Cable Modem Configuration File Editor

User Guide

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Version 3.1

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CONTENTS

ABOUT THIS GUIDE

Finding Specific Information in This Guide v
Conventions vi
Related Documentation vii
Year 2000 Compliance vii
Contacting 3Com Carrier Systems viii

PRODUCT OVERVIEW

Overview 1-1
Features 1-1
    Graphical User Interface 1-1
    Two-way/One-way Compatibility 1-2
    DOCSIS Compliant 1-2

GETTING STARTED

Installation Requirements 2-1
Installing CFE 2-2
Uninstalling CFE 2-2
Elements of the CFE GUI 2-2
    The Toolbar 2-4
    Dialog Box Buttons 2-4

CREATING THE CABLE MODEM CONFIGURATION FILE

Configuration File Overview 3-1
Components of the Configuration File 3-2
Creating the Configuration File 3-3
    General Configuration Parameters and Flags 3-3
    QoS Configuration 3-5
    SNMP Write Access Configuration 3-6

Baseline Privacy Configuration 3-7
Telephony Channel Descriptor Configuration 3-8
MIB Object Configuration 3-10
MAC Address Configuration 3-11
Saving the Configuration File 3-11
Viewing the Configuration File 3-12
Editing a Configuration File 3-14
Installing the Configuration File 3-15
TFTP Server 3-15
DHCP Server 3-15

INDEX

About This Guide

About This Guide provides an overview of this guide, describes guide conventions, tells you where to look for specific information and lists other publications that may be useful.

This guide describes how to install and use 3Com Cable Modem Configuration File Editor (CFE) software to create a customized cable modem configuration file for client cable modems that connect to the 3Com Cable Modem Termination System (CMTS).

This guide is intended for cable data network administrators with advanced knowledge of Radio Frequency (RF) and Internet Protocol (IP) networking concepts and terminology.

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 shows the location of specific information in this guide.

If you are looking for	Turn to
A high-level description of CFE software and its features	Chapter 1
Procedures for installing the software and navigating through the program	Chapter 2
A detailed description of the cable modem configuration file and its components	Chapter 3
A procedure for creating and verifying the cable modem configuration file	Chapter 3

Conventions

The tables below list conventions that are used throughout 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 Return or Enter key. Do not press the Return or Enter key when an instruction simply says "type."
[Key] names	Key names appear in text in one of two ways: ■ Referred to by their labels, such as "the Return key" or "the Escape key" ■ Written with brackets, such as [Return] or [Esc]. If you must press two or more keys simultaneously, the key names are linked with a plus sign (+). Example: Press [Ctrl]+[Alt]+[Del].
Menu commands and *buttons*	Menu commands or button names appear in italics. Example: From the *Help* menu, select *Contents*.
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	Bold text denotes key features.

Related Documentation

The following 3Com documents provide additional installation, configuration, and maintenance information about the 3Com data over cable system:

- *Cable Access Router User Guide:* Contains a description of the 3Com data over cable system, and installation, configuration, and troubleshooting information for the Cable Access Router (CAR). The CAR performs all routing and bridging functions in the 3Com data-over-cable network.
- *Cable Access Router Release Notes*: Contains helpful information that was not available when the *Cable Access Router User Guide* was printed.
- *Single Channel Stand-alone QAM Modulator Installation Guide*: Provides information required to install and configure the Single Channel QAM Modulator. The QAM Modulator processes all data destined for downstream data transmission from the CAR to client cable modems.
- *Dual Upstream Receiver Card Installation Guide*: Provides information required to install and configure the Dual Upstream Receiver (URC). The URC processes all data sent upstream from client cable modems to the 3Com CMTS.
- *Cable Headend Manager User Guide*: Describes how to install and use 3Com *Cable Headend Manager* software to configure and monitor 3Com CMTSs.
- *Cable Modem Manager User Guide*: Describes how to install and use 3Com *Cable Modem Manager* software to configure, monitor, and troubleshoot all 3Com cable modems connected to the 3Com data over cable network.

Year 2000 Compliance

3Com CFE software is Year 2000 compliant.

For information on Year 2000 compliance and other 3Com products, visit the 3Com Year 2000 web page:

`http://www.3Com.com/products/yr2000.html`

Contacting 3Com Carrier Systems

Use this chart as a reference when you need to contact 3Com Carrier Systems.

Contacting 3Com Carrier Systems	
3Com Corp. - 5400 Bayfront Plaza - P.O. Box 58145 - Santa Clara, CA - 95052-8145	
Internet	http://www.3Com.com
Internet Customer Support	http://totalservice.usr.com
Sales	1-800-877-2677
Technical Support (U.S. and Canada)	1-800-231-8770 7 a.m. to 8 p.m. CST Monday-Friday
Technical Support (Europe, Middle East, Africa)	353-1-205-7700 9 a.m. to 7 p.m. CET Monday-Friday
Technical Support (all other location)	1-847-797-6600 7 a.m. to 8 p.m. CST Monday-Friday
ISDN support	1-800-877-ISDN

1 PRODUCT OVERVIEW

This chapter provides an overview of the 3Com Cable Modem Configuration File Editor (CFE) and its features

Overview

The 3Com Configuration File Editor is a windows-based Graphical User Interface (GUI) software program designed to assist you in creating a Data over Cable System Interface Specification- (DOCSIS) compliant cable modem configuration file. This file is required for all DOCSIS-compliant cable modems to register with the 3Com Cable Modem Termination System (CMTS).

CFE runs on Windows 95 and Windows NT, and provides an on-line help system.

Features

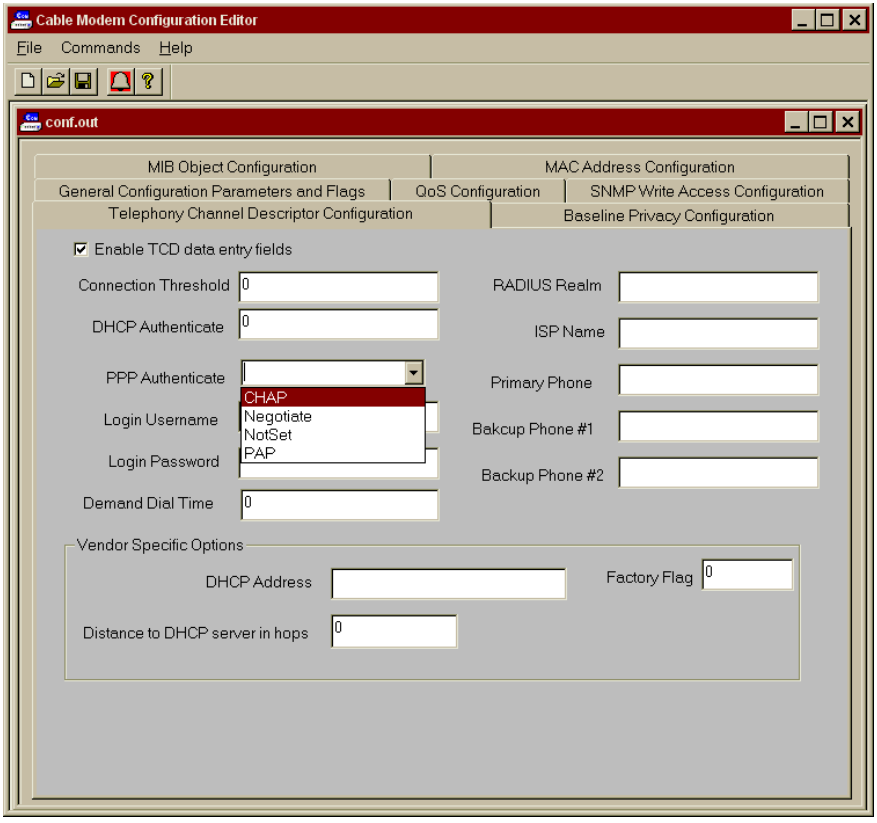
CFE provides the following features:

- Graphical User Interface
- Two-way/One-way Compatibility
- DOCSIS Compliant

Each is described in the subsections that follow.

Graphical User Interface

CFE is a Windows-based GUI application. CFE provides intuitive toolbar icons, as well as a text-based menu bar to access all features and commands. CFE runs on Windows 95 and Windows NT.



CFE Graphical User Interface

Two-way/One-way Compatibility

CFE allows you to create a cable modem configuration file regardless of the 3Com data over cable architecture. CFE allows you to create a customized configuration file for both one-way (telco return) and two-way (RF return) data-over-cable architectures.

DOCSIS Compliant

CFE provides configuration parameters that fully comply with the Data Over Cable System Interface Specification (DOCSIS). This guarantees that your cable modem configuration file allows any cable modem that complies with the DOCSIS standard will be able to use the file to connect and register with the 3Com CMTS.

2 GETTING STARTED

This chapter describes how to install the Cable Modem Configuration File Editor (CFE) software. It also provides information to help you navigate through the program. This chapter contains these sections:

- Installation Requirements
- Installing CFE
- Uninstalling CFE
- Elements of the CFE GUI

Installation Requirements

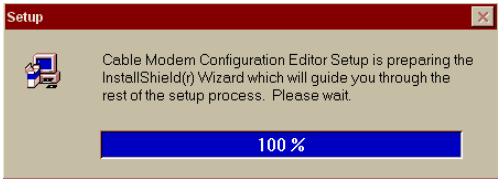
Install CFE on a PC workstation that meets these requirements:

- Intel Pentium processor
- Windows 95 Version 950 B or greater or Windows NT Version 4.0 or greater
- 32 MB RAM
- 10 MB available hard disk space
- Monitor set to 800 x 600 or greater screen resolution

Installing CFE

To install and launch CFE software:

1. Insert the CFE software diskette into your floppy disk drive.
2. Click **Start | Run**.
3. Type **a:setup** and press **<Return>** to launch the installation wizard.
4. Follow the on-screen prompts to finish the installation.



5. When prompted, click **OK** to exit the installation wizard.
6. Double click the **CFE program icon** to launch the program.

Uninstalling CFE

To uninstall CFE:

1. Double click the *Uninstall Cable Modem Configuration Editor* icon.
2. The uninstall shield appears and proceeds to remove the files related to the application.
3. When the uninstall program finishes, you may be prompted to remove some elements of the application. Do so at this time.
4. Reboot your workstation before re-installing or upgrading the CFE software.

Elements of the CFE GUI

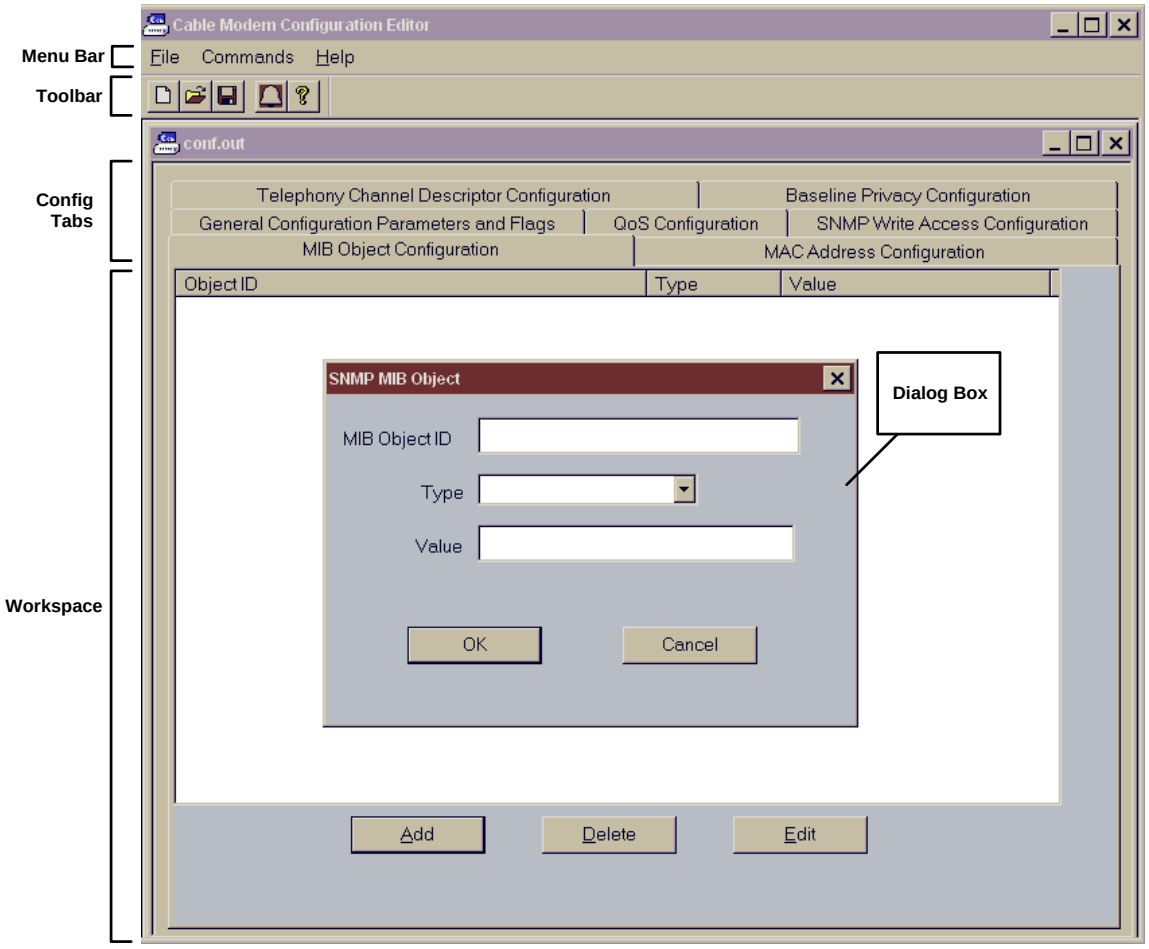
Refer to the illustration that follows. The CFE GUI is comprised of four basic elements:

- Menu Bar
- Toolbar
- Configuration Tabs
- Workspace

Each of the elements is described in the table and illustration that follow.

Elements of the CFE GUI

Element	Description
Menu Bar	The File menu on the Menu Bar above the Toolbar contains a pull-down menu which gives access to all CFE features.
Toolbar	The Toolbar provides one-click access to the CFE functions used most often.
Config Tabs	The Config (Configuration) Tabs group each of the seven sets of parameters you must set to create or edit a configuration file.
Workspace	This is the area where additional screens and dialog boxes appear.
Dialog Box	Some configuration screens bring up dialog boxes that ask you for specific entries.



Elements of the CFE GUI

The Toolbar

The CFE *Toolbar* provides access to CFE utilities used often. Each of the five Toolbar icons is described in the table that follows.

Toolbar Icons

Icon	Description
	Create New File: Click to begin creating a new configuration file. By default, the new configuration filename is *config.out*. You can change it when you use the *Save File* command described below.
	Open Existing File: Click this icon to open an existing configuration file. A dialog box appears which prompts you for the name and location of the configuration file.
	Save File: Click this icon to save a configuration file you created or edited. The file is saved in a binary format and also calculates the message integrity check (MIC). To see whether all the data has been stored properly in the output file, use the *View Log* feature described below.
	View Log: Click this icon after you save a created or edited a configuration file to check the integrity of the entries you made. It shows the recent error log information created when the configuration file was saved. By analyzing the error log, you can easily identify which configuration file parameters are successfully TLV encoded and stored, and which are not.
	About Box: Provides the version number of the Configuration File Editor software.

Dialog Box Buttons

Each of the screens or dialog boxes called up in CFE may contain one or more of the buttons described in the table below. Familiarize yourself with the function of each button.

Dialog Box Buttons

Button	Description
	Click *OK* to have all dialog box entries made part of the configuration file.
	Click *Cancel* to exit a dialog box without making your entries part of the configuration file.
	Click Add after you have entered parameters in a dialog box to make those settings part of your configuration file.
	Select an existing setting, then click *Delete* to remove that setting from the configuration file.
	Select an existing setting, then click Edit to modify that setting.

3 Creating the Cable Modem Configuration File

This chapter provides details on the cable modem configuration file and a procedure for creating the file with the Cable Modem Configuration File Editor (CFE). This chapter contains these sections:

- Configuration File Overview
- Components of the Configuration File
- Creating the Configuration File
- Saving the Configuration File
- Viewing the Configuration File
- Editing a Configuration File
- Installing the Configuration File

Configuration File Overview

The configuration file provides cable modems with the configuration and provisioning data they need to initialize and successfully connect with the cable data network. CFE allows you to create a customized configuration file that defines performance restrictions and parameters that you want to place on each cable modem that connects to the CMTS.

- The file is installed on the cable headend TFTP server.
- The configuration file name must be specified in the DHCP server assigned to the cable headend
- It is downloaded to every cable modem that registers with the CMTS. *No cable modem can successfully connect to the Cable Modem Termination System (CMTS) without the configuration file.*
- All parameters in the file are used by the cable modem until it powers down or reboots.
- There is no limit on the number of configuration files you can create for a given CMTS.

Components of the Configuration File

The cable modem configuration file can contain 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 or two-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 DOCSIS-compliant 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

To create a customized cable modem configuration file with CFE:

1 Double click the **CFE program icon** to launch the program.

2 On the Menu Bar, click **File**.

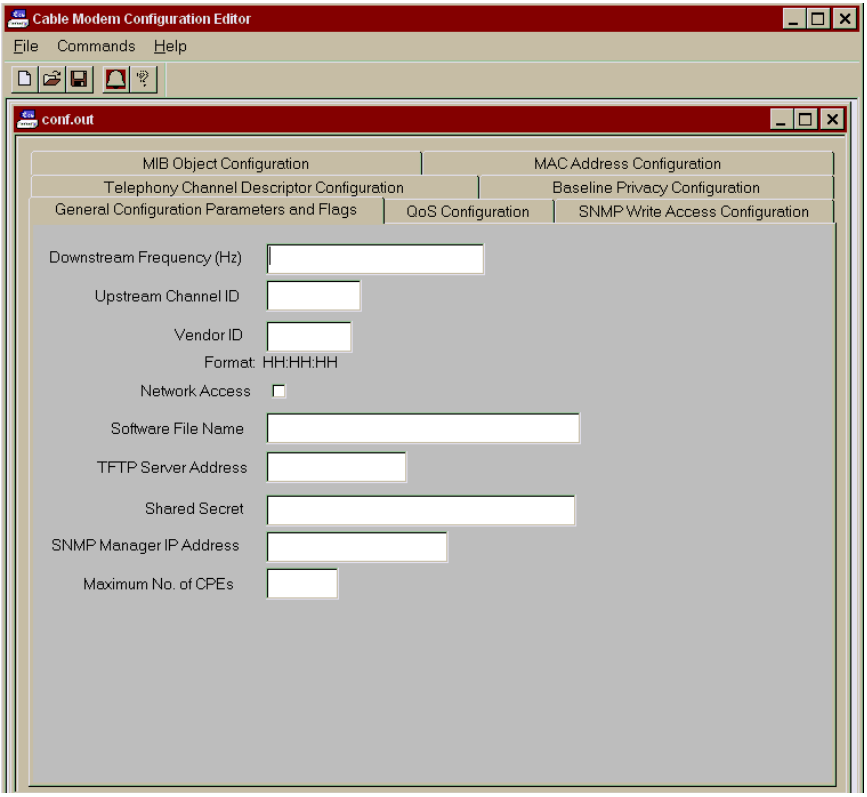
3 Click **New**.

4 Continue with *General Configuration Parameters and Flags*.

General Configuration Parameters and Flags

To configure General Configuration Parameters and Flags:

1 Click the **General Configuration Parameters and Flags** tab.



General Configuration Parameters and Flags Tab

2 Make the entries described in the table that follows.

General Configuration Parameters and Flags Entries

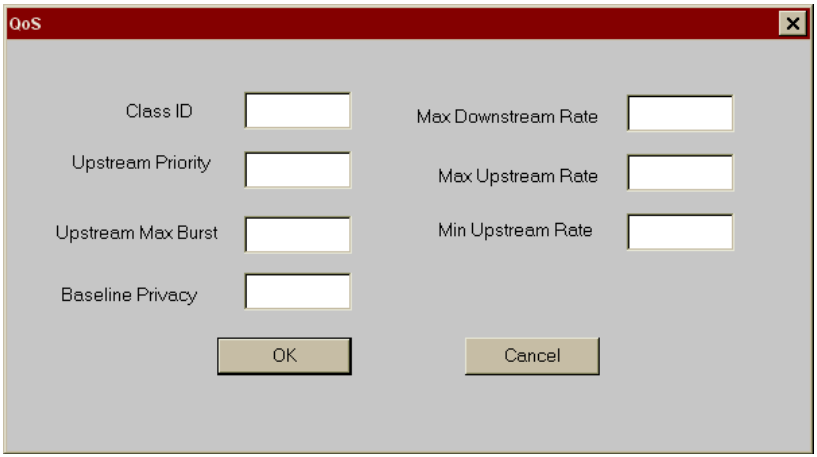
Field	Description
Downstream Frequency (Hz)	Enter the frequency (in Hz) to be used by the cable modem to receive downstream transmissions from the CMTS. It must be a multiple of 625000 Hz. It is the center frequency of the downstream channel in Hz stored as a 32-bit binary number. The downstream frequency is an override for the downstream channel selected by the cable modem during its original scanning. 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 CM 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	Enter 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	Specifies the software upgrade file for the cable modem. This allows the cable modem to check for software upgrades each time it registers with the CMTS.
TFTP Server Address	Enter the IP address of the TFTP server on which you will be placing a copy of this configuration file. Enter the address in the nnn.nnn.nnn.nnn format.
Shared Secret	Enter the 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. As you enter the string, the characters are echoed to the screen. However, there is no way to view the string once you finish configuration. Therefore, be careful to monitor your screen as you type in the string. Limited to 64 characters. **Note**: The Shared Secret **must** be identical to the one set in the Cable Access Router in the CMTS.
SNMP Manager IP Address	Enter the IP address of the workstation being used to receive SNMP Trap messages from cable modems.
Maximum No. of CPEs	Enter the maximum number of Customer Premises Equipment (CPE) devices that are allowed access to a single cable modem.

3 Continue with *QoS Configuration*.

QoS Configuration

To configure QoS (Quality of Service):

1. Click the **QoS Configuration** tab.
2. Click the **Add** button at the bottom of the screen. The *QoS* dialog box displays.



QoS Configuration Dialog Box

3. Make the entries described in the table that follows.

QoS Configuration Entries

Field	Description
Class ID	Enter 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	Enter 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	Enter a value which specifies the maximum data rate (in bits per second) allowed from this service class on the upstream channel. It is the peak data rate for Packet PDU data (including destination MAC address and the CRC) over a one second interval. This is a limit on the modem, not a guarantee that this rate is available.
Baseline Privacy	Enter a configuration setting which enables or disables Baseline Privacy on a provisioned class of service: ■ 1 = enable ■ 2 = disable
Max 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.

QoS Configuration Entries

Field	Description
Max 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.
Min 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.

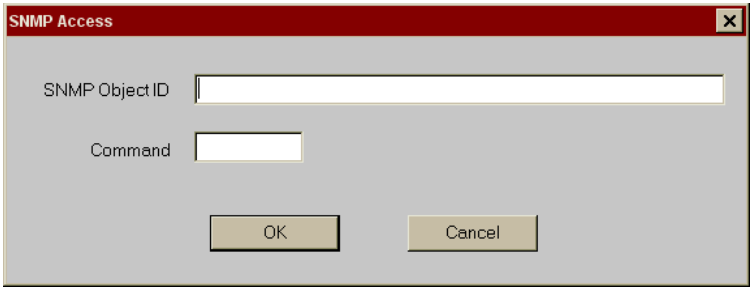
4 Continue with *SNMP Access Configuration*.

SNMP Write Access Configuration

To configure SNMP Write Access:

1 Click the **SNMP Write Access Configuration** tab.

2 Click the **Add** button at the bottom of the screen. The *SNMP Access* dialog box appears.



SNMP Access Dialog Box

3 Make the entries described in the table that follows.

SNMP Access Configuration Entries

Entry	Description
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: ■ 0 = read/write access ■ 1 = read access only

4 Click **OK**.

5 Repeat step 3 until you have entered all SNMP MIB Object access information.

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

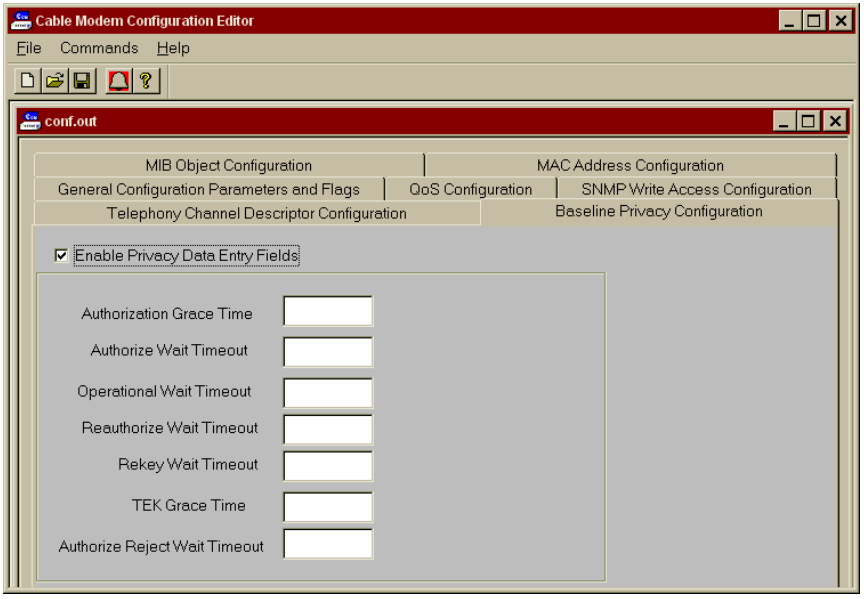
7 Continue with *Baseline Privacy Configuration*.

Baseline Privacy Configuration

To configure Baseline Privacy:

1 Click the **Baseline Privacy Configuration** tab.

2 Place a check mark in the *Enable Privacy Data Entry Fields* check box.



Baseline Privacy Configuration Dialog Box

3 Make the entries described in the table that follows:

Baseline Privacy Configuration Entries

Entry	Description
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.
Authorize Wait Timeout	Enter the timeout period (in seconds) between sending Authorization Request messages from the Authorize Wait state.
Operational Wait Timeout	Enter the timeout period (in seconds) between the sending of Key Request messages from the Operation Wait state.
Reauthorize Wait Timeout	Enter the timeout period (in seconds) between sending Authorization Request messages from the Reauthorize Wait sate.

Baseline Privacy Configuration Entries

Entry	Description
Rekey Wait Timeout	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 Timeout	Enter the amount of time (in seconds) before the system rejects an authorization request from a cable modem.

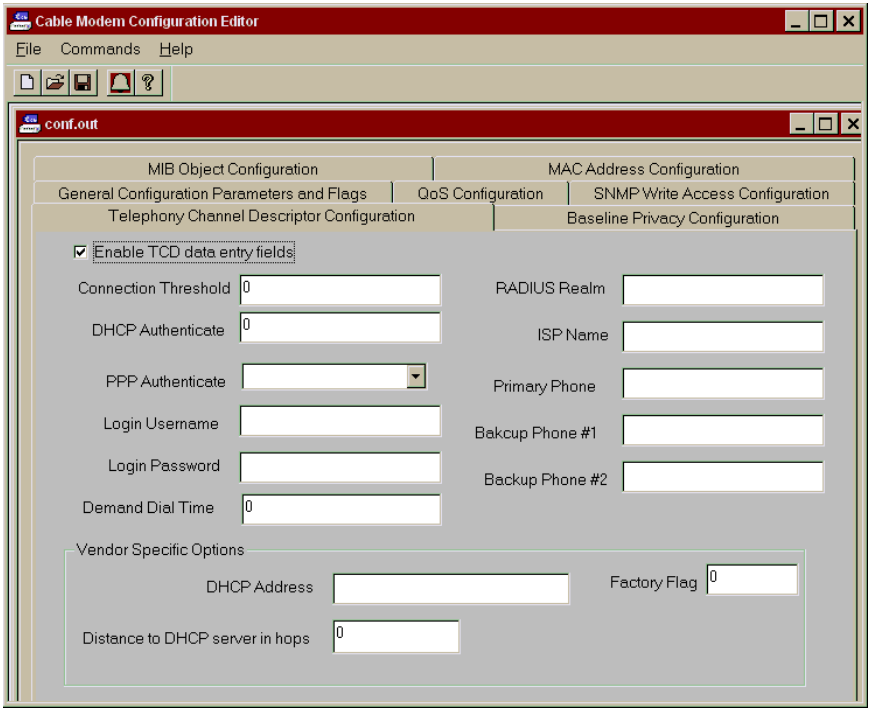
4 Continue with *Telephony Channel Descriptor Configuration*.

Telephony Channel Descriptor Configuration

TCD Configuration is required for Telco return data over cable systems only. To define the Telephony Channel Descriptor (TCD) Configuration:

1 Click the **Telephony Channel Descriptor Configuration** tab.

2 Place a check mark in the *Enable TCD data entry fields* check box.



Telephony Channel Descriptor Configuration Dialog Box

3 Make the entries described in the table that follows.

Telephony Channel Descriptor Configuration Entries

Entry	Description	
Connection Threshold	Enter the number of sequential failed connections allowed a cable modem before indicating a connection failure. For example, if you set this to 2, all configured phone numbers are tried twice: Telephone #1, Telephone #2, Telephone #3; then Telephone #1, Telephone #2, Telephone #3.	
DHCP Authentication	Enter a value which determines whether DHCP must be used by the dial-in host. There are three options: ■ 1 = Use DHCP when dialing in ■ 0 = Do not use DHCP when dialing in	
PPP Authentication	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 PAP 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 an identifying name for this 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 use to establish an ISP connection in case *Backup #1* is unavailable.	
Vendor Specific Options	DHCP Address	Enter the IP address of the DHCP server, if DHCP is used.
	Distance to DHCP Server	Enter the number of hops to the DHCP server.
	Factory Flag	Indicate whether this SPD should be used as the default. ■ 0 = disable ■ 1 - use this SPD as the default

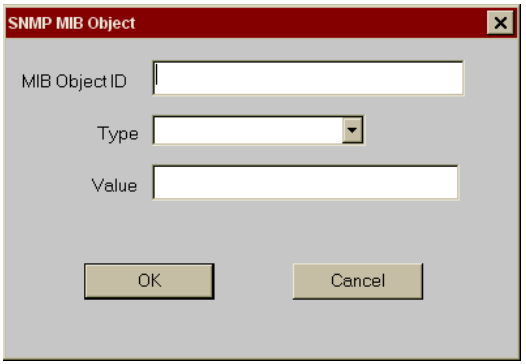
4 Continue with *MIB Object Configuration*.

MIB Object Configuration

To configure the MIB Object(s):

1 Click the **MIB Set Configuration** tab.

2 Click the **Add** button at the bottom of the screen. The *SNMP MIB Object* dialog box appears.



SNMP MIB Object Dialog Box

3 Make the entries described in the table that follows:

MIB Set Configuration Entries

Entry	Description
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 ■ SMMP OID ■ Time ticks
Value	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 of the required entries, click **OK**.

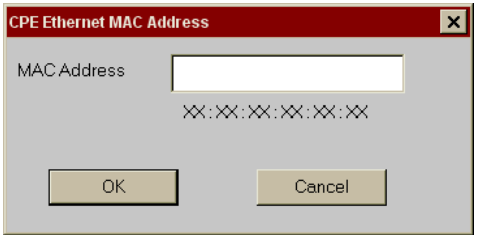
5 Continue with *MAC Address Configuration*.

MAC Address Configuration

To configure MAC Address parameters:

1 Click the **MAC Address Configuration** tab.

2 Click the **Add** button at the bottom of the screen. The *CPE Ethernet MAC Address* dialog box appears.



CPE Ethernet MAC Address Dialog Box

3 Enter the Ethernet MAC Address of the Customer Premises Equipment (CPE) device which will be allowed access to the data over cable network.

4 Click **OK**.

5 Repeat steps 2 through 4 for each additional CPE MAC address.

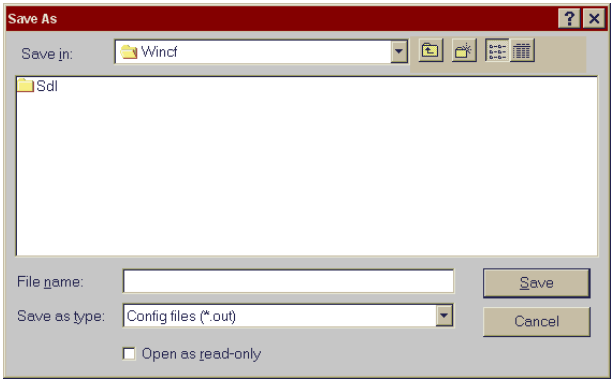
6 Continue with *Saving the Configuration File*.

Saving the Configuration File

To save your newly created file:

1 On the Menu Bar above the Toolbar, click **File**.

2 Click **Save As...**. The *Save As* dialog box appears.



Save As Dialog Box

3 Select a destination directory for your file.

4 Enter a filename and click **Save**.

3Com recommends that you save another copy of the configuration file to another drive so you will have a backup in case the one in use becomes damaged or otherwise unusable.

Viewing the Configuration File

After you have saved your cable modem configuration file, use the *View Log* feature to look through the file and verify that you have correctly entered you parameters.

To view the configuration file log:

1 If it is not already running, launch CFE by double clicking on the *Cable Modem Configuration File Editor* program icon.

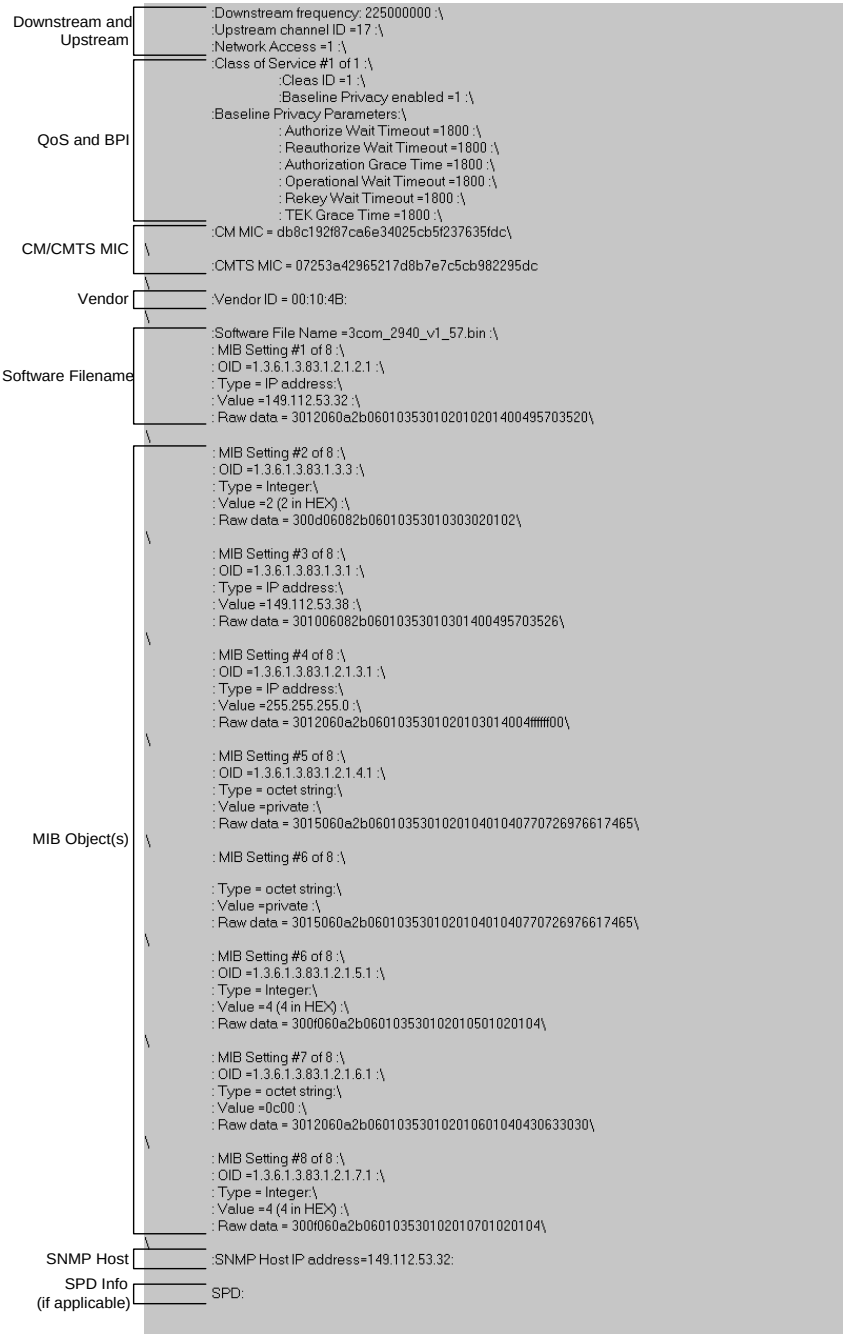
2 On the Menu Bar, click **File**.

3 Click **Open**.

4 Locate and select the cable modem configuration file you want to check for errors and then click **Open**.

5 On the *Toolbar*, click the **View Log icon**. The *Error Log* appears. Refer to the illustration that follows for an example configuration file log.

6 Use the scroll bar to review the log and make a note of any parameters that are not correct. Then continue with *Editing a Configuration File*.

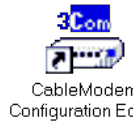


Viewing the Error Log

Editing a Configuration File

CFE allows you to edit existing configuration files to make changes or correct mistakes you found with the *View Log* feature.

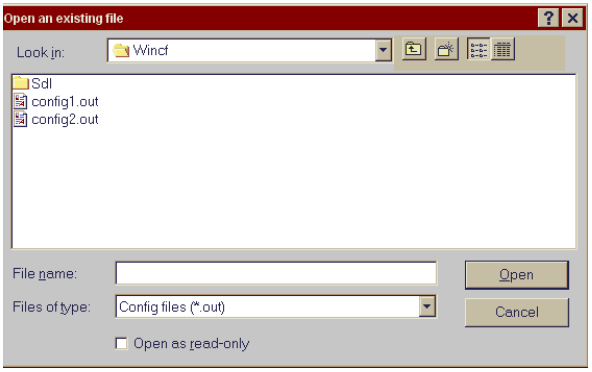
To edit an existing configuration file:



1 If it is not already running, launch CFE by double clicking on the *Cable Modem Configuration File Editor* program icon.

2 On the Menu Bar, click **File**.

3 Click **Open**. The *Open an Existing File* dialog box appears.



Open and Existing File Dialog Box

4 Locate and select the cable modem configuration file you want to modify and then click **Open**.

5 Click each of the tabs 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 of the tabs and fields.

6 Before you save your changes, click the **General Configuration Parameters and Flags** tab.

7 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. Otherwise, the Shared Secret will not be saved with the rest of your changes. As a result, no cable modems receiving this configuration file will be able to register with the CMTS.*

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 to perform this procedure:

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 to perform this procedure:

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.

Configuration file installation is complete. Your configuration file(s) can now be used by the 3Com CMTS to register and authenticate client cable modems.

INDEX

A

Authorization Grace Time 3-7
Authorize Wait Timeout 3-7
Authorized Reject Wait Timeout 3-8

B

Backup #1 3-9
Backup #2 3-9
Baseline Privacy 3-5
  Configuring 3-7
  Described 3-2

C

CFE
  Elements of the CFE GUI 2-2
  Features 1-1
    DOCSIS Compliant 1-2
    Graphical User Interface 1-1
    Two-way/One-way Compatibility 1-2
  Overview 1-1
Class ID 3-5
Command 3-6
Configuration File
  Components 3-2
  Creating 3-3
  Editing 3-14
  Installing 3-15
  Overview 3-1
  Saving 3-11
  Viewing 3-12
Connection Threshold 3-9
Contacting 3Com Carrier Systems viii
conventions
  notice icons, About This Guide vi
  text, About This Guide vi
Counter 3-10

D

Demand Dial Time 3-9
DHCP Address 3-9
DHCP Authenticate 3-9
DHCP Server 3-15
Dialog Box Buttons 2-4
Distance to DHCP Server 3-9
Downstream Frequency (Hz) 3-4

E

Editing a Configuration File 3-14

F

Factory Flag 3-9

G

Gauge 3-10
General Configuration Parameters and Flags
  Configuring 3-3
  Described 3-2
GUI
  Elements of 2-2
    Dialog Box Buttons 2-4
    Toolbar 2-4

I

Installation
  Installing CFE software 2-2
  Requirements/Recommendations 2-1
  Uninstalling CFE 2-2
Installing the Configuration File 3-15
  DHCP Server 3-15
  TFTP Server 3-15
Integer 3-10
IP Address 3-10
ISP Name 3-9

L

Login Password 3-9
Login Username 3-9

M

MAC Address
  Configuring 3-11
  Described 3-2
Max Downstream Rate 3-5
Max Upstream Rate 3-6
MIB Object
  Configuring 3-10
  Described 3-2
MIB Object ID 3-10
Min Upstream Rate 3-6

N
Network Access 3-4

O
Octet string 3-10
Operational Wait Timeout 3-7

P
PPP Authentication 3-9
Primary Phone 3-9

Q
QoS
- Configuring 3-5
- Described 3-2

R
RADIUS Realm 3-9
Reauthorize Wait Timeout 3-7
Rekey Wait 3-8

S
Saving the Configuration File 3-11
Shared Secret 3-4
SMMP OID 3-10
SNMP IP 3-4
SNMP Object ID 3-6
SNMP Write Access
- Configuring 3-6
- Described 3-2

Software File Name 3-4

T
Technical Support viii
TEK Grace Time 3-8
Telephony Channel Descriptor
- Configuring 3-8
- Described 3-2

TFTP Server 3-15
TFTP Server Address 3-4
Time ticks 3-10
Toolbar 2-4
- About Box 2-4
- Create New File 2-4
- Open Existing File 2-4
- Save File 2-4
- View Log 2-4

Type 3-10

U
Uninstalling CFE 2-2
Upstream Channel ID 3-4
Upstream Max Burst 3-5
Upstream Priority 3-5

V
Value 3-10
Vendor ID 3-4
Vendor Specific Options 3-9
View Log 3-13
Viewing the Configuration File 3-12

Y
Year 2000 Compliance vii