

Edge Access



**Model 2345
T3 Fiber Optic Modem
User Manual**

EdgeAccess Universal Chassis System



CAUTION!

This product may contain a laser diode operating at a wavelength of 1300 nm - 1600 nm. Use of optical instruments (e.g., collimating optics) with this product may increase eye hazard. Use of controls or adjustments, or performing procedures other than those specified herein may result in hazardous radiation exposure.

Under normal conditions, the radiation levels emitted by this product are under Class 1 limits in 21 CFR Chapter 1, Subchapter J.

ATTENCION!

Cet équipement peut avoir une diode laser émettant à des longueurs d'onde allant de 1300nm à 1600nm. L'utilisation d'instruments optiques (par exemple : un collimateur optique) avec cet équipement peut s'avérer dangereuse pour les yeux. Procéder à des contrôles, des ajustements ou toute procédure autre que celles décrites ci-après peut provoquer une exposition dangereuse à des radiations.

Sous des conditions normales, le niveau des radiations émises par cet équipement est en dessous des limites prescrites dans CFR21, chapitre 1, sous chapitre J.



NOTICE!

This device contains static sensitive components. It should be handled only with proper ElectroStatic Discharge (ESD) grounding procedures.

NOTE!

Cet équipement contient des composants sensibles aux décharges électro-statiques. Il doit absolument être manipulé en respectant les règles de mise à la terre afin de prévenir de telles décharges.

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EdgeAccess®

Universal Chassis System

Model 2345

User Manual

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Chapter 1

Overview

The Model 2345 managed T3 fiber optic modem with Optical Line Interface Module (OLIM) extends T3 (44.736 Mbps) signals between devices located up to 120 Km apart. The OLIM supports multimode and single mode fiber. Use the modem to extend a PBX, router, video codec, DS3 multiplexer, or ATM switch.

The 2345 transports B3ZS or AMI coded data. The 2345 supports both framed and unframed modes. Framed mode supports C-bit Parity or M-13 framing patterns, can correct polarity errors, and gathers DS3 statistics. Unframed mode passes data with full transparency.

The 2345 can be used in a UCS 1000 or UCS 1001 chassis or directly as a standalone.

- The UCS 1000 Chassis can hold up to 15 model 2345 modems; you can manage each 2345 either directly through the serial port or through the Domain Management Module (DMM) within the domain.

Note: The Chassis Interconnect Module (CIM) must be present in the UCS 1000 chassis in order for the DMM to recognize the 2345 modules.

- The UCS 1001 Chassis can hold up to two model 2345 modems; you can manage each 2345 directly through the serial port.
- The standalone 2345 provides one modem that you can manage directly through the serial port.

The 2345 is hot swappable; you can insert or remove it at any time without disrupting the data transfer of other modules in the chassis.

The rackmount 2345 front panel, shown in Figure 1, includes:

- EIA-232, BNC, and optical connectors
- Reset switch
- LEDs for:
 - System Status (STA)
 - Configuration (CFG)
 - Composite Loss of Signal (CLS)
 - Test/Loopback (TST)
 - Electrical Loss of Signal (LOS)
 - Alarm/Unframed Data (AIS/UNFRMED)

The front and back panels on the standalone 2345, shown in Figure 2, include the same connectors, switch, and LEDs, with these additional items:

- Alarm In and Out connectors
- Serial port
- MDM/TRM and Loopback switches

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Figure 1. Rackmount 2345



Figure 2. Standalone 2345, Front and Rear Panels

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The 2345 supports both full modem redundancy, with two modems, and fiber redundancy, through dual-path OLIMs. You can enable automatic or manual redundancy or disable the option.

Dual-path modules provide redundancy for the fiber link. The two transmit (Tx) outputs and two receive (Rx) inputs are connected on different fiber. Both Tx output transmit the same data; one Rx is active and the other is inactive. If data is lost on the active Rx, the module switches automatically to the inactive Rx and you can troubleshoot while data transmission continues.

When the redundant mode is set to Auto and the link fails, the software logs an alarm and switches to the secondary link. If the redundancy mode is set to Manual and the link fails, the software logs the alarm, but does not switch to the secondary link.

For details on setting up the hardware for redundancy, see Chapter 2. For details on setting up the software, see "Set Up Redundancy" on page 3-12.

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Chapter 2

Hardware Installation and Functions

You can install the 2345 in a UCS 1000 or 1001 or place a standalone 2345 in a flat, secure location. Before starting to install the 2345 in a chassis, make sure the chassis is installed and its User Manual is available for reference. If the system includes an optional DMM and CIM(s), make sure these are available:

- Serial cable (required to connect to a VT100 type terminal or PC)
- VT100 type terminal or PC to run the User Interface Manager software
- The DMM and CIM manuals

Setup and Installation

Follow these guidelines to determine which slot(s) can hold the 2345:

- You can install the 2345 in a UCS 1000 in any slot except 0 (reserved for the DMM and CIM) or the power supply slot(s).
 - You can install the 2345 in a UCS 1001 in either slot.
 - If this is a redundant pair of 2345s, plan to install the primary modem in an odd-numbered slot and install the secondary modem in the next higher-numbered slot, such as slots 3 (primary) and 4 (secondary) or in a UCS 1001, left (primary) and right (secondary).
1. Unpack and inspect all components. Save the shipping carton and packing materials in case you need to return the equipment to the manufacturer. Appendix A provides information for Return Material Authorization (RMA).
 2. If this is a standalone 2345, remove four screws from the back panel and slide the board part of the way out to access the switch and jumpers.
 3. Set jumpers as needed for line buildout (LBO), loopback, and pulse width; see Table 1 and Figure 3.

Table 1. Jumper Settings

Jumper	Position	Description
W2/W3	W2	Not Used
	W3	LBO more than 300 ft (90 m)
	Off	LBO 300 ft (90 m) or less
W4/W5	W4	Allows software control of loopback; default
	W5	Not used
	Off	Sets loopback
W6/W7	W6	Normal pulse (NP); default
	W7	Wide pulse (WP)

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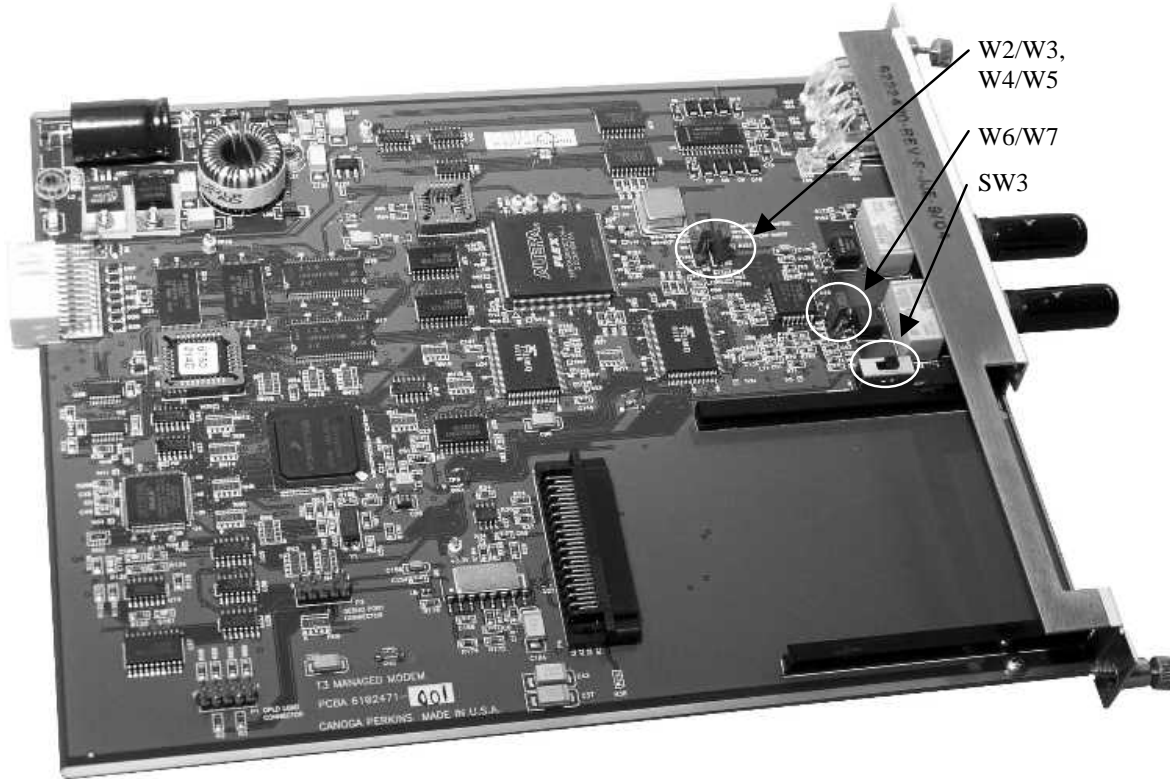


Figure 3. Jumper and Switch Locations

4. Set SW3: for Framed Data, set it toward the BNC connectors; or for Unframed data, set it away from the BNC connectors.
5. If this is a standalone 2345, slide the board back in, being careful to align the switches in the front panel, then replace the four screws in the back panel.
6. Slide the rackmount 2345 into the slot in the chassis or place the standalone 2345 on a flat, secure surface, then slide the OLIM into the 2345, and tighten all captive screws.

Note: The 2345 is hot-swappable and can be inserted or removed without disrupting data transfer in other modules in the chassis.

7. If this is a standalone 2345, see Figure 2 and connect the alarm outputs:
 - At ALM OUT, on the rear panel, connect devices to receive alarm information.
 - NO The contacts are open for normal operation and closed in a fault condition
 - COM The electrical common
 - NC The contacts are closed for normal operation and open in a fault condition
 - At ALM IN, on the rear panel, connect devices to supply alarm information. Connect cabling from the + output on the device to MAJ or MIN_IN+, from the - output to MAJ or MIN_IN-, and from ground on the device to CH_GND on the standalone.

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8. Connect the power:

- If this is a rackmount 2345, the module receives power automatically from the chassis. For details, see the user manual for the chassis.
- If this is a standalone 2345, see Figure 2 and connect the power at the back panel:
 - For AC power, plug the power cord into the socket on the 2345; to turn off power, unplug the power cord.
 - For a DC supply, loosen the screws for the GND and -48 VDC terminals, then slide the wires under the square washers, and tighten the screws. Use an ohmmeter to verify that -48 VDC is not shorted to GND, then connect the power cables to the power source.

The 2345 uses electrical cables to connect to the local site and fiber optic cables to connect to the remote modem. Follow these steps to connect the electrical and optical cables:

9. If you will manage the 2345 directly, rather than through a DMM, plug a serial cable into the EIA-232 port. For the pinout, see Table 2.

Table 2. EIA-232 Pinout

Pin Number	Signal Name	Source	I/O
1	RI	DCE	Output
2	DCD	DCE	Output
3	DTR	DCE	Input
4	SIG GND		
5	RXD	DCE	Output
6	TXD	DCE	Input
7	CTS	DCE	Output
8	RTS	DCE	Input

10. To connect to T3 at the local site, follow either of these steps:

- For a non-redundant modem, plug the BNC cables from the local equipment into the Rx and Tx connectors using Tx to Rx, and Rx to Tx orientation.
- For fully-redundant modems, use Canoga Perkins Y-cables p/n C002-000. Plug the single end of a Y cable into Rx on the local equipment and plug each dual end into Tx on the modems. Plug the single end of another Y cable into Tx on the local equipment and plug each dual end into Rx the modems.

11. To connect a local pair of fully-redundant standalone modes, plug Canoga Perkins cable p/n C001-000 into the Redundancy connectors located at the lower center of the rear panels.

Dirty optical connectors are a common source of link loss or attenuation problems, especially for single mode fiber (SMF). Clean the connectors before plugging in a cable and whenever there is a significant or unexplained light loss. To prevent contamination, always install protective dust covers on unused fiber optic connectors.

12. Wipe the ferrule and the end-face surface of the male fiber coupler with a lint-free isopropyl alcohol pad from a fiber cleaning kit.

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13. Use canned air to blow out any dust from the female fiber coupler.

Caution: *To avoid damaging the fiber end-surface or connector, use extreme care when installing or removing cables.*

14. Plug in the optical cables with Tx to Rx, and Rx to Tx orientation. For redundancy, use primary to primary and secondary to secondary orientation.

15. Label each cable and connector with the signal name and direction.

16. For cable connections to other modules in the chassis, see the appropriate user manual for details.

Canoga Perkins recommends that you determine and record link attenuation and transmission power before starting normal link traffic. The attenuation factor and transmission power identify potential problems with links near the lower limit of receiver limitations.

For details on link attenuation and transmission power, see Chapter 5.

Power Up and Front Panel Functions

During the initial power-up sequence, all LEDs light amber. When start-up is complete, the setup and installation are correct, and data is transmitting normally across the link, the STA LED lights green and the CFG, TST, LOS, and CLS LEDs are off. During normal operation, the LED colors change according to system and port conditions. The STA, CFG, and TST LEDs show the module condition. The LOS and CLS LEDs show the electrical and optical signal conditions. Table 3 shows the LED states for various conditions.

Table 3. 2345 LED Functions

LED	Status	Indicates
STA	Off	Power off or fault
	Green	Normal operation; active modem
	Amber	Normal operation; inactive redundant modem
	Amber blinking	System self test
	Red	Modem fault
CFG	Off	Normal operation
	Red	Conflict in configuration
CLS	Off	Normal operation
	Red	Local composite loss of sync
	Red blinking	Remote composite loss of sync
TST	Off	Normal operation
	Amber	Local modem in loopback
	Amber blinking	Remote modem in loopback

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LED	Status	Indicates
LOS	Off	Normal operation
	Red	Local electrical signal below threshold
	Red blinking	Remote electrical signal below threshold
AIS/UNFRM	Off	Normal operation
	Green	Normal operation in unframed mode
	Amber	Local modem receiving alarm
	Amber blinking	Remote modem receiving alarm
SQL1, SQL2	Green	Good local optical signal
	Red	Local optical Signal below threshold
	Red blinking	Remote optical signal below threshold

Alarms

The 2345 can generate Major and Minor Alarms. The Status (STA) LED lights green during normal operation. If an error occurs, the STA LED lights amber or red.

- UCS 1001 and standalone: the alarm outputs are forwarded to the chassis motherboard and, in the UCS 1001, appear on the MAJ and MIN LEDs.
- UCS 1000: the alarms are forwarded over the backplane to the CIM and appear on the Major (MAJ) and Minor (MIN) CIM LEDs and then are forwarded to the DMM for monitoring and transfer to the Network Manager as traps.

For details about connecting to the Alarm In and Out terminals for a standalone 2345, see Chapter 2.

For details about setting up the Alarms and viewing the Alarm Log, see Chapter 4.

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Chapter 3

Software Management

You can manage the 2345 through VT100 Terminal Emulation, which is accessible by a Telnet session, HyperTerminal or similar terminal emulation software, a standard SNMP network manager, and CanogaView. If the 2345 is in UCS 1000 with a CIM within a domain that includes a DMM, you can access the 2345 through the DMM. If the 2345 is a standalone or in a UCS 1001, you must access the 2345 directly through the serial port.

Setting Up for Network Management

Typically, the 2345 runs within the network on an Ethernet connection, communicating with your Network Management Platform.

Set Up the Network Management Platform

You must run several Management Information Bases (MIBs) on your Network Management Platform in order to successfully manage this module. Before you start, check that the industry-standard MIBs, Standard MIB and RFC2496.mib (the DS-3 MIB), are loaded:

In addition, download Cp.mib, a private mib that supports all Canoga Perkins products, available from the Canoga Perkins web site. Go to www.Canoga.com, click Support, then click Software Download, and follow the prompts on screen.

Set Up the PC for Terminal Operation

Connect the VT100 terminal emulation session to the DMM or directly to a 2345, either standalone or in a UCS chassis. Setting up the VT100 session depends on which connection, serial port or Ethernet, you have available for access to the VT100 management program. Canoga Perkins suggests that you use HyperTerminal for your first session.

Note: For details on the DMM, see the Model 1500 Domain Management Module User Manual (for UCS 1000) or Model 1502 Domain Management Module User Manual (for UCS 1002).

Setting up the VT100 session depends on which connection, serial port or Ethernet, you have available for access to the VT100 management program. Canoga Perkins suggests that you use HyperTerminal for your first session. You must set up TCP/IP for the DMM or directly-managed 2345 before you can use Telnet; for details, see the manual for the DMM or go to page 3-8.

These steps briefly describe how to set up your PC for a terminal connection. For details on using Windows, see your Windows documentation.

1. Turn on your PC.
2. Go to Accessories, the HyperTerminal Folder, and click HyperTerminal.

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3. At the Connection Description dialog, select an icon, enter a name for the connection to the system, and click OK.
4. At the Connect To dialog, pull down the Connect using menu, select the COM port, and click OK.
5. At the COM Properties dialog, on the Port Settings tab, check for these selections:
 - Bits per second: 19200 bps
 - Data bits: 8
 - Parity: None
 - Stop bits: 1
 - Flow control: None
6. Click OK. HyperTerminal connects to the system and the VT100 terminal emulation starts.

Management User Interface

The Management User Interface for the 2345 provides screens for setup, monitoring, and diagnostics. You can access the screens by connecting to the serial port of the DMM in the chassis or connecting directly to the serial port on the 2345. These sections discuss the screens for the 2345. For details about any other module in the domain, see the user manual for that module.

General Screen Format

A typical screen, shown in Figure 4, includes standard descriptions and reference designations. Use this and other screens to configure the system, set operational parameters, and verify the system status. All screens use a common method for navigation.

Not all screens and menus provide options that you can change. Some menu items reach screens that only report status, such as revision numbers, module type, or alarms. On other screens, you can move through and select options, and enter data.

Use these keys to navigate the screens:

- Space bar When a menu item is highlighted, press <Space> to cycle through all options for that item.
- Tab Press <Tab> to move the highlight to the next column to the right.
- Enter Press <Enter> to select the highlighted option for a menu item.
- Escape Press <Esc> to return to the previous screen.

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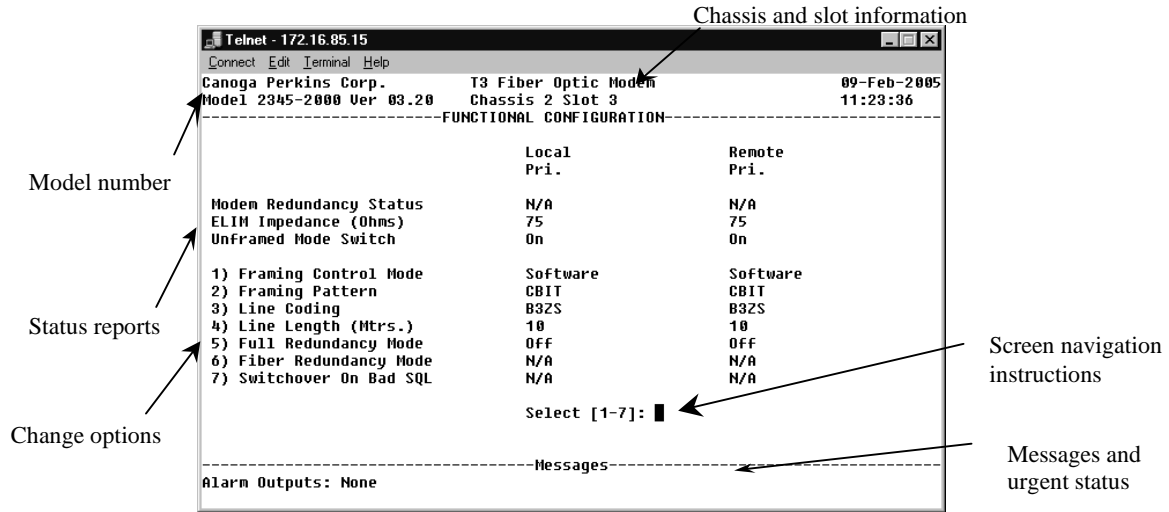


Figure 4. General Screen Format

User Interface Organization

The user interface consists of selectable, nested screens, available in this order:

Main Menu

1. System Configuration
 1. Hardware Configuration
 2. Functional Configuration
 3. Trap Configuration
 4. Alarm Output Configuration
 5. SNMP Configuration Parameters
 8. Host Table
2. Diagnostics
3. Performance Monitoring
4. Link Error Counters
5. System Alarms
6. Utilities
7. Software Upgrade

Login and Main Menu

When you connect directly to the 2345 or to the DMM through HyperTerminal or Telnet, the first screen is the Login Menu. To log in, follow these steps:

1. If this is your initial setup and no username or password has been set, type `admin` and press `<Enter>` at the prompts for the username and password. Otherwise, type your username and press `<Enter>`, then type your password and press `<Enter>`.
2. If you are using a DMM, the Main Menu for the DMM appears after you log in. This is the main management screen for the DMM. For details on all menu options, see the user manual for your DMM. From this screen, access the 2345 by either of two methods.
 - To reach the 2345 directly, follow these steps:
 - a. Type 4, "Manage or access a specific Module," and press `<Enter>`.
 - b. Type the slot and chassis numbers with a slash, such as "1 / 4" for chassis 1, slot 4, and then press `<Enter>`.
 - c. At the Module Menu, type 4, "Access User Interface," then press `<Enter>` to reach the Main Menu for the 2345.
 - To reach the chassis, and then select the 2345, follow these steps:
 - a. Type 3, "Manage or access a specific Chassis," and press `<Enter>`, press `<Space>` to cycle between the chassis in the domain, and then press `<Enter>` to select the chassis.
 - b. At the Chassis Management screen, press `<Space>` to cycle to the slot number for the 2345, then press `<Enter>` to reach the Main Menu for the 2345.

You can reach all configuration options from the Main Menu; see Table 4.

Table 4. Main Menu Selections

Menu Item	Description
1. System Configuration	View and set values for the system information and communications parameters
2. Diagnostics	Set up loopback for local and remote devices
3. Performance Monitoring	View statistics related to RFC 2496 or G.826 standards
4. Link Error Counters	View number of errors that occur on the link
5. System Alarms	View current conditions for local and remote alarms
6. Utilities	Set up managing hosts for accessing the DMM and receiving traps
7. Software Update	Download and install new firmware

Manage the 2345

You can manage the hardware and software for the module, including communication access.

View the Hardware Setup

To view information about the hardware setup, including model and serial numbers, as well as view basic system information for both the local and remote 2345s, go to the Hardware Configuration report. See Table 5. To access the System Configuration screen, follow these steps:

1. At the Main Menu, type 1, "System Configuration," and press <Enter>. The System Configuration screen appears.
2. At the prompt, type 1, "Hardware Configuration," and press <Enter>. The Hardware Configuration screen appears.
3. To return to the System Configuration menu, press <Esc>.

Table 5. Hardware Configuration Report

Item	Shows
Chassis/Slot	Where the modem is installed
Modem Model, Type, Revision, Serial No.	Data for the modem
OLIM Model, Type, Revision, Serial No.	Data for the optical interface
Power Supply Pri, Sec	Type(s) and status for the power supply(s)
Fan Installed	Status if a fan is installed
SNMP Management	If SNMP is enabled or disabled

Set the Date and Time

An accurate date and time assures accuracy for traps and alarms sent to the system administrator, as well as for all listed events. If the 2345 is in a system with a DMM, the date and time for the DMM overrides any date and time set in the 2345.

To set the date and time, follow these steps:

1. At the Main Menu, type 6, "Utilities," and press <Enter>; the Utilities menu appears.
2. At the Utilities menu, type 1, "Set Date and Time," and press <Enter>, then at the prompt to enter the current date and time, type the current information in DD/MM/YYYY HH:MM format.
3. To return to the Main Menu, press <Esc>.

Note: Because the Clock circuit exerts a large power drain on the battery in the 2345, the Clock may lose time when the power is off or the 2345 is out of the chassis. Reset the date and time whenever you install the 2345 in the chassis or turn the power on.

Set Up SNMP Access

Direct SNMP access is available for standalone modems only. To set values for basic system parameters, including some SNMP parameters, go to the SNMP Configuration Parameters menu. See Table 6. To access the SNMP Configuration Parameters menu, follow these steps:

1. At the System Configuration menu, type 5, "SNMP Configuration," and press <Enter>. The SNMP Configuration Parameters screen appears.
2. At the prompt, type an item number and follow the prompts on the screen. Table 6 lists options for each menu item.
3. To return to the System Configuration menu, press <Esc>.

Table 6. SNMP Configuration Options

Menu Item	Description
1. System Contact	Optional information, up to 50 characters
2. System Name	
3. System Location	
4. Read Community	Password for SNMP Read access, up to 50 characters, default is "public"
5. Write Community	Password for SNMP Write access, up to 50 characters, default is "private"
6. Serial Port Configuration	Type of serial port connection: VT100, SLIP, or PPP
7. SLIP/PPP IP Address	IP address for access through Serial Line Internet Protocol (SLIP) or Point-to-Point Protocol (PPP)
8. Host Table	Opens Host Table screen

Manage Traps and Alarms

Traps are messages that require management attention and are routed to the Network Manager, but do not trigger alarms. Conditions that generate an alarm require immediate attention. Enable or disable traps on the Trap Configuration screen and enable or disable alarms on the Alarm Output Configuration screen.

Use the Trap Configuration screen to view the current configuration and to enable or disable traps for the 2345. For a list of events that trigger traps, see Table 7. To set up the traps, follow these steps:

1. At the System Configuration menu, type 3, "Trap Configuration," and press <Enter>.
2. At the Trap Configuration screen, type the number for a trap and press <Enter>. See Table 7.
3. Press <Space> to cycle to Enabled or Disabled and press <Enter>.
4. To return to the System Configuration menu, press <Esc>.

These selections do not affect how the Major and Minor LEDs on the CIM report alarms.

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Table 7. Trap Configuration Options

Trap	When enabled, sends a Trap if. . .
Active Link/Modem	The active link fails; the remote device goes on- or offline; or redundancy switches between primary and secondary
Inactive Link/Modem	The inactive link fails or the redundant local or remote device goes on- or offline
Configuration	The 2345 is set up incorrectly
Diagnostic	Loopback is enabled or disabled
Authentication	An unauthorized host attempts SNMP access to the 2345
Power/Fan Malfunction	The power supply or fan fails
Cold Start	The 2345 is reset by a power failure or forced reset
Alarm Input	The 2345 received an alarm (standalone only)

Use the Alarm Output Configuration screen to view the current configuration and to enable or disable alarms for the 2345. For a list of events that trigger alarms, see Table 7. To set up the alarms, follow these steps:

1. At the System Configuration menu, type 3, "Alarm Configuration," and press <Enter>.
2. At the Trap Configuration screen, type the number for a trap and press <Enter>. See Table 8.
3. Press <Space> to cycle to Enabled or Disabled and press <Enter>.
4. To return to the System Configuration menu, press <Esc>.

These selections do not affect how the CIM Major and Minor LEDs report alarms.

Table 8. Alarm Configuration Options

Alarm	When enabled, sends an alarm if. . .
Active Composite Link	The fiber link fails (active signal in a redundant configuration)
Electrical Loss of Signal	The electrical input signal fails
Electrical Yellow/Blue/Red	Loss of sync, remote fault, or AIS (can be All 1s or Alarm Indication Signal) occurs
Configuration	The 2345 is set up incorrectly or the local and remote software versions do not match
Power Supply	The power supply or fan fails
Power-On Self Test	Self test fails at power-up
Inactive Composite Link	The inactive fiber link fails (redundant configuration, only)

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If you do not have a script file, you dial in through a modem, and the networking option is set to VT100 operation, you will not see the screens, but the 2345 responds to the commands normally. Follow these steps:

1. Dial in through a modem, then type your user name and password and press <Enter>.
2. Type 1 and press <Enter>.
3. Type 5 and press <Enter>.
4. Type 6 and press <Enter>.
5. Press <Space> once for SLIP mode or twice for PPP mode, then press <Enter> to confirm the port choice.

The 2345 is ready to run TCP/IP applications.

Set the VT100 Rate

Although the default rate the VT100 meet requirements for most systems, you may need to change it for your particular situation. To reset the baud rate, follow these steps:

1. At the Main menu, type 6, "Utilities," and press <Enter>.
2. At the Utilities menu, type 3, "VT100 Baud Rate," and press <Enter>, then press <Space> to cycle between 9600 and 19200 bps.
3. To return to the Main Menu, press <Esc>.

Update Software

Each module in the Universal Chassis System has two flash memory banks that store software:

- The Active Flash Memory holds the software currently in use
- The Inactive Flash Memory holds the new software from a download or the older version of software

Software is downloaded to the inactive region to avoid disrupting service. Resetting the module and swapping banks does not affect module operation and is transparent to user traffic.

Use the Software Upgrade report and menu screen to check the current version of the 2345 firmware and to upgrade software for any module in the domain or a managed module partner, if necessary.

To access the Software Upgrade screen, follow these steps:

1. At the Domain Management Module menu, type 4, Software Upgrade, and press <Enter>. The Software Upgrade screen appears.
2. Record the numbers for the Active and Inactive Firmware.

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3. Access the Canoga Perkins Web site, click Downloads, scroll to the 2345 filename, and compare the version number listed there with the version numbers you recorded. The 2345 firmware file name is similar to 23450106.zip, where "2345" indicates the module and "0106" indicates the version.

Caution: *To insure compatibility when a system includes two or more of the same module, you must upgrade all those modules with the same software.*

If the firmware for the 2345 is outdated, you need to upgrade it. To start the software upgrade, follow these steps:

1. Go to the Host Access Table (see page 3-11) and verify that the entry for the host you will use for the file transfer allows FTP or SFTP access, depending on the method you plan to use.
2. Log in to the FTP or SFTP server from the account that allows access.

Note: You can run only one FTP or SFTP session at a time.

3. Download the new firmware from the Canoga Perkins web site to your TFTP server; put the firmware in the "/BURNING" directory. For FTP, enable binary transfer mode. When the transfer is complete, the file is moved automatically to the "/INACTIVE" directory.
4. At the Main Menu, type 7, Upgrade Software, and press <Enter>.
5. At the Software Upgrade menu, type 3, Get New File with TFTP, and press <Enter>.
6. Follow the prompts on the screen to enter the IP address for the TFTP server and the file name for the new firmware, then start the upgrade.
7. When the file transfer is complete:
 - a. At the Software Upgrade menu, type 2, Swap Bank, and press <Enter>.
 - b. Type 1, Software Reset, and press <Enter>. The 2345 resets and starts using the new firmware.
8. To update a remote partner, type 4, Copy Software from Source modem to Destination modem, and press <Enter>. The 2345 writes the software to the remote partner, which then resets and starts using the new firmware.

Manage Security

To provide system security, the 2345 includes username and password access, as well as SNMP with Read and write communities and a Host table. To set up values for various security parameters on your 2345, you must typically have supervisor access.

Set Up Host Access

The SNMP agent allows access to up to 24 Host IP addresses listed in the Host Access Table. Set up the Host information for access to the 2345 on the Host Access Table screen. When a host attempts to access the 2345, the IP address is authenticated against the entries on the host table. If a user attempts SNMP access from a host or network that is not listed in this table, the 2345 rejects that host and generates an authentication trap. To access the Host Table, follow these steps:

1. At the SNMP Configuration Parameters menu, type 8, "Host Access Table," and press <Enter>. The Host Table screen appears.
2. To add a host, type 1 and press <Enter>, then follow the prompts to enter values for these parameters:
 - a. IP Address: for the Host
 - b. Access Level: Read, Read/Write Read/Trap, or Read/Write/Trap
 - c. Trap Community: the community name for requests from the host or network
3. To delete a host, type 2 and press <Enter>, then at the prompt, type the IP Address for that Host and press <Enter>. The host table appears again with your changes.
4. To return to the SNMP Configuration Parameters menu, press <Esc>.

Change Your Password

You can update your password for the 2345 in order to maintain security. You cannot change the password for any other users, especially those who are not logged in. To update your password, follow these steps:

1. From the Utilities menu, type 2, "Change Password," and press <Enter>.
2. To change your password, follow the prompts on the screen.
3. To return to the Main Menu, press <Esc>.

Manage the Modem

After you set up modem functions, you can monitor those functions and the data transmission.

Set Up Functions and Check Status

You can set up the modem functions and check status on the Functional Configuration screen. To work with modem functions, follow these steps:

1. At the System Configuration menu, type 2, "Functional Configuration," and press <Enter>.
2. To set up a parameter, type a number and press <Enter>, then follow the prompts on screen. To move to the next column, for a secondary or remote modem, press <Tab>.
 - Framing Control Mode: Set to software, following the options on this menu, or hardware, following SW3 (for details, see the hardware installation steps on page 2-2)
 - Framing Pattern: Set to match your system to CBIT, M13, or off (unframed)
 - Line Coding: Set to match your system to either B3ZS or AMI
 - Line Length (Mtrs.): Not used at this time; instead, set hardware jumper W2/W3; for details, see the hardware installation steps on page 2-1
 - Full Redundancy Mode, Fiber Redundancy Mode, and Switchover on Bad SQL: For details, see "Set Up Redundancy"
3. To return to the System Configuration menu, press <Esc>.

Set Up Redundancy

Redundant hardware can enable your modem connection to remain operational even if one part of the physical links fails. Two pairs of 2345 modems provide full redundancy or a pair of modems with dual-path OLIMs provide optical redundancy. To ensure redundant operation in all circumstances, also enable Switchover on bad SQL.

You can enable full redundancy in the software on the Functional Configuration screen; follow these steps:

1. At the System Configuration menu, type 2, "Functional Configuration," and press <Enter>.
2. At the Functional Configuration screen, type 5, Full Redundancy Mode, then press <Space> to cycle through these options: Auto (typical for normal operation), Man Pri or Man Sec (manual primary or secondary mode), or Off. To move to the next column, for a secondary or remote modem, press <Tab>.
3. To return to the System Configuration menu, press <Esc>.

You can enable optical redundancy in the software on the Functional Configuration screen; follow these steps:

1. At the System Configuration menu, type 2, "Functional Configuration," and press <Enter>.
2. At the Functional Configuration screen, type 6, Fiber Redundancy Mode, then press <Space> to cycle through these options: Auto (typical for normal operation), Man Pri or Man Sec (manual primary or secondary mode), or Off. To move to the next column, for a remote modem, press <Tab>.
3. To return to the System Configuration menu, press <Esc>.

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You can enable Switchover on bad SQL on the Functional Configuration screen; follow these steps:

1. At the System Configuration menu, type 2, "Functional Configuration," and press <Enter>.
2. At the Functional Configuration screen, type 7, Switchover on bad SQL, then press <Space> to cycle through these options: Auto (typical for normal operation) or Off. To move to the next column, for a remote modem, press <Tab>.
3. To return to the System Configuration menu, press <Esc>.

Monitor Data Transmission

The 2345 provides three screens for monitoring data transmission when running in framed mode.

- Two screens show statistics that are in the DSX3 MIB in RFC 2496; one shows the current 15 minute interval, the other shows a 24 hour interval. For details on the definitions, see RFC 2496.
 - dsx3PESs: P-bit Errored Seconds (PES)
One second with a PCV, an Out of Frame (OOF) defect, or an AIS; does not increment during unavailable seconds (UAS).
 - dsx3PSESs: P-bit Severely Errored Seconds (PSES)
One second with 44 or more PCVs, an OOF, or an AIS; does not increment during a UAS.
 - dsx3SEFSs: Severely Errored Framing Seconds (SEFS)
One second with an OOF or an AIS; does not increment during a UAS.
 - dsx3UASs: Unavailable Seconds
The number of seconds that the interface is not available, which is from the start of 10 continuous PSESs or the start of a failure condition, whichever occurs first. The UAS ends at the start of 10 contiguous seconds with no PSES if there is no failure or, if there is a failure with clearing time of up to 10 seconds. If the failure took more than 10 seconds to clear, the UAS ends at the start of 10 contiguous seconds with no PSES or when the clearing time started. No other counter increments during a UAS.
 - dsx3LCVs: Line Coding Violation (LCV) Error Event
Count of both BiPolar Violations (BPVs) and Excessive Zeros (EXZ) occurrences. One EXZ increments the LCV by one, regardless of the number of zeros in the string.
 - dsx3PCVs: P-bit Coding Violation (PCV) Error Event
Count of P-bit Parity Errors.
 - dsx3LESs: Line Errored Seconds (LES)
The number of seconds with a Coding Violation (CV) or LOS defect.
 - dsx3CCVs: C-bit Coding Violation (CCV) Error Event
Count of C-bit coding violations, CP-bit parity errors (C-bit Parity).
 - dsx3CESs: C-bit Errored Seconds (CES)
One second with a CCV, an OOF, or an AIS; does not increment during a UAS.
 - dsx3CSESs: C-bit Severely Errored Seconds (CSES)
One second with 44 or more CCVs, an OOF, or an AIS; does not increment during a UAS.

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- One screen shows G.826 statistics.
 - Errored Blocks: Blocks of data with one or more bit errors
 - Errored Seconds: Number of one-second periods with any errored blocks; includes all Sev Errored Sec
 - Sev Errored Secs: Severely Errored Seconds
Number of one-second periods with 30% or more errored blocks
 - Bgd Blk Errors: Background Block Errors
Number of errored blocks that were not within a Sev Errored Sec
 - Errored Sec Ratio: Errored Seconds Ratio
Percentage of total seconds that were errored seconds; includes all Sev Errored Sec
 - Sev Err Sec Ratio: Severely Errored Seconds Ratio
Percentage of total seconds that were severely errored blocks
 - Bgd Blk Err Ratio: Background Block Error Ratio
Percentage of total seconds that contained errored blocks that were not within a Sev Errored Sec

To view the transmission statistics, follow these steps:

1. At the Main Menu, type 3, "Performance Monitoring," and press <Enter>.
2. At the Performance Monitoring screen, press <Space> to cycle through the Current, 24 Hour, and G.826 Statistics. To reset all counters, press <Tab>.
3. To return to the Main Menu, press <Esc>.

Monitor Modem Performance

The 2345 provides one screen that monitors both local and remote modems for these errors:

- Composite LOS Errors: Shows loss of signal if running in unframed mode; if running in framed mode, check SQL Rx
- Electrical LOS Errors: Shows loss of signal if running in unframed mode or shows loss of synch if running in framed mode
- Electrical Yellow Errors: Loss of frame received
- Electrical Blue Errors: Alarm Indication Signal (AIS) received
- Electrical Red Errors: Loss of frame error
- SQL Rx1 and Rx2 Errors: Signal error generated by the optics; use this when running in unframed mode
- Optical Xmit Errors: Faulty optical signal transmitted by this modem

To view the modem performance, follow these steps:

1. At the Main Menu, type 4, "Link Error Counters," and press <Enter>.
2. At the Link Error Counters screen, press <Tab> to reset all counters, press <Tab>.
3. To return to the Main Menu, press <Esc>.

Chapter 4

Maintenance and Troubleshooting

Well-maintained modules and cabling can help ensure trouble-free operation.

General Maintenance

Well-maintained components and clearly identified cables help assure optimum system operation. Damaged fiber cables and dirty connectors are a common source of signal loss or attenuation. Single mode and multimode fiber optics are especially sensitive to contamination. Inspect, clean, and test all components to maintain optimum performance.

Note: To avoid damage and signal loss, do not over-tighten or force-fit optical connectors.

- To clean the ferrules and end-face surfaces of male fiber couplings, use a lint-free pad saturated with isopropyl alcohol.
- To clean the female fiber connectors, use canned air.
- To prevent damage and contamination, place protective dust caps on all unused optical connectors.

Manage Cable Links

Manage the cables to ensure trouble-free operation and maintenance tasks.

- Position and secure the fiber optic cables to prevent excessive bends and damage. Follow the guidelines for the bend radius for specific fiber cables.

Note: If no minimum bend radius is specified, the typical long-term, low-stress radius is not less than 15 times the cable diameter (based on Federal Standard FS-1037C).

- Always connect the fiber optic cables in the standard Tx to Rx and Rx to Tx scheme; reversing this can cause transmission conflicts.
- Label each fiber cable near each end with the signal direction, source, and destination to minimize connection errors.

Check Optical Power Levels

To ensure the proper performance levels, measure the fiber link loss, or link attenuation, for all fiber links. Each 2345 is shipped with a document that lists the output power for each laser transmitter. To determine link attenuation, use either the 2345 Tx source or a hand-held 1310/1550 nm laser source, a fiber optic test jumper cable (with known loss), and an optical power meter.

Measure optical fiber links at the shortest wavelength of operation to determine the limiting factor in the loss budget. Each device that transmits to a 2345 has a loss budget that is specified by the manufacturer and recorded on a data sheet provided with the equipment. That loss budget must be greater than the total of the measured loss of the fiber link and the attenuation of the 2345.

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Note: For accurate results, warm up each unit for at least 30 minutes before checking power levels.

The transmission laser in a 2345 turns on automatically when the chassis receives power.

To measure the output power, follow these steps:

1. Clean the connectors on the fiber optic test cable before plugging it in to the Tx connector on the 2345.
2. Warm up each component for at least 30 minutes.
3. Set the optical power meter to the proper wavelength.
4. Wait two or three minutes for the power reading to stabilize, and then read the output power.
5. Subtract out the test cable loss, then record the power level and compare it to the value on the performance sheet for that particular 2345. Measurement tolerance is +/- 0.5 dBm.

Note: When referencing optical power levels with numerical values less than zero, the reading closer to zero is the greater value; for example, -17 dBm is greater than -20 dBm.

6. If the reading is incorrect, repeat the measurement with a different test cable. If the power level is still not within range, call Technical Support.

If you know the link attenuation, subtract that value from the 2345 Tx output value to determine the power expected at the remote cable end, which is the input power at the remote receiver, and skip this section. Otherwise, continue these steps to use the 2345 to measure the link attenuation.

7. At the local site, connect the fiber link cable to Tx on the 2345.
8. At the remote site, set the optical power meter to the proper wavelength and connect it to the fiber link cable.
9. Record the optical power level and compare it with the sensitivity level listed on the data sheet for the link fiber type.
10. Subtract the remote power level from the value for the transmitter output power at the local site. The result provides the link loss, in dB. This power level must not exceed the limit for Rx sensitivity listed on the data sheet for the remote unit.

Note: If you cannot determine the Rx sensitivity, contact Canoga Perkins Technical Support Department for assistance.

11. Repeat this process at the other site.

Troubleshooting

This section describes fault conditions and corrective action. As a rule, whenever there is a significant signal loss, check the fiber path and the minimum bend radius for potential problems. Remove and inspect the cable connectors, being careful not to damage the fiber end-face surface or the connector housing. Clean all optical connectors before reinstalling them.

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The LEDs show both normal and fault conditions. Typically, if a LED is steady red, the fault is the local 2345; if it blinks red, the fault is in the remote modem. In particular, if SQL is red, the optical signal level is below threshold and if CLS is red, the optical signal is lost. For details on the LED status during start-up and operation, see Table 3 in Chapter 3.

Additional information about fault conditions appears in the System Alarms, Hardware Configuration, and Functional Configuration screens.

- CLS and SQL LEDs light red
 - Inspect and clean the optical cables and connectors, then replace any damaged fiber.
- SQL LED lights red
 - Inspect and clean the optical cables and connectors, then replace any damaged fiber.
- CLS LED lights red or the System Alarms screen shows a Fiber Loss of Signal
 - Inspect and clean the optical cables and connectors, then replace any damaged fiber. Retest the 2345 after cleaning.
- LOS LED lights red or the System Alarms screen shows an Electrical Loss of Signal
 - Check the BNC cables to be sure that Tx and Rx are not crossed.
- System Alarms screen shows Configuration Error with OLIM
 - Check that both ends of the link use the same OLIM.
- System Alarms screen shows Configuration Error with OS (Operating System)
 - Not all modems in the domain are using the same software; see for details on checking the software version number and updating the software.
- System Alarms screen shows Configuration Error with Setup
 - Check the redundancy setup on the Functional Configuration screen.
- CLS LED lights red or the System Alarms screen shows Configuration Error with OS; system includes a new 2345 or new OLIM
 - Not all modems in the domain are using the same software; see for details on checking the software version number and updating the software.

Check a New Installation

On new installations, make sure that all steps in Chapter 2, are complete, then make these checks:

- The STA LED is green
- All fiber cabling is of the same type and matches the 2345 optical mode; do not mix multimode and single mode cables
- The fiber optic cable is within the specifications and loss budget of the optic interface module
- The line length between the 2345 and the remote link does not exceed the allowable loss budget or overdrive limit
- All host modules in the link are turned on
- All fiber cables are connected Tx to Rx and Rx to Tx

Set the Electrical Line Relay

Use the Electrical Line Relay option to open or close the relays for the or the inactive circuits in order to diagnose a fault on a circuit that could not, otherwise, transmit and receive data. To set the electrical line relay, follow these steps:

1. From the Main Menu, type 2, "Diagnostics," and press <Enter>.
2. At the Diagnostics screen, type 3, "Electrical Line Relay" and press <Enter>, then press <Space> to cycle between Enable and Disable.
3. To return to the Main Menu, press <Esc>.

Run Loopback

Use loopback to diagnose a fault on the optical link, either on a modem or with a cable. Set loopback either in software for a managed 2345 or at the loopback function switch on a 2345 in a standalone enclosure. Figures 5 through 10 show how all combinations of loopback options return the signal(s) to the source in order to test specific parts of the circuit.

- Local loopback returns the received electrical signal to the local site and ignores the received optical signal; turn on Local Loopback at the local modem. The remote modem returns All Ones to the remote site. Faulty data can indicate that the local 2345 is faulty.
- Remote loopback returns the received optical signal to the remote modem and ignores the received electrical signal; turn on Remote Loopback at the local modem. The remote modem returns All Ones (AIS) to the remote site. Faulty data can indicate that either the fiber optic cable link or the remote 2345 is faulty.
- Bi-directional loopback returns the received electrical signal to its local site and the received optical signal to the modem that sent it; turn on Local loopback at one modem and Remote Loopback at the other modem. Faulty data can isolate the faulty equipment to indicate that either the fiber optic link or a 2345 is faulty.

To set up the software and start or stop loopback, follow these steps:

1. From the Main Menu, type 2, "Diagnostics," and press <Enter>. The Diagnostics screen appears.
2. Set Loopback Control Mode to software, if needed. Type 2 and press <Enter>, then press <Space> to cycle between Hardware and Software, and press <Enter> to select software. To move to the next column for a secondary or remote modem, press <Tab>.
3. To set and start Loopback, type 1 and press <Enter>, then press <Space> to cycle through the options. To move to the next column for a secondary or remote modem, press <Tab>. When you finish making selections, press <Enter>; loopback starts.
4. To stop Loopback, type 1 and press <Enter>, then press <Space> to cycle to Clear All. To move to the next column for a secondary or remote modem, press <Tab>. When you finish making selections, press <Enter>; loopback starts.
5. To return to the Main Menu, press <Esc>.

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Alternately, in a standalone 2345, only, you can set the Loopback switch on the front panel for Loc (local) or Rem (remote) loopback; see Figures 6 and 9. For normal operation, keep the switch at Off.

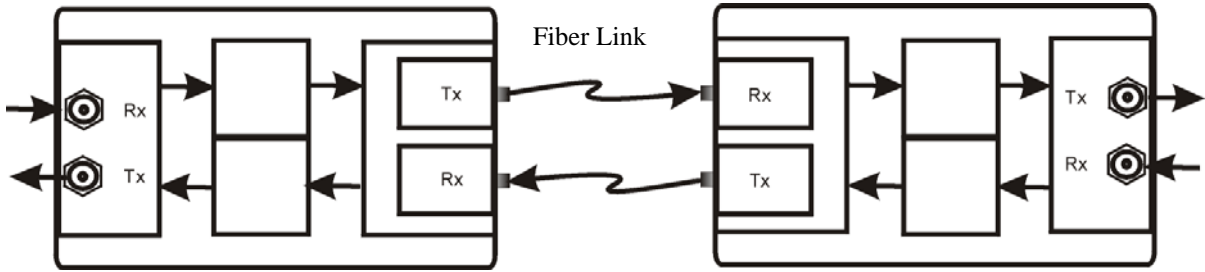


Figure 5. Normal Operation

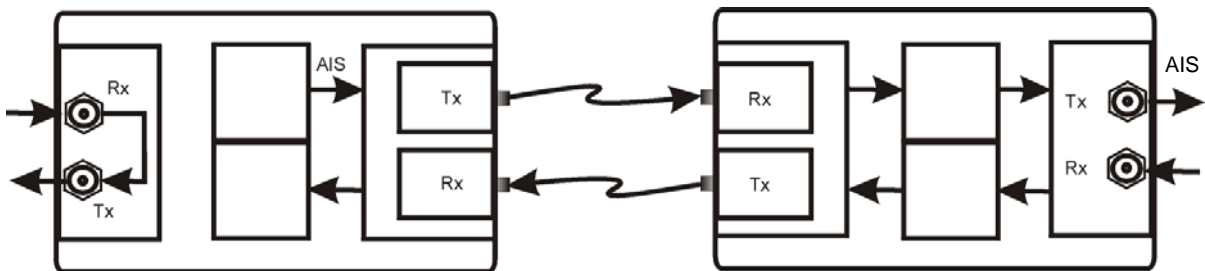


Figure 6. Local Loopback

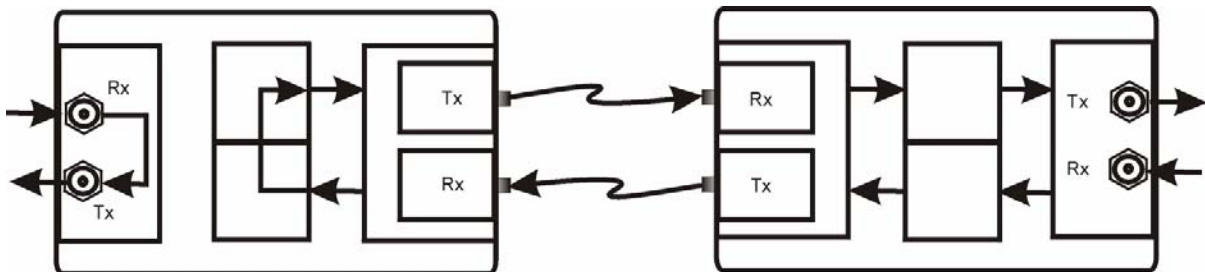


Figure 7. Local Bidirectional Loopback

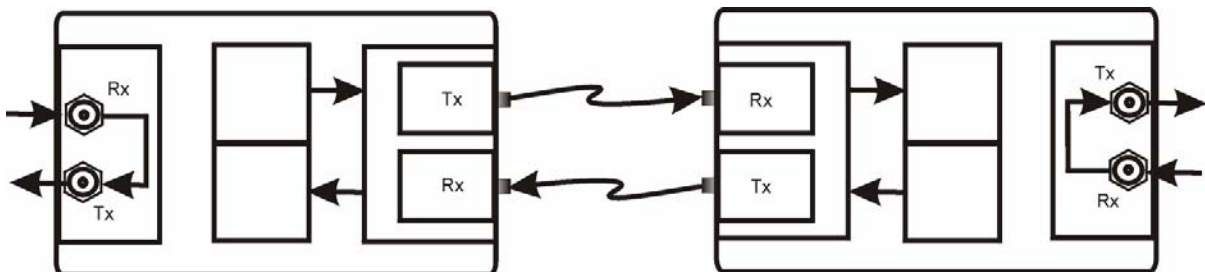


Figure 8. Local Loopback at Both Ends

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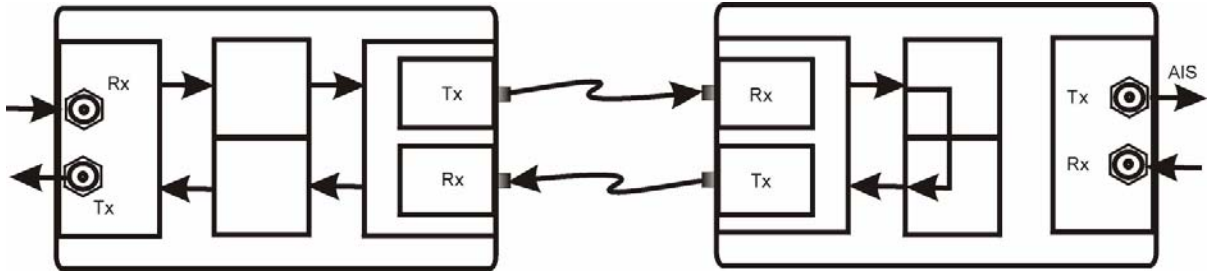


Figure 9. Remote Loopback

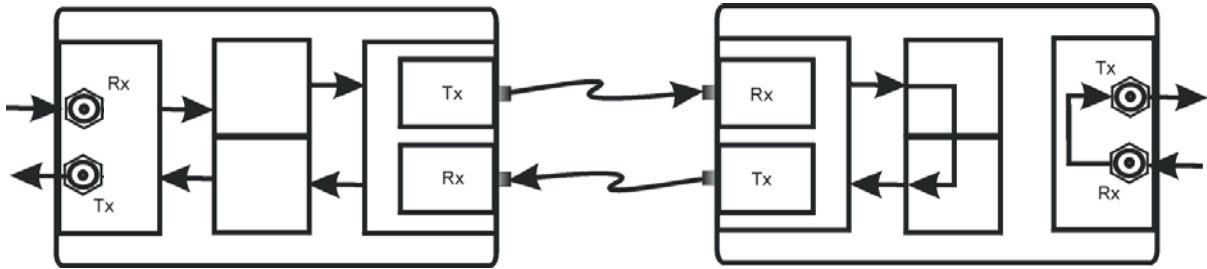


Figure 10. Remote Bidirectional Loopback

Chapter 5

Specifications

See also the specifications for the chassis or standalone enclosure.

2345 Specifications

Physical Specifications

Dimensions

Standalone:	1.7" H x 8.5" W x 11.5" D (44 x 215 x 292 mm)
Rackmount:	1.0" H x 7.9 " W x 10.4" D (25 x 201 x 264 mm)

Weight

Standalone:	3.2 lb. (1.45 Kg)
Rackmount	1.2 lb. (0.54 Kg)

Operating Temperature: 0° to 50° C

Operating Humidity: Up to 95% (non-condensing)

Power Consumption 9.5 W, Maximum

Standalone Power: 115/230 VAC, 47 to 63 Hz auto ranging
38 to 72 VDC

Regulatory Compliance

- ETL, ETLc (UL 60950/CSA C22.2 No. 60950)
- IEC 60950
- IEC 60825-1
- FCC part 15 Class A, IC003
- AS/NZS 3548
- NEBS Level 3
- CE Mark

2345 Models

Model	Options
Base Unit With Electrical Interface	
2345-2000	Rack mount for Chassis installation
2345-1100	Standalone with SNMP, 120-240 VAC power supply
2345-1400	Standalone with SNMP, -48 VDC power supply
Single Path OLIM	
L123-1321	1310 nm Laser, SM/MM, 17 dB, ST connector
L123-1322	1310 nm Laser, SM/MM, 17 dB, FC/PC connector
L123-1324	1310 nm Laser, SM/MM, 17 dB, SC connector
L123-1331	1310 nm Laser, SM/MM, 26 dB, ST connector
L123-1332	1310 nm Laser, SM/MM, 26 dB, FC/PC connector
L123-1334	1310 nm Laser, SM/MM, 26 dB, SC connector
L123-1531	1550 nm Laser, SM, 26 dB, ST connector
L123-1532	1550 nm Laser, SM, 26 dB, FC/PC connector
L123-1534	1550 nm Laser, SM, 26 dB, SC connector
Dual Path Redundancy OLIM	
L122-1321	1310 nm Laser, SM/MM, 17 dB, ST connector
L122-1322	1310 nm Laser, SM/MM, 17 dB, FC/PC connector
L122-1324	1310 nm Laser, SM/MM, 17 dB, SC connector
L122-1331	1310 nm Laser, SM/MM, 26 dB, ST connector
L122-1332	1310 nm Laser, SM/MM, 26 dB, FC/PC connector
L122-1334	1310 nm Laser, SM/MM, 26 dB, SC connector
L122-1531	1550 nm Laser, SM, 26 dB, ST connector
L122-1532	1550 nm Laser, SM, 26 dB, FC/PC connector
L122-1534	1550 nm Laser, SM, 26 dB, SC connector

Appendix A

Warranty Information

Current Warranty information is available on-line in the Client Login Area of the Canoga Perkins web site (www.canoga.com) or by contacting Technical Support at 800-360-6642 (voice) or fiber@canoga.com (email).

Appendix B

Acronyms and Abbreviations

AIS	Alarm LED or All Ones Signal
ALM	Alarm
CFG	Configuration LED
CIM	Chassis Interconnect Module
CLS	Composite LOS LED
DMM	Domain Management Module
LBO	Line Build Out
LOS	Loss of Signal
Mbps	Megabits per second
MDM	Modem
MMF	Multimode Fiber
OLIM	Optical Line Interface Module
Rx	Receive signal
SFTP	Secure File Transfer Protocol
SM	Single Mode
SMF	Single Mode Fiber
SNMP	Simple Network Management Protocol
STA	Status LED
TFTP	Trivial File Transfer Protocol
TRM	Terminal
TST	Test LED
Tx	Transmit signal

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