8. Prioritize the Syslog event by selecting a *Level*, as follows:
   - Common (least Syslog output)
   - Critical
   - Unusual
   - Verbose (most Syslog output).
9. Click **OK**.
10. Click the **Get** button to obtain the latest Log Host configuration information from the CAR.
11. Click **Set** to send the settings to the CAR.

Use the View Syslog feature or a third-party Syslog daemon to view the system event log messages. To view Syslog Messages, see Checking Syslog Messages in the Problem Solving section of this chapter.

Adding a TFTP Client

Use the *CAR Configuration* tool to add a TFTP client.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the plus sign next to the *Hosts* folder.
5. Click the **TFTP Clients** sub-folder.
6. Click **New**. The *TFTP Client Configuration* window displays.
7. Type the TFTP client's IP address.
8. For details on the terms in the *TFTP Client Configuration* window, see TFTP Client Configuration in CMS Online Help.
9. Click **OK**.
10. Click the **Set** button to send the settings to the CAR.

Reviewing SNMP Operations

CMS uses the Simple Network Management Protocol (SNMP) to communicate with the management station (or computer) where CMS is installed. CMS uses SNMP to

- Retrieve management information from the CMTS
- Update management information on the CMTS
- Send critical system messages (also known as Traps) from the CMTS to the management station.

Viewing SNMP Host Data

Use the *CAR Configuration* tool to view SNMP data counters and statistics for the CMTS selected.

1. First, open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View display*. Select the CAR icon in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the plus sign next to the *Hosts* folder.

5 Click the **SNMP Hosts** sub-folder. The *SNMP Hosts* window displays. This window lists the SNMP host community string, IP address and Read/Write access.

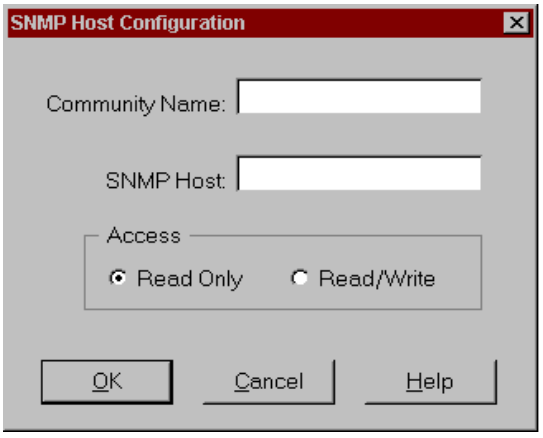


Figure 5-4 SNMP Host Configuration Dialog Box

6 Click **Get**  ,to obtain the latest information from the CAR.

Adding an SNMP Host

Use the *CAR Configuration* tool to add an SNMP host.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click on the plus signs to expand the *Chassis View display*. Select the CAR icon in the *Chassis View display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the plus sign next to the *Hosts* icon.

5 Click the **SNMP Hosts** sub-folder.

6 Click **New**. The *SNMP Host Configuration* window displays.

7 Type the SNMP host community name, SNMP host name, and select the Read/Write access. For details on the terms in the *SNMP Host Configuration* window, see CMS Online Help.

8 Click **OK**.

9 Click **Set**  , to send the settings to the CAR.

Adding an SNMP Trap Host

Use the *CAR Configuration* tool to add an SNMP Trap host.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View display*. Select the CAR icon in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the plus sign next to the *Hosts* folder.
5. Double-click the *SNMP Trap Hosts* sub-folder.
6. Click **New**. The *SNMP Trap Host Configuration* window displays.

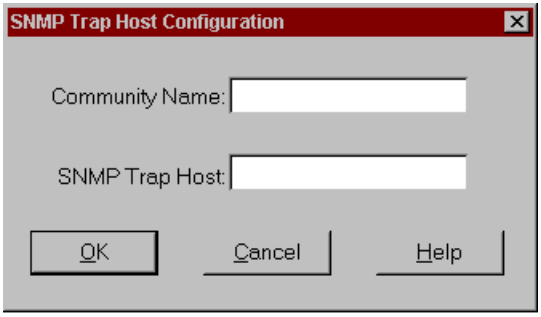


Figure 5-5 SNMP Trap Host Dialog Box

7. Type the SNMP host community name, and SNMP trap host name.
8. For details on the terms in the *SNMP Host Configuration* window, see SNMP Host Configuration in CMS online Help.
9. Click **OK**.
10. Click **Set** , to send the settings to the CAR.

System Clock Signal Summary

Each component in the 3Com CMTS must use the same reference clock signal. This is accomplished by defining one CAR as the system clock *master*. All other components (QAM Modulators, URCs, or another CAR) will then obtain their clock signal from the CAR master.

Any additional CAR in the same chassis must be defined as a *backupmaster* or *slave*.

Checking CAR LEDs for System Clock Status

Table 5-1 helps you quickly determine the status of the system clock component definitions in a given chassis.

Table 5-1 CAR STAT1 LED System Clock Indications

STAT1 LED Color	Indication
Solid Green	System clock master
Solid Amber	System clock backupmaster
Flashing Amber	CAR backupmaster cannot detect CAR master clock signal. If this backupmaster does not detect a master clock signal after 5 minutes, it will assume clock master status. If it detects a clock signal within 5 minutes, the LED will go back to solid amber and this CAR remains the backupmaster.
Off	System clock slave

CAUTION: *If more than one CAR in the same chassis is defined as the system clock master, no cable data network component will be able to communicate with the CMTS.*

Setting the CAR Clock Mode

To set the CAR clock mode via CMS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the plus sign next to the *Globals* folder.
5. Click the **System Information** sub-folder.
6. Locate the *Operational Clock Mode* entry. Select one of the following from the pull-down menu.
   - **backupMaster** — Assumes system clock master status **only** if the CAR defined as master goes down for five minutes or longer. Only one CAR per chassis can be defined as a backupmaster.
   - **master** — Provides system clock reference signal for all other components in the chassis. One CAR **must** be defined as the master.
   - **slave** — Always obtains its clock signal from another CAR. **Never** assumes system clock master status automatically.
7. Click **Set**  , to send the settings to the CAR.

Checking Status

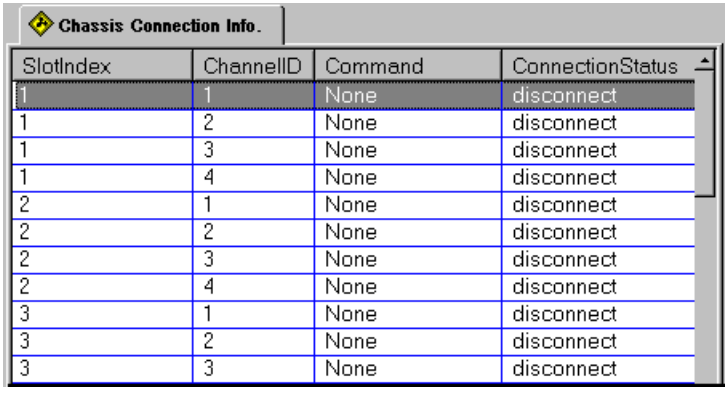
CMS provides you with four ways to verify that the components in your cable data network are working properly.

- *Card Details* section of the Main window
- *Chassis Connection Information* window
- *Chassis View display*
- *Connected Cable Modems Status* window

Viewing Chassis Slot Information

Use the *CAR Configuration* tool for a quick look at the connection status of all cards installed in the CMTS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the CAR icon in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the *Chassis Connection Details* icon. The *Chassis Connection Info.* window appears.



SlotIndex	ChannelID	Command	ConnectionStatus
1	1	None	disconnect
1	2	None	disconnect
1	3	None	disconnect
1	4	None	disconnect
2	1	None	disconnect
2	2	None	disconnect
2	3	None	disconnect
2	4	None	disconnect
3	1	None	disconnect
3	2	None	disconnect
3	3	None	disconnect

Figure 5-6 Chassis Connection Info.

5. For details on the terms in the *Chassis Connection Info.* window, see CMS Online Help.
6. Click **Get**  ,to obtain the latest slot information.

Setting Basic Interface Parameters

Read the following sections for procedures.

Setting Up a Default Gateway for the CMTS

Use the *CAR Configuration* tool in the Menu bar to define the default gateway.

1. First, open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the CAR icon in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the plus sign next to the *IP Configuration* folder in the display area.
5. Click the **Default Gateway** sub-folder. The *Default Gateway* dialog box displays.

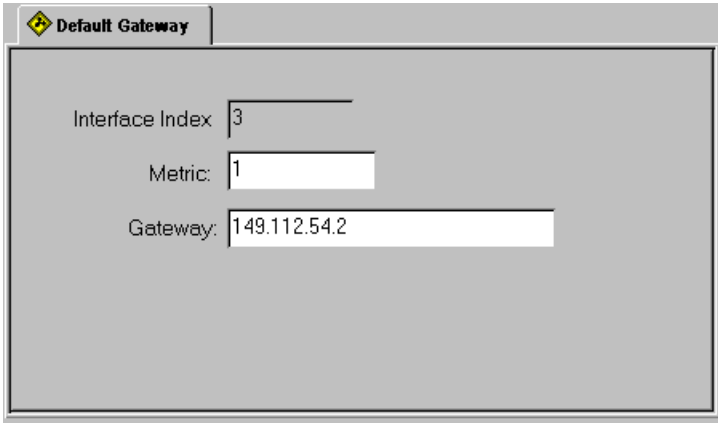


Figure 5-7 Default Gateway Dialog Box

6. Type the required entries. For an explanation of the terms in the *Default Gateway* dialog box, see CMS Online Help.
7. Click **OK**.
8. Click **Set**  , to send the settings to the Cable Access Router.

Settings Specific to Your One-way CMTS

Read the following section for procedures.

Defining Telco Attributes for a One-way CMTS

Use the *CAR Configuration* tool in the Menu bar to define the characteristics of the broadcast messages sent downstream to enable cable modems to register and connect with a One-way CMTS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the **RF Configuration** folder in the display area.
5. Double-click the **Telco Return** folder in the display area.
6. Click the **Telco Attributes** sub-folder. The *Attributes* dialog box displays.

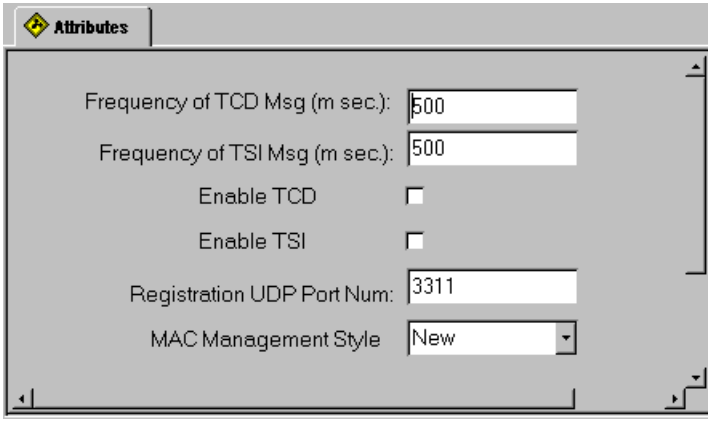


Figure 5-8 Attributes Dialog Box

7. Type the required entries. For details on the terms in the *Attributes* dialog box see Attributes in CMS Online Help.
8. Click **Set**  , to send the settings to the CAR.

Settings Specific to Your One-way and Three-way CMTS

Read the following sections for procedures.

Setting Termination Information

Use the *CAR Configuration* tool in the Menu bar to define the characteristics of broadcast messages sent downstream to a One-way or Three-way CMTS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the **RF Configuration** folder in the display area.
5. Double-click the *Telco Return* folder in the display area.
6. Click the *Termination System Information* sub-folder. The *Termination System Info.* dialog box displays.

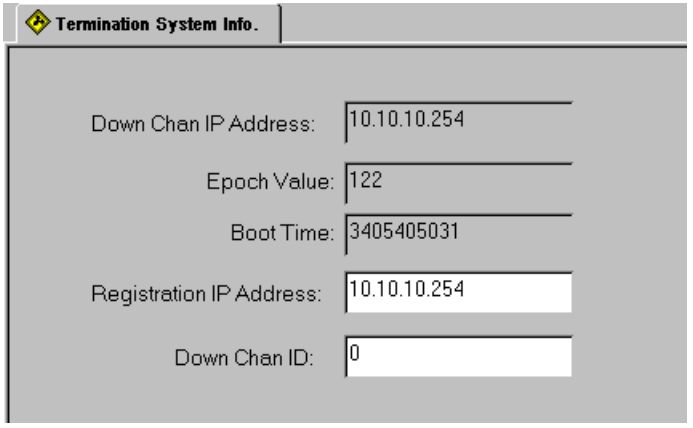


Figure 5-9 Termination System Info. Dialog Box

7. Type the required entries. For details on the terms in the *Termination System Info.* dialog box see Termination System Info. in CMS Online Help.
8. Click **Set** , to send the settings to the CAR.

Setting Service Provider Information

Use these steps to define Service Provider Descriptor (SPD) information. This data is required for cable modems connecting and registering with a One-way or Three-way CMTS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the **RF Configuration** folder in the display area.
5. Double-click the **Telco Return** folder in the display area.
6. Click the **Service Provider Information** sub-folder. The *Service Providers* list displays.
7. Click the **Create** button  , from the toolbar. The *Service Provider Descriptor* dialog box displays.

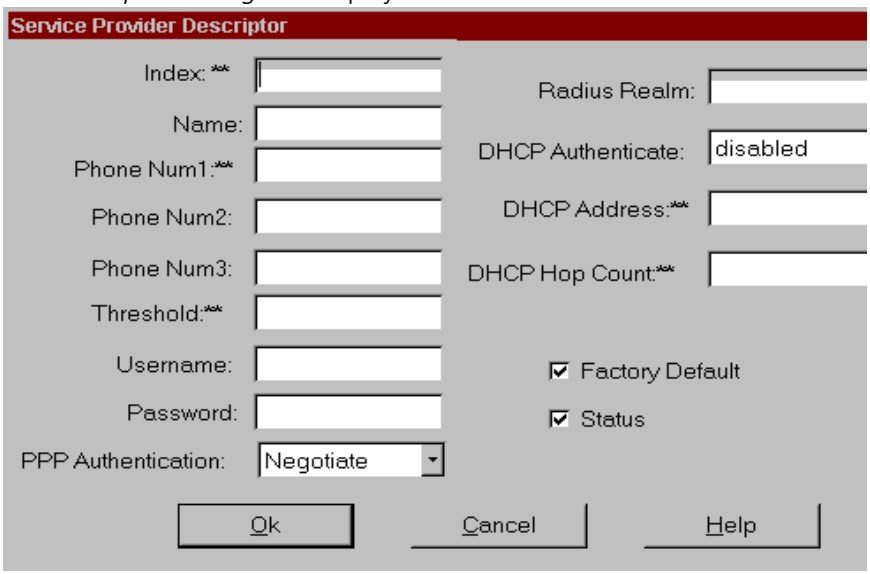


Figure 5-10 SPD Dialog Box

8. Type the required entries. For details on the terms in the *Service Provider Descriptor* dialog box, see *Service Provider Descriptor* in CMS Online Help.
9. Click **Set**  , to send the settings to the CAR.

Settings Specific to Your Two-way CMTS

Read the following sections for procedures.

Using the CPE ARP Feature

The Customer Premises Equipment (CPE) Address Resolution Protocol (ARP) option in CMS allows you to enable or disable CPE ARP for Two-way systems. This allows you to control the way CPEs connected to cable modems obtain IP addresses from the headend.

CPE ARP Enabled

This setting allows the CPE attached to a cable modem to immediately pass data even after the cable modem's power has been down or the CMTS has rebooted. However, it also allows a CPE user connected to a cable modem to configure their system to use static IP addresses, which bypasses the cable network administrator's security and provisioning mechanisms.

CPE ARP Disabled

This setting requires that CPEs connected to Two-way cable modems obtain their IP addresses via a DHCP server only. This makes it impossible for cable customers to assign static IP addresses to a CPE, or to attempt to steal service by masquerading as a host with a known IP address.

Once CPE ARP is disabled, the CAR does not send ARP messages over the cable network, and does not use received ARP messages to add entries to its ARP table. It will use DHCP to fill its ARP table for all hosts on cable networks.

Setting CPE ARP

Use these steps to set the CPE ARP feature via CMS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the plus sign next to the *Globals* folder.
5. Click the **System Information** sub-folder.
6. Locate the *CPE ARPing* entry. To use the ARP feature, click **Enable**. To terminate, click **Disable**.

Setting Downstream Channel Parameters

Use these steps to set downstream parameters for a Two-way CMTS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the **RF Configuration** folder in the display area.
5. Click the **Two-way** folder in the display area.
6. Click the **Downstream Channel Details** sub-folder. The *Downstream Channel Details* list displays.
7. To modify a setting, double click on an entry. The *Downstream Channel Edit* dialog box displays.

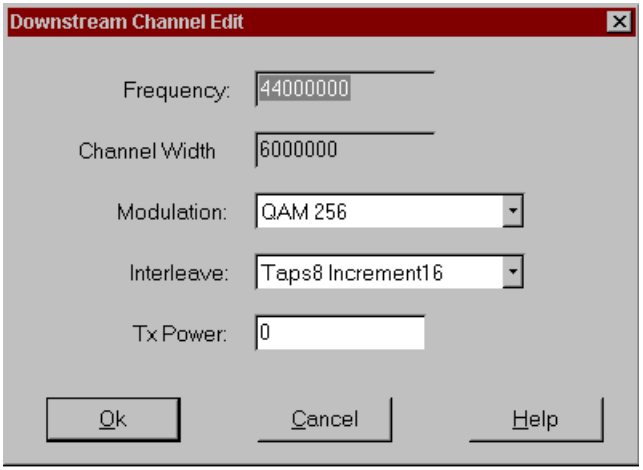


Figure 5-11 Downstream Channel Edit Dialog Box

8. Type the required entries. For details on the terms in the *Downstream Channel Edit* dialog box, see Downstream Channel Edit in CMS Online Help.
9. Click **Set**  , to send the settings to the CAR.

Setting MAC Interface Parameters

Use these steps to edit MAC interface settings defined for the CMTS selected in the *Chassis View display*.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the **RF Configuration** folder in the display area.
5. Click the **Two-way** folder in the display area.
6. Click the **MAC Details** sub-folder. The *MAC Details* list displays.
7. To modify a setting, double click on an entry. The *MAC Configuration Edit* dialog box displays.

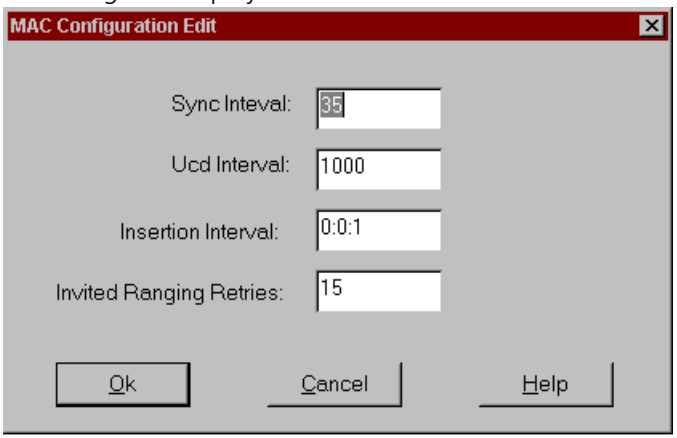


Figure 5-12 MAC Configuration Edit Dialog Box

8. Type the required entries. For details on the terms in the *MAC Configuration Edit* dialog box, see MAC Configuration Edit in CMS Online Help.
9. Click **Set**  , to send the settings to the CAR.

Setting Upstream Channel Parameters

Use these steps to edit upstream channel settings defined for the CMTS selected in the *Chassis View display*.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the **RF Configuration** folder in the display area.

5 Click the **Two-way** folder in the display area.

6 Click the **Upstream Channel Details** sub-folder. The *Upstream Channel Details* list displays.

7 To modify a setting, double click on an entry. The *Upstream Channel Edit* dialog box displays.

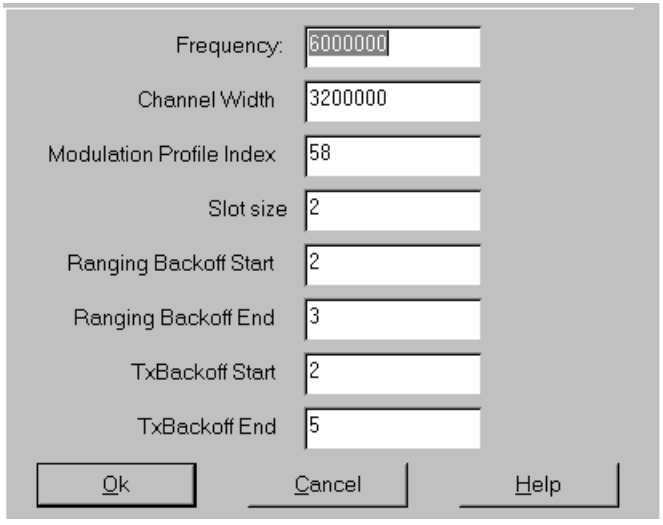


Figure 5-13 Upstream Channel Edit Dialog Box

8 Type the required entries. For details on the terms in the *Upstream Channel Edit* dialog box, see Upstream Channel Edit in CMS Online Help.

9 Click **Set** , to send the settings to the CAR.

Viewing Upstream Frequency Settings

Use these steps to view the current Upstream Frequency Change (UFC) parameters defined for the selected CMTS. These parameters define the frequency to which the CMTS automatically changes when any of the defined upstream error thresholds are exceeded.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the **RF Configuration** folder in the display area.

5 Click the **Two-way folder** in the display area.

6 Click the **Upstream Frequency Change** sub-folder. The *Upstream Frequency List* displays.

7 To modify a setting, double click on an entry. The *Upstream Frequency Edit dialog* box displays.

8 Type the upstream frequency.

9 Click **Set**  , to send the settings to the CAR.

Viewing or Editing Burst Profile Modulation Settings

Use these steps to view or edit burst profile modulation settings defined for the CMTS selected in the *Chassis View Display*.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the **RF Configuration** folder in the display area.

5 Click the **Two-way** folder in the display area.

6 Click the **Modulation Profile Details** sub-folder. The *Modulation Profile Details* list displays.

7 To modify a setting, double click on an entry. The *Modulation Profile Edit* dialog box displays.

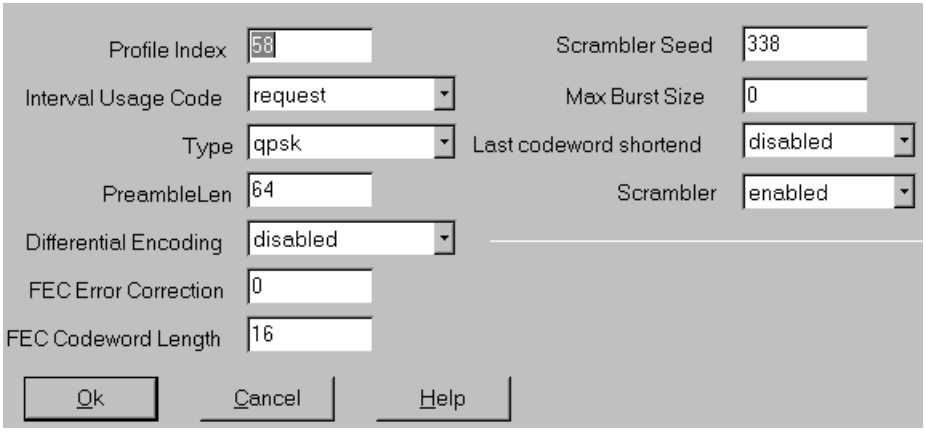


Figure 5-14 Modulation Profile Edit Dialog Box

8 Type the required entries. For details on the terms in the *Modulation Profile Edit* dialog box, see Modulation Profile Edit in CMS Online Help.

9 Click **Set** , to send the settings to the CAR.

Viewing or Editing Burst Profile Settings

Use these steps to view or edit burst profile settings defined for the CMTS selected in the *Chassis View display*.

1 Open the appropriate Chassis View, (.cvw).

2 Next, click the plus signs to expand the *Chassis View display*. Select the name of the CAR in the *Chassis View display*.

3 Click **Configuration** | **Cable Access Router** from the Menu bar.

4 Click the **RF Configuration** folder in the display area.

5 Click the **Two-way** folder in the display area.

6 Click the **Burst Profile Details** sub-folder. The *Burst Profile Details* list displays.

7 To modify a setting, double click on an entry. The *Burst Profile Edit* dialog box displays.

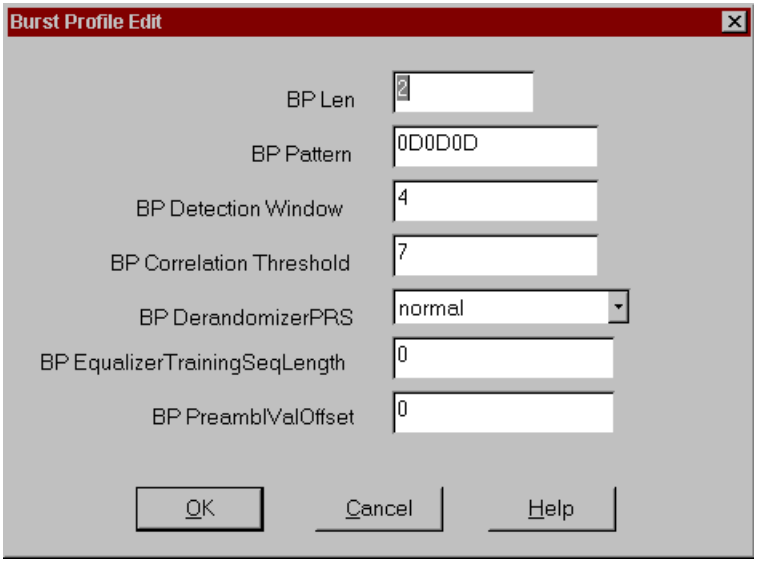


Figure 5-15 Burst Profile Edit Dialog Box

8 Type the required entries. For details on the terms in the *Burst Profile Edit* dialog box, see CMS Online Help. Click the **Set** button.

Upgrading 3Com CMTS Software

Read the following sections for procedures.

Upgrading a Single CAR or URC

Use these steps to upgrade a CAR or URC to the latest software version.

1. Obtain the latest software version of the software. Contact your 3Com sales representative for instructions on obtaining the latest nexxx.dmf file.
2. Save the nexxx.dmf file to a local drive on the computer where you installed CMS.
3. Click **Command** | **Software Download** from the Menu bar.
4. Note the Chassis View displayed under the CMTS column. Click on the plus signs to expand the *Chassis View display*.
5. Select the image file to use for the upgrade.
6. Click a checkmark in the checkbox next to the CAR or URC you need to upgrade.
7. Click **Upgrade**. A prompt displays indicating that the upgrade is complete.

Upgrading All CMTS Device Software

Use these steps to upgrade the software on all cards installed in the CMTS.

1. Click **Command** | **Software Download** from the Menu bar.
2. Note the Chassis View displayed under the CMTS column. Click on the plus signs to expand the *Chassis View display*.
3. Click a checkmark in the *All URC* and *All CAR* checkboxes.
4. Select the image file to use for the upgrade.
5. Click **Upgrade**. A prompt displays indicating that the device software operation completed successfully.

Problem Solving

Read these sections for instructions on how to proceed if you are unable to access the CMTS, and connected cable modems.

Monitoring Events

If you notice a change in system performance, use System Event Log (Syslog) messages to view real-time logs that describe the events and traffic flow through all CMTS devices managed by CMS.

Remember to view Syslog messages, you must first define your CMS management station or pc, as a Log Host for each CMTS device that sends their Syslog messages to CMS. For instructions, see "Adding or Deleting a Log Host," listed in the "Configuring Systems to Work with the CMTS" section, shown previously in this chapter.

Checking Syslog Messages

Use these steps to check Syslog messages.

1. Click **Tools** | **Syslog** from the Menu bar.
2. Review the *Syslog Message* window items described below:
   - **IP Address** — This is the Ethernet address of the CAR that is associated with this Syslog message.
   - **Rcv Time** — Displays time of day (in the hours:minutes:seconds format) that this system event occurred.
   - **Rcv Date** — Displays month, date, and year that corresponds to the time of receipt.
   - **Syslog** — Displays a description of the logged event.
3. Close the *Syslog* window to return to the *Chassis View display.*

Restoring a Connection Between Cable Modems and the CMTS

If you notice that a particular cable modem no longer appears connected to the CMTS, first check the modem's *Registration State* listed in the *Connected Cable Modem Status* window, and proceed as follows.

1. Open the appropriate Chassis View (.cvw).
2. Next, click the plus signs to expand the *Chassis View display*. Double-click the **Connected Modems** icon. The *Connected CMs Status* window displays.
3. If *Ranging Aborted* appears in the *Registration State* column, check the following.
   - Check if the cable modem's RF power is disconnected, also
   - Make sure the cable modem is plugged into the power source.
4. *Access Denied* in the *Registration State* column, can signify the following.
   - The Message Integrity Check (MIC) has failed.
   - The authorization string (also known as *Shared Secret*) is incorrect. Check that the authorization string is identical to the one on the provisioning server.

If a pause in connectivity occurs due to a CAR crash or reset, CMS automatically resumes when the CAR finishes rebooting.

6 USING CMS TO MAXIMIZE PERFORMANCE

Read this chapter for instructions on using CMS performance features including,

- Concatenation, and
- Graphing data traffic.

Concatenation Overview

This feature allows you to send multiple MAC frames in a single upstream burst. This can help you use the mini-slot allocations more efficiently and reduce the amount of data request and data grant traffic between the CMTS and cable modems.

In smaller networks that have low upstream contention, concatenation can improve overall system performance, and improve audio and/or video applications that are not working smoothly in a non-concatenated CMTS. It also can help you to more efficiently use the maximum upstream transmit burst defined for each upstream channel in a CMTS with the *set cable modulation index* command.

CAUTION: *3Com does not recommend enabling concatenation in larger cable data networks with high upstream contention. Doing so can adversely affect system performance.*

Concatenation Guidelines

Before you can enable concatenation in the CMTS, verify the following information:

- The cable modem configuration file must contain an entry in the upstream burst field (typically in bits per second) that is greater than zero.
- Each of the cable modem configuration files being used by this CMTS must have Baseline Privacy disabled.

- Baseline Privacy must be enabled in each cable modem accessing the CMTS.
- The CMTS must be using these URC hardware and software versions:
  - Hardware revision: B or greater
  - Boot code software version: 4.2.x or greater
  - Operational code software version: any version

Setting Concatenation

Use the following steps to enable or disable concatenation in a CMTS.

1. Open the appropriate Chassis View, (.cvw).
2. Next, click on the plus signs to expand the *Chassis View Display*. Select the CAR icon in the *Chassis View Display*.
3. Click **Configuration** | **Cable Access Router** from the Menu bar.
4. Click the plus sign next to the *Globals* folder.
5. Click the **System Information** sub-folder.
6. Locate the *Concatenation* entry. To set Concatenation, click **Enable**. To terminate, click **Disable**.

Graphing Overview

The CMS graphing capability allows you to create a line graph based on the following cable modem network performance characteristics.

- **Downstream Signal to Noise Ratio (SNR) Graph** — Allows you to determine if the cable modem is receiving a usable signal from the headend.
- **Upstream Power Level Graph** — RF return cable modems only. Allows you to monitor the upstream transmit power generated by the selected cable modem.
- **Downstream Power Level Graph** — RF return cable modems only. Allows you to monitor the receive power level received by the cable modem.

Graphing the Downstream SNR

Use the following steps.

1. Open the appropriate Chassis View.
2. Next, click on the plus signs to expand the *Chassis View display*. Double-click the **Connected Modems** icon, . The *Connected CMs Status* window displays.
3. Click the **Get the Detailed CM Info** button , on the *Connected CMs Status* window toolbar. The *Cable Modem Advanced View* displays.
4. Double-click the **Performance** folder.
5. Select MAC address of the cable modem you want to graph.
6. Click the **Downstream SNR** folder.

   The graph displays to the right of the *Cable Modem Advanced View* window, for example.

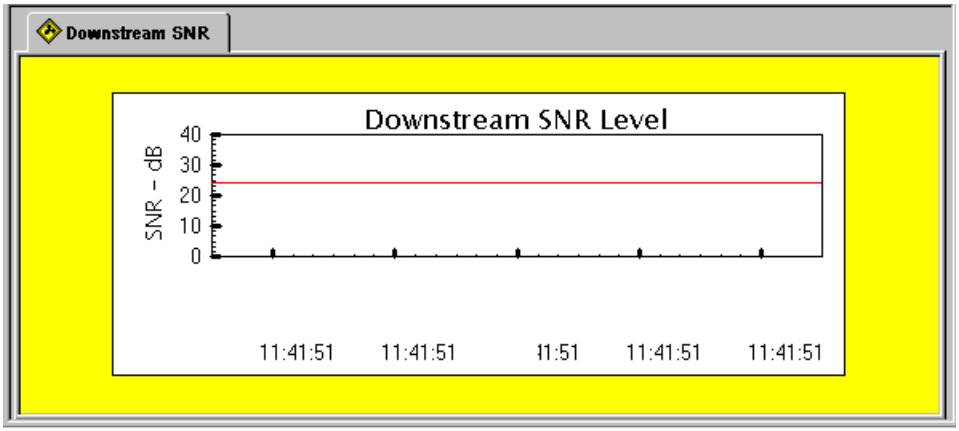


Figure 6-1 Downstream SNR Graph Example

Graphing the Downstream Signal

Use the following steps.

1. Open the appropriate Chassis View.
2. Next, click on the plus signs to expand the *Chassis View display*. Double-click the **Connected Modems** icon, . The *Connected CMs Status* window displays.

3 Click the **Get the Detailed CM Info** button  , on the *Connected CMs Status* window toolbar. The *Cable Modem Advanced View* displays.

4 Double-click the **Performance** folder.

5 Select MAC address of the Cable Modem you want to graph.

6 Click the **Downstream Signal** folder.

The graph displays to the right of the *Cable Modem Advanced View* window, for example.

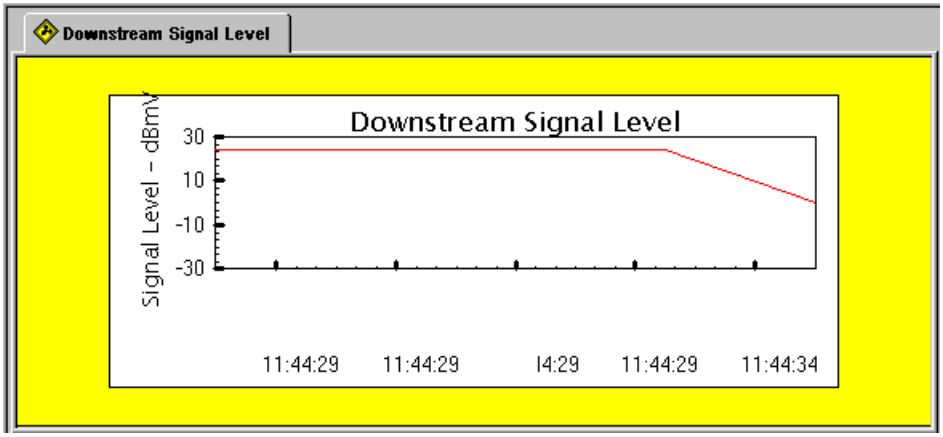


Figure 6-2 Downstream Signal Example

Graphing the Upstream Signal

Use the following steps.

1 Open the appropriate Chassis View.

2 Next, click on the plus signs to expand the *Chassis View display.* Double-click the **Connected Modems** icon,  . The *Connected CMs Status* window displays.

3 Click the **Get the Detailed CM Info** button  , on the *Connected CMs Status* window toolbar. The *Cable Modem Advanced View* displays.

4 Double-click the **Performance** folder.

5 Select MAC address of the Cable Modem you want to graph.

6 Click the **Upstream Signal** folder.

The graph displays to the right of the *Cable Modem Advanced View* window, for example.

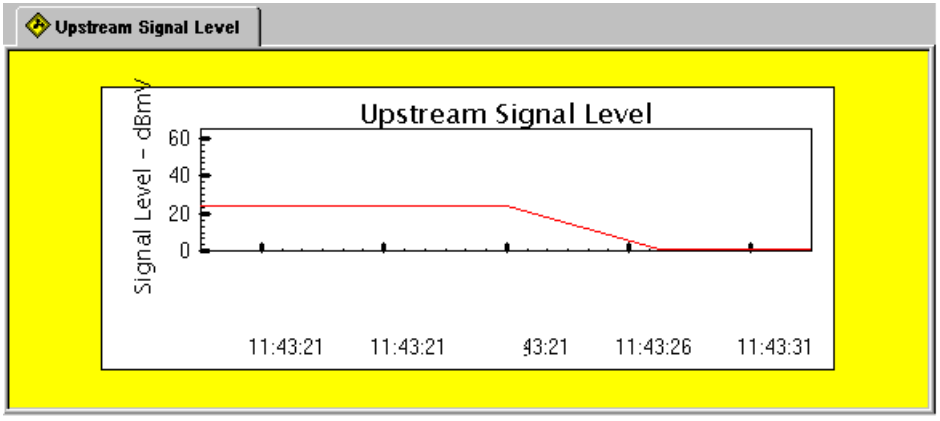


Figure 6-3 Upstream Signal Example

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