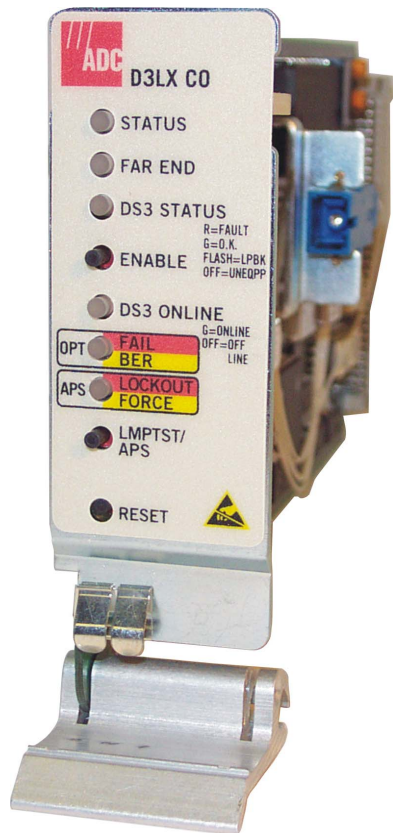
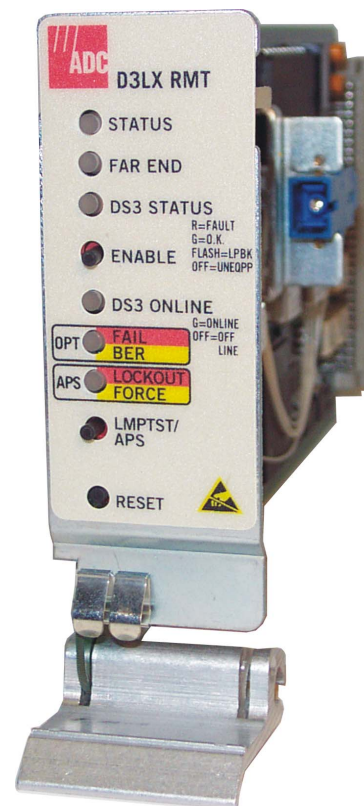


USER MANUAL



Soneplex
DS3 Loop Extender (D3LX) CO Module
Product: D3LXC-FCA100, D3LXC-SCA100
CLEI Code: SOCPG2GB, SOCPG2KB



Soneplex
DS3 Loop Extender (D3LX) RMT Module
Product: D3LXR-FCA100, D3LXR-SCA100
CLEI Code: SOCPG2HB, SOCPG2JB



Revision History of This Manual

To order copies of this document, use document catalog number LTPS-UM-8013-03.

Issue	Release Date	Revisions Made
1	January 11, 2002	Initial release
2	March 21, 2002	Updated BNC cable/cabling instructions
3	August 30, 2002	Updated BNC Tip and Ring illustration

Related Documentation

Soneplex Remote Terminal Enclosure Installation Manual	ADCP-61-704
Soneplex Two-Position D3LX Remote Chassis Installation Instructions	LTPS-AD-8029-xx
Soneplex Four-Position Remote Terminal Cabinet Installation Addendum for D3LX Systems	LTPS-AD-8030-xx
Soneplex QLX/WQLXR and Four-Position Remote Terminal Cabinet Description Manual	ADCP-61-151
Soneplex System Installation Manual	LTPS-UM-8010-xx
Soneplex Loop Extender System Operation and Maintenance Manual	ADCP-61-494
Soneplex TL1 Interface Specification for D3LX-Based Systems	LTPS-UM-8027-xx
Soneplex D3LX Remote Craft Access Module (D3RCAM) User Manual	LTPS-UM-8017-xx

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August 30, 2002

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USING THIS MANUAL

The following conventions are used in this manual:

- Monospace type indicates screen text.
- Keys you press are indicated by small icons such as **Y** or **ENTER**. Key combinations to be pressed simultaneously are indicated with a plus sign as follows: **CTRL** + **ESC**.
- Items you select are in **bold**.
- Three types of messages, identified by icons, appear in text.



Notes contain information about special circumstances.



Cautions indicate the possibility of personal injury or equipment damage.



The Electrostatic Discharge (ESD) symbol indicates that a device or assembly is susceptible to damage from electrostatic discharge.

INSPECTING SHIPMENT

Upon receipt of the equipment:

- Unpack each container and inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to ADC DSL Systems, Inc. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact ADC DSL Systems, Inc. as described in [“Appendix C - Product Support”](#) on page 41. If you must store the equipment for a prolonged period, store the equipment in its original container.

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OVERVIEW

The Soneplex® DS3 Loop Extender (D3LX) modules shown in [Figure 1](#) are a pair of fiber-optic units that provide DS3 service. The D3LX CO resides at the Central Office (CO) site, and the D3LX RMT resides at the Customer Premises Equipment (CPE) or remote site.

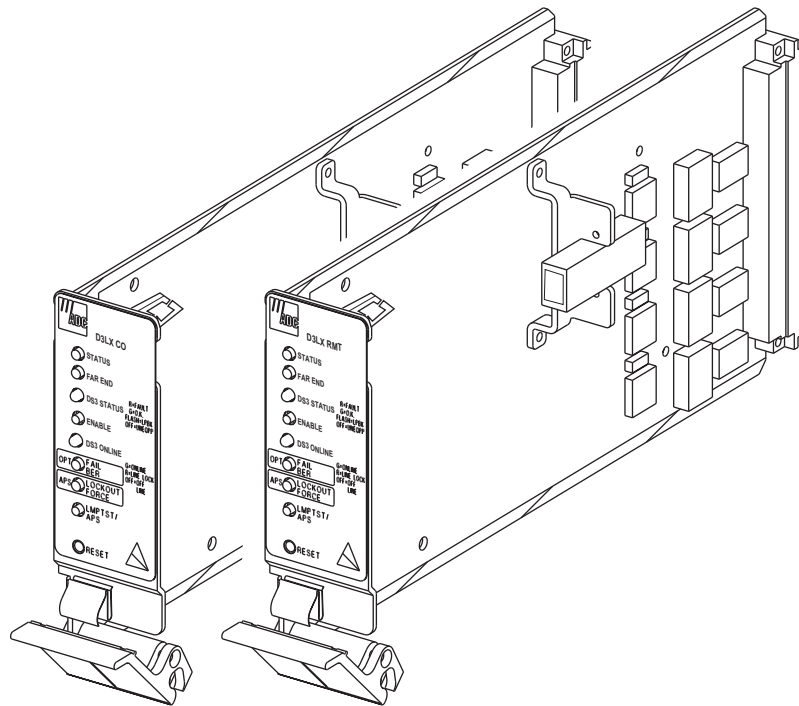


Figure 1. D3LX CO and D3LX RMT Modules

The D3LX CO module occupies two card slots in a local, Soneplex Loop Extender Chassis (LEC). The D3LX RMT module occupies two card slots in a Four-Position Remote Terminal Cabinet, or Two-Position QLX Remote BNC Chassis. A D3LX Remote Craft Access Module (D3RCAM) may also be installed to provide maintenance terminal access at the remote site. For more information on the D3RCAM, refer to LTPS-UM-8017-xx, the Four-Position Remote Terminal Cabinet, refer to ADCP-61-151, or the Two-Position QLX Remote BNC Chassis, refer to LTPS-UM-8029-xx.

The D3LX modules are part of a system that converts a metallic DS3 circuit at the CO site into a DS3 optical signal that uses Wavelength Division Multiplexing (WDM) to transmit a signal across one single-mode fiber to a D3LX RMT via a D3LX LTU at the CPE site. The D3LX RMT module converts the optical signal back into an electrical DS3 and transmits the signal back to the D3LX CO residing in the LEC as shown in [Figure 2 on page 2](#).

The D3LX modules perform the following functions:

- Exchange status, alarm, and protection switching information.
- Perform bit error rate monitoring of the optical link.
- Monitor the optical input for Loss-Of-Signal (LOS) and Loss-Of-Frame (LOF).
- Monitor the laser bias for degradation.
- Retrieve remote module status.
- Provide 1+1 Protect mode (line protection).

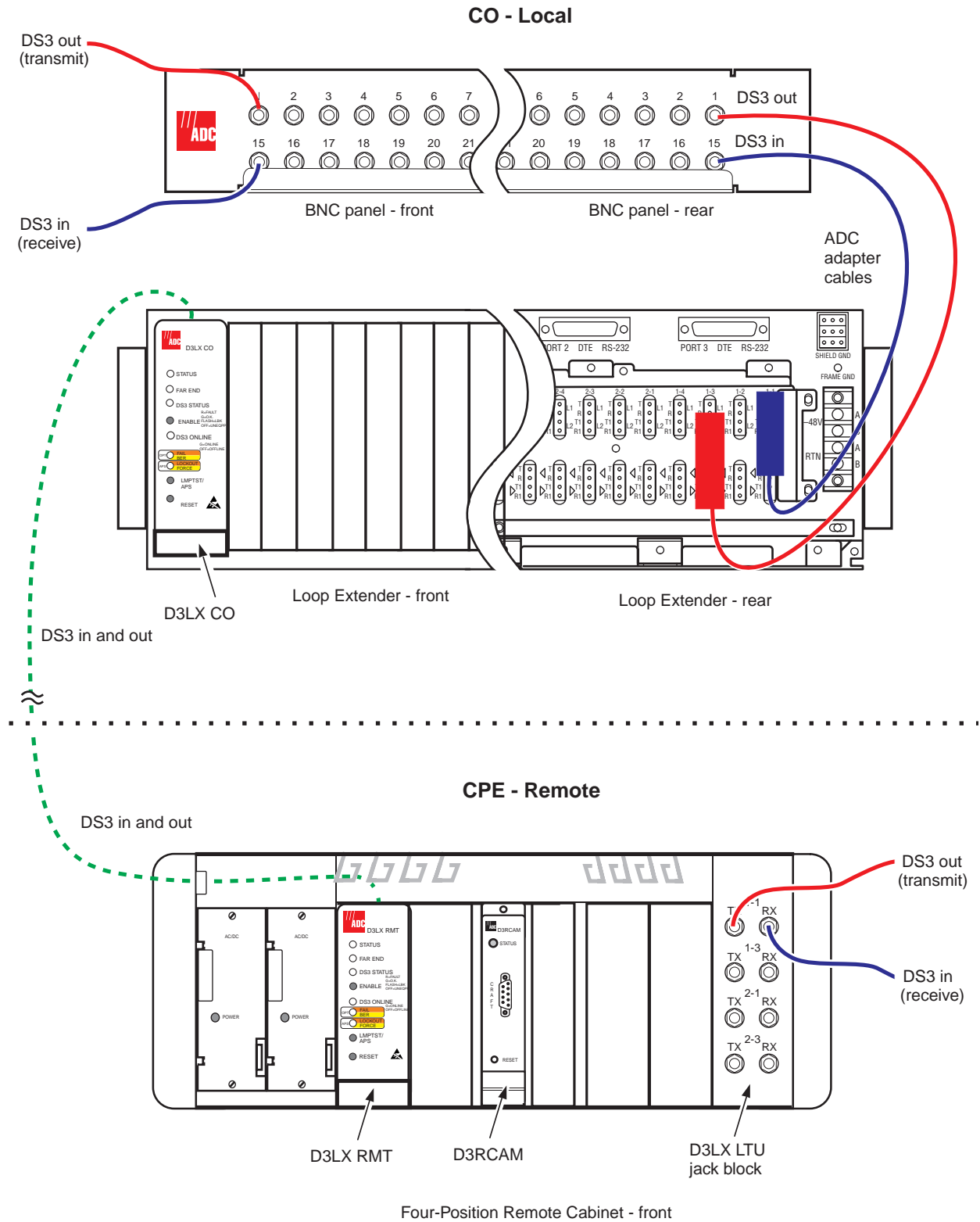


Figure 2. System Overview

FRONT-PANEL DESCRIPTION

Figure 3 shows the D3LX CO front panel. Table 1 on page 4 describes the LEDs and other front-panel components. For pinout diagrams of the D3LX card-edge connector, refer to “D3LX Card-Edge Connector” on page 38.

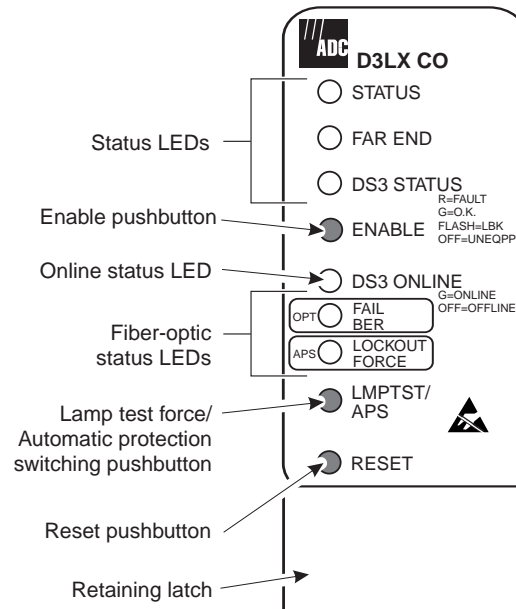


Figure 3. D3LX CO Front Panel

Table 1. D3LX Front-Panel Description and Status LEDs

Name	Function		
LEDs	The LEDs can report the following conditions:		
	Activity	Color	Status
STATUS	Off	Not lit	Blown fuse
	On (solid)	Green	Normal operation.
	On (solid)	Yellow	Module initializing or performing self test diagnostics or LED test.
	On (solid)	Red	Module fault detected.
FAR END	Off	Not lit	Remote alarms inactive (no alarm).
	On (solid)	Yellow	Remote alarm on D3LX CO.
DS3 STATUS	Off	Not lit	Unequipped.
	On (solid)	Green	DS3 active.
	On (flashing)	Green	DS3 in loopback, output AIS.
	On (solid)	Red	DS3 fault (LOS).
	On (flashing)	Red	DS3 in loopback, output AIS.
DS3 ONLINE	Off	Not lit	DS3 offline.
	On (solid)	Green	DS3 active.
OPT	Off	Not lit	Optical link active (normal operation).
	On (solid)	Yellow	BER fault.
	On (solid)	Red	Optical link failure (OOF)
APS	Off	Not lit	No protection switching (normal operation).
	On (solid)	Yellow	Force manual protection enabled.
	On (solid)	Red	Protection switching limit.
ENABLE pushbutton	Pressed with APS	In a protected system, the active DS3 are force switched to that module. Note: The ENABLE pushbutton is pressed first and released last.	
	Pressed with RESET	Cold start reset (service affecting). Note: The ENABLE pushbutton is pressed first and released last.	
LMPTST/APS pushbutton	Pressed	Lights front-panel LEDs yellow, except for STATUS and DS3 STATUS which light red.	
	Pressed with ENABLE	In a protected system, the active DS3 are force switched to that module. Note: The ENABLE pushbutton is pressed first and released last.	
RESET pushbutton	Pressed	Warm start reset (non-service affecting).	
	Pressed with ENABLE	Cold start reset (service affecting). Note: The ENABLE pushbutton is pressed first and released last.	
Retaining latch	Secures the D3LX when it is firmly seated in the backplane of the chassis and the latch is in the upright position		

PROTECTION SWITCHING

The D3LX system may be configured for either protected or non-protected mode. For protected mode, two modules are installed: working and protect. The working module carries the signal, while the protect module is in standby. Each working module uses 1 group, physically occupying 2 slots. Each protected module occupies an additional 2 slots; there are four slots required for each D3LX system.

In protected mode, the offline module is switched into service whenever the D3LX determines that a service fault has occurred in the online module.

Automatic Switching

The 1:1 (Line) Protect mode transmits identical traffic across two parallel systems. The working and protect D3LX modules provide Automatic Protection Switching (APS) compatible with the remote D3LX module. APS is non-revertive and bidirectional and may be forced or disabled through the front-panel pushbuttons or the SCU software.

Service is automatically switched from the online D3LX module to the offline module when one or more of the following events occur:

- Offline module detects a failure in the online module.
- Online module detects an optical failure. (LOS, LOF, or BER threshold is exceeded.)

APS is completed within 50 msec of the initiation of a switch. After the occurrence of three automatic switches within a 24-hour period, APS is locked out. APS may be enabled again through the front panel interface or the craft interface.

APS to the offline module can be disabled. To do this, simultaneously press the LMPTST/APS and ENABLE pushbuttons on the online module's front panel. APS can be restored by pressing both pushbuttons a second time.

BER Monitoring

The optical link is continuously monitored for bit errors. If the bit errors exceed a predetermined threshold, and the D3LX is configured for protection, protection switching occurs and an alarm is indicated. The optical alarm is indicated when the threshold exceeds 10^{-6} to 10^{-10} (default is 10^{-8}). The optical switch threshold may be set between 10^{-4} and 10^{-10} (default is 10^{-6}).

Manual Switching

Service can be manually switched from the online D3LX module to the offline module by simultaneously pressing the LMPTST/APS and ENABLE pushbuttons located on the offline module's front panel. This disables the APS causing the APS LED to turn yellow. The ONLINE LED of the new online module (formerly the protect module) turns green, indicating a successful transfer of service. The ONLINE LED of the new offline module (formerly the working module) is not lit, indicating it is in standby mode and not carrying the DS3 service.

APPLICATIONS

D3LX modules can be used in a number of solutions:

- Switched Multimegabit Data Service (SMDS) Applications—D3LX modules support the transmission of SMDS service through the network.
- Private Line Interconnect Applications—D3LX modules provide private point-to-point LAN interconnect services through the use of the D3LX.
- DS3 Video Distance Learning Applications—D3LX modules provide high quality video signal transmission that is the most cost-effective solution for DS3 video transport.
- DS3 Asynchronous Transport Mode (ATM) Applications—D3LX modules provide high speed ATM services using D3LX at a fraction of the cost of an OC-3 multiplexer.

PREPARING TO INSTALL D3LX MODULES

Prior to installing D3LX modules in chassis confirm that:

- chassis are installed for each module (an LEC for the D3LX CO and a Four-Position Remote Terminal Cabinet or Two-Position QLX Remote BNC Chassis for the D3LX RMT).
- a BNC Patch Panel with ADC adapter cables is installed in the CO rack and at the remote site. For more information about this operation, refer to [“Installing the BNC Panel” on page 7](#).
- protection switching is enabled (if you plan to employ it). For more information about protection switching, refer to [“Setting Up System Options” on page 19](#).
- a meter and variable line attenuator are available.
- fiber-optic patch cords are of appropriate length and that the connectors are of appropriate type (SC or FC) for your application.
- the optical components receive the proper cleaning procedures. For more information about cleaning, refer to [“Appendix B - Cleaning and Mating Fiber-Optic Systems” on page 39](#).
- a Soneplex Controller Unit (SCU) version 3.7 or greater is installed in the LEC.
- any other optional equipment that needs to be installed prior to the D3LX modules, such as an Alarm Processing Unit (APU) or D3LX Remote Access Module (D3RCAM), is installed. Refer to the optional equipment documentation for installation information.

INSTALLING THE BNC PANEL

OVERVIEW

The ADC BNC Panel consists of 14 pairs of 75Ω BNC connectors that are part of a system that converts an electrical DS3 circuit at the CO site into an optical signal that uses WDM to transmit a signal across one single-mode fiber to a CPE site. The BNC Panel can support 7 working D3LX lines and 7 protection D3LX lines. (Table 2 on page 8 lists each working slot location as labelled on the front panel of the chassis and its corresponding protection slot.)

The D3LX CO (CO module) converts the optical signal at the CO site and the D3LX RMT (remote module) converts the optical signal back into an electrical DS3 and transmits the signal back to the D3LX CO residing in the Loop Extender Chassis (LEC).

A BNC Panel and ADC adapter cables are required when D3LX modules are installed. Prior to ordering ADC adapter cables, measure the distance between the BNC Panel and the chassis. For more information about installing D3LX modules, refer to “Installing a D3LX CO Module in an LEC” on page 9.

INSTALLATION OF THE PANEL



Prior to installing the ADC adapter cables (BNC-3-CBL-WW), remove any existing wires from the LINE wire-wrap row on the back of the LEC.

- 1 Mount the panel in the rack.
- 2 Secure the panel to the rack by using the provided screws.
- 3 On the front of the panel, connect the DS3 IN (transmit) and DS3 OUT (receive) coax cables as shown in Figure 4 on page 8. Note the connector numbers on the BNC panel.

In every group of 4 slots, such as 1-1 through 1-4, the right most two slots have cables plugged into the bottom 2 wire-wrap pins (T1 and R1), and the two left most slots have cables plugged into the top 2 wire-wrap pins (T and R). If it is a protected system or a single D3LX module, then slots 1-2 and 1-4 do not have cables.

For example, a D3LX CO module plugged into slot 1-1 of the chassis or in a 2 D3LX protected system:

- The DS3 receive cable plugs into the bottom 2 pins T1 and R1 of slot 1-1. This is the DS3 that the D3LX receives.
- The DS3 transmit cable is plugged into the top 2 pins T and R of slot 1-3. This is the DS3 that the D3LX transmits.

In another example, for a D3LX CO module plugged into slot 1-3 of the chassis in an unprotected system:

- The DS3 receive cable plugs into the bottom 2 pins T1 and R1 of slot 1-2. This is the DS3 that the D3LX receives.
- The DS3 transmit cable plugs into the top 2 pins T and R of slot 1-4. This is the DS3 that the D3LX transmits.

- 4 From the rear of the panel, connect the coax end of an ADC adapter cable to the DS3 IN (receive) connector. The connector number must match the connector number on the front of the panel.
- 5 Connect the wire-wrap conversion block end of the same ADC adapter cable to the T and R EQUIP wire-wrap posts on the back of the LEC as shown in Figure 4 on page 8. The top of the conversion block mates with the T and R LINE wire-wrap posts to prevent improper connection.

- 6 From the rear of the panel, connect the coax end of an ADC adapter cable to the DS3 OUT (transmit) connector. The connector number must match the connector number on the front of the panel.
- 7 Connect the wire-wrap conversion block end of the same ADC adapter cable to the T and R EQUIP wire-wrap posts on the back of the LEC as shown in Figure 4 on page 8. The top of the conversion block mates with the T1 and R1 LINE wire-wrap posts to prevent improper connection.
- 8 Repeat this entire procedure for each D3LX module installed.

Table 2. Tip and Ring Assignments for Protection Switching Applications

Working Card Slot	TX/RX BNC Connector Pair	Protect Card Slot	TX/RX BNC Connector Pair
1-1	1/15	1-3	2/16
2-1	3/17	2-3	4/18
3-1	5/19	3-3	6/20
4-1	7/21	4-3	8/22
5-1	9/23	5-3	10/24
6-1	11/25	6-3	12/26
7-1	13/27	7-3	14/28

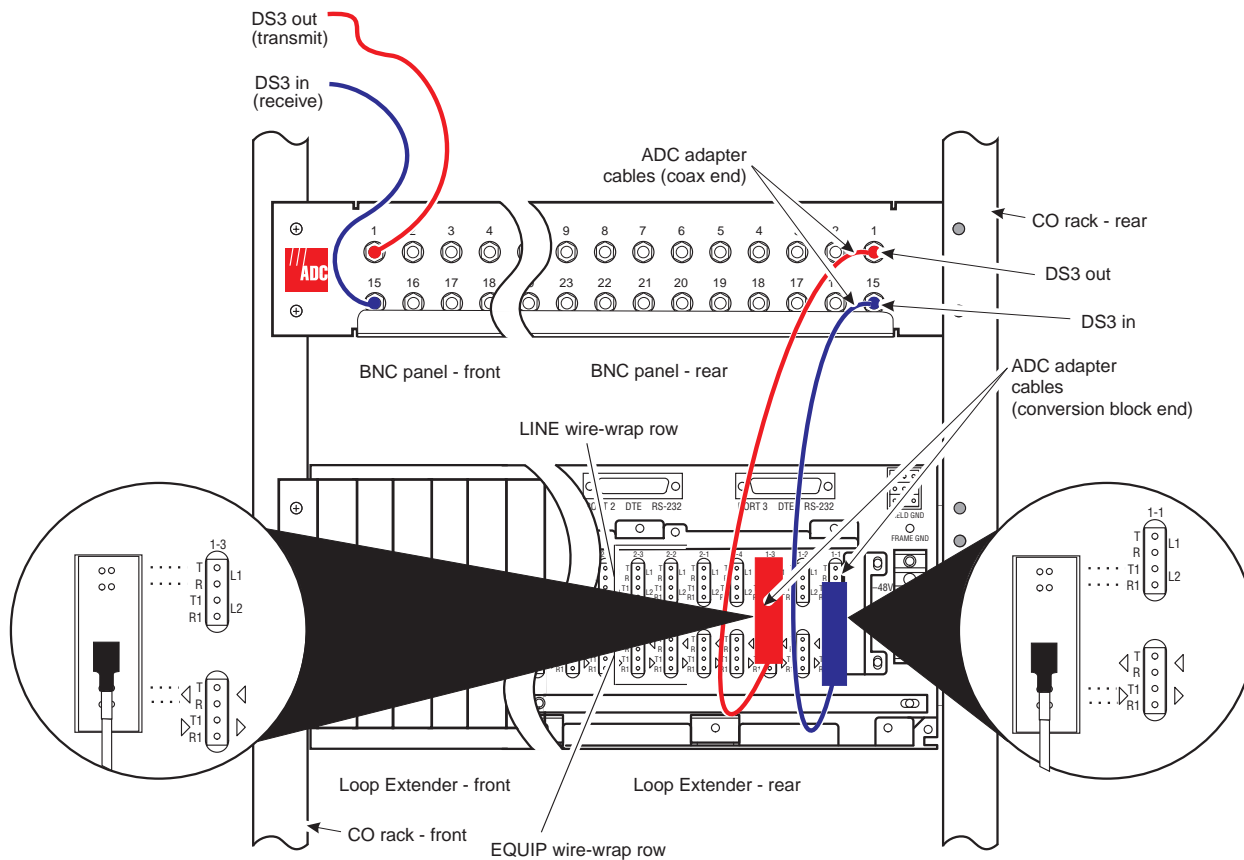


Figure 4. Mounting the BNC Panel and Connecting ADC Adapter Cables (LEC Shown)

INSTALLING A D3LX CO MODULE IN AN LEC



Avoid exposure to invisible laser radiation.

- Do not look into the ends of any optical fiber or directly into the module fiber connectors as exposure to invisible laser radiation may result.
- Use a meter to verify active fibers.
- Do not insert module edge connectors into the chassis connectors before connecting the optical fiber to the module. Verify that LED indicators are not lit, and the module is not engaged with the chassis connectors before proceeding.



When using D3LX CO modules in a group, never install other Soneplex modules in any of the unused slots in the same group.



Remove any existing wire wraps from the LEC backplane prior to installing any ADC adapter cables (BNC-3-CBL-WW) for the groups that are being used for D3LX modules.

Use the following procedure to install D3LX CO modules in LECs:

- 1 Select the fiber-optic patch cord with the appropriate length (the measured distance from the Fiber Distribution Frame or equivalent distribution device) and the appropriate type optical connector (SC or FC type).
- 2 Route the fiber patch cord through the top of the chassis, along the heat baffle/fiber management panel. Lower the cord through the FiberGuide vertical duct to the location reserved for the D3LX CO module as shown in [Figure 5 on page 10](#). The protective cover must remain on the fiber connector to prevent dust and damage to the connection. The fiber should be tagged to identify the circuit.
- 3 Open the front panel of the LEC into which the D3LX CO will be installed.

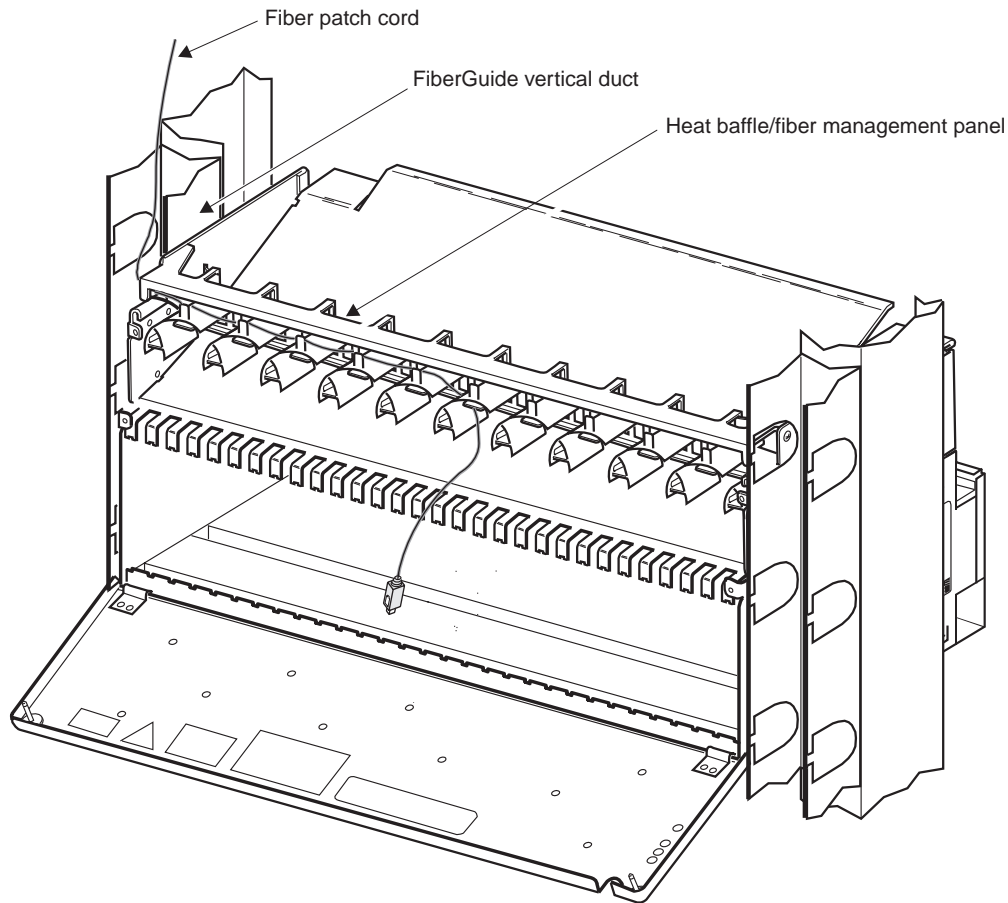


Figure 5. Routing the Fiber Patch Cord

- 4 Locate the mounting slots designated for the D3LX CO modules in the chassis.
- 5 Refer to [Figure 6 on page 11](#) for D3LX CO module locations chassis and slot corresponding to the DS3 signal.
 - If no protection switching is required, proceed to the next step.
 - If protection switching is required, a working module may be installed in the first slot of any quad group, such as 1-1, 2-1, 3-1, 4-1, 5-1, 6-1, or 7-1. The protection module is installed in the slot to its immediate right in the order of 1-3, 2-3, 3-3, 4-3, 5-3, 6-3, or 7-3. For more information on protection switching, refer to [“Protection Switching” on page 4](#).

Install the working module first, then the protect module.

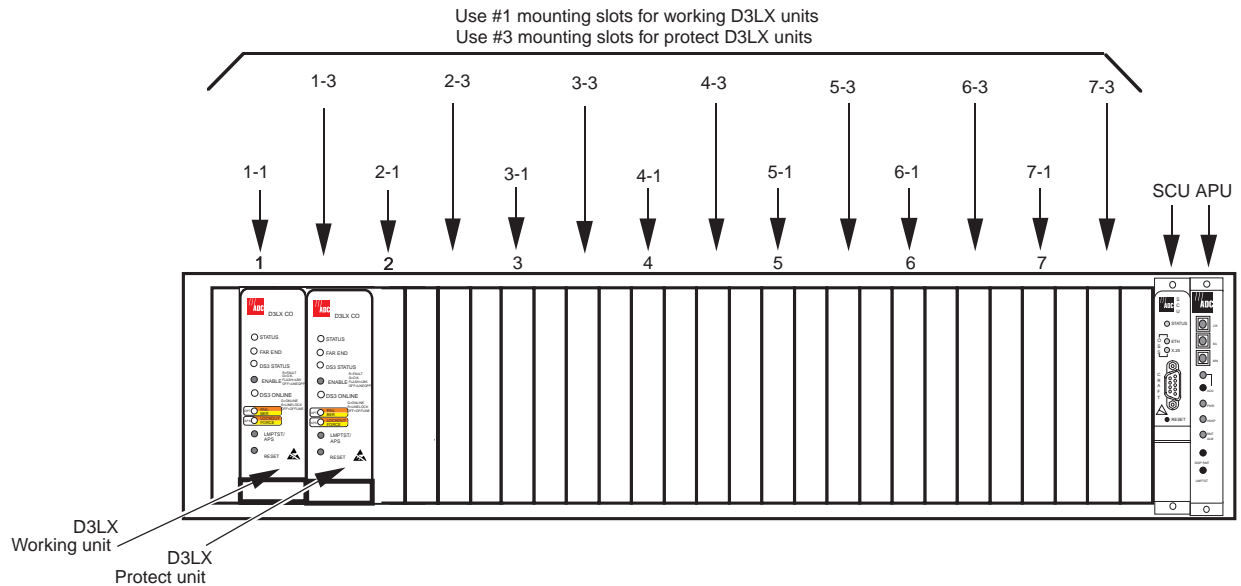


Figure 6. D3LX Module Locations in Loop Extender Chassis

- 6** Remove a new module from its protective ESD packaging. If the module is installed, remove it and inspect for physical damage.
- 7** Align the module with the slot and slide the module into the chassis until about 3 inches protrude from the front of the chassis as shown in [Figure 7 on page 12](#). Do not seat module in connector at this time.
- 8** Remove the protective dust cap from the connector on the D3LX CO module.

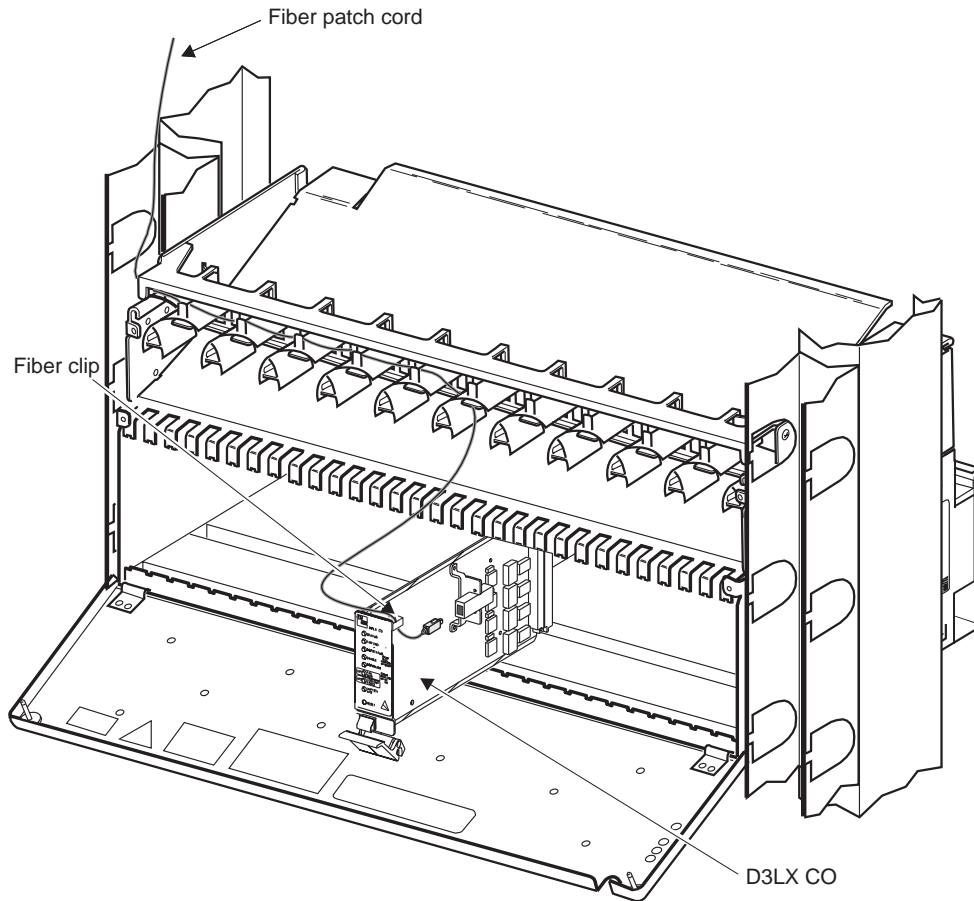


Figure 7. Installing the D3LX CO

- 9 After removing the protective cover from a fiber patch cord, clean the fiber-optic connector and adapter as directed in “Appendix B - Cleaning and Mating Fiber-Optic Systems” on page 39.

POWER VERIFICATION

Verification of Electrical DS3 Power Level

- 1 Apply power to the D3LX CO.
- 2 Attach the fiber patch cord from the D3LX CO to a meter.
- 3 Confirm that the readings are within the specification (-5 dBm to -23 dBm).
If the reading is not within the specification, check all fiber-optic connections to the D3LX CO.
If the reading is still not within the specification, replace the module.
- 4 Once the readings are within specification, disconnect the patch cord from the meter.
Now that the DS3 power level meets optical specifications, verify the D3LX CO module.

Verification of D3LX CO Optical Power

- 1 Connect an attenuator in series:
 - Connect a patch cord from the meter to the attenuator.
 - Connect a meter patch cord from the attenuator to the module.
- 2 Using the retaining latch, press the module into the chassis until it is properly seated.
- 3 Is the STATUS indicator lit green?
 - If **Yes**, continue to next step.
 - If **No**, repeat steps 1 through 3 with a new D3LX CO module.
- 4 On the APU, as shown in [Figure 6 on page 11](#), press the LMPTST/APS pushbutton. Did all D3LX CO indicators light?
 - If **Yes**, continue to next step.
 - If **No**, repeat steps 1 through 3 with a new D3LX CO module.

The module laser is transmitting when power is applied to the module.
- 5 Confirm that the transmit power is $-7 \text{ dBm} \pm 2 \text{ dBm}$.

If the reading is not within this specification, replace the module.
- 6 Reduce the voltage on the attenuator and confirm that the receive dynamic range is -5 dBm to 123 dBm .

If the reading is not within this specification, replace the module.



Verify that unit is completely disconnected from the chassis connectors before removing the optical fiber from the plug-in unit. Verify that the far end transmitter is off before proceeding. Exposure to invisible laser radiation from the optical fiber is possible if the far end transmitter is transmitting. Verify that all LEDs are off (not illuminated).

- 7 Release the retaining latch on the D3LX CO module and slide the module out about 3 inches.
- 8 Disconnect the meter patch cord from the D3LX CO module.
- 9 Route the fiber out the top of the chassis and adjust as required to remove any excess slack.
- 10 Guide the fiber with one hand while sliding the module slowly back into the chassis.



Always allow sufficient fiber length to permit routing without severe bends. Fibers may be permanently damaged if bent/curved to a radius of less than 1.5 inches (3.81 cm).

- 11 Using the retaining latch, press the module into the chassis until it is properly seated.
- 12 Did the STATUS indicator light green? (If there is no DS3 signal present, the OPT FAIL indicator is lit red.)
 - If **Yes**, continue to next step.
 - If **No**, repeat steps 1 through 10 with a new D3LX CO module.
- 13 If this is to be a DS3 protected system, repeat the preceding steps to install the protect module in the slot adjacent to the working module.
- 14 Repeat entire procedure for each D3LX CO module to be installed.
- 15 Store excess fiber at the fiber storage device specified in the work instruction.

INSTALLING A D3LX RMT MODULE IN A REMOTE CABINET



Avoid exposure to invisible laser radiation.

- Do not look into the ends of any optical fiber or directly into the module fiber connectors as exposure to invisible laser radiation may result.
- Use a meter to verify active fibers.
- Do not insert module edge connectors into the chassis connectors before connecting the optical fiber to the module. Verify that LED indicators are not lit, and the module is not engaged with the chassis connectors before proceeding.

Use the following procedure to install D3LX RMT modules in a Four-Position Remote Terminal Cabinet or Two-Position QLX Remote BNC Chassis. After installing the D3LX RMT modules in either chassis, proceed to “Power Verification” on page 16.

FOUR-POSITION REMOTE TERMINAL CABINET INSTALLATION

To install first the working module, and then the protect module (if installing D3LX RMT modules in protection switching applications):

- 1 Open the front panel of the remote terminal into which the D3LX RMT will be installed.
- 2 Route the fiber patch cord through the top of the chassis and around the radius limiters as shown in [Figure 8](#). The protective cover must remain on the fiber connector to prevent dust and damage to the connection. The fiber should be tagged to identify the circuit.

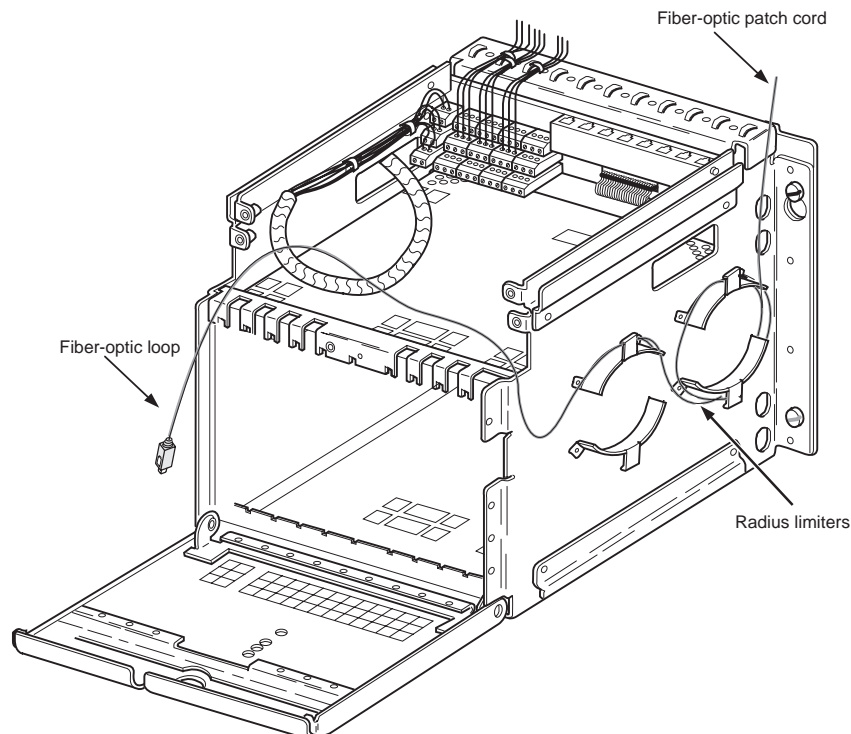


Figure 8. Routing the Fiber Through a Four-Position Remote Terminal Cabinet

- 3 Locate the mounting slots designated for the D3LX RMT modules in the chassis. If protection switching is required, a working module installs in the first slot of a quad group, such as 1-1 or 2-1. The protection module installs in the slot to the right of the working module, slot 1-2 or 2-2.
- 4 Refer to [Figure 9](#) for D3LX RMT module locations chassis and slot corresponding to the DS3 signal.
 - If no protection switching is required, proceed to the next step.
 - If protection switching is required, a working module may be installed in the first slot of any quad group, such as 1-1 or 2-1. The protection module is installed in the slot to its immediate right in the order of 1-3 or 2-3. For more information on protection switching, refer to “[Protection Switching](#)” on page 4.

Install the working module first, then the protect module.

- 5 Remove a new module from its protective ESD packaging. If the module is installed, remove it and inspect for physical damage.
- 6 Align the module with the slot and slide the module into the chassis until about three inches protrude from the front of the chassis. Do not seat module in connector at this time.
- 7 Remove the protective dust cap from the connector on the D3LX RMT module.

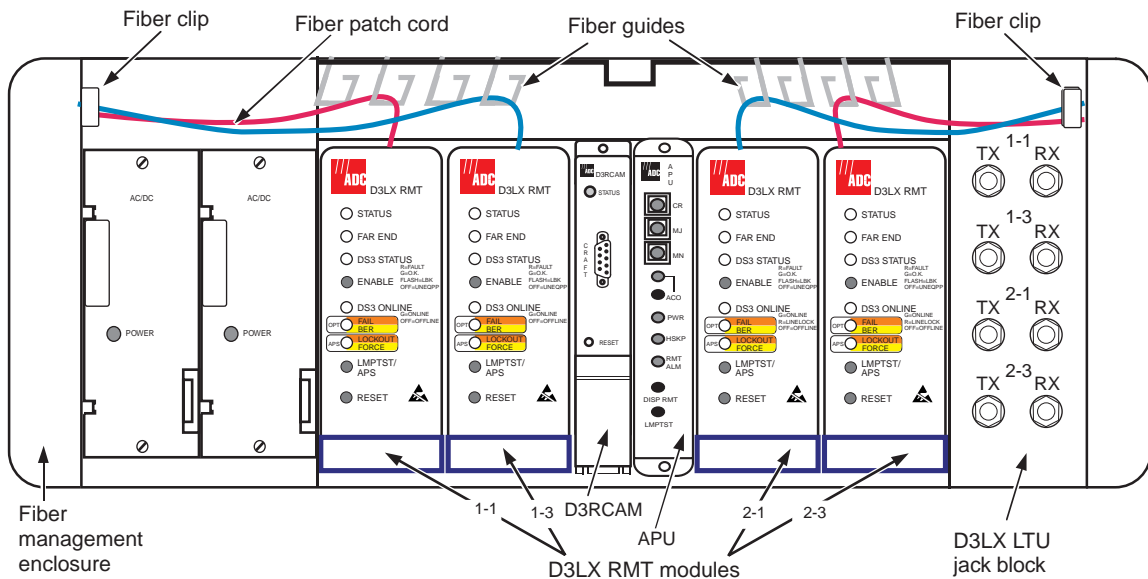


Figure 9. D3LX RMT Module Locations in a Four-Position Remote Terminal Cabinet

- 8 After removing the protective cover from a fiber patch cord, confirm that the fiber-optic connector is free of debris as directed in “[Appendix B - Cleaning and Mating Fiber-Optic Systems](#)” on page 39.
- 9 Proceed to “[Power Verification](#)” on page 16.

Two-Position QLX Remote BNC Chassis Installation

To install first the working module, and then the protect module (if installing D3LX RMT modules in protection switching applications):

- 1 Open the front panel of the remote terminal into which the D3LX RMT will be installed.
- 2 Route the fiber patch cord through the left side of the fiber management enclosure located on the remote terminal as shown in [Figure 10](#). The protective cover must remain on the fiber connector to prevent dust and damage to the connection. The fiber should be tagged to identify the circuit.

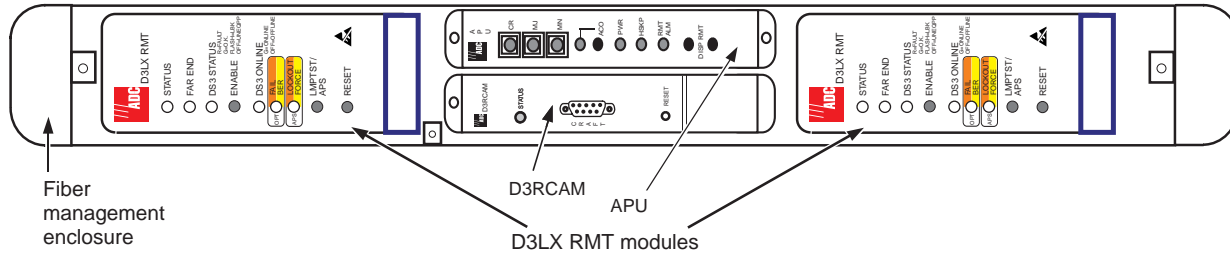


Figure 10. D3LX RMT Module Locations in a Two-Position QLX Remote BNC Chassis

- 3 Locate the mounting slots designated for the D3LX RMT modules in the chassis.
- 4 Refer to [Figure 10](#) for D3LX RMT module locations chassis and slot corresponding to the DS3 signal.
- 5 Remove a new module from its protective ESD packaging. If the module is installed, remove it and inspect for physical damage.
- 6 Align the module with the slot and slide the module into the chassis until about three inches protrude from the front of the chassis. Do not seat module in connector at this time.
- 7 Remove the protective dust cap from the connector on the D3LX RMT module.
- 8 After removing the protective cover from a fiber patch cord, confirm that the fiber-optic connector is free of debris as directed in “[Appendix B - Cleaning and Mating Fiber-Optic Systems](#)” on page 39.
- 9 Proceed to “[Power Verification](#)” on page 16.

POWER VERIFICATION

Verification of Electrical DS3 Power Level

- 1 Apply power to the D3LX RMT.
- 2 Attach the fiber patch cord from the D3LX RMT to a meter.
- 3 Confirm that the readings are within the specification (-5 dBm to -23 dBm).
If the reading is not within the specification, check all fiber-optic connections to the D3LX RMT.
If the reading is still not within the specification, replace the module.
- 4 Once the readings are within specification, disconnect the patch cord from the meter.
Now that the DS3 power level meets optical specifications, verify the D3LX RMT module.

Verification of Optical Power

- 1 Connect an attenuator in series:
 - Connect a patch cord from the meter to the attenuator.
 - Connect a meter patch cord from the attenuator to the module.
- 2 Using the retaining latch, press the module into the chassis until it is properly seated.
- 3 Is the STATUS indicator lit green?
 - If **Yes**, continue to next step.
 - If **No**, repeat steps 1 through 3 with a new D3LX RMT module.
- 4 On the APU, as shown in [Figure 9 on page 15](#), press the LMPTST/APS pushbutton. Did all D3LX RMT indicators light?
 - If **Yes**, continue to next step.
 - If **No**, repeat steps 1 through 3 with a new D3LX RMT module.

The module laser is transmitting when power is applied to the module.

- 5 Confirm that the transmit power is $-7 \text{ dBm} \pm 2 \text{ dBm}$.
If the reading is not within this specification, replace the module.
- 6 Reduce the voltage on the attenuator and confirm that the receive dynamic range is -5 to -23 dBm .
If the reading is not within this specification, replace the module.



Verify that unit is completely disconnected from the chassis connectors before removing the optical fiber from the plug-in unit. Verify that the far end transmitter is off before proceeding. Exposure to invisible laser radiation from the optical fiber is possible if the far end transmitter is transmitting. Verify that all LEDs are off (not illuminated).

- 7 Release the retaining latch on the D3LX RMT module and slide the module out about 3 inches.
- 8 Disconnect the meter patch cord from the D3LX RMT module.
The D3LX RMT module optical power level specification is now verified.
- 9 Route the fiber out the top of the chassis and adjust as required to remove any excess slack.
- 10 Guide the fiber with one hand while sliding the module slowly back into the chassis.



Always allow sufficient fiber length to permit routing without severe bends. Fibers may be permanently damaged if bent/curved to a radius of less than 1.5 inches (3.81 cm).

- 11 Using the retaining latch, press the module into the chassis until it is properly seated. If there is excessive resistance, withdraw the module and check for alignment or obstructions.
- 12 Did the STATUS indicator light green? (If there is no DS3 signal present, the OPT FAIL indicator is lit red.)
 - If **Yes**, continue to next step.
 - If **No**, repeat steps 1 through 10 with a new D3LX RMT module.
- 13 If this is to be a DS3 protected system, repeat the preceding steps to install the protect module in the slot adjacent to the working module.
- 14 Repeat entire procedure for each D3LX RMT module to be installed.

- 15 Store the remaining slack fiber on the left side of the fiber management enclosure within the remote cabinet, leaving 5 to 6 inches of slack fiber above the upper card guide to provide a service loop.

PROVISIONING

In D3LX systems, provisioning occurs automatically if a remote module is installed. In the event that a remote module is not installed or properly functioning, refer to the manual provisioning process below.

MANUAL

Manual provisioning of the D3LX system may be performed locally through the SCU (version 3.7 or later) or remotely through the D3RCAM. Craft interface software provides a user-friendly menu driven program to option the modules in the system and maintain a provisioning database at the central office. In the chassis with the SCU, provisioning instructions pass to resident modules through communication channels embedded in the backplane of the chassis.

Perform manual provisioning through the craft interface of the D3LX module after installation or when changes occur in the network system configuration. For complete information about manual provisioning, refer to the Soneplex Loop Extender System Operation and Maintenance Manual (Version S1.0), document ADCP-61-494 and Soneplex Shelf Controller User Manual (V3.7).

AUTOMATIC

Automatic provisioning occurs in a previously provisioned system when replacing the D3LX module or when power to the module is lost and then restored. In systems with D3LXs at the CO, the SCU provides provisioning data to the module (slot) that powers up, based on the database established when the system was previously provisioned.



When an SCU is replaced at the CO, the new SCU module requests provisioning data from the D3LX CO modules in the local chassis and from the remote modules optically connected to them. Additionally, the SCU retains its provisioning database up to 24 hours after power is lost.

The following items are configured during provisioning:

- Protect or Non-Protect operation
- BER Minor Alarm Threshold (range, 10^{-6} to 10^{-10})
- BER Switch Threshold (range, 10^{-4} to 10^{-10})
- Equipped/Unequipped state
- Line State
 - In-Service (IS)
 - Out of Service (OOS)
- Alarm reporting options. For more information, see [“Alarm Setting During Provisioning”](#) on page 19.
- Line Buildout (range: two segments between 0 - 450 ft)

OTHER PROVISIONING CONSIDERATIONS

Alarm Setting During Provisioning

The D3LX generates alarms on conditions occurring in the D3LX CO modules DS3 facility. The severity of the alarm conditions as Critical, Major, Minor, or Event is selected while provisioning. The alarms are handed off to an Alarm Processing Unit (APU) which acts as an interface between the D3LX modules and the customer alarm monitoring equipment. For more information on alarms, see “[Configuring D3LX Alarms](#)” on page 25.

D3 Remote Craft Access Module (D3RCAM) Option

The D3RCAM is a plug-in module for the D3LX system which provides a craft interface at the remote site. Additionally, the D3RCAM works in conjunction with the APU and the D3LX modules to display alarm information for the remote chassis or terminal.

SETTING UP SYSTEM OPTIONS

To configure D3LX system options, you must connect a maintenance terminal to an available craft port. You may select either the SCU or Ports 2 or 3 (local) or the D3RCAM (remote) craft port.

- If you are using the SCU, refer to “[Connecting a Maintenance Terminal to the SCU Craft Port](#)” on page 19.
- If you are using the D3RCAM, refer to “[Connecting a Maintenance Terminal to the D3RCAM Craft Port](#)” on page 20.

CONNECTING A MAINTENANCE TERMINAL TO THE SCU CRAFT PORT

Connect the VT100 compatible terminal or host computer to the interface port as follows:

- 1 For initial setup, connect the local maintenance terminal to the SCU craft port (on front panel). After configuration, the SCU may be connected to ports 2 or 3 on the backplane of the LEC. For more information on Ports 2 and 3 located on the LEC, refer to Soneplex Loop Extender System Operation and Maintenance Manual, ADCP-61-494. See [Table 3](#) for chassis port descriptions.

Table 3. Chassis Port Description

SCU Front-Panel Craft Port	Ports 2 and 3
Function—DCE connection on the installed SCU module (see Figure 11 on page 20)	DTE connections on the chassis backplane. Ports provide an RS (EIA-232) interface.
Cable Type—Straight-through cable (26 AWG or larger, stranded pairs, overall shielding, common for all leads).	A null-modem cable or adapter.
Connector—Type DB-9 receptacle.	Type DB-25 receptacle.

- 2 Connect one end of the interface cable to the maintenance terminal and the other end to the craft port located on the front of the SCU as shown in [Figure 11](#).
- 3 Start a terminal emulation program such as Procomm that emulates a VT100 terminal.
- 4 Configure the maintenance terminal to the following communication settings:

- 9600 baud
- No parity
- 8 data bits
- 1 stop bit
- Hardware flow control to OFF

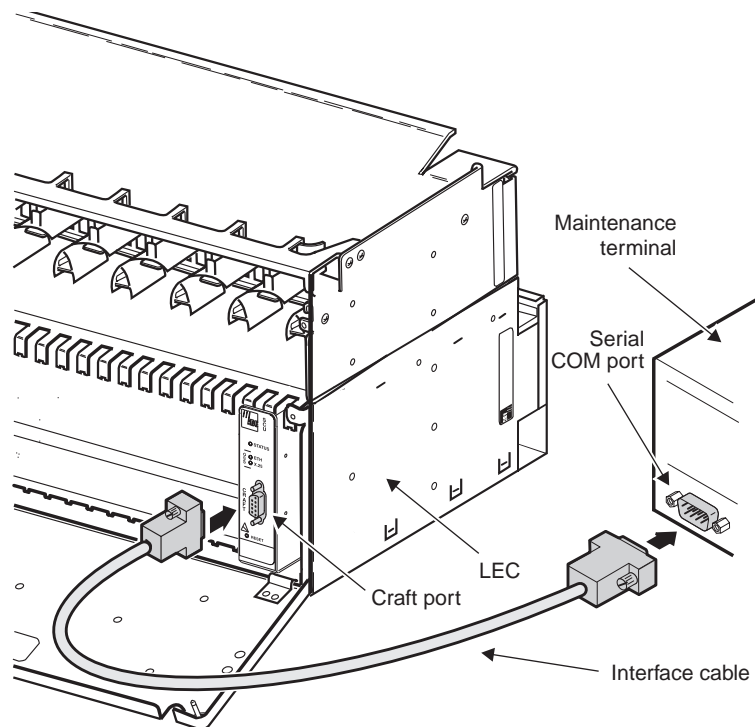


Figure 11. Connecting a Maintenance Terminal to the SCU



The default port configuration for the SCU craft port is CRAFT. Ports 2 and 3 must be configured for CRAFT before the craft interface may be accessed via these ports.

- 5 At the maintenance terminal, press **ENTER**. The **Enter User Name** field appears.

CONNECTING A MAINTENANCE TERMINAL TO THE D3RCAM CRAFT PORT

- 1 Locate the D3RCAM in the remote cabinet. The D3RCAM craft port is located on the front of the D3RCAM.
- 2 Select the cable for use between the craft port and the maintenance terminal with a DB-9 (male) connector at one end and a maintenance terminal connector at the other end.
- 3 Connect one end of the interface cable to the maintenance terminal and the other end to the D3RCAM craft port as shown in [Figure 12](#).
- 4 Start a terminal emulation program such as Procomm that emulates a VT100 terminal.

- 5 At the maintenance terminal, press **ENTER**. The **Enter User Name** field appears.

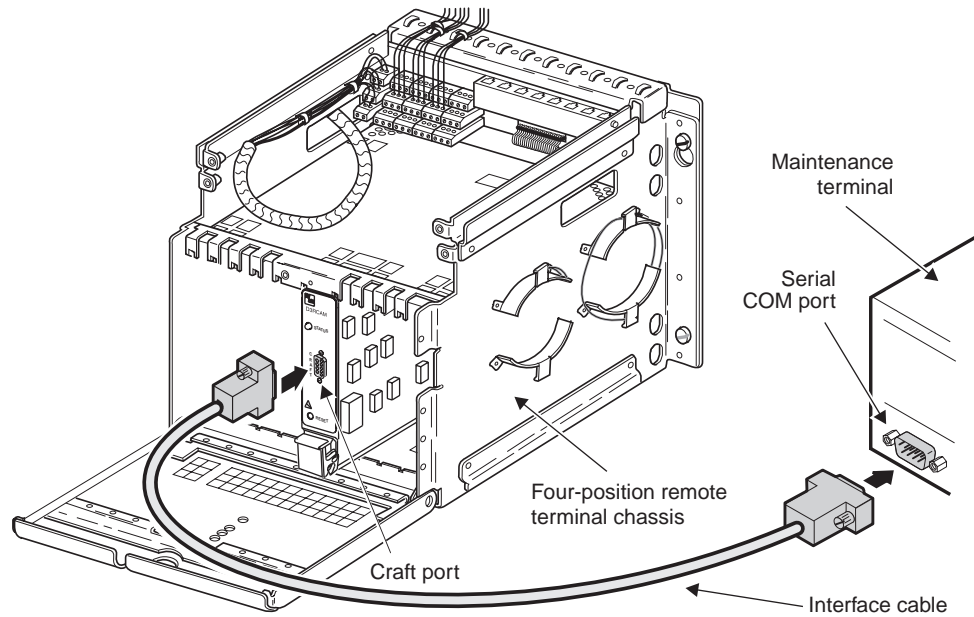


Figure 12. Connecting a Maintenance Terminal to the D3RCAM

NAVIGATING THROUGH CRAFT INTERFACE MENUS

Many of the operations that follow require the use of the craft interface.

To select a menu from the craft interface, do one of the following:

- Press the number of the menu.
- Use the **←** **→** arrow keys to select the menu and press **ENTER**.

Table 4 summarizes the navigational keys, which are also listed in the on-screen Help menu.

Table 4. *Navigational Keys for the Craft Interface Screens During Telnet Sessions*

Key ^(a)	Function
SPACEBAR	Cycles through selections.
ENTER	Activates the current setting or choice, or display a menu.
ESC	Returns to the previous menu.
↑	Selects the line or item above the current one.
↓	Selects the line or item below the current one.
→	Selects the next page or item to the right of the current one.
←	Selects the previous page or item to the left of the current one or returns to the previous menu.
Menu number	Selects the menu or item.
CTRL + T	Returns to Main menu.
CTRL + P	Returns to previous menu.
CTRL + D	Terminates the session (logout).
CTRL + A	Displays the Help menu.
CTRL + E	Jumps to Active Alarm menu.
CTRL + G	Jumps to Shelf Status screen.
CTRL + R	Refreshes the screen.

(a) Legacy management units require the use of control keys instead of arrow keys.



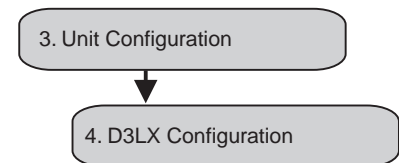
Most VT100 emulation programs support a print screen option. For Windows-based programs, such as Procomm or HyperTerminal, see the Help menu for instructions.

LOCAL CONFIGURATION

A D3LX system can be configured locally by an SCU (version 3.7 or later) with a D3LX CO module in an LEC. It can also be configured remotely by a D3RCAM with a D3LX RMT module installed in a remote chassis. See “Remote Configuration” on page 33 for the procedure configuring remotely using the D3RCAM.

The following details the local configuration procedure.

CONFIGURING THE D3LX SYSTEM THROUGH THE SCU



Use the craft interface system menu to view or edit the configuration for each D3LX module in the chassis. This menu can also be used to equip, provision, assign thresholds, and assign service state.

- 1 Connect a maintenance terminal to the craft port on the SCU front panel and log on to the craft interface system as described in “Connecting a Maintenance Terminal to the SCU Craft Port” on page 19.



See “Navigating Through Craft Interface Menus” on page 22 for detailed information on making selections.

- 2 From the Main menu, select 3. Unit Configuration.
- 3 From the Unit Configuration menu, select 4. D3LX Configuration.

The D3LX Configuration appears as shown in Figure 13.

```

D3LX CONFIGURATION

Group: 1   Slot: 1   Circuit ID:

Unit Equip State       : EQUIPPED
Unit Service State     : IN SERVICE
Unit Protect State     : UNPROTECTED
Optical Service State  : IN SERVICE
Optical BER Alarm Threshold : 1E-8
Optical BER Switch Threshold : N/A
DS3 Provisioned       : YES
DS3 Service State     : IN SERVICE
DS3 Transmit LBO Local   : 0-225 ft.
DS3 Transmit LBO Remote : 0-225 ft.
Housekeeping Label 1    : RMT-HSKP1
Housekeeping Label 2    : RMT-HSKP2

Press CONTROL-A For Assistance
  
```

Figure 13. D3LX Configuration Screen



Press **CTRL** + **A** for assistance when making selections.

- 4 Configure the fields as detailed in the [Table 5](#) and assign the selections by pressing **ENTER**.
- 5 Repeat Steps 2 through 5 for each D3LX system installed in the chassis.

Table 5. D3LX CO Configuration Fields—SCU V3.7 or later

Field Name	Type	Options	Description	Default
Unit Equip State	Toggle	EQUIPPED	Establishes communication with SCU. Module must be set to EQUIPPED before remaining selections are allowed.	UNEQUIPPED
		UNEQUIPPED	No communication with SCU.	
Unit Service State	Toggle	IN SERVICE	Places the unit in service and allows equipment alarm reporting by the SCU. Must be set to IS for reporting of equipment alarms.	OOS
		OUT OF SERVICE	Removes unit from service and stops equipment alarm reporting by the SCU.	
Unit Protect State	Toggle	PROTECTED	Line protection	Unprotected
		UNPROTECTED	No protection	
Optical Service State	Toggle	IN SERVICE	Places facility in service and enables T2 alarm reporting by the D3LX CO.	OOS
		OUT OF SERVICE	Removes facility from service and stops T2 alarm reporting by the D3LX CO.	
Optical BER Alarm Threshold	Toggle	Set to OFF or set between 10^{-6} and 10^{-10}	The average Bit Error Ratios of both the incoming optical signals are monitored by the D3LX CO. By monitoring BERs, the D3LX CO is capable of triggering a minor alarm when any of the monitored signals degrades below the BER threshold level.	10^{-8}
Optical BER Switch Threshold	Toggle	Range from 10^{-4} to 10^{-10}	Sets the threshold at which the APS will be executed.	10^{-6}
DS3 Provisioned (set for each T1)	Toggle	YES	Brings up T1 default settings and allows configuration changes.	NO
		NO	No configuration changes allowed.	
DS3 Service State	Toggle	IN SERVICE	Select IS after completing the remaining configurations.	OOS
		OUT OF SERVICE	Leave this field at OUT OF SERVICE (versus IN SERVICE) at this time to avoid undesirable reporting of alarms.	
DS3 Transmit LBO Local	Toggle	0–225 ft., 226–450 ft.	The DS1 signal output provides standard DSX signal levels which can be compensated for at various distances, such as cable length.	0–225 ft.
DS3 Transmit LBO Remote	Toggle	0–225 ft., 226–450 ft.	The DS1 signal output provides standard DSX signal levels which can be compensated for at various distances, such as cable length.	0–225 ft.

Continued

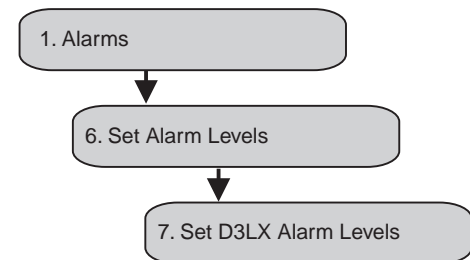
Table 5. D3LX CO Configuration Fields–SCU V3.7 or later (Continued)

Field Name	Type	Options	Description	Default
Housekeeping Labels 1 and 2	Input	Enter up to 8 alphanumeric characters.	Enter the remote housekeeping alarm label you want for each field; the fields can be edited to create customized labels. When a housekeeping alarm occurs, for example, door ajar, water on the floor, or fire alarm, the name assigned is displayed in the condition column of the Alarm History and Active Alarms screens.	SCU V3.7 = Blank

* This field shows as N/A if D3RCAM is not installed at the Four-Position Remote Terminal Cabinet or Two-Position QLX Remote BNC Chassis.

CONFIGURING D3LX ALARMS

Use this procedure to set alarm indicators for equipment, optical facilities, and DS3 facilities groups for each D3LX CO module. You can select CRITICAL (CR), MAJOR (MJ), MINOR (MN), EVENT (EV), or NOT RPTD (not reported) for each field.



Setting Alarm Levels

- From the Main menu, select 1. Alarms.
- From the Alarms menu, select 6. Set Alarms Levels.
- From the Set Alarm Levels menu, select 7. Set D3LX Alarm Levels.
The D3LX CO Alarm Levels screen appears as shown in [Figure 14 on page 26](#).
- In the **Group** toggle field, use **SPACEBAR** to select the group number (1-7).
- From the **Equipment Alarms**, **Optical Facility Alarms**, and **DS3 Facility Alarms** fields, select CRITICAL (CR), MAJOR (MJ), MINOR (MN), EVENT (EV), or NOT RPTD (not reported) for each field. Default alarm levels are shown in [Table 6 on page 26](#). Assign the selections by pressing **ENTER**.



Abbreviations of the alarm field options (except NOT RPTD) appear in the Active Alarms and Alarm History screens. The option you select for a particular type of alarm determines whether you will be notified when that type alarm occurs: critical, major, and minor alarms are audible and visual notifications, events are system actions without audible and visual notifications, and not reported alarms do not require notification.

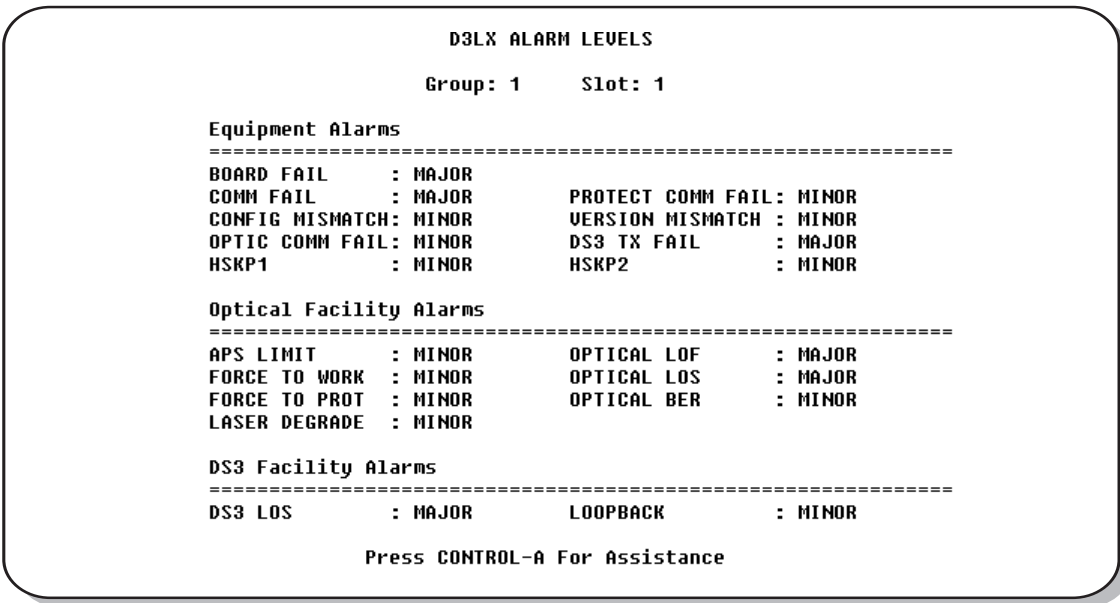


Figure 14. D3LX Alarm Setting Menu

Table 6. D3LX Alarm Level Defaults

Condition	Alarm Level Default
Equipment Alarms	
BOARD FAIL	Major
COMM FAIL	Major
CONFIG MISMATCH	Minor
HSKP1, HSKP2	Minor
PROTECT COMM FAIL	Minor
OPTICAL COMM FAIL	Minor
VERSION MISMATCH	Minor
Optical Facility Alarms	
APS LIMIT	Minor
FORCE TO WORK	Minor
FORCE TO PROT	Minor
LASER DEGRADE	Minor
OPTICAL LOF	Major
OPTICAL LOS	Major
T-BER	Minor
DS3 Facility Alarm	
LOOPED BACK	Minor
RECEIVE LOS	Major
TRANSMIT LOS	Minor
RECEIVE AIS	Major

DISPLAYING D3LX STATUS

2. Display Status

5. Display D3LX Status

Use this procedure to display the status of both working and protect modules in local and remote sites.

- 1 From the Main menu, select 2. Display Status.
- 2 From the Alarms menu, select 5. Display D3LX Status (as shown in Figure 16).
- 3 Use **SPACEBAR**, **←**, **→**, **↓**, and **↑** to select the group and slot to display.

DISPLAY D3LX STATUS				
Group: 1 Slot: 1				
	Local		Remote	
	Working	Protect	Working	Protect
	-----	-----	-----	-----
Unit Online	: ONLINE	OFFLINE	ONLINE	OFFLINE
HSKP1/HSKP2	: N/A	N/A	BOTH	NO
Optical Status	: OK	LOS	OK	OK
Optical Comm Fail	: NO	YES	NO	NO
Laser Degrade	: NO	NO	NO	NO
Mate Comm Fail	: NO	NO	YES	NO
Config Mismatch	: NO	NO	NO	NO
Version Mismatch	: NO	NO	NO	NO
Board Fail	: NO	NO	NO	NO
Optical BER Alarm	: NO	YES	NO	NO
APS Status	: ENABLED			ENABLED
APS Lockout	: NO			NO
Loopback Active	: NO	NO	NO	NO
Receive DS3 LOS	: YES	YES	NO	NO
DS3 TX Failure	: NO	NO	NO	NO

Press CONTROL-A For Assistance

Figure 15. Display D3LX Status

VIEWING LOOPBACK STATUS AND PERFORMING LOOPBACK COMMANDS

Use this procedure to view loopbacks and send loopback commands for a specific D3LX system.

- 1 From the Main menu, select 6. System Maintenance.
- 2 From the System Maintenance menu, select 4. Loopback Status Commands.
- 3 From the Loopback Status/Commands menu, select 1. High/Low Speed Loopback Status/Commands (as shown in Figure 16) to view the status of current loopbacks and to enable new loopback tests for low-speed modules and their associated components.
- 4 Use **SPACEBAR**, **←**, **→**, **↓**, and **↑** to select the group and slot to display, populate each data field according to your requirements, then assign the selections by pressing **ENTER**.

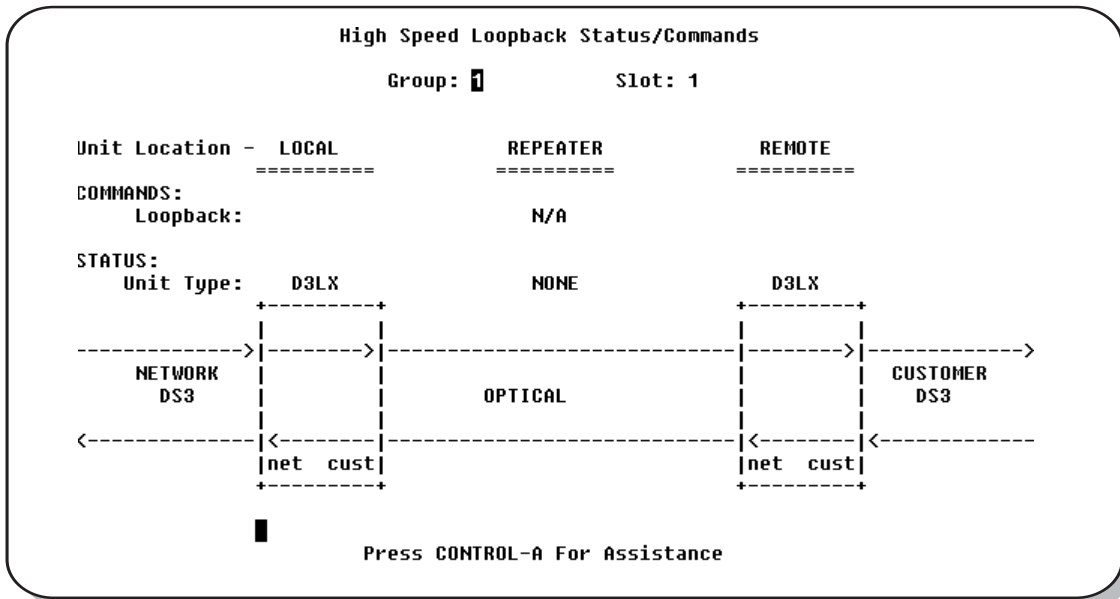
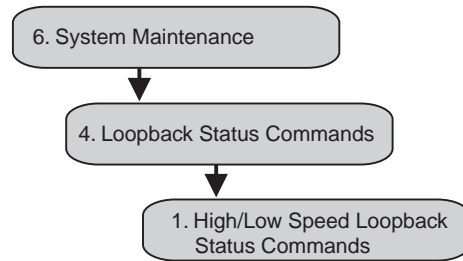


Figure 16. Loopback Status and Commands

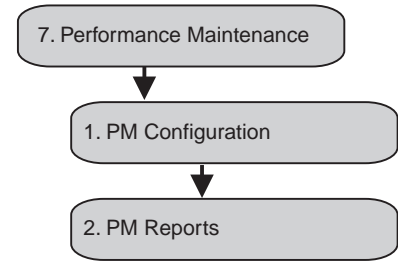
PERFORMANCE MONITORING

Use this procedure to monitor the performance of modules on both the near and far end of D3LX systems.

- 1 From the Main menu, select 7. Performance Monitoring.
- 2 From the Performance Monitoring menu, select DS3/E3 PM Configuration (as shown in Figure 17).
- 3 In PM Reports, select DS3/E3 Far End PM Configuration.

To change the type of report, select the Group and Circuit, then select Local or Remote, 15 Minute, Daily, or Summary.

- 4 Use **SPACEBAR**, **←**, **→**, **↓**, and **↑** to select the group and slot to display, populate each data field according to your requirements, then assign the selections by pressing **ENTER**.



DS3/E3 PERFORMANCE MONITORING CONFIGURATION

Group: 1 Circuit: 1 Circuit ID:

DS3	15 MINUTE			DAILY			OPTICAL	15 MINUTE			DAILY		
MON	=====			=====			MON	=====			=====		
TYPE	THRSH	ALM	LUL	THRSH	ALM	LUL	TYPE	THRSH	ALM	LUL	THRSH	ALM	LUL
=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
CUL							CUL						
ESL							ESL						
SESL							SESL						
_OSS							LOF						
							UASL						
							AISSL						

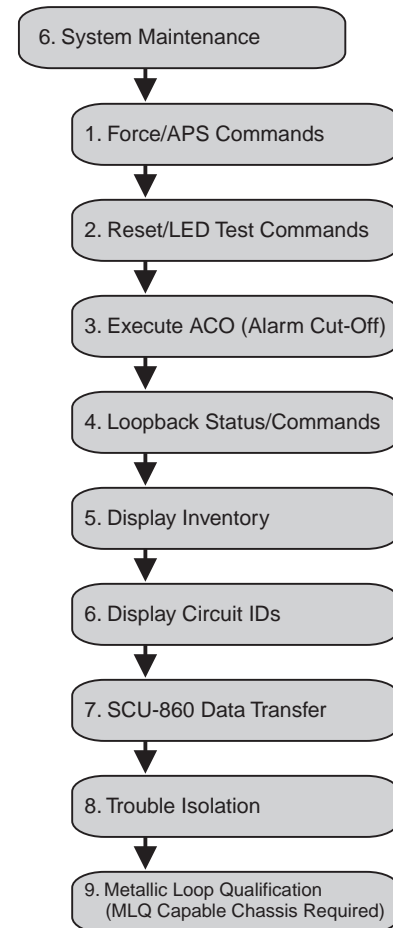
Press **CONTROL-A** For Assistance, **CONTROL-C** To Clear All PM Counts

Figure 17. Performance Monitoring Menu–DS3/E3 PM Configuration Shown

PERFORMING SYSTEM MAINTENANCE

Use this procedure to perform the system maintenance commands listed.

- 1 From the Main menu, select 6. System Maintenance.
- 2 From the System Maintenance menu, select
 - 1. Force/APS Commands, and then select 1. Commands for Optical Facilities to view and force line protection for the available circuits,
 - 2. Reset/LED Test Commands to reset the selected D3LX module or verify that its LEDs are working properly,
 - 4. Loopback Status Commands, and then select 1, High/Low Speed Loopback Status/Commands to view the loopback status or perform loopbacks on the selected D3LX, or
 - 8. Trouble Isolation (as shown in [Figure 18 on page 31](#)), and then select the Group and Slot.
- 3 Use **SPACEBAR**, **←**, **→**, **↓**, and **↑** to select the group and slot to display, populate each data field according to your requirements, then assign the selections by pressing **ENTER**.



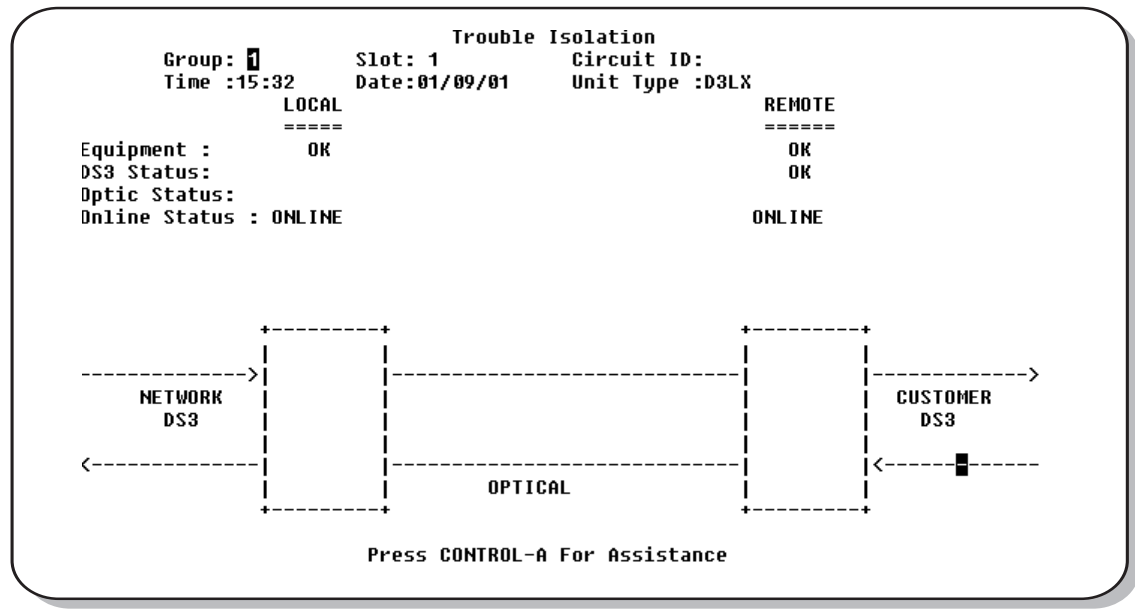


Figure 18. System Maintenance–Trouble Isolation Screen Shown

LOGGING OFF

To log off from anywhere on the system during a Telnet session, press **CTRL + D**.

REMOVING D3LX MODULES

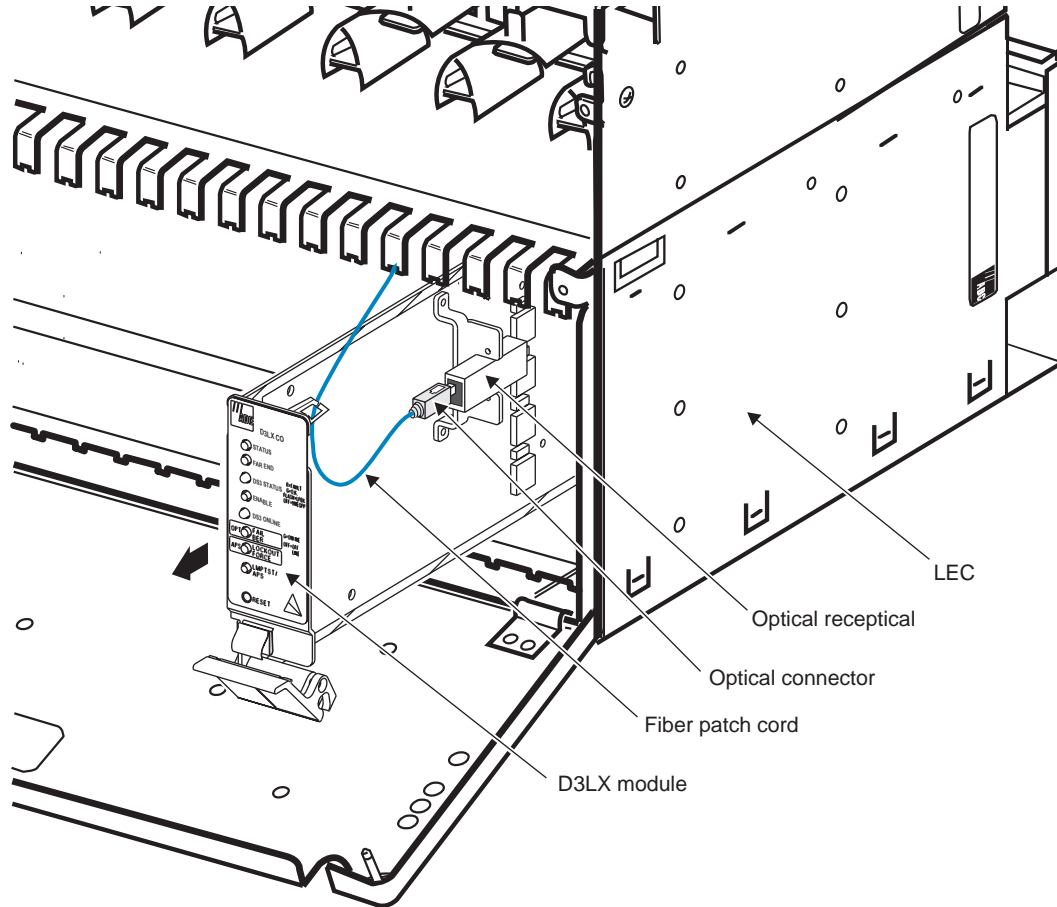


Figure 19. Removing a D3LX Module—D3LX CO Shown



Do not look into the ends of any optical fiber or into any plug-in module connector. Exposure to invisible laser radiation may cause permanent eye damage. A meter should be used to verify active fibers.

- 1 For SC-type connectors: pull down on the retaining latch and withdraw the unit halfway out of the chassis while preventing the fiber-optic cord from binding. Release the fiber-optic patch cord from the optical receptacle by gently pulling back on the locking mechanism and remove the cord as shown in [Figure 19](#).
- 2 For FC-type connectors: unscrew the threaded cap counterclockwise and withdraw the unit halfway out of the chassis while preventing the fiber-optic cord from binding.
- 3 Replace the protective cap on the optical connector located on the circuit board.

REMOTE CONFIGURATION

Use the D3RCAM craft interface system menu to view or edit the configuration for each D3LX RMT module in the chassis. This menu can also be used to equip, provision, assign thresholds, and assign service state. The D3RCAM Configuration menu is shown in [Figure 22 on page 34](#).

- 1 Connect a maintenance terminal to the craft port on the D3RCAM front panel. Logon to the craft interface system as described in “[Connecting a Maintenance Terminal to the D3RCAM Craft Port](#)” on page 20.

The Main Menu appears, as shown in [Figure 20](#). If the Main Menu does not appear, check the terminal communication parameters (or computer software interface) and retry this procedure.

```
Welcome to REMOTE CRAFT ACCESS MODULE Version 1.0
(C) Copyright 2000 - 2001 ADC Telecommunications, Inc.

REMOTE TERMINAL MAIN MENU

1. Alarms
2. Display Status
3. Unit Configuration
4. System Date/time
5. System Maintenance

Display Active Alarms, Alarm Summary, Alarm History, Clear Alarm History_
Press CONTROL-A For Assistance
```

Figure 20. D3RCAM Craft Interface Main Menu

D3RCAM MENU

The D3RCAM Main Menu (as shown in Figure 21) displays following configuration options:

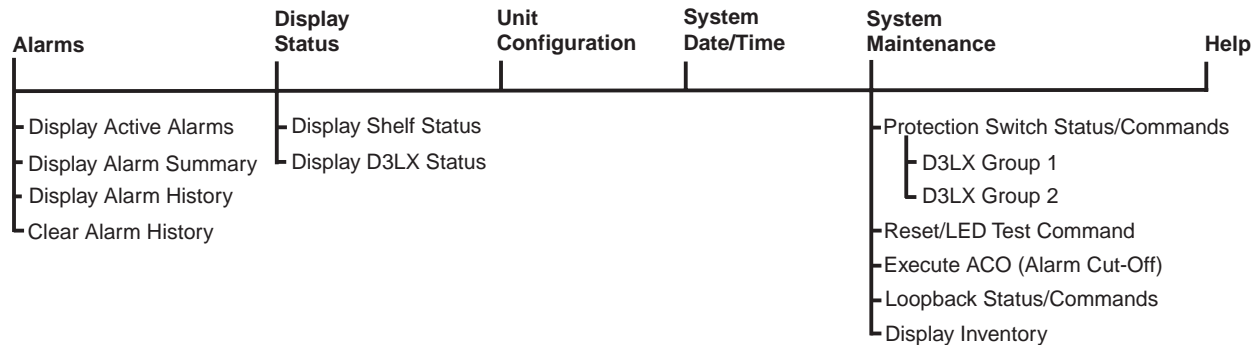


Figure 21. D3RCAM Menu Tree

UNIT CONFIGURATION

Use this procedure to configure each D3LX RMT module installed in the remote chassis. Refer to your work order for configuration settings.



Please note that it is not necessary to configure each card in a working and protect system. Both working and protect cards are provisioned at the same time. Provisioning can be done from either the CO or remote end.

Additionally, configuration must be done prior to testing an D3LX circuit from the remote end.

```

UNIT CONFIGURATION

Group: 1                SLOT: 1

Unit Equip State      : EQUIPPED      Optical Service State   : IS
Unit Service State    : IS            Optical BER Alarm Thresh: 1E-8
Unit Protect State    : PROTECTED     Optical BER Switch Thresh: 1E-6
D33 Provisioned      : YES            D33 Remote LBO         : 0-225 FT.
D33 Service State    : ENABLED      D33 Local LBO          : 0-225 FT.

Press CONTROL-A For Assistance
    
```

Figure 22. Unit Configuration Screen

- 1 From the Main menu, select **3. Unit Configuration**.
- 2 Within the Unit Configuration screen (see [Figure 22 on page 34](#)), select the Group number that corresponds to the D3LX circuit you want to configure, based on the module's position in the remote unit.
- 3 Select each field parameter and move from field to field as shown in [Table 7](#). Assign the selections by pressing **ENTER**.



Leave Unit Service State field set to OOS (Out of Service) until the Unit Equip State has been set. This prevents false alarms. Set the Unit Service State to IS (In Service).

- 4 Repeat Steps 1 and 2 for each D3LX RMT system installed in the chassis.

Table 7. Unit Configuration Fields—D3RCAM Version 1.0 or later

Field Name	Type	Options	Description	Default
Unit Equip State	Toggle	EQUIPPED	Establishes communication with D3RCAM. Module must be set to EQUIPPED before remaining selections are allowed.	UNEQUIPPED
		UNEQUIPPED	No communication with D3RCAM.	
Unit Service State	Toggle	IN SERVICE	Places the unit in service and allows equipment alarm reporting by the D3RCAM. Must be set to IS for reporting of equipment alarms.	OOS
		OUT OF SERVICE	Removes unit from service and stops equipment alarm reporting by the D3RCAM.	
Unit Protect State	Toggle	PROTECTED	Line protection	Unprotected
		UNPROTECTED	No protection	
DS3 Provisioned	Toggle	YES	Brings up DS3 default settings and allows configuration changes.	NO
		NO	No configuration changes allowed.	
DS3 Service State	Toggle	IN SERVICE	Select IS after completing the remaining configurations.	OOS
		OUT OF SERVICE	Leave this field at OUT OF SERVICE (versus IN SERVICE) at this time to avoid undesirable reporting of alarms.	
Optical Service State	Toggle	IN SERVICE	Places facility in service and enables T3 alarm reporting by the D3LX RMT.	OOS
		OUT OF SERVICE	Removes facility from service and stops T3 alarm reporting by the D3LX RMT.	
Optical BER Alarm Threshold	Toggle	Set to OFF or set between 10^{-6} and 10^{-10}	The average Bit Error Ratios of both the incoming optical signals are monitored by the D3LX RMT. By monitoring BERs, the D3LX CO is capable of triggering a minor alarm when any of the monitored signals degrades below the BER threshold level.	10^{-8}
Optical BER Switch Threshold	Toggle	Range from 10^{-4} to 10^{-10}	Sets the threshold at which the APS will be executed.	10^{-6}
DS3 Remote LBO	Toggle	0–225 ft., 226–450 ft.	The DS3 signal output provides standard DSX signal levels which can be compensated for at various distances, such as cable length.	0–225 ft.
DS3 Local LBO	Toggle	0–225 ft., 226–450 ft.	The DS3 signal output provides standard DSX signal levels which can be compensated for at various distances, such as cable length.	0–225 ft.

TROUBLESHOOTING

Before the system tests are started, the fiber-optic network and DS3 lines at both ends must be connected. The STATUS and DS3 ONLINE LEDs should be illuminated green.

Table 8 is intended as an aid in localizing trouble. If trouble is encountered with the operation of the D3LX, verify that all installer connections are correct and that the options are configured properly. If technical assistance is required, refer to “Appendix C - Product Support” on page 41. ADC strongly recommends that no internal (component level) repairs be attempted on the module. The only field service should be a fuse or module replacement. Any unauthorized adjustments or repairs may void the unit’s warranty.

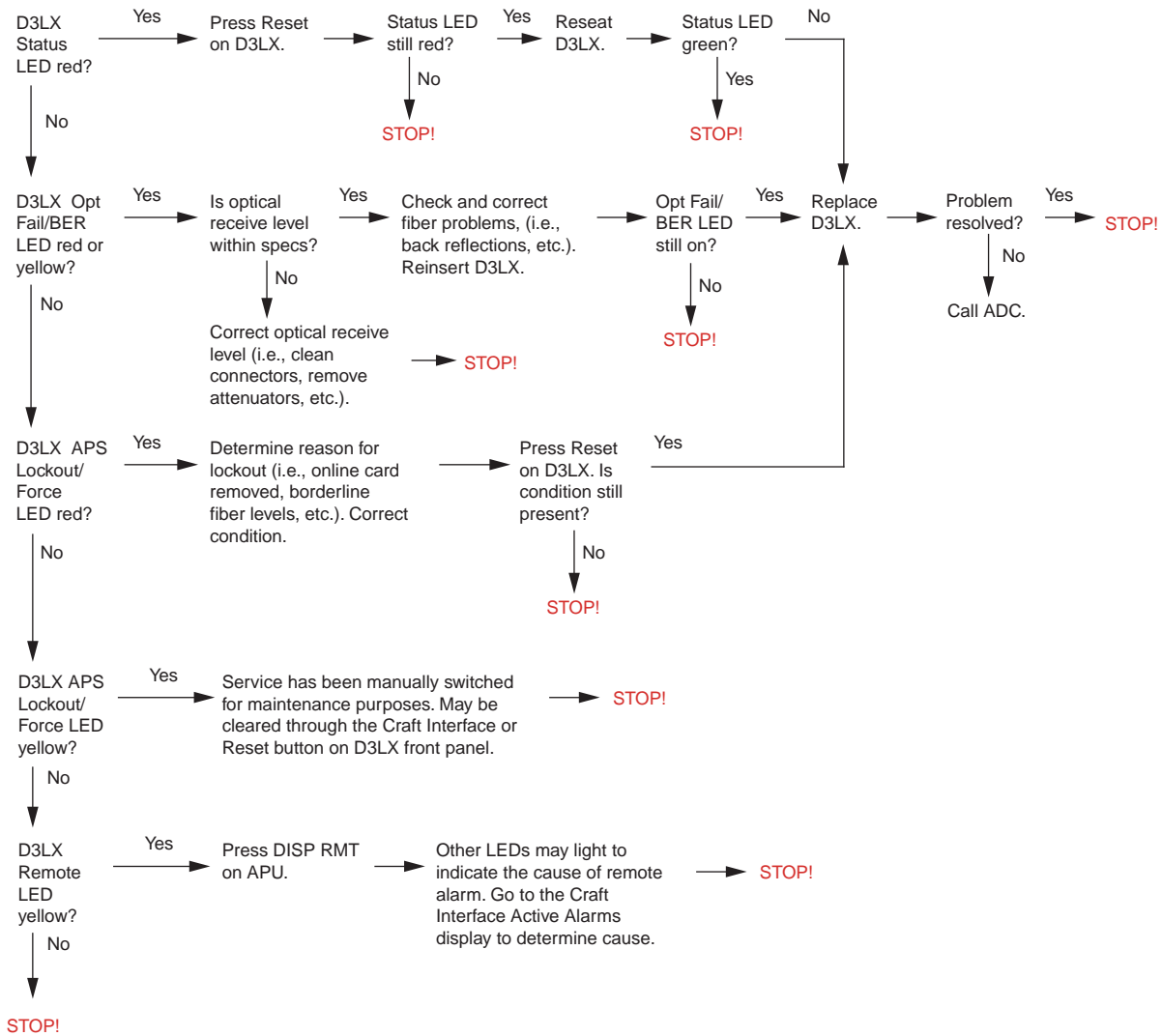


Table 8. Troubleshooting

APPENDIX A - SPECIFICATIONS

Table 9. D3LX Module Specifications

Parameter	Specifications	Remarks
DS3		
Input Frequency	44.736 Mbps	
Input Level	+5.7 dBm to -7.3 dBm	
Interface Standard	DSX-3 Bipolar	
Output Signal	Within DSX-3 template 0 to 225, 226 to 450 ft.	
Line Buildout - Software selectable Input/ Output Impedance	75Ω ± 5%	
Power		
Consumption/Dissipation	6W	
Supply Voltage	-42.0 to -56.0 Vdc	
Supply Current	110 mA typical @ -48V 125 mA max. @ -48V	
Optical		
Fiber Cable	9/125 μm single-mode	Nominal
Transmit Wavelength		
D3LX CO	1550 nm ± 40 nm	
D3LX RMT	1310 nm ± 40 nm	
Optical Connector	SC or FC	Per catalog number
Transmit Device	Laser	
Receive Device	PIN Photodiode	
Transmit Power	-7 dBm ± 2 dBm	Average Power
Receive Dynamic Range	-5 dBm to -23 dBm	
Minimum Optical Budget	13 dB	
BER Threshold for Protection Switching	8.5×10^{-4} to 1×10^{-10}	Software selectable threshold
BER Threshold for Minor Alarm	1×10^{-4} to 1×10^{-10}	Software selectable threshold
Dimensions		
Size (H x W x D)	4.4 x 1.4 x 9.2 in. (11.2 x 3.6 x 23.4 cm)	
Weight	1.0 lb (.45 kg)	Each module
Environmental		
Operating Temperature	-40°C to +65°C (-40°F to + 149°F)	
Storage Temperature	-40°C to +80°C (-40°F to + 176°F)	
Operating Humidity	5% to 95%	No condensation
Storage Humidity	5% to 95%	No condensation

D3LX CARD-EDGE CONNECTOR

Figure 23 shows the pin assignments of the card-edge connector on the D3LX card. Active pins are highlighted in black.

-48 VDC B	■	CHASSIS GND	■	-48 VDC RTNB	■	32
	□		■	ACOSWITCH	■	31
	□	AMAJ	■	AMIN	■	30
	□	VMAL	■	VMIN	■	29
	□	GND	■	REMA LM	■	28
	□		□		□	27
	□		□		□	26
DS3RXRING2	■		□		□	25
DS3RXTIP2	■		□		□	24
DS3RXRING1	■		□		□	23
DS3RXTIP1	■		□		□	22
	□	DS3RXRING2	■		□	21
	□	DS3RXTIP2	■		□	20
	□	DS3RXRING1	■		□	19
	□	DS3RXTIP1	■		□	18
	□		□		□	17
TXMATECOMDAT	■	TXMATECOMDAT	■	HSKPB	■	16
TXMATECOMCLK	■	TXMATECOMCLK	■	DISPLAYREM	■	15
GND	■	GND	■	GND	■	14
	□		□	MPUCLKIN	■	13
	□		□	MPUCLKIN	■	12
	□		□		□	11
	□		□		□	10
	□		□		□	9
	□		□		□	8
GND	■	GND	■	GND	■	7
MPUDATOUT	■	MPUDATIN	■	MATEBRDFAIL	■	6
MPUDATOUT	■	MPUDATIN	■	MYBRDFAIL	■	5
MPUFAIL	■		□		□	4
SLOTADD3	■	SLOTADD4	■	TESTLED	■	3
SLOTADD0	■	SLOTADD1	■	SLOTADD2	■	2
-48 VDC RTNA	■	GND	■	-48 VDC A	■	1
	A		B		C	

Figure 23. D3LX Card-Edge Connector

APPENDIX B - CLEANING AND MATING FIBER-OPTIC SYSTEMS

The performance of a fiber-optic system is mainly dependent on the fiber-optic connector cleaning procedures performed before installation. Clean all connectors and adapters before making any connections.

CLEANING

1 Assemble the required cleaning materials shown in [Figure 24](#):

- Lint-free laboratory wipes
- Cotton tipped swabs
- Isopropyl alcohol in a pressurized dispenser
- Lint-free pipe cleaners
- Clean, dry, oil-free compressed air

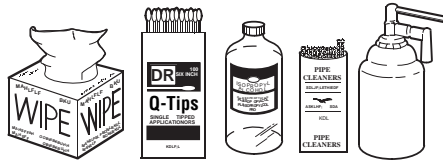


Figure 24. Cleaning Materials

2 Clean connectors as follows:

- a Moisten a lint-free wipe with alcohol and then wipe completely around the connector ferrule twice; wipe several times across the tip.
- b Use a lint-free dry wipe to wipe completely around the connector ferrule twice; wipe several times across the tip.
- c Blow across the end of the ferrule with clean, dry, compressed air.
- d Visually inspect the connector tip for cleanliness. If the tip does not appear to be thoroughly cleaned, repeat [Step a](#) through [Step c](#).

3 Clean adapters as follows:

- a SC and FC adapters are cleaned by using a pipe cleaner moistened with alcohol. Insert the pipe cleaner into either end of the adapter and rotate so the inside surface of the adapter is wiped by the pipe cleaner. Repeat this procedure for the opposite end.
- b Blow the adapter dry with clean compressed air.

4 Clean attenuators with clean, dry compressed air only. Do not use a moistened wipe or pipe cleaner.

MATING

Mate the SC and FC connectors by inserting the connector into the adapter and aligning the connector key with the adapter key slot as follows:

- **FC connectors**—Align the housing key with the slot in the adapter. Push the connector into the adapter and screw the threaded cap clockwise onto the adapter to complete the connection.
- **SC connector**—Align the housing key with the slot in the adapter. Push the connector into the adapter until a click is heard/felt, indicating that the latching system is engaged. When connector is fully engaged, the white stripes on the sides of the connector housing should be hidden inside the adapter.

APPENDIX C - PRODUCT SUPPORT

ADC Customer Service Group provides expert pre-sales and post-sales support and training for all its products. Technical support is available 24 hours a day, 7 days a week by contacting the ADC Technical Assistance Center.

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Fax: 952.917.3237

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- ADC Return Material Authorization (RMA) number and instructions must be obtained before returning products.

All telephone numbers with an 800 prefix are toll-free in the USA and Canada.

APPENDIX D - ABBREVIATIONS

A

APS: Automatic Protection Switching

APU: Alarm Processing Unit

ATM: Asynchronous Transport Mode

B

BER: Bit Error Rate

BNC: Bayonet-Locking Connector

C

CO: Central Office

CPE: Customer Premises Equipment

D

DCE: Data Communication Equipment

DTE: Data Terminal Equipment

E

ESD: Electrostatic Discharge

I

IS: In Service

L

LBO: Line Build Out

LEC: Loop Extender Chassis

LMPTST: Lamp Test

LOF: Loss-Of-Frame

O

OOS: Out-Of-Service

S

SCU: Soneplex Controller Unit

SMDS: Switched Multimegabit Data Service

W

WDM: Wavelength Division Multiplexing

CERTIFICATION AND WARRANTY

FCC CLASS A COMPLIANCE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

LIMITED WARRANTY

ADC DSL Systems, Incorporated ("ADC") warrants that, for a period of sixty (60) months from the date of shipment, the hardware portion of its products will be free of material defects and faulty workmanship under normal use. ADC's obligation, under this warranty, is limited to replacing or repairing, at ADC's option, any such hardware product which is returned during the 60-month warranty period per ADC's instructions and which product is confirmed by ADC not to comply with the foregoing warranty.

ADC warrants that, for a period of 90 days from the date of purchase, the software furnished with its products will operate substantially in accordance with the ADC published specifications and documentation for such software. ADC's entire liability for software that does not comply with the foregoing warranty and is reported to ADC during the 90-day warranty period is, at ADC's option, either (a) return of the price paid or (b) repair or replace of the software. ADC also warrants that, for a period of thirty (30) days from the date of purchase, the media on which software is stored will be free from material defects under normal use. ADC will replace defective media at no charge if it is returned to ADC during the 30-day warranty period along with proof of the date of shipment.

The transportation charges for shipment of returned products to ADC will be prepaid by the Buyer. ADC will pay transportation charges for shipment of replacement products to Buyer, unless no trouble is found (NTF), in which case the Buyer will pay transportation charges.

ADC may use reconditioned parts for such repair or replacement. This warranty *does not* apply to any product which has been repaired, worked upon, or altered by persons not authorized by ADC or in ADC's sole judgment has been subjected to misuse, accident, fire or other casualty, or operation beyond its design range.

Repaired products have a 90-day warranty, or until the end of the original warranty period—whichever period is greater.

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MODIFICATIONS

Any changes or modifications made to this device that are not expressly approved by ADC DSL Systems, Inc. voids the user's warranty.

All wiring external to the products should follow the provisions of the current edition of the National Electrical Code.

STANDARDS COMPLIANCE

This equipment has been tested and verified to comply with the applicable sections of the following standards:

- GR 63-CORE - Network Equipment-Building System (NEBS) Requirements (D3LX CO only)
- GR 1089-CORE - Electromagnetic Compatibility and Electrical Safety (D3LX CO only)
- UL-1459 and CSA-C22.2, 225-M90: Telecommunications Equipment Electronic and Electrical Safety

For technical assistance, refer to ["Appendix C - Product Support"](#) on page 41.

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