Lucent Technologies
Bell Labs Innovations

Optical Networking

Optical Line System (OLS) & Optical Translator (OT)

Releases 1.0 through 2.1

Installation Manual

Notice

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Federal Communications Commission (FCC) Notification and Repair Information[1]

NOTE: This equipment is designed 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 instructions manual, may cause interference to radio communications. Operation of this equipment in a residence is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

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In rare instances, unauthorized individuals make connections to the telecommunications network. In such an event, applicable tariffs require that the customer pay all network charges for traffic. Lucent Technologies Inc. cannot be responsible for such charges and will not make any allowance or give any credit for charges that result from unauthorized access.

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The Lucent Technologies Regional Technical Assistance Center (RTAC) provides a technical assistance telephone number that is monitored 24 hours a day. For technical assistance, call 1-800-225-RTAC.

This document was developed by the Lightwave Customer Technical Support Organization (CTS).

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1. Language of statute.

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Document Title: **Optical Networking -Optical Line System (OLS) & Optical Translator (OT) Installation Manual.**

Lucent Technologies Document Number: **365-575-320** Issue Number: **2.1B** Publication Date: **February 1998**

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About this Document

Purpose

This manual provides instructions for installation, turn-up and testing of the Optical Line System (OLS) and the Optical Translator (OT).

This manual is not a service manual. Refer to 365-575-331, Optical Line System (OLS) User/Service Manual, or 365-575-401, Optical Translator (OT) User/Service Manual, for any activity involving circuit turn-up, regular maintenance, or trouble analysis. Refer to 824-102-176, Optical Line System (OLS) Operations Systems Engineering Guide or for any activity using X.25 (TL-1 commands).

Intended Audience

This installation manual is for personnel who will install Optical Line System equipment. It emphasizes Release 2.1 practices and procedures.

It is also intended for personnel who will install Optical Translator equipment and emphasizes Release 1.0 practices and procedures for that product.

Reason for Reissue

- Combination of Optical Line System Installation Manual and Optical Translator Installation Manual into one Integrated Optical Networking Installation Manual.

- Inclusion of Release 2.1 Optical Line System information and new CenterLink Management Console (CMC). Added to this document are the Dual Facing Shelf Configuration for 2 fiber systems, SDH options, Single OA

configurations, 16 wavelength applications, Quad Optical Translator Units, Optical Translator Port Modules, multiple bit rates and other features added for this point release.

How to Use this Manual

This manual is divided into several sections. The sections are numbered in the order in which they are to be performed. This manual is intended ONLY for use in a central office environment in Network Equipment Building System (NEBS) installations and for installation and testing performed prior to turnover to central office personnel.

The sections in this document provide the following information:

■   "About this Document" describes the purpose, intended audience, and organization of this document. Ordering information and procedures to comment on this document are included.

■   Section 1, "Overall Installation and Test Considerations", provides a list of required tools and test equipment for OLS and OT equipment installation and testing, gives a description of requirements for the Personal Computer to be used as the CenterLink Management Console (CMC), presents safety information, and gives a list of other related documentation. Training, security, and technical support information is also presented.

■   Section 2, "Platform Descriptions", introduces the OLS platforms and describes the OLS cabinet. Also introduced are the OT platforms, cabinet and miscellaneous mount option.

■   Section 3, "System Installation Planning", discusses system and network level installation and testing issues.

■   Section 4, "Equipment Installation", describes how to uncrate and erect OLS and OT cabinets and miscellaneous mount installation for OLS and OT equipment.

■   Section 5, "Power Cable Installation", provides information about power cables related to OLS and OT and describes how to install the power cables.

■   Section 6, "Wired Cable Installation", provides information about wired cables related to OLS and OT and describes how to install the wired cables including the Interconnection Panel, Office Alarms, Serial, Parallel & X.25 Telemetry cables, CMC DTE cables, Line & Section Orderwire, Section User Channel cables, Miscellaneous Mount Intershelf wiring and Miscellaneous Discrete cables.

■   Section 7, "OLS and OT Installation" describes the Fiber Installation procedures for OT and OLS 1A-TX, 1A-RCV, Repeaters, and Dual Facing Shelf applications, SIngle Optical Amplifier applications as well as Circuit Pack Installation.

■ Section 8, "Powering", provides procedures for verifying cabinet/shelf ground and powering the cabinet/shelf for both the OLS and OT.

■ Section 9, "OLS Network Element Start-up And Provisioning", provides procedures for installing circuit packs in the cabinet/shelf, for installing software and logging into the OLS, and for entering basic provisioning information so that alarms will clear when all end-to-end fiber connections are correctly made.

■ Section 10, "OLS and OT Local Installation Testing", describes how to perform OLS and OT Auto Turnup tests at end terminals, Repeater, Dual Facing Shelves and Dual Bay stations. These tests are self tests available in the Network Element Software. Tests of cabling and Operations Systems interfaces are also described.

■ Section 11, "OLS System Fiber Connections"' describes how to establish the OLS system. General information of Lightwave jumpers and optical Line BuildOuts for quick references is given.

■ Section 12, "Connecting OC-48 Systems to OLS", describes fiber jumper installation and testing between OC-48 Systems and the OLS End Terminal equipment.

■ Section 13, "OLS Troubleshooting", provides guidelines for troubleshooting an out-of-service system during initial start-up.

■ Appendix A, "LBO Selection Tables"' provides the Release 1.0 and 2.0 LBO selection tables for installing OLS/OT/OC-48 networks.

■ Appendix B, "Pin Replacement", describes how to repair backplane pins that need to be replaced.

■ Appendix C, "Fiber Cleaning", describes how to clean the optical connectors.

■ Appendix D, "Dantel Alarm Control Block Installation - Extended Miscellaneous Discretes", describes how to install the Dantel Alarm Control Block for use with the extended miscellaneous discretes feature.

■ Appendix E, "Harris C-1000 Centurion Installation - Extended Miscellaneous Discretes", describes how to install the Harris C-1000 Centurion for use with the extended miscellaneous discretes feature.

■ Appendix F, "CenterLink Management Console", describes the setup and use of the new Centerlink Management Console (CMC) for use with the OLS.

■ Appendix G, "Related Equipment", describes the Dantel Orderwire use and connections with the OLS.

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RBOC/BOC	Process through your Company Documentation Coordinator	

* For commercial customers, a check, money order, purchase order number, or charge card number is required with all orders. Make checks payable to Lucent Technologies.

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How to Comment on This Document

This manual was developed by the Lightwave Customer Technical Support (CTS). The CTS welcomes your comments. A feedback form is located immediately after the title page of this document. Please fill out the form and fax it to 978-960-1665.

If the feedback form is missing, fax your comments on this document to 978-960-1665.

Overall Installation and Test Considerations

1

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Overall Installation and Test Considerations

1

Overview

This section presents: a list of required tools and test equipment for installation of OLS cabinets or shelves and OT cabinet or shelves, requirements of the Personal Computer to be used as a CenterLink Management Console, safety instructions including lightwave safety and ESD considerations, lists of OLS documents and drawings, a list of documents for related Lucent Technologies equipment, information on training available, OLS system security features, and Technical Support functions.

Information generic to both products is covered first, followed by a section specific to each product.

Required Tools and Test Equipment

Table 1, "Required Tools and Test Equipment for Both Products," on page 2, lists the tools, test sets, and accessories required for installation of *both* the OT and OLS Equipment.

Table 2, "Required Tools and Test Equipment for OLS Only," on page 2, lists tools, test sets, and accessories required for installation of OLS equipment *only*.

Table 3, "Required Tools and Test Equipment for OT Only," on page 3, lists tools, test sets, and accessories required for installation of OT equipment *only*.

Table 1-1. Required Tools and Test Equipment for Both Products

Description	Commercial or COMCODE	Lucent Technologies Installers Only	Notes
Multimeter	Fluke 8060A	ITE #5632 or ITE #6379A	For measuring 40-60 V DC and ground continuity
Anti-oxidation Material	NO-OX-ID "A" Compound	NO-OX-ID "A" Compound	Only if cabinet or shelf has been scraped to make ground connection
ESD wrist strap	900486994	R TOOL #4987B	For ESD protection
Single Mode Fiber jumpers with appropriate connectors (2 jumpers needed)	107306243 (MS1EP-EP-02)	107306243 (MS1EP-EP-02)	For optical local tests. (Minimum 2 ft. length) with yellow cladding
CLETOP Reel Type A			For fiber cleaning.
CLETOP Stick Type			Refer to Appendix C for more details.
Optical power meter with appropriate connectors	HP8140A equipped with HP81401A	ITE #6550	For optical power measurements
Metral Pin Repair Kit (optional, as required)	BERG MT370-01 Kit		For replacing any damaged METRAL pins Refer to Appendix B for more details.
Insertion/Extraction Tool Kit (optional, as required)	AMP 91261-1		For replacing ACTION PIN contacts in AMPLIMITE HDP-20 connectors (d-sub connectors)

Table 1-2. Required Tools and Test Equipment for OLS Only

Description	Commercial or COMCODE	Lucent Technologies Installers Only	Notes
Multi Mode Fiber jumpers with appropriate connectors (2 jumpers for end terminals and 4 jumpers at repeaters)	105618755 (FA1E-E-02)	105618755 (FA1E-E-02)	For optical local tests. (Minimum 2 ft. length) 50 mm fiber with orange cladding

Table 1-2. Required Tools and Test Equipment for OLS Only

Description	Commercial or COMCODE	Lucent Technologies Installers Only	Notes
Single Mode 33 dB Attenu-ated Fiber jumpers with appropriate connectors (2 jumpers for end terminals and 4 jumpers at repeaters)	847265451 (F93AK8573)	847265451 (F93AK8573)	For optical local tests.
Personal Computer	See "Personal Com-puter for Use as Center-Link Management Console" on page 1-16.	ITE #6795 LIST 2 or ITE #6938	For use as CMC on DCE port
Straight through RS-232 cable 25 pin to 25 pin OR 25 pin to 9 pin depending on the PC serial port	Black Box Corp. RM-BC00301 OR RM-BC00401	Part of ITE #6795 LIST 2 or ITE #6938	For providing the connection between the PC (25 or 9 pin) and OLS (25 pin)
Shorting Contact Insertion Tool	Berg Electronics 409298-001		For replacing Metral shorting con-tacts
Null Modem Adapter	Black Box Corp. RM-ME202	Black Box Corp. RM-ME202	For testing DTE port

Table 1-3. Required Tools and Test Equipment for OT Only

Description	Commercial or COMCODE	Lucent Technologies Installers Only	Notes
A Sonet Frame OC-48 Signal	May be obtained from any OC-48 incoming signal. Also available from Tektronix ST2400 with option 12.	ITE 7089 (If Required)	For testing output of OTUs
Wire Wrap Tool with bit for 26 Gauge wire.			For wire wrapping miscellaneous discrete cables from OT to the Dantel or Harris EMDU.
ST to ST Fiber Optic Cou-pling (2 needed)	105271142 (C3000A-2)	105271142 (C3000A-2)	

Additional Tools And Test Equipment

Refer to Appendix B for backplane pin repair tool information and Appendix C for optical connector cleaning information.

Safety Instructions

Admonishments

This manual contains admonishments in the form of DANGERS, WARNINGS, and CAUTIONS. These admonishments, listed in order of priority, have the following definitions:

■   Danger shows the presence of a hazard that will cause death or severe personal injury if the hazard is not avoided.

■   Warning shows the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.

■   Caution shows the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided. Caution is also used for property-damage-only accidents. This includes equipment damage, loss of software, or service interruption.

These admonishments are noted by an alert symbol ⚠ .

IMPORTANT SAFETY INSTRUCTIONS

READ AND UNDERSTAND ALL INSTRUCTIONS.

When using this telecommunication equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

(1) Follow all warnings and instructions marked on the product.

(2) Slots and openings in this product at the back or bottom are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered.

(3) Opening or removing rear covers or sheet-metal parts may present exposure to high current or electrical energy levels, or to other risks.

(4) Never push objects of any kind into this product through slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock. Never spill liquid of any kind on the product.

(5) Refer servicing to qualified service personnel.

(6) Use caution when installing and modifying telecommunications lines.

(7) Never install telecommunication wiring during a lightning storm.

(8) Never install telecommunication jacks in wet locations unless the jack is specifically designed for wet locations.

(9) Never touch uninsulated telecommunication wires or terminals unless the telecommunication line has been disconnected at the network interface.

(10) Installation must include an independent frame ground conductor to building ground. Grounding/bonding circuit continuity is vital for safe operation of this equipment. Never operate with grounding/bonding conductor disconnected.

(11) This product has two -48V DC input power feeders. Disconnecting one power feeder will not de-energize the product. To reduce the risk of injury, disconnect the two power supply cables when removing power from the system.

(12) Metallic telecommunication interfaces should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection, as applicable.

(13) For continued protection against risk of fire, replace only with same type and rating of fuse.

(14) Use only Lucent Technologies manufactured, recognized circuit packs.

SAVE THESE INSTRUCTIONS.

Lightwave Safety

Lucent Technologies Lightwave digital transmission systems and associated optical test sets use semiconductor laser transmitters. The lasers emit lightwaves, at or near infrared wavelengths, into lightguide cables. This light is at the red end of the visible spectrum. Direct exposure at close distances should be avoided.

⚠ WARNING:
Never view any unterminated optical connector with optical instruments other than indirect image-converting devices such as the FIND-R-SCOPE[1]. Viewing optics tend to focus the energy from an optical connector and, hence, increase the potential risk for injury.

Lasers and laser products are subject to federal and state regulations as well as Lucent Technologies laser safety requirements. The OLS uses a Class I or Class IIIb laser as a transmitter. Under normal operation, the system is totally enclosed and fully protected by devices such that it presents no hazards to safety or health. Each system has been certified and registered with the National Center for Devices and Radiological Health (NCDRH) under the U.S. Food and Drug

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1. Registered trademark of F. J. W. Industries, Inc.

Administration (FDA) as a Class I system (exempt lasers and laser systems). All sections of the OLS that can be removed and allow potential access to laser radiation have been identified. A warning label is provided on the rear of the shelf.

In addition, a compliance label stating that the system has been certified, along with the manufacturer's name and place of manufacture, is attached to each equipment bay. Figure 1-1 shows an example of a compliance label. The compliance label is located on the rear of the equipment bays (at eye level). Several Cautions, Notices and Danger Indications are also given on the rear label, be sure to read and observe them. The text in these labels now appears in both French and English, for an international market.

Lucent Technologies
Bell Labs Innovations

OPTICAL LINE SYSTEM CABINET

J689982C-1

Lucent Technologies NETWORK SYSTEMS
1600 Osgood Street
North Andover, MA

Date Of Manufacture May Be Viewed Behind Right
Front Door Upper Right Post Of The Framework.
La date de fabrication est inscrite derriere la colonnette
superieure droite du panneau avant droit du bati.

POWER REQUIREMENTS: Two (2) -48 VDC Input Power
Lines, Each Rated 20 Amps DC.
ALIMENTATION Deux (2) entrees -48V c. c. de 20 A c. c.
chacune.

Complies With 21 CFR 1040.10 And 1040.11.
Conforme aux documents 21 CFR 1040.10 et 1040.11.

This Digital Apparatus Does Not Exceed The Class A
Limits For Radio Noise Emissions Set Out In The Radio
Interference Regulations Of The Canadian Department
Of Communications.

Cet appareil numerique n'emet pas de bruits
radioelectriques depassant les limites applicables aux
la reglement sur le brouillage radioelectrique edicte par
appareils numeriques de la Class A specifiees dans
le ministere des Communications du Canada.

This Device Complies With Part 15 Of The FCC Rules.
Operation Is Subject To The Following Two Conditions:
(1) This Device May Not Cause Harmful Interference,
And (2) This Device Must Accept Any Interference
Received, Including Interference That May Cause
Undesired Operation.

Figure 1-1 Compliance Label

Electrostatic Discharge (ESD) Considerations

⚠️ CAUTION:
Industry experience has shown that all integrated circuit packs can be damaged by static electricity that builds up on work surfaces and personnel. The static charges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static charges to accumulate. Higher potentials are measured in areas with low relative humidity, but potentials high enough to cause damage can occur anywhere.

Observe the following precautions when handling circuit packs to prevent damage by electrostatic discharge:

- Assume all circuit packs and units contain solid state electronic components that can be damaged by ESD.

- Wear (always) a grounded wrist strap (shown in Figure 1-2) or wear a heel strap and stand on a grounded, static-dissipating, floor mat when handling circuit packs (storing, inserting, removing, etc.) or when working on the backplane.

- Handle all circuit packs by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.

- Observe warning labels on bags and cartons. Whenever possible, do not remove circuit packs from antistatic packaging until ready to insert them into slots.

- Open (if possible) all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats.

- Store and transport (always) circuit packs in static-safe packaging.

- Keep all static-generating materials such as food wrappers, plastics, and styrofoam containers away from all circuit packs. Upon removal from bay, immediately put circuit packs into static-safe packages.

- Maintain (whenever possible) relative humidity above the 20 percent level.

- Keep the electromagnetic interference (EMI)/ESD protective front covers installed at all times except during an upgrade or maintenance procedure. Once a circuit pack is replaced in the shelf, close the front cover immediately.

To reduce the possibility of ESD damage, assemblies are equipped with grounding jacks to enable personnel to ground themselves using wrist straps while handling circuit packs or working on a shelf. The jacks for connection of wrist straps are located at the lower right-hand corner of each user panel and filter panel and at the rear of the bay. These jacks are labeled: Wrist Strap Ground.

Wrist straps should be checked periodically with a wrist strap tester to ensure that they are working properly.

To
Ground
Connection

NOTE: Alligator connection not needed when connecting directly into the OLS or OT grounding jacks.
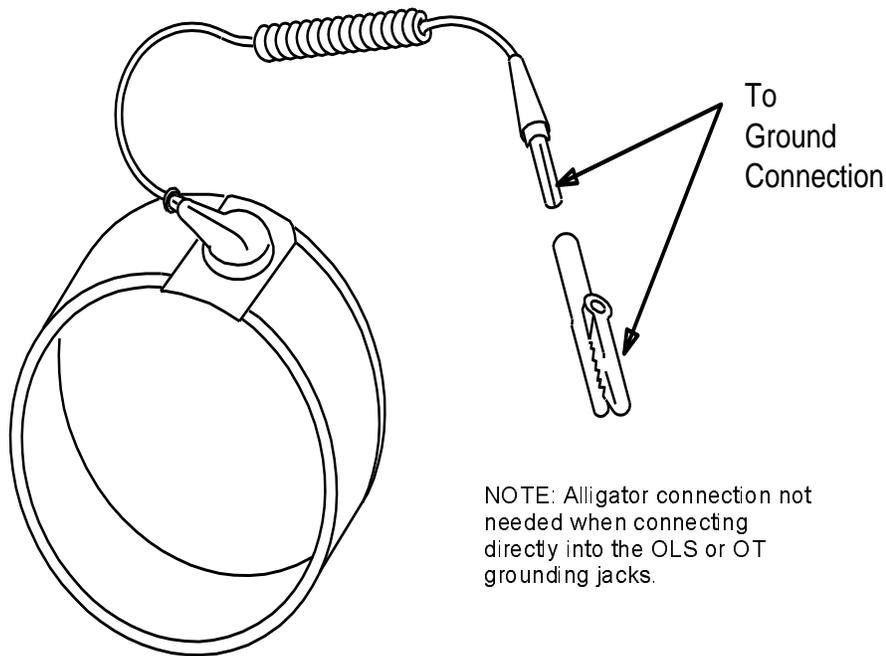
Figure 1-2 Static Control Wrist Strap

Related Documentation

OLS and OT Documentation

The following documents provide additional information about the Optical Line System:

- Number: 365-575-330

    Title: Optical Line System (OLS), Applications, Planning, and Ordering Guide

    Audience: System planners and engineers

    Content: Features, applications, general description, system planning/engineering, and ordering information

- Number: 365-575-331

    Title: Optical Line System (OLS), User/Service Manual

    Audience: End user maintenance personnel

    Content: Detailed description, technical specifications, operations and maintenance, and user interface descriptive/tutorial information

- Number: C108066382 Release 2.1.0-OLS

    Title: Optical Line System (OLS), Software Release Description

    Audience: End user maintenance personnel

    Content: Status of problems fixed, known problems, and software installation procedure for the specific software release. This Lucent Technologies document is shipped with OLS software and is not orderable from the Lucent Technologies Customer Information Center.

- Number: 824-102-201

    Title: Optical Line System (OLS) Operations Systems Engineering Guide

    Audience: Engineers

    Content: Operations systems (X.25/TL-1) engineering information for Optical Line System.

- Number: 365-575-400

    Title: Optical Translator (OT), Applications, Planning, and Ordering Guide

    Audience: System planners and engineers

    Content: Features, applications, general description, system planning/engineering, and ordering information

- Number: 365-575-401

    Title: Optical Translator (OT), User/Service Manual

    Audience: End user maintenance personnel

    Content: Detailed description, technical specifications, operations and maintenance, and user interface descriptive/tutorial information

Training

No product offering is complete without a formal training package. The National Product Training Center at Hickory Ridge in Lisle, Illinois, will provide management courses for system planning, engineering and ordering, as well as training telecommunications technicians in installation, operations, and maintenance. Suitcasing of these courses is also available. Contact the National Product Training Center on 1-800-TRA-INER (1-800-872-4637) to enroll in training classes. To arrange suitcase sessions, call the Product Training Manager on 1-800-432-6317.

The following courses are provided by the National Product Training Center:

- Number: LW2252

  Title: Optical Line System-Optical Translator (OLS-OT) Applications, Architecture, Planning and Ordering

  Audience: Facility planners, account executives, equipment engineers, private telecommunications network technical consultants and design engineers.

  Prerequisite: A basic understanding of digital fundamentals and lightwave transmission systems. Unless the student has experience on a lightwave transmission assignment, the following courses are prerequisite:

  - LW2200, Optical Networking Overview (FT-2000 OC-48 and Optical Line System)

  - TR0510, Transmission principles, self-paced (for digital fundamentals, needed before the networking overview course)

  Content: This two day course provides instruction on the product applications, features and architecture, as well as the office and network planning needed for implementation. Included is instruction and practice on ordering.

- Number: LW2652

  Title: Optical Line System Optical Translator (OLS-OT) Operation and Maintenance (Hands-On)

  Audience: This course is designed for technicians, installers, maintenance engineers, technical support personnel, product evaluators, and anyone desiring to learn operation and maintenance procedures for the Optical Line System or Optical Translator.

  Prerequisite: A background in telephony and a basic understanding of digital transmission principles is necessary. Unless the student already has experience on a lightwave transmission assignment, the following course is a prerequisite:

- TR0510, Transmission Principles (Self-Paced)

Content: This two-day training course provides the participant with practical hands-on experience with required circuit packs, provisioning appropriate options, conducting turn up and test procedures, and clearing routine cases of trouble. The student performs all of these tasks using standard documentation.

■ Number: LW2451V

Title: Optical Translator (OT) Installation

Audience: Installers and anyone desiring installation information for the Optical Translator (OT). Included is Miscellaneous Mount Information.

Prerequisite: TR2448 or equivalent knowledge

Content: Video presentation covering OT installation and physical design.

Security

Lucent Technologies has designed the CenterLink Management Console (CMC) so that, when properly administered, it will minimize the ability of unauthorized persons to gain access to the network. Each authorized user should be instructed about the proper use of the CMC. Security features are fully described in the Optical Line System User/Service Manual.

Technical Support

Assistance in maintaining your installed system is available through the Regional Technical Assistance Center (RTAC) and the Customer Technical Support (CTS) organization. As shown in Figure 1-3, RTAC is your single point of contact. RTAC personnel troubleshoot field problems 24 hours a day over the phone and, if necessary, on site. For technical assistance, simply call 1-800-225-RTAC. One call guarantees support.

RTAC organizations are supported by a centralized CTS for transmission products. The CTS maintains a close relationship with Bell Laboratories and other Lucent Technologies organizations to expedite resolutions and maintain contact with the development community. This association provides continuous accessibility to every phase of a products life cycle and assures a prompt resolution to all inquiries.

The CTS has also established a technical support medium, CTS customer support tools. Many transmission products are currently supported by COACH, including the Optical Line System and Optical Translator. COACH is a system of computerized on-line support tools aimed at providing product news and bulletins,

diagnostic services, compatibility information, and on-line documents. COACH tools provide you with the most up-to-date product information so that problems are either prevented or quickly resolved. COACH tools reside on a dedicated time-share computer accessible over toll free lines and are available 24 hours a day, 7 days a week. For information about how to access COACH, contact your local Account Executive.

Once connected to COACH, the user specifies which product to access and COACH grants the appropriate combination of tools and commands. The user reaches each one of these tools and commands through a centralized, menu-driven computer program. Every screen provides help in making appropriate menu selections. COACH users achieve proficiency quickly because of the consistency of menu selections among products.

The CTS strives to provide proactive and responsive technical customer support for all its products. Through the combined efforts of individual customer support groups and through COACH tools, the CTS provides you with the best possible customer support.
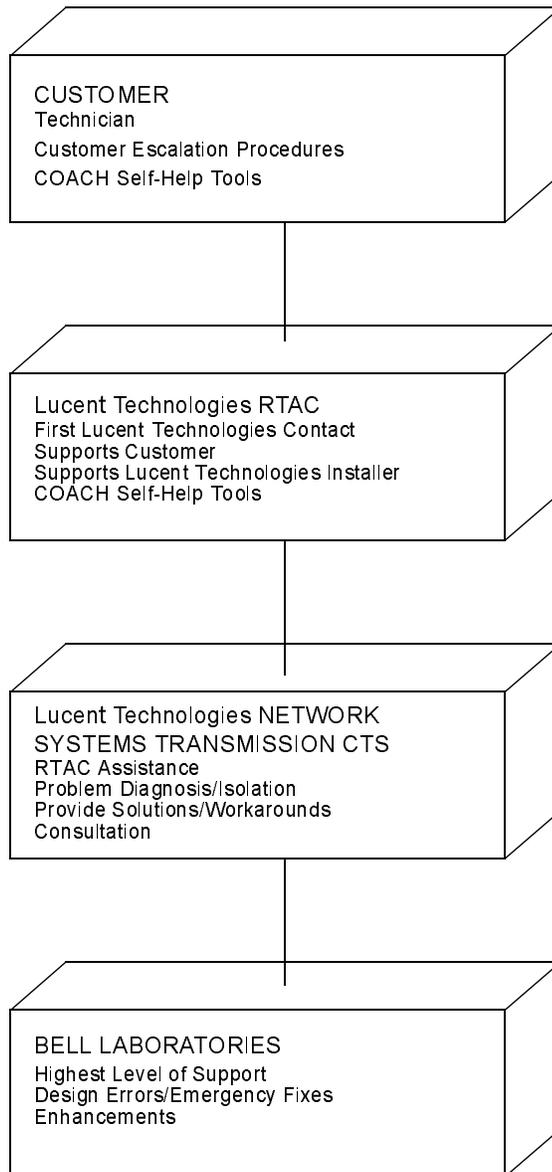
Figure 1-3 Product Support

COACH Tools

Coach tools available to users are given in Table 1-4, "Coach Tools".

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Table 1-4. Coach Tools

Diagnostic dictionary:	The diagnostic dictionary contains histories of previously encountered problems and descriptions of solutions or workarounds. Your support staff can use this tool when published documentation or standard diagnostic procedures fail to address a problem. Your support staff is allowed to enter problems and solutions into the customer input area of the diagnostic dictionary. CTS personnel evaluate data daily and, when appropriate, data is moved to a general area.
News and bulletins:	Immediately after a user logs into COACH tools, a news and bulletins tool displays bulletins containing urgent information relating to all the user's products. All users are automatically notified about urgent matters such as problems with scheduled releases, recalls of hardware or software, or scheduled maintenance for computer support. Less urgent messages are distributed through news items that can be sent to individuals or categories of users. Notification of news appears on the screen immediately following current bulletins.
Compatibility data:	Occasionally, hardware/software configuration problems arise when new software generics are issued. The compatibility data tools permit users to view the correct hardware configuration associated with a specific software generic. The user simply enters the appropriate software generic number and COACH responds with page-formatted lists of circuit packs compatible with the selected software generic. This tool also contains the latest issue numbers of customer documentation.
COACH user's guide:	COACH supplies an on-line version of its user's guide. The COACH user's guide includes instructions on using customer support tools and documents any changes to previous versions of the guide.

Optical Line System Specifics

Installation Operations for OLS

Table 1-5. Installation Operations for OLS

	Procedure	Sections	Details
Standard Installation E, F, & I	Equipment Installation	Section 4	Mount, Drill, Erect, Assemble, and Ground Cabinet
	Power Cable Installation	Section 5	Connect Power Cables to Cabinet
	Wired Cable Installation	Section 6	Connect All Non-Power And Non-Transmission Cables
	Intrashelf, Customer Maintenance, Outside Plant and Low Speed Fiber Installation	Section 7	Connect Fibers.
	Powering	Section 8	Power the OLS Cabinet
	Network Element Start Up and Basic Provisioning	Section 9	Install CMC and NE Software, Install Circuit Packs, and Perform Basic Provisioning.
	Local Installation Testing -	Section 10	LED, Auto Turnup, Cable, and Operational Tests
"Turnkey" System Connections	Fiber Connection and End-to-End Verification	Section 11	System Connection and Verification
	Connection to OC-48 equipment	Section 12	Connection Customer OC-48

Personal Computer for Use as CenterLink Management Console

The CenterLink Management Console (CMC) for OLS is a personal computer (PC). A PC and the OLS Software distribution CD-ROM will be necessary to install OLS software. The PC must meet certain requirements to ensure proper interaction with the OLS. The minimum requirements are as follows:

■ Pentium IBM*-compatible desktop or laptop PC

■ Disk drive - one 2x CD ROM drive

■ Hard disk with approximately 20 Megabytes of free space

- 16 Megabytes RAM

- MS-DOS† operating system using Windows95

- Serial port (EIA-232-D): configured as COM1, COM2, COM3 or COM4

- Parallel Port: Configured as LPT1

- SVGA Active Matrix Color Display 800x600

- Microsoft Mouse or compatible pointing device.

* Registered Trademark of International Business Machines Corporation

† Registered Trademark of Microsoft Corporation

OLS Drawings

- J68982C-1 Optical Line System Cabinet

    (Equipment and Circuit Packs Ordered with Equipment)

- J686982D-1 Optical Networking Cabinet - OLS & OT in one cabinet

    (Equipment and Circuit Packs Ordered with Equipment)

- J68982CS-1 Optical Line System Software

    (Software and Documentation)

- T-5G276-33 Optical Line System Interconnect Circuit

- T-5G276-30 Optical Line System Circuit

- T-5G273-30 Optical Line System Shelf Circuit

- ED-7G033-30 Optical Line System Cabinet Framework

- ED-7G028-20 OLS Cable Assembly

- ED-7G028-22 OLS Interconnect Cable Assembly

- ED-7G028-30 Optical Line System Shelf Assembly

- ED-7G027-30 User/Fuse Panel/Power Indicating Assembly

- FPD 804-604-161-1 Optical Line System Cabinet Floor Plan Data Sheet

Optical Translator Specifics

Table 1-6. Installation Operations

	Procedure	Sections	Details
Standard Installation E, F, & I	Equipment Installation	Section 4	Mount, Drill, Erect, Assemble, and Ground Cabinet
	Power Cable Installation	Section 5	Connect Power Cables to Cabinet
	Wired Cable Installation	Section 6	Connect Power Cables and Non-Transmission Cables
	Fiber Installation	Section 7	Install Fibers
	Powering	Section 8	Power the OLS & OT Cabinet
	Start Up and Local Installation Testing	Section 10	Testing of OTUs, QOTUs, OTPMs and Miscellaneous Discrete Alarms.

OT Drawings

- J69000C-1 Optical Translator Cabinet
- T-6G156-33 Optical Translator Interconnect Circuit
- T-6G156-30 Optical Translator System Circuit
- T-6G155-30 Optical Translator Shelf Circuit
- ED-7G044-30 Optical Translator Cabinet Framework
- ED-7G045-20 OT Cable Assembly
- ED-7G045-22 OT Interconnect Cable Assembly
- ED-7G045-30 Optical Translator Shelf Assembly
- ED-7G047-30 User/Fuse Panel/Power Indicating Assembly
- FPD 804-604-162 Optical Translator Cabinet Floor Plan Data Sheet
- 847823325 OT Installation Kit

Platform Descriptions

2

Contents

Platform Descriptions

2

Overview

This section with its subsections introduces OLS equipment packages and provides a detailed view of the OLS Cabinet physical design and miscellaneous mounted shelves.

Also introduced are the OT equipment packages, detailed views of the OT Cabinet physical design and the miscellaneous mount configuration. Applications of the OT are shown along with a description of the miscellaneous discrete alarm operation.

The sections and their contents are listed below:

■ Section A - Equipment Descriptions contains a brief descriptions of the capabilities of each type of equipment and the packages available for each.

■ Section B - Cabinet Descriptions and Types contains a description of the available cabinet and various types of OLS and OT Cabinet set-ups.

■ Section C - Cabinet Indicator Strips contains a description of the indicator strips used for each type of equipment and their LEDs.

■ Section D - Shelf Descriptions contains a description of each shelf available for the OLS and OT. Also covered are the Interconnection Panels and Fuse Panels.

■ Section E - Circuit Pack Descriptions and Addresses contains a brief description of each circuit pack and the corresponding addresses.

■ Section F - System Block Diagrams and Applications contains block diagrams for both the OT and OLS as well as examples of applications.

■ Section G - Miscellaneous Discrete Alarms contains information regarding the operation of the miscellaneous discretes associated with the OT and their connection to the OLS.

A - Equipment Descriptions

OLS Description

The OLS is a flexible, high capacity lightwave system that multiplexes digitally encoded information contained in up to sixteen different wavelengths (each in the 1.5 micrometer wavelength range), transmits the resulting combined signal through optical fibers, and then demultiplexes the information at the other end.

OLS transmits on optical lines. An **optical line** is a fiber transmission facility, including optical amplifiers, that extends from the output of the optical multiplexing unit (OMU) to the input of the optical demultiplexing unit (ODU). Repeaters may be used to expand the distance between end terminals. The distance between adjacent end terminal and repeater sites or between adjacent repeater sites is referred to as an **optical section** or **span**.

Release 2.1 of OLS is available in the following equipment packages

- Miscellaneous Mounted Shelf (List 10)

- End Terminal for 4 Bidirectional Optical Lines - Cabinet Mounted

- Repeater for 4 Bidirectional Optical Lines - Cabinet Mounted

- Dual End Terminal (2 shelves with 2 bidirectional optical lines each) - Cabinet Mounted

- Dual Repeater (2 shelves with 2 bidirectional optical lines each) - Cabinet Mounted

- End Terminal And Repeater

- OLS/OT/EMDU Miscellaneous Mount Combination

- Dual Facing Shelf.

OT Description

The Optical Translator (OT) is an addition to the Optical Line System (OLS) Product Line that will allow for improved economics for applications such as Wavelength Add/ Drop (WAD), multi-vendor compatibility, and extended reach between offices.

The Optical Translator (OT) 3 shelf arrangement supports up to a maximum of thirty-two (32) Optical Translator Units (OTUs). Each OTU circuit pack operates independently allowing for maximum system flexibility. The OTU has a broadband input capability allowing it to receive OC-48/STM-16 signals with wavelengths in the 1310 nm and 1550 nm range. Each OTU outputs an OC-48/STM-16 signal at a code specific wavelength which is OLS compatible.

An OTU may be used to translate an optical input to another wavelength or as an optical regenerator of the same wavelength. Being used in this capacity, OTUs are capable of performing Wavelength Add/Drop (WAD) or providing signal regeneration capability.

The Quad Optical Translator Unit (QOTU) allows the combination of up to four Optical Translator Port Modules (OTPMs). The OTPMs are available in 3 varieties: OC-12, OC-3 and Broadband. Any mix of OTPMs may be used in a single QOTU.

Release 1.0 of OT is available in the following equipment configurations:

- System Controller Shelf, Complementary Shelves 1 & 2 mounted in an OT cabinet with interconnecting wiring installed. (List 1)

- Miscellaneous Mounted System Controller Shelf and Complementary Shelves 1 & 2 with interconnecting wiring provided. (List 10)

- Miscellaneous Mounted System Controller Shelf (List 11)

- Miscellaneous Mounted Complementary Shelf 1 (List 12)

- Miscellaneous Mounted Complementary Shelf 2 (List 13)

B - OLS & OT Cabinet Descriptions and Types

Each OLS or OT can be equipped in a cabinet that is 6 feet high, 34 inches wide, and 24 inches deep. Each cabinet houses two shelves for the OLS and three for the OT. Each OLS shelf contains a maximum of two bidirectional optical lines, for a maximum of four bidirectional optical lines per OLS cabinet. One shelf of the OT is the system controller shelf and the other two are Complementary Shelf One and Two, combining to provide slots for 32 Optical Translator units (OTUs) or 16 QOTUs. Each OTU has an input and output optical connection. Each QOTU has 4 possible lots for OTPMs each with an input and output for carrying OC-12, OC-3 and Broadband signals. The fibers that mate with these connections originate or terminate external to the OT cabinet. A fully loaded OT cabinet will have a total of between 64 and 128 fibers entering/exiting the cabinet.

A heat baffle is located between the each shelf. The CenterLink Management Console (CMC) CIT-DCE connector and ESD jack are accessed through a small door located in the right front door. Additional ESD jacks are provided within the cabinet on each OT shelf. Figure 2-1 on page 2-6 shows the OLS or OT cabinet with its front doors closed and Figure 2-2 on page 2-7 shows the OLS cabinet with the doors open. Figure 2-3 on page 2-8 shows the OT cabinet with the doors removed.

Cable Rack Cover

Indicator Strip

Door Logo Badge

Latch Fixture

CIT/ESD Jack
Access Door

End Guard

Wave Profile

Kickplate
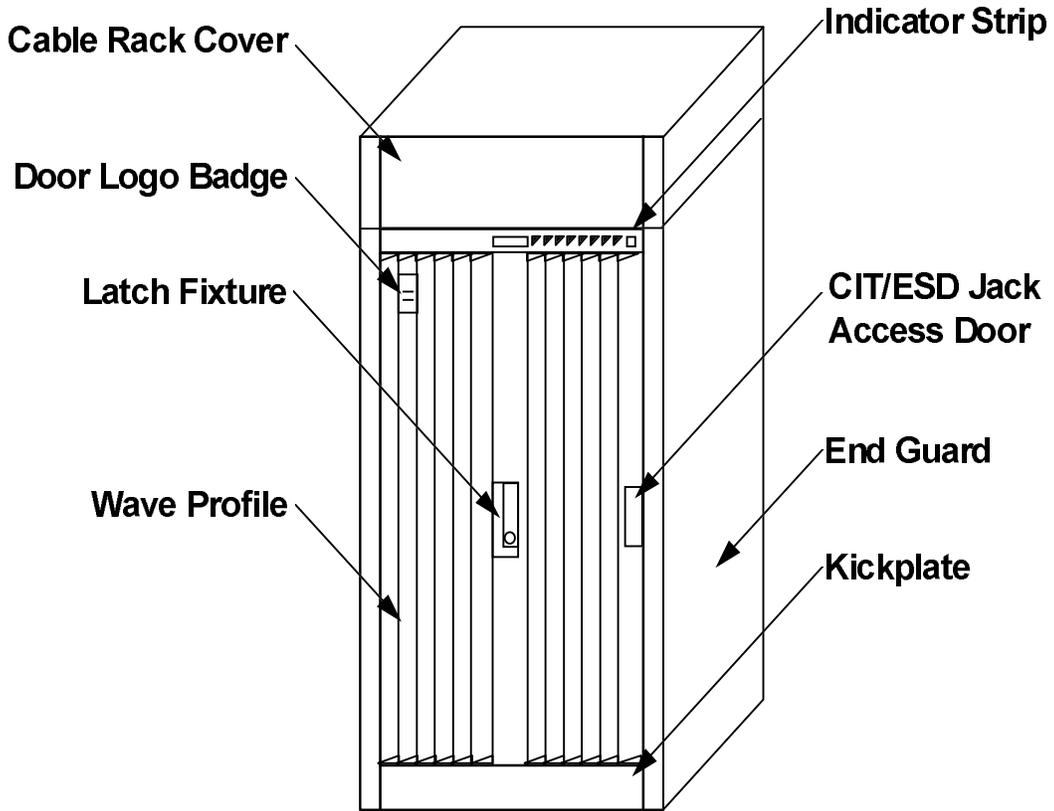
OLS & OT Cabinet (Doors Closed)
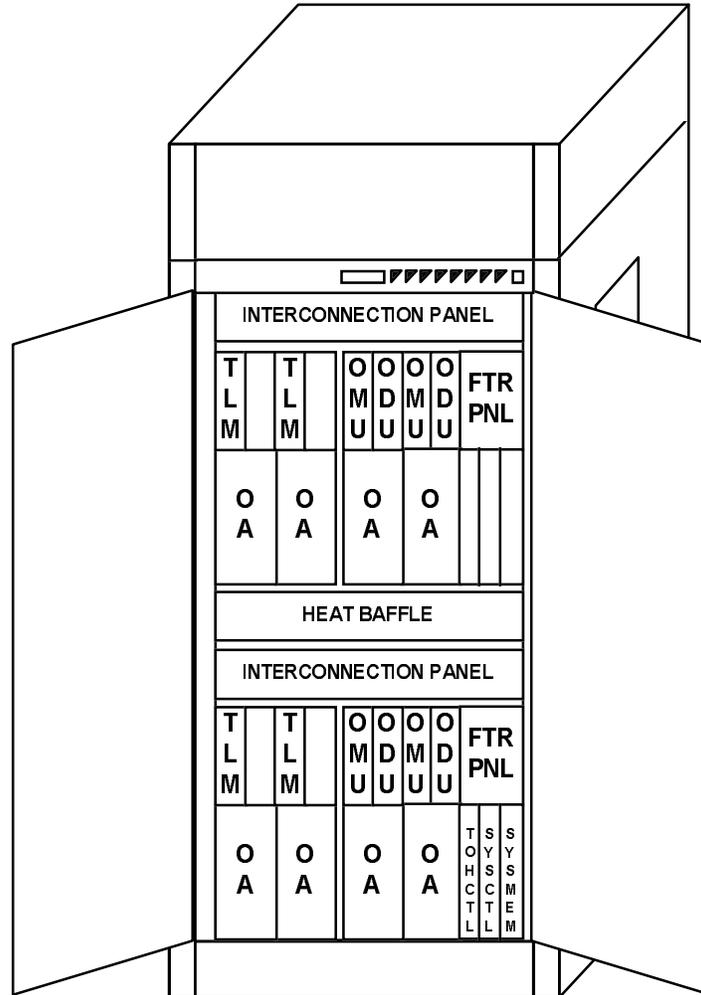
Figure 2-2 OLS Cabinet (Doors Open)
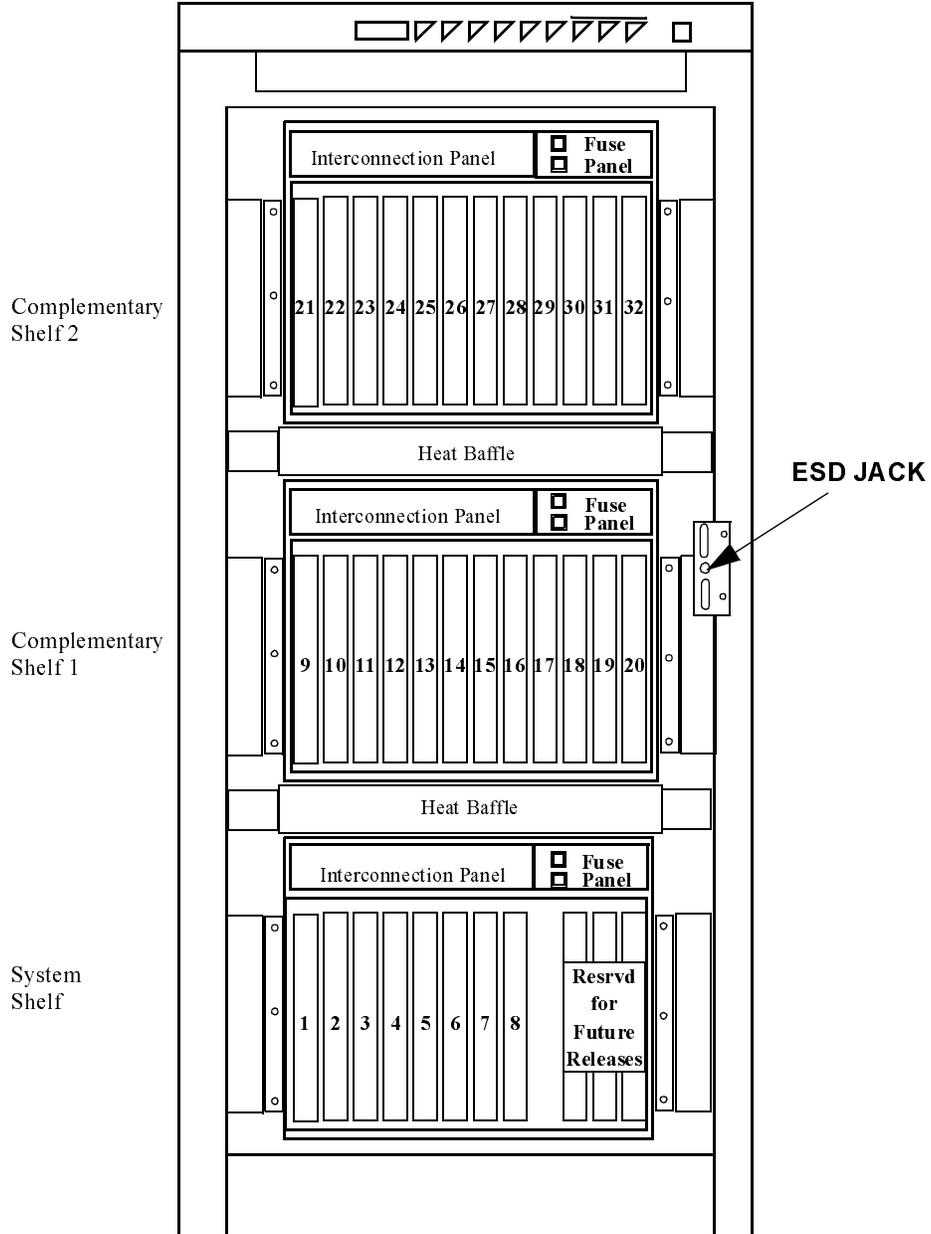
Figure 2-3 OT Cabinet (Doors Removed)

OLS Cabinet Types

End Terminal for 4 Bidirectional Optical Lines

The OLS End Terminal for 4 Bidirectional Optical Lines (Figure 2-4 on page 2-9) consists of the cabinet containing two OLS end terminal shelves that are physically identical, except for the label strips. The lower shelf is equipped with all the control circuit packs; the upper shelf is not equipped with control circuit packs. The lower shelf contains lines 1 and 2 and the upper shelf contains lines 3 and 4.
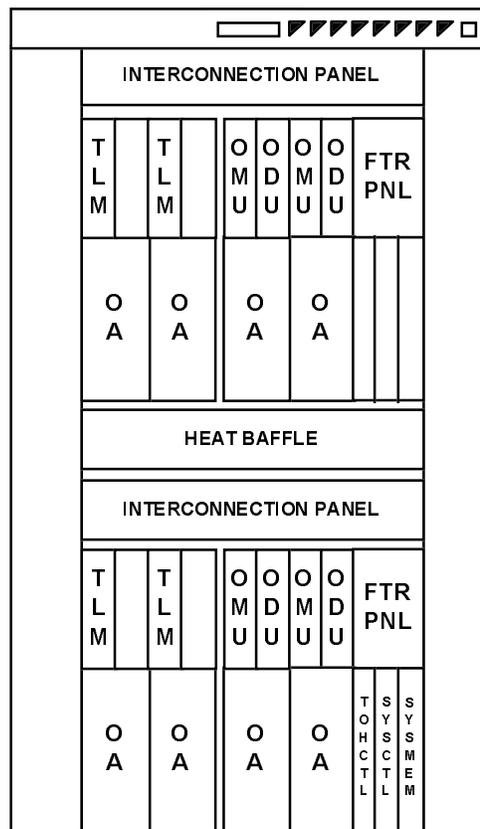
4 OLS End Terminal for 4 Bidirectional Lines (1A-TX Shown)

OLS Repeater for 4 Bidirectional Optical Lines

The OLS Repeater for 4 Bidirectional Optical Lines (Figure 2-5 on page 2-10) consists of the cabinet containing two OLS repeater shelves that are physically identical, except for the label strips. The lower shelf is equipped with all the control circuit packs; the upper shelf is not equipped with control circuit packs. The lower shelf contains lines 1 and 2 and the upper shelf contains lines 3 and 4.
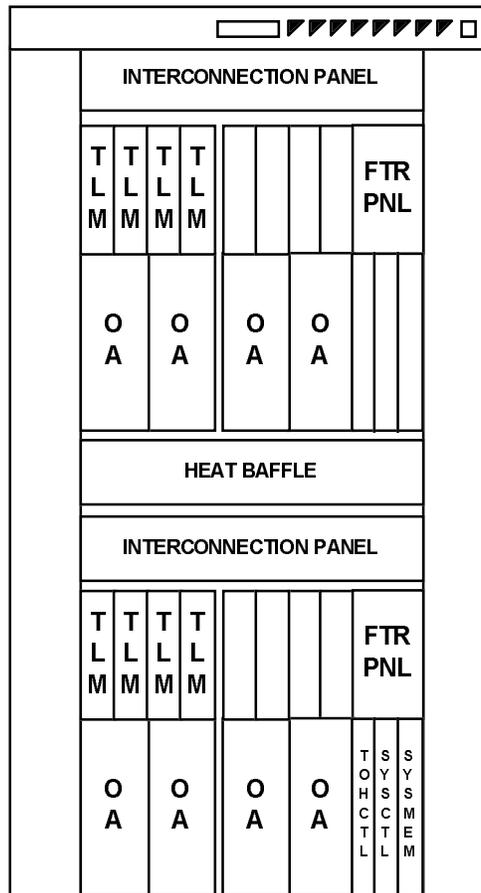
Figure 2-5 OLS Repeater for 4 Bidirectional Lines

OLS Dual End Terminal

The OLS Dual End Terminal (Figure 2-6 on page 2-11) consists of the cabinet containing two OLS end terminal shelves that are physically identical. Both shelves are equipped with control circuit packs and contain lines 1 and 2 and can be configured independently.
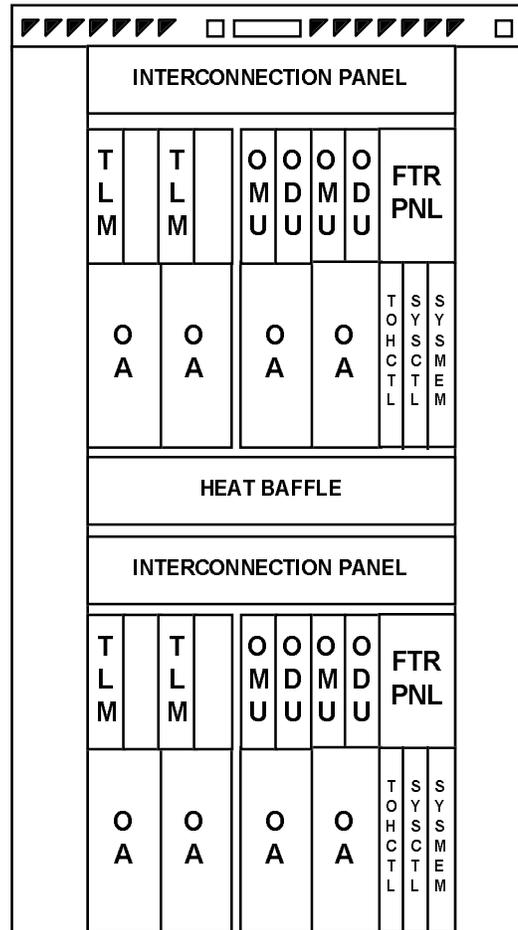
e 2-6 OLS Dual End Terminal (1A-TX Shown)

Dual Repeater

The OLS Dual Repeater (Figure 2-7 on page 2-12) consists of the cabinet containing two OLS repeater shelves that are physically identical. Both shelves are equipped with control circuit packs and contain lines 1 and 2 and can be configured independently.

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│  ┌─────────────────────────────────────────────┐ │
│  │           INTERCONNECTION PANEL             │ │
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│  │ T │ T │ T │ T │     │     │                 │ │
│  │ L │ L │ L │ L │     │     │   FTR           │ │
│  │ M │ M │ M │ M │     │     │   PNL           │ │
│  ├───┴───┼───┴───┼─────┼─────┼─┬─┬─────────────┤ │
│  │       │       │     │     │T│S│S            │ │
│  │       │       │     │     │O│Y│Y            │ │
│  │   O   │   O   │  O  │  O  │H│S│S            │ │
│  │   A   │   A   │  A  │  A  │C│C│M            │ │
│  │       │       │     │     │T│T│E            │ │
│  │       │       │     │     │L│L│M            │ │
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│  │               HEAT BAFFLE                   │ │
│  ├─────────────────────────────────────────────┤ │
│  │           INTERCONNECTION PANEL             │ │
│  ├───┬───┬───┬───┬─────┬─────┬─────────────────┤ │
│  │ T │ T │ T │ T │     │     │                 │ │
│  │ L │ L │ L │ L │     │     │   FTR           │ │
│  │ M │ M │ M │ M │     │     │   PNL           │ │
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│  │       │       │     │     │T│S│S            │ │
│  │       │       │     │     │O│Y│Y            │ │
│  │   O   │   O   │  O  │  O  │H│S│S            │ │
│  │   A   │   A   │  A  │  A  │C│C│M            │ │
│  │       │       │     │     │T│T│E            │ │
│  │       │       │     │     │L│L│M            │ │
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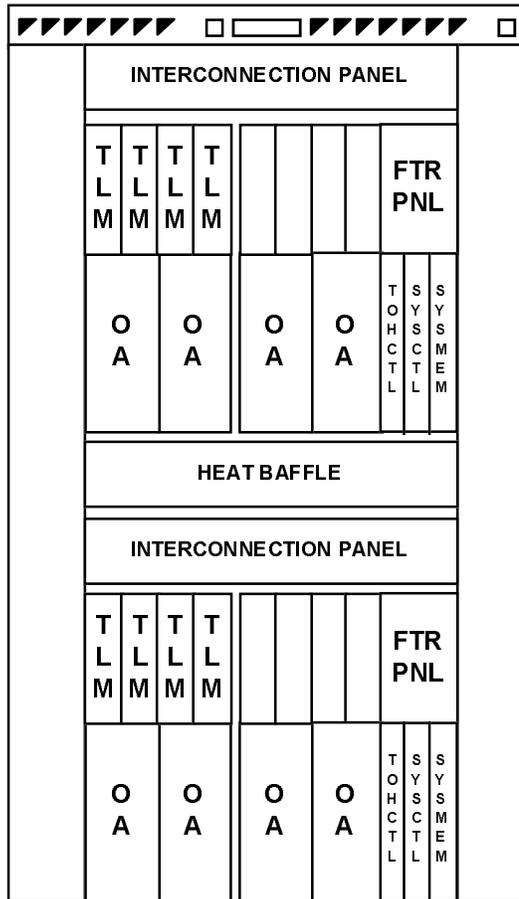
7 OLS Dual Repeater

End Terminal And Repeater

The OLS End Terminal and Repeater (Figure 2-8 on page 2-13) consists of the cabinet containing one OLS end terminal shelf and one OLS repeater shelf. Both shelves are equipped with control circuit packs and contain lines 1 and 2 and be configured independently.
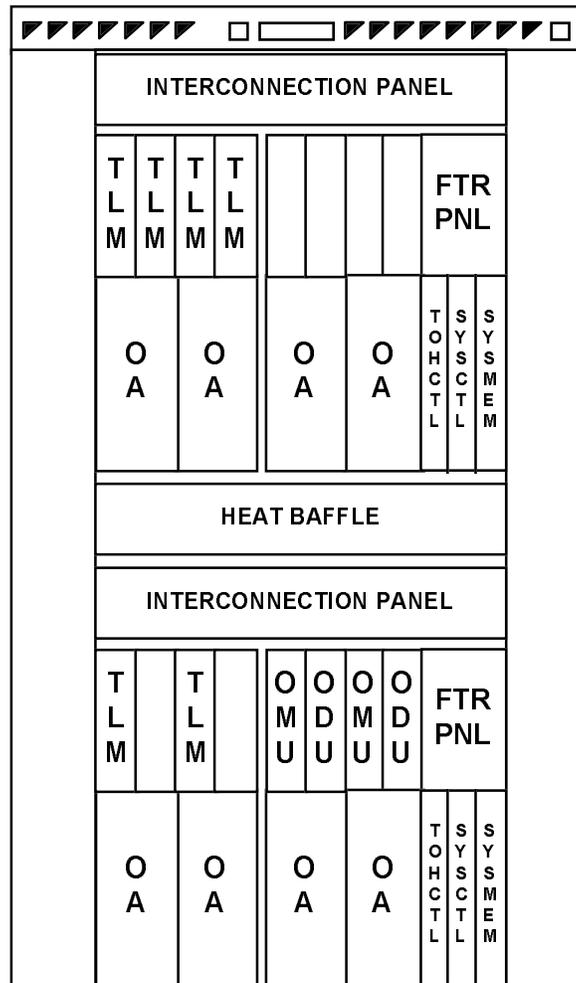
Figure 2-8 OLS End Terminal (1A-TX Shown) And Repeater

Dual Facing Shelf and Repeater

The OLS Dual Facing Shelf and Repeater, Figure 2-9 on page 2-14, shows the Dual Facing Shelf on the bottom with a repeater configuration at the top. This is only one of the possible configurations for the Dual Facing shelf. Both top and bottom support lines 1 & 2 and contains control circuit packs for independent configuration.
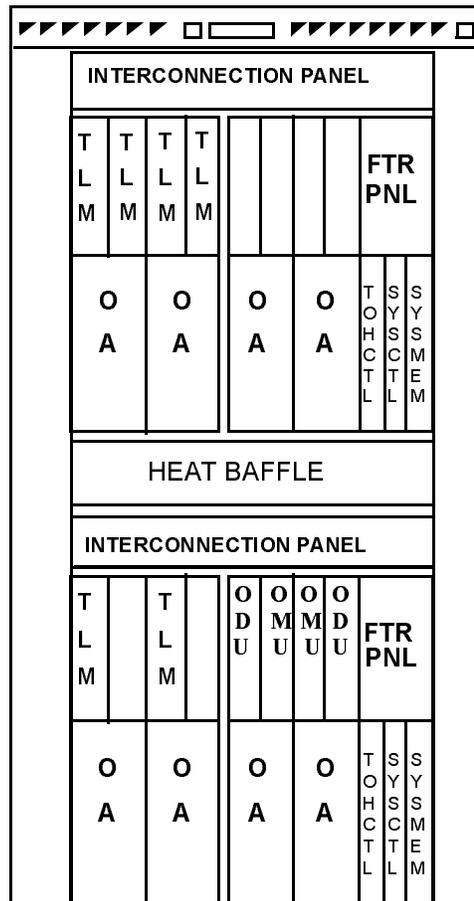
OLS Dual Facing Shelf And Repeater

OLS/OT/EMDU Miscellaneous Mounted Configuration

The OLS/OT/EMDU Miscellaneous Mounted Configuration, Figure 2-10 on page 2-15, shows a possible configuration with an OLS on the bottom, two OT shelves in the middle and the EMDU mounted at the top. This supports lines 1 & two and the OLS contains control circuit packs.

EMDU											
Interconnection Panel											PWR PANEL
OTU-9	OTU-10	OTU-11	OTU-12	OTU-13	OTU-14	OTU-15	OTU-16	OTU-17	OTU-18	OTU-19	OTU-20

HEAT BAFFLE							
Interconnection Panel							USR PANEL
OTU-1	OTU-2	OTU-3	OTU-4	OTU-5	OTU-6	OTU-7	OTU-8

HEAT BAFFLE

Interconnection Panel								USR PANEL
TLM-1A	TLM-1B	TLM-2A	TLM-2B	ODU-1	OMU-1	ODU-2	OMU-2	USER PANEL
OA-1A	OA-1B			OA-2A	OA-2B	TOHCTL	SYSCTL	SYSMEM

HEAT BAFFLE

Figure 2-10 OLS/OT/EMDU Miscellaneous Mounted Configuration

C - Cabinet Indicator Strips

Each cabinet has an indicator strip located at the top of the cabinet for displaying alarm and status information. Connectorized cabling connects the indicator strip to the shelf or shelves.

LED and Push-button Descriptions

The indications of the LEDs located on the user panel are listed in Table 2-1, on page 2-17.

Table 2-1 Indicator Strip LEDs Indications

LED	Status	Indications
CR (red)	Critical	For OLS, any unprotected incoming signal loss is critical
MJ (red)	Major	Non-service-affecting unprotected failure that may mask the reporting of another service-affecting failure. For example, a Controller failure will cause a MJ alarm.
MN (Yellow)	Minor	Non-service-affecting failure, protected failure
ACO (Green) (SW & LED)	Alarm Cutoff	Audible office alarms are silenced and parallel telemetry indications are turned off
PWR-ON (Green) Upper Shelf	Power On	Upper Shelf is receiving a -48 volt source
PWR-ON (Green) Lower Shelf	Power On	Lower Shelf is receiving a -48 volt source
ABN (Yellow)	Abnormal	Abnormal condition initiated through a CMC (Centerlink Management Console) command. For example, loopback, forced switch
NE ACTY (Yellow)	Near End Activity	An alarm or status condition exists at the near-end OLS
FE ACTY (Yellow)	Far End Activity	An alarm or status condition exists at a far-end OLS

FAULT LED Indication

Each circuit pack has a FAULT LED. When a FAULT LED is steadily lighted, the circuit pack has failed or its communication with the SYSCTL circuit pack has failed.

In general, when a FAULT LED is flashing, the circuit pack has lost its input signal, or the input signal has degraded severely. An exception is when the SYSMEM FAULT LED is flashing; this indicates a software mismatch between the SYSCTL software version and the SYSMEM.

OLS Specific Considerations

Four optical line cabinets have a single set of indicators as shown in Figure 2-11 on page 2-18, "Indicator Strip For 4-line OLS Cabinets" and dual 2-line cabinets have two sets of indicators as shown in Figure 2-12 on page 2-18, "Indicator Strip For OLS Dual 2-line Cabinets".
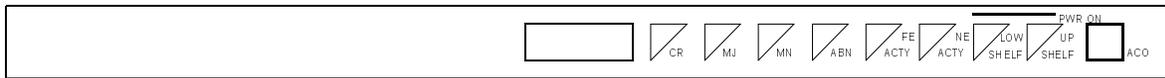
Figure 2-11 Indicator Strip For 4-line OLS Cabinets
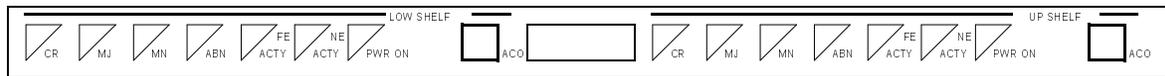
Figure 2-12 Indicator Strip For OLS Dual 2-line Cabinets

OT Specific Considerations

The three green PWR-ON LEDs will be the only functional LEDs on the indicator strip for R1-OT. The remaining LEDs on the indicator strip as well as the ACO push-button are non-functional with R1-OT. The indicator strip for the OT cabinet is shown in Figure 2-13 on page 2-18, "Indicator Strip For OT Cabinet".
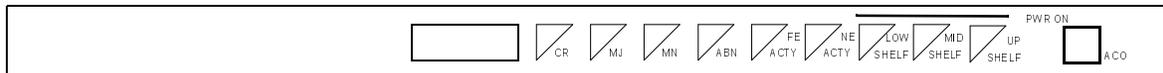
Figure 2-13 Indicator Strip For OT Cabinet

D - Shelf and Panel Descriptions

OLS Shelf Descriptions

The OLS shelves can be configured to provide the following functions:

- End Terminal with Optical Amplifiers for Lines A Transmitting (1A-TX) as shown in Figure 2-14 on page 2-20.

- End Terminal with Optical Amplifiers for Lines A Receiving (1A-RCV) as shown in Figure 2-15 on page 2-21.

- Repeater as shown in Figure 2-16 on page 2-22.

- Dual Facing Shelf as shown in Figure 2-17 on page 2-23.

1A-TX and 1A-RCV Applications

The concept of 1A-TX and 1A-RCV will be used throughout this document. In an OLS system, one end terminal will always have lines A (1A, 2A, etc.) transmitting to and the opposite end will have lines A receiving from the outside plant fiber.

1A-TX End Terminal

Figure 2-14 on page 2-20 shows the OLS shelf configuration for 1A-TX end terminal applications. As an end terminal there are 2 telemetry circuit packs (TLM), 2 optical multiplexer units (OMU), 2 optical demultiplexer units (ODU), and 4 optical amplifiers (OA) for transmission. The 1A-TX application places the OMU to the left of the ODU for each line. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are equipped based on the cabinet application type (4-line vs. dual 2-line). Mechanical keying prevents the SYSCTL, SYSMEM, and TOHCTL circuit packs from being inserted into incorrect slots.

1A-RCV End Terminal

Figure 2-15 on page 2-21 shows the OLS shelf configuration for 1A-RCV end terminal applications. As an end terminal there are 2 telemetry circuit packs (TLM), 2 optical multiplexer units (OMU), 2 optical demultiplexer units (ODU), and 4 optical amplifiers (OA) for transmission. The 1A-RCV application places the ODU to the left of the OMU for each line. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are

equipped based on the cabinet application type (4-line vs. dual 2-line).
Mechanical keying prevents the SYSMEM, SYSCTL, and TOHCTL circuit packs
from being inserted into incorrect slots.

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│ ┌─────────────────────────────────────────────┐ │
│ │              Interconnect Panel              │ │
│ └─────────────────────────────────────────────┘ │
│                                                  │
│ ┌─────┬─────┬──────┬──────┬─────┬────┬────────┐ │
│ │ TLM │ TLM │      │ OMU/ODU    │    │   ▢    │ │
│ │ 1A  │ 2A  │  1A  │ 1B │ 2A │ 2B │    ▢       │ │
│ │     │     │  O   │ O  │ O  │ O  │    ○       │ │
│ │     │     │  M   │ D  │ M  │ D  │    ▢       │ │
│ │     │     │  U   │ U  │ U  │ U  │            │ │
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│ │  OA  │  OA  │  OA  │  OA  │ T│ S│ S│          │
│ │  1A  │  1B  │  2A  │  2B  │ O│ Y│ Y│          │
│ │      │      │      │      │ H│ S│ S│          │
│ │      │      │      │      │ C│ C│ M│          │
│ │      │      │      │      │ T│ T│ E│          │
│ │      │      │      │      │ L│ L│ M│          │
│ │Trans-│Receive│Trans-│Receive                  │
│ │ mit  │ from │ mit  │ from │                    │
│ │  to  │outside│  to  │outside                   │
│ │outside│plant │outside│plant│                   │
│ │plant │ fiber│plant │ fiber│                    │
│ │fiber │      │fiber │      │                    │
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Figure 2-14 OLS End Terminal Configured Shelf (1A-TX)

Interconnect Panel							
TLM 1A	TLM 2A		1A **O D U**	OMU/ODU 1B **O M U**	2A **O D U**	2B **O M U**	▢ ▢ ○ ▢
OA 1A Receive from outside plant fiber	OA 1B Transmit to outside plant fiber	OA 2A Receive from outside plant fiber	OA 2B Transmit to outside plant fiber	T O H C T L	S Y S C T L	S Y S M E M	
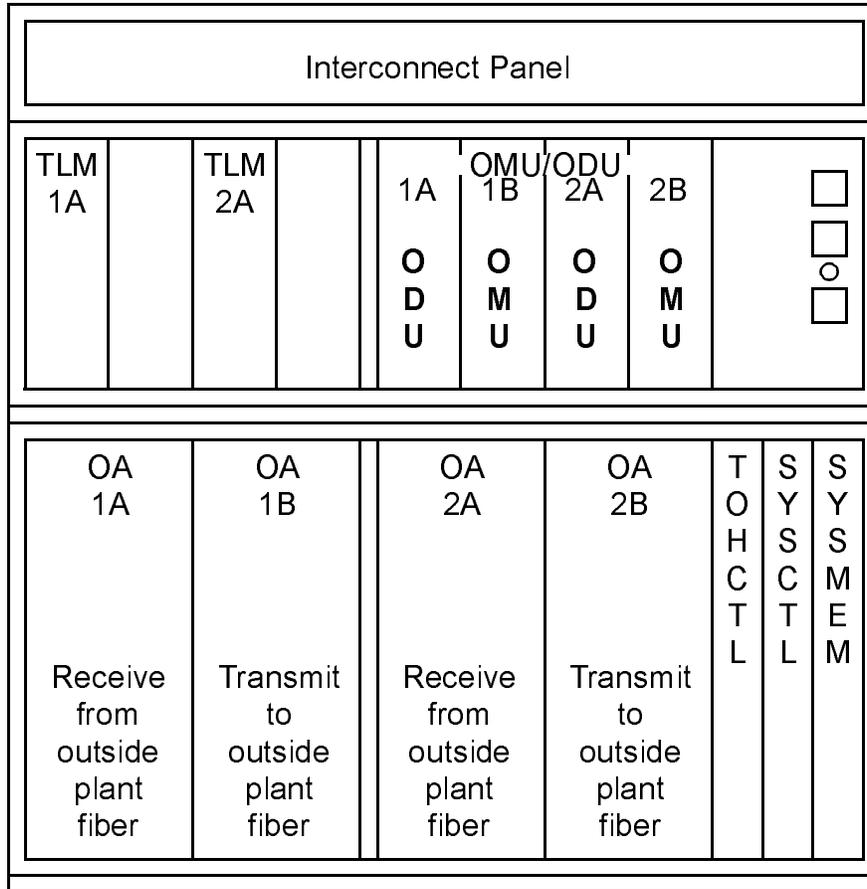
Figure 2-15 OLS End Terminal Configured Shelf (1A-RCV)

Repeater

Figure 2-16 shows the OLS shelf configuration for repeater applications. As a repeater there are 4 telemetry circuit packs (TLM) and 4 optical amplifiers (OA) for transmission. The lack of OMU or ODU circuit packs and presence of all 4 TLM circuit packs signify the repeater application. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are equipped based on the cabinet application type (4-line vs. dual 2-line). Mechanical keying prevents the SYSCTL, SYSMEM, and TOHCTL circuit packs from being inserted into incorrect slots.
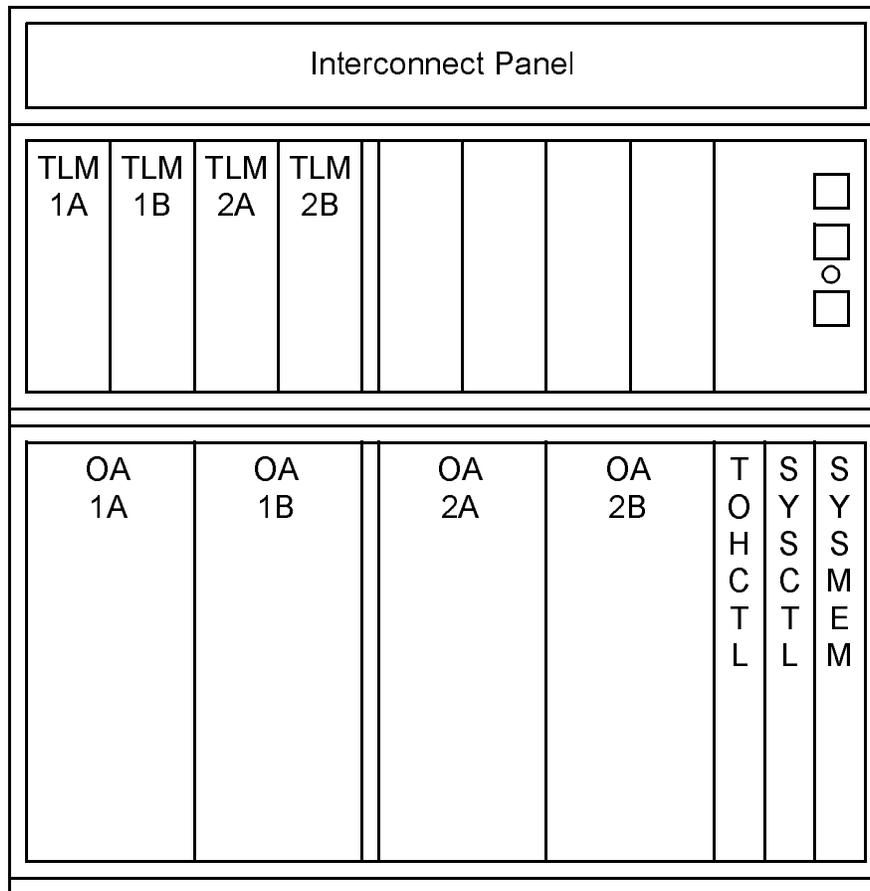
Figure 2-16 OLS Repeater Configured Shelf

Dual Facing Shelf

Figure 2-17 on page 2-23 shows the OLS shelf configured as a Dual Facing Shelf. There are 2 telemetry packs, 4 OAs, 2 ODUs and 2 OMUs needed for this application. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are equipped. Mechanical keying prevents the SYSCTL, SYSMEM, and TOHCTL circuit packs from being inserted into incorrect slots.

⇒ NOTE:
The ODUs and OMUs are placed in the OLS shelf in a non-standard configuration. Care should be taken to place them in the correct location.

```
+-------------------------------------------------------------------+
|                        Interconnect Panel                         |
+-------------------------------------------------------------------+
|                                 OMU/ODU                           |
| TLM      TLM              1A    1B   2A    2B          [ ]         |
| 1A       2A                                            [ ]         |
|                          O     O    O     O            (o)        |
|                          D     M    M     D           [ ]         |
|                          U     U    U     U                      |
+-------------------------------------------------------------------+
|  OA        OA         OA         OA        T  S  S                |
|  1A        1B         2A         2B        O  Y  Y                |
|                                            H  S  S                |
|                                            C  C  M                |
|                                            T  T  E                |
|                                            L  L  M                |
|  Receive   Transmit   Transmit   Receive                          |
|  from      to         to         from                             |
|  outside   outside    outside    outside                          |
|  plant     plant      plant      plant                            |
|  fiber     fiber      fiber      fiber                            |
+-------------------------------------------------------------------+
```
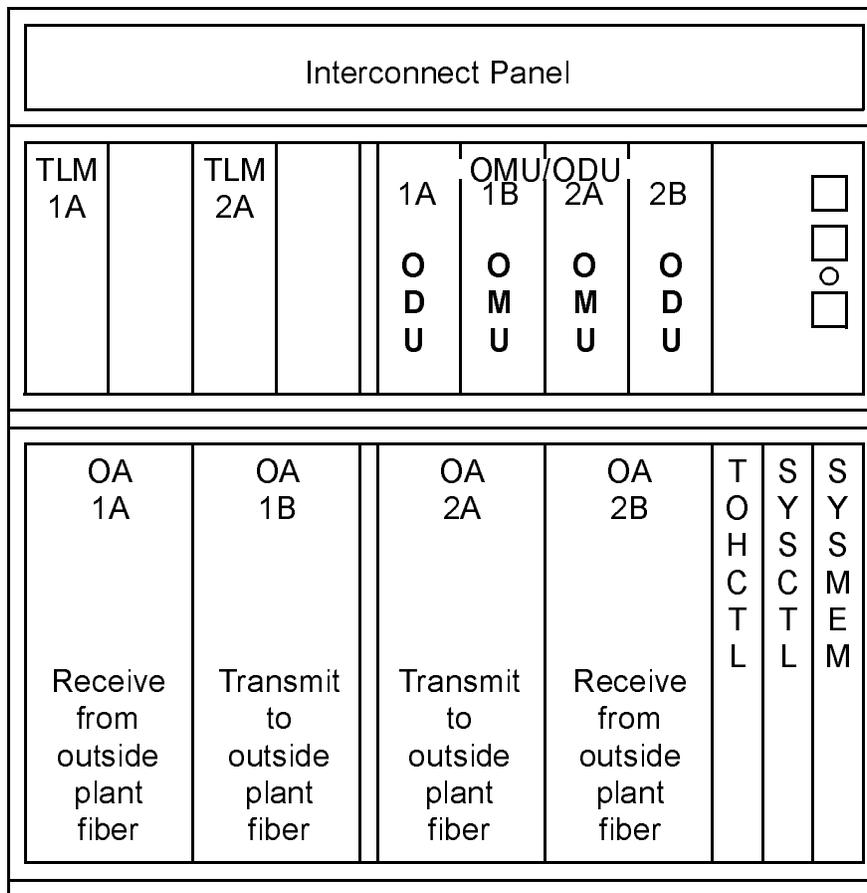
Figure 2-17 OLS Dual Facing Configured Shelf

One OA OLS 1A-RCV End Terminal

Figure 2-18 on page 2-24 shows the OLS shelf configuration for One OA 1A-RCV end terminal applications. As an end terminal, there are 2 telemetry circuit packs (TLM), 2 optical multiplexer units (OMU), 2 optical demultiplexer units (ODU), and 2 optical amplifiers (OA) for transmission. The 1A-RCV application places the ODU to the left of the OMU for each line. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are equipped. Mechanical keying prevents the SYSMEM, SYSCTL, and TOHCTL circuit packs from being inserted into incorrect slots.
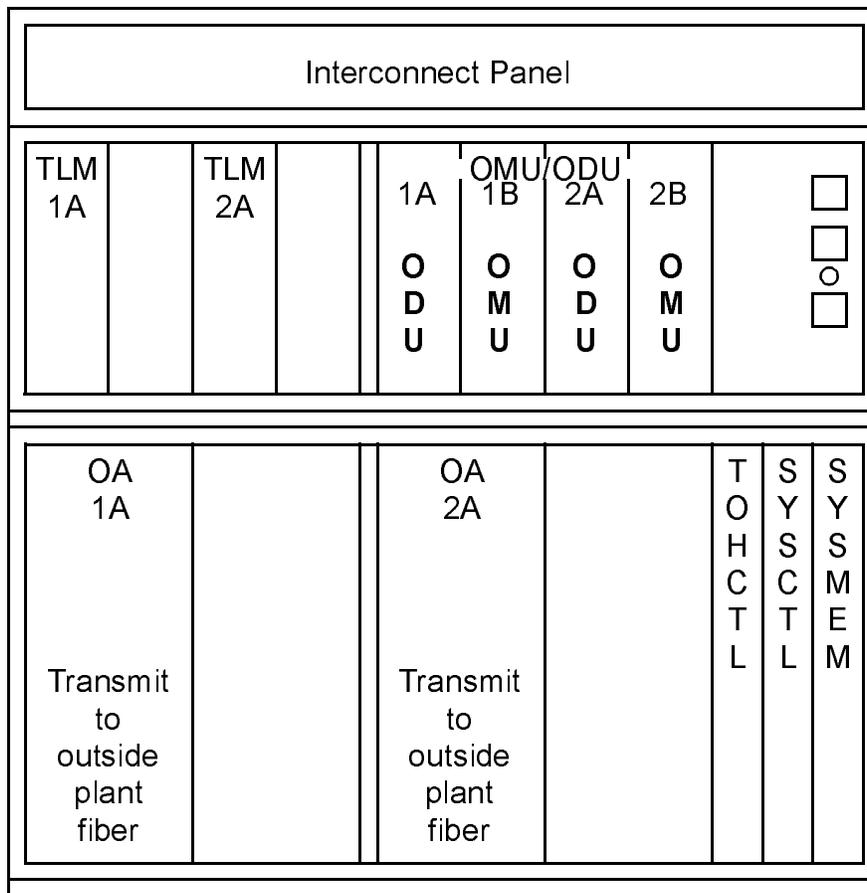
Figure 2-18 OLS One OA End Terminal Configured Shelf (1A-RCV)

One OA OLS 1A-Tx End Terminal

Figure 2-19 on page 2-25 shows the OLS shelf configuration for One OA 1A-TX end terminal applications. As a single OA end terminal, there are 2 telemetry circuit packs (TLM), 2 OMUs, 2 ODUs, and 2 OAs. The 1A-TX application places the OMU to the left of the ODU for each line. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are equipped based on the cabinet application type. Mechanical keying prevents the SYSCTL, SYSMEM, and TOHCTL circuit packs from being inserted into incorrect slots. The OAs must be placed in the B slots to provide ODU temperature control.
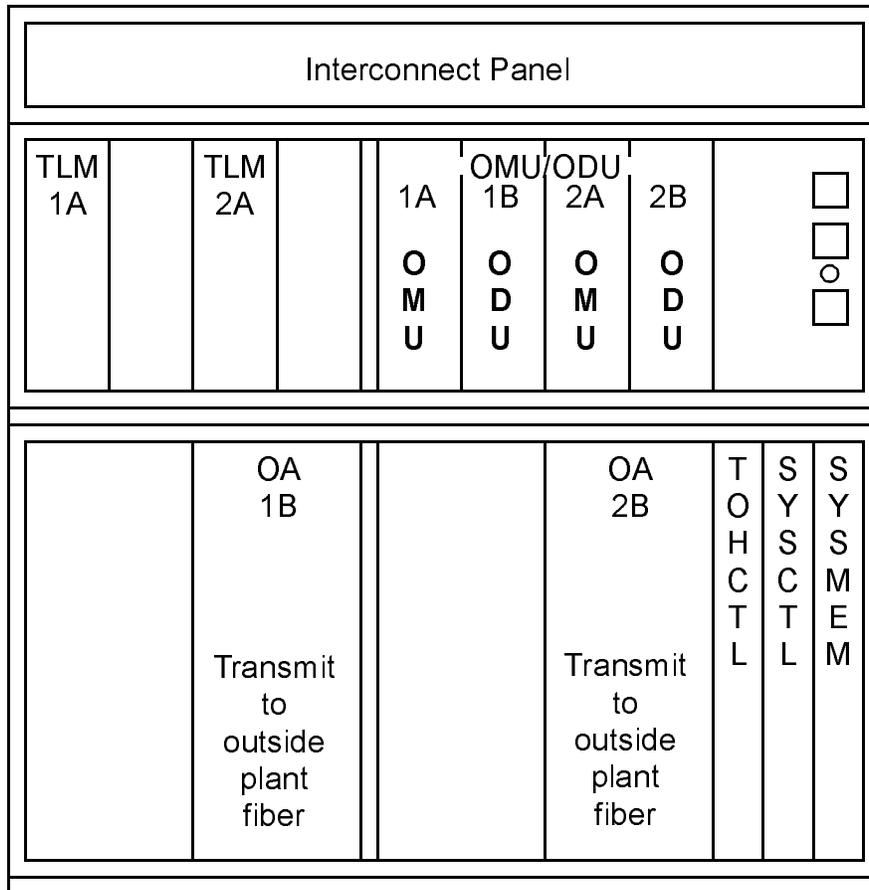
Figure 2-19 OLS One OA End Terminal Configured Shelf (1A-TX)

Two OA/One OA OLS Dual Facing Shelf

Figure 2-20 on page 2-26 shows a Dual Facing Shelf configured for Two OA operation on its line-1 side and One OA operation on its line-2 side. As a Dual Facing Shelf, required are 2 Telemetry packs (TLM), 3 OAs (2 for line 1, 1 for line 2), 2 ODUs, and 2 OMUs. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are equipped. Mechanical keying prevents the SYSCTL, SYSMEM, and TOHCTL circuit packs from being inserted into incorrect slots.

NOTE:
Notice the placement of the OMUs and ODUs.
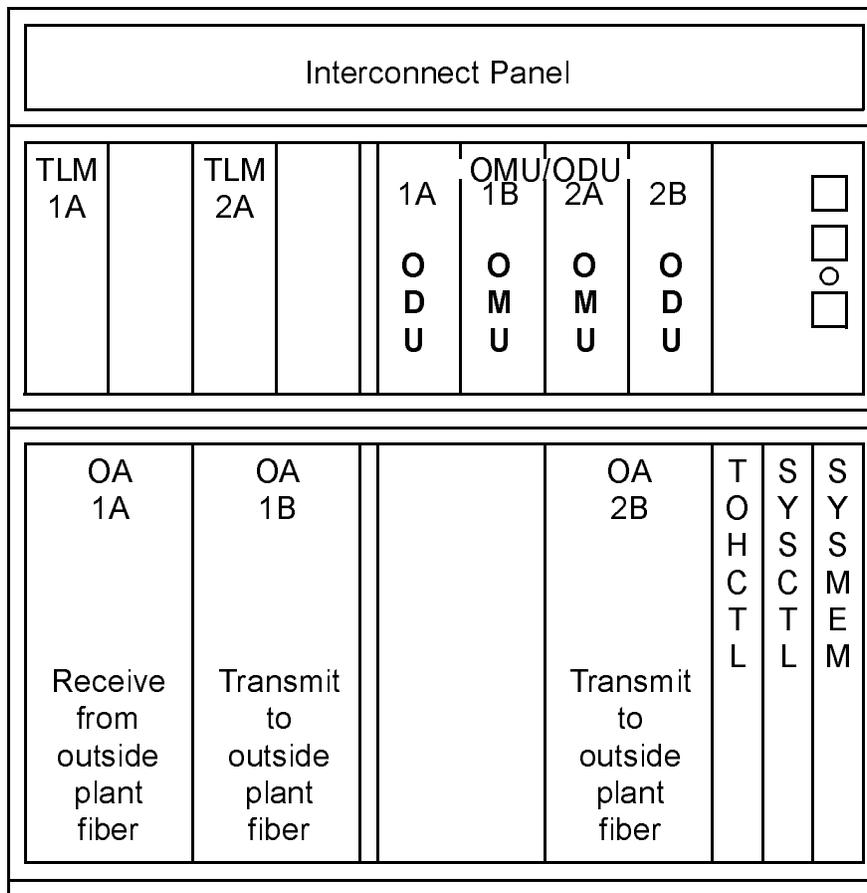
Figure 2-20 Two OA/One OA OLS Dual Facing Configured Shelf

One OA/Two OA OLS Dual Facing Shelf

Figure 2-21 on page 2-27 shows a Dual Facing Shelf configured for One OA operation on its line-1 side and Two OA operation on its line-2 side. As a Dual Facing Shelf, 2 Telemetry packs (TLM), 3 OAs (1 for line 1, 2 for line 2), 2 ODUs, and 2 OMUs are required. The system controller (SYSCTL), system memory (SYSMEM), and tributary overhead controller (TOHCTL) circuit packs are equipped. Mechanical keying prevents the SYSCTL, SYSMEM, and TOHCTL circuit packs from being inserted into incorrect slots.

➡ NOTE:
Notice the placement of the OMUs and ODUs.

Figure 2-21 One OA/Two OA OLS Dual Facing Configured Shelf

One OA/One OA OLS Dual Facing Shelf

Figure 2-22 on page 2-28 shows a Dual Facing Shelf configured for One OA operation on its line-1 side and One OA operation on its line-2 side. As a Dual Facing Shelf, 2 Telemetry packs (TLM), 2 OAs (1 for line 1, 1 for line 2), 2 ODUs, and 2 OMUs. The system controller (SYSCTL), system memory (SYS-MEM), and tributary overhead controller (TOHCTL) circuit packs are also equipped. Mechanical keying prevents the SYSCTL, SYSMEM, and TOHCTL circuit packs from being inserted into incorrect slots.

➡ NOTE:
Notice the placement of the OMUs and ODUs.
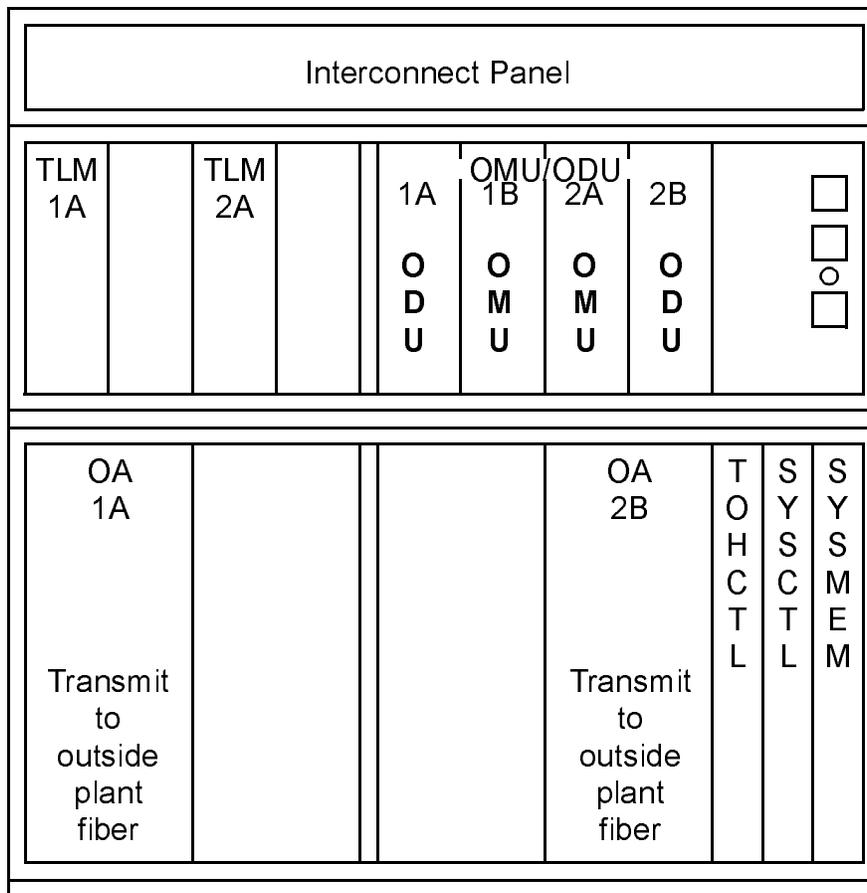
Figure 2-22 One OA/One OA OLS Dual Facing Configured Shelf

OLS Interconnection Panel

The top of the OLS shelf contains the interconnection panel for Operations, Administration, Maintenance, and Provisioning (OAM&P) connections. Figure 2-23 shows the interconnection panel.

Except for power, all the cabling entering the interconnection panel is connectorized with D-subminiature connectors. Power cables are connected using push-on type connectors.
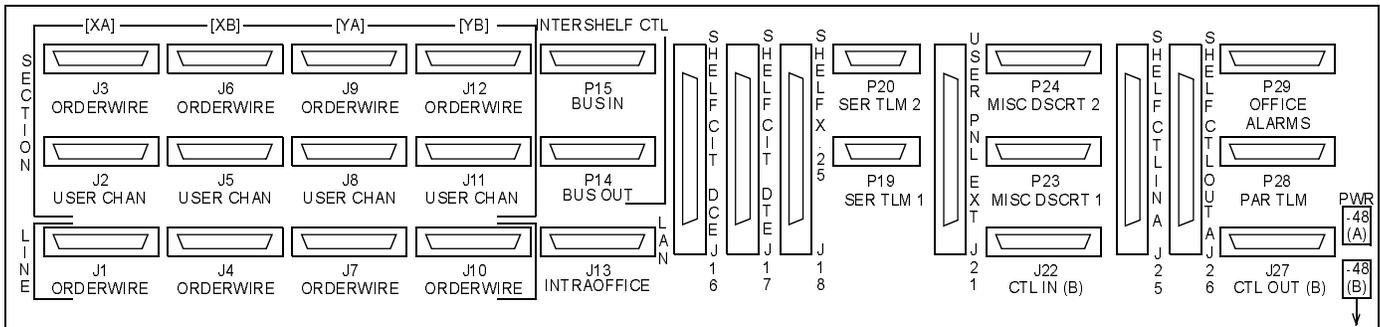
-23 OLS Interconnection Panel

Shelf Interfaces

Front cable access is provided through the interconnection panel. The interconnection panel provides the following interfaces:

- X.25: This connector provides an interface to a message-based operations system that uses X.25 protocol and the Transaction Language 1 (TL1) message language.

- SER TLM 1 and SER TLM 2: These connectors provide a serial telemetry interface that uses telemetry byte-oriented serial (TBOS) protocol. SER TLM 1 will provide an interface to the External Miscellaneous Discrete Unit (EMDU) for Release 2.0 or later. SER TLM 2 is not currently used.

- OFFICE ALMS: This connector provides an interface to the local office audible and visible alarms.

- PAR TLM: This connector provides an interface to an operations center for alarm information.

- MISC DSCRT 1 and MISC DSCRT 2: These connectors provide an interface to external equipment via a terminal strip. This allows an operations system to monitor and control equipment co-located with the OLS.

- CIT-(DTE): This connector provides an interface to a modem that allows dial-up CenterLink Management Console (CMC) access.

- CIT-(DCE): This connector provides an interface to the CMC (DCE) port behind the right front door that allows local access.

- USER PNL EXT: This connector provides an interface to the alarm and status indicators and ACO switch on the indicator strip.

- SECTION USER CHAN LINE (XA), LINE (XB), LINE (YA), and LINE (YB): These connectors provide an interface that allows access to the section user channel (F1 byte) of the OC-3 supervisory signal.

- SECTION ORDERWIRE LINE (XA), LINE (XB), LINE (YA), and LINE (YB): These connectors provide an interface that allows an orderwire set access to the section orderwire (E1 byte) of the OC-3 supervisory signal for voice communications, or (with additional wiring and converters) other uses such as connection to remote alarm or CMC ports.

- LINE ORDERWIRE LINE (XA), LINE (XB), LINE (YA), and LINE (YB): These connectors provide an interface that allows an orderwire set access to the line orderwire (E2 byte) of the OC-3 supervisory signal for voice communications.

- INTRAOFFICE LAN LINE (X) and LINE (Y): These connectors are reserved for use in a future release.

- PWR: These connectors provide an interface to the -48V DC power filters behind the fuse panel. The power cables are connected to radio frequency (RF) filters on the interconnection panel using push-on type connectors.

OLS Shelf Fuse Panel

Figure 2-24 shows the fuse panel from the OLS shelf. It contains the A and B bus fuses, an ESD jack, shelf identification label, and the line identification label.
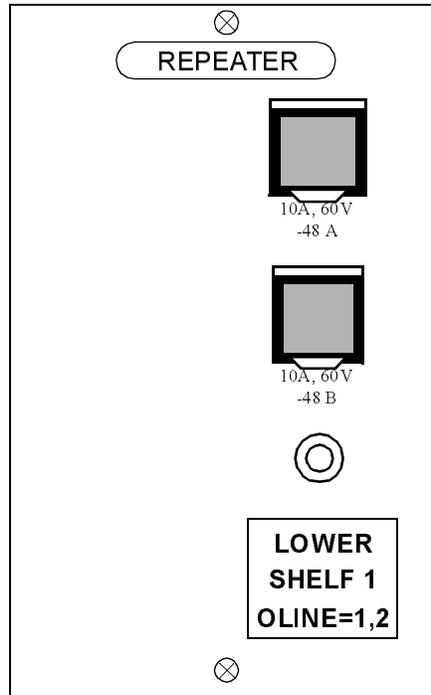
Figure 2-24 OLS Shelf Fuse Panel (Repeater Application Shown)

Miscellaneously Mounted OLS Shelf

Figure 2-25 on page 2-32 shows the Miscellaneously Mounted OLS Shelf with its Wave Pattern covers, mounting brackets and associated Heat Baffle.

ols04001.00eJF080196
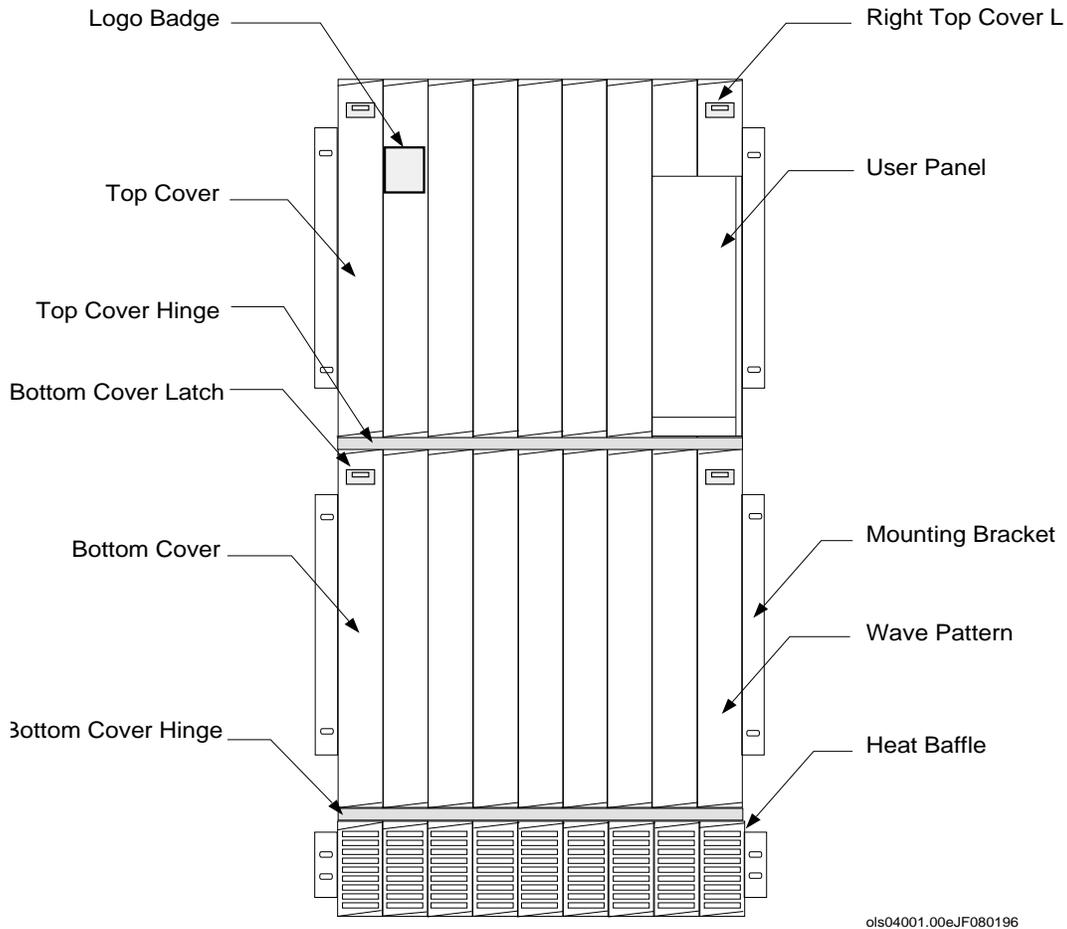
Figure 2-25 Miscellaneously Mounted OLS Shelf

OT Shelf Descriptions

The OT cabinet is comprised of the following three (3) shelves: the System Controller Shelf, Complementary Shelf 1 and Complementary Shelf 2.

System Controller Shelf Description

The System Controller Shelf is powered by two independent -48 Volt power sources (A & B), each independently fused for 10 Amps, and each having a power filter with a low voltage shutoff. The low voltage shutoff occurs at a nominal voltage of -38 volts with a turn on of -42 volts nominal. A miscellaneous discrete alarm is provided with each filter to indicate when a fuse failure or a low voltage shutoff occurs.

The shelf provides slots to hold eight (8) OTU or four (4) QOTU circuit packs. Each slot is defined by a numbered designation label. Three additional slots have been provided for control circuit packs for use in future releases. These slots will remain empty for R1-OT.

The System Controller Shelf is the lowest shelf in the OT cabinet and is shown in Figure 2-26 on page 2-33, "OT System Controller Shelf."
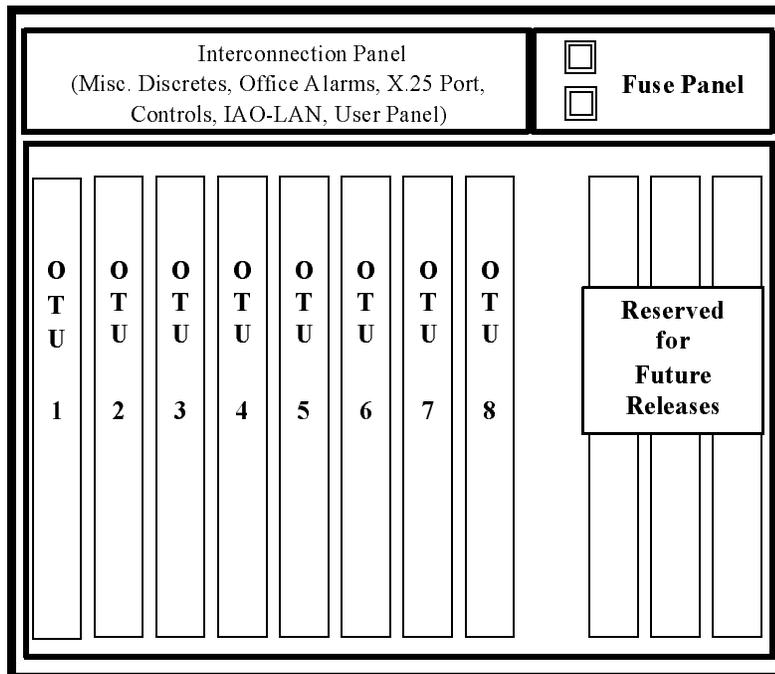
Figure 2-26 OT System Controller Shelf

Complementary Shelf 1 and 2

Each Complementary Shelf is powered by two independent -48 Volt power sources (A&B), each independently fused at 10 Amps, and each having a power filter with a low voltage shutoff. The low voltage shutoff occurs at a nominal voltage of -38 volts with a turn on of -42 volts nominal. A miscellaneous discrete alarm is provided with each filter to indicate when a fuse failure or low voltage shutoff occurs.

Each shelf supplies slots to hold up to twelve (12) OTU or six (6) QOTU circuit packs. On Complementary Shelf 1 the slots are labeled OTU 9 through OTU 20 while Complementary Shelf 2 has slots 21 through 32. Complementary Shelf 1 is the middle shelf within the OT cabinet while Complementary Shelf 2 is the upper shelf.

Complementary Shelf 1 and 2 are shown in Figure 2-27 on page 2-34, "OT Complementary Shelf 1," and Figure 2-28 on page 2-35, "OT Complementary Shelf 2" respectively.
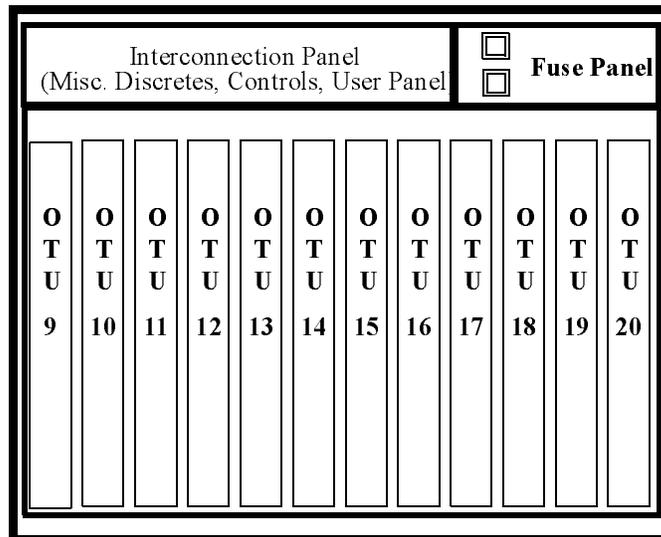
Figure 2-27 OT Complementary Shelf 1
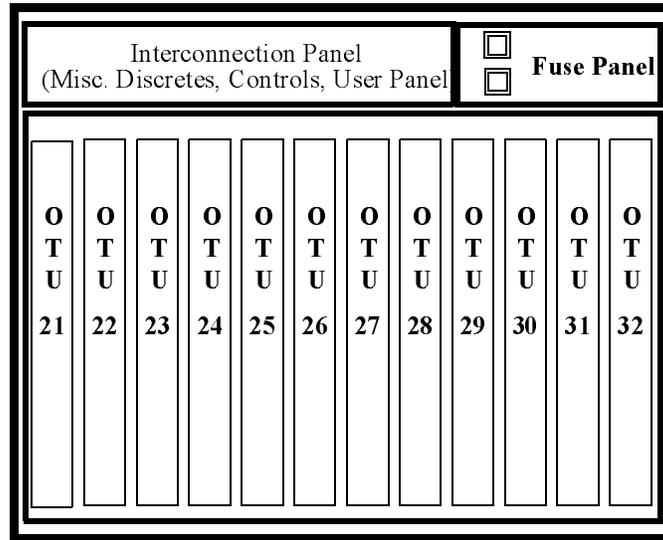
Figure 2-28 OT Complementary Shelf 2

OT Interconnection Panel

The top of each OT shelf contains an interconnection panel to provide interconnections between the three shelves and to provide external interfaces for the OT functions. Except for power, all the cabling entering the interconnection panel is connectorized with D-subminiature connectors. Power cables use a push-on type connector and are factory installed in the OT cabinet (List 1). All access to the connectors is from the front.

Shelf Interfaces

The shelf interfaces for the two Complementary Shelves 1 and 2 are identical and active for R1-OT. The System Shelf has a different interconnection panel with some interfaces active and others available for future releases.

Complementary Shelf Interfaces:

The interconnection panel for Complementary Shelves 1 and 2 is shown in Figure 2-29 on page 2-36, "OT Complementary Shelf Interconnection Panel".
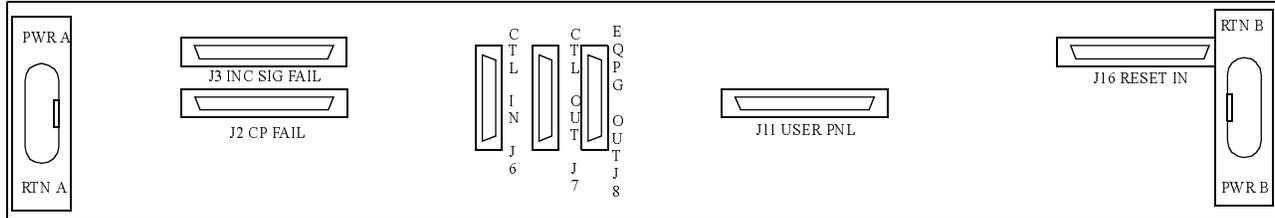
Figure 2-29 OT Complementary Shelf Interconnection Panel

The following external interface connectors are active and used in R1-OT:

■ INC SIG FAIL J3: This connector provides an interface to the Incoming Loss of Signal Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ CP FAIL J2: This connector provides an interface to the Circuit Pack Failure Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ PWR: These connectors provide an interface to the -48V DC power filters from source A and source B. They are installed at the factory for List 1 OT with cabinet.

System Shelf Interfaces:

The interconnection panel for the System Shelf is shown in Figure 2-30 on page 2-36, "OT System Shelf Interconnection Panel".
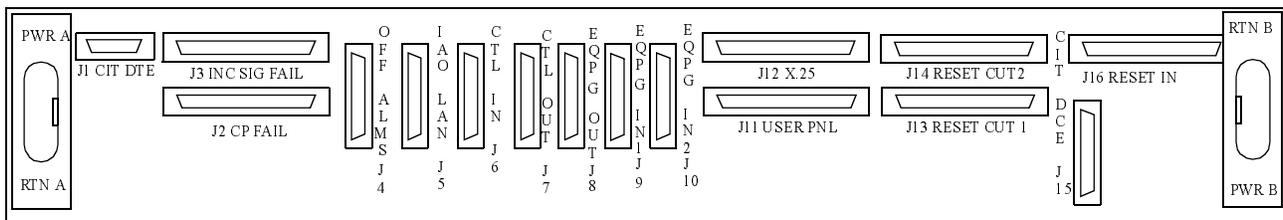
Figure 2-30 OT System Shelf Interconnection Panel

The following external interface connectors are active and used in R1-OT.

■ INC SIG FAIL J3: This connector provides an interface to the Incoming Loss of Signal Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ CP FAIL J2:   This connector provides an interface to the Circuit Pack Failure Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ PWR: These connectors provide an interface to the -48V DC power filters from source A and source B. They are installed at the factory.

The following connectors are provided for future releases: X.25 J12, OFF ALMS J4, CIT DCS J15, CIT DTE J1, and IAO LAN J5.

OT Cabinet Fuse Panel

Each shelf in the OT cabinet has its own fuse panel. The fuse panels for each shelf have a common design and are identical. Each fuse panel contains the A and B bus fuses and labeling identifying the fuse amperage and voltage.

Under normal conditions, power is supplied to the shelf from both the A and B supplies. Should there be a fuse failure, the fuse capacity is sufficient to handle the current supplied from one source. The cover on the fuse holder will illuminate during a fuse failure to indicate that the fuse is blown.

The fuse panel is shown in Figure 2-31 on page 2-37, "OT Cabinet Fuse Panel".

-48A
10A
60V

-48B
10A
60V
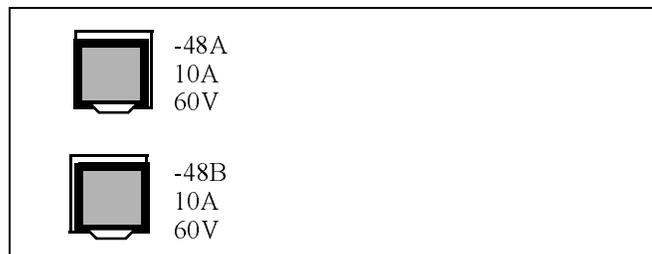
31 OT Cabinet Fuse Panel

OT Power Filter

Power Filters are provided for the A and B power sources on each shelf. they are wired in series with the respective fuses for each source. Each filter has a low voltage cutoff that will operate at a nominal -38 Volts and turn back on at -42 Volts nominal. A miscellaneous discrete contact is provided with each filter so a fuse failure or low voltage cutoff may be reported independently for each power source.

Miscellaneously Mounted OT

The miscellaneously mounted versions of OT (List 10 through List 13) are provided for applications requiring mounting other than an OT cabinet. The bay frame is supplied by the customer or ordered separately. The miscellaneous mount versions would be used in applications where space is limited. The shelves must be mounted on site and the interconnecting wiring must be installed on site.

The miscellaneous mounted OT shelves are identical to the shelves in the OT cabinet except for the following differences:

- Each shelf has its own cover.

- The power on indicators and alarms that were on the cabinet indicator strip are incorporated within the fuse panels.

- Each shelf is equipped with a heat baffle mounted below each shelf.

Figure 2-32 on page 2-39, "Miscellaneously Mounted OT (List 10)," shows a miscellaneously mounted OT mounted to an 800 Type bayframe.
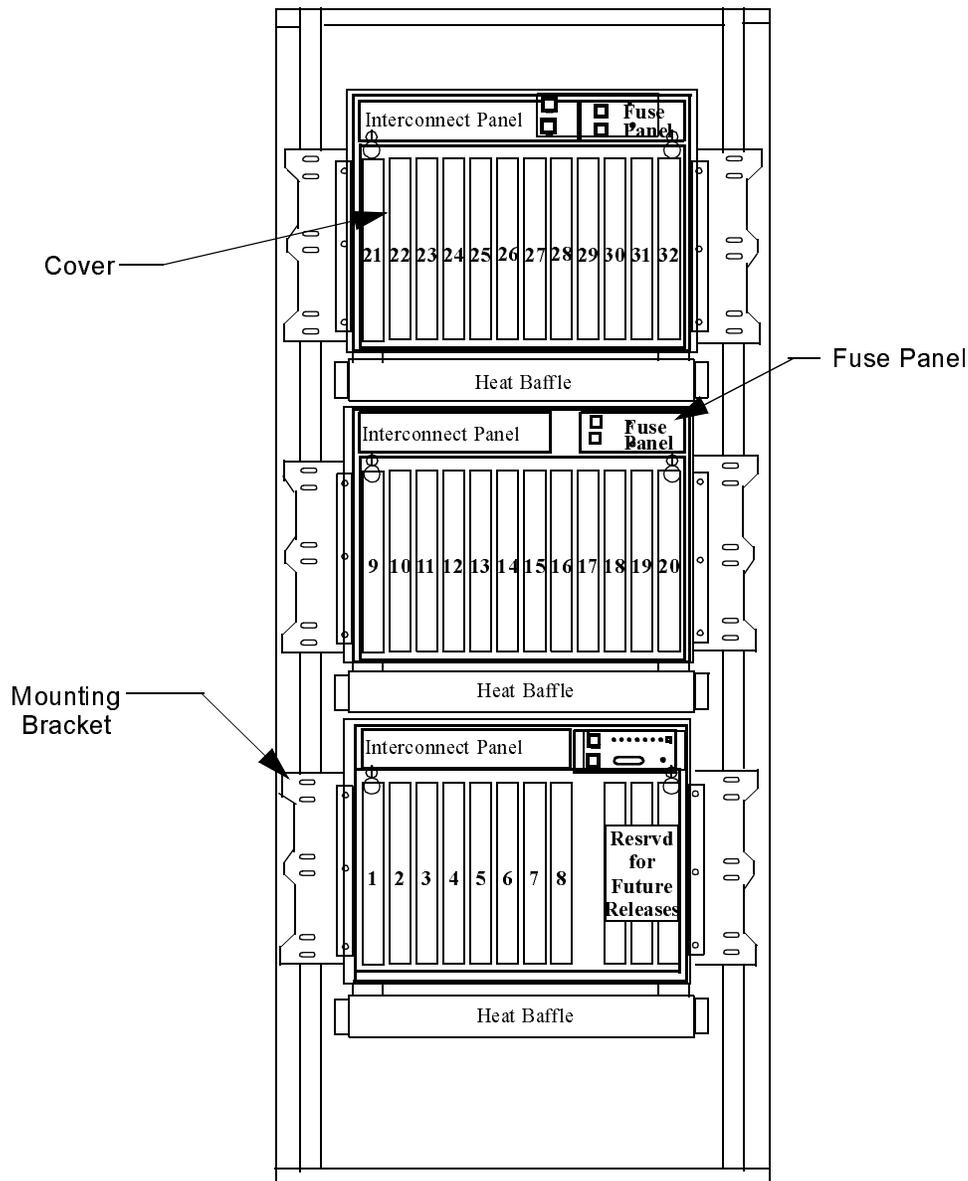
Figure 2-32 Miscellaneously Mounted OT (List 10)

Figure 2-33 on page 2-40, "OT Miscellaneously Mounted System Shelf Fuse Panel," shows the System Shelf fuse panel for the miscellaneously mounted OT. The alarm indicators that were located at the top of the OT cabinet are now located at this panel along with the CIT-DCE port connector. The definition of the alarms is the same as described in Table 2-1, "Indicator Strip LEDs Indications,"

on page 2-17. Figure 2-34, "OT Miscellaneously Mounted Complementary Shelf Fuse Panel," shows the fuse panel for the miscellaneously mounted Complementary Shelves. The power ON LED is now located on this panel.
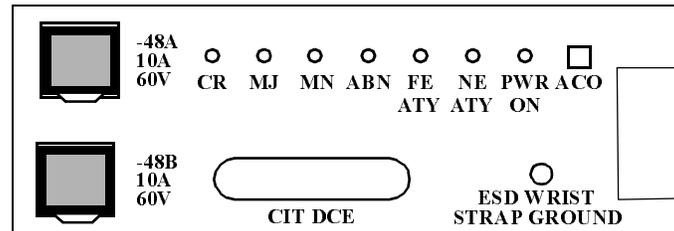
Figure 2-33 OT Miscellaneously Mounted System Shelf Fuse Panel
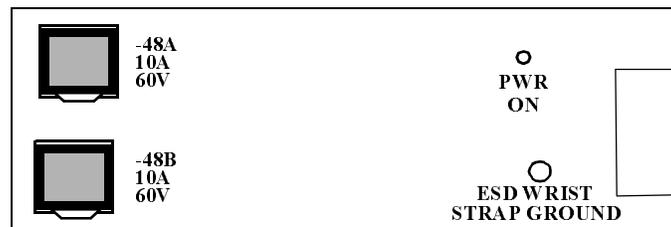
Figure 2-34 OT Miscellaneously Mounted Complementary Shelf Fuse Panel

Available Versions of Miscellaneous Mount

- List 10 - Includes the System Controller Shelf with Complementary Shelves 1 and 2. Power cables and shelf interconnecting cables are provided.

- List 11 - Includes the System Controller Shelf and single shelf power cables.

- List 12 - Includes Complementary Shelf 1, single shelf power cables, and interconnecting cables to the System Controller Shelf. The List 12 is provided to handle system growth beyond a single System Controller Shelf. It is assumed that the system already has a System Controller Shelf installed.

- List 13 - Includes Complementary Shelf 2, a set of single shelf power cables, and interconnecting cables to the System Controller Shelf and Complementary Shelf 1. The List 13 is provided to handle system growth beyond a System Controller Shelf and Complementary Shelf 1. It is assumed that the system already has a System Controller Shelf and a Complementary Shelf 1 is installed.

E - Circuit Pack Descriptions & Addresses

OLS Circuit Pack/Unit Descriptions

System Controller Circuit Pack

The LEA1 SYSCTL circuit pack and the system memory circuit pack provide the highest level of system control for OLS. The SYSCTL provides system-level user and operations systems interfaces and performs system-wide maintenance computations such as performance monitoring. It contains the circuitry for all serial interfaces (X.25, CIT(CMC), TBOS).

System Memory Circuit Pack

The LEA2 SYSMEM circuit pack provides memory support for the system controller. It contains erasable programmable read-only memory (EPROM) for nonvolatile storage of the user-provisioned data and the system state and a flash EPROM for nonvolatile storage of the software for the entire system. The SYSMEM contains the circuitry for the indicator strip, parallel telemetry, miscellaneous discretes, and office alarms.

Tributary Overhead Controller Circuit Pack

The LEA5 TOHCTL circuit pack processes the SONET Section overhead (D1-D3) of the supervisory channel. It interfaces with the transmission overhead on the TLM circuit pack to deliver and receive Data Communications Channel (DCC) data and it interfaces to the system controller complex by means of the Overhead Access Local Area Network (OALAN).

Optical Amplifier Circuit Pack

The LEA6 OA circuit pack:

■ amplifies the optical signal a maximum of 33 dB for a maximum output power of +17 dBm with 8 wavelengths equipped.

■ provides the power monitors on the optical monitor point provided by the amplifier module.

■ controls the pump lasers which controls the OA output power.

■ provides add/drop ports for the supervisory signal.

■ provides temperature control for the OMUs and ODUs for version and type information.

The LEA7 OA circuit pack:

⇒ **NOTE:**

In Releases 2.0, the Optical Line System can configured as an Nx33 (N≤3) or Mx24/Px25 (M≤8 and P≤7). In the Nx33 configuration, an LEA6 or LEA7 may be used, however refer to Table 2-3 on page 2-56 when using the LEA7 as the full 33dB is not achievable for 2 and 3 spans. In the Mx24/P25 configuration, an LEA7 OA circuit pack *must* be used.

■ amplifies the optical signal a maximum of 33 dB or 24 dB for a maximum output power of +17 dBm with 16 wavelengths equipped.

■ provides the power monitors on the optical monitor point provided by the amplifier module.

■ controls the pump lasers which controls the OA output power.

■ provides add/drop ports for the supervisory signal.

■ provides temperature control for the OMUs and ODUs for version and type information.

Figure 2-35 on page 2-43, "OLS Optical Amplifiers Faceplates," shows the OA circuit pack faceplate.

The LEA105 OA circuit pack:

■ provides a shorter fiber span distance (typically 10 to 40 km) between network elements

■ interfaces at OC48, OC12, OC3 and Broadband (400-700 Mbps)

■ provides add/drop ports with OTUs

■ controls the pump laser which controls the OA output power

■ does **not** provide for the supervisory channel

Telemetry Circuit Pack

The LDA1 TLM circuit pack provides the ninth optical signal used in the OLS. This is the supervisory signal and is used for fault location and maintenance functions. In addition, an IS-3 customer maintenance signal interface is provided to allow site-to-site customer specific data. Figure 2-36 on page 2-44, "OLS OMU, ODU, And TLM Faceplates," shows the TLM circuit pack faceplate.

Optical Multiplexing Unit

8 Wavelength - The 505A OMU is used at end terminal sites to combine the 8 incoming signals into one optical signal called the optical line signal. There is no board controller or FAULT LED on the unit. Figure 2-36 on page 2-44 shows the OMU faceplate.

16 Wavelength - The 506A OMU is used at end terminal sites to combine the 16 incoming signals into one optical signal called the optical line signal. There is no board controller or FAULT LED on the unit.Figure 2-36 on page 2-44 shows the OMU faceplate.

Optical Demultiplexing Unit

8 Wavelength - The 605A ODU is used at end terminal sites to demultiplex the 8 dropside signals from the optical line signal. There is no board controller or FAULT LED on the unit. The OA unit provides the temperature monitor/control circuit for the ODU unit. Figure 2-36 on page 2-44 shows the ODU faceplate.

16 Wavelength - The 606A ODU is used at end terminal sites to demultiplex the 16 dropside signals from the optical line signal where the LEA105 is used. There is no board controller or FAULT LED on the unit. The OA unit provides the temperature monitor/control circuit for the ODU unit. Figure 2-36 on page 2-44 show the 606A ODU faceplate.

16 Wavelength (Non-supervisory) - The 606B ODU is used at end terminal sites to demultiplex 16 dropside signals from the optical line signal. There is no board controller or FAULT LED on the unit. The OA unit provides the temperature monitor/control circuit for the ODU unit. Figure 2-36 on page 2-44 shows the 606B ODU faceplate.

```
┌──────────────┐  ┌──────────────┐  ┌──────────────┐
│      OA      │  │      OA      │  │      OA      │
│     LEA6     │  │    LEA105    │  │     LEA7     │
│              │  │              │  │              │
│              │  │              │  │              │
│              │  │              │  │              │
│              │  │              │  │              │
│    ○   ○     │  │    ○   ○     │  │    ○   ○     │
│   OUT  IN    │  │   OUT  IN    │  │   OUT  IN    │
│    ○   ○     │  │    ○   ○     │  │    ○   ○     │
│  TLMTLM      │  │  TLM TLM     │  │  TLM TLM     │
│  OUT IN      │  │  OUT IN      │  │  OUT IN      │
│              │  │              │  │              │
│              │  │              │  │              │
└──────────────┘  └──────────────┘  └──────────────┘
```
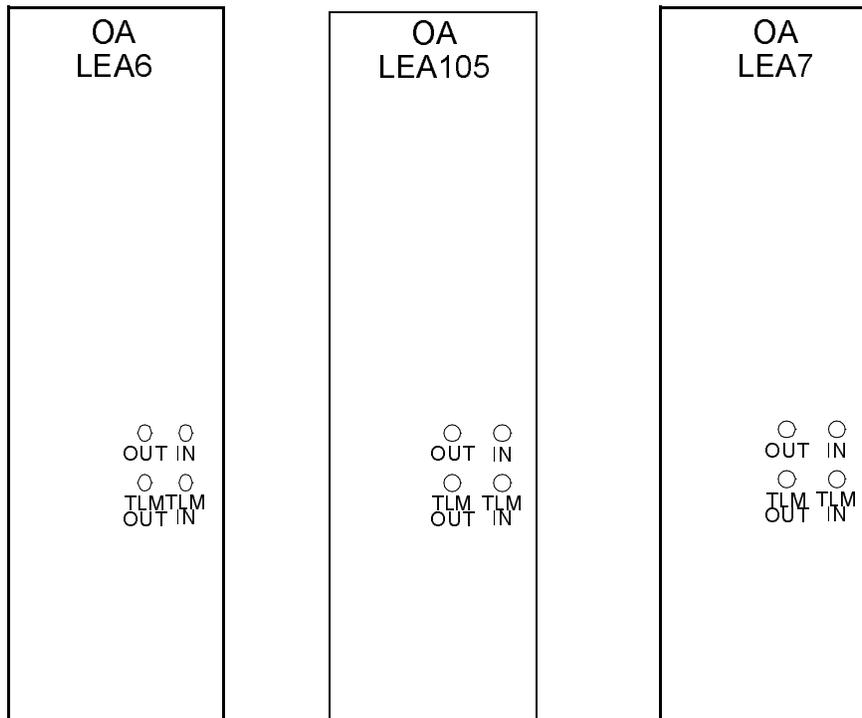
Figure 2-35 OLS Optical Amplifiers Faceplates

OMU 505A

○
OCHAN1 IN
○
OCHAN2 IN
○
OCHAN3 IN
○
OCHAN4 IN
○
OCHAN5 IN
○
OCHAN6 IN
○
OCHAN7 IN
○
OCHAN8 IN

○
OMU OUT

ODU 605A

○
OCHAN1 OUT
○
OCHAN2 OUT
○
OCHAN3 OUT
○
OCHAN4 OUT
○
OCHAN5 OUT
○
OCHAN6 OUT
○
OCHAN7 OUT
○
OCHAN8 OUT

○
ODU IN

TLM

LDA1

○   ○
CM   IN
IN
○   ○
CM   OUT
OUT

OMU 506A

Not Used

OMU
OUT

ODU 606A

Not Used

ODU
IN

ODU 606B

SUPR OUT

ODU
IN
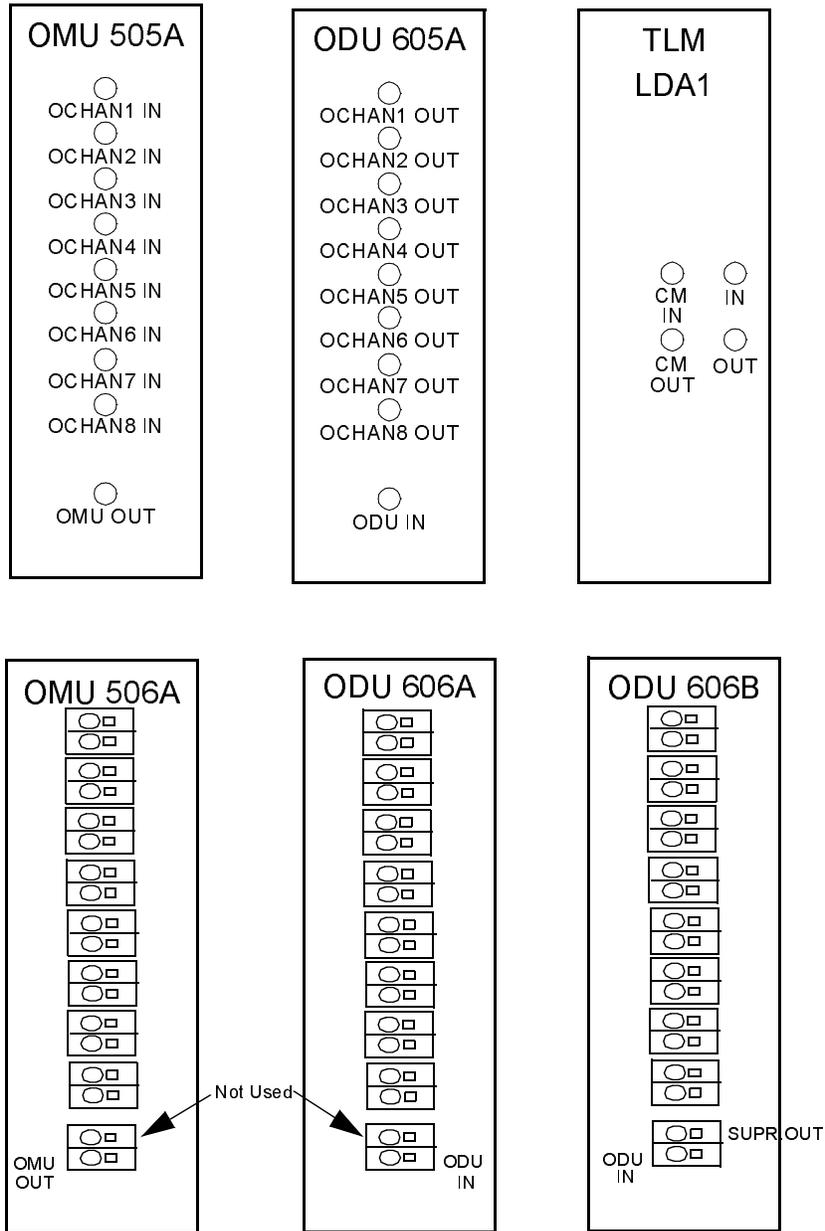
Figure 2-36 OLS OMU, ODU, And TLM Faceplates

OLS Circuit Pack Addresses

Each circuit pack in the OLS (the OMU and ODU are units not circuit packs) has a unique address for the alarm system called an access identifier (AID). Figure 2-37 on page 2-45 shows the AIDs by cabinet type. For an End Terminal and Repeater Cabinet use the shelf 1 from an End Terminal cabinet as the lower shelf and shelf 1 from a repeater cabinet as the upper shelf.

UPPER SHELF	UPPER SHELF	UPPER SHELF	UPPER SHELF
Shelf 2 OA-3A, OA-3B OA-4A, OA-4B TLM-3A/B, TLM-4A/B	**Shelf 2** OA-3A, OA-3B OA-4A, OA-4B TLM-3A/B, TLM-3B/A TLM-4A/B, TLM-4B/A	**Shelf 2** OA-1A, OA-1B OA-2A, OA-2B TLM-1A/B, TLM-2A/B SYSCTL SYSMEM TOHCTL	**Shelf 2** OA-1A, OA-1B OA-2A, OA-2B TLM-1A/B, TLM-1B/A TLM-2A/B, TLM-2B/A SYSCTL SYSMEM TOHCTL
LOWER SHELF	LOWER SHELF	LOWER SHELF	LOWER SHELF
Shelf 1 OA-1A, OA-1B OA-2A, OA-2B TLM-1A/B, TLM-2A/B SYSCTL SYSMEM TOHCTL	**Shelf 1** OA-1A, OA-1B OA-2A, OA-2B TLM-1A/B, TLM-1B/A TLM-2A/B, TLM-2B/A SYSCTL SYSMEM TOHCTL	**Shelf 1** OA-1A, OA-1B OA-2A, OA-2B TLM-1A/B, TLM-2A/B SYSCTL SYSMEM TOHCTL	**Shelf 1** OA-1A, OA-1B OA-2A, OA-2B TLM-1A/B, TLM-1B/A TLM-2A/B, TLM-2B/A SYSCTL SYSMEM TOHCTL
OLS End Terminal **4 Bidirectional Lines**	**OLS Repeater** **4 Bidirectional Lines**	**OLS Dual End Terminal** **2 - 2 Bidirectional Lines**	**OLS Dual Repeater** **2 - 2 Bidirectional Lines**

Figure 2-37 OLS Circuit Pack AIDs By Cabinet Type

OT Circuit Pack/Unit Descriptions

41A, 41B & 41C Optical Translator Unit (OTU) Pack

The 41A(1-16)B/41A(1-16)C Type and 41C(1-16)B/41C(1-16)C Type Optical Translator Unit (OTU) receives an OC-48 optical signal at its input, downconverts the signal to a 2.5 Gb/s electrical signal, strips away stray tones caused by intermodulation products, applies a new tone at a code specific frequency, upconverts to an optical signal, and outputs an OLS compatible OC-48 optical signal at a wavelength specified by its particular code. The input to all OTUs can receive optical signals in the 1310 nm and 1550 nm range. The OLS compatible output wavelength of the unit is specified by its code as shown in Table 2-2, "OTU Code verses Wavelength, Output Power, and Tone Frequency," on page 2-46 along with the output power range and tone frequency. With such a capability, OTUs may be used to regenerate the optical signal or provide Wavelength Add Drop (WAD) capability. The 41BB OTU translates a 1550 nm signal to a 1310 nm signal for WAD capability with 1310 nm equipment.

The faceplate of the OTU is shown in Figure 2-38 on page 2-47, "OTU and OTPM Faceplates". The OTU is shipped equipped with a Lightwave Build-out (LBO) for ST-Type connectors on the optical input and output. A fault LED is provided with each unit. When there is a loss of incoming signal or it has degraded severely, the LED is flashing. When the LED is on continuously, it indicates circuit pack failure. Each OTU comes equipped with two miscellaneous discrete relay contacts mounted on the board for remote sensing of incoming signal problems and circuit pack failure. Refer to Table 2-7, "Miscellaneous Discrete and Fault LED Conditions," on page 2-67 for more information on the operation of the fault LED and the miscellaneous discretes.

Table 2-2 OTU Code verses Wavelength, Output Power, and Tone Frequency

OTU CODE	Center Wavelength (nm)	Output Power Range (dBm)	Approximate Tone Frequency (KHz)
41A1B, 41A1C, 41C1B, 41C1C	1549.32	-3.3 -to -4.7	5
41A2B, 41A2C, 41C2B, 41C2C	1550.92	-4.8 to -6.0	7
41A3B, 41A3C, 41C3B, 41C3C	1552.52	-5.8 to -7.3	9
41A4B, 41A4C, 41C4B, 41C4C	1554.13	-6.5 to -7.9	11
41A5B, 41A5C, 41C5B, 41C5C	1555.75	-7.0 to -8.4	15
41A6B, 41A6C, 41C6B, 41C6C	1557.37	-7.5 to -8.9	17
41A7B, 41A7C, 41C7B, 41C7C	1558.98	-7.3 to -8.7	19
41A8B, 41A8C, 41C8B, 41C8C	1560.61	-5.8 to -7.2	21

Table 2-2 OTU Code verses Wavelength, Output Power, and Tone Frequency

OTU CODE	Center Wavelength (nm)	Output Power Range (dBm)	Approximate Tone Frequency (KHz)
41A9B, 41A9C, 41C9B, 41C9C	1548.52	-1.3 to -2.7	23
41A10B, 41A10C, 41C10B, 41C10C	1550.12	-4.9 to -5.3	24
41A11B, 41A11C, 41C11B, 41C11C	1551.72	-5.1 to -6.5	25
41A12B, 41A12C, 41C12B, 41C12C	1553.33	-6.1 to -7.5	26
41A13B, 41A13C, 41C13B, 41C13C	1554.94	-6.7 to -8.1	27
41A14B, 41A14C, 41C14B, 41C14C	1556.56	-7.2 to -8.6	28
41A15B, 41A15C, 41C15B, 41C15C	1558.17	-7.4 to -8.9	29
41A16B, 41A16C, 41C16B, 41C16C	1559.79	-6.5 to -7.9	30
41BB	1310.00	0.0 to 2.0	NA
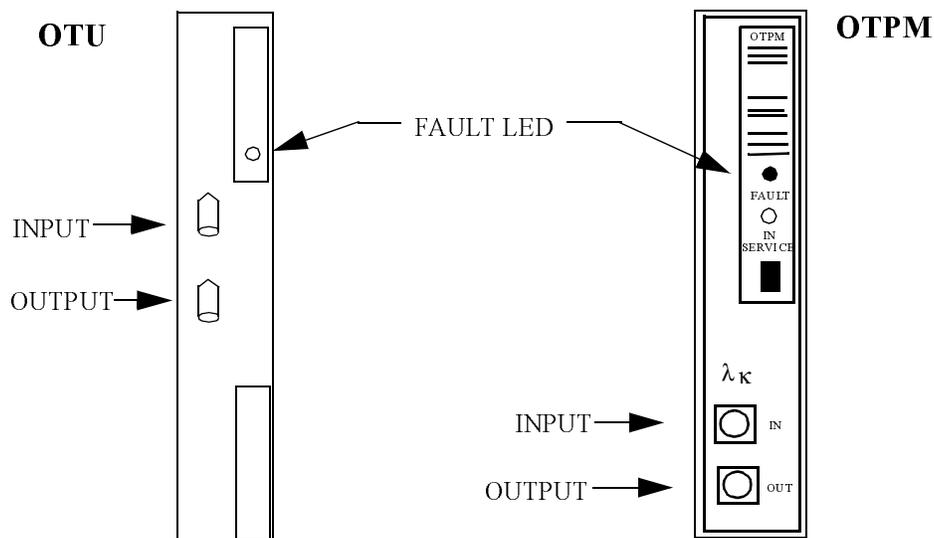
Figure 2-38 OTU and OTPM Faceplates

42A & 42B Type Optical Translator Port Module (OTPM)

Each of these Optical Translator Port Modules (OTPM) circuit packs electrically regenerates a single input OC-12/SDH STM-4 optical signal and inserts the tone required by OLS onto that signal. The 16 42Ax OTPM codes support the 16 1500 nm wavelengths on OLS systems with a total dispersion not exceeding 10,900 ps/nm.

The SONET OC12/SDH STM-4 Optical Translator Port Module (OTPM) circuit pack electrically regenerates a single OC-12/STM-4 signal in one direction and inserts a clean tone signal. It accepts and SONET OC-12/SDH STM-4 wavelength in the 1280-1335 nm or 1480-1580 nm range and converts to an electrical STS-12 signal. The electrical STS-12 signal is reshaped, retimed, and amplified.

The electrical STS-12 signal is also demultiplexed into four 155.52 Mb/s signals. This allows certain SONET section (B1) overhead bytes to be extracted and monitored.

➡ NOTE:
The OTPM circuit pack does not change the SONET overhead bytes and is not considered a SONET regenerator.

The STS-12 signal is then combined with a wavelength specific tone signal and converted back to a specific wavelength OC-12/STM=4 signal for transmission over a single mode fiber.

The 42A (1-16) OTPM circuit packs support the 16 wavelengths on Optical Line Systems. The 42B OTPM circuit pack generates a SONET OC-12/SDH STM-4 signal in the 1330 nm range for other SONET OC-12/SDH STM-4 receivers. For detailed information, refer to the APOG (Application, Planning and Ordering Guide 365-575-301, Section 10) for further information.

43A & 43B Optical Translator Port Module (OTPM)

Each of these Optical Translator Port Modules (OTPM) circuit pack electrically regenerates a single input OC-3 optical signal and inserts the tone required by OLS onto that signal. The 16 43Bx OTPM codes support the 1.3Um wavelengths on the OLS systems with total dispersion not exceeding 10,900 ps/nm.

This type of OTPM accepts any SONET OC-3/SDH STM-1 wavelength in the 1280-1335 nm or 1480-1580 nm range and converts it to an electrical STS-3 signal. The electrical STS-3 signal is reshaped, retimed, and amplified.

The electrical STS-3 signal is also demultiplexed into a 155.52 Mb/s signal. This allows certain SONET section (B1) overhead bytes to be extracted and monitored.

⇒ NOTE:
The OTPM circuit pack does not change the SONET overhead bytes and is not considered a SONET regenerator.

The STS-3 signal is then combined with a wavelength specific tone signal and converted back to a specific wavelength OC-3/STM-1 signal for transmission over a single mode fiber.

The 43A (1-16) OTPM circuit packs support the 16 wavelengths on Optical Line Systems. The 43B OTPM circuit pack generates a SONET OC-3/SDH STM-1 signal in the 1330 nm range for other SONET OC-3/SDH STM-1 receivers.

For more detailed information associated with the 43A and 43B OTPM circuit packs, refer to the Applications, Planning and Ordering Guide (APOG), Section 10, "Technical Specifications."

44A & 44B Optical Translator Port Module (OTPM)

Each of these Optical Translator Port Modules (OTPM) circuit packs electrically regenerates a single 400-700 Mb/s and inserts a clean tone signal required by OLS onto that signal. The 16 44Ax OTPM codes support the 1.5 um wavelengths on the OLS systems with a total dispersion not exceeding 10,900 ps/nm.

This type of OTPM accepts any data rate in the 400-700 Mb/s range and converts it to an electrical signal which is reshaped, retimed and amplified.

The 44B OTPM circuit pack generates a 400-700 Mb/s signal in the 1.5 um range for other receivers. For detailed information, refer to the APOG (Application, Planning and Ordering Guide 365-575-3301, Section 10) for further information.

41S Quad Optical Translator Unit (QOTU)

The Quad Optical Translator Unit (QOTU) mounts up to four Optical Translator Port Modules (OTPM). Each OTPM regenerates and retimes the received signal. It occupies 2 standard OTU slots on the Optical Translator shelf and must be placed in an odd/even pair (for example 1,2 or 9,10). Each Quad Optical Translator will hold 4 OTPMs in any combination.
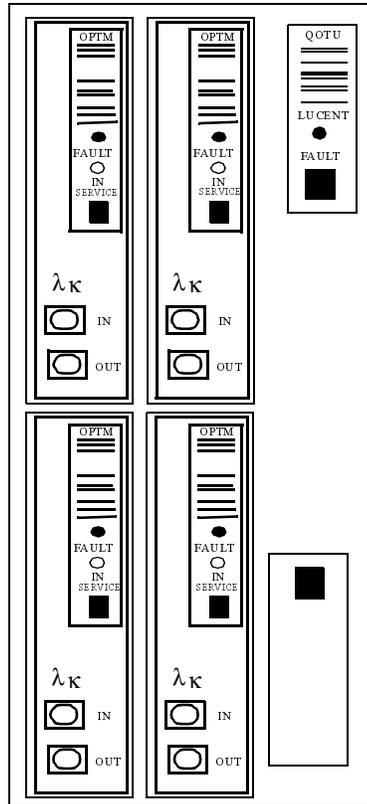
e 2-39 QOTU Faceplate

F - System Block Diagrams & Applications

OLS System Standard Block Diagram

Figure 2-40 on page 2-51 shows the block diagram for the OLS standard configuration. Notice how the 1A OA is transmitting to the outside plant fiber at the 1A-TX site and is receiving from the outside plant fiber at the 1A-RCV site.
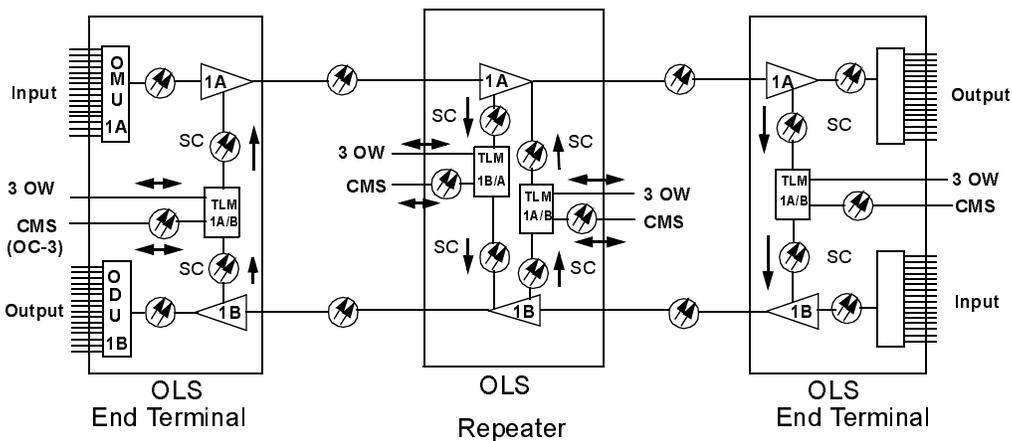
Figure 2-40 OLS Standard Configuration Block Diagram

OLS Dual Facing System Block Diagram

Figure 2-41 on page 2-52 shows the block diagram for the OLS Dual Facing configuration. Notice how the 2A OA is transmitting to the outside plant fiber and the 1A is receiving. This deviation from the standard configuration is necessary with the Dual Facing Shelf. The 2A OA, however, must feed a 1A in either a repeater or at the receiving end. In this configuration only one DS-NE should be established among the 4 nodes.
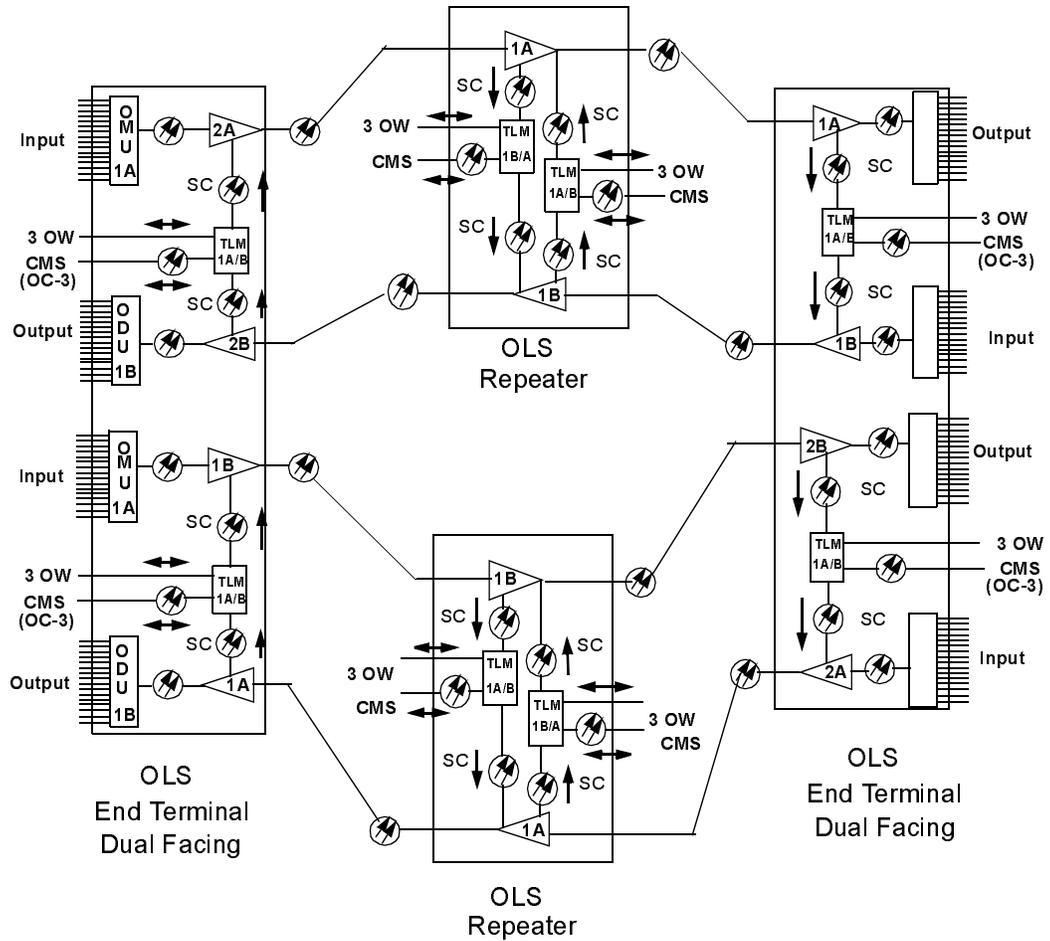
Figure 2-41 OLS Dual Facing Block Diagram
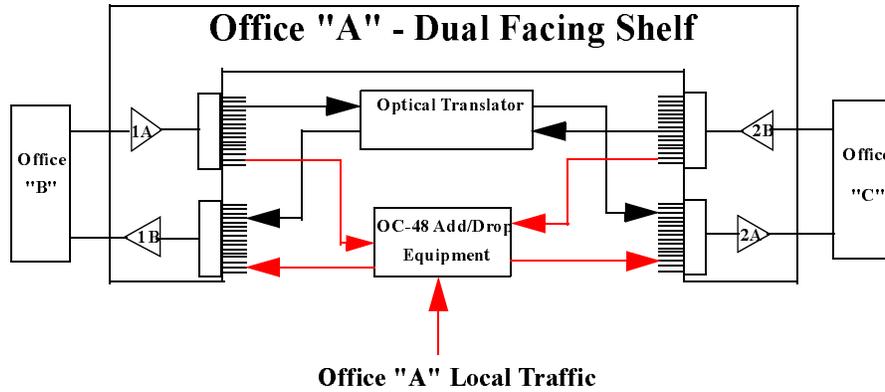
Figure 2-42 Dual Facing Shelf Application

Figure 2-43 on page 2-54, "OT/OLS System Block Diagram," shows a block diagram of the Optical Translator fiber connected to two OLS End Terminals. The diagram illustrates a four fiber system (two service, two protection) with four OTU circuit packs being required for each wavelength. For an OLS System operating with all sixteen (16) wavelengths 64 OTUs would be required.

WEST

PROTECTION

EAST

ODU 1

IN

OUT

41A5

IN

OUT

41A5

OMU 1

OMU 1

ODU 1

ODU 2

IN

OUT

41A5

IN

OUT

41A5

OMU 2

OMU 2

ODU 2

SERVICE
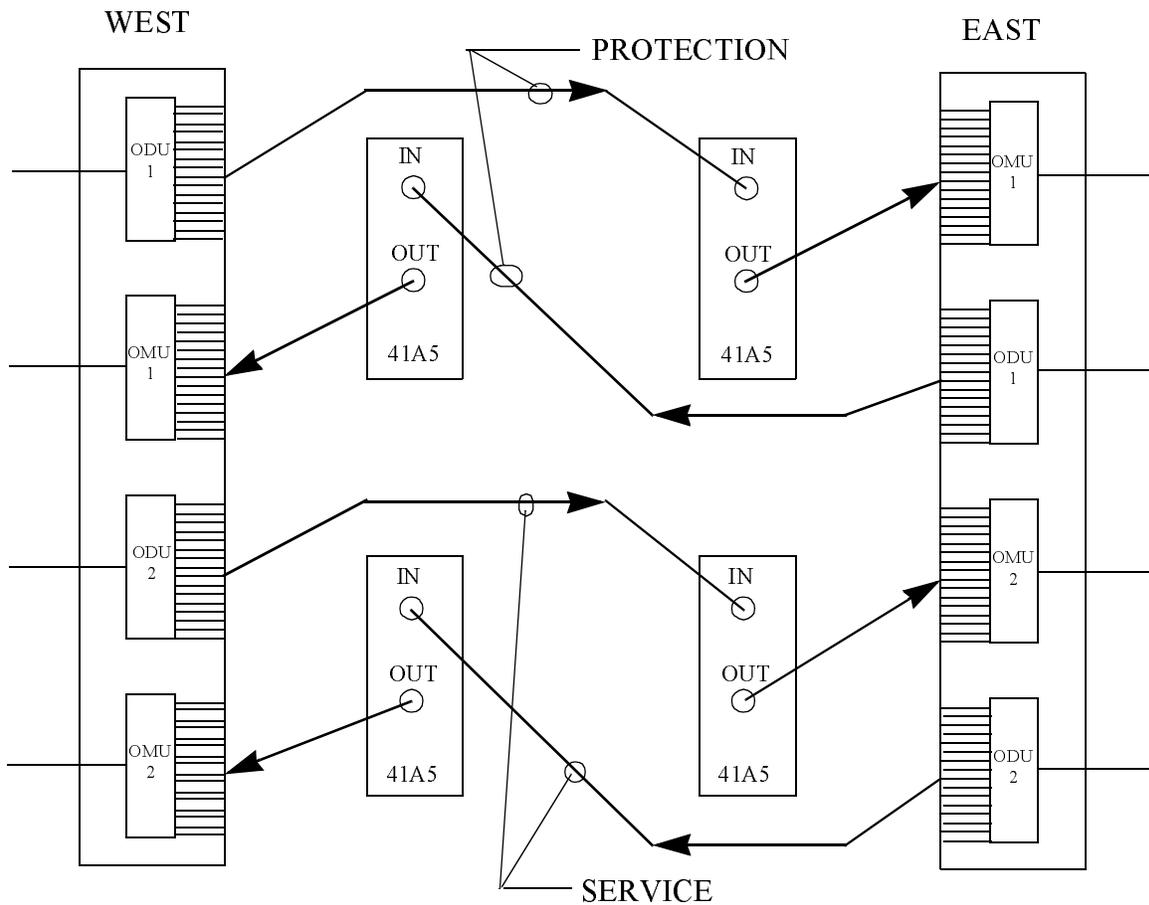
Figure 2-43 OT/OLS System Block Diagram

System Applications

OLS Applications

The OLS is a bit rate independent, point-to-point, optical system that can be used in a variety of applications. In Releases 2 and 2.1, the OLS can be configured for either 1 span Single OA maximum with a loss of 13 dB (1x13) between spans, a 3 span maximum with a loss of 33db (N x 33) between spans, an 8 span maximum with a loss of 24db (M x 24) between spans or a 7 span maximum with a loss of

25db (P x 25). Figure 2-44 on page 2-55, "OLS Release 2.1 Spacings," shows the typical maximum span length of these two configurations. Table 2-5, "Engineering Rules for Release 2.1 Two-OA Systems," on page 2-57 shows the associated span losses, total reaches and allowable number of spans for the Two-OA systems. Table 2-6, "Engineering Rules for Single-OA System with LEA105 (Release 2.1)," on page 2-59 shows the associated span losses, total reaches, bit rates, and allowable spans for the One-OA configurations.

1 X 13 System (Single OA Application)
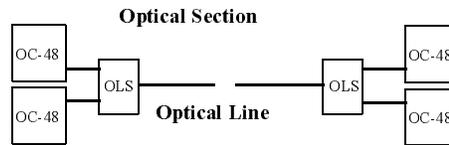
3 X 33 System
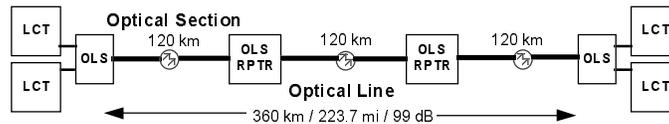
7 X 25 System
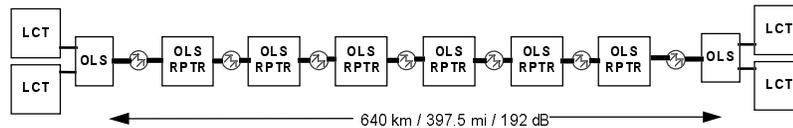
8 X 24 System
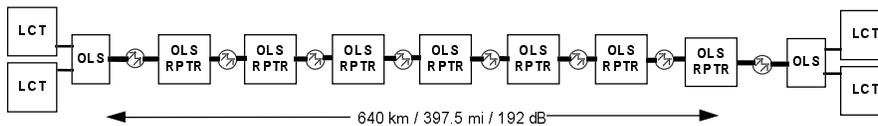
Figure 2-44 OLS Release 2.1 Spacings

Table 2-3 Engineering Rules for Release 2.0 Systems

Application	OA	No. Chan.	No. Spans	Span Loss (dB)		Total Reach (dB)	Span Distance (km) Fiber loss=0.25dB/km	Total Reach (km)
				min	max*	max	max	max
Long Span	LEA6	8	1	22	33	33	132	132
			2	22	33	66	132	264
			3	22	33	99	132	396
Long Reach	LEA7	8	1	22	33	33	132	132
			2	22	30	60	120	240
			3	22	28	84	112	336
			4	21	27	108	108	432
			5	21	26	130	104	520
			6	21	26	156	104	624
			7	17	22	154	88	616
			8	17	22	176	88	640**

* Some spans with span loss more than the maximum value may be accommodated. Lucent provides network engineering support to optimize OLS systems for actual network. Please contact your Lucent sales representative for more information.

** This distance is limited by the dispersion characteristics of standard single-mode fiber (SSMF) (640km x 17ps/nm-km=10880 ps/nm).

⇒ NOTE:
In Release 2 and 2.1, the LEA7 Optical Amplifier can be used in either of these configurations. **The LEA6 can only be used in a N x 33db configuration.**

Table 2-4 Engineering Rules for LEA6 and LEA7 for Releases 1.0 & 2.0

Software Release		OA	System Config.	# of Spans	Span Loss (dB)		Bit Rate
R1	R2				Min*	Max	
X	X	LEA6	Nx33	1 to 3	22	33	OC48
	X	LEA7	Nx33	1	22	33	
	X			2	22	30	
	X			3	22	28	
	X		Px25 or Mx24	4	21	26	
	X			5	21	26	
	X			6	21	26	
	X			7	17	22	
	X			8	17	22	

Table 2-5 Engineering Rules for Release 2.1 Two-OA Systems

OA	Power Config -Side	No. Chan.	No. Spans	Span Loss (dB)		Total Reach (dB)	Span Distance (km)	Total Reach (km)
				min	max*	max	Fiber loss=0.25dB/km max	max
LEA6	A	8	1	22	35	35	140	140
			2	22	34	68	136	272
			3	22	33	99	132	396
	B	8	4	26	31	124	124	496
			5	26	30	150	120	600
		16	1	22	33	33	132	132

Table 2-5 Engineering Rules for Release 2.1 Two-OA Systems

OA	Power Config -Side	No. Chan.	No. Spans	Span Loss		Total Reach (dB)	Span Distance (km)	Total Reach (km)
LEA7	A	16	1	22	33	33	132	132
			2	22	30	60	120	240
			3	22	28	84	112	336
	B	16	4	22	27	108	108	432
			5	21	26	130	104	520
	C	16	6	21	26	156	104	624
			7	17	22	154	88	616
			8	17	22	176	88	640**
LEA105	A	16	1	14	18	18	72	72
	1_OA	16	1	0	***	***	***	***

* Some spans with span loss more than the maximum value may be accommodated. Lucent provides network engineering support to optimize OLS systems for actual network. Please contact your Lucent sales representative for more information.

** This distance is limited by the dispersion characteristics of standard single-mode fiber (SSMF) (640km x 17ps/nm-km=10880 ps/nm).

*** See Table 2-6, "Engineering Rules for Single-OA System with LEA105 (Release 2.1)," on page 2-59.

Table 2-6 Engineering Rules for Single-OA System with LEA105 (Release 2.1)

OA	Max. No. Chan.	No. Span	Span Loss (dB)		Total Reach in (km). Fiber loss=0.25dB/km	Bit Rates
			min	max		
LEA105	16	1	0	12	48	0C-48/12/3,STM-16/4/1 or 400-700 Mb/s
		1	0	12	48	OC-48/12, STM-16/4, or 400-700 Mb/s
		1	0	13	52	OC-48/3or STM-16/1
		1	0	16	64	OC-12/3, TM-4/1 OR 400-700 mB/S
		1	0	13	52	OC-48 alone
		1	0	16	64	OC-12 alone or 400-700 mB/S
		1	0	20	80	OC-3 alone

The OLS can be deployed between the FT-2000 OC-48 Large Capacity Terminal (LCT), FT-2000 Add/Drop Rings (ADR) or other OC-48 systems to create point-to-point or ring systems. Figure 2-45 on page 2-59, "OLS to LCT Interconnect," shows how the LCT will connect to the OLS.
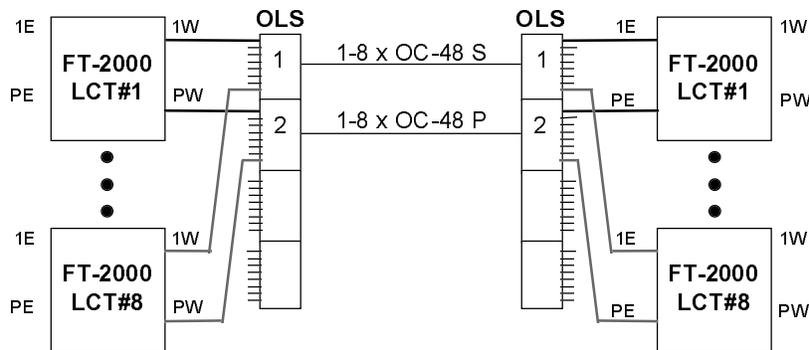
Figure 2-45 OLS to LCT Interconnect

OT Applications

The OT may be used in a variety of applications such as a low cost replacement for a regenerator. Figure 2-46 on page 2-61, "OT Replacement of OC-48 Signal Regenerators," shows such an application where three (3) regenerators have been replaced with OTUs. In this four fiber application, four OTU circuit boards are required at each wavelength (λ_1, λ_2, and λ_3) for a total of 12 OTUs. Besides obtaining a cost reduction, a SONET node is made available in each of the three rings. A space reduction is achieved in this example going from six regenerator bays (two bays per wavelength) to one OT cabinet.

-46 OT Replacement of OC-48 Signal Regenerators

OC-48 Regenerator

360 Km max

120 Km

360 Km max

| OC-48 | | OLS ET | | OLS RPT | | OLS RPTR | | OLS ET | λ_1 | OC-48 ReGen | | OLS ET | | OLS RPT | | OLS RPT | | OLS ET | OC-48 |

λ_1 OC-48 ReGen
λ_2 OC-48 ReGen
λ_3 OC-48 ReGen
λ_4 OC-48 Add/Drop

Four Fibers

Four Fibers

Four Optical Translator Units / Wavelength

120 Km

360 Km max

λ_1 OTU'
λ_2 OTU'
λ_3 OTU'
λ_4 OC-48 Add/Drop

OLS ET   OLS RPT   OLS RPT   OLS ET   OLS ET   OLS RPT   OLS RPT   OLS ET

OC-48

Four Fibers
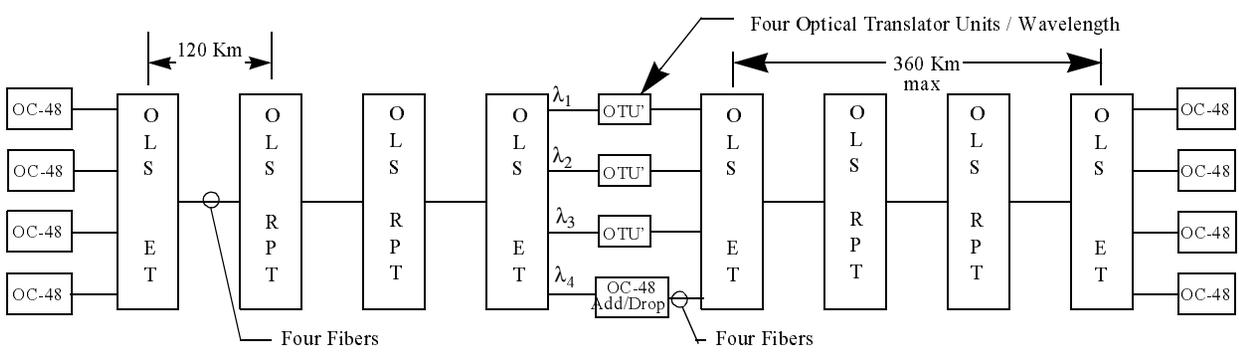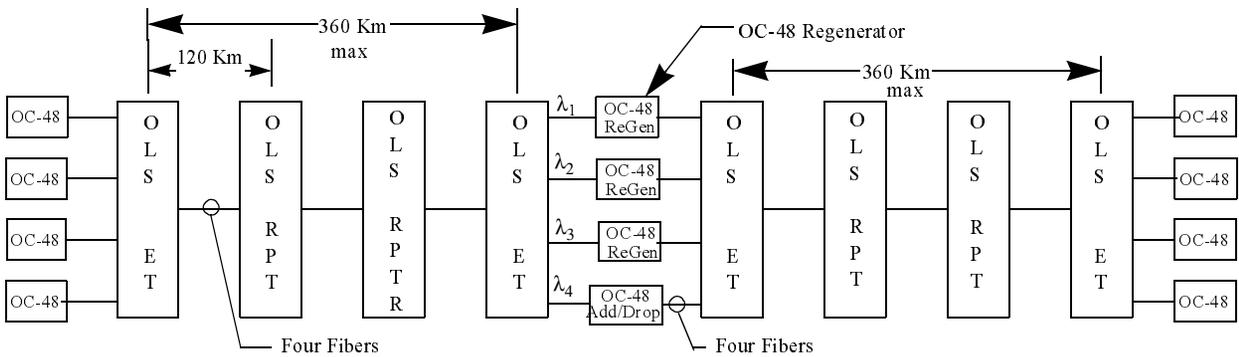
Four Fibers

Another application for OT is a low cost replacement for a node of OC-48 generating equipment in Wavelength Add/ Drop (WAD) applications where the The OC-48 equipment is being used to regenerate signals for through traffic. Figure 2-47 on page 2-62, "Wavelength Add/ Drop Applications shows such an application. The OC-48 equipment on wavelengths 1, 3, and 5 is being used to regenerate the signal so that stray tones may be removed. In a four fiber system, four OTUs at each wavelength mounted in one OT cabinet will be required to replace the three pieces of OC-48 equipment in this example thus saving cost, a SONET node at each wavelength, and space.

WAD with NGLN R2.0

WAD with OT
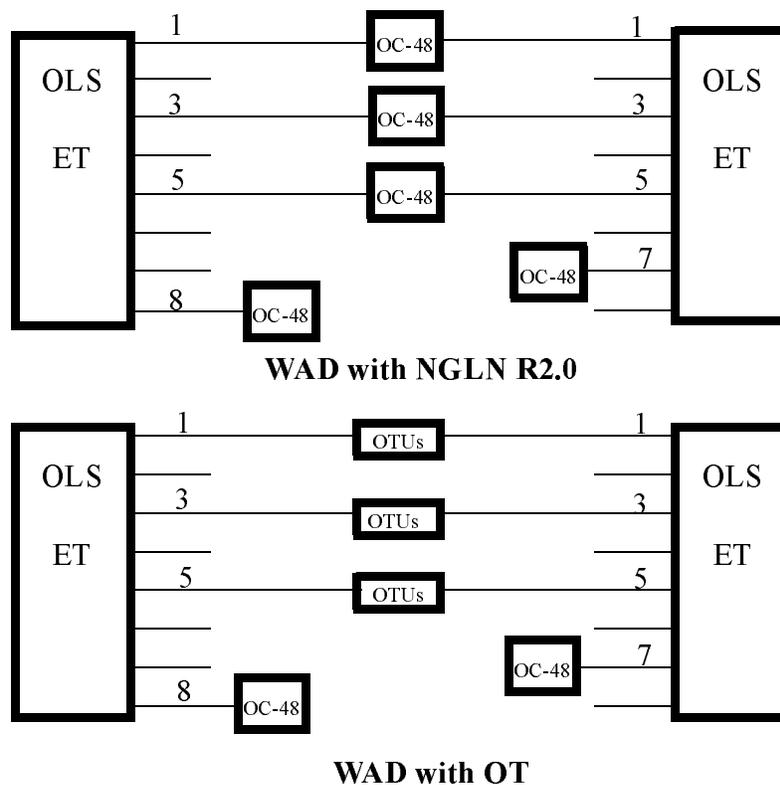
Figure 2-47 Wavelength Add/ Drop Applications

G - Miscellaneous Discrete Alarms

OT Miscellaneous Discrete Alarms

The miscellaneous discrete alarms are the only alarms that can be reported remotely by the OT. There are two miscellaneous discrete alarms per OTU which combine for a total of 64 (2/OTU x 32 OTUs) miscellaneous alarms for a fully populated OT. In addition to the OTU alarms, there are two additional alarms per shelf to report if the A or B source has a loss of power. This power loss may be the result of a fuse failure or a low voltage cutoff. The maximum number of miscellaneous discrete alarms available for a complete OT system would be 70.

OTU Alarm Operation

The alarms are reported by the OTU through two relay contacts. The alarms are wired out from the OTU circuit pack to the backplane and out to the miscellaneous shelf connectors J2 and J3 as a wired pair for each contact (refer to Figure 2-48 on page 7-66). The two relay contacts on the OTU board are identified as MD1 and MD2. A contact closure signifies an alarm condition.
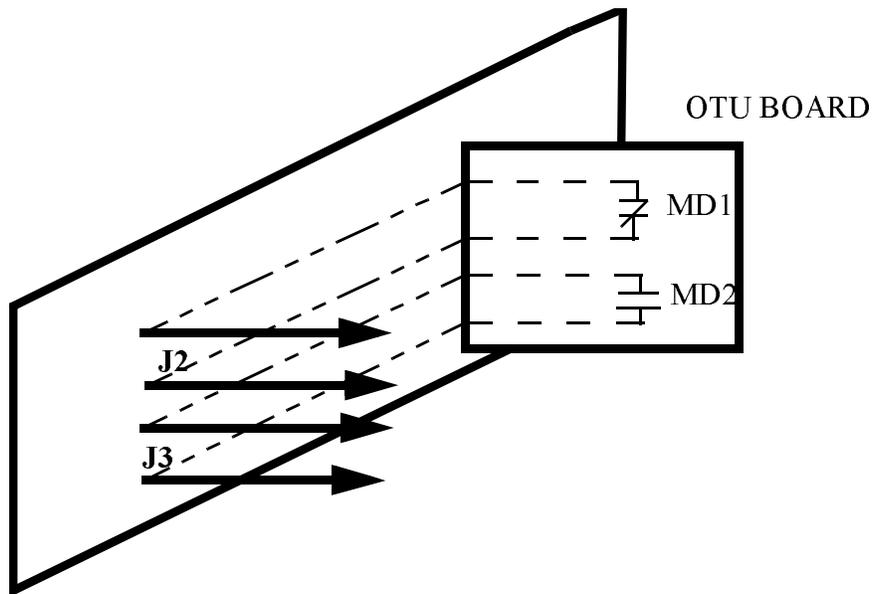
Figure 2-48 Miscellaneous Discrete-Board to Jack Connections

The MD1 relay contact closes whenever there is a circuit pack failure. During initial insertion of the board, the MD-1, being a normally closed contact, will cause an alarm condition. During initialization of the OTU circuit pack a self check is performed. After completing the self check, which takes 15 to 20 seconds, the OTU will open the MD1 contact if the initialization process has been satisfied. Should the pack fail the self check, the contact will remain closed until the condition is corrected.

Contact MD2 is a normally open contact which closes when there is a loss or degradation of incoming signal. The MD2 contact stays open during initialization of the OTU. If after the 15 to 20 second initialization process, the OTU determines that a clean OC-48 signal is present at its input, the MD2 will remain open. If an OC-48 signal is not present or is degraded, the contact will close. Table 2-7, "Miscellaneous Discrete and Fault LED Conditions," on page 2-67 describes the conditions for the operation of MD1 and MD2 and their relation to the fault LED operation.

⇒ NOTE:
The removal of an OTU will not cause a miscellaneous discrete alarm. The insertion of an OTU of a different wavelength will not cause a miscellaneous discrete alarm at the OTU but will cause alarms elsewhere within the network.

Table 2-7 Miscellaneous Discrete and Fault LED Conditions

Condition	Fault LED	MD1	MD2	Laser
No Failures	Off	Open	Open	On
Incoming Signal OC-48 LOS/ LOF	Flashing	Open	Closed	Off
Incoming Signal B_1 parity error	On	Open	Closed	On
Out of Range (OOR) on Laser Bias Current (LBC) or Optical Power Transmit (OPT)	On	Closed	Open	On
Internal defect on OTU	On	Closed	Open	Off
Power converter / fuse failure on OTU	On	Closed	Open	Off
OTU reset / initialization	On	Closed	Open	On
OTU pack insertion	On	Closed	Open	Off
A or B Supply Failure	Off	Closed for all OTUs	Open	On

Power Alarm Operation

Each power filter comes equipped with a miscellaneous discrete alarm to indicate when there is a loss of power due to a fuse failure or voltage cutoff. The alarm does not distinguish between the type of failure but will indicate whether it's the A or B power source and which shelf is involved.

The alarm utilizes an opto-isolator to interface with the EMDU unit. An alarm condition is a low impedance (less than 10 ohms) while a normal condition is indicated by a high impedance.

Connecting to the Miscellaneous Discretes to OLS

The OTU miscellaneous alarms are accessed at the J2 and J3 connectors on each shelf of the OT. Connector J2 carries all the Circuit Pack Failure Alarms (MD1) and J3 carries the Incoming Signal Failures (MD2). With three shelves, this results in six cables required to output all the alarms from the OT cabinet. These cables are brought to an External Miscellaneous Discrete Unit (EMDU). The EMDU adds an additional 128 alarm inputs to the original 16 in the OLS to bring its total to 144 inputs. The EMDU adds an additional 32 control outputs to the original four (4) to bring its total to 36 outputs.

The EMDU is to be located between one of the OLS End Terminals and the OT. The EMDU is wired back to the OLS End Terminal with a single cable that uses

TBOS protocol to communicate between the two units. The EMDU may be wired to either the OLS 1A-TX or 1A-RCV End Terminal depending upon customer preference. These connections are shown in Figure 2-49 on page 7-68, "Miscellaneous Discrete Cable Connections". The interface between the OT and the OLS occurs at the EMDU. The wiring and physical installation of the EMDU and its interface with the OLS is located in Appendix D or Appendix E of the manual. A manual is available from DANTEL titled "46220 Alarm and Control Block Installation & Operation Manual". Harris also provides a manual titled "Harris User Guide for C1000 Centurion". Both units are rack mountable. The DANTEL unit may also be wall mounted.
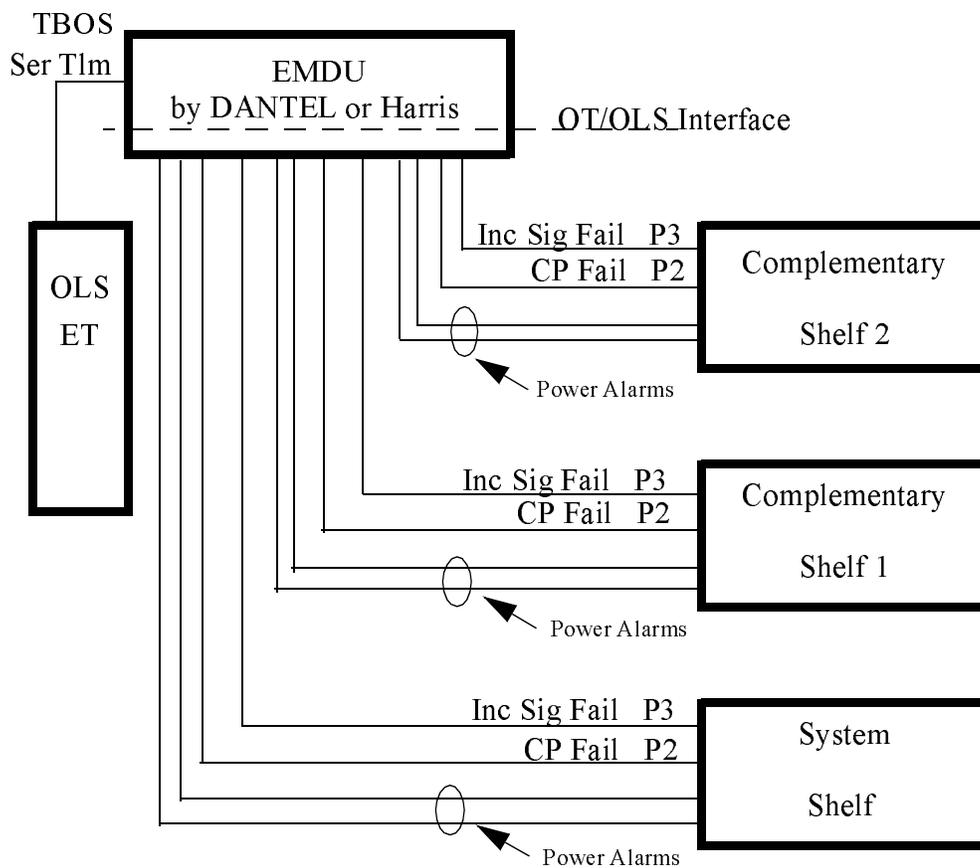
Figure 2-49 Miscellaneous Discrete Cable Connections

System Installation Planning

3

Contents

System Installation Planning

3

Overview

This chapter provides guidelines for establishing OC-48 systems connected through OLS. It describes procedures to be followed in this book to establish these systems.

OLS Basics

Release 1 and 2 Network Architectures

With Releases 1 and 2 the OLS is only a point-to-point system. An OLS can be deployed on a single fiber span to relieve a fiber blockage (Figure 3-1) or can be deployed between any or all nodes of a ring (Figure 3-2). Note that when multiple Optical Line Systems are deployed between different nodes of a ring the systems are independent and cannot communicate between each other. The OLS only exists between the SONET nodes, an entirely different OLS will exist between the other SONET nodes. Other examples of network architectures include point-to-point (Figure 3-3) or linear add/drop systems (Figure 3-4). When a OLS is deployed between two central offices it allows completely independent network architectures to exist on different wavelengths of the same fiber pair. For example, wavelengths 3 and 5 could carry rings, wavelength 4 could carry a point-to-point system, and wavelengths 2 and 7 could carry linear add/drop systems.

Release 2.1 Architecture

In addition to the options outlined in the previous paragraph, Release 2.1 includes another feature for two fiber systems that will allow an OLS system to encompass two or more point-to-point OLS systems. The introduction of the Dual Facing shelf allows the combining of back-to-back co-located single facing shelves in one shelf. The coordination of the SYSMEM and SYSCTL packs in one shelf allows the OSS to communicate across two domains. The operations domain will still not go from the optical networking equipment across to other TDM (Time Division Multiplexing) equipment (SONET/SDH or asynchronous/PDH).

With the operations domain extended, the "Ring" topology is extended as well. The total number of nodes in a "ring" by the old definition is 16, due to the K bits allocated fro carrying the node ID by the SONET standards. The new "ring" topology will not use the K bits, thus will allow for more than 16 nodes in the ring. The guaranteed total number of NEs in this release is no more than 32. In these 32 or less nodes, there can be only one DS-NE (Directory Server-Network Element).
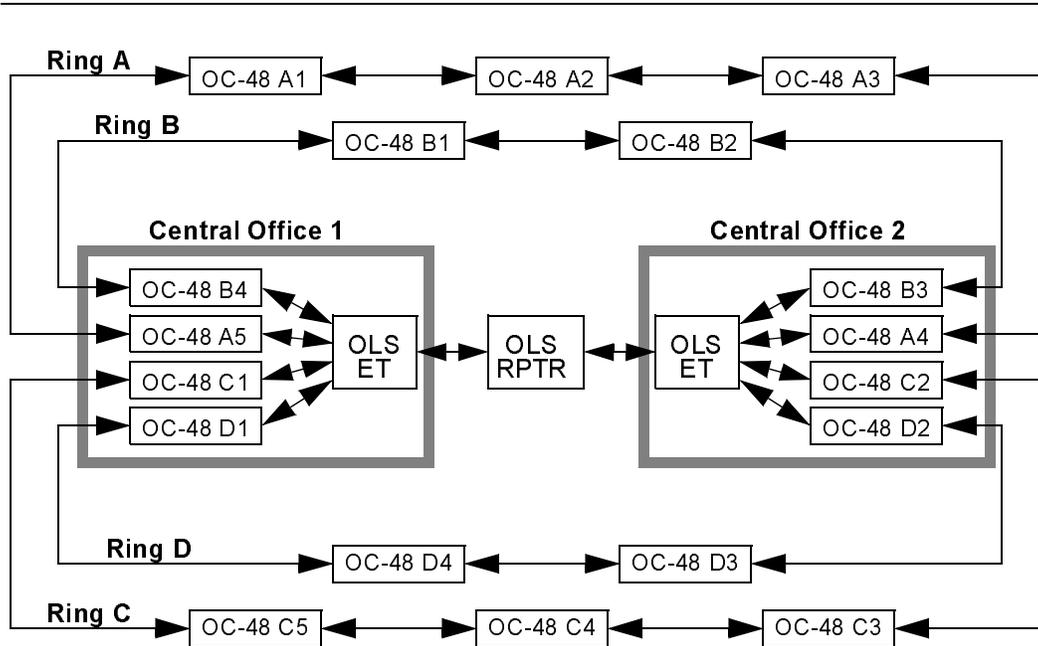
Figure 3-1 Clearing Fiber Blocking
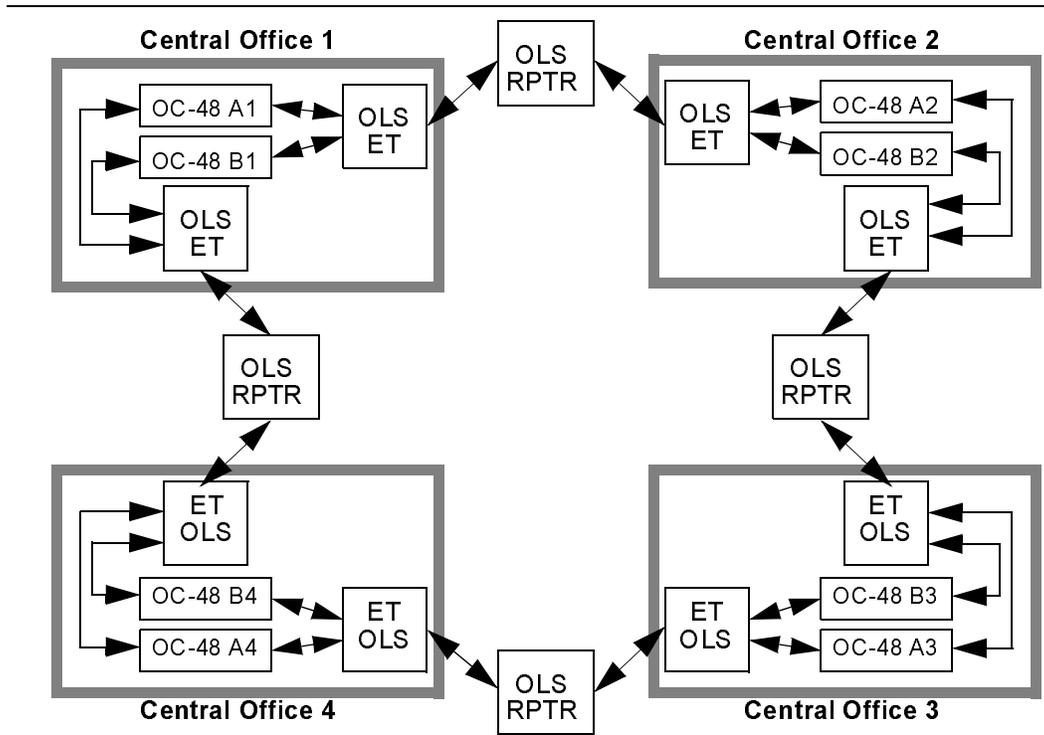
Figure 3-2 Ring Systems
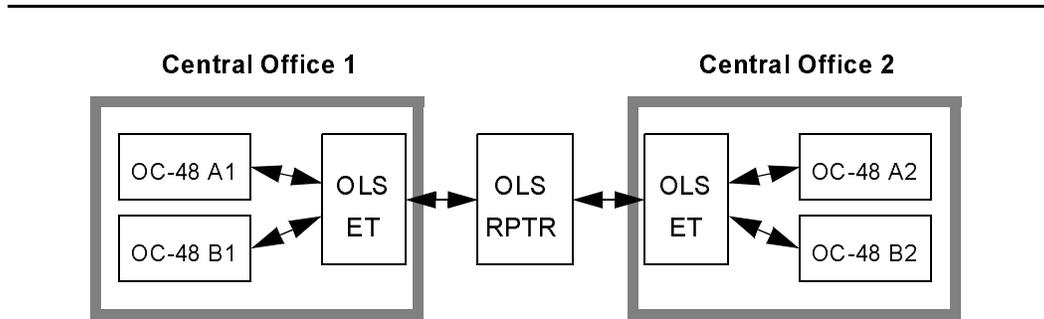
Figure 3-3 Point-To-Point Systems
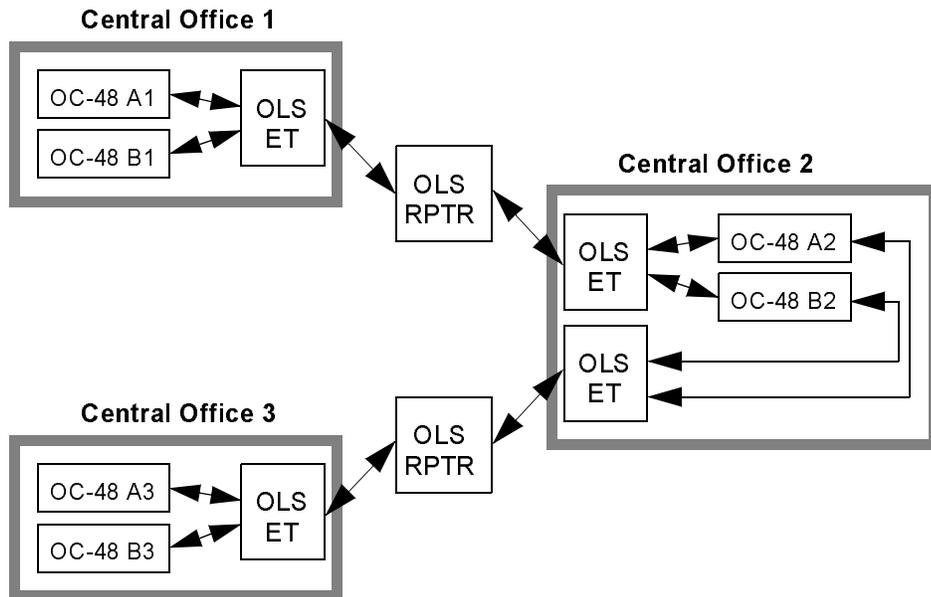
Figure 3-4 Linear Add/Drop Systems

Bi-directional Optical Line

An Optical Line System combines multiple wavelengths called optical channels into a single fiber signal called the optical line. The OLS is deployed as a bi-directional optical line shown in Figure 3-5. It consists of optical multiplex and demultiplex units at each end of the system to combine and split out the optical channels, telemetry circuit packs to generate and receive the supervisory channel, and a string of optical amplifiers in each direction. Three types of offices are shown: 1A-TX End Terminal, Repeater, and 1A-RCV End Terminal. Every OLS will at least have a 1A-TX and 1A-RCV End Terminal. A single bi-directional optical line will support a 2-fiber section or a 4-fiber section if service and protection use different optical channels on the same optical line (Figure 3-6). To achieve full equipment diversity 4-fiber systems would use two optical lines, one for service and one for protection (Figure 3-7).
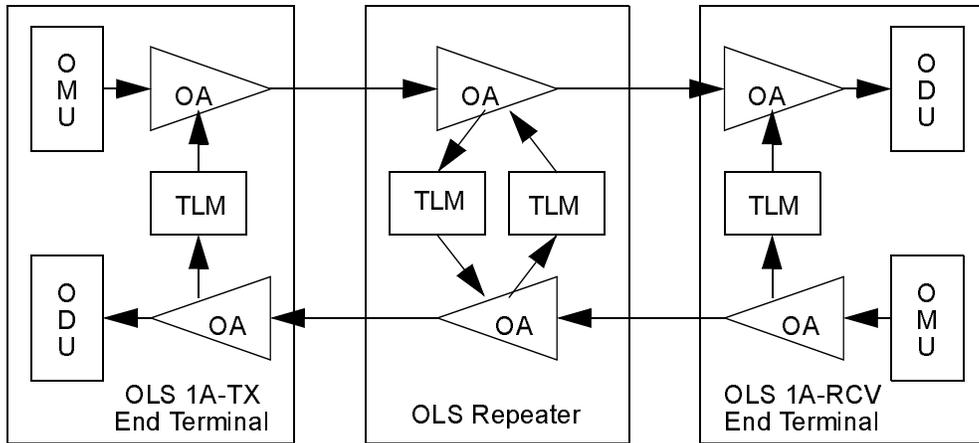
Figure 3-5 Basic Optical Line
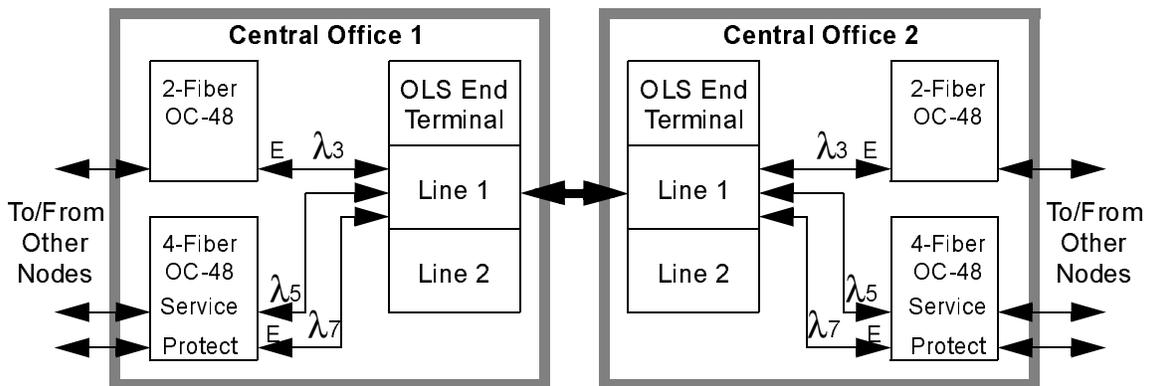
Figure 3-6 Connections To A Single Line
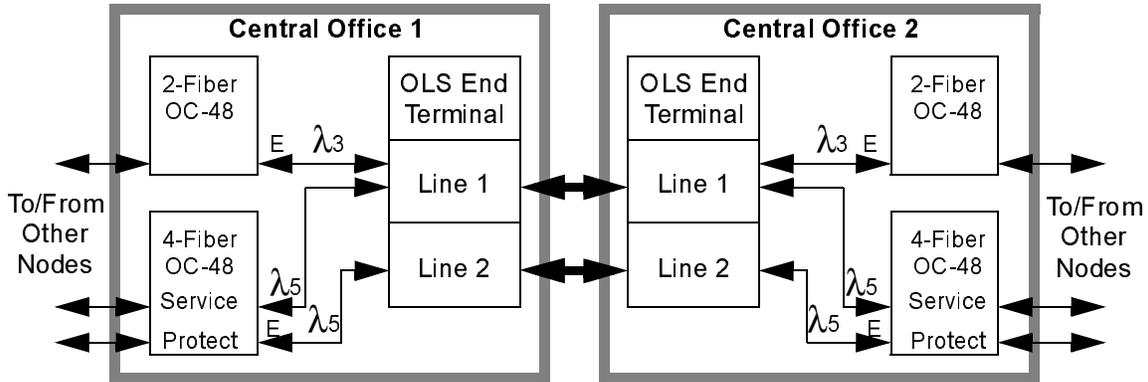
Figure 3-7 Connections To Both One And Two Lines

Basic OLS Shelf

The basic OLS shelf holds one or two optical lines identified as Line 1 and Line 2. If only one line is needed then either line can be equipped first (i.e. line 2 can be used before line 1). Refer to Figure 3-8 and Figure 3-9. Both lines must connect between the same two locations. At Central Office 2 if one line is equipped using half the shelf to connect to Central Office 1 then the other half of the shelf cannot be used to connect to a different location (Central Office 3). Refer to Figure 3-10. This means that two shelves would have to be equipped and only half of each shelf will be used.

With the use of Release of 2.1in two fiber systems, the requirement shown in Figure 3-10 on page 3-8 is no longer banned. If a Dual Facing Shelf is used in Central Office 3 with each side facing a different office, this configuration is allowed. Refer to Figure 3-11 on page 3-9.

Multiple OLS Shelves

Two OLS shelves can be connected together and controlled from a single shelf for high traffic applications between two locations. In this application the shelf with the controllers contains lines 1 and 2, the controlled shelf contains lines 3 and 4. But like the basic shelf, all four lines must connect between the same two locations unless the Dual Facing Shelf configuration is used with R2.1.
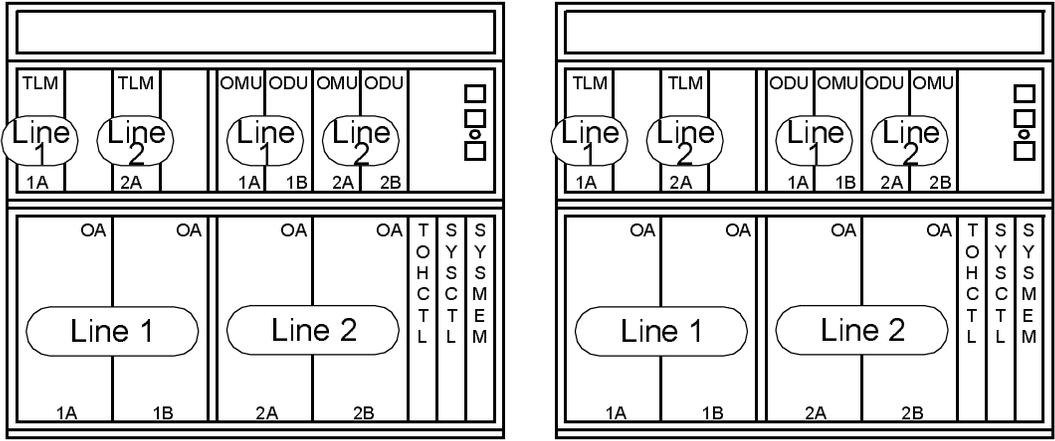
Figure 3-8 End Terminal Shelves (1A-TX at Left/1A-RCV at Right)
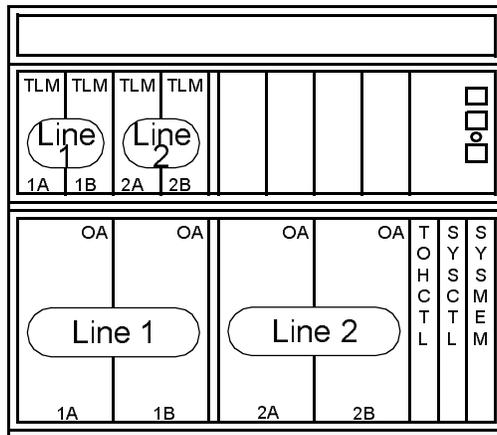
Figure 3-9 Repeater Shelf

Central Office 1

OLS End Terminal Shelf "A"

| Line 1 | Line 2 |

OK

Central Office 3

OLS End Terminal Shelf "D"

| Line 1 | Line 2 |

Second Line Optional

| Line 1 | Line 2 |

Shelf "B" OLS End Terminal

| Line 1 | Line 2 |

Shelf "C" OLS End Terminal

Central Office 2

Not With Release 1 Or 2

Not With Release 1 Or 2

Central Office 1

OLS End Terminal Shelf "A"

| Line 1 | Line 2 |

Central Office 3

OLS End Terminal Shelf "D"

| Line 1 | Line 2 |

| Line 1 | Line 2 |

Shelf "B" OLS End Terminal

Central Office 2

Figure 3-10 Optical Line Connections Between Offices (R1 & 2)
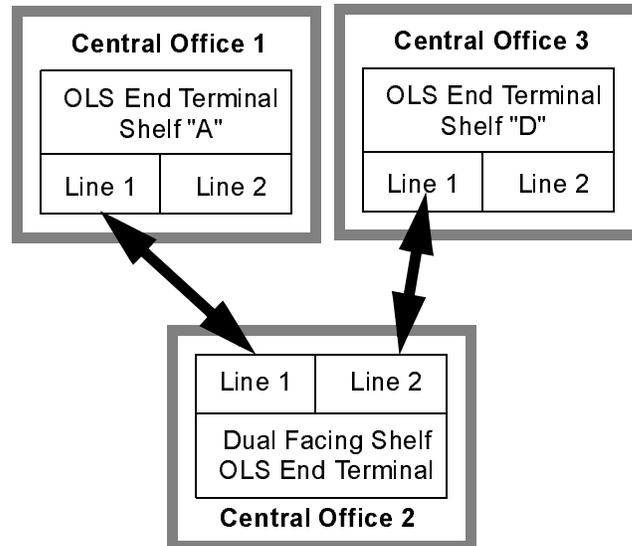
Figure 3-11 Optical Line Connections Between Offices (R2.1 Dual Facing Shelf)

NOTE:
Line 2 of a Dual Facing shelf **MUST** be connected to Line 1 of the OLS next in the Optical Line

ptical Translator Basics

Optical Translator Units are used with Optical Line Systems to perform the following functions:

■ Connecting OC-48 systems with non-OLS compatible optics to an OLS

■ Signal Regeneration between concatenated OLS

■ Wavelength Translation between concatenated OLS

■ Wavelength Add/Drop between OLS

Connecting Non-OLS Compatible Optics To OLS

Optical Translator Units are used to receive any standard wavelength OC-48 signal and produce an OC-48 with the appropriate wavelength and tone for the OLS.

Non-OLS Compatible OC-48	Optical Translator	OLS End Terminal	OLS End Terminal	Optical Translator	Non-OLS Compatible OC-48
TRMTR	OTU	OMU	ODU	OTU	RCVR
RCVR	OTU	ODU	OMU	OTU	TRMTR
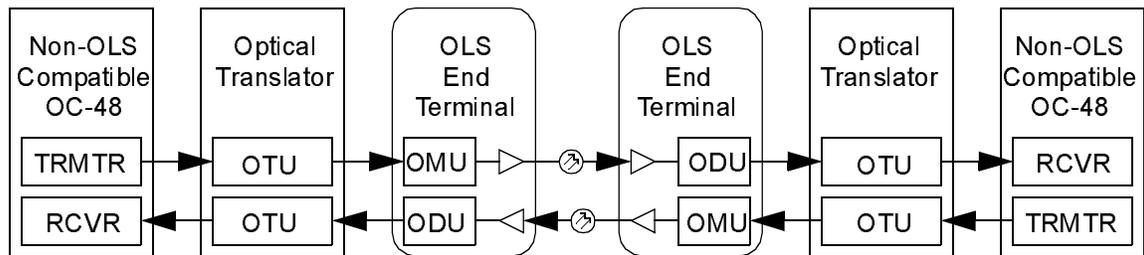
Figure 3-12 OT Connecting Non-OLS Compatible Optics To OLS

Signal Regeneration And Wavelength Translation

Optical Translator Units are used between back-to-back OLS to regenerate the OC-48 signals. The regenerated signal can output the original wavelength or the output can be translated to another wavelength. See Figure 3-13.

To/From Rest Of OLS	OLS 1A-RCV End Terminal	$\lambda 3$	OTUs For Wavelength 3	$\lambda 3$	OLS 1A-TX End Terminal	To/From Rest Of OLS
		$\lambda 5$	OTUs For Wavelength 5	$\lambda 7$		
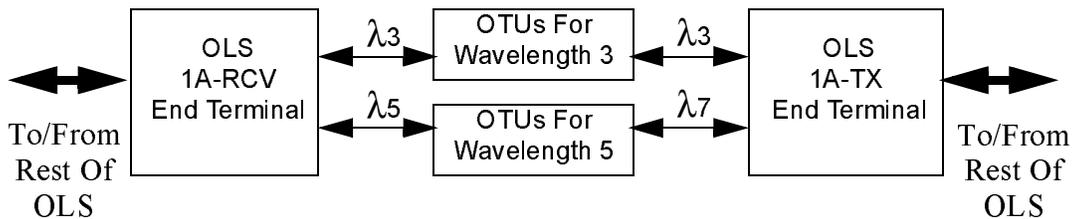
Figure 3-13 OTUs Used For Signal Regeneration And Wavelength

Wavelength Add-Drop

Optical Translator Units are used to add/drop and regenerate the OC-48 signals between several OLS. The regenerated signals can output the original wavelength or the output can be translated to another wavelength. See Figure 3-14

.
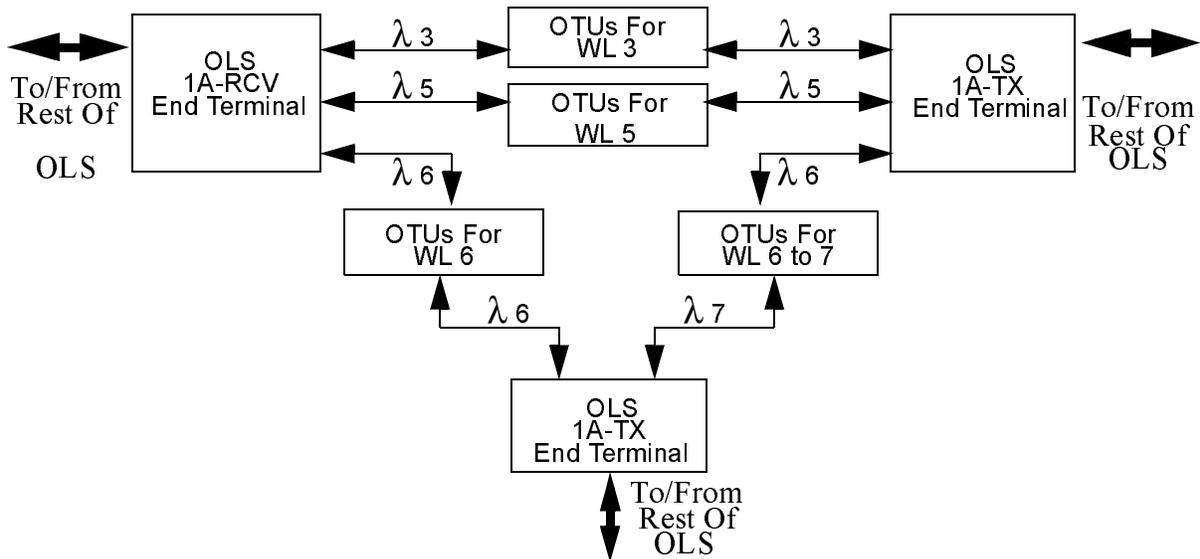
Figure 3-14 OTUs Used For Wavelength Add/Drop

Optical Line System Provisioning

Requirements

The entire Optical Line System consists of 1 to 4 lines, 2 End Terminals, and 0 to 7 Repeaters. Each system *must have* the following basic provisioning:

■ One and only one DS-NE

■ One AGNE per alarm group

■ A unique TID for each node

Guidelines

To maintain consistency the following guidelines are *recommended*:

- The 1A-TX End Terminal should be the DS-NE office.

- The 1A-RCV End Terminal should be the AGNE office.

- The "West" side of the OC-48 system should connect to the 1A-TX End Terminal.

- The "East" side of the OC-48 system should connect to the 1A-RCV End Terminal.

Wavelength Usage

Requirements

There are no specific requirements for wavelength equipage on the OLS. Wavelengths may be equipped in any random order and wavelengths do not have to be equipped the same in opposite directions.

Guidelines

The following wavelength guidelines will assist in maintaining OC-48/OLS/OT networks:

- Both directions of an OC-48 system should be equipped on the same wavelength through an OLS.

- An OC-48 system (ring or linear) should use the same wavelength on each OLS between OC-48 nodes.

Connections To OLS/OT

Connecting 2-Fiber OC-48 Systems

A 2-fiber OC-48 system uses 1 line for transmission as shown in Figure 3-15. The OC-48 Terminal shown uses OLS compatible optics to connect directly to the OLS.
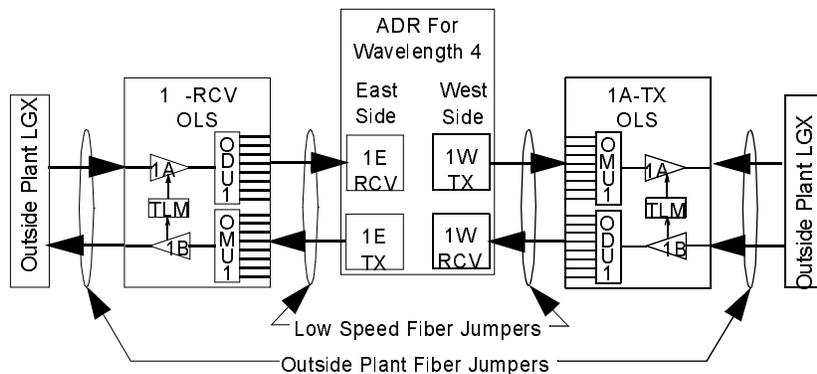
Figure 3-15 Intraoffice Fiber Jumpers For 2-Fiber Systems

Connecting 4-Fiber OC-48 Systems

A 4-fiber OC-48 system typically uses 2 lines for transmission providing service and protection equipment diversity (shown in Figure 3-16). A 4-fiber OC-48 system can place service and protection on different wavelengths of the same optical line if there is a shortage of fibers (shown in Figure 3-17). The OC-48 Terminals shown use OLS compatible optics to connect directly to the OLS.
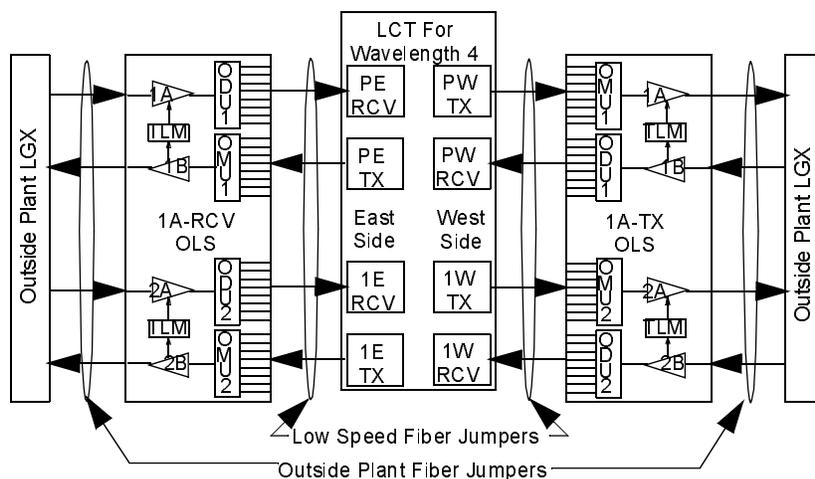
Figure 3-16 Intraoffice Fiber Jumpers For 4-Fiber Systems (Equipment Diversity)
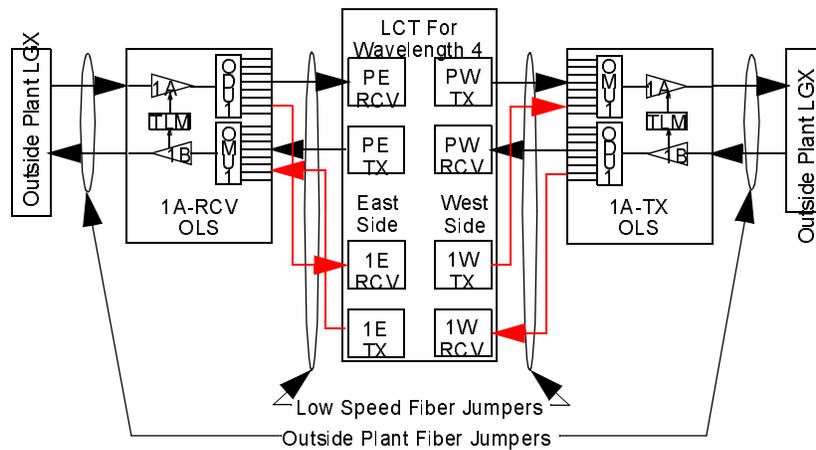
Figure 3-17 Intraoffice Fiber Jumpers For 4-Fiber Systems (Wavelength Diversity)

Connecting Optical Translators

Figure 3-18 shows the fiber connections for using OTUs to regenerate a 2-fiber OC-48 system. Figure 3-19 shows the fiber connections for using OTUs to regenerate a 4-fiber OC-48 system using 2 OLS lines. Figure 3-20 shows the fiber jumpers for using OTUs to connect an OC-48 system without compatible optics to an OLS.
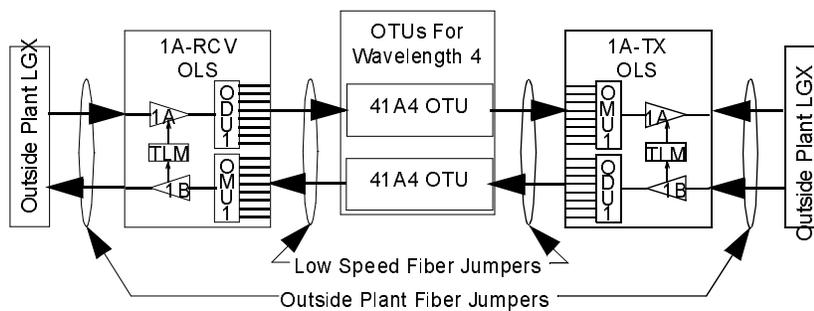
Figure 3-18 Intraoffice Fiber Jumpers For 2-Fiber System OT Regeneration
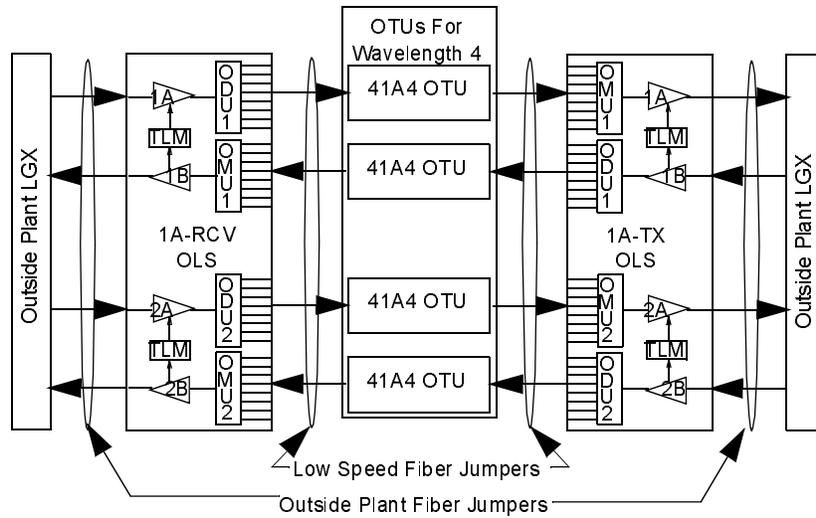
Figure 3-19 Intraoffice Fiber Jumpers For 4-Fiber System OT Regeneration
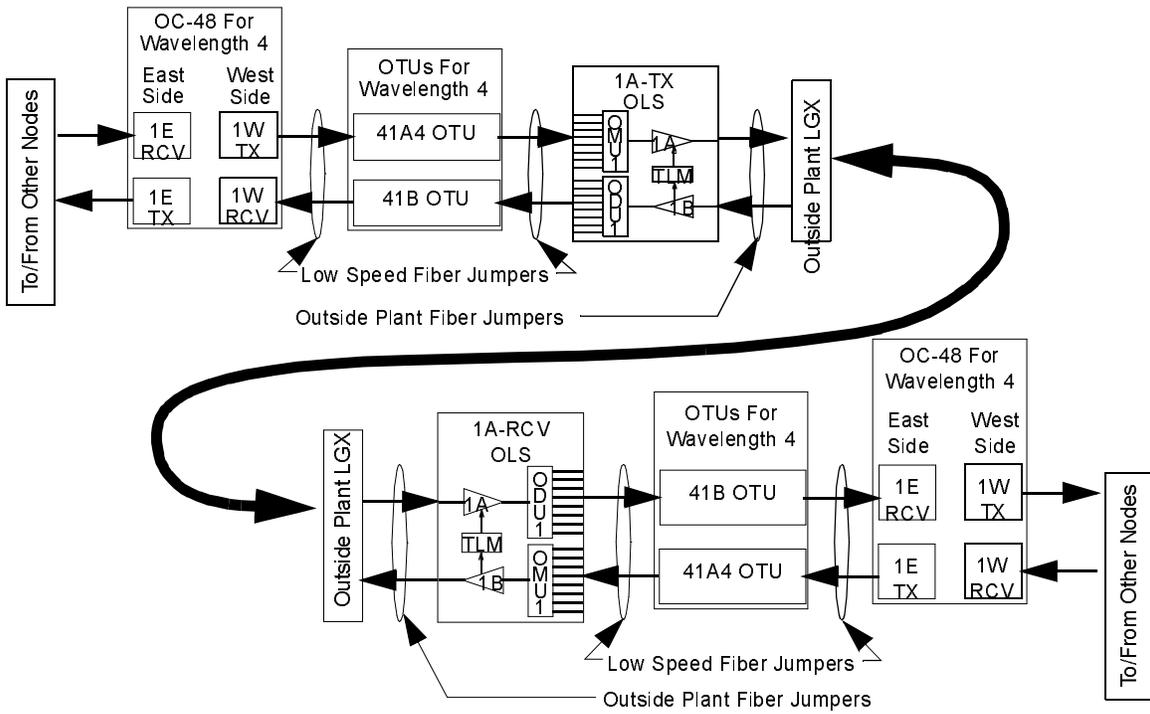
Figure 3-20 Intraoffice Fiber Jumpers For OC-48 To OLS Through OTUs

Equipment Installation

4

Contents

Equipment Installation

4

Overview

This section covers the general requirements and methods for installing the OLS cabinet and its associated cable rack and end guard assemblies. It also covers the requirements and methods for installing the OT cabinet and the installation of miscellaneously mounted OT. The cabinetized version of both the OT and the OLS use the same cabinet components as the 5ESS-2000.

Equipment

The procedure for installing the OLS or OT equipment is summarized as follows:

- Check material and tools
- Determine earthquake zone
- Install cabinet
- Install cable rack
- Ground framework
- Install door frame assemblies
- Wire cabinet
- Install door assemblies
- Install end guard assemblies

Check Material and Tools

Ship Loose Material

Material shipped includes:

- The cabinet framework equipped with 2 shelves for the OLS or 3 for the OT

- Two power cables (15 ft. or longer as specified by the order)

- Cabinet front indicator kit (upper door frame, strike, indicator strip and mounting screws)

- Cabinet door kit (air deflector plate with retainers, lower door frames with screws, front doors, and rear doors)

- Cabinet rear (blank) indicator kit (upper door frame, blank indicator strip and mounting screws)

- Installation Kit (fiber ID labels, spare shelf grommet, fuses, and fiber protection tubing)

- Lightguide buildout kit per the order

- Circuit packs per the order

- Intrashelf fiber jumpers with ID labels per the order*

- Alarm circuit module

- OT to OLS fiber jumpers with ID labels per the order**

    * OLS only

    ** OT only

Tools

The tools required for installation of the OLS and OT are listed below in Table 4-1, "Required Tools for Installation," on page 4-2 Small hand tools normally used are omitted.

Table 4-1 Required Tools for Installation

Quantity	Comcode	Description
1	TK-33	Vacuum
1	TK-76B or TK-66B	Drill or Hammer Drill

Table 4-1 Required Tools for Installation

Quantity	Comcode	Description
1	54720	C-Tap Thomas & Betts or equivalent
1	TBM2 or TMB8	Crimping tool Thomas & Betts or equivalent (use 54720)
1	Die code brown or pink	Thomas & Betts (use with 54720)
1	R-3055	Safety goggles
1	406902049	Anchor Setting Tool for drop-in Anchors
1	406899831	Anchor Setting Tool for Heavy-Duty Anchors
1		3/4" Torque wrench, 25 ft.-lbs. (for 1/2" bolts)
1		19-mm Open End Wrench (or 3/4")

Determine Earthquake Zone

The United States is divided into 5 different earthquake zones. Check which zone your area is classified as before beginning bay installation. In general there are two different floor attachment techniques, one for Zone 0, 1 and 2, and one for Zone 3 and 4.

For stand-alone cabinets in Zones 0, 1 and 2 use two 13mm (1/2") anchors on opposite corners of the cabinet baseplate. For stand-alone cabinets in Zones 3 and 4 use four 12mm (1/2") heavy duty expansion anchors on opposite corners of the cabinet baseplate.

Cabinet Installation

Uncrating and Hauling Precautions

➥ NOTE:
Please note the following precautions when uncrating equipment:

■ Do NOT ship or store containers in any position other than its marked position.

■ Do not stack equipment more than two cabinets high when it is being transported over the road or is being held in a warehouse.

■ Move containers in the shipping position only. Verify that containers have not been damaged. It is important that all containers be handled with care and that no units are dropped.

■ Uncrate all material in quarters separate from the equipment room so as to keep dust and lint away from other equipment.

■ Uncrate the cabinet in its shipping position. All cabinets are shipped in a dust-protective, antistatic plastic bag and placed in a wooden container.

■ Care should be exercised when uncrating position so that the equipment will not be damaged. The tools required for uncrating position are standard pinch-bar and claw-type hammers. Use a pinch-bar and/or hammer only in areas that have been nailed. Remove the plastic bag and all foreign material.

■ Use the cabinet's square tube framework when lifting and moving the cabinet into position.

Install EMC Cover Plates - OT Only

EMC cover plates are required on both sides of the cabinet. The only exception allowed is for the installation of end guards which is described in the last section of the chapter. End guards may be called out for appearance purposes when one side of the cabinet is exposed at the end of a row or the cabinet is a stand-alone with both sides exposed. Review installation instructions to determine which sides will have end guard installed. Do not install EMC side shields and vertical cable channels to these sides.

Mount the EMC side shields as follows:

■ Mount the Vertical Cable Channels to both sides of the cabinet frame using the supplied M6 x 12 Hex Bolts with tooth lock washers. Starting from inside the frame, insert the bolts with lock washers through predrilled holes at top and bottom of the frame. Align bolts with threads on Vertical Cable Channel and secure channel to the frame using four bolts per channel as shown in Figure 4-1 on page 4-6.

■ Align the left panel to the left side of the cabinet with folded edges facing inward towards the cabinet. **Verify that the top center mounting screw hole and coupling bolt holes are in alignment** as shown in Figure 4-1 on page 4-6. A hole mismatch indicates that the right panel is being aligned to the left side. Swap panels with the other side panel in the installation kit and verify hole alignment.

■ Install left and right side panels using the eleven (11) Phillips head screws (M5 X.8X6MM) per side. Refer to Figure 4-1 on page 4-6.

Vertical Cable Channel

M6 Bolts

Clearance Hole for
Coupling Bolt
4 per Panel

M6 Bolts
(Bolt head on inside)

Left EMC Side Panel

M5 X 6 Phillips Hd
Screw
11 Req'd
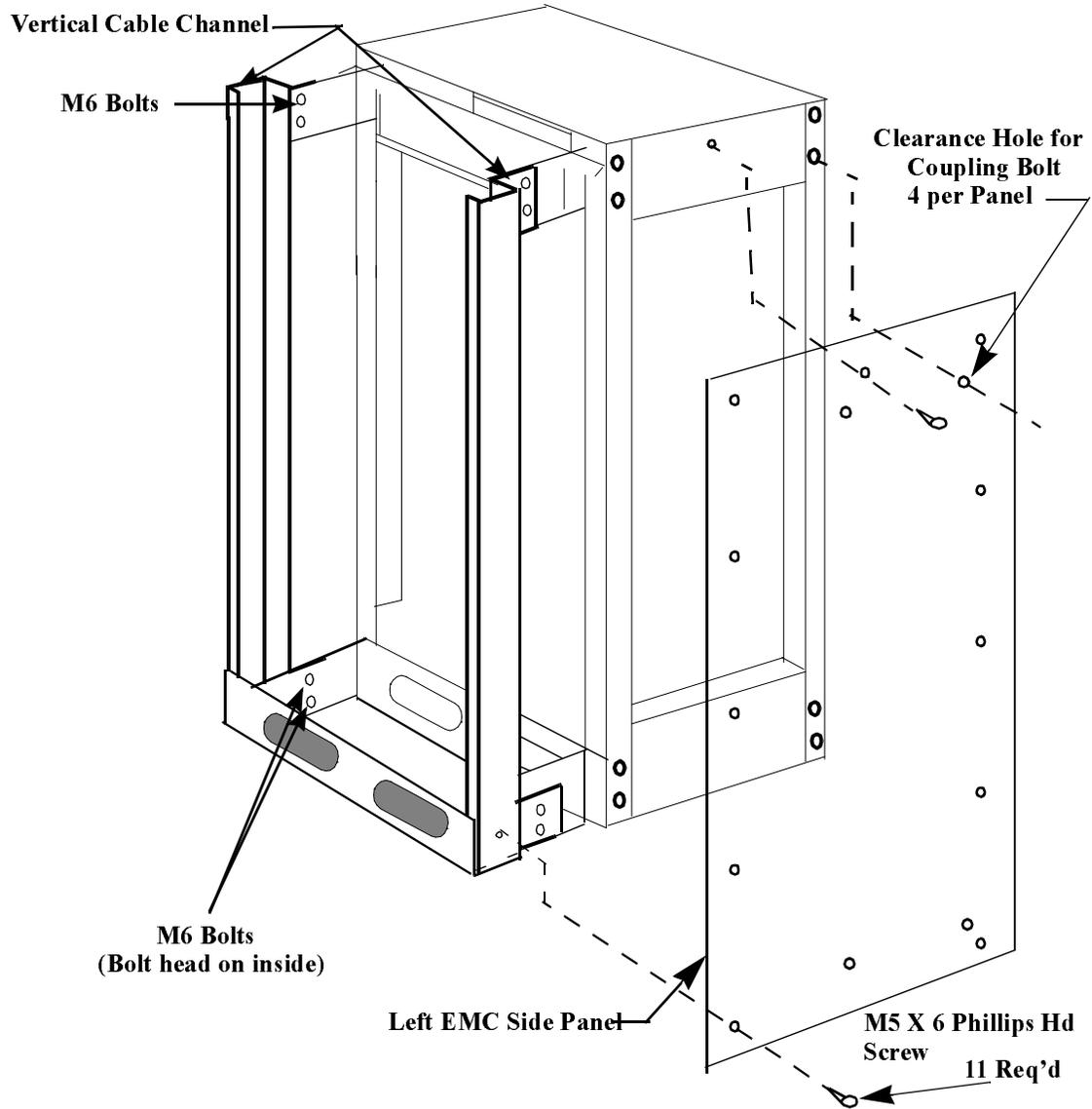
Figure 4-1 EMC Cover Plate Installation

Mark Floor Layout

Refer to Figure 4-2 on page 4-7 for cabinet mounting information. Locations 1 are the preferred drilling locations and locations 2 are the secondary. Refer to the job floor plan for cabinet-lineup location, and mark the floor for drilling using a marking pencil or felt pen.

Locations for raised floor cable access holes if required

Optional locations for raised floor cable access holes if required
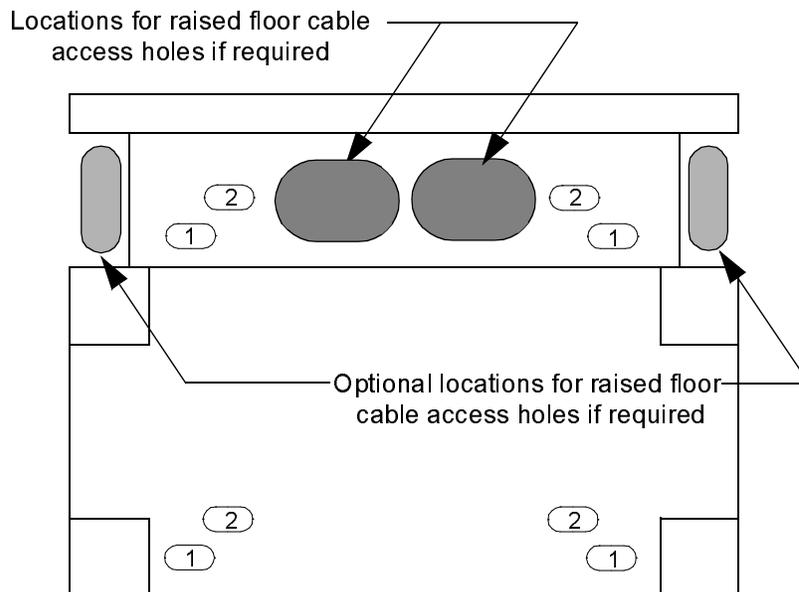
Figure 4-2 Cabinet Framework Footprint

Drill Mounting Holes

⚠ CAUTION:
When drilling holes in concrete (or operating any power tools), always wear safety goggles.

Noting the correct earthquake zone for your area, special attention should be paid to the Anchor Installation for Heavy Duty Anchor or Drop-In Anchor to ensure correct floor drilling.

➡ NOTE:
Refer to ED-5D511-31 "Hardware for anchoring 5ESS switch and 5ESS cabinet and cable rack support stanchions" for details.

Erect and Align Cabinets and Framework

To mount and assemble the cabinet, follow the procedure below:

(1) Move the cabinet to its proper floor location. Exercise care when moving the cabinet and avoid sudden shock or strain to the equipment.

(2) Use two or more technicians to erect the cabinet into position.

(3) Lift the cabinet and place it into its proper location in the lineup. Visually inspect for obvious damage.

(4) Before the cabinet is secured to the floor, verify that it is level so that alignment with adjacent cabinet can occur. Refer to SIG I WW 100 5ESS-2000 Switch Handbook Section 4809, Coupling of Cabinets, for details.

(5) Assemble the cabinet to the floor using appropriate hardware. Be sure to note earthquake zone requirements. Refer to ED-5D511-31 "Hardware for anchoring 5ESS switch and 5ESS cabinet and cable rack support stanchions" for details.

Install Cable Rack Top

When a cable rack top assembly is required, assemble per the following:

■   Verify the cabinet is not grounded.

■   Connect the ED5D742-70, G2 and G10 cable rack to the cabinet using the 4 supplied bolts as shown in Figure 4-3 on page 4-9, "Cable Rack Top Installation."

⇒ NOTE:
Information on ordering and installation of cable racks is included on ED5D742-10 and ED5D742-70 for the 5ESS-2000 system.
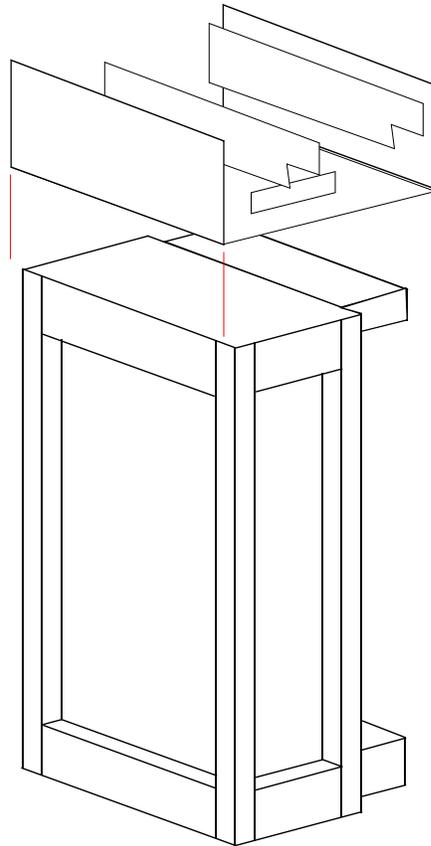
e 4-3 Cable Rack Top Installation

Ground Cabinet Framework

Connecting the cabinets to building ground serves two purposes:

(1) A direct earth ground connection for lightning protection

(2) A common ground potential for electrostatic discharge (ESD) protection.

When a frame is installed, it should be connected to the building ground as soon as possible after the cable rack is installed.

All OLS and OT frames are shipped with ground cable assemblies. It will be necessary to terminate the ground wire in the cable rack.

Install Door Frame Assemblies

Assemble the door frames as follows:

■ Mount the lower door frame assemblies to the front and rear of the cabinet using 4 supplied screws. Part A on Figure 4-4 on page 4-10 and Figure 4-5 on page 4-11.

■ Pull the alarm cables through the cable access window (shown in Figure 4-4 on page 4-10) by clipping any necessary factory tie downs.

■ Mount the upper door frame assemblies to the front and rear of the cabinet using 3 supplied screws. Part B on Figure 4-4 on page 4-10 and Figure 4-5 on page 4-11.
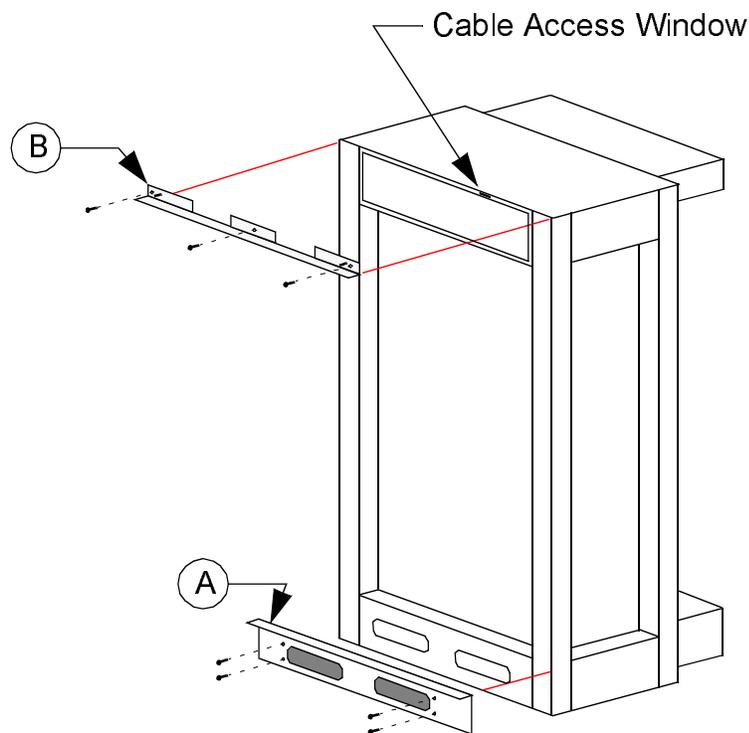
Figure 4-4 Front Door Frame Assembly
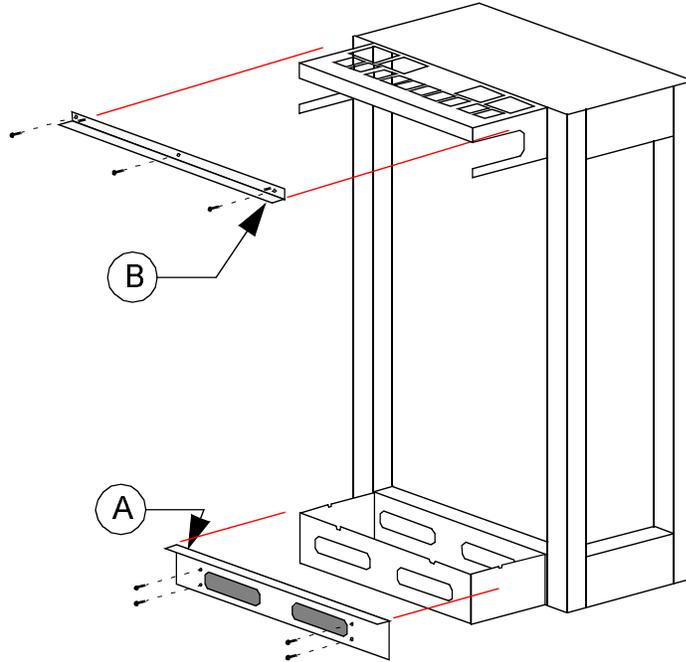
Figure 4-5 Rear Door Frame Assembly

Indicator Strip Wiring

Alarm Circuit Module For OLS 4-Line Cabinet

- ■ Dress the alarm cables through the frame cable window and over the notch in the top of the alarm circuit module.

- ■ Install the 481A alarm circuit module using the 3 supplied screws as shown in Figure 4-6 on page 4-12.

- ■ Plug the J1B and J2B connectors into the 481A alarm circuit module and route cables as shown in Figure 4-7 on page 4-12.
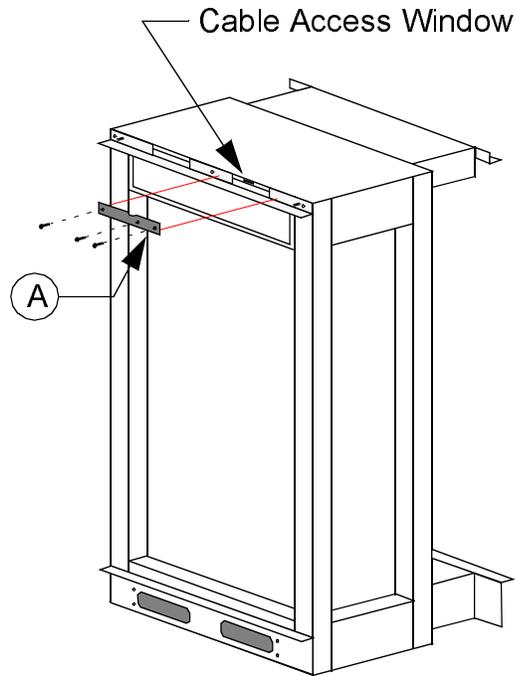
Figure 4-6 Alarm Circuit Module Installation For 4-Line Cabinet
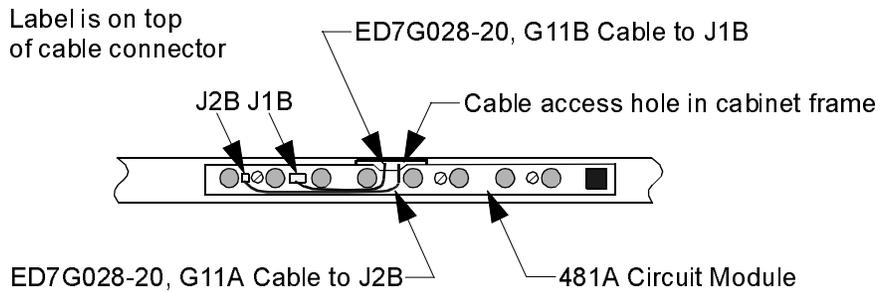
Figure 4-7 Alarm Circuit Module Routing For OLS 4-Line Cabinet

**Alarm Circuit Module For OLS Dual 2-Line
Cabinet**

■ Dress the alarm cables through the frame cable window and over the notch in
the top of the alarm circuit module.

■ Install the 481A alarm circuit modules using 3 supplied screws for each as
shown in Figure 4-8 on page 4-13.

■ Plug the J1B connectors into the 481A alarm circuit module and route cables
as shown in Figure 4-9 on page 4-14.

Cable Access Window

A
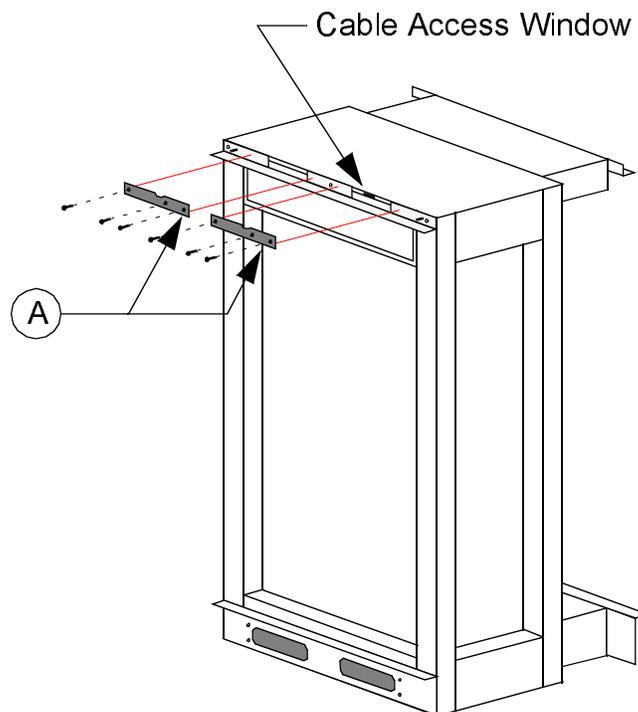
-8 Alarm Circuit Module Installation For OLS Dual 2-Line Cabinet

J1B

481A Circuit Module

ED7G028-20, G10B Cable to J2B

Label is on top
of cable connector

Tape area of the cable
assembly for additional
protection

SIDE VIEW

ED7G028-20, G10A Cable
to J1B On Right Board

J1B

Cable access hole in
cabinet frame

ED7G028-20, G10B Cable
to J1B On Left Board

481A Circuit Module
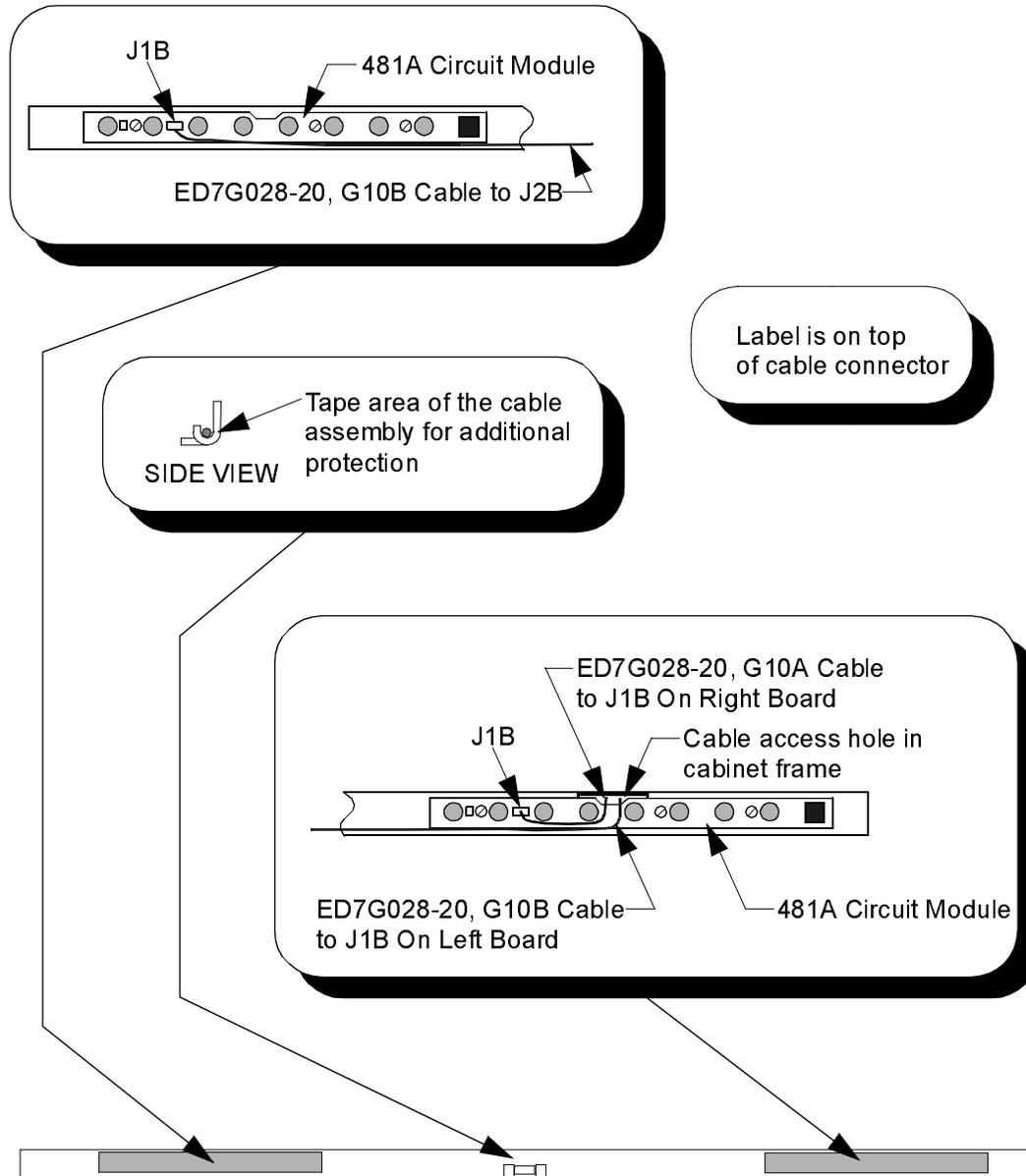
-9 Alarm Circuit Module Cable Routing For OLS Dual 2-Line

Alarm Circuit Module for OT Cabinet

■ Dress the alarm cables through the frame cable window and cover the notch in the top of the alarm circuit module.

■ Install the 857A alarm circuit module (Part of OT Installation Kit P/N 847814316) using the 3 supplied screws as shown in Figure 4-6 on page 4-12.

■ Plug the J1B, J2B and J3B connectors into the 857A alarm circuit module and route the cables as shown in Figure 4-10 on page 4-15

.
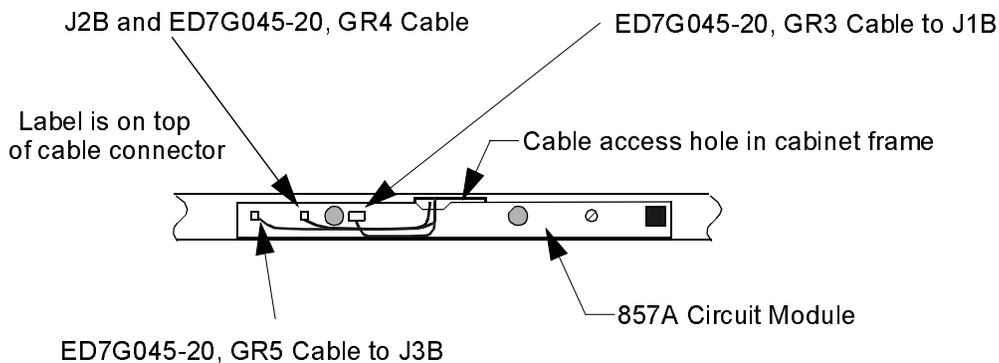
Figure 4-10 Alarm Circuit Module Routing For OT Cabinet

Install Door Assemblies

Assemble the doors as follows:

■ Install the OLS or OT indicator strip to the top front of the cabinet by snapping the spring catches to the pins on the upper door frame assembly. Part A on Figure 4-11 on page 4-16.

■ Install the OLS or OT blank indicator strip to the top rear of the cabinet by snapping the spring catches to the pins on the upper door frame assembly. Part A on Figure 4-12 on page 4-17.

■ Mount the front door assemblies to the front of the cabinet by aligning the bottom pins then pulling the top pins to engage into the upper door frame. The right front door has the CIT access panel. Part B on Figure 4-11 on page 4-16.

■ Mount the rear door assemblies to the rear of the cabinet by aligning the bottom pins then pulling the top pins to engage into the upper door frame. Part B on Figure 4-12 on page 4-17.

■ Mount the air deflector plate to the bottom rear of the cabinet using 2 supplied plastic insertion plugs. Part C on Figure 4-12 on page 4-17.
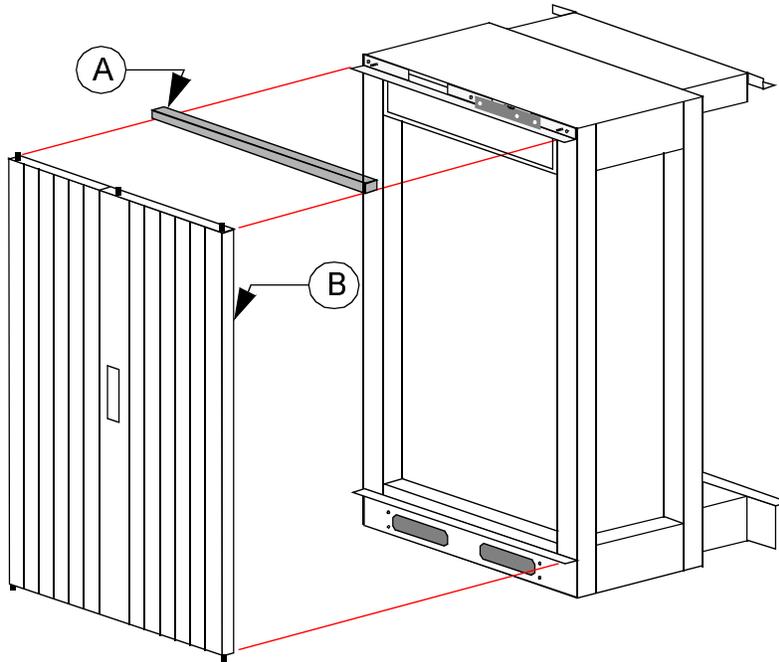
Figure 4-11 Front Door Assembly
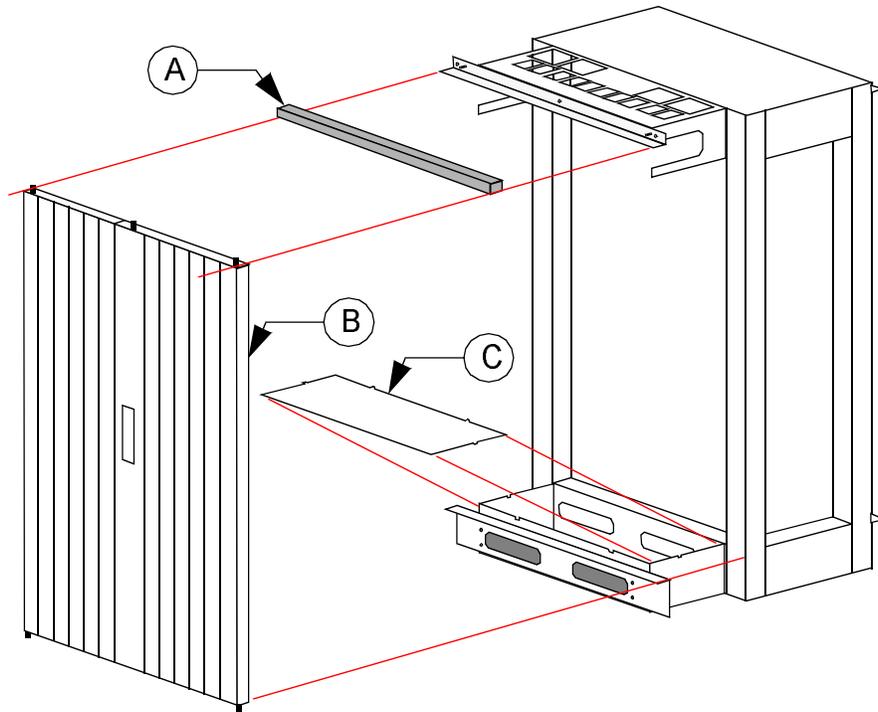
Figure 4-12 Rear Door Assembly

Install Cabinet Door Grounding Cables

Install grounding cable assemblies to door and frame as follows:

■ Locate the four(4) grounding cable assemblies in installation kit.

■ Install cable assembly to the rear door using M4 screw with lock washer locating it 5.32 inches(13.5 cm) down from the top of door (fourth hole down from top of door) as shown in Figure 4-13 on page 4-18. Torque screw to 10 inch-lbs(1.13 N.M). Do not overtorque.

■ Install other end of cable with M6 screw to the cabinet as show in Figure 3-9. Torque screw to 27.0 inch-lbs(3.1 N.M).

■ Repeat the process for the other rear door.

- Install cable assembly to front door using M4 screw with lock washer locating cable 23.3 inches down from top of door (16th hole down from top) as shown in Figure 4-14 on page 4-19. Torque screw to 10 inch-lbs (1.13 N.M). Do not overtorque.

- Install other end of cable with M6 screw to the cabinet 46.5 inches (118 cm) up from bottom (two holes up from 45 inch marker on frame) as show in Figure 3-10. Location should be same as vertical center of upper vent. Torque screw to 27.0 inch-lbs (3.1 N.M).

- Repeat the process for the other rear door.
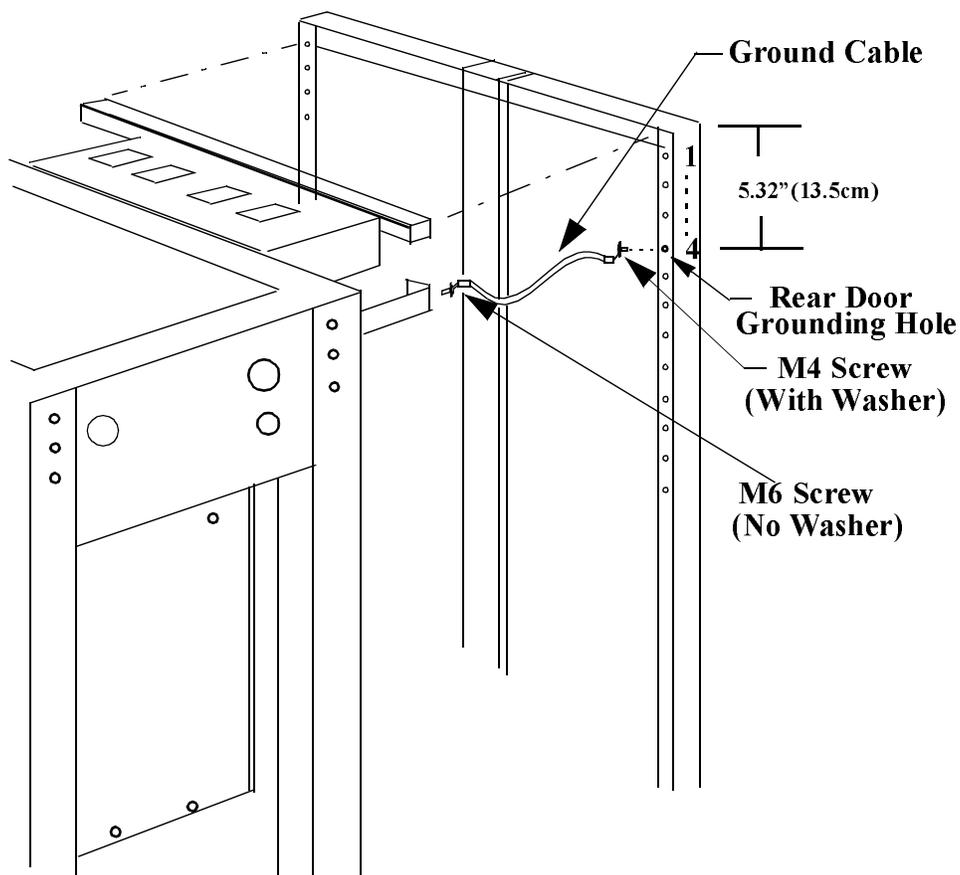
Figure 4-13 Mounting of Rear Door Grounding Cables
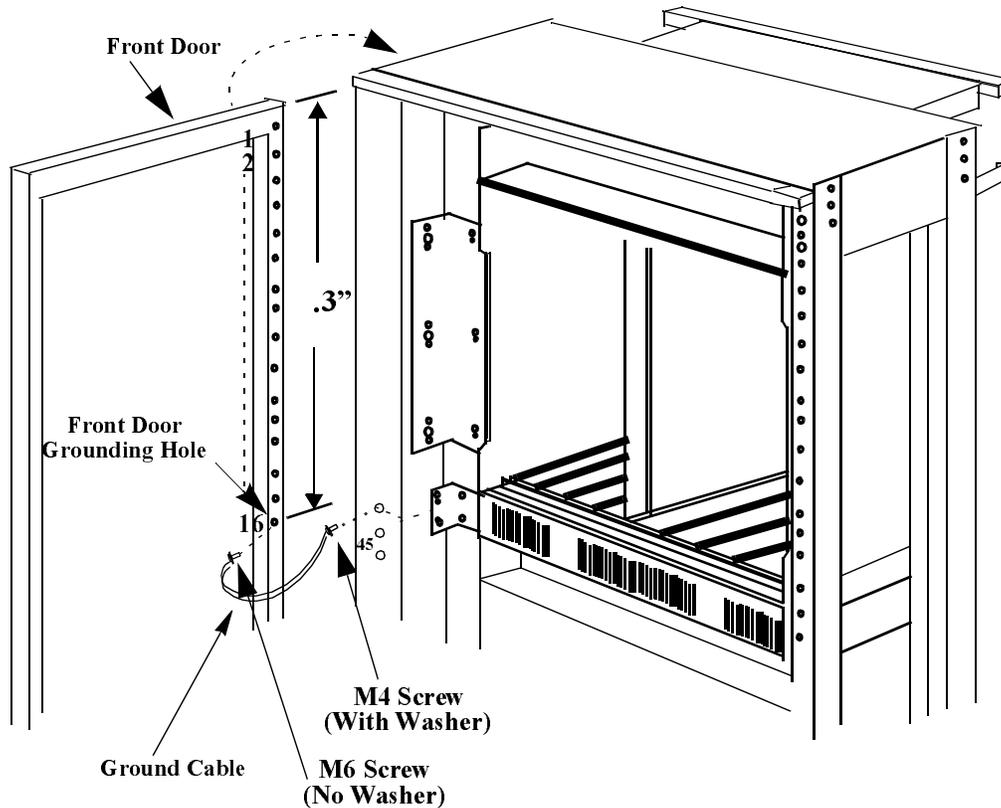
Mounting of Front Door Grounding Cables

Install End Guard Assembly

When end guards are required, assemble the ED5D743-70, G21 (left) and G22 (right) end guards to the sides of the cabinet as shown in Figure 4-15 on page 4-20.

➡ NOTE:
Information on ordering and installation of end guards is included on ED5D743-10 and ED5D743-70 for the 5ESS-2000 system.

➡ NOTE:
If at a later date the End Guard Assembly is removed for any reason, the EMC Plate must be installed in its place. (See Figure 4-1 on page 4-6.)
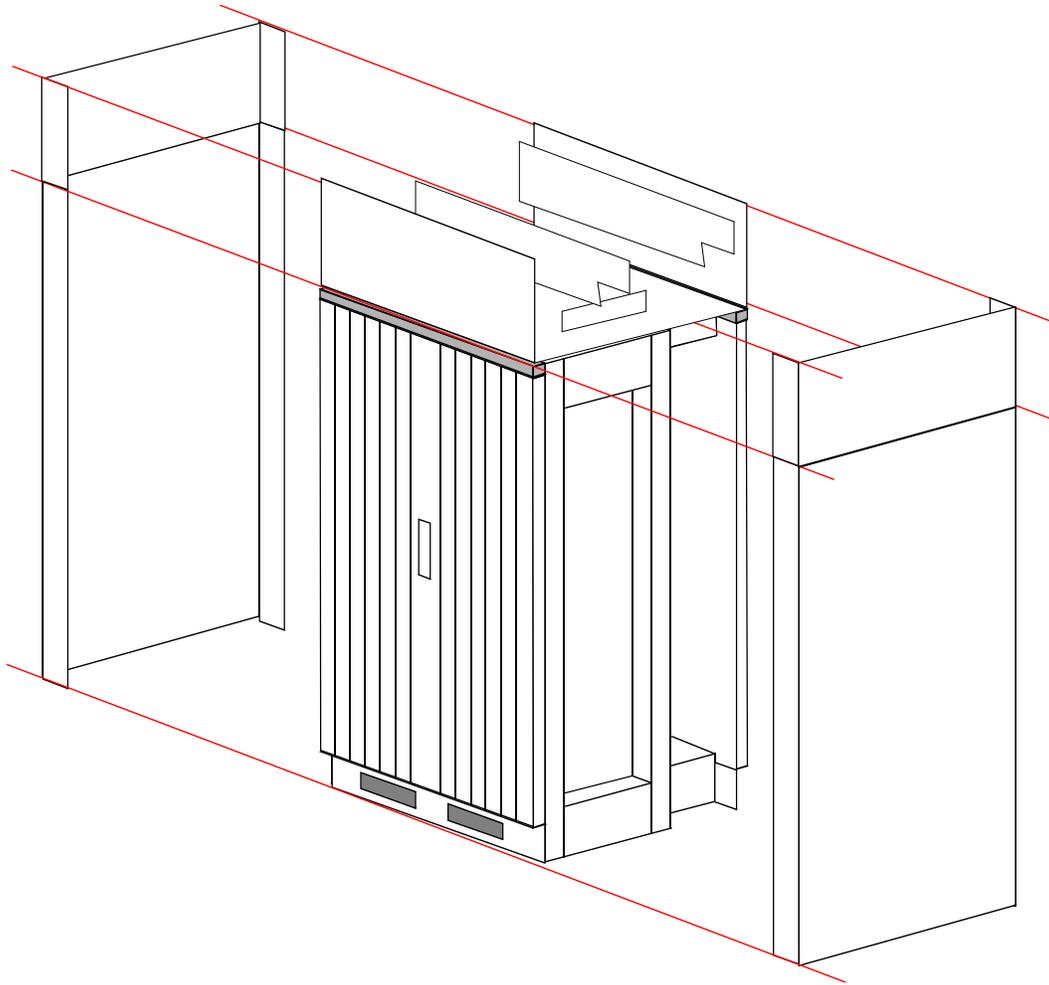
Figure 4-15 End Guard Installation

OT Miscellaneous Mount Installation

Bay Frame and Mounting Requirements

Miscellaneously mounted OLS or OT is designed to mount into customer installed bay frames. It is assumed that the bay frames have been installed properly and meet earthquake zone requirements.

The frames used to mount the miscellaneous mount OLS or OT must meet the following requirements:

(1) Side to side opening must be 21.5 inches.

(2) Hole to hole spacing must be 22.312 inches.

(3) Vertical mounting hole spacing should be one (1) inch on center.

Figure 4-16 on page 4-22, "Miscellaneously Mounted OT," shows a List 10 Miscellaneously Mounted OT mounted to a Lucent Technologies 800 Type bay frame. Figure 4-17 on page 4-23, "Two Miscellaneously Mounted OLS Shelves," shows two Miscellaneously Mounted OLS shelves mounted to a Lucent Technologies 800 Type bay frame. When installing shelves in the bay frame, the following mounting requirements must followed:

- The heat baffle mounted to the bottom of each shelf must be installed with each shelf. The heat baffles are not to be removed from any shelf.

- The mounting bracket hole separation of 11 inches, as shown in Figure 4-16 on page 4-22, must be maintained. The supplied interconnecting cables will not be long enough for a larger separation.

- Either another heat baffle or an open space of three (3) inches is required for cooling at the top of each installation. The shelves may be mounted at any height ranging from the lower heat baffle touching the base of the bay, to any distance above the base, as long as the top clearance of 3 inches or greater is maintained.

The total height required for the various OT List structures is as follows:

Table 4-2 Vertical Space Requirements for OT List Structures

List Number	Vertical Space Required
List 10	66 Inches
List 11	24 Inches
List 12 with List 11	45 Inches
List 13 with List 11 & 12	66 Inches
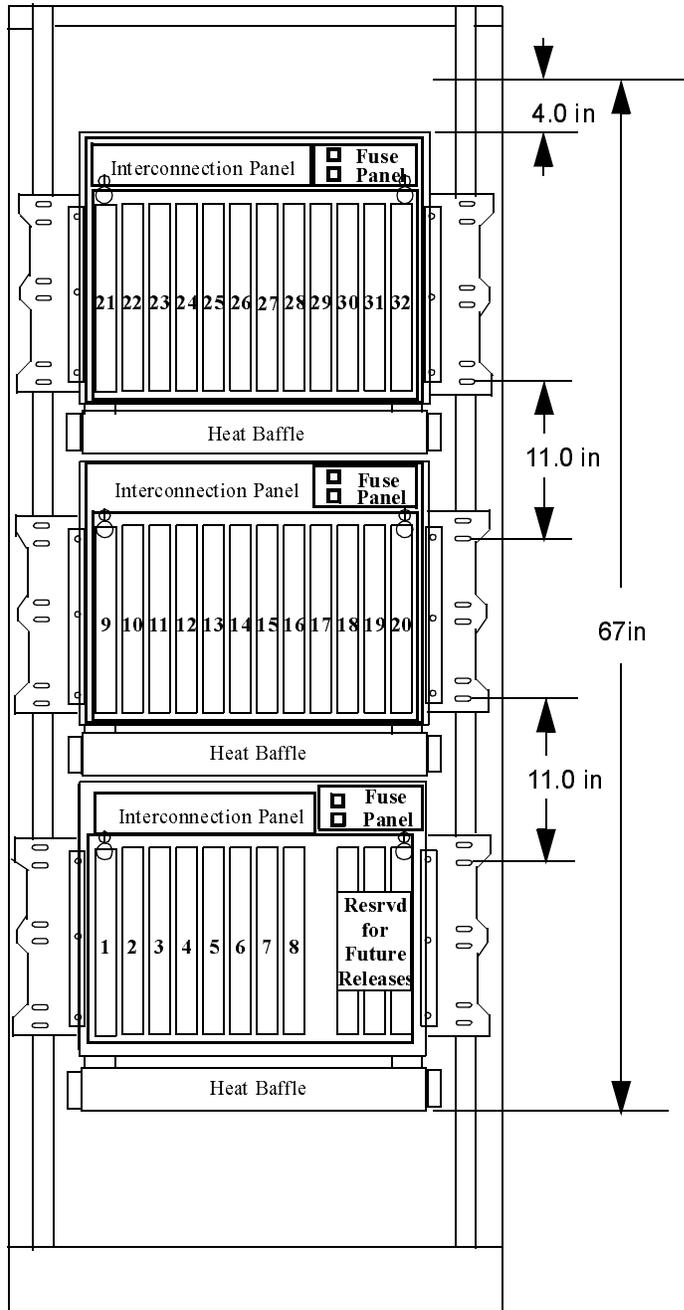
Figure 4-16 Miscellaneously Mounted OT
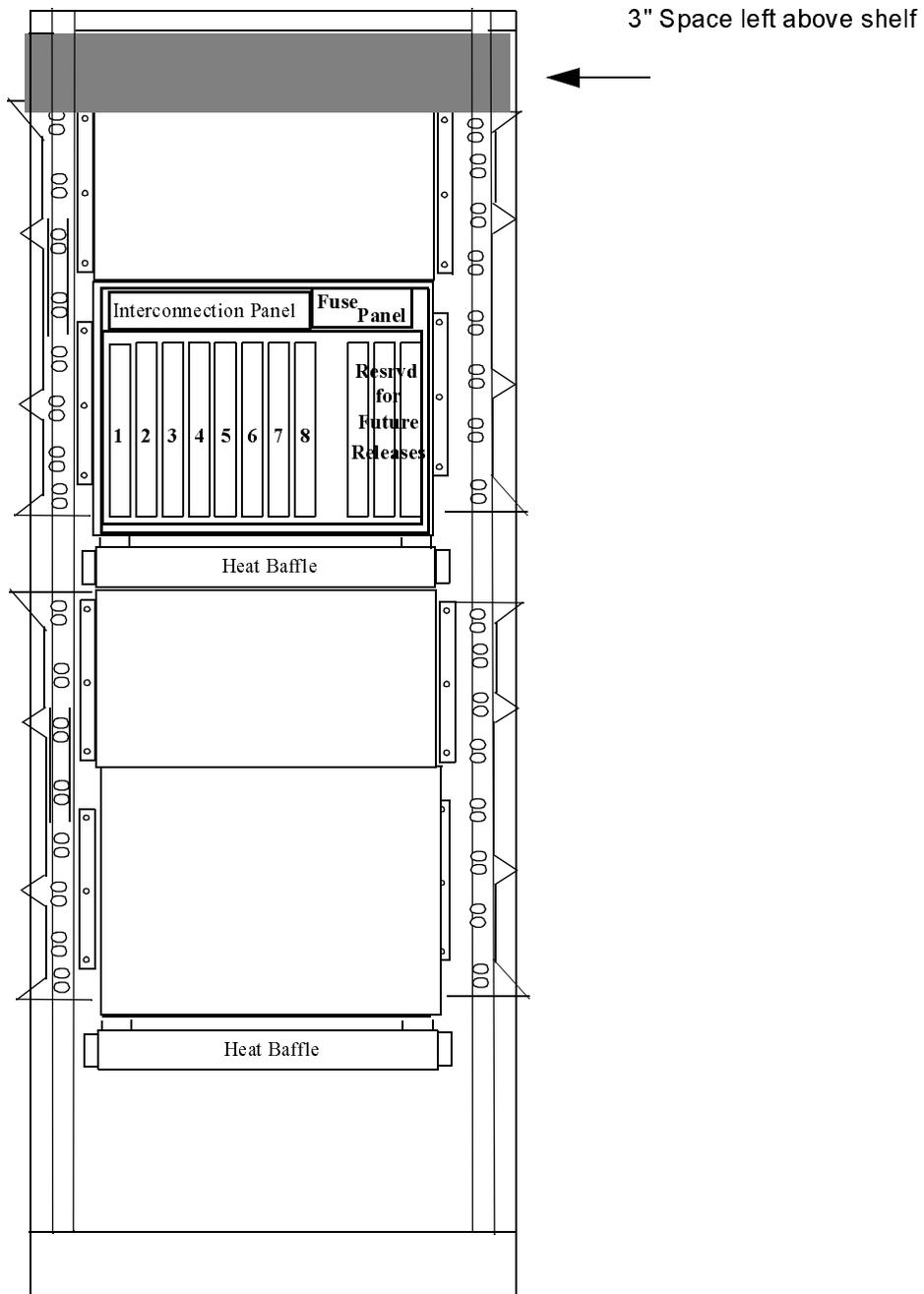
Figure 4-17 Two Miscellaneously Mounted OLS Shelves

Adjustment of Side Mounting Brackets

The side mounting brackets are factory installed for mounting to the narrow mounting flange of a Lucent Technologies 800 Type bay frame. These brackets are identified by the letters L and R stamped on them. For mounting to the Lucent Technologies 801 Type frame using the wide mounting flange, the bracket needs to be moved forward to another set of mounting holes. For other bay frame types, the bracket should be positioned to provide the best overall results.

If the mounting bracket needs to be moved, remove the three (3) screws holding the bracket and slide the bracket one inch forward towards the front of the shelf. Align the bracket holes with the new set of mounting holes on the chassis side. The bracket should now be parallel with its previous position, offset by one inch. Install and tighten mounting screws. Perform the same operation with the mounting bracket on the other side of the shelf. Repeat the process for the brackets on any remaining shelves.

Mounting OT Shelves to Bay Frame

Mount the lowest shelf, the System Shelf, to the bay frame using three (3) mounting screws in each bracket on each side. The Lucent Technologies 800 and 801 type bay frames use a No. 12-24 x 3/4 inch long screw for mounting. If using a different bay frame, check mounting hardware requirements for that particular frame. If this is a List 11, System Controller Shelf Only, verify that a three inch space exists above the shelf.

Mount Complementary Shelf 1 above the System Shelf maintaining the 11 inch spacing as shown in Figure 4-9 on page 4-14. Complementary Shelf 1 can be identified by the OTU slot label having numbers 9 through 20. Use six (6) mounting screws, three on each side, to mount Complementary Shelf 1 to the bay frame. If this is the last shelf to be installed, verify that a three inch opening exists above the shelf.

Mount Complementary Shelf 2 above Complementary Shelf 1 maintaining the 11 inch spacing as shown in Figure 4-9 on page 4-14. Complementary Shelf 2 can be identified by the OTU slot label having numbers 21 through 32. Use six (6) mounting screws, three on each side, to mount Complementary Shelf 2 to the bay frame. Verify that a three (3) inch open space or greater is available above Complementary Shelf 2.

Mounting OLS Miscellaneous Shelf to Bay Frame

Mount the shelf to the bay frame using 3 mounting screws in each bracket on each side. The Lucent Technologies 800 and 801 type bay frames use a No. 12-24x3/4 inch screw for mounting. If using a different bay frame, check mounting hardware requirements for that particular frame.

Power Cable Installation

5

Contents

Power Cable Installation

5

Overview

⚠ CAUTION:
Procedures in this installation manual are only to be performed by trained personnel.

This section covers OLS and OT Power (battery A and battery B) cable installation for both cabinet and miscellaneous mount configurations.

General Considerations

⚠ CAUTION:
A wrist strap, connected to a wrist strap ground jack on the terminal must be worn for ESD protection during the installation process.

⚠ CAUTION:
Connectors on the interconnect panel come equipped with protective ESD covers. These covers should be left in place on any connector that is not being immediately cabled so that ESD protections are maintained.

⚠ WARNING:
Unterminated optical connectors may emit laser radiation and should not be viewed with optical instruments (other than indirect image-converting devices). Also avoid direct exposure to beam.

Keep the following information under consideration during cable installation:

■ This cable information is the latest cable information available at the time of the issue. For up-to-date information, refer to the ED cable drawings listed in the Section 1, "Overall Installation and Test Considerations."

■ For ordering information, refer to 365-575-330, Optical Line System (OLS) Application, Planning, and Ordering Guide or 365-575-400, Optical Translator (OT) Application, Planning and Ordering Guide.

■ Do not remove the shelf backplane cover during the installation process.

Power Cable Installation for Cabinets

Description

The OLS and the OT are both powered by -48 volt direct current. Since redundant power is used to ensure maximum availability of the terminal, two battery power feeds are required for each terminal (feed A is Red and feed B is Blue).

Power Requirements

The power requirements for OLS and OT are as follows:

■ Two feeders (A and B) are required for powering the cabinet.

■ Each independent feeder must supply -48 volts direct current and a return.

■ Each feeder capacity must be 20 amperes at the battery distribution fuse board (BDFB).

Table 5-1 OLS & OT Power Planning

Equipment Package	Maximum Power Dissipation		Current Drains per Feeder*	
	Watts	Watts per Square Foot	Nominal at -48V**	Maximum (List 2)***
OLS End Terminal 4 BiDirectional Optical Lines	252	20.2	2.6	5.9
OLS Repeater 4 BIdirectional Optical Lines	320	25.6	3.3	7.5
OLS Dual End Terminal	276	22.1	2.9	6.5
OLS Dual Repeater	344	27.6	3.6	8.0
OLS End Terminal & Repeater	310	24.8	3.2	7.3
OLS Miscellaneously Mounted End Terminal Shelf	138	NA	1.4	3.2
OLS Miscellaneously Mounted Repeater Shelf	172	NA	1.8	4.0
OT System Controller Shelf	182	14.6	1.7	3.7
OT Complementary Shelf	232	18.6	2.1	4.7
OT Cabinet (3 shelves)	646	51.7	5.9	13.2

* Nominally both feeders share the current equally for the cabinet or shelf. If one feeder fails, the remaining feeder carries the total load for the cabinet.

** In power engineering. List 1 refers to the current drains used to size batteries and rectifiers. To do this, use twice the Nominal (List 1) current drain per feeder. These current drains represent the average busy-hour current at normal operating voltages.

*** In power engineering, List 2 refers to the current drains used to size feeder cables and fuses. To do this, use the Maximum (List 2) current drain per feeder. These current drains represent peak current under worst case operating conditions.

Available Power Cables

Table 5-2 lists power cables available for installing an OLS.

Table 5-2 Available Power Cables for OLS

ED-9C103-22 Cable Group	Cable Type	Cable Length (ft.)	Use With Power Bus	Color
1	WHICS 2998400000	15	A	Red
2	WHICS 2998400000	15	B	Blue
11	WHICS 2998400000	As Required	A	Red
12	WHICS 2998400000	As Required	B	Blue

Table 3, "Available Power Cables for OT," on page 5-4 lists power cables available for installing an OT.

Table 5-3 Available Power Cables for OT

ED-9C103-22 Cable Group	Cable Length (ft.)	Use With Power Bus	Color
5	17	A	Red
6	17	B	Blue
15	As Required	A	Red
16	As Required	B	Blue

OLS Power Cable Connection

The OLS uses a Y-cable to power both shelves in the cabinet. Install as follows:

(1) Turn the power breakers off, or do not install fuses, at the battery distribution fuse board (BDFB).

(2) Verify the circuit packs are not installed in the shelves.

⚠ WARNING:
Leave the fuses out or breakers off until performing the steps in Section 8, "Powering" of this document.

(3) Identify the battery feed connections at the battery distribution fuse board or other protection equipment. They should be labeled BAT A, BAT A RTN, BAT B, and BAT B RTN.

(4) Check that the supplied ED-9C103-22 power feed cables are labeled for battery A (RED) and battery B (BLUE) use.

(5) Route the battery cables (A on left, B on right) out of the shelf, up through the cabinet and through the cable restraints mounted in the top of the cabinet, then out through the top of the cabinet. Place the A battery cable down behind the upper top plate of the shelf and retain the cable under the retaining clips. This will keep the cable out of the way when other cables are connected. Refer to Figure 5-1 on page 5-6 or Figure 5-2 on page 5-7.

(6) The power cables are mechanically keyed to prevent incorrect insertion. Be sure to fully seat the cables until they are locked into the connector on the shelf.

(7) Connect the power feed cables to the battery feed connections at the appropriate battery A or battery B terminal connectors located in the interconnect panel area of each OLS shelf behind the fuse panel.
See Figure 5-1 on page 5-6 and Figure 5-2 on page 5-7.

(8) Tighten the power cable restraint clamp screws around the power cable outer jacket to a torque of about 7 inch-pounds.

(9) Splice feeders from the battery distribution fuse board to the OLS power cables. The red clad power lead connect to -48V. The white power lead connect to the power feed return.
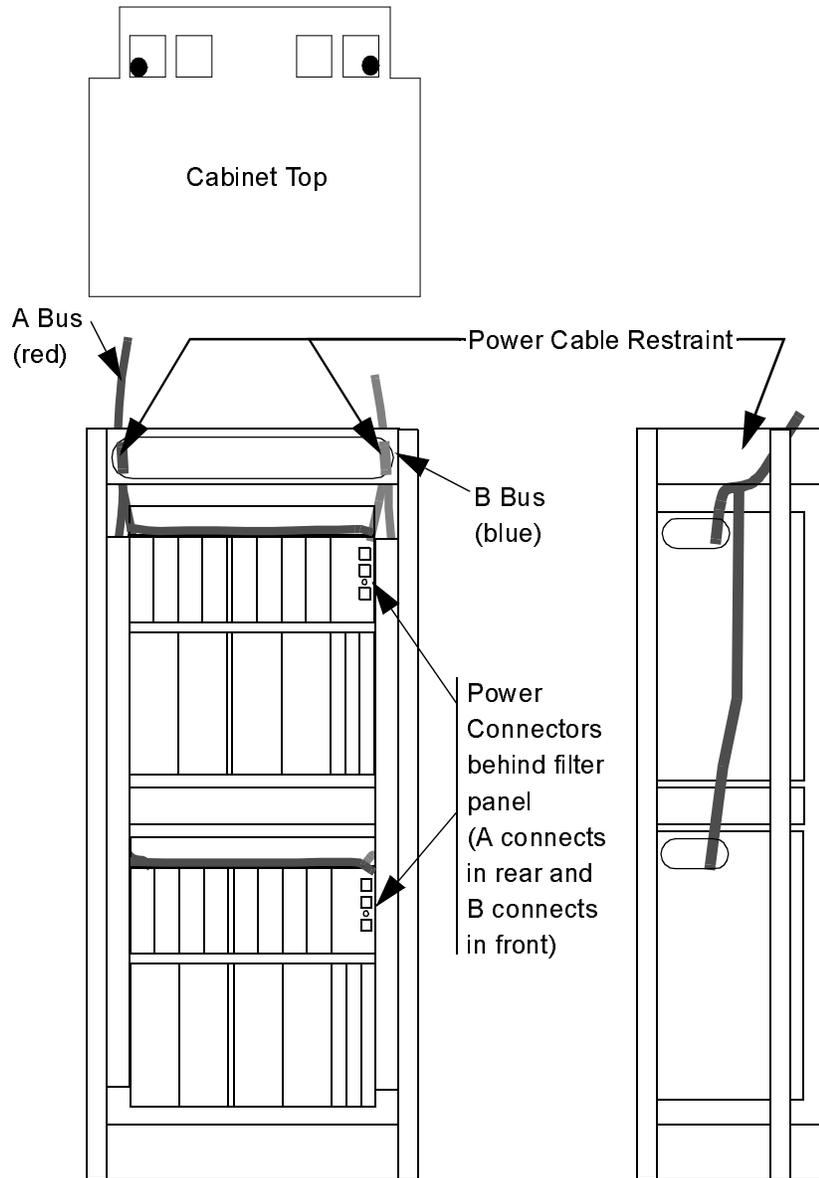
Figure 5-1 OLS Cabinet Power Cable Routing (Cabinet Frame Shown)
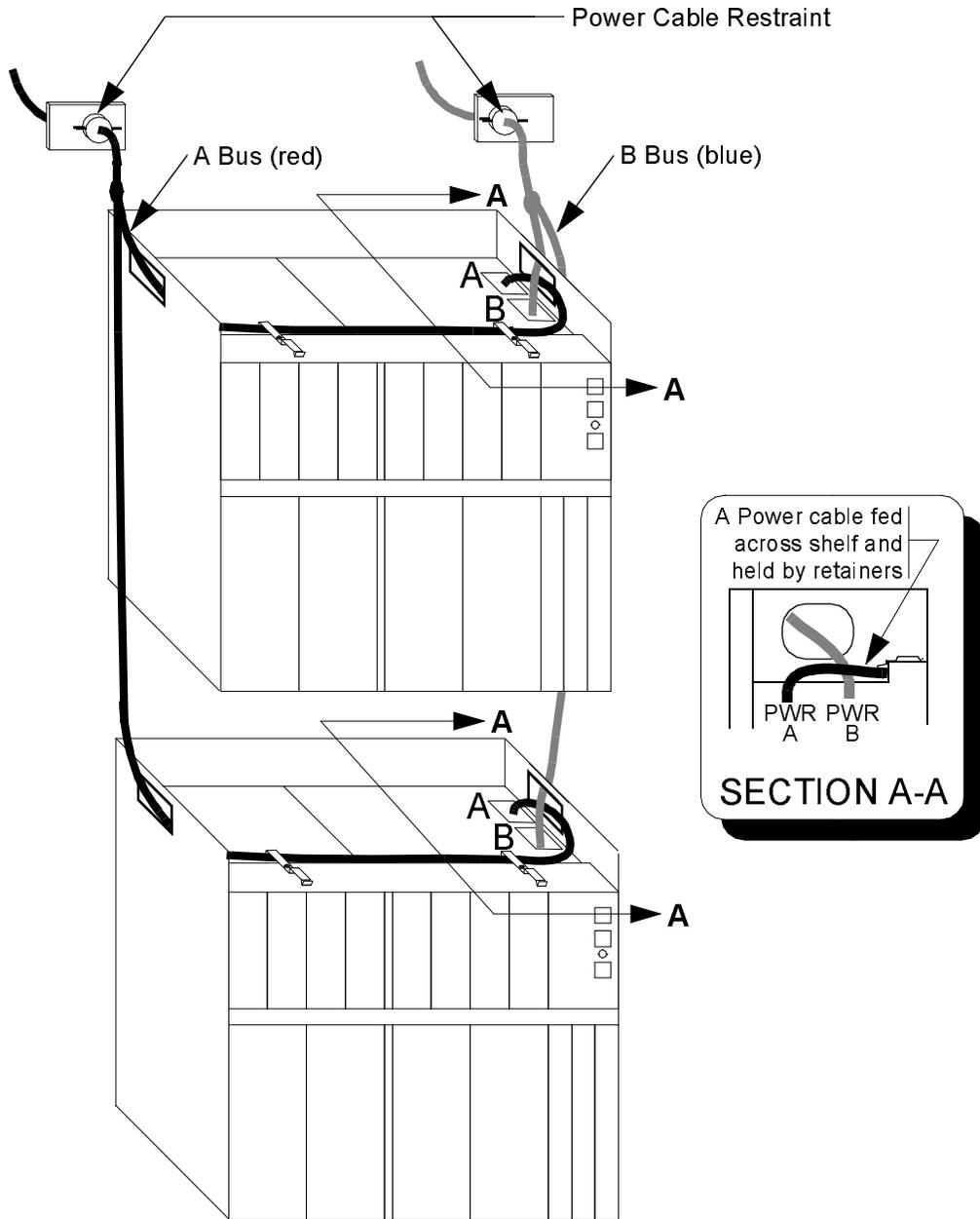
Figure 5-2 OLS Cabinet Power Cable Routing (Cabinet Frame Not Shown)

OT Power Cable Connection

Install as follows:

(1) Turn the power breakers off, or do not install fuses, at the battery distribution fuse board (BDFB).

(2) Verify the circuit packs are not installed in the shelves.

⚠ WARNING:
Leave the BDFB fuses out or breakers off until performing the steps in Section 8, "Powering" of this document.

(3) If power is being fed by an overhead cable rack, route power cable out through top of bay as shown in Figure 5-3 on page 5-9. If power is being fed from a raised floor storage tray, route power cables as show in Figure 5-4 on page 5-10.

(4) Identify the battery feed connections at the battery distribution fuse board or other protection equipment. They should be labeled BAT A, BAT A RTN, BAT B, and BAT B RTN.

(5) Check that the supplied ED-9C103-22 power feed cables are labeled for battery A (RED) and battery B (BLUE) use.

(6) Splice feeders from the battery distribution fuse board to the OLS power cables. The red clad internal power lead connect to -48V. The white power lead connects to the power feed return.

(7) Connect equipment ground lead from cabinet or bay to proper ground connection.

Exit Red Jacket Power
Cable and Left Side Control
Cables

Exit Blue Jacket Power
Cable and Right Side Control
Cables
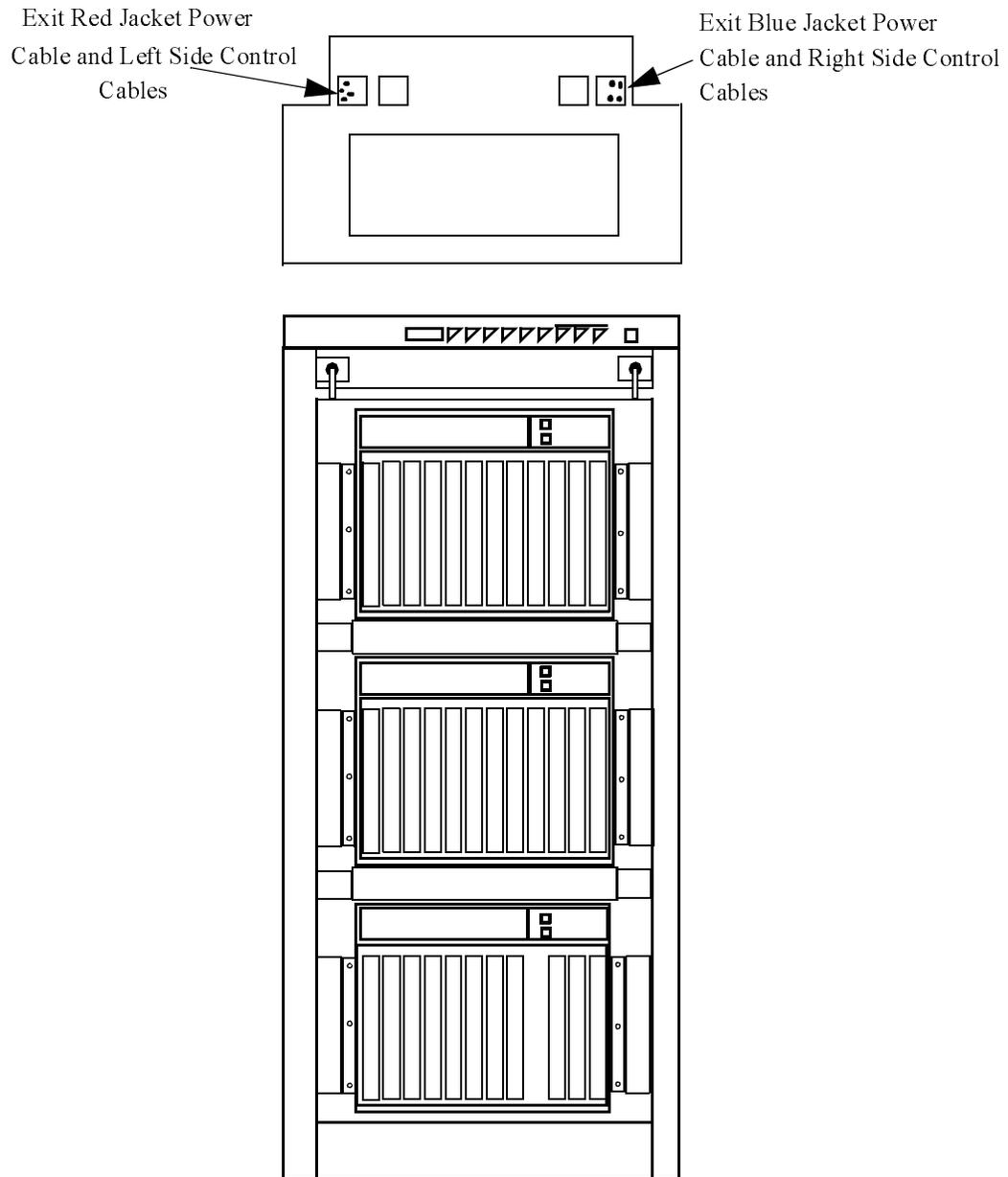
Figure 5-3 OT Cable Routing for Overhead Rack Installations

**Power Cable
Routing for
Right Side Blue
Jacket Cable
(Left Side to
have similar
routing)**

**Wiring Exit Right Side Power
and Control Cables**

**Wiring Exit Left Side Power
and Control Cables**
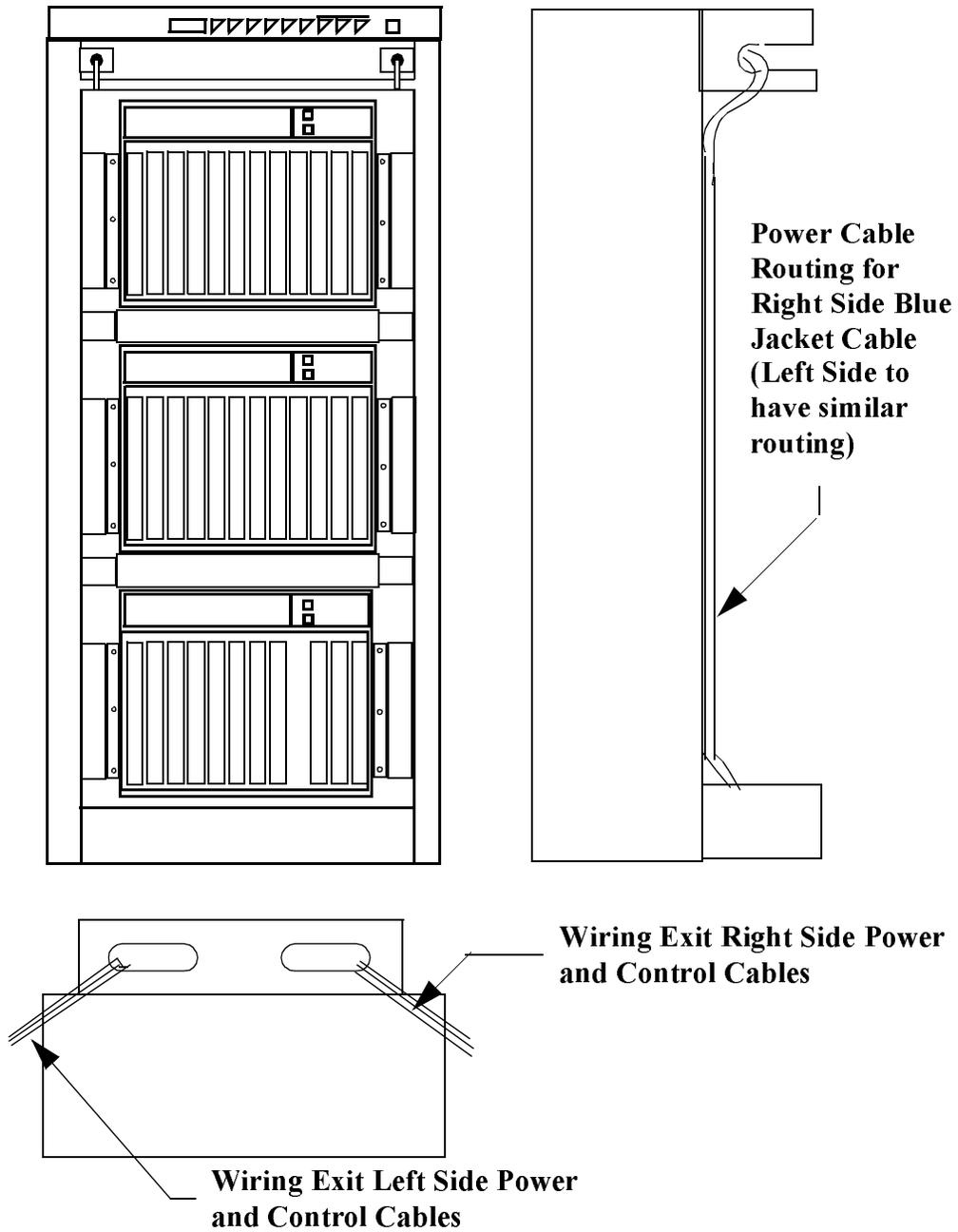
Figure 5-4 OT Cable Routing for Raised Floor Applications

Miscellaneous Mounted OLS Cables

This section describes the installation of the A and B power cables for the Miscellaneous Mounted OLS Shelf.

➡ NOTE:
Each feeder capacity in the miscellaneous mount shelf must be 15 amperes (unless otherwise specified by the customer) at the battery distribution fuse board (BDFB).

Available Power Cables

Table 5-2 lists power cables available for installing an OLS.

Table 5-4 Available Power Cables

ED-9C103-22 Cable Group	Bay Type	Cable Length (ft.)	Use With Power Bus	Color
3	Miscellaneous Mount	15	A	Red
4	Miscellaneous Mount	15	B	Blue
13	Miscellaneous Mount	As Required	A	Red
14	Miscellaneous Mount	As Required	B	Blue

Power Cable Connection

For the Miscellaneous Mounted Shelf, the power cables are a single feed. Each miscellaneous shelf is powered individually. Install as follows:

(1) Turn the power breakers off, or do not install fuses, at the battery distribution fuse board (BDFB).

(2) Verify the circuit packs are not installed in the shelves.

⚠ WARNING:
Leave the fuses out or breakers off until performing the steps in Section 8, "Powering" of this document.

(3) Identify the battery feed connections at the battery distribution fuse board or other protection equipment. They should be labeled BAT A, BAT A RTN, BAT B, and BAT B RTN.

(4) Check that the supplied ED-9C103-22 power feed cables are labeled for battery A (RED) and battery B (BLUE) use.

(5) Route the battery cables (A on left, B on right) out of the miscellaneous mounted shelf, up through the bay and through the cable restraints mounted at the top of the bay, then out through the top of the bay. Place the A battery cable down behind the upper top plate of the shelf and retain the cable under the retaining clips. This will keep the cable out of the way when other cables are connected. See Figure 5-5 or Figure 5-6.

(6) The power cables are mechanically keyed to prevent incorrect insertion. Be sure to fully seat the cables until they are locked into the connector on the shelf.

(7) Connect the power feed cables to the battery feed connections at the appropriate battery A or battery B terminal connectors located in the interconnect panel area of each OLS shelf behind the fuse panel. See Figure 5-5 on page 5-13 or Figure 5-6 on page 5-14.

(8) Tighten the power cable restraint clamp screws around the power cable outer jacket to a torque of about 7 inch-pounds.

(9) Splice feeders from the battery distribution fuse board to the OLS power cables. The red clad internal power lead connect to -48V. The white power lead connect to the power feed return.

(red)

Power Cable Restraint

B Bus
(blue)

Power
Connectors
behind filter
panel
(A connects
in rear and
B connects
in front)
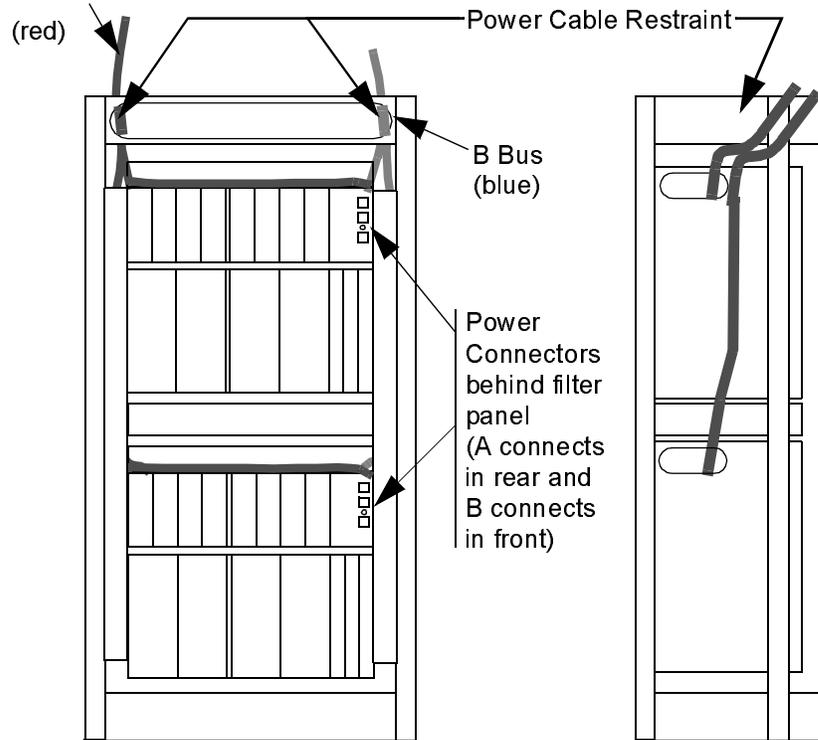
Figure 5-5 OLS Power Cable Routing (Miscellaneous Bay Shown)
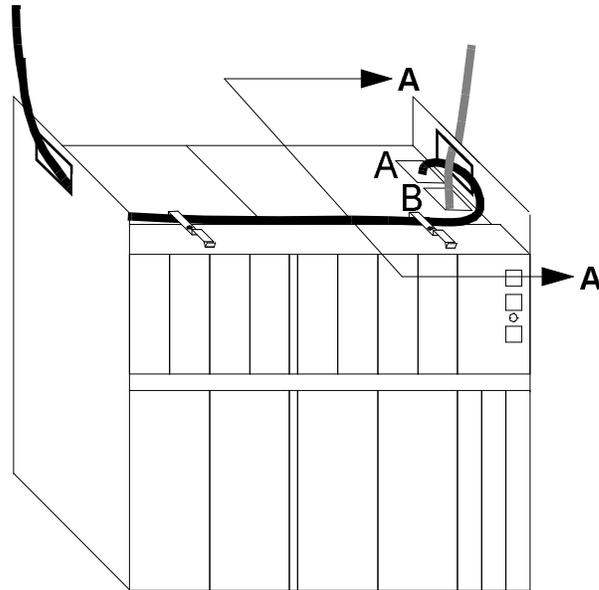
Figure 5-6 OLS Power Cable Routing (Miscellaneous Mount Frame Not Shown)

Miscellaneous Mounted OT Cables

This section describes the installation of the A and B power cables and shelf interconnecting wiring for the four configurations of miscellaneous mounted OT (List 10 through List 13).

➡ NOTE:
Each feeder capacity in the miscellaneous mount shelf must be 15 amperes (unless otherwise specified by the customer) at the battery distribution fuse board (BDFB).

Miscellaneous Mount Power Cable Installation
List 10

The List 10 power cable connections at each shelf are to be installed prior to any other intershelf wiring.

To install the intershelf power cable for the **A supply** perform the following:

■ Locate the List 10 power cable for the A supply: ED9C103-22 GR5 or GR15. The supply end of the cable will have a **RED** jacket.

■ Take the connector farthest from the supply end and put it through the left access hole of the System Shelf (lowest shelf). Align plug with PWR A connector checking that the locking clip is on the right side and the RED (-48 V) is at the upper end of the connector. Push connector in until locking tab snaps in place.

■ Select the connector of the remaining two that is farthest from the supply end and put it through the left access hole of the Complementary Shelf 1 (middle shelf). Align plug with PWR A connector checking that the locking clip is on the right side and the RED (-48 V) is at the upper end of the connector. Push connector in until locking tab snaps in place.

■ Take the remaining connector and put it through the left access hole of the Complementary Shelf 2 (top shelf). Align plug with PWR A connector checking that the locking clip is on the right side and the RED (-48 V) is at the upper end of the connector. Push connector in until locking tab snaps in place.

■ Route excess cable into bay frame channel on left side and tie to frame.

■ Secure cable at entrance to frame.

To install the intershelf power cable for the B supply perform the following:

■ Locate B supply power cable ED9C103-22 GR6 or GR16. The supply end of the cable will have a **BLUE** jacket.

■ Take the connector farthest from the supply end and put it through the right access hole of the System Shelf (lowest shelf). Align plug with PWR B connector checking that the locking clip is on the left side and the BLUE (-48 V) is at the lower end of the connector. Push connector in until locking tab snaps in place.

■ Select the connector of the remaining two that is farthest from the supply end and put it through the right access hole of the Complementary Shelf 1 (middle shelf). Align plug with PWR B connector checking that the locking clip is on the left side and the BLUE (-48 V) is at the lower end of the connector. Push connector in until locking tab snaps in place.

■ Take the remaining connector and put it through the right access hole of the Complementary Shelf 2 (top shelf). Align plug with PWR B connector checking that the locking clip is on the left side and the BLUE (-48 V) is at the lower end of the connector. Push connector in until locking tab snaps in place.

■ Route excess cable into bay frame channel on right side and tie to frame.

■ Secure cable at entrance to top of frame.

Miscellaneous Mount Power Cable Installation
List 11, 12, and 13

The power cable connections at each shelf are to be installed prior to any intershelf wiring. The List 11, 12, and 13 shelves use the same A and B power cables which have a single power connector at each end. It is assumed that the shelves are being installed as single shelves. Each shelf will require a separate power cable.

To install the intershelf power cable for the A supply, perform the following:

- Locate the A supply power cable for List 11, 12, and 13. It is the same cable for all three list numbers: ED9C103-22 GR7 (length=15ft) or GR8 (length as specified). The supply end of the cable will have a **RED** jacket.

- Put the connector through the left access hole of the shelf to be wired. Align the plug with PWR A connector on interconnection panel checking that the locking clip is on the right side and the RED (-48V) wire is at the lower end of the connector. Push connector in until locking tab snaps in place.

- Route excess cable into bay frame channel on right side and tie to frame.

- Secure cable at entrance to top of frame.

Miscellaneous Mount Power Cable Connection

Install as follows:

- Turn the power breakers off, or do not install fuses, at the battery distribution fuse board (BDFB).

- Verify the circuit packs are not installed in the shelves.

⚠️ WARNING:
  Leave the BDFB fuses out or breakers off until performing the steps in Section 8, "Powering", of this document.

- If power is being fed by an overhead cable rack, route the cable out through the top of the bay wiring channel. If power is being fed from a raised floor storage tray, route the power cables down the bay wiring channel and out through the raised floor.

- Identify the battery feed connections at the battery distribution fuse board or other protection equipment. They should be labeled BAT A, BAT A RTN, BAT B, and BAT B RTN.

- Check that the power feed cables are labeled for battery A (RED) and battery B (BLUE) use.

- Splice feeders from the battery distribution fuse board to the OT power cables. The red clad internal power lead connect to -48V. The white power lead connects to the power feed return.

- Connect equipment ground lead from cabinet or bay to proper ground connection.

Final Verification

Perform the following steps to ensure that cables are properly installed:

(1) Verify that power cables are properly secured and dressed.

(2) Verify that all power cables are properly labeled.

Wired Cable Installation

6

Contents

Wired Cable Installation

6

Overview

⚠ CAUTION:
Procedures in this installation manual are only to be performed by trained personnel.

This section covers OLS and OT cable installation. This section covers general considerations and has been broken out into several subsections listed below:

■ Section A - Interconnection Panels covers the physical layout of each panel and a brief discussion of the associated connections.

■ Section B - Office Alarms covers available alarms and connection to the interconnection panels.

■ Section C - Serial, Parallel and X.25 Telemetry Cable Installation covers the uses and installation of all three types of telemetry cables.

■ Section D - CIT-DTE Cables covers the installation of the data terminal equipment (DTE) cable.

■ Section E - Line Orderwire, Section Orderwire, Section User Channel, and line growth cables installation covers the installation and application of these cables.

■ Section F - Miscellaneous Mount OT Intershelf Wiring covers the installation of the cables necessary to interconnection Lists 11, 12 and 13

■ Section G - Miscellaneous Discrete Cables Installation covers the installation of the Miscellaneous discrete cables necessary to communicate alarms from the OT and other outside sources to the OLS.

General Considerations

⚠ CAUTION:
A wrist strap connected to a wrist strap ground jack on the terminal must be worn for ESD protection during the installation process.

⚠ CAUTION:
Connectors on the interconnect panel come equipped with protective ESD covers. These covers should be left in place on any connector that is not being immediately cabled so that ESD protections are maintained.

Keep the following information under consideration during cable installation:

■ This cable information is the latest cable information available at the time of the issue. For up-to-date information, refer to the ED cable drawings listed in the Section 1, "Overall Installation and Test Considerations."

■ For ordering information, refer to 365-575-330, Optical Line System (OLS) Application, Planning, and Ordering Guide.

■ To simplify installation, install cables starting from the sides of the interconnection panel and work towards the center.

■ All shielded cable that is less than 25 feet in length must have its shield grounded. If cables are over 25 feet in length, it is strongly advised to ground the cable shield. Ground at the transmit end of the cable.

■ Do not remove the backplane cover during the installation process.

■ Any broken pins or bent pins that cannot be straightened on the D-sub connectors must be replaced using the AMP 91261-1 tool.

Final Verification

Perform the following steps at the end of each subsection to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that all cables are properly labeled.

A - Interconnection Panel Description

The Interconnection Panel Descriptions of OLS, OT and Miscellaneous Mount OT are covered in this section.

OLS Interconnection Panel

The OLS interconnect panel is shown in Figure 6-1 on page 6-3.
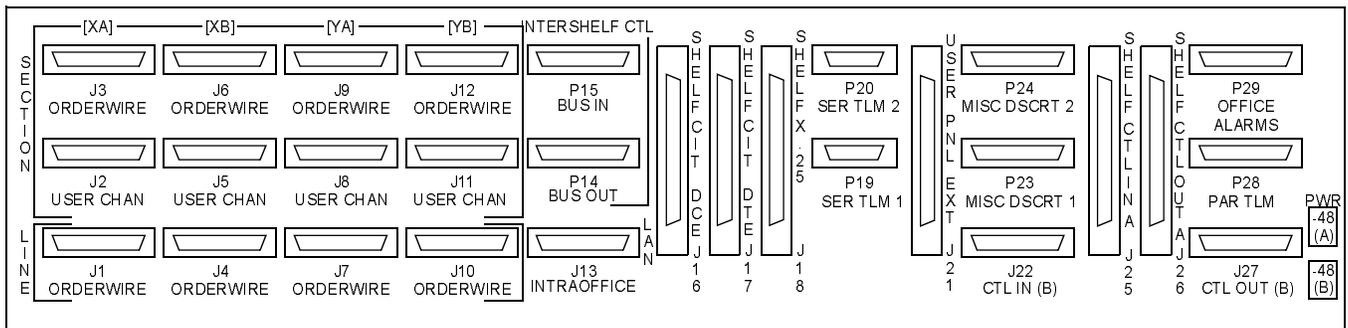
Figure 6-1 OLS Interconnection Panel

Table 6-1, "OLS Interconnection Panel Connectors and Types," on page 6-3 lists the connector types used on the OLS shelf.

Table 6-1 OLS Interconnection Panel Connectors and Types

CONNECTOR	TYPE	Connector Orientation
J1-13, J22, J27	dB15 Female	

Table 6-1 OLS Interconnection Panel Connectors and Types

CONNECTOR	TYPE	Connector Orientation
P14, P15, P23, P24, P28, P29	dB15 Male	
P19, P20	dB9 Male	
J16, J17, J18, J21, J25, J26	dB25 Female	
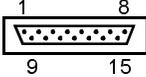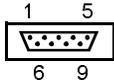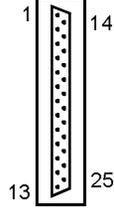
OT Interconnection Panel

The Interconnection Panel for the two Complementary Shelves 1 and 2 are identical and all connections are utilized in R1-OT. The System Shelf has a different interconnecting panel with some interfaces active and others available for future releases. Installation instructions will be provided for all interconnections whether being used now or in the future.

The Interconnection Panel for Complementary Shelf 1 and 2 is shown Figure 6-2 on page 6-4.
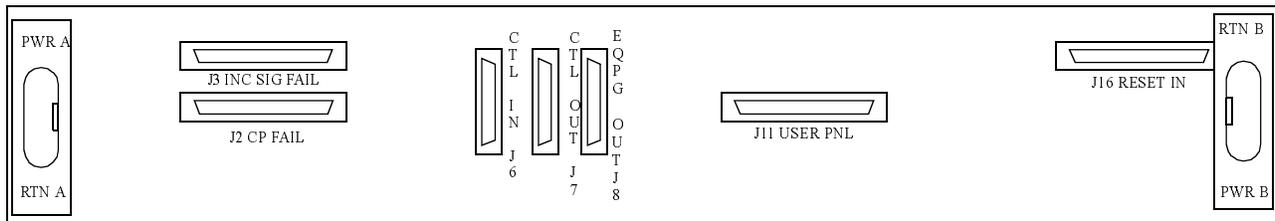
Figure 6-2 Interconnection Panel for OT Complementary Shelf 1 &2

The external interface connections that are operational for Complementary Shelves 1 and 2 for R1-OT are as follows:

■ INC SIG FAIL J3: This connector provides an interface to the Incoming Loss of Signal Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ CP FAIL J2: This connector provides an interface to the Circuit Pack Failure Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ PWR: These connectors provide an interface to the -48V DC power coming from source A and source B. They are installed at the factory.

The Interconnection Panel for the System Shelf is shown Figure 6-3 on page 6-5.
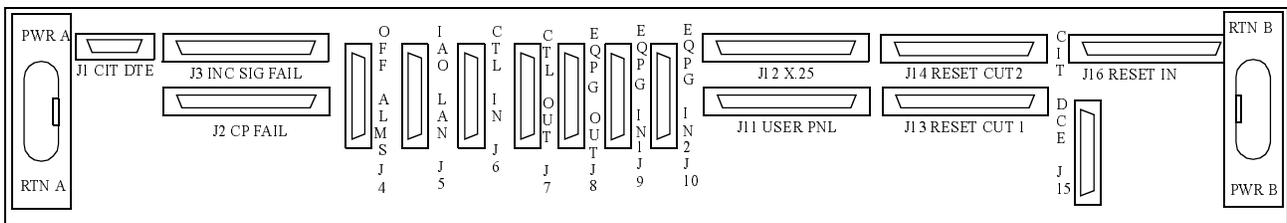
Figure 6-3 Interconnection Panel for OT System Shelf

The System Shelf external interface connections operational for R1-OT are as follows:

■ INC SIG FAIL J3: This connector provides an interface to the Incoming Loss of Signal Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ CP FAIL J2: This connector provides an interface to the Circuit Pack Failure Miscellaneous Discrete relay contacts located on each OTU within the shelf.

■ PWR: These connectors provide an interface to the -48V DC power coming from source A and source B. They are installed at the factory.

The external interface available for future releases but not supported in RI-OT are as follows: X.25 (J12), OFF ALMS (J4), and CIT-DTE (J1).

A summary of the interconnections for all shelves is given in Table 6-2, "Connection to Shelf Interconnection Panels," on page 6-6.

Table 6-2 Connection to Shelf Interconnection Panels

Cable Applications	System Shelf	Complementary Shelf 1	Complementary Shelf 1
Misc. Discrete CP Failure	J2	J2	J2
Misc. Discrete Inc. Sig. Fail.	J3	J3	J3
Office Alarms	J4	No Conn.	No Conn
X.25 (TL-1) Telemetry	J12	No Conn	No Conn
CIT-DTE	J1	No Conn	No Conn

B - Office Alarm Installation

Description

Office alarms are commonly used by central office maintenance personnel to quickly identify a failed system.

Available OLS Office Alarms Discrete Cables

Table 6-3, "OLS Office Alarms Cables," on page 6-7 lists cables that are available for office alarms applications. Cables listed may be used for this application as well as for Miscellaneous Discrete and Parallel Telemetry applications.

Table 6-3 OLS Office Alarms Cables

ED-7G028-22 Cable Group	Cable Length (ft.)	Cable Type
301	As Req'd	811AS
351	150	
361	250	

OLS Alarm Connection to Interconnection Panel

The OS Alarm Connection to the Interconnection Panel is located at **P29**.

OLS Office Alarm Cable Connection

Table 6-4, "OLS Office Alarm Cable Connection," on page 6-8 lists office alarm cable connections and designations.

Table 6-4 OLS Office Alarm Cable Connection

Alarm Name	Designation	Pin	Wire Color
Office Alarm Critical Audible	OACRAUD	1	BL-W
Office Alarm Critical Visual	OACRVIS	2	O-W
Office Alarm Major Audible	OAMJAUD	3	G-W
Office Alarm Major Visual	OAMJVIS	4	BR-W
Office Alarm Minor Audible	OAMNAUD	5	S-W
Office Alarm Minor Visual	OAMNVIS	6	BL-R
No Connection	none	7	none
No Connection	none	8	none
Office Alarm Critical Audible Return	OACRAUDR	9	W-B
Office Alarm Critical Visual Return	OACRVISR	10	W-O
Office Alarm Major Audible Return	OAMJAUDR	11	W-G
Office Alarm Major Visual Return	OAMJVISR	12	W-BR
Office Alarm Minor Audible Return	OAMNAUDR	13	W-S
Office Alarm Minor Visual Return	OAMNVISR	14	R-BL
No Connection	none	15	R-O

OT Office Alarms Cable Connection

Description

Office alarms are commonly used by central office maintenance personnel to quickly identify a failed system. In Release 1 of OT, the operation of office alarms is not supported. The connector is provided on the interconnection panel for future releases. Wiring information is provided should the cable be wired at this time.

OT Available Office Alarms Cables

Table 6-5, "OT Office Alarms Cables," on page 6-9 lists cables that are available for the OT office alarms application.

Table 6-5 OT Office Alarms Cables

ED-7G045-22 Cable Group	Cable Length (ft.)	Cable Type
1	As Specified	816AS 6/26
2	150	

OT Office Alarm Cable Connection

Table 6-6, "OT Office Alarm Cable Connection," on page 6-9 lists office alarm cable connections and designations.

NOTE:
The designations and their associated pin numbers on this office alarm cable are different than the alarm cables used for OLS. Follow wiring designations carefully.

Table 6-6 OT Office Alarm Cable Connection

Alarm Name	Designation	Pin	Wire Color
Office Alarm Critical Audible	OACRAUD	6	BL-R
Office Alarm Critical Visual	OACRVIS	5	S-W
Office Alarm Major Audible	OAMJAUD	1	BL-W
Office Alarm Major Visual	OAMJVIS	2	O-W
Office Alarm Minor Audible	OAMNAUD	4	BR-W
Office Alarm Minor Visual	OAMNVIS	3	G-W
No Connection	none	7	none
No Connection	none	8	none
Office Alarm Critical Audible Return	OACRAUDR	14	R-BL
Office Alarm Critical Visual Return	OACRVISR	13	W-S
Office Alarm Major Audible Return	OAMJAUDR	9	W-BL
Office Alarm Major Visual Return	OAMJVISR	10	W-O
Office Alarm Minor Audible Return	OAMNAUDR	12	W-BR
Office Alarm Minor Visual Return	OAMNVISR	11	W-GR
No Connection	none	15	none

Office Alarm Cable Installation Procedure

During office alarm cable installation, note the following transient current considerations:

■   Steady-state current for office alarm connections shall not exceed 0.9 amps at 60 volts or 1.8 amps at 30 volts. The maximum transient currents (20 msec. duration) during initial contact closure shall not exceed 9 amps at 60 volts or 18 amps at 30 volts.

■   Use transient noise-suppressing devices to keep within the limits specified above. These devices may include diodes or contact suppression networks. If the protection devices are not adequate, use an external buffer relay.

■   Use suppression devices across any external relay coil being driven by the OLS or OT. Selection of transient suppression devices shall be made according to the specific office alarm circuit arrangement.

OLS Office Alarm Connection

Perform the following steps to install the office alarm cable (optional):

(1) Route the office alarm cable (see Figure 6-1 on page 6-3) through the right opening in the side of the OLS shelf from the office alarm panel.

(2) Connect the office alarm cable to P29 on the interconnection panel.

(3) Inspect the office alarm panel. Use a contact suppression network (refer to transient current considerations information above) if required.

(4) Connect the office alarm cable to the office alarm panel by cutting the cable to length and wire-wrapping the loose ends onto the panel.

(5) Label the connections that are wire-wrapped.

(6) Dress and tie the cable.

⇒ NOTE:
If installing the office alarm cable on an End Terminal for 4 Bidirectional Optical Lines or a Repeater for 4 Bidirectional Lines use, the P29 located on the lower shelf. If the upper shelf is used the ACO function will not work properly.

OT Office Alarm Connection

Perform the following steps to install the office alarm cable (optional):

(1) Route the office alarm cable through the left opening in the side of the OT system shelf.

(2) Connect the office alarm cable to J4 on the interconnection panel. Refer to Figure 6-3 on page 6-5, OT Interconnection Panel for System Controller Shelf, for location of the appropriate jack.

(3) Inspect the office alarm panel. Use a contact suppression network (refer to transient current considerations information above) if required.

(4) Connect the office alarm cable to the office alarm panel by cutting the cable to length and wire-wrapping the loose ends onto the panel.

(5) Label the connections that are wire-wrapped.

(6) Dress and tie the cable.

Final Verification

Perform the following steps at the end of each subsection to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that all cables are properly labeled.

C - Serial, Parallel & X.25 Telemetry Cable Installation

OLS Serial Telemetry Cables Installation

Description

- Serial telemetry (TBOS) provides information to the maintenance center about that location and remote control over that location from the maintenance center. In Releases 2.0 and 2.1 OLS, the Ser Tlm 1 port will support the **Extended Miscellaneous Discretes** feature. This involves connecting the Ser Tlm 1 port to an Extended Miscellaneous Unit (EMDU) located outside of the OLS system. Appendix D and Appendix E covers the installation of the EMDU to the OLS system.

- Extended miscellaneous discrete points will provide an additional means of notifying an operations system (OS) maintenance center of environmental conditions at the OLS site.

➡ NOTE:
Releases 1.0, 2.0 and 2.1 OLS do not support use of the Ser Tlm 2 port.

Available OLS Serial Telemetry Cables

Table 6-7 lists available cables for serial telemetry applications.

Table 6-7 OLS Serial Telemetry Cables

ED-7G028-22 Cable Group	Cable Length (ft.)	Cable Type
201	As req'd (4000' max)	761A1 (CA1) and 761A2 (CA2)
251	150	
261	250	

Table 6-8 lists serial telemetry cable connection to the interconnection panel.

Table 6-8 OLS Serial Telemetry Cable Connection to Interconnection Panel

Cable Application	Interconnection Panel Location
Serial Telemetry 1	P19
Serial Telemetry 2	P20

OLS Serial Telemetry Cable Connection

Table 6-9 lists serial telemetry cable connections and designations.

Table 6-9 Serial Telemetry Connector

Name	Designation	Pin	Wire Color
TBOS TRM Transmit N	TBASTXN	1	BL (CA1)
No Connection	none	2	none
TBOS TRM Receive N	TBASRXN	3	O (CA2)
No Connection	none	4	none
No Connection	none	5	none
TBOS TRM Transmit P	TBASTXP	6	W (CA1)
No Connection	none	7	none
TBOS TRM Receive P	TBASRXP	8	W (CA2)
No Connection	none	9	none

OLS Serial Telemetry Cable Installation Procedure

Perform the following steps to install serial telemetry cables:

(1) Route the serial telemetry cables out the right side of the OLS shelf to the serial telemetry system.

➤ NOTE:
Refer to Figure 6-1 on page 6-3 for location on the Interconnection panel.

(2) Connect serial telemetry cable 1 to P19 on the interconnection panel.

(3) Connect serial telemetry cable 2 to P20 on the interconnection panel.

(4) Connect the serial telemetry cables to the serial telemetry system by cutting the cables to length and wire-wrapping the loose ends onto the panel.

(5) Label the connections that are wire-wrapped.

(6) Dress and tie the cables.

X.25 (TL-1) Telemetry Cable Installation

Description

X.25 is a synchronous network communication protocol commonly used with operations systems. It utilizes transaction language 1 (TL1) for the message language.

Available OLS X.25 Telemetry Cables

Table 6-10 lists cables available for OLS X.25 applications.

Table 6-10 OLS X.25 Telemetry Cable

ED-7G028-22 Cable Group	Cable Length (ft.)	Cable Type	Connector Types F=Female M=Male
602	As Required (150' max)	811AS	F-M
652	150'	811AS	F-M

Available OT X.25 Telemetry Cables

Table 6-11 lists cables available for OT X.25 applications.

Table 6-11 OT X.25 Telemetry Cable

ED-7G045-22 Cable Group	Cable Length (ft.)	Cable Type
6	As Specified	321 46
7	150'	321 46

X.25 Telemetry Cable Connection

Table 6-12 lists the X.25 telemetry cable connection to the interconnection panel for both OT and OLS.

Table 6-12 X.25 Telemetry Cable Connection to Interconnection Panel

System	Cable Application	Interconnection Panel Location
OLS	X.25	J18
OT	X.25	J12

Table 6-13 lists pin connections for the X.25 cable (EIA-232D). For more information about the TL1 interface refer to Lucent Technologies 824-102-176 Optical Line System (OLS) Operations Systems Engineering Guide.

Table 6-13 TL1/X.25 Interface - EIA-232D Pin Connections

Pin	Description
1	Protective Ground (Shield)
2	Transmitted Data
3	Received Data
4	Request to Send (RTS)*
5	Clear to Send (CTS)**
6	DSR Data Set Ready
7	Signal Ground
8	Received Line Signal Detector
15	Transmitter Signal Element Timing (DCE to DTE)
17	Receiver Signal Element Timing (DCE to DTE)
20	DTR Data Terminal Ready*
	* RTS and DTR are always on when OLS is powered. ** OLS will only transmit data via X.25 when CTS is on.

Table 6-14 lists X.25 cable connections and designations for Group 602 and 652 cables.

Table 6-14 X.25 Telemetry Cable Connection, G602 and G652 (OLS) & G6 and G7 (OT)

Name	Designation	P156A Terminal	Wire Color	Datakit End
Protective Ground	GRD	1	BL	1 GRD
MSR Transmit Data	MSRTDX	2	BL/W	2 TDX
MSR Receive Data	MSRRXD	3	O/W	3 RXD
MSR Request To Send	MSRRTS	4	G/W	No Connect
MSR Clear To Send	MSRCTS MSRDTR	5 20	W/G W/S	4 RTS 20 DTR **
MSR Data Set Ready	MSRDSR	6	BR/W	6 DSR
Signal Ground	GRD	7	S/W	7 GRD
MSR Receive Line Signal Detected	MSRRLSD	8	BL/R	8 RLSD
No Connection	none	9	none	
No Connection	none	10	none	
No Connection	none	11	none	
No Connection	none	12	none	
No Connection	none	13	none	
No Connection	none	14	none	
MSR Transmitter Signal Element Timing	MSRTSET	15	R/O	15 TSET
No Connection	none	16	none	
MSR Receiver Signal Element Timing	MSRRSET	17	R/G	17 RSET
No Connection	none	18	none	
No Connection	none	19	none	
MSR Data Terminal Ready	MSRDTR MSRCTS	20 5	W/S W/G	20 DTR 4 RTS **
No Connection	none	21	none	
MSR Ring Indicator	MSRRI	22	R/BL	22 RRI
No Connection	none	23	none	
No Connection	none	24	none	

Table 6-14 X.25 Telemetry Cable Connection, G602 and G652 (OLS) & G6 and G7 (OT)

Name	Designation	P156A Terminal	Wire Color	Datakit End
No Connection	none	25	none	
** The short between 5 and 20 at the OLS end, and 4 and 20 at the Datakit end, is physically accomplished at the Datakit end with a Black wire between 4 and 20. Pin 5 is No Connect at the Datakit end.				

X.25 Telemetry Cable Installation Procedure

Perform the following steps to install the X.25 telemetry cable:

⮕ NOTE:

OLS Group 602 and 652 Cables have a socket (female type connector with a blank label) at one end and a plug (male type connector labeled P156A) at the other end. The cable plug end (male) mates with the socket on the OLS. The socket end (female) is intended to mate with the X.25 network equipment. For cables that have two blank labels, mark P18 on the blank label at the plug (male) end of the cable.

⮕ NOTE:

OT Group 6 and 7 Cables have a socket (female type connector with a blank label) at one end and a plug (male type connector labeled P156A) at the other end. The cable plug end (male) mates with the socket on the OT. The socket end (female) is intended to mate with the X.25 network equipment.

(1) Mark the blank label at the socket (female) end of the cable with the appropriate jack number for the X.25 port on the operation support system.

(2) Making sure the plug end (labeled P18 for OLS or P156A for OT) of the cable is at the FT-2000 equipment, route the X.25 cable out the right side of the OLS or OT shelf to the X.25 port of the operation support system.

⮕ NOTE:

Refer to Figure 6-1 on page 6-3 for the location on the OLS interconnection panel or Figure 6-3 on page 6-5 for the location on the OT interconnection panel.

(3) Connect the X.25 telemetry cable to J18 for OLS or J12 for OT on the interconnection panel.

(4) Connect the X.25 telemetry cable to the X.25 port of the operation support system.

(5) Dress and tie the cables.

OLS Parallel Telemetry Cable Installation

Description

Parallel telemetry reports a minimum set of alarms and status indications to a maintenance center via a telemetry system.

Available Parallel Telemetry Cables

Table 6-15, "OLS Parallel Telemetry Cables," on page 6-19 list cables that available for use in connecting Parallel Telemetry.

Table 6-15 OLS Parallel Telemetry Cables

ED-7G028-22 Cable Group	Cable Length (ft.)	Cable Type
301	As Req'd	811AS
351	150	
361	250	

OLS Parallel Telemetry Cable Connections

Table 6-16, "OLS Parallel Telemetry Cable Connections," on page 6-19 lists parallel telemetry cable connections and designations.

Table 6-16 OLS Parallel Telemetry Cable Connections

Alarm Name	Designation	Pin	Wire Color
Local Alarm Minor	LAMN	1	BL-W
Local Alarm Major	LAMJ	2	O-W
Local Alarm Critical	LACR	3	G-W
Remote Alarm Minor	RAM	4	BR-W
Remote Alarm Major	RAMJ	5	S-W
Remote Alarm Critical	RACR	6	BL-R
No Connection	none	7	none

Table 6-16 OLS Parallel Telemetry Cable Connections

Alarm Name	Designation	Pin	Wire Color
No Connection	none	8	none
Local Alarm Minor Return	LAMNR	9	W-BL
Local Alarm Major Return	LAMJR	10	W-O
Local Alarm Critical Return	LACRR	11	W-G
Remote Alarm Minor Return	RAMNR	12	W-BR
Remote Alarm Major Return	RAMJR	13	W-S
Remote Alarm Critical Return	RACRR	14	R-BL
No Connection	none	15	R-O

**OLS Parallel Telemetry Cable Installation
Procedure**

Perform the following steps to install the parallel telemetry cable:

(1) Route the cable through the right opening in the side of the OLS shelf from the telemetry system. Refer to Figure 6-1 on page 6-3, OLS Interconnection Panel, to locate the corresponding jack.

(2) Connect the parallel telemetry cable to P28 on the interconnection panel.

(3) Connect the parallel telemetry cable to the telemetry processor by cutting the cable to length and wire-wrapping the loose ends onto the telemetry processor.

(4) Label the connections that are wire-wrapped.

(5) Dress and tie the cable.

Final Verification

Perform the following steps at the end of each subsection to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that all cables are properly labeled.

D - CIT(CMC) DTE Cables Installation

Description

The OLS supplies access to remote CenterLink Management Console (CMC) PCs through a local area network or modem connection to the CIT-DTE port.

This option is not supported in Release 1.0 of the Optical Translator, however the information is provided if installing the cabling is to be done at this time.

Available CIT(CMC) DTE Cables

Table 6-17 lists cables available for CIT(CMC)-DTE applications for OLS

Table 6-17 OLS CIT(CMC)-DTE Cable

ED-7G028-22 Cable Group	Cable Length (ft.)	Cable Type
702	As Req'd. (150' max)	811AS
752	150'	811AS

Table 6-18 lists cables available for CIT(CMC)-DTE applications.

Table 6-18 OT CIT(CMC)-DTE Cable

ED-7G045-22 Cable Group	Cable Length (ft.)	Cable Type
14	150'	321 46
15	As Req'd.	321 46

CIT(CMC)-DTE Cable Connection to Interconnection Panel

Table 6-19 lists cable connection to the interconnection panel for both systems.

Table 6-19 CIT(CMC)-DTE Cable Connection to Interconnection Panel

System	Cable Application	Interconnection Panel Location
OLS	CIT-DTE	J17
OT	CIT-DTE	J1

The CIT-DTE cable connects to a local area network or modem which must meet the following requirements:

■   Must be able to transmit at 300, 1200, 2400, 4800, or 9600 baud rate

■   Must have an RS-232 DCE interface port

■   Must be configured for 8 bit data bytes with 1 start bit and 1 stop bit

■   Must not use the DSR lead.

CMC DTE Connections and Designations

Table 6-20 lists CIT-DTE cable connections and designations.

Table 6-20 CIT-DTE Cable Connection

Name	Designation	Pin	Wire Color
Protective Ground	GRD	1	ground wire
CT Transmit Data	CTTXD	2	BL/W
CT Receive Data	CTRXD	3	O/W
CT Request To Send	CTRTS	4	G/W
CT Clear To Send	CTCTS	5	BR/W
CT Data Set Ready	CTDSR	6	S/W
Signal Ground	GRD	7	BL/R
CT Receive Line Signal Detected	CTRLSD	8	R/BL
No Connection	none	9	none
No Connection	none	10	none

Table 6-20 CIT-DTE Cable Connection

Name	Designation	Pin	Wire Color
No Connection	none	11	none
No Connection	none	12	none
No Connection	none	13	none
No Connection	none	14	none
No Connection	none	15	R/O
No Connection	none	16	none
No Connection	none	17	R/G
No Connection	none	18	none
No Connection	none	19	none
CT Data Terminal Ready	CTDTR	20	W/S
No Connection	none	21	none
No Connection	none	22	R/BL
No Connection	none	23	none
No Connection	none	24	none
No Connection	none	25	none

OLS CIT-DTE Cable Installation Procedure

Perform the following steps to install the CIT(CMC)-DTE cable:

(1) Both ends of the cable are connectorized. Making sure the socket end of the cable is at the OLS equipment, route the CIT(CMC)-DTE cable out the right side of the OLS shelf to the 25-pin D-type connector on the local area network or modem.

(2) Connect the CIT(CMC)-DTE cable to J17 on the interconnection panel. Refer to Figure 6-1 on page 6-3 for the location of the connector.

(3) Connect the CIT(CMC)-DTE cable to the RS232 DCE port on the local area network or modem.

(4) Dress and tie the cables.

OT CIT-DTE Cable Installation Procedure

Perform the following steps to install the CIT-DTE cable:

(1) Both ends of the cable are connectorized. Making sure the socket end of the cable is at the OT equipment, route the CIT-DTE cable out the left side of the OT shelf to the 25-pin D-type connector on the local area network or modem.

(2) Connect the CIT-DTE cable to J1 on the interconnection panel. Refer to Figure 6-3 on page 6-5 for the location of the connector.

(3) Connect the CIT-DTE cable to the RS232 DCE port on the local area network or modem.

(4) Dress and tie the cables.

Final Verification

Perform the following steps at the end of each subsection to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that all cables are properly labeled.

E - Line Orderwire, Section Orderwire and Section User Channel Cables Installation

Description

The Optical Translator (OT) does not currently support Line Orderwire, Section Orderwire or Section User Channel capabilities. However, the Optical Line System (OLS) does. The following section describes the cables and their installation for OLS.

Line orderwire, section orderwire, and section user channel cables allow for access to SONET overhead bytes. They include:

■   Orderwire capabilities

■   User channel access

Available Line Orderwire, Section Orderwire, and Section User Channel Cables

Table 6-21 lists the cables that are available for Line Orderwire, Section Orderwire, and Section User Channel.

Table 6-21 Available Line Orderwire, Section Orderwire, and Section User Channel Cables

ED-7G028-22 Cable Group	Cable Length (ft.)	Cable Type
401	As req'd (2850' max*)	816AS
451**	150	
461**	250	
* When used for Line Growth Channel application the limit is 11 ft. ** Not available for Line Growth Channel applications.		

Line and Section Orderwire and Section User Channel Connection to Interconnection Panel

Table 6-22 lists Line Orderwire, Section Orderwire, and Section User Channel cable connection to the interconnection panel.

Table 6-22 Line Orderwire, Section Orderwire, and Section User Channel Cable Connection to Interconnection Panel

Cable Application	Interconnect Panel Location			
	XA	XB	YA	YB
Section Orderwire	J3	J6	J9	J12
Section User Channel	J2	J5	J8	J11
Line Orderwire	J1	J4	J7	J10
Note: X=Line 1, Y=Line 2				

Line Orderwire Cable Connections

Table 6-23 lists Line Orderwire cable connections and designations.

Table 6-23 Line Orderwire Cable Connection

Name	Designation	Pin	Wire Color
Overhead E2 Clock Input N	OE2CIN	1	BL-W
Overhead E2 Sync Input N	OE2SIN	2	O-W
Overhead E2 Data Input N	OE2DIN	3	G-W
Overhead E2 Data Output N	OE2DON	4	BR-W
Overhead E2 Sync Output N	OE2SON	5	S-W
Overhead E2 Clock Output N	OE2CON	6	BL-R
No Connection	none	7	none
No Connection	none	8	none
Overhead E2 Clock Input P	OE2CIP	9	W-BL
Overhead E2 Sync Input P	OE2SIP	10	W-O
Overhead E2 Data Input P	OE2DIP	11	W-G

Table 6-23 Line Orderwire Cable Connection

Name	Designation	Pin	Wire Color
Overhead E2 Data Output P	OE2DOP	12	W-BR
Overhead E2 Sync Output P	OE2SOP	13	W-S
Overhead E2 Clock Output P	OE2COP	14	R-BL
No Connection	none	15	none

Line Orderwire Cable Installation Procedure

Perform the following steps to install the Line Orderwire cable:

(1) Route the cable through the left side of the OLS shelf to the line orderwire equipment. Refer to Figure 6-1 on page 6-3, OLS Interconnection Panel, to locate the corresponding jacks.

(2) Connect the line orderwire cable to J1, J4, J7, J10 on the interconnection panel.

(3) Connect line orderwire cable to line orderwire equipment by cutting the cable to length and wire-wrapping the loose ends onto the unit.

(4) Label the connections that are wire-wrapped.

(5) Dress and tie the cable.

Section User Channel Cable Connections

Table 6-24 lists Section User Channel cable connections and designations.

Table 6-24 Section User Channel Cable Connection

Name	Designation	Pin	Wire Color
Overhead F1 Clock Input N	OF1CIN	1	BL-W
Overhead F1 Sync Input N	OF1SIN	2	O-W
Overhead F1 Data Input N	OF1DIN	3	G-W
Overhead F1 Data Output N	OF1DON	4	BR-W
Overhead F1 Sync Output N	OF1SON	5	S-W
Overhead F1 Clock Output N	OF1CON	6	BL-R

Table 6-24 Section User Channel Cable Connection

Name	Designation	Pin	Wire Color
No Connection	none	7	none
No Connection	none	8	none
Overhead F1 Clock Input P	OF1CIP	9	W-BL
Overhead F1 Sync Input P	OF1SIP	10	W-O
Overhead F1 Data Input P	OF1DIP	11	W-G
Overhead F1 Data Output P	OF1DOP	12	W-BR
Overhead F1 Sync Output P	OF1SOP	13	W-S
Overhead F1 Clock Output P	OF1COP	14	R-BL
No Connection	none	15	none

Section User Channel Cable Installation Procedure

Perform the following steps to install the Section User Channel cable:

(1) Route the cable through the left side of the OLS shelf to the user channel equipment. Refer to Figure 6-1 on page 6-3, OLS Interconnection Panel, to locate the corresponding jacks/plugs.

(2) Connect the section user channel cable to J2, J5, J8, J11 on the interconnection panel.

(3) Connect the section user channel cable to the section user channel equipment by cutting the cable to length and wire-wrapping the loose ends onto the user channel unit.

(4) Label the connections that are wire-wrapped.

(5) Dress and tie the cable.

Section Orderwire Cable Connections

Table 6-25 lists Section Orderwire cable connections and designations.

Table 6-25 Section Orderwire Cable Connection

Name	Designation	Pin	Wire Color
Overhead E1 Clock Input N	OE1CIN	1	BL-W
Overhead E1 Sync Input N	OE1SIN	2	O-W
Overhead E1 Data Input N	OE1DIN	3	G-W
Overhead E1 Data Output N	OE1DON	4	BR-W
Overhead E1 Sync Output N	OE1SON	5	S-W
Overhead E1 Clock Output N	OE1CON	6	BL-R
No Connection	none	7	none
No Connection	none	8	none
Overhead E1 Clock Input P	OE1CIP	9	W-BL
Overhead E1 Sync Input P	OE1SIP	10	W-O
Overhead E1 Data Input P	OE1DIP	11	W-G
Overhead E1 Data Output P	OE1DOP	12	W-BR
Overhead E1 Sync Output P	OE1SOP	13	W-S
Overhead E1 Clock Output P	OE1COP	14	R-BL
No Connection	none	15	none

Section Orderwire Cable Installation Procedure

Perform the following steps to install the section orderwire cable:

(1) Route the cable through the left side of the OLS shelf to the section orderwire equipment. Refer to Figure 6-1 on page 6-3, OLS Interconnection Panel, to locate the corresponding jacks.

(2) Connect the section orderwire cable to J3, J6, J9, J12 on the interconnection panel.

(3) Connect the Section Orderwire cable to the Section Orderwire equipment by cutting the cable to length and wire-wrapping the loose ends onto the unit.

(4) Label the connections that are wire-wrapped.

(5) Dress and tie the cable.

Final Verification

Perform the following steps at the end of each subsection to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that all cables are properly labeled.

F - OT Miscellaneous Mount Intershelf Wiring

Intershelf wiring is required for list 10, 12, and 13. The List 11 System Controller Shelf does not require intershelf wiring since it is the initial stand alone shelf.

Table 6-26 on page 6-31 lists the appropriate table to refer to for each List number and the Interconnection Cables for that list.

Table 6-26 List Number, Reference Table, and Page

List Number	Reference Table	Page
List 10	Table 6-27, entitled "Shelf Interconnecting Cables for List 10"	page 6-32
List 12	Table 6-28, entitled "Shelf Interconnecting Cables for List 12"	page 6-32
List 13	Table 6-29, entitled "Shelf Interconnecting Cables for List 13"	page 6-33

- Table 6-27 on page 6-32 lists the interconnections required for a List 10 configuration which entails all three shelves.

- List 12 interconnections are based upon the List 11 shelf having already been installed and requiring the Complementary Shelf 1 be interconnected.

- List 13 interconnections are based upon the assumption that the interconnection called out in Table 6-28 are already in place.

⇒ NOTE:
If any of the shelf interconnections have not yet be made, complete these before proceeding.

When installing cables, match cable plug designation with jack designation such that a P7 cable designation is connected to a J7 connector designation.

⇒ NOTE:
The jack designations for Complementary Shelf 1 and 2 are shown in Figure 6-2 on page 6-4. Figure 6-3 on page 6-5 shows the jack designations for the System Shelf interconnection panel.

List 10 Intershelf Cabling

Install the List 10 intershelf cables as follows:

(1) Install intershelf cables as specified in Table 6-27.

(2) Route cables out the left or right side access holes as specified in Table 6-27. When all the cables have been installed, tie excess cable into left or right bay frame channels.

(3) Upon completion of cable interconnections, verify that ED7G045-20 GR2 termination connectors were factory installed on System Shelf J6 and Complementary Shelf 2 J7.

Table 6-27 Shelf Interconnecting Cables for List 10

Cable Part No.	Connector Pin Size	Side to Run Cable	FROM Shelf / Jack	TO Shelf / Jack
ED7G045-20 GR6	15	Left	System Shelf / J7	Compl. Shelf 1 / J6
ED7G045-20 GR7	15	Left	System Shelf / J9	Compl. Shelf 1 / J8
ED7G045-20 GR8	15	Left	System Shelf / J10	Compl. Shelf 2 / J8
ED7G045-20 GR9	25	Right	System Shelf / J13	Compl. Shelf 1 / J16
ED7G045-20 GR10	25	Right	System Shelf / J14	Compl. Shelf 2 / J16
ED7G045-20 GR11	15	Left	Compl. Shelf 1 / J7	Compl. Shelf 2 / J6

List 12 Intershelf Cabling

Install List 12 intershelf cables as follows:

(1) Remove the ED7G045-20 GR2 termination from the System Controller Shelf Connector J7 and plug it into Complementary Shelf 1 Connector J7.

(2) Install intershelf cables as specified in Table 6-28.

(3) Route cables out the left or right side access holes as specified in Table 6-28. When all the cables have been installed, tie excess cable into left or right bay frame channels.

(4) Upon completion of cable interconnections, verify that ED7G045-20 GR2 termination connectors are on System Shelf J6 and Complementary Shelf 1 J7.

Table 6-28 Shelf Interconnecting Cables for List 12

Cable Part No.	Connector Pin Size	Side to Run Cable	FROM Shelf / Jack	TO Shelf / Jack
ED7G045-20 GR6	15	Left	System Shelf / J7	Compl. Shelf 1 / J6
ED7G045-20 GR7	15	Left	System Shelf / J9	Compl. Shelf 1 / J8
ED7G045-20 GR9	25	Right	System Shelf / J13	Compl. Shelf 1 / J16

List 13 Intershelf Cabling

Install List 13 intershelf cables as follows:

(1) Remove the ED7G045-20 GR2 termination from the Complementary Shelf 1 Connector J7 and plug it into Complementary Shelf 2 Connector J7.

(2) Install intershelf cables as specified in Table 6-29.

(3) Route cables out the left or right side access holes as specified in Table 6-29. When all the cables have been installed, tie excess cable into left or right bay frame channels.

(4) Upon completion of cable interconnections, verify that ED7G045-20 GR2 termination connectors are on System Shelf J6 and Complementary Shelf 2 J7.

Table 6-29 Shelf Interconnecting Cables for List 13

Cable Part No.	Connector Pin Size	Side to Run Cable	FROM Shelf / Jack	TO Shelf / Jack
ED7G045-20 GR11	15	Left	Compl. Shelf 1 / J7	Compl. Shelf 2 / J6
ED7G045-20 GR8	15	Left	System Shelf / J10	Compl. Shelf 2 / J8
ED7G045-20 GR10	25	Right	System Shelf / J14	Compl. Shelf 2 / J16

Final Verification

Perform the following steps at the end of each subsection to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that all cables are properly labeled.

G - Miscellaneous Discrete Cables Installation

Description

Miscellaneous discrete points provide a means for notifying an operations system (OS) maintenance center of environmental conditions at the OLS or OT site.

OLS Miscellaneous Discrete Cable Connection

Two miscellaneous discrete connections are supported by OLS, Cables 1 and 2.

Table 6-30, "OLS Miscellaneous Discrete Cable 1 Connection," on page 6-35 list connections and designations for Miscellaneous Discrete Cable 1.

Table 6-30 OLS Miscellaneous Discrete Cable 1 Connection

Name	OLS Misc. Discretes	Designation	Pin	Wire Color
User Settable Discrete In 12	13	USDI12	1	BL-W
User Settable Discrete In 08	9	USDI08	2	O-W
User Settable Discrete In Common		USDICOM	3	G-W
User Settable Discrete In 04	5	USDI04	4	BR-W
User Settable Discrete In 00	1	USDI00	5	S-W
User Settable Discrete Out Common		USDOCOM	6	BL-R
User Settable Discrete Out 00		USDO00	7	O-R
No Connection		none	8	none
User Settable Discrete In 13	14	USDI13	9	W-BL
User Settable Discrete In 09	10	USDI09	10	W-O
User Settable Discrete In Common		USDICOM	11	W-G
User Settable Discrete In 05	6	USDI05	12	W-BR
User Settable Discrete In 01	2	USDI01	13	W-S
User Settable Discrete Out Common		USDOCOM	14	R-BL
User Settable Discrete Out 01		USDO01	15	R-O

NOTE:

The miscellaneous discretes are numbered 0 through 15. However, they will appear as 1 through 16 on the CenterLink Management Console (CMC) display.

Table 6-31, "OLS Miscellaneous Discrete Cable 2 Connection," on page 6-36 list connections and designations for Miscellaneous Discrete Cable 2.

Table 6-31 OLS Miscellaneous Discrete Cable 2 Connection

Name	OLS Misc. Discretes	Designation	Pin	Wire Color
User Settable Discrete In 14	15	USDI14	1	BL-W
User Settable Discrete In 10	11	USDI10	2	O-W
User Settable Discrete In Common		USDICOM	3	G-W
User Settable Discrete In 06	7	USDI06	4	BR-W
User Settable Discrete In 02	3	USDI02	5	S-W
User Settable Discrete Out Common		USDOCOM	6	BL-R
User Settable Discrete Out 02		USDO02	7	O-R
No Connection		none	8	none
User Settable Discrete In 15	16	USDI15	9	W-BL
User Settable Discrete In 11	12	USDI11	10	W-O
User Settable Discrete In Common		USDICOM	11	W-G
User Settable Discrete In 07	8	USDI07	12	W-BR
User Settable Discrete In 03	4	USDI03	13	W-S
User Settable Discrete Out Common		USDOCOM	14	R-BL
User Settable Discrete Out 03		USDO03	15	R-O

OLS Miscellaneous Discrete Cables Installation Procedure

Perform the following steps to install miscellaneous discrete cables:

(1) Route Cable 1 and Cable 2 through the right opening in the OLS shelf.

(2) Connect the two miscellaneous discrete cables to P23 (Cable 1) and P24 (Cable 2) on the interconnection panel. Refer to Figure 6-1 on page 6-3, OLS Interconnection Panel, to locate the appropriate jacks.

(3) Route the cables to the terminal strip for miscellaneous discrete input points and control output points along the cable rack.

(4) Connect the miscellaneous discrete cables to the miscellaneous discrete input points and control output points terminal strip by cutting the cables to length and wire-wrapping the loose ends onto the terminal strip. The terminal strip is not part of the OLS equipment. It needs to be provided elsewhere in the office. Use Figure 6-4 on page 6-38 as a guide.

⇒ NOTE:
Notes for Figure 6-4 on page 6-38:

2. The miscellaneous customer equipment to be monitored by the OLS equipment must provide the electrical equivalent of a contact closure across the corresponding USDI/USDIC pairs. The closure must be capable of passing at least 10 mA of DC current.

3. Shield wires must be terminated to the frame or chassis ground if the distance between the miscellaneous terminal strip and the OLS interconnection panel is 25 feet or less. For greater distance, the shield ground is not required, but is recommend for enhanced EMC performance.

4. The power source to enable the equipment to control user-provided equipment may be from 3 V to a maximum of 72 V. The OLS equipment provides a unidirectional opto-isolator connected across each corresponding USDO[]USDOC[] pair. The load current across each corresponding pair shall be limited by the customer equipment and shall not exceed 35 mA.

5. The miscellaneous discrete alarms can be assigned in any order.

(5) Label the connections that are wire-wrapped.

(6) Clearly label the use of each discrete input and output on the terminal strip.

(7) Dress and tie the cable.
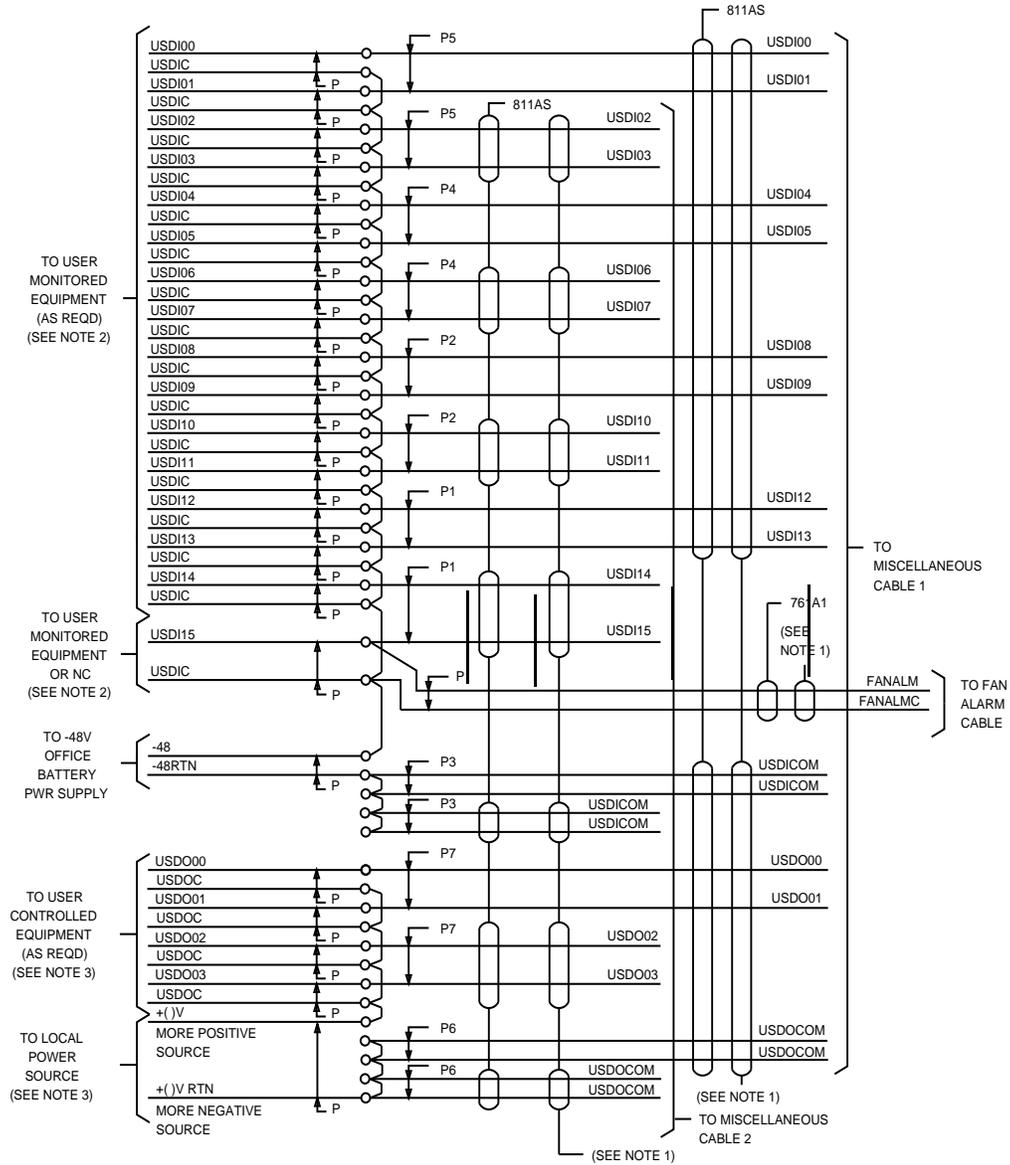
Figure 6-4 OLS Office Termination for Miscellaneous Discrete Cables

OT Miscellaneous Discrete Cable Installation

Description

There are 70 miscellaneous discrete alarms which must be wired from the OT to the External Miscellaneous Discrete Unit (EMDU). Four cables per OT shelf are required to transport the alarms to the EMDU. The wiring of the OT to the EMDU is specified in this section.

Two EMDUs have been selected for use with OT: DANTEL Model 46220-00 and Harris C-1000 Centurion. The EMDU is located between the OT and one of the OLS end terminals. The EMDU installation and wiring of the EMDU to the OLS is specified in Appendix D for the Dantel unit and Appendix E for the Harris unit. Manuals are available from DANTEL (46220 Alarm and Control Block Installation & Operation Manual) and Harris (Harris User Guide for C1000 Centurion.) Both units are rack mountable. The DANTEL unit may also be wall mounted. A block diagram of the cabling to the EMDU is shown in Figure 6-9 on page 6-44, "OT Miscellaneous Discrete Cable Connections."

Dantel Installation Procedure

A detailed installation procedure is provided in the DANTEL Installation & Operation Manual provided with the 46220-00 Alarm and Control Block. The following procedure is provided to facilitate its use with Lucent's Release 2.0 & 2.1 Optical Line System.

Assemble

(1) Attach the Alarm and Control Block to the Mounting Bar.

(2) Attach the mounting bar to the distribution frame. The mounting bar is rear mounted to the distribution frame.

(3) Run the ED7G028-22 cable from the SER TLM1 port of the OLS to the Alarm Control Block.

(4) The SER TLM1 Cable needs to be wired to the Alarm and Control block.

Wiring

(1) In order to access the power supply board of the Dantel Alarm Block the unit must be opened by placing your thumbs under the sides of the unit and gently pushing outwards as in Figure 6-5 on page 6-40.
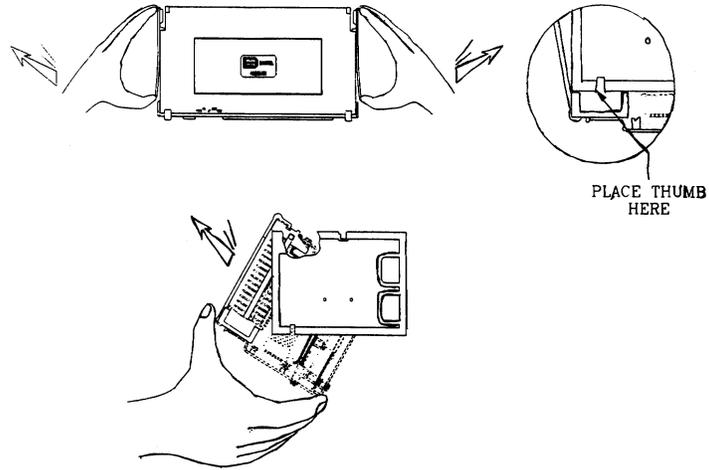
Figure 6-5 Opening the Dantel Alarm Block
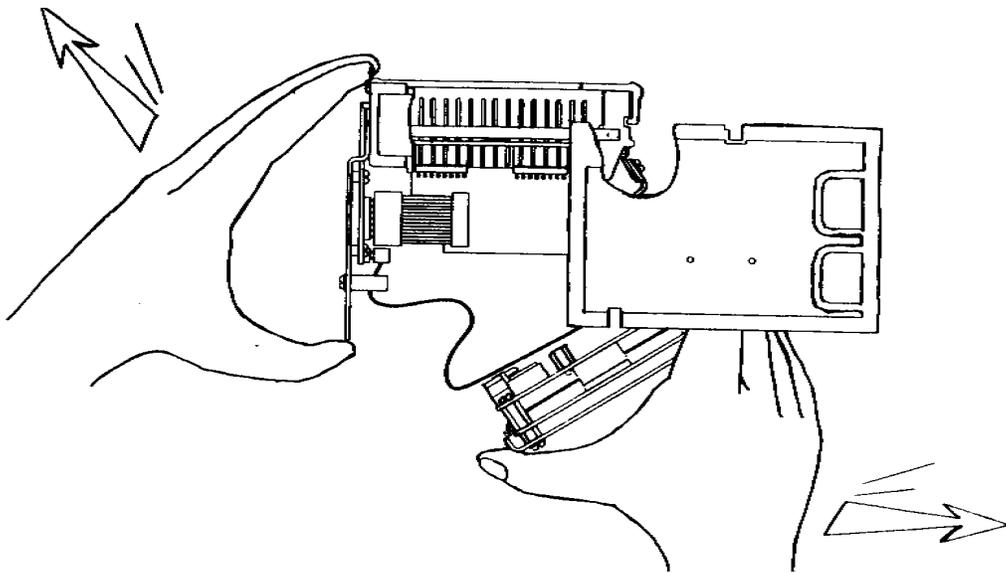
Figure 6-6 Pulling Down the Power Supply and CPU

(2) Pull the Power Supply board and CPU board down. Refer to Figure 6-6 on page 6-40.

(3) On the power supply board, wire negative battery (-21 to -56 VDC) to -48v on connector TB1 (Refer to Figure 6-7 on page 6-41) and Ground return to GND.

.
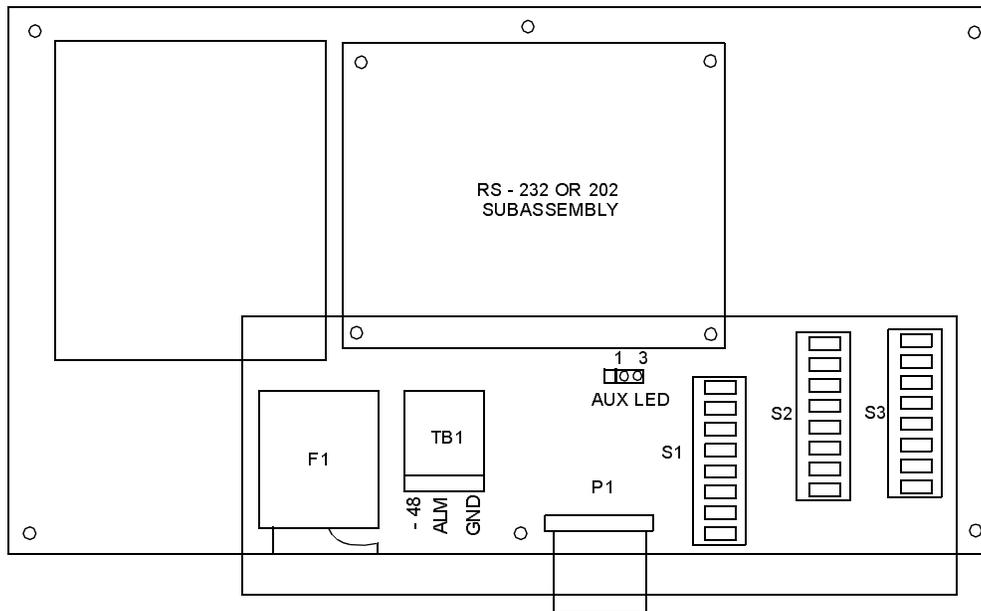
Figure 6-7 Power Supply Board Component Location

(4) Wire the alarm inputs using wiring Table 6-35 on page 6-45 through Table 6-41 on page 6-50 (refer to Figure 6-8 on page 6-42). There are two pins for each input. One is for ground and the other is for alarm input. The dark-colored columns are grounds and are wired together.

(5) Wire Pin 30 S (refer to Figure 6-8 on page 6-42) back to the Battery return ground terminal (GND) on TB-1 (refer to Figure 6-7). Pin 1 will begin with Input Point 17 (refer to Figure 6-8 on page 6-42).

Figure 6-8 Dantel Wire Wrap Pin Designations

Attach Ground Wire Here at Pin 30S
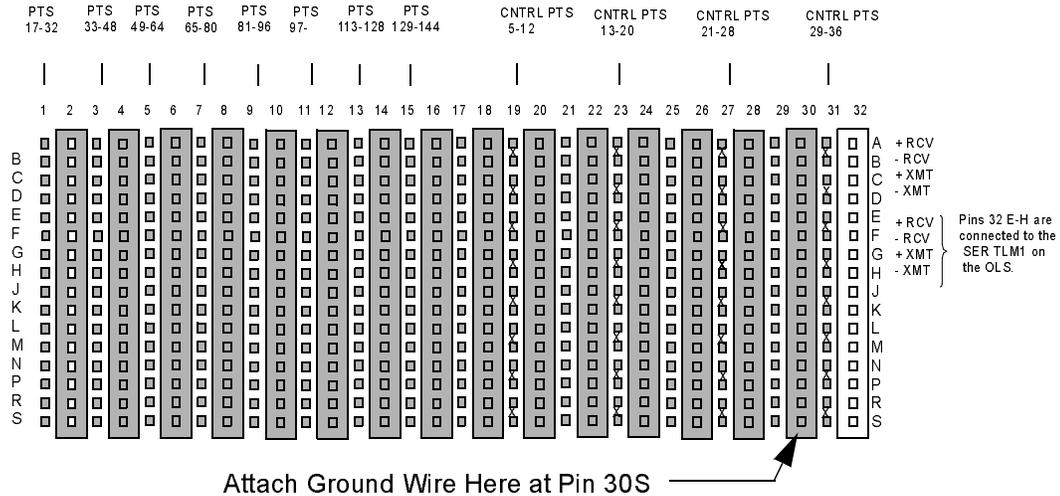
(6) The following table lists the SER TLM1 cable connections and designations:

Table 6-32 SER TLM 1 Cable Connections and Designations

Name	Designation	Pin	Wire Color
TBOS TRM Transmit N	TBASTXN	1	BL (CA1)
No Connection	none	2	none
TBOS TRM Receive N	TBASRXN	3	O (CA2)
No Connection	none	4	none
No Connection	none	5	none
TBOS TRM Transmit P	TBASTXP	6	W (CA1)
No Connection	none	7	none
TBOS TRM Receive P	TBASRXP	8	W (CA2)
No Connection	none	9	none

(7) The SER TLM1 port is located at P19 on the OLS Interconnection Panel. See Figure 6-1 on page 6-3.

(8) The TBOS Transmit and Receive for both Positive and Negative (see Table 6-32 on page 6-42) need to be wire-wrapped to pins 32 E-H on the Alarm and Control Block (See Figure 6-8 on page 6-42).

1. TBASTXP - Cable 1(W) to 32-E 3. TBASRXP - Cable 2(W) to 32-G

2. TBASTXN - Cable 1(BL) to 32-F 4. TBASRXN - Cable 2(O) to 32-H

Switch and Strap Settings

On the Dantel Alarm and Control Block there are three (3) switches located on the Power Supply Board (Figure 6-7 on page 6-41). With Lucent's Optical Line System the following switch settings must be made:

Table 6-33 Switch Settings for Lucent OLS

	S1 Switch Settings	S2 Switch Settings	S3 Switch Settings
1	OFF	OFF	OFF
2	OFF	ON	ON
3	OFF	OFF	OFF
4	ON	OFF	ON
5	OFF	OFF	ON
6	OFF	OFF	OFF
7	OFF	OFF	OFF
8	OFF	ON	OFF

Figure 6-9 OT Miscellaneous Discrete Cable Connections

Available Miscellaneous Discrete Cables

Table 6-34, "OT Miscellaneous Discrete Cables," on page 6-44 lists cables available for office miscellaneous discrete cables.

Table 6-34 OT Miscellaneous Discrete Cables

ED-7G045-22 Cable Group	Cable Length (ft.)	Cable Type
3	As Specified	12 pair/26 Gauge/Solid
4	150	12 pair/26 Gauge/Solid
16	As Specified	1 pair/26 Gauge/Solid
17	150	1 pair/26 Gauge/Solid

Miscellaneous Discrete Cable Connections

Connections to the DANTEL EMDU

Figure 6-8 on page 6-42 shows the DANTEL terminal strip to which the miscellaneous discrete cables will be wired. The miscellaneous discrete cable connections tables (Table 6-35 through Table 6-41) will reference the wire wrap pin designations on this terminal strip.

⚠ CAUTION:
The Dantel EMDU must have power removed prior to performing any wiring or DIP switch settings.

Table 6-35, "OT System Shelf P2 Wiring to Dantel EMDU," on page 6-45 to Table 6-41, "OT Power Alarm Wiring to DANTEL EMDU," on page 6-50 provide detail information to wire each cable shown in Figure 6-9 on page 6-44. If the OT is a List 1 or List 10 which has all three shelves, wire cables in the same sequence as the tables, starting with Table 6-35 and ending with Table 6-41. The System Controller Shelf (bottom shelf) cable P2 should be wired first followed by the Complementary Shelf 1 (middle shelf) cable P2 and then the Complementary Shelf 2 (upper shelf) cable P2. Repeat the sequence again starting at the System Shelf with cable P3.

Before wiring the power alarm cables detailed in Table 6-41, review the instructions for providing cable slack within the bay and connecting to the power filter. These instructions precede Table 6-41.

If the shelf is an individual miscellaneous mount shelf (List 11 through 13), wire only those miscellaneous discrete cable associated with that shelf.

In each table, the second column provides the pin locations on the Dantel wire wrap terminals. The third column provides the color code for the two wires to be wired for each alarm.

The OLS alarm numbers for the miscellaneous discrete alarms start with alarm number 17 in Table 6-35. The initial 16 miscellaneous discrete alarms are located with the OLS.

Table 6-35 OT System Shelf P2 Wiring to Dantel EMDU

OTU ALARM NAME	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
C P Fail OTU 1	1 (A1 & A2)	W-BL / BL-W	12 & 25(RTN)	17
C P Fail OTU 2	2 (B1 & B2)	W-O / O-W	11 & 24(RTN)	18
C P Fail OTU 3	3 (C1 & C2)	W-G / G-W	10 & 23(RTN)	19
C P Fail OTU 4	4 (D1 & D2)	W-BR / BR-W	9 & 22(RTN)	20
C P Fail OTU 5	5 (E1 & E2)	W-S / S-W	8 & 21(RTN)	21

Table 6-35 OT System Shelf P2 Wiring to Dantel EMDU

OTU ALARM NAME	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
C P Fail OTU 6	6 (F1 & F2)	R-BL / BL-R	7 & 20(RTN)	22
C P Fail OTU 7	7 (G1 & G2)	R-O / O-R	6 & 19(RTN)	23
C P Fail OTU 8	8 (H1 & H2)	R-G / G-R	5 & 18(RTN)	24
	No Connection		1, 2, 3, 4,13, 14, 15, 16, 17,	

Table 6-36 OT Complementary Shelf 1 Cable P2 Wiring to DANTEL EMDU

OTU ALARM NAME	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
C P Fail OTU 9	9 (J1 & J2)	W-BL / BL-W	12 & 25(RTN)	25
C P Fail OTU 10	10 (K1 & K2)	W-O / O-W	11 & 24(RTN)	26
C P Fail OTU 11	11 (L1 & L2)	W-G / G-W	10 & 23(RTN)	27
C P Fail OTU 12	12 (M1 & M2)	W-BR / BR-W	9 & 22(RTN)	28
C P Fail OTU 13	13 (N1 & N2)	W-S / S-W	8 & 21(RTN)	29
C P Fail OTU 14	14 (P1 & P2)	R-BL / BL-R	7 & 20(RTN)	30
C P Fail OTU 15	15 (R1 & R2)	R-O / O-R	6 & 19(RTN)	31
C P Fail OTU 16	16 (S 1 & S2)	R-G / G-R	5 & 18(RTN)	32
C P Fail OTU 17	17 (A3 & A4)	R-BR / BR-R	4 & 17(RTN)	33
C P Fail OTU 18	18 (B3 & B4)	R-S / S-R	3 & 16(RTN)	34
C P Fail OTU 19	19 (C3 & C4)	BK-BL / BL-BK	2 & 15(RTN)	35
C P Fail OTU 20	20 (D3 & D4)	BK-O / O-BK	1 & 14(RTN)	36
	No Connection		13	

Table 6-37 OT Complementary Shelf 2 Cable P2 Wiring to Dantel EMDU

OTU ALARM NAME	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
C P Fail OTU 21	21 (E3 & E4)	W-BL / BL-W	12 & 25(RTN)	37

Table 6-37 OT Complementary Shelf 2 Cable P2 Wiring to Dantel EMDU

C P Fail OTU 22	22 (F3 & F4)	W-O / O-W	11 & 24(RTN)	38
C P Fail OTU 23	23 (G3 & G4)	W-G / G-W	10 & 23(RTN)	39
C P Fail OTU 24	24 (H3 & H4)	W-BR / BR-W	9 & 22(RTN)	40
C P Fail OTU 25	25 (J3 & J4)	W-S / S-W	8 & 21(RTN)	41
C P Fail OTU 26	26 (K3 & K4)	R-BL / BL-R	7 & 20(RTN)	42
C P Fail OTU 27	27 (L3 & L4)	R-O / O-R	6 & 19(RTN)	43
C P Fail OTU 28	28 (M3 & M4)	R-G / G-R	5 & 18(RTN)	44
C P Fail OTU 29	29 (N3 & N4)	R-BR / BR-R	4 & 17(RTN)	45
C P Fail OTU 30	30 (P3 & P4)	R-S / S-R	3 & 16(RTN)	46
C P Fail OTU 31	31 (R3 & R4)	BK-BL / BL-BK	2 & 15(RTN)	47
C P Fail OTU 32	32 (S 3 & S 4)	BK-O / O-BK	1 & 14(RTN)	48
	No Connection		13	

Table 6-38 OT System Shelf Cable P3 Wiring to Dantel EMDU

OTU ALARM NAME	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
I S Fail OTU 1	33 (A5 & A6)	W-BL / BL-W	12 & 25(RTN)	49
I S Fail OTU 2	34 (B5 & B6)	W-O / O-W	11 & 24(RTN)	50
I S Fail OTU 3	35 (C5 & C6)	W-G / G-W	10 & 23(RTN)	51
I S Fail OTU 4	36 (D5 & D6)	W-BR / BR-W	9 & 22(RTN)	52
I S Fail OTU 5	37 (E5 & E6)	W-S / S-W	8 & 21(RTN)	53
I S Fail OTU 6	38 (F5 & F6)	R-BL / BL-R	7 & 20(RTN)	54
I S Fail OTU 7	39 (G5 & G6)	R-O / O-R	6 & 19(RTN)	55
I S Fail OTU 8	40 (H5 & H6)	R-G / G-R	5 & 18(RTN)	56
	No Connection		1, 2, 3, 4,13, 14, 15, 16, 17,	

Table 6-39 OT Complementary Shelf 1 P3 Wiring to Dantel EMDU

OTU ALARM NAME	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
I S Fail OTU 9	41 (J5 &J6)	W-BL / BL-W	12 & 25(RTN)	57
I S Fail OTU 10	42 (K5 & K6)	W-O / O-W	11 & 24(RTN)	58
I S Fail OTU 11	43 (L5 & L6)	W-G / G-W	10 & 23(RTN)	59
I S Fail OTU 12	44 (M5 & M6)	W-BR / BR-W	9 & 22(RTN)	60
I S Fail OTU 13	45 (N5 & N6)	W-S / S-W	8 & 21(RTN)	61
I S Fail OTU 14	46 (P5 & P6)	R-BL / BL-R	7 & 20(RTN)	62
I S Fail OTU 15	47 (R5 & R6)	R-O / O-R	6 & 19(RTN)	63
I S Fail OTU 16	48 (S5 & S6)	R-G / G-R	5 & 18(RTN)	64
I S Fail OTU 17	49 (A7 & A8)	R-BR / BR-R	4 & 17(RTN)	65
I S Fail OTU 18	50 (B7 & B8)	R-S / S-R	3 & 16(RTN)	66
I S Fail OTU 19	51 (C7 & C8)	BK-BL / BL-BK	2 & 15(RTN)	67
I S Fail OTU 20	52 (D7 & D8)	BK-O / O-BK	1 & 14(RTN)	68
	No Connection		13	

Table 6-40 OT Complementary Shelf Cable P3 Wiring to Dantel EMDU

OTU ALARM NAME	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
I S Fail OTU 21	53 (E7 & E8)	W-BL / BL-W	12 & 25(RTN)	69
I S Fail OTU 22	54 (F7 & F8)	W-O / O-W	11 & 24(RTN)	70
I S Fail OTU 23	55 (G7 & G8)	W-G / G-W	10 & 23(RTN)	71
I S Fail OTU 24	56 (H7 & H8)	W-BR / BR-W	9 & 22(RTN)	72
I S Fail OTU 25	57 (J7 & J8)	W-S / S-W	8 & 21(RTN)	73
I S Fail OTU 26	58 (K7 & K8)	R-BL / BL-R	7 & 20(RTN)	74
I S Fail OTU 27	59 (L7 & L8)	R-O / O-R	6 & 19(RTN)	75
I S Fail OTU 28	60 (M7 & M8)	R-G / G-R	5 & 18(RTN)	76
I S Fail OTU 29	61 (N7 & N8)	R-BR / BR-R	4 & 17(RTN)	77
I S Fail OTU 30	62 (P7 & P8)	R-S / S-R	3 & 16(RTN)	78
I S Fail OTU 31	63 (R7 & R8)	BK-BL / BL-BK	2 & 15(RTN)	79

Table 6-40 OT Complementary Shelf Cable P3 Wiring to Dantel EMDU

I S Fail OTU 32	64 (S7 & S8)	BK-O / O-BK	1 & 14(RTN)	80
	No Connection		13	

Power Failure Miscellaneous Discrete

Each power fail alarm is cabled individually from the A and B power filter on each shelf. This results in six (6) cables for a three (3) shelf OT system. Figure 6-10 on page 6-49 shows the location of the connector at the rear of the power filter.

When wiring the cable to the power filter, provide ten (10) inches of cable length between the entrance of the cable to the shelf and the end of the cable (refer to Figure 6-11 on page 6-50) needed to allow access to connector release tab.
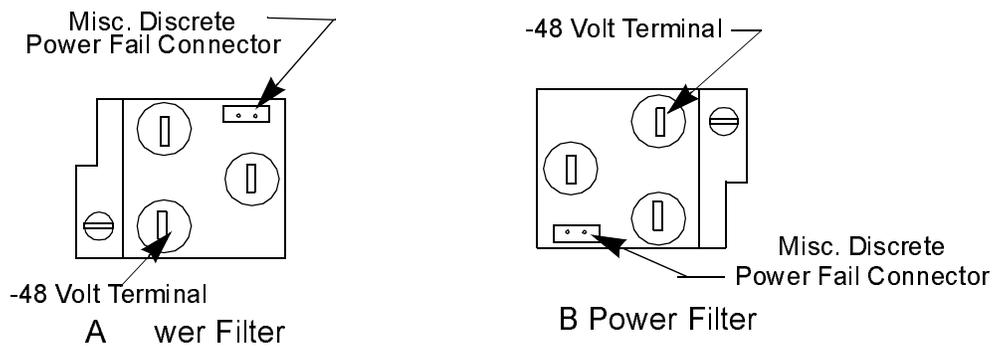
Figure 6-10 Miscellaneous Discrete Power Filter Connections

Power Filter

**Misc. Discrete
Power Fail Cable**

10 in.
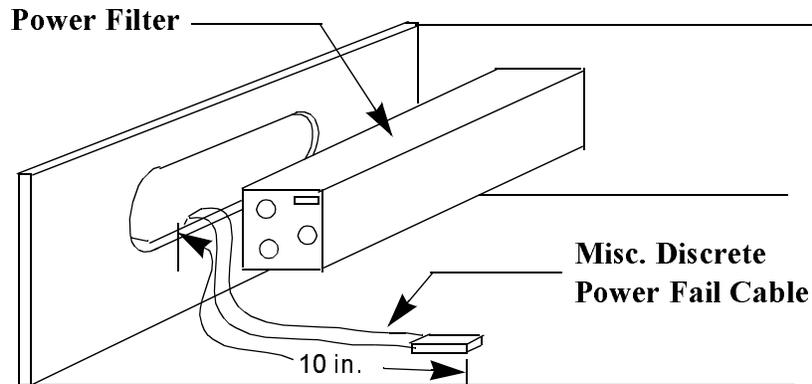
Figure 6-11 Required Length for Misc. Discrete Power Fail Cables

Table 6-41 OT Power Alarm Wiring to DANTEL EMDU

ALARM NAME & LOCATION	DANTEL ALARM No.(Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers	OLS ALARM No.
A Pwr Fail - Sys. Shelf	65 (A9 & A10)	W-BL / BL-W	1 & 2(RTN)	81
B Pwr Fail - Sys. Shelf	66 (B9 & B10)	W-BL / BL-W	1 & 2(RTN)	82
A Pwr Fail - Compl 1 Shelf	67 (C9 & C10)	W-BL / BL-W	1 & 2(RTN)	83
B Pwr Fail - Compl 1 Shelf	68 (D9 & D10)	W-BL / BL-W	1 & 2(RTN)	84
A Pwr Fail - Compl 2 Shelf	69 (E9 & E10)	W-BL / BL-W	1 & 2(RTN)	85
B Pwr Fail - Compl 2 Shelf	70 (F9 & F10)	W-BL / BL-W	1 & 2(RTN)	86

Harris EMDU Installation Procedures

A complete and detailed installation procedure is provided in the Harris C1000 User Guide provided with the Centurion C-1000. The following procedure is provided to facilitate its use with Lucent's Release 2.0 & 2.1 Optical Line System.

Assembly

(1) Attach the Mounting Brackets to the Harris C-1000 Centurion.The Mounting Brackets are then front mounted to the distribution frame.

(2) Run the ED7G028-22 cable from the SER TLM1 port of the OLS to J9 on the rear of the C-1000 Centurion (See Figure 2-1 of the C-1000 Centurion User Guide).

(3) J1 - J8 are the ports to be used for inputs and control outputs (See Table 2-1 of the C-1000 Centurion User Guide).

Powering the Unit

(1) Power must be provided from a fuse panel using #14 to #24 (#20 is optimum) AWG power and ground wire. The input voltage range is -20 to -60 VDC. Fuse protection should be removed before inserting or removing power wires.

(2) Power connections are located at J11 on the rear panel of the C1000 Centurion (See Figure 2-1 in the C-1000 Centurion User Guide). The Positive and Negative connections are marked at J11 (See also Figure 2-2 in the C-1000 Centurion User Guide).

Switch Settings

(1) Each C1000 unit is configured by using Configuration DIP switches on the front of the unit (See Figure 1-1 in the C-1000 Centurion User Guide). Units, such as the OLS, that can handle 128 or less discrete points use the 10-switch block on the Left (S1). The 10-switch block on the right (S2) is not used. The settings should be as follows:

    1. S1-1 to S1-8 OFF (down)

    2. S1-9 to S1-10 ON (up)

    3. S2-1 to S1-10 OFF (down)

OT Connections to the Harris Centurion EMDU.

The Harris Centurion EMDU utilizes D-Subminiature 50 pin connectors for its inputs. Each 50 pin connector on the Harris unit provides for 32 alarm inputs, 4 control outputs using wired pair, and ten ground connections. The OT uses 25 pin D-Subminiature connectors with all connections being used for wired pair alarms requiring a pair of wires (two connections). With these incompatibilities, a connectorized cable connection is not possible.

Refer to Figure 6-10 on page 6-49 and Figure 6-11 on page 6-50 when wiring power fail miscellaneous discretes from the power filter to the Harris EMDU.

The Harris unit is shipped equipped with adapters that connect with D-Subminiature connector on the Harris unit and provide a 50 pin wire wrap terminal on the other side of the adapter. This allows the Harris unit to be connectorized for easy replacement without requiring any wiring.

Since the Harris unit has limited wire wrap connections to ground, some wire wrap terminals will be required to handle two wire wraps per terminal. When wire wrapping the first connections to pins 5 through 9 and 30 through 34, install the first connection at the bottom of the pin to allow space for the second wire wrap. When these terminals are filled, the wiring table will call out ground connections to be used on J3 and J4 connectors which are located directly above connectors J1 and J2.

Table 6-42 OT Misc. Disc. Cable Wiring / OT to Harris EMDU

OLS Alrm No.	OTU ALRM NAME	CABLE CONN/ SHELF	HARRIS ALARM NO. (Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers
17	CP Fail OTU 1	P2 / System	1 (J1-10 & J1-5-RTN)	W-BL/BL-W	12 & 25(RTN)
18	C P Fail OTU 2	P2 / System	2 (J1-35 & J!-5-RTN)	W-O / O-W	11 & 24(RTN)
19	C P Fail OTU 3	P2 / System	3 (J1-11 & J1-6-RTN)	W-G / G-W	10 & 23(RTN)
20	C P Fail OTU 4	P2 / System	4 (J1-36 & J1-6-RTN)	W-BR / BR-W	9 & 22(RTN)
21	C P Fail OTU 5	P2 / System	5 (J1-12 & J1-7-RTN)	W-S / S-W	8 & 21(RTN)
22	C P Fail OTU 6	P2 / System	6 (J1-37 & J1-7-RTN)	R-BL / BL-R	7 & 20(RTN)
23	C P Fail OTU 7	P2 / System	7 (J1-13 & J1-8-RTN)	R-O / O-R	6 & 19(RTN)
24	C P Fail OTU 8	P2 / System	8 (J1-38 & J1-8-RTN)	R-G / G-R	5 & 18(RTN)
		P2 / System	No Connection		1, 2, 3, 4, 13, 14, 15, 16, 17
25	C P Fail OTU 9	P2 / Compl S1	9 (J1-14 & J1-9-RTN)	W-BL / BL-W	12 & 25(RTN)
26	C P Fail OTU 10	P2 / Compl S1	10 (J1-39 & J1-9-RTN)	W-O / O-W	11 & 24(RTN)
27	C P Fail OTU 11	P2 / Compl S1	11 (J1-15 & J1-30-RTN)	W-G / G-W	10 & 23(RTN)
28	C P Fail OTU 12	P2 / Compl S1	12 (J1-40 & J1-30-RTN)	W-BR / BR-W	9 & 22(RTN)
29	C P Fail OTU 13	P2 / Compl S1	13 (J1-16 & J1-31-RTN)	W-S / S-W	8 & 21(RTN)
30	C P Fail OTU 14	P2 / Compl S1	14 (J1-41 & J1-31-RTN)	R-BL / BL-R	7 & 20(RTN)
31	C P Fail OTU 15	P2 / Compl S1	15 (J1-17 & J1-32-RTN)	R-O / O-R	6 & 19(RTN)
32	C P Fail OTU 16	P2 / Compl S1	16 (J1-42 & J1-32-RTN)	R-G / G-R	5 & 18(RTN)
33	C P Fail OTU 17	P2 / Compl S1	17 (J1-18 & J1-33-RTN)	R-BR / BR-R	4 & 17(RTN)
34	C P Fail OTU 18	P2 / Compl S1	18 (J1-43 & J1-33-RTN)	R-S / S-R	3 & 16(RTN)

Table 6-42 OT Misc. Disc. Cable Wiring / OT to Harris EMDU

OLS Alrm No.	OTU ALRM NAME	CABLE CONN/ SHELF	HARRIS ALARM NO. (Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers
35	C P Fail OTU 19	P2 / Compl S1	19 (J1-19 & J1-34-RTN)	BK-BL/BL-BK	2 & 15(RTN)
36	C P Fail OTU 20	P2 / Compl S1	20 (J1-44 & J1-34-RTN)	BK-O / O-BK	1 & 14(RTN)
		P2 / Compl S1	No Connection		13
37	C P Fail OTU 21	P2 / Compl S2	21 (J1-20 & J3-5-RTN)	W-BL / BL-W	12 & 25(RTN)
38	C P Fail OTU 22	P2 / Compl S2	22 (J1-45 & J3-5-RTN)	W-O / O-W	11 & 24(RTN)
39	C P Fail OTU 23	P2 / Compl S2	23 (J1-21 & J3-6-RTN)	W-G / G-W	10 & 23(RTN)
40	C P Fail OTU 24	P2 / Compl S2	24 (J1-46 & J3-6-RTN)	W-BR / BR-W	9 & 22(RTN)
41	C P Fail OTU 25	P2 / Compl S2	25 (J1-22 & J3-7-RTN)	W-S / S-W	8 & 21(RTN)
42	C P Fail OTU 26	P2 / Compl S2	26 (J1-47 & J3-7-RTN)	R-BL / BL-R	7 & 20(RTN)
43	C P Fail OTU 27	P2 / Compl S2	27 (J1-23 & J3-8-RTN)	R-O / O-R	6 & 19(RTN)
44	C P Fail OTU 28	P2 / Compl S2	28 (J1-48 & J3-8-RTN)	R-G / G-R	5 & 18(RTN)
45	C P Fail OTU 29	P2 / Compl S2	29 (J1-24 & J3-9-RTN)	R-BR / BR-R	4 & 17(RTN)
46	C P Fail OTU 30	P2 / Compl S2	30 (J1-49 & J3-9-RTN)	R-S / S-R	3 & 16(RTN)
47	C P Fail OTU 31	P2 / Compl S2	31 (J1-25 & J3-30-RTN)	BK-BL/BL-BK	2 & 15(RTN)
48	C P Fail OTU 32	P2 / Compl S2	32 (J1-50 & J3-30-RTN)	BK-O / O-BK	1 & 14(RTN)
		P2 / Compl S2	No Connection		13
49	I S Fail OTU 1	P2 / Compl S2	33 (J2-10 & J2-5-RTN)	W-BL / BL-W	12 & 25(RTN)
50	I S Fail OTU 2	P3 / System	34 (J2-35 & J2-5-RTN)	W-O / O-W	11 & 24(RTN)
51	I S Fail OTU 3	P3 / System	35 (J2-11 & J2-6-RTN)	W-G / G-W	10 & 23(RTN)
52	I S Fail OTU 4	P3 / System	36 (J2-36 & J2-6-RTN)	W-BR / BR-W	9 & 22(RTN)
53	I S Fail OTU 5	P3 / System	37 (J2-12 & J2-7-RTN)	W-S / S-W	8 & 21(RTN)
54	I S Fail OTU 6	P3 / System	38 (J2-37 & J2-7-RTN)	R-BL / BL-R	7 & 20(RTN)
55	I S Fail OTU 7	P3 / System	39 (J2-13 & J2-8-RTN)	R-O / O-R	6 & 19(RTN)
56	I S Fail OTU 8	P3 / System	40 (J2-38 & J2-8-RTN)	R-G / G-R	5 & 18(RTN)
		P3 / System	No Connection		1, 2, 3, 4,13, 14, 15, 16, 17,
57	I S Fail OTU 9	P3 / System	41 (J2-14 & J2-9-RTN)	W-BL / BL-W	12 & 25(RTN)
58	I S Fail OTU 10	P3 / Compl S1	42 (J2-39 & J2-9-RTN)	W-O / O-W	11 & 24(RTN)

Table 6-42 OT Misc. Disc. Cable Wiring / OT to Harris EMDU

OLS Alrm No.	OTU ALRM NAME	CABLE CONN/ SHELF	HARRIS ALARM NO. (Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers
59	I S Fail OTU 11	P3 / Compl S1	43 (J2-15 & J2-30-RTN)	W-G / G-W	10 & 23(RTN)
60	I S Fail OTU 12	P3 / Compl S1	44 (J2-40 & J2-30-RTN)	W-BR / BR-W	9 & 22(RTN)
61	I S Fail OTU 13	P3 / Compl S1	45 (J2-16 & J2-31-RTN)	W-S / S-W	8 & 21(RTN)
62	I S Fail OTU 14	P3 / Compl S1	46 (J2-41 & J2-31-RTN)	R-BL / BL-R	7 & 20(RTN)
63	I S Fail OTU 15	P3 / Compl S1	47 (J2-17 & J2-32-RTN)	R-O / O-R	6 & 19(RTN)
64	I S Fail OTU 16	P3 / Compl S1	48 (J2-42 & J2-32-RTN)	R-G / G-R	5 & 18(RTN)
65	I S Fail OTU 17	P3 / Compl S1	49 (J2-18 & J2-33-RTN)	R-BR / BR-R	4 & 17(RTN)
66	I S Fail OTU 18	P3 / Compl S1	50 (J2-43 & J2-33-RTN)	R-S / S-R	3 & 16(RTN)
67	I S Fail OTU 19	P3 / Compl S1	51 (J2-19 & J2-34-RTN)	BK-BL / BL-BK	2 & 15(RTN)
68	I S Fail OTU 20	P3 / Compl S1	52 (J2-44 & J2-34RTN)	BK-O / O-BK	1 & 14(RTN)
		P3 / Compl S1			13
69	I S Fail OTU 21	P3 / Compl S2	53 (J2-20 & J4-5-RTN)	W-BL / BL-W	12 & 25(RTN)
70	I S Fail OTU 22	P3 / Compl S2	54 (J2-45 & J4-5-RTN)	W-O / O-W	11 & 24(RTN)
71	I S Fail OTU 23	P3 / Compl S2	55 (J2-21 & J4-6-RTN)	W-G / G-W	10 & 23(RTN)
72	I S Fail OTU 24	P3 / Compl S2	56 (J2-46 & J4-6-RTN)	W-BR / BR-W	9 & 22(RTN)
73	I S Fail OTU 25	P3 / Compl S2	57 (J2-22 & J4-7-RTN)	W-S / S-W	8 & 21(RTN)
74	I S Fail OTU 26	P3 / Compl S2	58 (J2-47 & J4-7-RTN)	R-BL / BL-R	7 & 20(RTN)
75	I S Fail OTU 270	P3 / Compl S2	59 (J2-23 & J4-8-RTN)	R-O / O-R	6 & 19(RTN)
76	I S Fail OTU 28	P3 / Compl S2	60 (J2-48 & J4-8-RTN)	R-G / G-R	5 & 18(RTN)
77	I S Fail OTU 29	P3 / Compl S2	61 (J2-24 & J4-9-RTN)	R-BR / BR-R	4 & 17(RTN)
78	I S Fail OTU 30	P3 / Compl S2	62 (J2-49 & J4-9-RTN)	R-S / S-R	3 & 16(RTN)
79	I S Fail OTU 31	P3 / Compl S2	63 (J2-25 & J4-30-RTN)	BK-BL/BL-BK	2 & 15(RTN)
80	I S Fail OTU 32	P3 / Compl S2	64 (J2-50 & J4-30-RTN)	BK-O / O-BK	1 & 14(RTN)
		P3 / Compl S2	No connection		13
81	A Pwr Fail-Sys. Shelf	A Pwr/ System	65 (J3-10 & J3-31-RTN)	W-BL/BL-W	1 & 2(RTN)
82	B Pwr Fail-Sys. Shelf	B Pwr / System	66 (J3-35 & J3-31-RTN)	W-BL/BL-W	1 & 2(RTN)
83	A Pwr Fail-Compl 1 Shelf	A Pwr/Compl S1	67 (J3-11 & J3-32-RTN)	W-BL/BL-W	1 & 2(RTN)

Table 6-42 OT Misc. Disc. Cable Wiring / OT to Harris EMDU

OLS Alrm No.	OTU ALRM NAME	CABLE CONN/ SHELF	HARRIS ALARM NO. (Pin Desg)	WIRE COLORS	OT CABLE PIN Numbers
84	B Pwr Fail-Compl 1 Shelf	B Pwr/Compl S1	68 (J3-36 & J3-32 RTN)	W-BL/BL-W	1 & 2(RTN)
85	A Pwr Fail - Compl 2 Shelf	A Pwr / Compl S2	69 (J3-12 & J3-33-RTN)	W-BL/BL-W	1 & 2(RTN)
86	B Pwr Fail - Compl 2 Shelf	B Pwr / Compl S2	70 (j3-37 & J3-33-RTN)	W-BL/BL-W	1 & 2(RTN)

OT Miscellaneous Discrete Cables Installation Procedure

Perform the following steps to install miscellaneous discrete cables:

(1) Verify power is off at the EMDUs (DANTEL or Harris).

(2) Route both 25 pin connector cables and one two pin connector cable through the left opening in the OT system shelf. Route one two pin connector cable through the right opening.

(3) Connect the 25 pin miscellaneous discrete cables to J2 (CP Fail) and J3 (Inc Sig Fail) on the interconnection panel.

(4) Connect the two pin miscellaneous discrete cables to the A & B power filter connections. Allow extra length in cables as specified in Figure 6-11 on page 6-50.

(5) Route the cables along the cable rack to the input wiring points on the Dantel or Harris EMDU.

(6) Repeat steps 2, 3, and 4 for Complementary Shelf 1 and 2.

(7) Connect the miscellaneous discrete cables to the external miscellaneous discrete unit (EMDU) input terminal strip by cutting the cables to length and wire-wrapping the loose ends onto the terminal strip. The DANTEL or Harris EMDU are not to be located within the OT cabinet.

(8) Dress and tie the cable.

Final Verification

Perform the following steps at the end of each subsection to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that all cables are properly labeled.

OLS & OT Fiber and Circuit Pack Installation

7

Contents

OLS & OT Fiber and Circuit Pack Installation

7

Overview

⚠ CAUTION:
Procedures in this installation manual are only to be performed by trained personnel.

This section covers OLS and OT and gives a brief overview of each piece of equipment. It is broken into the 11 subsections listed below:

- Section A - Generic Information for Fiber Installation
- Section B - OLS Transmit End Terminal Specific Installation
- Section C - OLS Receive End Terminal Specific Installation
- Section D - OLS Repeater Terminal Specific Installation
- Section E - OLS One OA Receive End Terminal Specific Installation
- Section F - OLS One OA Transmit End Terminal Specific Installation
- Section G - OLS Two OA/One OA Dual Facing Shelf Installation
- Section H - OLS One OA/Two OA Dual Facing Shelf Installation
- Section I - OLS One OA/One OA Dual Facing Shelf Installation
- Section J - OLS Two OA Dual Facing Shelf Installation
- Section K - OT Specific Installation

Subsections B - K cover fiber routing, fiber protection, fiber dressing, circuit pack and unit installation and precautions, and fiber installation.

General Considerations

⚠ CAUTION:
> A wrist strap connected to a wrist strap ground jack on the terminal must be worn for ESD protection during the installation process.

⚠ CAUTION:
> Connectors on the interconnect panel come equipped with protective ESD covers. These covers should be left in place on any connector that is not being immediately cabled so that ESD protections are maintained.

⚠ WARNING:
> Unterminated optical connectors may emit laser radiation and should not be viewed with optical instruments (other than indirect image-converting devices). Also avoid direct exposure to beam.

Keep the following information under consideration during cable installation:

■ This cable information is the latest cable information available at the time of the issue. For up-to-date information, refer to the ED cable drawings listed in the Section 1, "Overall Installation and Test Considerations."

■ For ordering information for the Optical Line System (OLS), refer to 365-575-330, Optical Line System (OLS) Application, Planning, and Ordering Guide.

■ For ordering information for the Optical Translator (OT), refer to 365-575-400, Optical Translator (OT) Application, Planning, and Ordering Guide.

■ Do not use cable ties with the optical fiber.

■ Place optical fiber jumpers in protective tube or channel, such as polyvinyl chloride (PVC) tubing, when running the cable from the OLS or OT to the cable rack.

■ Place optical fiber jumpers in the cable rack in a protective channel with nothing on top of them.

■ Maintain a minimum of 1.5 inches of optical fiber bend radius.

■ Optical fiber jumpers require ST, FC/PC, or SC type connectors for connection to the OLS or OT.

■ Do not remove the backplane cover during the installation process.

A - Generic Information for Fiber Installation

OLS End Terminal Description

The OLS End Terminal combines and separates up to 16 OC-48 signals, transmitting and receiving up to 516,096 voice channels simultaneously on one optical fiber. All OLS transmission uses fiber jumpers connected to circuit pack faceplates. Connection is made to a removable Optical Line Build-Out (LBO).

OLS Repeater Description

The OLS Repeater provides optical amplification of the combined optical signal. All OLS transmission uses fiber jumpers connected to circuit pack faceplates. Connection is made to a removable Optical Line Build-Out (LBO).

OLS Dual Facing Shelf Description

The OLS Dual Facing Shelf allows for combining back-to-back, co-located, 2-fiber, SONET/SDH single facing shelves into one shelf. This extends the OSS across the operations domains allowing the concatenation of OLS subnetworks. It comes in a variety of configurations supported by Release 2.1.

Optical Translator Description

The Optical Translator (OT) cabinet can accommodate up to 32 Optical Translator Units (OTUs). Each one of these circuit packs requires two fibers, one input and one output. Each cabinet can also accommodate up to 16 Quad Optical Translator Units (QOTUs,) each capable of holding up to 4 Optical Translator Port Modules (OTPMs). Each OTPM requires two fibers, one input and one output for a possible total of 8 fibers per QOTU. Connection is made to a removable Optical Line Build-Out (LBO). The input fibers originate from an external source and the output fibers exit the cabinet to an external location. In most instances this will be an OLS End Terminal. The cabinet will not have any internal fiber connections.

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Intraoffice Fiber Jumpers

Connections between OLS and both the OC-48 equipment and outside plant fiber are shown in Figure 7-1 on page 7-4.
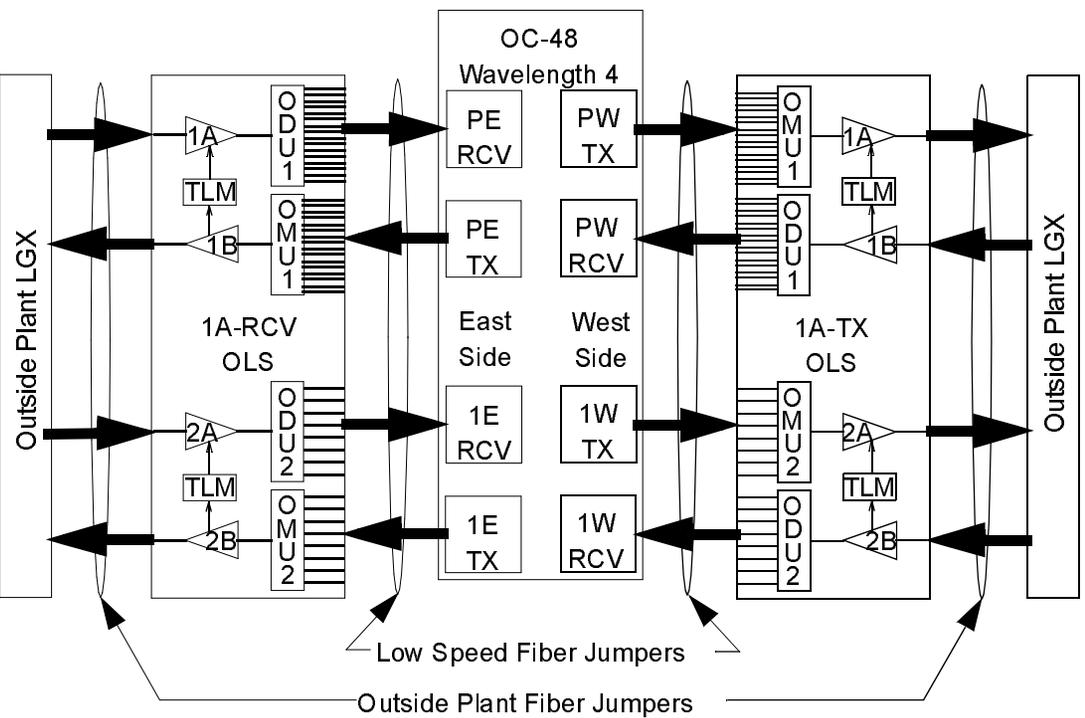
Figure 7-1 Intraoffice Fiber Jumpers

Available Fiber Jumpers

Table 7-1 lists some of the available jumpers for high speed fiber connection for use with the Optical Line System (OLS) or Optical Translator (OT).

Table 7-1 High Speed Lightwave Jumpers

FS1EP-EP* Comcode	MS1EP-EP* Comcode	Length	Description
107 149 494	107 306 243	2 ft.	ST II+ - ST II+
107 149 536	107 306 292	10 ft.	ST II+ - ST II+
107 149 569	107 306 326	25 ft.	ST II+ - ST II+
107 149 601	107 306 367	50 ft.	ST II+ - ST II+
107 149 627	107 306 383	100 ft.	ST II+ - ST II+

* FS1EP is mini-cord (.063 in dia.) and MS1EP is standard fiber (1.2 in dia.)

Table 7-3 lists some of the available jumpers for Intrashelf fiber connection for use with the Optical Line System (OLS).

Table 7-2 Lightwave Jumpers

Code	Comcode	Length	Description
MS1EP-EP-1.67	108 108 705	20 in.	LC-ST II+
MS1LC-EP-10	108 108 853	10 ft.	LC-ST II+
MS1LC-EP-25	108 108 887	25 ft.	LC-ST II+
MS1LC-EP-50	108 108 937	50 ft.	LC-ST II+
MS1LC-EP-75	108 108 945	75 ft.	LC-ST II+
MS1LC-EP-100	108 108 960	100 ft.	LC-ST II+
MS1LC-EP	107 815 896	as req.	LC-ST II+

Table 7-3 Intrashelf Lightwave Jumpers Lists

List	Max # of Chan.	System Type	Requirement	#/Length/Type
L161	8	2 OA	1 per Optical Line	4-50 "-ST to ST
	8/16	Repeater	1 per Optical Line	

Table 7-3 Intrashelf Lightwave Jumpers Lists

List	Max # of Chan.	System Type	Requirement	#/Length/Type
L162	16	2 OA	1 per Optical Line	4-50"-ST to ST 3-50"-LC to ST 1-20"-LC to ST
L163	16	1 OA	1 per Optical Line	1-50"-ST to ST 1-50"-LC to ST 1-20"-LC to ST
	16	1 OA/1 OA Dual Facing Shelf	1 per Optical Line	
L164	16	2 OA/2 OA Dual Facing Shelf	1 per shelf	4-50"-ST to ST 4-50"-LC to ST
L165	16	2 OA/1 OA, 1 OA/2 OA Dual Facing Shelf	1 per shelf	5-50"-ST to ST 4-50"-LC to ST 2-20"-LC to ST

Identification of OLS Cabinet Type

Use the following table to identify what type of OLS cabinet is to be installed and how the circuit packs are equipped.

Table 7-4 OLS Cabinet Types

Type of Cabinet	J68982C-1 List	Circuit Pack and Line Identification Figure	System Configuration
4-Line End Terminal	List 1 + List 101	Figure 7-4 on page 7-12	1X-TX (OA1A transmits to the outside plant fiber)
Dual 2-Line End Terminal	List 2 + List 103	Figure 7-5 on page 7-13	1A-TX (OA1A transmits to the outside plant fiber)
End Terminal and Repeater	List 2 + List 105	Use Figure 7-4 on page 7-12 for bottom shelf and repeater info for top shelf.	1A-TX (OA1A transmits to the outside plant fiber)
Dual Facing Shelf	List 2 + various options	Use Figure 7-10 on page 7-18	Dual (OA2A transmits to the outside plant fiber)
Dual 2-line Repeater	List 1 + List 104	Figure 7-6 on page 7-14	repeater
4-Line Repeater	List 2 + List 102	Figure 7-7 on page 7-15	repeater

Table 7-4 OLS Cabinet Types

Type of Cabinet	J68982C-1 List	Circuit Pack and Line Identification Figure	System Configuration
End Terminal and Repeater	List 2 + List 105	Use Figure 7-5 on page 7-13 end terminal info for bottom shelf and Figure 7-6 for top shelf.	repeater
4-Line End Terminal	List 1 + List 101	Figure 7-8 on page 7-16	1A-RCV (OA1A receives from the outside plant fiber)
Dual 2-Line End Terminal	List 2 + List 103	Figure 7-9 on page 7-17	1A-RCV (OA1A receives from the outside plant fiber)
End Terminal and Repeater	List 2 + List 105	Use Figure 7-8 on page 7-16 for bottom shelf and Figure 7-6 on page 7-14 repeater info for top shelf.	1A-RCV (OA1A receives from the outside plant fiber)

OLS Fiber Cable Routing

The figure that follow illustrate the routing to be used to bring cables from outside plant fiber or other equipment to the appropriate shelf in the OLS. Also illustrated is the proper routing for the fibers feeding the OMUs and ODUs from outside plant fiber or other equipment. Fibers will pass through the clips at the top and front of the OLS shelf.
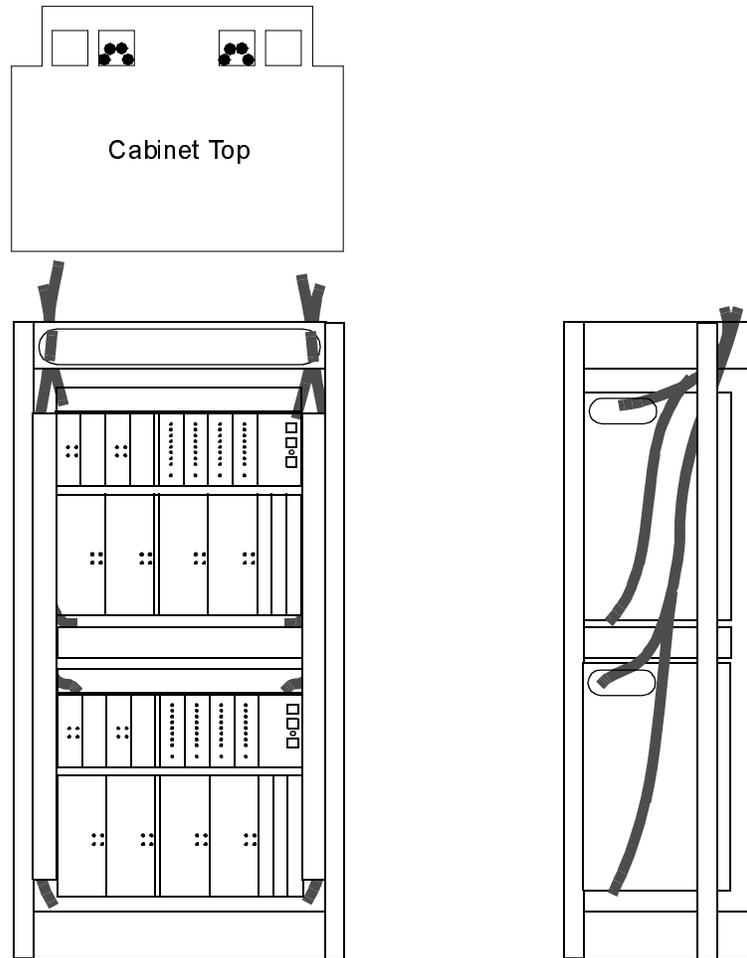
Figure 7-2 OLS Cabinet Fiber Routing

Flexible Lightwave
Protection Tubing
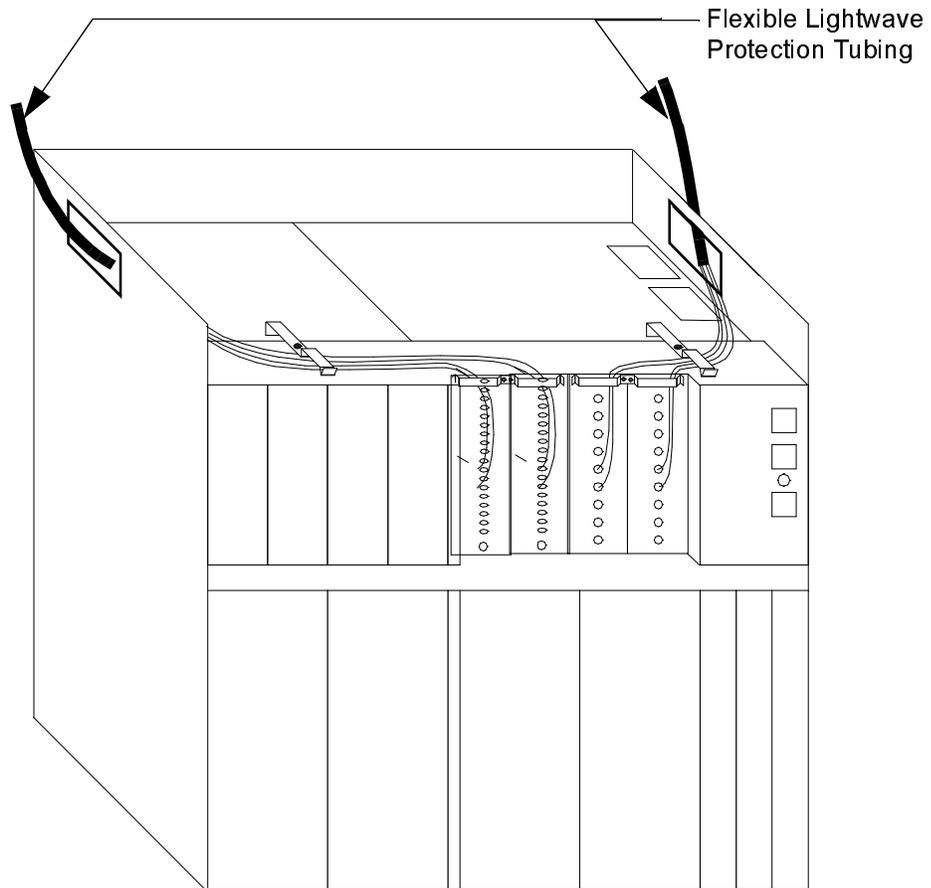
NOTE: Lift the retainer clip high enough for one lightwave fiber to
pass through and insert one at a time. Do not lift the clip too
high otherwise the clip may overstress.

Figure 7-3 OMU/ODU Fiber Routing (Single Shelf Shown)

Circuit Pack Installation

Circuit pack installation for the OLS includes the following:

- Install, but do not seat, all circuit packs and units in their final locations to aid in the installation of the fiber jumpers.

- Move the transmission circuit packs to the highest numbered lines. This will allow the circuit pack and unit slots in the highest numbered lines to be tested.

- After software installation in Section 9, the circuit packs will be moved to their final locations.

General Circuit Pack Installation Considerations

- A wrist strap, connected to the wrist strap ground jack on the user panel or filter panel, must be worn when handling circuit packs or touching the terminal.

- Circuit packs are keyed to prevent being inserted into the wrong shelf position.

- Before installing any circuit packs, inspect the **circuit pack side** of the backplane for any bent or broken backplane pins. If any pins are found to be bent, straighten the pin if possible.

- Any broken pins or bent pins that cannot be straightened must be replaced using the BERG MT370-01 pin kit for the METRAL pins. Refer to Appendix B "Pin Repair".

- When installing circuit packs, use care to insert them straight to avoid damaging the circuit packs or the backplane pins.

- Fiber connectors on optical circuit packs should always be either connected to fiber or covered by protective covers.

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

⇒ NOTE:
The 41 type OTUs are keyed the same as the Optical Amplifiers (OLS). However the OTUs have more depth and cannot be fully inserted into the OLS. **Do Not** attempt to seat an OTU into an Optical Amplifier slot.

Circuit Pack Availability

Table 7-5 lists available circuit packs for the OLS. Packs specific to each configuration will be called out in the individual subsections.

Table 7-5 Available OLS Circuit Pack Codes

List	Comcode	Circuit Pack	Description
L35	107272510	LEA1	System Controller (SYSCTL)
L40	107786568	LEA2	System Memory (SYSMEM)
L30	107273328	LEA5	Tributary Overhead Controller (TOHCTL)
L20	107273336	LEA6	Optical Amplifier (OA) - Long Span
L21	107742439	LEA7	Optical Amplifier (OA) - Long Haul
L22	108045394	LEA105	Optical Amplifier (OA) - Short Haul
L25	107272569	LDA1	Telemetry (TLM)
L60	107292179	505A	8 λ Optical Multiplexing Unit (OMU)
L61	107727828	506A	16 λ Optical Multiplexing Unit (OMU)
L50	107292187	605A	8 λ Optical Demultiplexing Unit (ODU)
L51	108032814	606A	16 λ Optical Demultiplexing Unit (ODU) without supervisory channel
L52	108032822	606B	16 λ Optical Demultiplexing Unit (ODU) with Supervisory channel
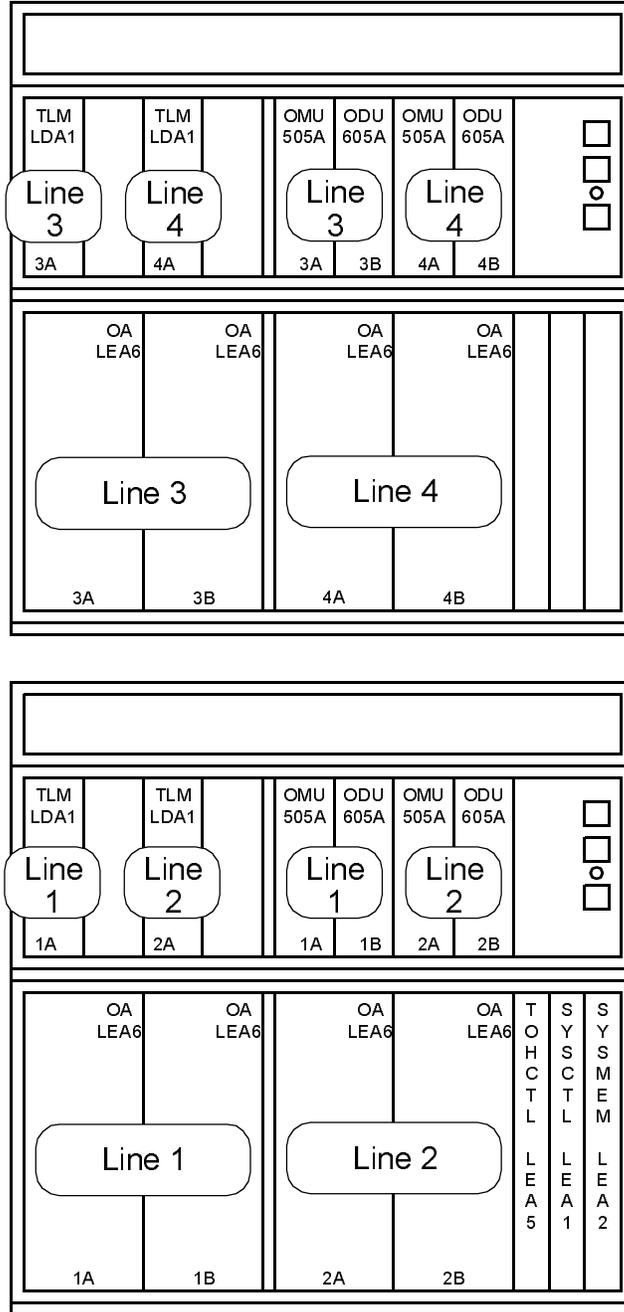
Figure 7-4 4-Line End Terminal 1A-TX
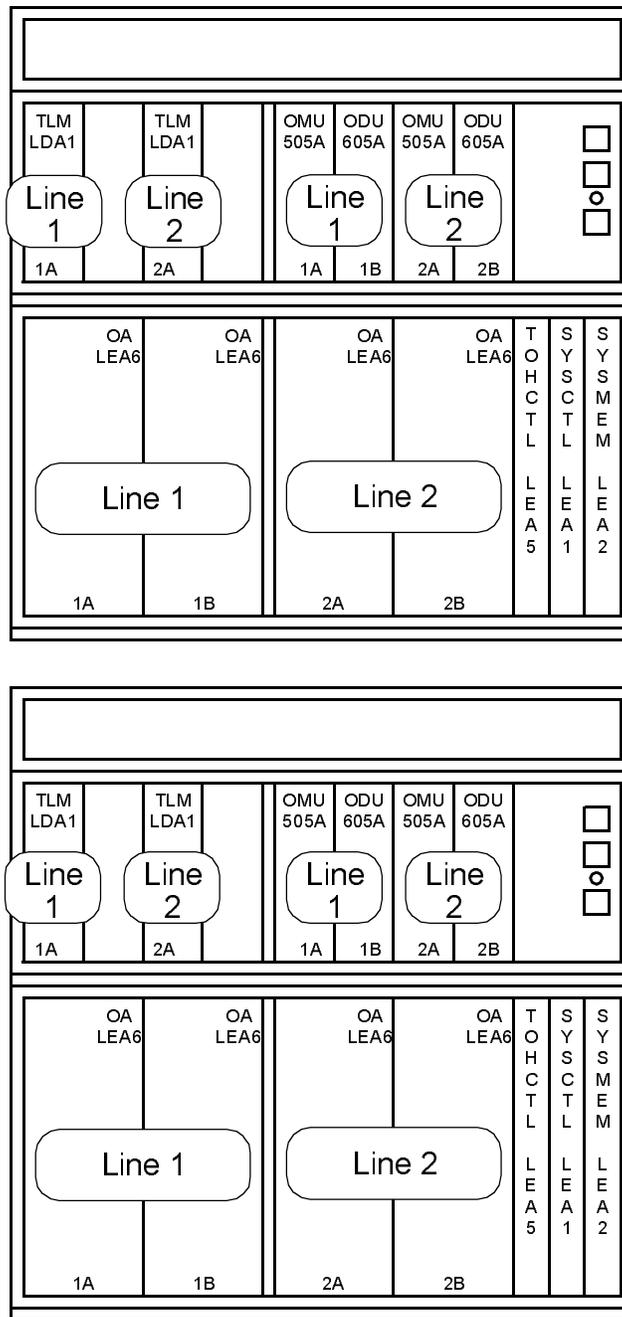
Figure 7-5 Dual 2-Line End Terminal 1A-TX
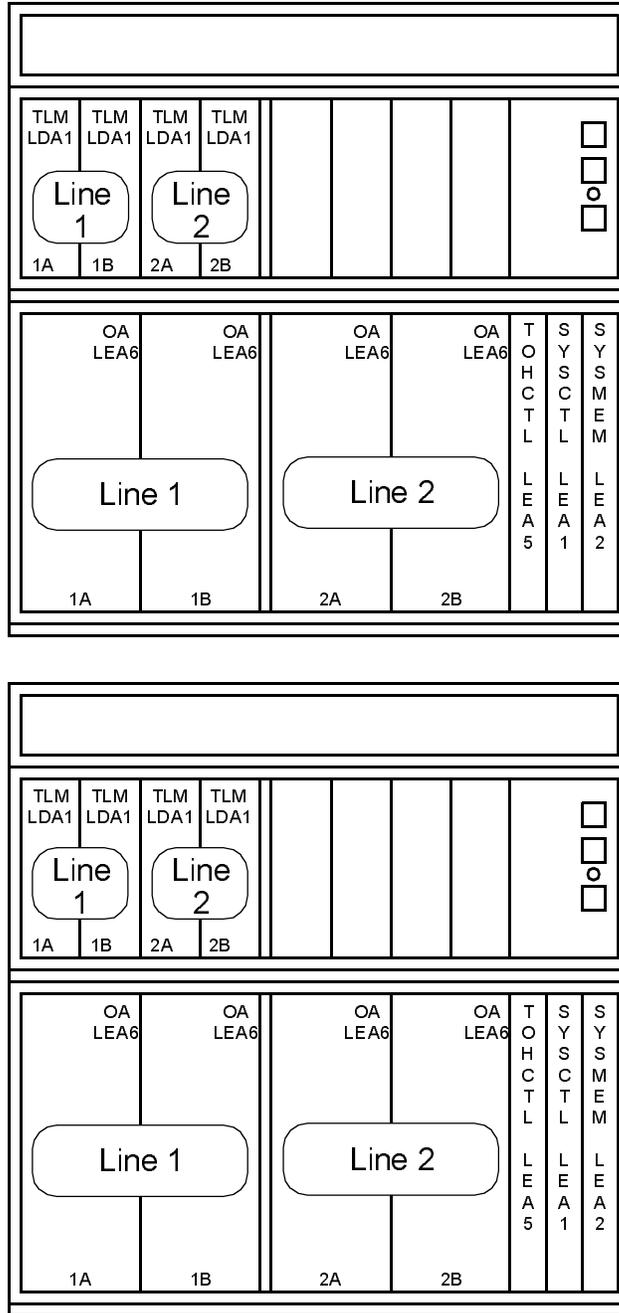
Figure 7-6 Dual 2-Line Repeater
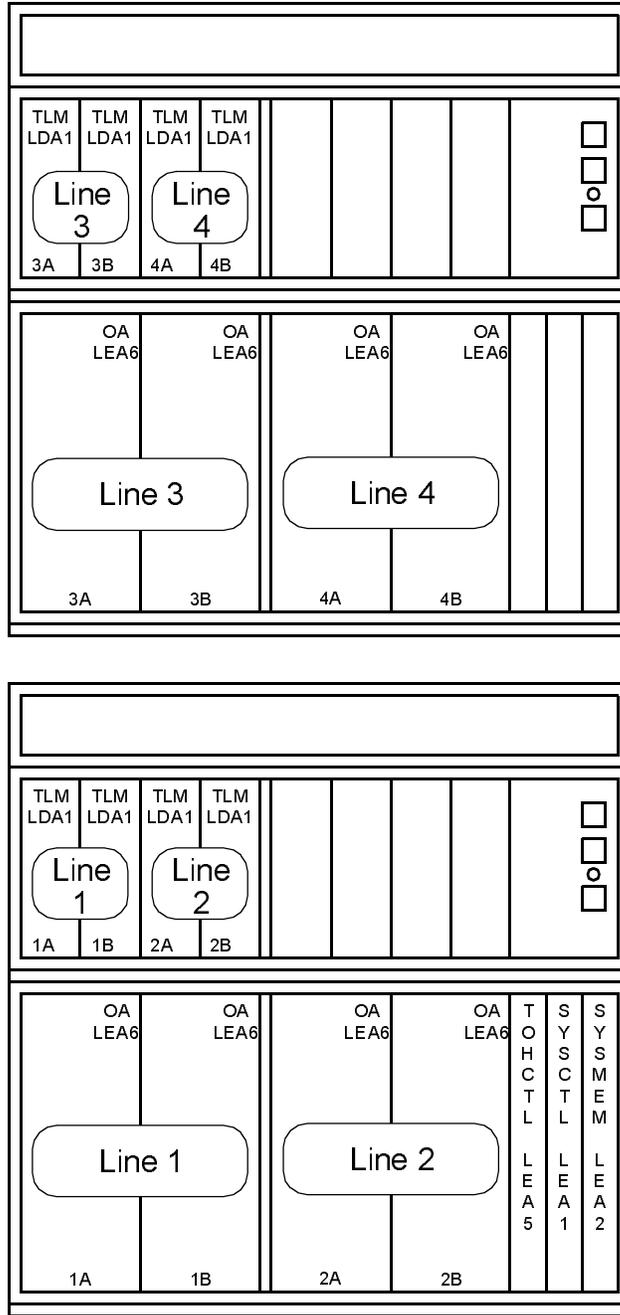
Figure 7-7 4-Line Repeater
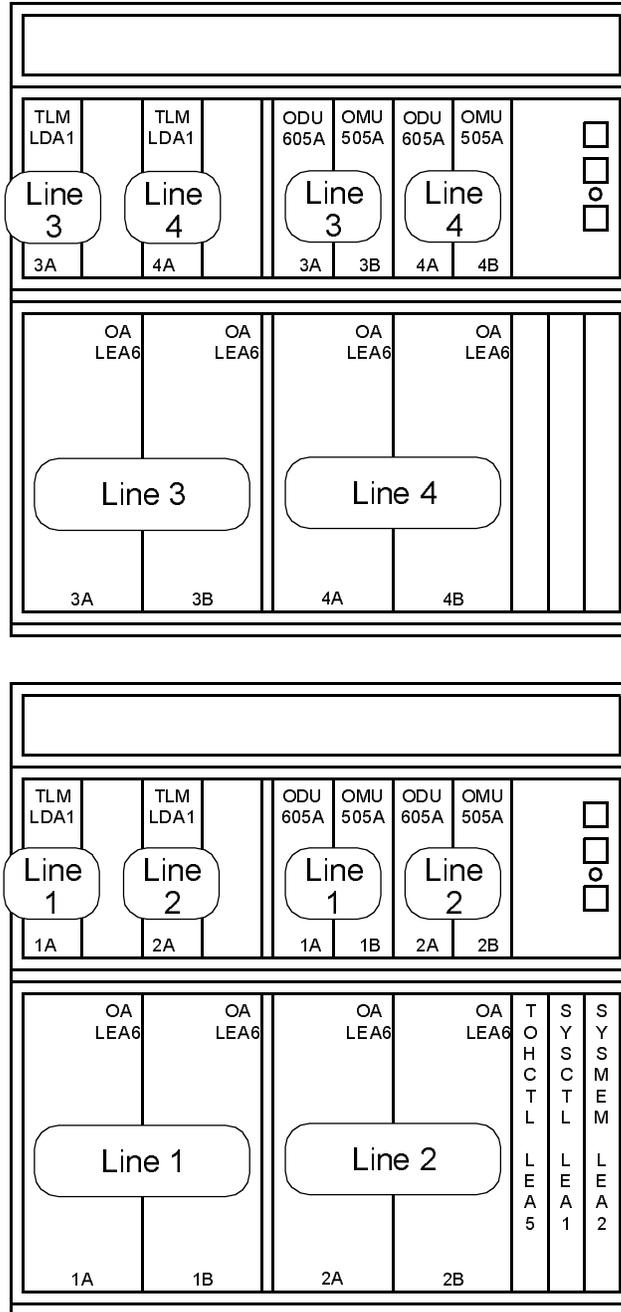
Figure 7-8 4-Line End Terminal 1A-RCV
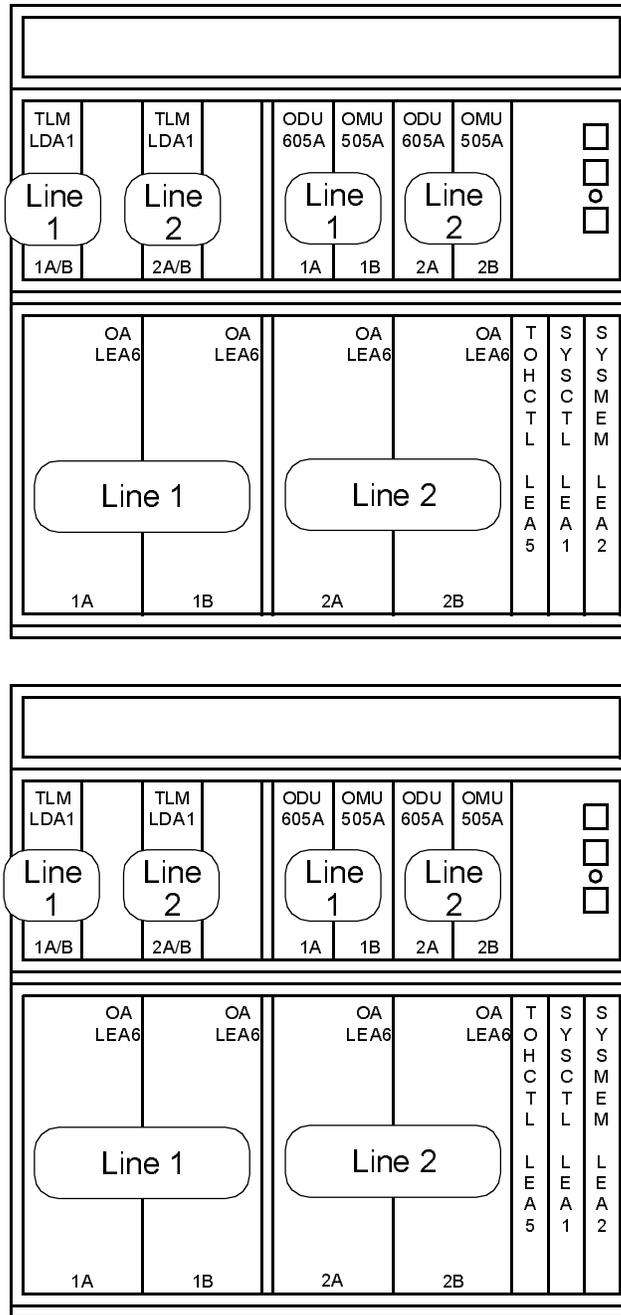
Figure 7-9 Dual 2-Line End Terminal 1A-RCV
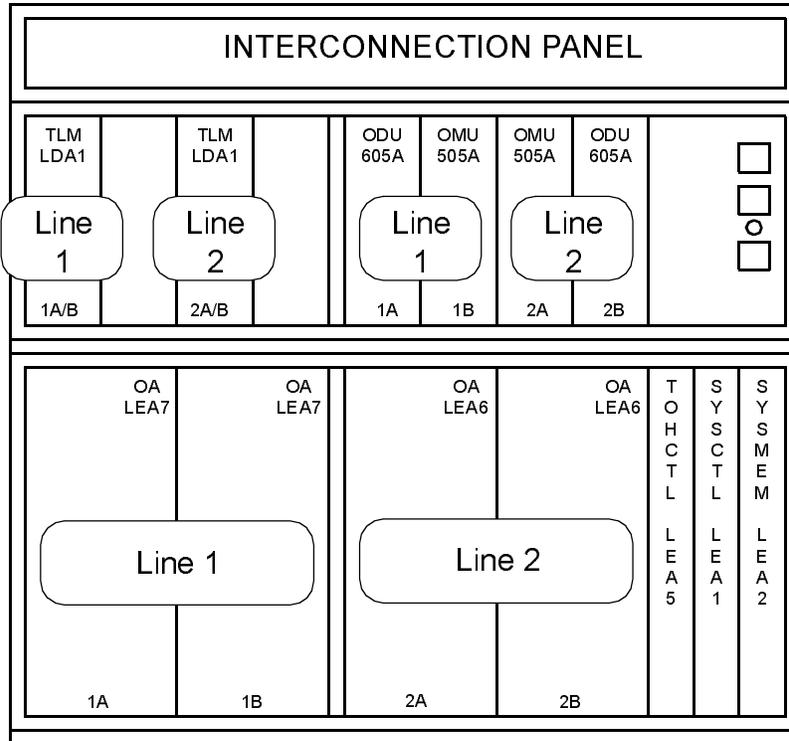
Figure 7-10 Dual Facing Configuration

➡ NOTE:
The Line 1 OMU and ODU have reversed positions from the standard configuration.

B - OLS 1A-TX End Terminal Installation

This subsection covers the installation of fibers and labels for the OLS 1A-TX End Terminal configuration for Release 1.0, 2.0 and 2.1. Releases 1.0 and 2.0 support only 8 wavelengths. Release 2.1 supports either 8 or 16 wavelengths. The subsection is divided into five procedures:

■ Intraself Fiber Jumper Installation

■ Low Speed Fiber Jumper Installation to OC-48 equipment

■ Outside Plant Fiber Jumper Installation to LGX

■ Customer Maintenance Signal Fiber Jumper Installation

■ End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure for 4-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) If the cabinet is a dual 2-line cabinet, see "Circuit Pack Equip Procedure For Dual 2-Line Cabinets" on page 7-21.

(3) Refer to Figure 7-4 on page 7-12 for circuit pack locations.

(4) Install, but do not seat, the following controller circuit packs in the lower shelf:

    · (1) LEA1 SYSCTL

    · (1) LEA2 SYSMEM

    · (1) LEA5 TOHCTL

(5) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:

For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(6) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:

For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

⇒ NOTE:

Typically only lines 1 and 2 are equipped on first installations, however, if lines 3 and/or 4 are equipped perform the following step(s). If not equipped go to step 9.

(7) If line 3 is equipped, install, but do not seat, the following transmission circuit packs and units for line 3 in the upper shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:

For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(8) If line 4 is equipped, install, but do not seat, the following transmission circuit packs and units for line 4 in the upper shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(9) Proceed to the Intrashelf Fiber Jumper Installation paragraph (page 7-22).

Circuit Pack Equip Procedure For Dual 2-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-5 on page 7-13 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the lower shelf:

- (1) LEA1 SYSCTL
- (1) LEA2 SYSMEM
- (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA
- (1) LDA1 TLM
- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(5) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA
- (1) LDA1 TLM
- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:

For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(6) Repeat steps 1 to 4 if the upper shelf is to be equipped.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 4 fiber jumpers per List 161 for 8 λ or List 162 for 16 λ for *each* line (8 fibers for a 2-line shelf), add the labels, then route the fibers by referring to Figure 7-11 and Table 7-6. See Table 7-3 on page 7-5 for more fiber information.

⇒ NOTE:

The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets.
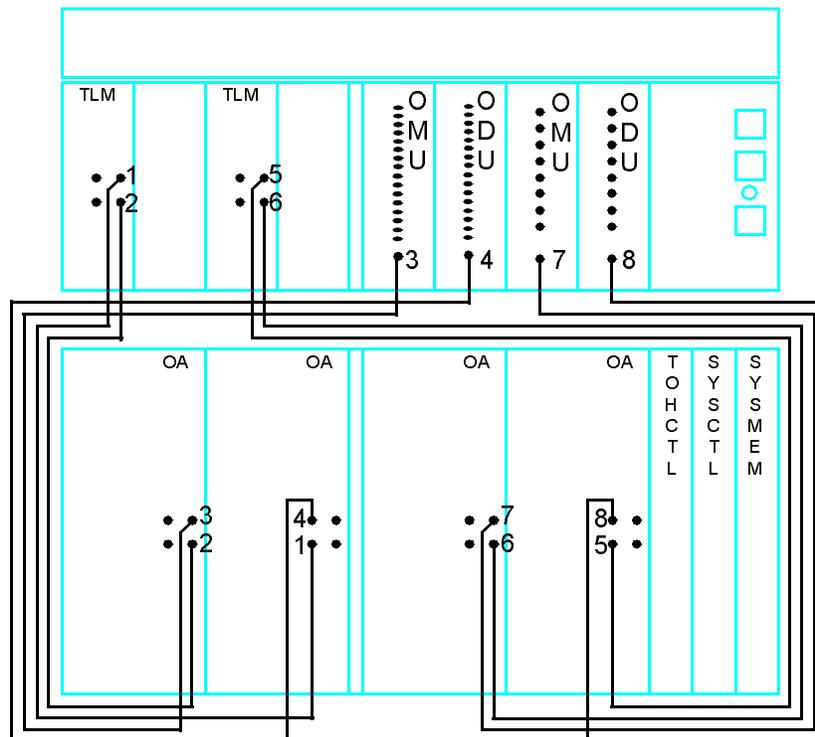
Figure 7-11 1A-TX End Terminal Intrashelf Fiber Jumpers

Table 7-6 Intrashelf Fiber Jumpers For 1A-TX End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal 1A-TX 4-Line or Dual 2-Line (use lines 1 & 2 for each shelf) Refer to Figure 7-11 on page 7-22 for connection point	1	1	TLM 1A/B	IN	1A-TLM-IN
		1	OA 1B	TLM OUT	1B-OA-TLMOUT
		2	TLM 1A/B	OUT	1A-TLM-OUT
		2	OA 1A	TLM IN	1A-OA-TLMIN
		3	OMU 1A	OMU OUT	1-OMU-OUT
		3	OA 1A	IN	1A-OA-IN
		4	ODU 1B	ODU IN	1-ODU-IN
		4	OA 1B	OUT	1B-OA-OUT
	2	5	TLM 2A/B	IN	2A-TLM-IN
		5	OA 2B	TLM OUT	2B-OA-TLMOUT
		6	TLM 2A/B	OUT	2A-TLM-OUT
		6	OA 2A	TLM IN	2A-OA-TLMIN
		7	OMU 2A	OMU OUT	2-OMU-OUT
		7	OA 2A	IN	2A-OA-IN
		8	ODU 2B	ODU IN	2-ODU-IN
		8	OA 2B	OUT	2B-OA-OUT
	3	1	TLM 3A/B	IN	3A-TLM-IN
		1	OA 3B	TLM OUT	3B-OA-TLMOUT
		2	TLM 3A/B	OUT	3A-TLM-OUT
		2	OA 3A	TLM IN	3A-OA-TLMIN
		3	OMU 3A	OMU OUT	3-OMU-OUT
		3	OA 3A	IN	3A-OA-IN
		4	ODU 3B	ODU IN	3-ODU-IN
		4	OA 3B	OUT	3B-OA-OUT
	4	5	TLM 4A/B	IN	4A-TLM-IN
		5	OA 4B	TLM OUT	4B-OA-TLMOUT
		6	TLM 4A/B	OUT	4A-TLM-OUT
		6	OA 4A	TLM IN	4A-OA-TLMIN
		7	OMU 4A	OMU OUT	4-OMU-OUT
		7	OA 4A	IN	4A-OA-IN
		8	ODU 4B	ODU IN	4-ODU-IN
		8	OA 4B	OUT	4B-OA-OUT

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9 and Figure 7-12 on page 7-24. Use Table 7-7 on page 7-25 and Table 7-8 on page 7-26 for Shelves 1 and 2. Use Table 7-9 on page 7-27 and Table 7-10 on page 7-28 for Shelves 3 and 4.

⚠ CAUTION:
Do not connect either end of the fiber jumper at this time.
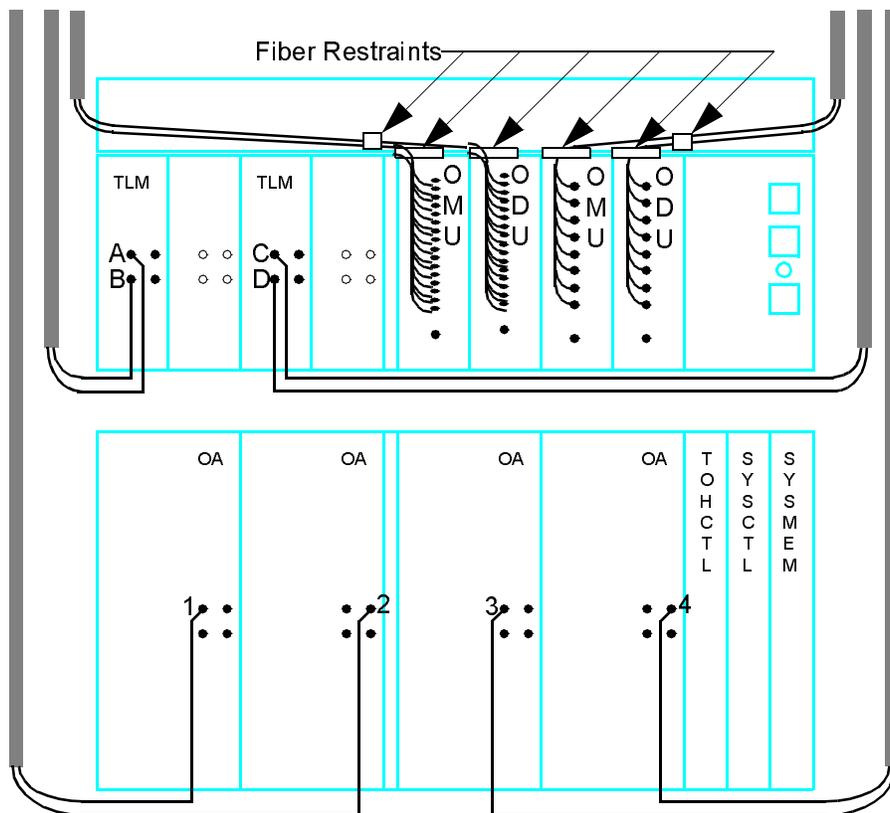
-12 1A-TX End Terminal Outside Plant, Low Speed, & Customer Maintenance Signal Fiber Jumpers

Table 7-7 1A-TX End Terminal Low Speed Fiber Jumpers - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	1	OMU 1A	OCHAN1 IN	LOWER 1M1	UPPER 1M1
1A-TX		OMU 1A	OCHAN2 IN	LOWER 1M2	UPPER 1M2
		OMU 1A	OCHAN3 IN	LOWER 1M3	UPPER 1M3
4-Line or		OMU 1A	OCHAN4 IN	LOWER 1M4	UPPER 1M4
Dual 2-Line		OMU 1A	OCHAN5 IN	LOWER 1M5	UPPER 1M5
(use lines 1 & 2		OMU 1A	OCHAN6 IN	LOWER 1M6	UPPER 1M6
for each shelf)		OMU 1A	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1A	OCHAN8 IN	LOWER 1M8	UPPER 1M8
Refer to		OMU 1A	OCHAN9 IN	LOWER 1M9	UPPER 1M9
Figure 7-12 on		OMU 1A	OCHAN10 IN	LOWER 1M10	UPPER 1M10
page 7-24		OMU 1A	OCHAN11 IN	LOWER 1M11	UPPER 1M11
for connection		OMU 1A	OCHAN12 IN	LOWER 1M12	UPPER 1M12
points		OMU 1A	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1A	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1A	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1A	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1B	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1B	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1B	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1B	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1B	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1B	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1B	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1B	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1B	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1B	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1B	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1B	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1B	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1B	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1B	OCHAN15OUT	LOWER 1D15	UPPER 1D15
		ODU 1B	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-8 1A-TX End Terminal Low Speed Fiber Jumpers - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf
End Terminal	2	OMU 2A	OCHAN1 IN	LOWER 2M1	UPPER 2M1
1A-TX		OMU 2A	OCHAN2 IN	LOWER 2M2	UPPER 2M2
		OMU 2A	OCHAN3 IN	LOWER 2M3	UPPER 2M3
4-Line or		OMU 2A	OCHAN4 IN	LOWER 2M4	UPPER 2M4
Dual 2-Line		OMU 2A	OCHAN5 IN	LOWER 2M5	UPPER 2M5
(use lines 1 & 2		OMU 2A	OCHAN6 IN	LOWER 2M6	UPPER 2M6
for each shelf)		OMU 2A	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2A	OCHAN8 IN	LOWER 2M8	UPPER 2M8
Refer to		OMU 2A	OCHAN9 IN	LOWER 2M9	UPPER 2M9
Figure 7-12 on		OMU 2A	OCHAN10 IN	LOWER 2M10	UPPER 2M10
page 7-24		OMU 2A	OCHAN11 IN	LOWER 2M11	UPPER 2M11
for connection		OMU 2A	OCHAN12 IN	LOWER 2M12	UPPER 2M12
points		OMU 2A	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2A	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2A	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2A	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2B	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2B	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2B	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2B	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2B	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2B	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2B	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2B	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2B	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2B	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2B	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2B	OCHAN12 OUT	LOWER 2D12	UPPER 2D12
		ODU 2B	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2B	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2B	OCHAN15OUT	LOWER 2D15	UPPER 2D15
		ODU 2B	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Table 7-9 1A-TX End Terminal Low Speed Fiber Jumpers - Line 3

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	3	OMU 3A	OCHAN1 IN		UPPER 3M1
1A-TX		OMU 3A	OCHAN2 IN		UPPER 3M2
		OMU 3A	OCHAN3 IN		UPPER 3M3
4-Line or		OMU 3A	OCHAN4 IN		UPPER 3M4
Dual 2-Line		OMU 3A	OCHAN5 IN		UPPER 3M5
(use lines 1 & 2		OMU 3A	OCHAN6 IN		UPPER 3M6
for each shelf)		OMU 3A	OCHAN7 IN		UPPER 3M7
		OMU 3A	OCHAN8 IN		UPPER 3M8
Refer to		OMU 3A	OCHAN9 IN		UPPER 3M9
Figure 7-12 on		OMU 3A	OCHAN10 IN		UPPER 3M10
page 7-24		OMU 3A	OCHAN11 IN		UPPER 3M11
for connection		OMU 3	OCHAN12 IN		UPPER 3M12
points		OMU 3A	OCHAN13 IN		UPPER 3M13
		OMU 3A	OCHAN14 IN		UPPER 3M14
		OMU 3A	OCHAN15 IN		UPPER 3M15
		OMU 3A	OCHAN16 IN		UPPER 3M16
		ODU 3B	OCHAN1 OUT		UPPER 3D1
		ODU 3B	OCHAN2 OUT		UPPER 3D2
		ODU 3B	OCHAN3 OUT		UPPER 3D3
		ODU 3B	OCHAN4 OUT		UPPER 3D4
		ODU 3B	OCHAN5 OUT		UPPER 3D5
		ODU 3B	OCHAN6 OUT		UPPER 3D6
		ODU 3B	OCHAN7 OUT		UPPER 3D7
		ODU 3B	OCHAN8 OUT		UPPER 3D8
		ODU 3B	OCHAN9 OUT		UPPER 3D9
		ODU 3B	OCHAN10 OUT		UPPER 3D10
		ODU 3B	OCHAN11 OUT		UPPER 3D11
		ODU 3B	OCHAN12 OUT		UPPER 3D12
		ODU 3B	OCHAN13 OUT		UPPER 3D13
		ODU 3B	OCHAN14 OUT		UPPER 3D14
		ODU 3B	OCHAN15OUT		UPPER 3D15
		ODU 3B	OCHAN16 OUT		UPPER 3D16

Table 7-10 1A-TX End Terminal Low Speed Fiber Jumpers - Line 4

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf
End Terminal	4	OMU 4A	OCHAN1 IN		UPPER 4M1
1A-TX		OMU 4A	OCHAN2 IN		UPPER 4M2
		OMU 4A	OCHAN3 IN		UPPER 4M3
4-Line or		OMU 4A	OCHAN4 IN		UPPER 4M4
Dual 2-Line		OMU 4A	OCHAN5 IN		UPPER 4M5
(use lines 1 & 2		OMU 4A	OCHAN6 IN		UPPER 4M6
for each shelf)		OMU 4A	OCHAN7 IN		UPPER 4M7
		OMU 4A	OCHAN8 IN		UPPER 4M8
Refer to		OMU 4A	OCHAN9 IN		UPPER 4M9
Figure 7-12 on		OMU 4A	OCHAN10 IN		UPPER 4M10
page 7-24		OMU 4A	OCHAN11 IN		UPPER 4M11
for connection		OMU 4A	OCHAN12 IN		UPPER 4M12
points		OMU 4A	OCHAN13 IN		UPPER 4M13
		OMU 4A	OCHAN14 IN		UPPER 4M14
		OMU 4A	OCHAN15 IN		UPPER 4M15
		OMU 4A	OCHAN16 IN		UPPER 4M16
		ODU 4B	OCHAN1 OUT		UPPER 4D1
		ODU 4B	OCHAN2 OUT		UPPER 4D2
		ODU 4B	OCHAN3 OUT		UPPER 4D3
		ODU 4B	OCHAN4 OUT		UPPER 4D4
		ODU 4B	OCHAN5 OUT		UPPER 4D5
		ODU 4B	OCHAN6 OUT		UPPER 4D6
		ODU 4B	OCHAN7 OUT		UPPER 4D7
		ODU 4B	OCHAN8 OUT		UPPER 4D8
		ODU 4B	OCHAN9 OUT		UPPER 4D9
		ODU 4B	OCHAN10 OUT		UPPER 4D10
		ODU 4B	OCHAN11 OUT		UPPER 4D11
		ODU 4B	OCHAN12 OUT		UPPER 4D12
		ODU 4B	OCHAN13 OUT		UPPER 4D13
		ODU 4B	OCHAN14 OUT		UPPER 4D14
		ODU 4B	OCHAN15 OUT		UPPER 4D15
		ODU 4B	OCHAN16 OUT		UPPER 4D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-12 on page 7-24 and Table 7-11 on page 7-29.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-11 Outside Plant LGX Fiber Jumpers For 1A-TX End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	1	OA 1A	OUT	1A-OA-OUT
1A-TX		2	OA 1B	IN	1B-OA-IN
	2	3	OA 2A	OUT	2A-OA-OUT
4-Line or		4	OA 2B	IN	2B-OA-IN
Dual 2-Line	3	1	OA 3A	OUT	3A-OA-OUT
(use lines 1 & 2 for each shelf)		2	OA 3B	IN	3B-OA-IN
Refer to Figure 7-12 on page 7-24 for connection points	4	3	OA 4A	OUT	4A-OA-OUT
		4	OA 4B	IN	4B-OA-IN

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facilities or LGX by adding the labels then routing the fibers by referring to Figure 7-12 on page 7-24 and Table 7-12 on page 7-29.

Table 7-12 Customer Maintenance Fiber Jumpers For End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal 1A-TX	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
4-Line or	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT
Dual 2-Line (use lines 1 & 2 for each shelf)	3	A	TLM 3A/B	CM IN	3A-TLM-CMIN
		B	TLM 3A/B	CM OUT	3A-TLM-CMOUT
Refer to Figure 7-12 on page 7-24 for connection points	4	C	TLM 4A/B	CM IN	4A-TLM-CMIN
		D	TLM 4A/B	CM OUT	4A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-11 on page 7-22 and Figure 7-12 on page 7-24.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9.

➡ NOTE:
To place the fibers through the clips, lift the clip and slide one fiber through at a time to prevent overstressing the clip.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested first for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 10 and for transmission in Section 11.

4-Line Cabinets With 2 Lines Equipped

For 4-line cabinets with only lines 1 and 2 equipped during the initial installation, move the transmission circuit packs/units to lines 3 and 4 to test the slots per the following procedure:

➡ NOTE:
This procedure assumes that lines 1 and 2 are equipped and lines 3 and 4 are not.

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-4 on page 7-12 for circuit pack locations.

(3) Verify the following controller circuit packs are installed, but not seated, in the lower shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(4) Move and install, but do not seat, the following transmission circuit packs and units into line 3 in the upper shelf from line 1 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇨ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

⇨ NOTE:
Leave the intrashelf fiber jumpers installed at the line 1 locations.

(5) Move and install, but do not seat, the following transmission circuit packs and units into line 4 in the upper shelf from line 2 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇨ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

⇨ NOTE:
Leave the intrashelf fiber jumpers installed at the line 2 locations.

Seat OMUs and ODUs Into Shelf

Refer to Figure 7-4 on page 7-12 or Figure 7-5 on page 7-13 and seat the OMU and ODU units in the shelf as follows:

(1) Remove the screws from the shelf positions.

(2) Seat the OMUs and ODUs into the shelf slots.

(3) If the OMUs and ODUs are not in their final position, temporarily store the screws.

⚠ CAUTION:
Do not seat any other circuit packs in the shelf at this time.

Final Verification

Perform the following steps to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that optical cable is protected properly.

(3) Verify that all cables are properly labeled.

(4) Verify circuit packs/units other than the OMU and ODU are installed but not seated into their backplane connectors.

C - OLS 1A-RCV End Terminal Installation

Releases 1.0 and 2.0 support 8 wavelengths and Release 2.1 supports either 8 or 16 wavelengths. This sub section covers all three releases. If Release 1.0, 2.0 or 2.1 with 8 wavelengths is being installed, disregard any reference to labeling and fibering wavelengths 9 through 16.

This subsection covers the fiber and label installation for the 1A-RCV End Terminal configuration. It has been broken into five procedures:

- Intrashelf Fiber Jumper Installation

- Low Speed Fiber Jumper Installation to OC-48 equipment

- Outside Plant Fiber Jumper Installation to LGX

- Customer Maintenance Signal Fiber Jumper Installation

- End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure for 4-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) If the cabinet is a dual 2-line cabinet, proceed to the Circuit Pack Equip Procedure for Dual 2-Line Cabinets paragraph.

(3) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(4) Install, but do not seat, the following controller circuit packs in the lower shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(5) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(6) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

NOTE:
Typically only lines 1 and 2 are equipped on first installations, however, if lines 3 and/or 4 are equipped perform the following step(s). If lines 3 and 4 are not equipped, go to step 9.

(7) If line 3 is equipped, install, but do not seat, the following transmission circuit packs and units for line 3 in the upper shelf:

- (2) LEA6, LEA7 or LEA105 OA

- (1) LDA1 TLM

- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(8) If line 4 is equipped, install, but do not seat, the following transmission circuit packs and units for line 4 in the upper shelf:

- · (2) LEA6, LEA7 or LEA105 OA

- · (1) LDA1 TLM

- · (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- · (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(9) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Circuit Pack Equip Procedure For Dual 2-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-9 on page 7-17 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the lower shelf:

- · (1) LEA1 SYSCTL

- · (1) LEA2 SYSMEM

- · (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- · (2) LEA6, LEA7 or LEA105 OA

- · (1) LDA1 TLM

- · (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- · (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(5) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- · (2) LEA6, LEA7 or LEA105 OA

- · (1) LDA1 TLM

- · (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

· (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:

For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(6) Repeat steps 1 to 4 if the upper shelf is to be equipped.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 4 fiber jumpers per List 161 for 8 λ or L162 for 16 λ for *each* line (8 fibers for a 2-line shelf), add the labels, and route the fibers using Figure 7-13 and Table 7-13 on page 7-39. See Table 7-3 on page 7-5 for more information on fiber lists.

⇒ NOTE:

The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets.

Figure 7-13 1A-RCV End Terminal Intrashelf Fiber Jumpers

Table 7-13 Intrashelf Fiber Jumpers For 1A-RCV End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	1	TLM 1A/B	IN	1A-TLM-IN
		1	OA 1A	TLM OUT	1A-OA-TLMOUT
1A-RCV		2	TLM 1A/B	OUT	1A-TLM-OUT
		2	OA 1B	TLM IN	1B-OA-TLMIN
4-Line or		3	ODU 1A	ODU IN	1-ODU-IN
		3	OA 1A	OUT	1A-OA-OUT
Dual 2-Line		4	OMU 1B	OMU OUT	1-OMU-OUT
(use lines 1 & 2		4	OA 1B	IN	1B-OA-IN
for each shelf)	2	5	TLM 2A/B	IN	2A-TLM-IN
		5	OA 2A	TLM OUT	2A-OA-TLMOUT
Refer to		6	TLM 2A/B	OUT	2A-TLM-OUT
Figure 7-13 on		6	OA 2B	TLM IN	2B-OA-TLMIN
page 7-38		7	ODU 2A	ODU IN	2-ODU-IN
for connection		7	OA 2A	OUT	2A-OA-OUT
point		8	OMU 2B	OMU OUT	2-OMU-OUT
		8	OA 2B	IN	2B-OA-IN
	3	1	TLM 3A/B	IN	3A-TLM-IN
		1	OA 3A	TLM OUT	3A-OA-TLMOUT
		2	TLM 3A/B	OUT	3A-TLM-OUT
		2	OA 3B	TLM IN	3B-OA-TLMIN
		3	ODU 3A	ODU IN	3-ODU-IN
		3	OA 3A	OUT	3A-OA-OUT
		4	OMU 3B	OMU OUT	3-OMU-OUT
		4	OA 3B	IN	3B-OA-IN
	4	5	TLM 4A/B	IN	4A-TLM-IN
		5	OA 4A	TLM OUT	4A-OA-TLMOUT
		6	TLM 4A/B	OUT	4A-TLM-OUT
		6	OA 4B	TLM IN	4B-OA-TLMIN
		7	ODU 4A	ODU IN	4-ODU-IN
		7	OA 4A	OUT	4A-OA-OUT
		8	OMU 4B	OMU OUT	4-OMU-OUT
		8	OA 4B	IN	4B-OA-IN

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9, Figure 7-14 on page 7-40, and Table 7-14 on page 7-41 through Table 7-17 on page 7-44.

⚠ CAUTION:
Do not connect either end of the fiber jumper at this time
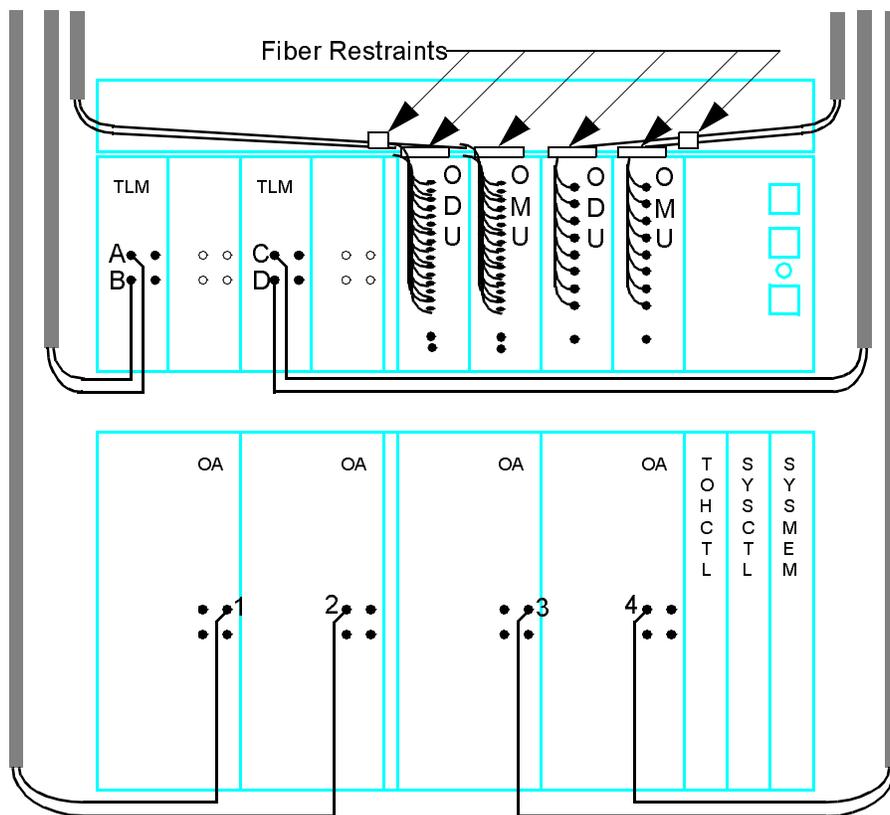
Figure 7-14 1A-RCV End Terminal Outside Plant, Low Speed, & Customer Maintenance Signal Fiber Jumpers

Table 7-14 1A-RCV End Terminal Low Speed Fiber Jumpers - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	1	OMU 1B	OCHAN1 IN	LOWER 1M1	UPPER 1M1
1A-RCV		OMU 1B	OCHAN2 IN	LOWER 1M2	UPPER 1M2
		OMU 1B	OCHAN3 IN	LOWER 1M3	UPPER 1M3
4-Line or		OMU 1B	OCHAN4 IN	LOWER 1M4	UPPER 1M4
Dual 2-Line		OMU 1B	OCHAN5 IN	LOWER 1M5	UPPER 1M5
(use lines 1 & 2		OMU 1B	OCHAN6 IN	LOWER 1M6	UPPER 1M6
for each shelf)		OMU 1B	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1B	OCHAN8 IN	LOWER 1M8	UPPER 1M8
Refer to		OMU 1B	OCHAN9 IN	LOWER 1M9	UPPER 1M9
Figure 7-14 on		OMU 1B	OCHAN10 IN	LOWER 1M10	UPPER 1M10
page 7-40		OMU 1B	OCHAN11 IN	LOWER 1M11	UPPER 1M11
for connection		OMU 1B	OCHAN12 IN	LOWER 1M12	UPPER 1M12
point		OMU 1B	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1B	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1B	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1B	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1A	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1A	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1A	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1A	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1A	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1A	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1A	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1A	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1A	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1A	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1A	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1A	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1A	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1A	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1A	OCHAN15 OUT	LOWER 1D15	UPPER 1D15
		ODU 1A	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-15 1A-RCV End Terminal Low Speed Fiber Jumpers - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf
End Terminal 1A-RCV 4-Line or Dual 2-Line (use lines 1 & 2 for each shelf) Refer to Figure 7-14 on page 7-40 for connection point	2	OMU 2B	OCHAN1 IN	LOWER 2M1	UPPER 2M1
		OMU 2B	OCHAN2 IN	LOWER 2M2	UPPER 2M2
		OMU 2B	OCHAN3 IN	LOWER 2M3	UPPER 2M3
		OMU 2B	OCHAN4 IN	LOWER 2M4	UPPER 2M4
		OMU 2B	OCHAN5 IN	LOWER 2M5	UPPER 2M5
		OMU 2B	OCHAN6 IN	LOWER 2M6	UPPER 2M6
		OMU 2B	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2B	OCHAN8 IN	LOWER 2M8	UPPER 2M8
		OMU 2B	OCHAN9 IN	LOWER 2M9	UPPER 2M9
		OMU 2B	OCHAN10 IN	LOWER 2M10	UPPER 2M10
		OMU 2B	OCHAN11 IN	LOWER 2M11	UPPER 2M11
		OMU 2B	OCHAN12 IN	LOWER 2M12	UPPER 2M12
		OMU 2B	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2B	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2B	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2B	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2A	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2A	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2A	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2A	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2A	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2A	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2A	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2A	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2A	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2A	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2A	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2A	OCHAN12 OUT	LOWER 2D12	UPPER 2D12
		ODU 2A	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2A	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2A	OCHAN15 OUT	LOWER 2D15	UPPER 2D15
		ODU 2A	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Table 7-16 1A-RCV End Terminal Low Speed Fiber Jumpers - Line 3

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	3	OMU 3B	OCHAN1 IN		UPPER 3M1
1A-RCV		OMU 3B	OCHAN2 IN		UPPER 3M2
		OMU 3B	OCHAN3 IN		UPPER 3M3
4-Line or		OMU 3B	OCHAN4 IN		UPPER 3M4
		OMU 3B	OCHAN5 IN		UPPER 3M5
Dual 2-Line		OMU 3B	OCHAN6 IN		UPPER 3M6
(use lines 1 & 2 for each shelf)		OMU 3B	OCHAN7 IN		UPPER 3M7
		OMU 3B	OCHAN8 IN		UPPER 3M8
Refer to		OMU 3B	OCHAN9 IN		UPPER 3M9
Figure 7-14 on page 7-40		OMU 3B	OCHAN10 IN		UPPER 3M10
for connection		OMU 3B	OCHAN11 IN		UPPER 3M11
point		OMU 3B	OCHAN12 IN		UPPER 3M12
		OMU 3B	OCHAN13 IN		UPPER 3M13
		OMU 3B	OCHAN14 IN		UPPER 3M14
		OMU 3B	OCHAN15 IN		UPPER 3M15
		OMU 3B	OCHAN16 IN		UPPER 3M16
		ODU 3A	OCHAN1 OUT		UPPER 3D1
		ODU 3A	OCHAN2 OUT		UPPER 3D2
		ODU 3A	OCHAN3 OUT		UPPER 3D3
		ODU 3A	OCHAN4 OUT		UPPER 3D4
		ODU 3A	OCHAN5 OUT		UPPER 3D5
		ODU 3A	OCHAN6 OUT		UPPER 3D6
		ODU 3A	OCHAN7 OUT		UPPER 3D7
		ODU 3A	OCHAN8 OUT		UPPER 3D8
		ODU 3A	OCHAN9 OUT		UPPER 3D9
		ODU 3A	OCHAN10 OUT		UPPER 3D10
		ODU 3A	OCHAN11 OUT		UPPER 3D11
		ODU 3A	OCHAN12 OUT		UPPER 3D12
		ODU 3A	OCHAN13 OUT		UPPER 3D13
		ODU 3A	OCHAN14 OUT		UPPER 3D14
		ODU 3A	OCHAN15 OUT		UPPER 3D15
		ODU 3A	OCHAN16 OUT		UPPER 3D16

Table 7-17 1A-RCV End Terminal Low Speed Fiber Jumpers - Line 4

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf
End Terminal	4	OMU 4B	OCHAN1 IN		UPPER 4M1
1A-RCV		OMU 4B	OCHAN2 IN		UPPER 4M2
		OMU 4B	OCHAN3 IN		UPPER 4M3
4-Line or		OMU 4B	OCHAN4 IN		UPPER 4M4
Dual 2-Line		OMU 4B	OCHAN5 IN		UPPER 4M5
(use lines 1 & 2		OMU 4B	OCHAN6 IN		UPPER 4M6
for each shelf)		OMU 4B	OCHAN7 IN		UPPER 4M7
		OMU 4B	OCHAN8 IN		UPPER 4M8
Refer to		OMU 4B	OCHAN9 IN		UPPER 4M9
Figure 7-14 on		OMU 4B	OCHAN10 IN		UPPER 4M10
page 7-40		OMU 4B	OCHAN11 IN		UPPER 4M11
for connection		OMU 4B	OCHAN12 IN		UPPER 4M12
point		OMU 4B	OCHAN13 IN		UPPER 4M13
		OMU 4B	OCHAN14 IN		UPPER 4M14
		OMU 4B	OCHAN15 IN		UPPER 4M15
		OMU 4B	OCHAN16 IN		UPPER 4M16
		ODU 4A	OCHAN1 OUT		UPPER 4D1
		ODU 4A	OCHAN2 OUT		UPPER 4D2
		ODU 4A	OCHAN3 OUT		UPPER 4D3
		ODU 4A	OCHAN4 OUT		UPPER 4D4
		ODU 4A	OCHAN5 OUT		UPPER 4D5
		ODU 4A	OCHAN6 OUT		UPPER 4D6
		ODU 4A	OCHAN7 OUT		UPPER 4D7
		ODU 4A	OCHAN8 OUT		UPPER 4D8
		ODU 4A	OCHAN9 OUT		UPPER 4D9
		ODU 4A	OCHAN10 OUT		UPPER 4D10
		ODU 4A	OCHAN11 OUT		UPPER 4D11
		ODU 4A	OCHAN12 OUT		UPPER 4D12
		ODU 4A	OCHAN13 OUT		UPPER 4D13
		ODU 4A	OCHAN14 OUT		UPPER 4D14
		ODU 4A	OCHAN15 OUT		UPPER 4D15
		ODU 4A	OCHAN16 OUT		UPPER 4D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-14 on page 7-40 and Table 7-18 on page 7-45.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-18 Outside Plant LGX Fiber Jumpers For 1A-RCV End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal 1A-RCV	1	1	OA 1A	IN	1A-OA-IN
		2	OA 1B	OUT	1B-OA-OUT
4-Line or	2	3	OA 2A	IN	2A-OA-IN
		4	OA 2B	OUT	2B-OA-OUT
Dual 2-Line (use lines 1 & 2 for each shelf)	3	1	OA 3A	IN	3A-OA-IN
		2	OA 3B	OUT	3B-OA-OUT
Refer to Figure 7-14 on page 7-40 for connection point	4	3	OA 4A	IN	4A-OA-IN
		4	OA 4B	OUT	4B-OA-OUT

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels then routing the fibers by referring to Figure 7-14 on page 7-40 and Table 7-19 on page 7-45.

Table 7-19 Customer Maintenance Fiber Jumpers For 1A-RCV End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
1A-RCV	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT
4-Line or	3	A	TLM 3A/B	CM IN	3A-TLM-CMIN
Dual 2-Line (use lines 1 & 2 for each shelf)		B	TLM 3A/B	CM OUT	3A-TLM-CMOUT
Refer to Figure 7-14 on page 7-40for connection point	4	C	TLM 4A/B	CM IN	4A-TLM-CMIN
		D	TLM 4A/B	CM OUT	4A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-13 on page 7-38 and Figure 7-14 on page 7-40.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9 and Figure 7-13 on page 7-38.

➡ NOTE:
The fibers should be placed through the clips one at a time to avoid overstressing the clips.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 10 and for transmission in Section 11.

4-Line Cabinets With 2 Lines Equipped

For 4-line cabinets with only lines 1 and 2 equipped during the initial installation, move the transmission circuit packs/units to lines 3 and 4 to test the slots per the following procedure:

➡ NOTE:
This procedure assumes that lines 1 and 2 are equipped and lines 3 and 4 are not.

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(3) Verify the following controller circuit packs are installed, but not seated, in the lower shelf:

- (1) LEA1 SYSCTL
- (1) LEA2 SYSMEM
- (1) LEA5 TOHCTL

(4) Move and install, but do not seat, the following transmission circuit packs and units into line 3 in the upper shelf from line 1 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA
- (1) LDA1 TLM
- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

⇒ NOTE:
Leave the intrashelf fiber jumpers installed at the line 1 locations.

(5) Move and install, but do not seat, the following transmission circuit packs and units into line 4 in the upper shelf from line 2 in the lower shelf:

- (2) LEA6, LEA7 or LEA105 OA
- (1) LDA1 TLM
- (1) 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

⇒ NOTE:
Leave the intrashelf fiber jumpers installed at the line 2 locations.

Seat OMUs and ODUs Into Shelf

Refer to Figure 7-8 on page 7-16 or Figure 7-9 on page 7-17 and seat the OMU and ODU units in the shelf as follows:

(1) Remove the screws from the shelf positions.

(2) Seat the OMUs and ODUs into the shelf slots.

(3) If the OMUs and ODUs are not in their final position, temporarily store the screws.

⚠ CAUTION:
Do not seat any other circuit packs in the shelf at this time.

Final Verification

Perform the following steps to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that optical cable is protected properly.

(3) Verify that all cables are properly labeled.

(4) Verify circuit packs other than the OMU and ODU are installed but not seated into their backplane connectors.

D - OLS Repeater Installation

This configuration is available for use with Releases 1.0, 2.0 and 2.1. If a single OA configuration is to be installed, there should be no associated repeaters in the transmission line.

This subsection contains information for installing the fibers and circuit packs for the OLS Repeaters. It has been broken into four procedures:

- Intrashelf Fiber Jumper Installation

- Outside Plant Fiber Jumper Installation to LGX

- Customer Maintenance Signal Fiber Jumper Installation

- Circuit Pack Installation

Intraoffice Fiber Jumpers

Connections between OLS and the outside plant fiber between offices are shown in Figure 7-1 on page 7-4. Assignment of east and west is described in Section 3.

Fiber Routing Through Cabinet

Refer to Figure 7-2 on page 7-8 for the fiber routing information for the OLS cabinet.

Circuit Pack Equip Procedure For 4-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) If the cabinet is a dual 2-line cabinet, proceed to the Circuit Pack Equip Procedure for Dual 2-Line Cabinets paragraph.

(3) Refer to Figure 7-7 on page 7-15 for circuit pack locations.

(4) Install, but do not seat, the following controller circuit packs in the lower shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(5) Install, but do not seat, the following transmission circuit packs for line 1 in the lower shelf:

- (2) LEA6 or LEA7 OA
- (2) LDA1 TLM

(6) If line 2 is equipped, install, but do not seat, the following transmission circuit packs for line 2 in the lower shelf:

- (2) LEA6 or LEA7 OA
- (2) LDA1 TLM

➡ NOTE:

Typically only lines 1 and 2 are equipped on first installations, however, if lines 3 and/or 4 are equipped perform the following step(s). If lines 3 and 4 or not equipped, go to step 9.

(7) If line 3 is equipped, install, but do not seat, the following transmission circuit packs for line 3 in the upper shelf:

- (2) LEA6 or LEA7 OA
- (2) LDA1 TLM

(8) If line 4 is equipped, install, but do not seat, the following transmission circuit packs and units for line 4 in the upper shelf:

- (2) LEA6 or LEA7 OA
- (2) LDA1 TLM

(9) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Circuit Pack Equip Procedure For Dual 2-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-6 on page 7-14 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the lower shelf:

- (1) LEA1 SYSCTL
- (1) LEA2 SYSMEM
- (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs for line 1 in the lower shelf:

- (2) LEA6 or LEA7 OA
- (2) LDA1 TLM

(5) If line 2 is equipped, install, but do not seat, the following transmission circuit packs for line 2 in the lower shelf:

- · (2) LEA6 or LEA7 OA

- · (2) LDA1 TLM

(6) Repeat steps 1 to 4 if the upper shelf is to be equipped.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 4 fiber jumpers (50 inches long) per List 161 for each line by adding the labels then routing the fibers by referring to Figure 7-15 and Table 7-20 on page 7-52.The fibers must pass in front of the shelf bracket to the right of the TLM slots. The fibers should be dressed behind the shelf mounting brackets

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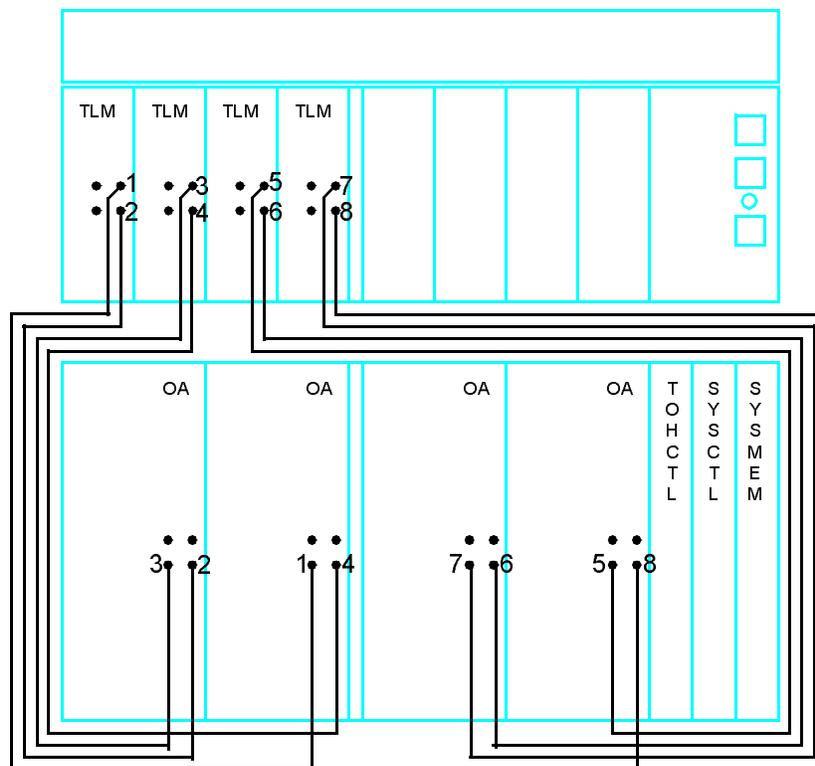
Figure 7-15 Repeater Intrashelf Fiber Jumpers

Table 7-20 Intrashelf Fiber Jumpers For Repeaters

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Repeater 4-Line or Dual 2-Line (use lines 1 & 2 for each shelf) Refer to Figure 7-15 for connection point	1	1	TLM 1A/B	IN	1A-TLM-IN
		1	OA 1B	TLM OUT	1B-OA-TLMOUT
		2	TLM 1A/B	OUT	1A-TLM-OUT
		2	OA 1A	TLM IN	1A-OA-TLMIN
		3	TLM 1B/A	IN	1B-TLM-IN
		3	OA 1A	TLM OUT	1A-OA-TLMOUT
		4	TLM 1B/A	OUT	1B-TLM-OUT
		4	OA 1B	TLM IN	1B-OA-TLMIN
	2	5	TLM 2A/B	IN	2A-TLM-IN
		5	OA 2B	TLM OUT	2B-OA-TLMOUT
		6	TLM 2A/B	OUT	2A-TLM-OUT
		6	OA 2A	TLM IN	2A-OA-TLMIN
		7	TLM 2B/A	IN	2B-TLM-IN
		7	OA 2A	TLM OUT	2A-OA-TLMOUT
		8	TLM 2B/A	OUT	2B-TLM-OUT
		8	OA 2B	TLM IN	2B-OA-TLMIN
	3	1	TLM 3A/B	IN	3A-TLM-IN
		1	OA 3B	TLM OUT	3B-OA-TLMOUT
		2	TLM 3A/B	OUT	3A-TLM-OUT
		2	OA 3A	TLM IN	3A-OA-TLMIN
		3	TLM 3B/A	IN	3B-TLM-IN
		3	OA 3A	TLM OUT	3A-OA-TLMOUT
		4	TLM 3B/A	OUT	3B-TLM-OUT
		4	OA 3B	TLM IN	3B-OA-TLMIN
	4	5	TLM 4A/B	IN	4A-TLM-IN
		5	OA 4B	TLM OUT	4B-OA-TLMOUT
		6	TLM 4A/B	OUT	4A-TLM-OUT
		6	OA 4A	TLM IN	4A-OA-TLMIN
		7	TLM 4B/A	IN	4B-TLM-IN
		7	OA 4A	TLM OUT	4A-OA-TLMOUT
		8	TLM 4B/A	OUT	4B-TLM-OUT
		8	OA 4B	TLM IN	4B-OA-TLMIN

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-16 on page 7-54 and Table 7-21 on page 7-53.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-21 Outside Plant LGX Fiber Jumpers For Repeaters

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Repeater 4-Line or Dual 2-Line (use lines 1 & 2 for each shelf) Refer to Figure 7-16 for connection point	1	1	OA 1A	OUT	1A-OA-OUT
		2	OA 1A	IN	1A-OA-IN
		3	OA 1B	OUT	1B-OA-OUT
		4	OA 1B	IN	1B-OA-IN
	2	5	OA 2A	OUT	2A-OA-OUT
		6	OA 2A	IN	2A-OA-IN
		7	OA 2B	OUT	2B-OA-OUT
		8	OA 2B	IN	2B-OA-IN
	3	1	OA 3A	OUT	3A-OA-OUT
		2	OA 3A	IN	3A-OA-IN
		3	OA 3B	OUT	3B-OA-OUT
		4	OA 3B	IN	3B-OA-IN
	4	5	OA 4A	OUT	4A-OA-OUT
		6	OA 4A	IN	4A-OA-IN
		7	OA 4B	OUT	4B-OA-OUT
		8	OA 4B	IN	4B-OA-IN

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels and routing the fibers.Refer to Figure 7-16 on page 7-54 and Table 7-22 on page 7-54.
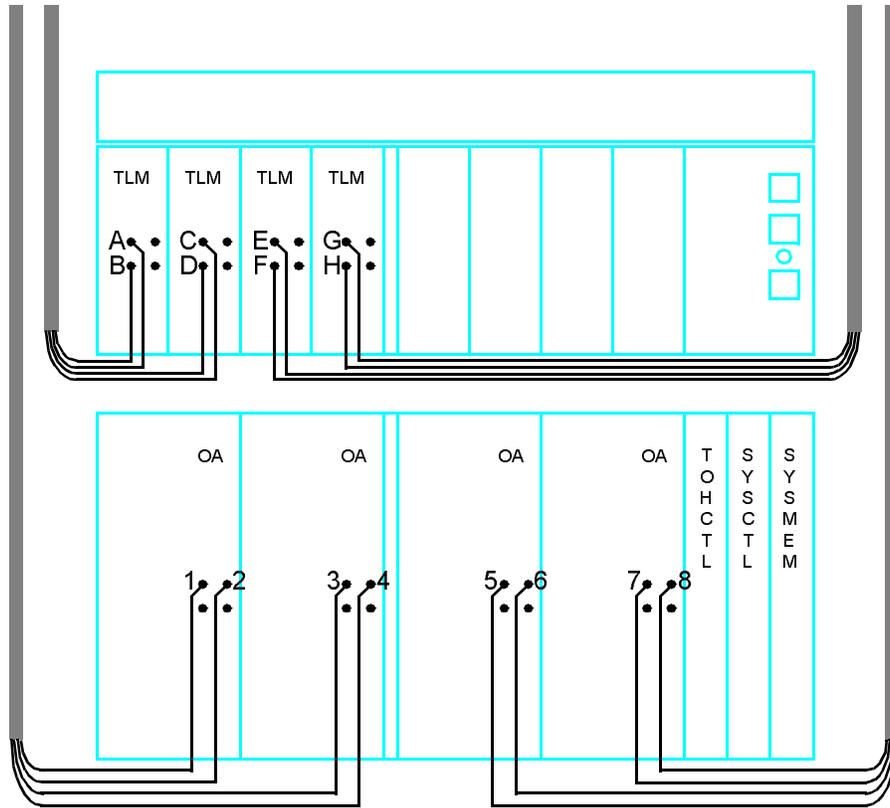
Figure 7-16 Repeater Outside Plant & Customer Maintenance Fiber Jumpers

Table 7-22 Customer Maintenance Fiber Jumpers For Repeaters

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Repeater 4-Line or Refer to Figure 7-16 for connection point	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
		C	TLM 1B/A	CM IN	1B-TLM-CMIN
		D	TLM 1B/A	CM OUT	1B-TLM-CMOUT
	2	E	TLM 2A/B	CM IN	2A-TLM-CMIN
		F	TLM 2A/B	CM OUT	2A-TLM-CMOUT
		G	TLM 2B/A	CM IN	2B-TLM-CMIN
		H	TLM 2B/A	CM OUT	2B-TLM-CMOUT

Table 7-22 Customer Maintenance Fiber Jumpers For Repeaters

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Repeater 4-Line	3	A	TLM 3A/B	CM IN	3A-TLM-CMIN
		B	TLM 3A/B	CM OUT	3A-TLM-CMOUT
Refer to Figure 7-16 for connection point		C	TLM 3B/A	CM IN	3B-TLM-CMIN
		D	TLM 3B/A	CM OUT	3B-TLM-CMOUT
	4	E	TLM 4A/B	CM IN	4A-TLM-CMIN
		F	TLM 4A/B	CM OUT	4A-TLM-CMOUT
		G	TLM 4B/A	CM IN	4B-TLM-CMIN
		H	TLM 4B/A	CM OUT	4B-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8.

Fiber Dressing

All fiber jumpers should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-15 on page 7-51 and Figure 7-16 on page 7-54.

⇒ NOTE:
Place the fibers through the fiber clips one at a time to avoid overstressing the clips and possibly damaging the fibers.

Circuit Pack Placement For Testing

The procedures to follow will place the OLS circuit packs into any unequipped slots where they will be tested first for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 10 and for transmission in Section 11.

4-Line Cabinets With 2 Lines Equipped

For 4-line cabinets with only lines 1 and 2 equipped during the initial installation move the transmission circuit packs to lines 3 and 4 to test the slots per the following procedure:

➡ NOTE:
This procedure assumes that lines 1 and 2 are equipped and lines 3 and 4 are not.

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-7 on page 7-15 for circuit pack locations.

(3) Verify the following controller circuit packs are installed, but not seated, in the lower shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(4) Move and install, but do not seat, the following transmission circuit packs into line 3 in the upper shelf from line 1 in the lower shelf:

- (2) LEA6 or LEA7 OA

- (2) LDA1 TLM

➡ NOTE:
Leave the intrashelf fiber jumpers installed at the line 1 locations.

(5) Move and install, but do not seat, the following transmission circuit packs into line 4 in the upper shelf from line 2 in the lower shelf:

- (2) LEA6 or LEA7 OA

- (2) LDA1 TLM

➡ NOTE:
Leave the intrashelf fiber jumpers installed at the line 2 locations.

Final Verification

Perform the following steps to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that optical cable is protected properly.

(3) Verify that all cables are properly labeled.

(4) Verify circuit packs are installed, but not seated, into the backplane connectors.

E - One OA OLS 1A-RCV End Terminal Installation

This configuration is available only in Release 2.1.

The installation of a single One OA OLS 1A-RCV End Terminal Shelf is the more common application for this configuration, however this subsection does address the installation of a four line application. It is possible to install either the top two lines or bottom lines as another configuration. If this is the case, refer to the appropriate section to fiber the lines NOT configured as a One OA OLS 1A-RCV End Terminal. For single shelf applications, disregard any references to lines 3 and 4.

This subsection covers the fiber and label installation for the One OA 1A-RCV End Terminal configuration. It has been broken into five procedures:

- Intrashelf Fiber Jumper Installation

- Low Speed Fiber Jumper Installation to OC-48 equipment

- Outside Plant Fiber Jumper Installation to LGX

- Customer Maintenance Signal Fiber Jumper Installation

- End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure For 4-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) If the cabinet is a Dual 2-line cabinet, proceed to the Circuit Pack Equip Procedure for Dual 2-Line Cabinets paragraph.

(3) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(4) Install, but do not seat, the following controller circuit packs in the lower shelf:

- · (1) LEA1 SYSCTL

- · (1) LEA2 SYSMEM

- · (1) LEA5 TOHCTL

(5) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- · (1) LEA105 OA

- · (1) LDA1 TLM

- · (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- · (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(6) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- · (1) LEA105 OA

- · (1) LDA1 TLM

- · (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- · (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
Typically only lines 1 and 2 are equipped on first installations, however, if lines 3 and/or 4 are equipped using the same configuration, perform the following step(s). If another configuration is used, go to the appropriate section for fiber and circuit packs installation located elsewhere in Section 7 of this manual. If lines 3 and 4 are not equipped, go to step 9.

(7) If line 3 is equipped, install, but do not seat, the following transmission circuit packs and units for line 3 in the upper shelf:

- · (1) LEA105A OA

- · (1) LDA1 TLM

- · (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- · (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(8) If line 4 is equipped, install, but do not seat, the following transmission circuit packs and units for line 4 in the upper shelf:

- · (1) LEA105A OA

- · (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(9) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Circuit Pack Equip Procedure For Dual 2-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-9 on page 7-17 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the lower shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- (1) LEA105A OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(5) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- (1) LEA105A OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(6) Repeat steps 1 to 4 if the upper shelf is to be equipped.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 3 fiber jumpers per List 163 for *each* line (6 fibers for a fully equipped 2-line shelf), add the labels, then route the fibers by referring to Figure 7-17 and Table 7-23 on page 7-61. See Table 7-3 on page 7-5 for more fiber information.

⇒ NOTE:
The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets.

Figure 7-17 One OA 1A-RCV End Terminal Intrashelf Fiber Installation

Table 7-23 Intrashelf Fiber Jumpers For One OA 1A-RCV End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal One OA 1A-RCV 4-Line or Dual 2-Line (use lines 1 & 2 for each shelf) Refer to Figure 7-17 on page 7-60 for connection point	1	1	TLM 1A	IN	1A-TLM-IN
		1	ODU 1A	SUPR. OUT	
		2	TLM 1A	OUT	1A-TLM-OUT
		2	OA 1A	TLM IN	1A-OA-TLMIN
		5	OMU 1A	OMU OUT	1-OMU-OUT
		5	OA 1A	IN	1A-OA-IN
	2	3	TLM 2A	IN	2A-TLM-IN
		3	ODU 2A	SUPR.OUT	
		4	TLM 2A	OUT	2A-TLM-OUT
		4	OA 2A	TLM IN	2A-OA-TLMIN
		6	OMU 2A	OMU OUT	2A-OMU-IN
		6	OA 2A	IN	2A-OA-IN
	3	1	TLM 3A	IN	3A-TLM-IN
		1	ODU 3A	SUPR. OUT	
		2	TLM 3A	OUT	3A-TLM-OUT
		2	OA 3A	TLM IN	3A-OA-TLMIN
		5	OMU 3A	OMU OUT	3-OMU-OUT
		5	OA 3A	IN	3A-OA-IN
	4	3	TLM 4A	IN	4A-TLM-IN
		3	ODU 4A	SUPR.OUT	
		4	TLM 4A	OUT	4A-TLM-OUT
		4	OA 4A	TLM IN	4A-OA-TLMIN
		6	OMU 4A	OMU OUT	4A-OMU-IN
		6	OA 4A	IN	4A-OA-IN

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9, Figure 7-18 on page 7-62, Table 7-25 on page 7-64 through Table 7-27 on page 7-66 and Table 7-28 on page 7-67.

⚠ CAUTION:
Do not connect either end of the fiber jumper at this time.

Fiber Restraints
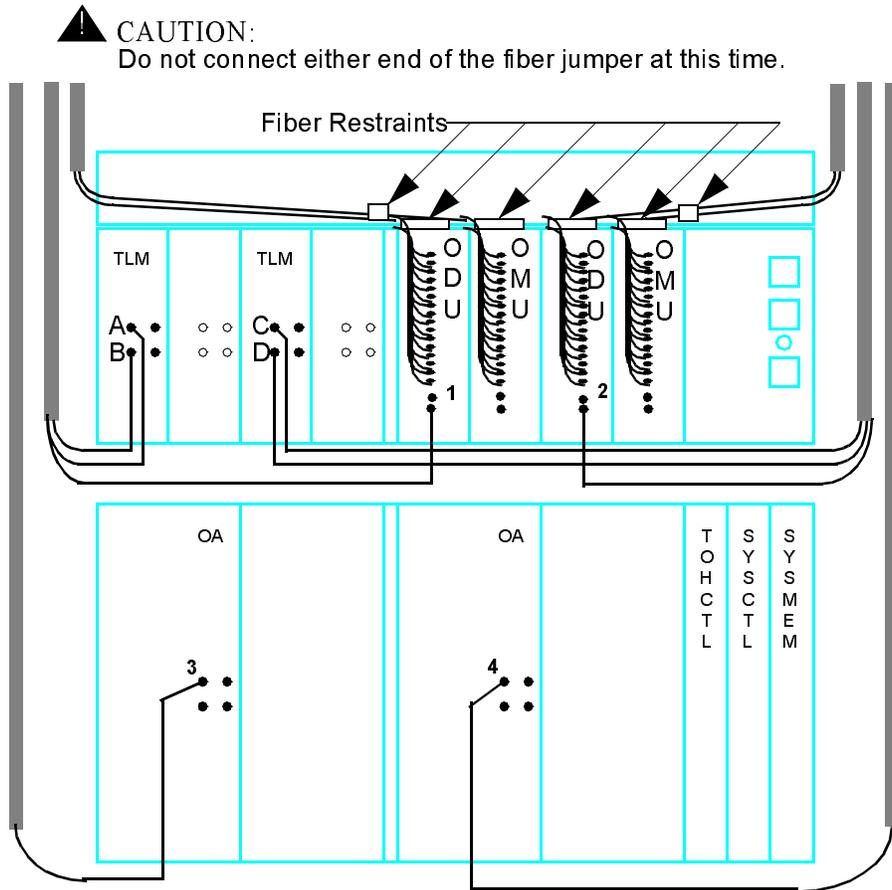
Figure 7-18 One OA 1A-RCV End Terminal Outside Plant, Low Speed, & Customer Maintenance Signal Fiber Jumpers

Table 7-24 One OA 1A-RCV End Terminal Low Speed Fiber Jumper - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Top Shelf Dual 2-Line
End Terminal One OA 1A-RCV Dual 2-line (uses line 1 & 2 for each shelf) Refer to Figure 7-18 on page 7-62 for connection points.	1	OMU 1B	OCHAN1 IN	LOWER 1M1	UPPER 1M1
		OMU 1B	OCHAN2 IN	LOWER 1M2	UPPER 1M2
		OMU 1B	OCHAN3 IN	LOWER 1M3	UPPER 1M3
		OMU 1B	OCHAN4 IN	LOWER 1M4	UPPER 1M4
		OMU 1B	OCHAN5 IN	LOWER 1M5	UPPER 1M5
		OMU 1B	OCHAN6 IN	LOWER 1M6	UPPER 1M6
		OMU 1B	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1B	OCHAN8 IN	LOWER 1M8	UPPER 1M8
		OMU 1B	OCHAN9 IN	LOWER 1M9	UPPER 1M9
		OMU 1B	OCHAN10 IN	LOWER 1M10	UPPER 1M10
		OMU 1B	OCHAN11 IN	LOWER 1M11	UPPER 1M11
		OMU 1B	OCHAN12 IN	LOWER 1M12	UPPER 1M12
		OMU 1B	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1B	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1B	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1B	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1A	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1A	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1A	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1A	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1A	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1A	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1A	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1A	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1A	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1A	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1A	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1A	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1A	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1A	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1A	OCHAN15 OUT	LOWER 1D15	UPPER 1D15
		ODU 1A	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-25 One OA 1A-RCV End Terminal Low Speed Fiber Jumper - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	2	OMU 2B	OCHAN1 IN	LOWER 2M1	UPPER 2M1
		OMU 2B	OCHAN2 IN	LOWER 2M2	UPPER 2M2
One OA 1A-RCV		OMU 2B	OCHAN3 IN	LOWER 2M3	UPPER 2M3
		OMU 2B	OCHAN4 IN	LOWER 2M4	UPPER 2M4
4-Line or		OMU 2B	OCHAN5 IN	LOWER 2M5	UPPER 2M5
		OMU 2B	OCHAN6 IN	LOWER 2M6	UPPER 2M6
Dual 2-Line (use lines 1&2 for each shelf)		OMU 2B	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2B	OCHAN8 IN	LOWER 2M8	UPPER 2M8
		OMU 2B	OCHAN9 IN	LOWER 2M9	UPPER 2M9
Refer to Figure 7-18 on page 7-62 for connection points		OMU 2B	OCHAN10 IN	LOWER 2M10	UPPER 2M10
		OMU 2B	OCHAN11 IN	LOWER 2M11	UPPER 2M11
		OMU 2B	OCHAN12 IN	LOWER 2M12	UPPER 2M12
		OMU 2B	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2B	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2B	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2B	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2A	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2A	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2A	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2A	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2A	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2A	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2A	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2A	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2A	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2A	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2A	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2A	OCHAN1 OUT	LOWER 2D12	UPPER 2D12
		ODU 2A	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2A	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2A	OCHAN15 OUT	LOWER 2D15	UPPER 2D15
		ODU 2A	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Table 7-26 One OA 1A-RCV End Terminal Low Speed Fiber Jumper - Line 3

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	3	OMU 3B	OCHAN1 IN		UPPER 3M1
		OMU 3B	OCHAN2 IN		UPPER 3M2
One OA 1A-RCV		OMU 33	OCHAN3 IN		UPPER 3M3
		OMU 3B	OCHAN4 IN		UPPER 3M4
4-Line or		OMU 3B	OCHAN5 IN		UPPER 3M5
		OMU 3B	OCHAN6 IN		UPPER 3M6
Dual 2-Line (use lines 1&2 for each shelf)		OMU 3B	OCHAN7 IN		UPPER 3M7
		OMU 3B	OCHAN8 IN		UPPER 3M8
		OMU 3B	OCHAN9 IN		UPPER 3M9
Refer toFigure 7-18 on page 7-62 for connection points		OMU 3B	OCHAN10 IN		UPPER 3M10
		OMU 3B	OCHAN11 IN		UPPER 3M11
		OMU 3B	OCHAN12 IN		UPPER 3M12
		OMU 3B	OCHAN13 IN		UPPER 3M13
		OMU 3B	OCHAN14 IN		UPPER 3M14
		OMU 3B	OCHAN15 IN		UPPER 3M15
		OMU 3B	OCHAN16 IN		UPPER 2M16
		ODU 3A	OCHAN1 OUT		UPPER 3D1
		ODU 3A	OCHAN2 OUT		UPPER 3D2
		ODU 3A	OCHAN3 OUT		UPPER 3D3
		ODU 3A	OCHAN4 OUT		UPPER 3D4
		ODU 3A	OCHAN5 OUT		UPPER 3D5
		ODU 3A	OCHAN6 OUT		UPPER 3D6
		ODU 3A	OCHAN7 OUT		UPPER 3D7
		ODU 3A	OCHAN8 OUT		UPPER 3D8
		ODU 3A	OCHAN9 OUT		UPPER 3D9
		ODU 3A	OCHAN10 OUT		UPPER 3D10
		ODU 3A	OCHAN11 OUT		UPPER 2311
		ODU 3A	OCHAN12 OUT		UPPER 3D12
		ODU 3A	OCHAN13 OUT		UPPER 3D13
		ODU 3A	OCHAN14 OUT		UPPER 3D14
		ODU 3A	OCHAN15 OUT		UPPER 3D15
		ODU 3A	OCHAN16 OUT		UPPER 3D16

Table 7-27 One OA 1A-RCV End Terminal Low Speed Fiber Jumper - Line 4

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	4	OMU 4B	OCHAN1 IN		UPPER 4M1
One OA 1A-RCV		OMU 4B	OCHAN2 IN		UPPER 4M2
		OMU 4B	OCHAN3 IN		UPPER 4M3
4-Line or		OMU 4B	OCHAN4 IN		UPPER 4M4
Dual 2-Line (use		OMU 4B	OCHAN5 IN		UPPER 4M5
lines 1&2 for each		OMU 4B	OCHAN6 IN		UPPER 4M6
shelf)		OMU 4B	OCHAN7 IN		UPPER 4M7
		OMU 4B	OCHAN8 IN		UPPER 4M8
Refer to Figure 7-18 on page 7-62		OMU 4B	OCHAN9 IN		UPPER 4M9
for connection		OMU 4B	OCHAN10 IN		UPPER 4M10
points		OMU 4B	OCHAN11 IN		UPPER 4M11
		OMU 4B	OCHAN12 IN		UPPER 4M12
		OMU 4B	OCHAN13 IN		UPPER 4M13
		OMU 4B	OCHAN14 IN		UPPER 4M14
		OMU 4B	OCHAN15 IN		UPPER 4M15
		OMU 4B	OCHAN16 IN		UPPER 4M16
		ODU 4A	OCHAN1 OUT		UPPER 4D1
		ODU 4A	OCHAN2 OUT		UPPER 4D2
		ODU 4A	OCHAN3 OUT		UPPER 4D3
		ODU 4A	OCHAN4 OUT		UPPER 4D4
		ODU 4A	OCHAN5 OUT		UPPER 4D5
		ODU 4A	OCHAN6 OUT		UPPER 4D6
		ODU 44	OCHAN7 OUT		UPPER 4D7
		ODU 4A	OCHAN8 OUT		UPPER 4D8
		ODU 4A	OCHAN9 OUT		UPPER 4D9
		ODU 4A	OCHAN10 OUT		UPPER 4D10
		ODU 4A	OCHAN11 OUT		UPPER 4D11
		ODU 4A	OCHAN12 OUT		UPPER 4D12
		ODU 4A	OCHAN13 OUT		UPPER 4D13
		ODU 4A	OCHAN14 OUT		UPPER 4D14
		ODU 4A	OCHAN15 OUT		UPPER 4D15
		ODU43A	OCHAN16 OUT		UPPER 4D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-18 on page 7-62 and Table 7-28 on page 7-67.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-28 Outside Plant LGX Fiber Jumpers For One OA 1A-RCV End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	1	ODU-1A	IN	1A-ODU-IN
One OA 1A-RCV		3	1A-OA	OUT	1A-OA-OUT
	2	2	ODU-2A	IN	2A-ODU-IN
4-Line or Dual 2-Line		4	2A-OA	OUT	2A-OA-OUT
	3	1	ODU-3A	IN	3A-ODU-IN
(use lines 1 & 2 for each shelf)		3	3A-OA	OUT	3A-OA-OUT
Refer to Figure 7-18 on page 7-62 for connection point	4	2	ODU-4A	IN	4A-ODU-IN
		4	4A-OA	OUT	4A-OA-OUT

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels then routing the fibers by referring to Figure 7-18 on page 7-62 and Table 7-29 on page 7-68.

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Table 7-29 Customer Maintenance Fiber Jumpers For One OA 1A-RCV End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
One OA 1A-RCV	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
4-Line or		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT
Dual 2-Line	3	A	TLM 3A/B	CM IN	3A-TLM-CMIN
(use lines 1 & 2 for each shelf)		B	TLM 3A/B	CM OUT	3A-TLM-CMOUT
Refer to Figure 7-18 on page	4	C	TLM 4A/B	CM IN	4A-TLM-CMIN
7-62 for connection point		D	TLM 4A/B	CM OUT	4A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-17 on page 7-60 and Figure 7-18 on page 7-62.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9 and Figure 7-17 on page 7-60.

⟹ NOTE:
The fibers should be placed through the clips one at a time to avoid overstressing the clips.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 10 and for transmission in Section 11.

4-Line Cabinets With 2 Lines Equipped

For 4-line cabinets with only lines 1 and 2 equipped during the initial installation, move the transmission circuit packs/units to lines 3 and 4 to test the slots per the following procedure:

⇒ NOTE:
This procedure assumes that lines 1 and 2 are equipped and lines 3 and 4 are not.

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(3) Verify the following controller circuit packs are installed, but not seated, in the lower shelf:

- (1) LEA1 SYSCTL
- (1) LEA2 SYSMEM
- (1) LEA5 TOHCTL

(4) Move and install, but do not seat, the following transmission circuit packs and units into line 3 in the upper shelf from line 1 in the lower shelf:

- (1) LEA105 OA
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
Leave the intrashelf fiber jumpers installed at the line 1 locations.

(5) Move and install, but do not seat, the following transmission circuit packs and units into line 4 in the upper shelf from line 2 in the lower shelf:

- (1) LEA105 OA
- (1) LDA1 TLM
- (1)506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
Leave the intrashelf fiber jumpers installed at the line 2 locations.

Seat OMUs and ODUs Into Shelf

Refer to Figure 7-8 on page 7-16 or Figure 7-9 on page 7-17 and seat the OMU and ODU units in the shelf as follows:

(1) Remove the screws from the shelf positions.

(2) Seat the OMUs and ODUs into the shelf slots.

(3) If the OMUs and ODUs are not in their final position, temporarily store the screws.

⚠ CAUTION:
Do not seat any other circuit packs in the shelf at this time.

Final Verification

Perform the following steps to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that optical cable is protected properly.

(3) Verify that all cables are properly labeled.

(4) Verify circuit packs other than the OMU and ODU are installed but not seated into their backplane connectors.

F - One OA OLS 1A-TX End Terminal Installation

This configuration is support by Release 2.1 software only.

This configuration is most commonly used as a stand-alone shelf or coupled with another configuration in a Dual shelf bay, however this section covers the possibility that it could be fibered for a 4 line One OA OLS 1A-TX End Terminal. If the upper 2 lines are to be configured using a different option, refer to the appropriate subsection for the fibering of those lines. If lines 3 and 4 are not to be fibered with this configuration, disregard any references to those lines.

This subsection covers the fiber and label installation for the One OA 1A-TX End Terminal configuration. It has been broken into five procedures:

- Intrashelf Fiber Jumper Installation

- Low Speed Fiber Jumper Installation to OC-48 equipment

- Outside Plant Fiber Jumper Installation to LGX

- Customer Maintenance Signal Fiber Jumper Installation

- End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure For 4-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) If the cabinet is a dual 2-line cabinet, proceed to the Circuit Pack Equip Procedure for Dual 2-Line Cabinets paragraph.

(3) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(4) Install, but do not seat, the following controller circuit packs in the lower shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(5) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- (1) LEA105 OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(6) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- (1) LEA105 OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
Typically only lines 1 and 2 are equipped on first installations, however, if lines 3 and/or 4 are equipped using the same configuration, perform the following step(s). If another configuration is used, go to the appropriate section for fiber and circuit packs installation located elsewhere in Section 7 of this manual. If lines 3 and 4 are not equipped, go to step 8.

(7) If line 3 is equipped, install, but do not seat, the following transmission circuit packs and units for line 3 in the upper shelf:

- (1) LEA105A OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(8) If line 4 is equipped, install, but do not seat, the following transmission circuit packs and units for line 4 in the upper shelf:

- (1) LEA105A OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(9) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Circuit Pack Equip Procedure For Dual 2-Line Cabinets

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-9 on page 7-17 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the lower shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the lower shelf:

- (1) LEA105A OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(5) If line 2 is equipped, install, but do not seat, the following transmission circuit packs and units for line 2 in the lower shelf:

- (1) LEA105A OA

- (1) LDA1 TLM

- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(6) Repeat steps 1 to 4 if the upper shelf is to be equipped.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 3 fiber jumpers per List 163 for *each* line (6 fibers for a fully equipped 2-line shelf), add the labels, and route the fibers by referring to Figure 7-19 and Table 7-30 on page 7-75. See Table 7-3 on page 7-5 for more fiber List information.

⇒ NOTE:

The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets
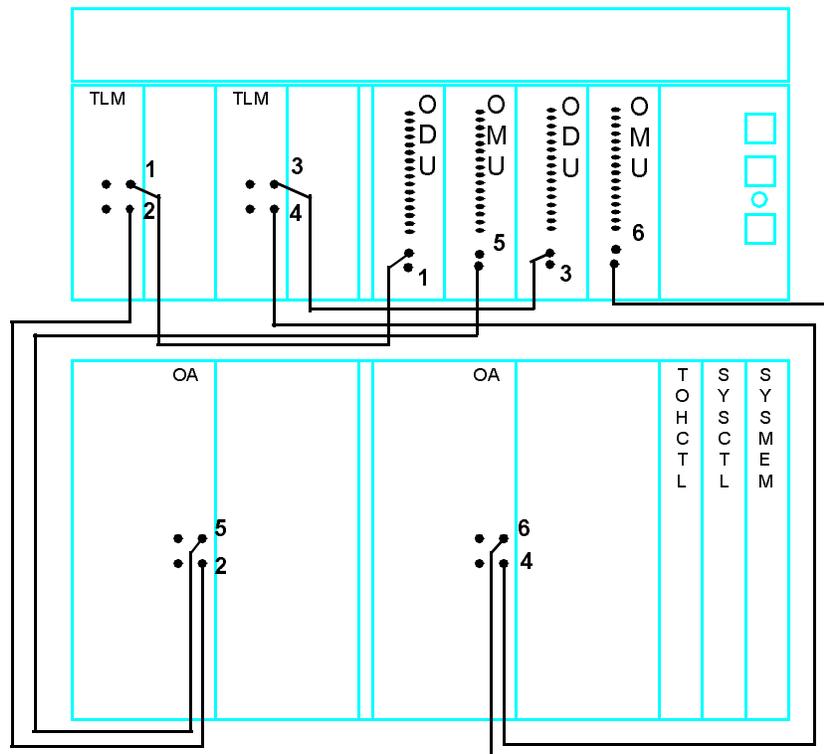

Figure 7-19 ONE OA 1A-TX End Terminal Intrashelf Fiber Jumpers

Table 7-30 Intrashelf Fiber Jumpers For One OA 1A-TX End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	1	TLM 1A	IN	1A-TLM-IN
		1	ODU 1A	SUPR. OUT	
One OA 1A-TX		2	TLM 1A	OUT	1A-TLM-OUT
		2	OA 1B	TLM IN	1B-OA-TLMIN
4-Line or		5	OMU 1A	OMU OUT	1-OMU-OUT
		5	OA 1B	IN	1B-OA-IN
Dual 2-Line	2	3	TLM 2A	IN	2A-TLM-IN
(use lines 1 & 2		3	ODU 2A	SUPR.OUT	
for each shelf)		4	TLM 2A	OUT	2A-TLM-OUT
		4	OA 2B	TLM IN	2B-OA-TLMIN
Refer to		6	OMU 2A	OMU OUT	2A-OMU-IN
Figure 7-19 on		6	OA 2B	IN	2B-OA-IN
page 7-74	3	1	TLM 3A	IN	3A-TLM-IN
for connection		1	ODU 3A	SUPR. OUT	
point		2	TLM 3A	OUT	3A-TLM-OUT
		2	OA 3B	TLM IN	3B-OA-TLMIN
		5	OMU 3A	OMU OUT	3-OMU-OUT
		5	OA 3B	IN	3B-OA-IN
	4	3	TLM 4A	IN	4A-TLM-IN
		3	ODU 4A	SUPR.OUT	
		4	TLM 4A	OUT	4A-TLM-OUT
		4	OA 4B	TLM IN	4B-OA-TLMIN
		6	OMU 4A	OMU OUT	4A-OMU-IN
		6	OA 4B	IN	4B-OA-IN

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9, Figure 7-20 on page 7-76, Table 7-32 on page 7-78 through Table 7-34 on page 7-80 and Table 7-35 on page 7-81.

⚠ CAUTION:
Do not connect either end of the fiber jumper at this time.
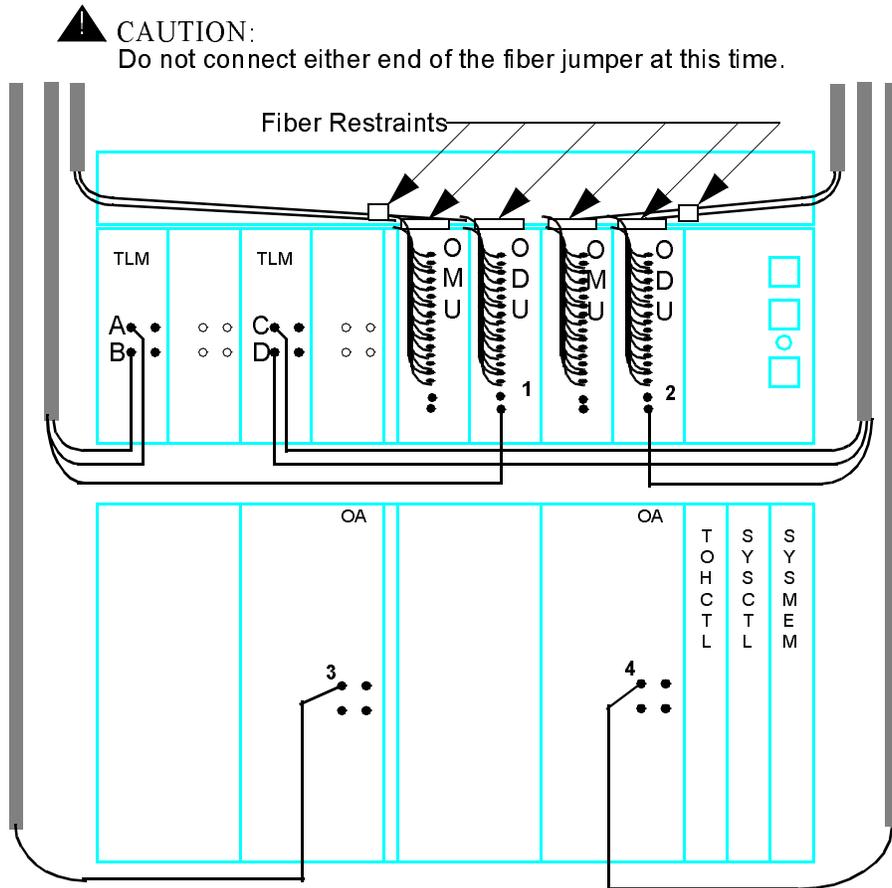
Figure 7-20 1A-TX End Terminal Outside Plant, Low Speed, & Customer Maintenance Signal Fiber Jumpers

Table 7-31 One OA 1A-TX End Terminal Low Speed Fiber Jumper - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Top Shelf Dual 2-Line
End Terminal One OA 1A-TX Dual 2-line (uses line 1 & 2 for each shelf) Refer to Figure 7-20 on page 7-76 for connection points.	1	OMU 1B	OCHAN1 IN	LOWER 1M1	UPPER 1M1
		OMU 1B	OCHAN2 IN	LOWER 1M2	UPPER 1M2
		OMU 1B	OCHAN3 IN	LOWER 1M3	UPPER 1M3
		OMU 1B	OCHAN4 IN	LOWER 1M4	UPPER 1M4
		OMU 1B	OCHAN5 IN	LOWER 1M5	UPPER 1M5
		OMU 1B	OCHAN6 IN	LOWER 1M6	UPPER 1M6
		OMU 1B	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1B	OCHAN8 IN	LOWER 1M8	UPPER 1M8
		OMU 1B	OCHAN9 IN	LOWER 1M9	UPPER 1M9
		OMU 1B	OCHAN10 IN	LOWER 1M10	UPPER 1M10
		OMU 1B	OCHAN11 IN	LOWER 1M11	UPPER 1M11
		OMU 1B	OCHAN12 IN	LOWER 1M12	UPPER 1M12
		OMU 1B	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1B	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1B	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1B	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1A	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1A	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1A	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1A	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1A	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1A	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1A	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1A	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1A	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1A	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1A	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1A	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1A	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1A	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1A	OCHAN15 OUT	LOWER 1D15	UPPER 1D15
		ODU 1A	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-32 One OA 1A-TX End Terminal Low Speed Fiber Jumper - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	2	OMU 2B	OCHAN1 IN	LOWER 2M1	UPPER 2M1
		OMU 2B	OCHAN2 IN	LOWER 2M2	UPPER 2M2
One OA 1A-TX		OMU 2B	OCHAN3 IN	LOWER 2M3	UPPER 2M3
		OMU 2B	OCHAN4 IN	LOWER 2M4	UPPER 2M4
4-Line or		OMU 2B	OCHAN5 IN	LOWER 2M5	UPPER 2M5
		OMU 2B	OCHAN6 IN	LOWER 2M6	UPPER 2M6
Dual 2-Line (use lines 1&2 for each shelf)		OMU 2B	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2B	OCHAN8 IN	LOWER 2M8	UPPER 2M8
		OMU 2B	OCHAN9 IN	LOWER 2M9	UPPER 2M9
Refer to Figure 7-20 on page 7-76 for connection points		OMU 2B	OCHAN10 IN	LOWER 2M10	UPPER 2M10
		OMU 2B	OCHAN11 IN	LOWER 2M11	UPPER 2M11
		OMU 2B	OCHAN12 IN	LOWER 2M12	UPPER 2M12
		OMU 2B	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2B	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2B	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2B	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2A	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2A	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2A	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2A	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2A	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2A	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2A	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2A	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2A	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2A	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2A	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2A	OCHAN1 OUT	LOWER 2D12	UPPER 2D12
		ODU 2A	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2A	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2A	OCHAN15 OUT	LOWER 2D15	UPPER 2D15
		ODU 2A	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Table 7-33 One OA 1A-TX End Terminal Low Speed Fiber Jumper - Line 3

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	3	OMU 3B	OCHAN1 IN		UPPER 3M1
One OA 1A-TX		OMU 3B	OCHAN2 IN		UPPER 3M2
		OMU 33	OCHAN3 IN		UPPER 3M3
4-Line or		OMU 3B	OCHAN4 IN		UPPER 3M4
		OMU 3B	OCHAN5 IN		UPPER 3M5
Dual 2-Line (use lines 1&2 for each shelf)		OMU 3B	OCHAN6 IN		UPPER 3M6
		OMU 3B	OCHAN7 IN		UPPER 3M7
		OMU 3B	OCHAN8 IN		UPPER 3M8
Refer to Figure 7-20 on page 7-76for connection points		OMU 3B	OCHAN9 IN		UPPER 3M9
		OMU 3B	OCHAN10 IN		UPPER 3M10
		OMU 3B	OCHAN11 IN		UPPER 3M11
		OMU 3B	OCHAN12 IN		UPPER 3M12
		OMU 3B	OCHAN13 IN		UPPER 3M13
		OMU 3B	OCHAN14 IN		UPPER 3M14
		OMU 3B	OCHAN15 IN		UPPER 3M15
		OMU 3B	OCHAN16 IN		UPPER 2M16
		ODU 3A	OCHAN1 OUT		UPPER 3D1
		ODU 3A	OCHAN2 OUT		UPPER 3D2
		ODU 3A	OCHAN3 OUT		UPPER 3D3
		ODU 3A	OCHAN4 OUT		UPPER 3D4
		ODU 3A	OCHAN5 OUT		UPPER 3D5
		ODU 3A	OCHAN6 OUT		UPPER 3D6
		ODU 3A	OCHAN7 OUT		UPPER 3D7
		ODU 3A	OCHAN8 OUT		UPPER 3D8
		ODU 3A	OCHAN9 OUT		UPPER 3D9
		ODU 3A	OCHAN10 OUT		UPPER 3D10
		ODU 3A	OCHAN11 OUT		UPPER 2311
		ODU 3A	OCHAN12 OUT		UPPER 3D12
		ODU 3A	OCHAN13 OUT		UPPER 3D13
		ODU 3A	OCHAN14 OUT		UPPER 3D14
		ODU 3A	OCHAN15 OUT		UPPER 3D15
		ODU 3A	OCHAN16 OUT		UPPER 3D16

Table 7-34 One OA 1A-TX End Terminal Low Speed Fiber Jumper - Line 4

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	4	OMU 4B	OCHAN1 IN		UPPER 4M1
		OMU 4B	OCHAN2 IN		UPPER 4M2
One OA 1A-TX		OMU 4B	OCHAN3 IN		UPPER 4M3
		OMU 4B	OCHAN4 IN		UPPER 4M4
4-Line or		OMU 4B	OCHAN5 IN		UPPER 4M5
		OMU 4B	OCHAN6 IN		UPPER 4M6
Dual 2-Line (use		OMU 4B	OCHAN7 IN		UPPER 4M7
lines 1&2 for each		OMU 4B	OCHAN8 IN		UPPER 4M8
shelf)		OMU 4B	OCHAN9 IN		UPPER 4M9
		OMU 4B	OCHAN10 IN		UPPER 4M10
Refer to Figure 7-20 on page 7-76 for connection points		OMU 4B	OCHAN11 IN		UPPER 4M11
		OMU 4B	OCHAN12 IN		UPPER 4M12
		OMU 4B	OCHAN13 IN		UPPER 4M13
		OMU 4B	OCHAN14 IN		UPPER 4M14
		OMU 4B	OCHAN15 IN		UPPER 4M15
		OMU 4B	OCHAN16 IN		UPPER 4M16
		ODU 4A	OCHAN1 OUT		UPPER 4D1
		ODU 4A	OCHAN2 OUT		UPPER 4D2
		ODU 4A	OCHAN3 OUT		UPPER 4D3
		ODU 4A	OCHAN4 OUT		UPPER 4D4
		ODU 4A	OCHAN5 OUT		UPPER 4D5
		ODU 4A	OCHAN6 OUT		UPPER 4D6
		ODU 44	OCHAN7 OUT		UPPER 4D7
		ODU 4A	OCHAN8 OUT		UPPER 4D8
		ODU 4A	OCHAN9 OUT		UPPER 4D9
		ODU 4A	OCHAN10 OUT		UPPER 4D10
		ODU 4A	OCHAN11 OUT		UPPER 4D11
		ODU 4A	OCHAN12 OUT		UPPER 4D12
		ODU 4A	OCHAN13 OUT		UPPER 4D13
		ODU 4A	OCHAN14 OUT		UPPER 4D14
		ODU 4A	OCHAN15 OUT		UPPER 4D15
		ODU43A	OCHAN16 OUT		UPPER 4D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-20 on page 7-76 and Table 7-35 on page 7-81.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time

.

Table 7-35 Outside Plant LGX Fiber Jumpers For One OA 1A-TX End Terminals

Application	Line	Connect oint	Circuit Pack	Connector	Label to Install
End Terminal	1	1	ODU-1A	IN	1A-ODU-IN
ONE OA 1A-TX		3	1B-OA	OUT	1B-OA-OUT
	2	2	ODU-2A	IN	2A-ODU-IN
4-Line or Dual 2-Line		4	2B-OA	OUT	2B-OA-OUT
	3	1	ODU-3A	IN	3A-ODU-IN
(use lines 1 & 2 for each shelf)		3	3B-OA	OUT	3B-OA-OUT
Refer to Figure 7-20 on page 7-76 for connection point	4	2	ODU-4A	IN	4A-ODU-IN
		4	4B-OA	OUT	4B-OA-OUT

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels then routing the fibers by referring to Figure 7-20 on page 7-76 and Table 7-36 on page 7-82.

Table 7-36 Customer Maintenance Fiber Jumpers For End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
1A-TX		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
4-Line or		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT
Dual 2-Line	3	A	TLM 3A/B	CM IN	3A-TLM-CMIN
(use lines 1 & 2 for each shelf)		B	TLM 3A/B	CM OUT	3A-TLM-CMOUT
Refer to Figure 7-20 on page	4	C	TLM 4A/B	CM IN	4A-TLM-CMIN
7-76 for connection point		D	TLM 4A/B	CM OUT	4A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-19 on page 7-74 and Figure 7-20 on page 7-76.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9 and Figure 7-19 on page 7-74.

⇒ NOTE:
The fibers should be placed through the clips one at a time to avoid overstressing the clips.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 11 and for transmission in Section 12.

4-Line Cabinets With 2 Lines Equipped

For 4-line cabinets with only lines 1 and 2 equipped during the initial installation, move the transmission circuit packs/units to lines 3 and 4 to test the slots per the following procedure:

➡ NOTE:
This procedure assumes that lines 1 and 2 are equipped and lines 3 and 4 are not.

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(3) Verify the following controller circuit packs are installed, but not seated, in the lower shelf:

- (1) LEA1 SYSCTL
- (1) LEA2 SYSMEM
- (1) LEA5 TOHCTL

(4) Move and install, but do not seat, the following transmission circuit packs and units into line 3 in the upper shelf from line 1 in the lower shelf:

- (1) LEA105 OA
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

➡ NOTE:
Leave the intrashelf fiber jumpers installed at the line 1 locations.

(5) Move and install, but do not seat, the following transmission circuit packs and units into line 4 in the upper shelf from line 2 in the lower shelf:

- (1) LEA105 OA
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

➡ NOTE:
Leave the intrashelf fiber jumpers installed at the line 2 locations.

Seat OMUs and ODUs Into Shelf

Refer to Figure 7-8 on page 7-16 or Figure 7-9 on page 7-17 and seat the OMU and ODU units in the shelf as follows:

(1) Remove the screws from the shelf positions.

(2) Seat the OMUs and ODUs into the shelf slots.

(3) If the OMUs and ODUs are not in their final position, temporarily store the screws.

⚠ CAUTION:
Do not seat any other circuit packs in the shelf at this time.

Final Verification

Perform the following steps to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that optical cable is protected properly.

(3) Verify that all cables are properly labeled.

(4) Verify circuit packs other than the OMU and ODU are installed but not seated into their backplane connectors.

G - Two OA/One OA OLS Dual Facing Shelf Installation

This configuration is supported by Release 2.1 only.

The information in this subsection contains the information to fiber a 2 line Dual Facing shelf. It is possible that there will be two shelves in the bay being installed. Refer to the appropriate subsection to fiber the other shelf contained within such a bay.

This subsection covers the fiber and label installation for the Two OA/One OA Dual Facing Shelf Configuration. It has been broken into five procedures:

- Intrashelf Fiber Jumper Installation

- Low Speed Fiber Jumper Installation to OC-48 equipment

- Outside Plant Fiber Jumper Installation to LGX

- Customer Maintenance Signal Fiber Jumper Installation

- End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure For 2-Line Shelf

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the shelf:

- (1) LEA1 SYSCTL

- (1) LEA2 SYSMEM

- (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the shelf:

- (2) LEA6 or LEA7 OA
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

➡ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(5) Install, but do not seat, the following transmission circuit packs and units for line 2 in the shelf:

- (1) LEA105 OA
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(6) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 7 fiber jumpers per List 161 for *each* line by adding the labels then routing the fibers by referring to Figure 7-21 and Table 7-37 on page 7-88. See Table 7-3 on page 7-5 for more information on fiber lists.

➡ NOTE:
The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets.
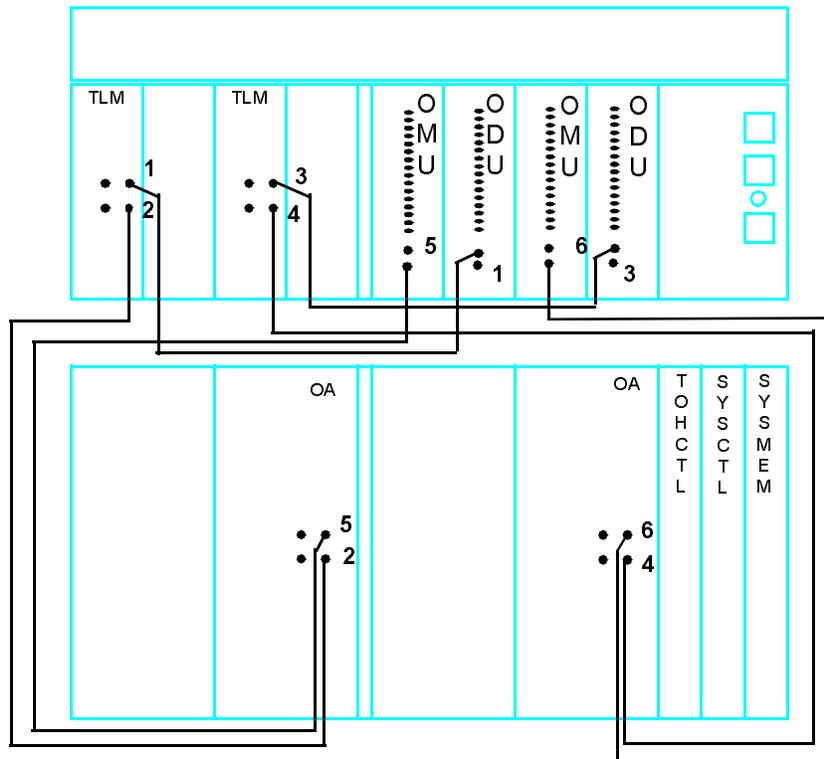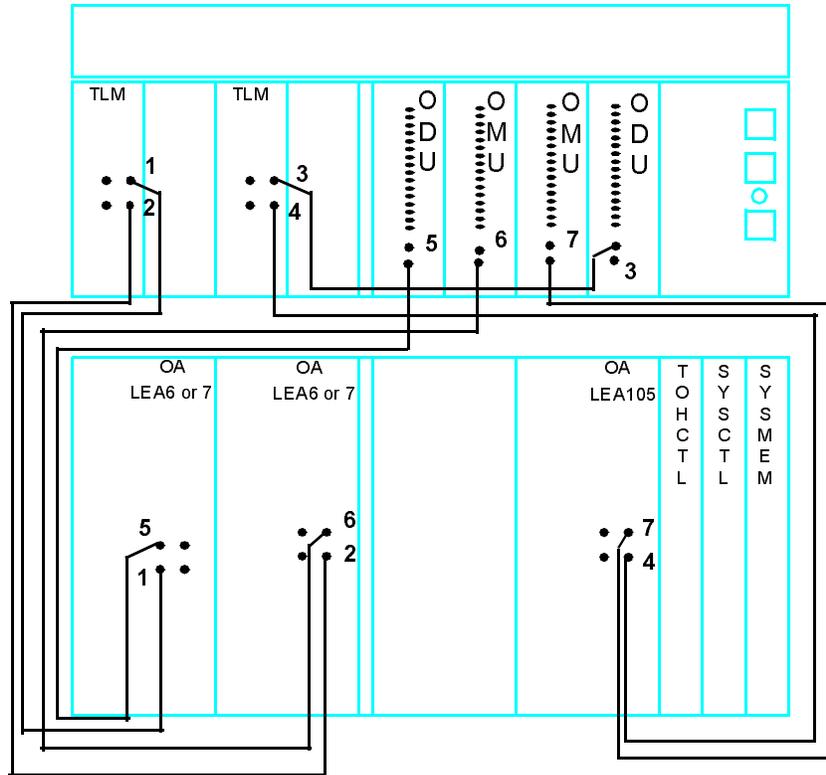
Figure 7-21   Two OA/One OA Dual Facing Shelf Intrashelf Fiber Jumpers

Table 7-37 Intrashelf Fiber Jumpers For Two OA/One OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	1	TLM 1A	IN	1A-TLM-IN
Two OA/One OA Dual Facing Shelf		1	1A-OA	TLM-OUT	1A-OA-TLMOUT
		2	TLM 1A	OUT	1A-TLM-OUT
		2	OA 1B	TLM IN	1B-OA-TLMIN
		5	ODU 1A	ODU IN	1-ODU-IN
Refer to Figure 7-21 on page 7-87 for connection point		5	OA 1A	OUT	1A-OA-OUT
		6	OA 1B	IN	1B-OA-IN
		6	OMU1	OUT	1-OMU-OUT
	2	3	TLM 2A	IN	2A-TLM-IN
		3	ODU 2A	SUPR.OUT	
		4	TLM 2A	OUT	2A-TLM-OUT
		4	OA 2B	TLM IN	2B-OA-TLMIN
		7	OMU 2A	OMU OUT	2A-OMU-OUT
		7	OA 2B	IN	2B-OA-IN

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9, Figure 7-22 on page 7-89, Table 7-38 on page 7-90, Table 7-39 on page 7-91 and Table 7-40 on page 7-92.

⚠ CAUTION:
Do not connect either end of the fiber jumper at this time.

Fiber Restraints

TLM   TLM   O D U   O M U   O M U   O D U

A   C
B   D

1

OA   OA   OA
LEA6 or 7   LEA6 or 7   LEA105   T O H C T L   S Y S C T L   S Y S M E M

2   3   4
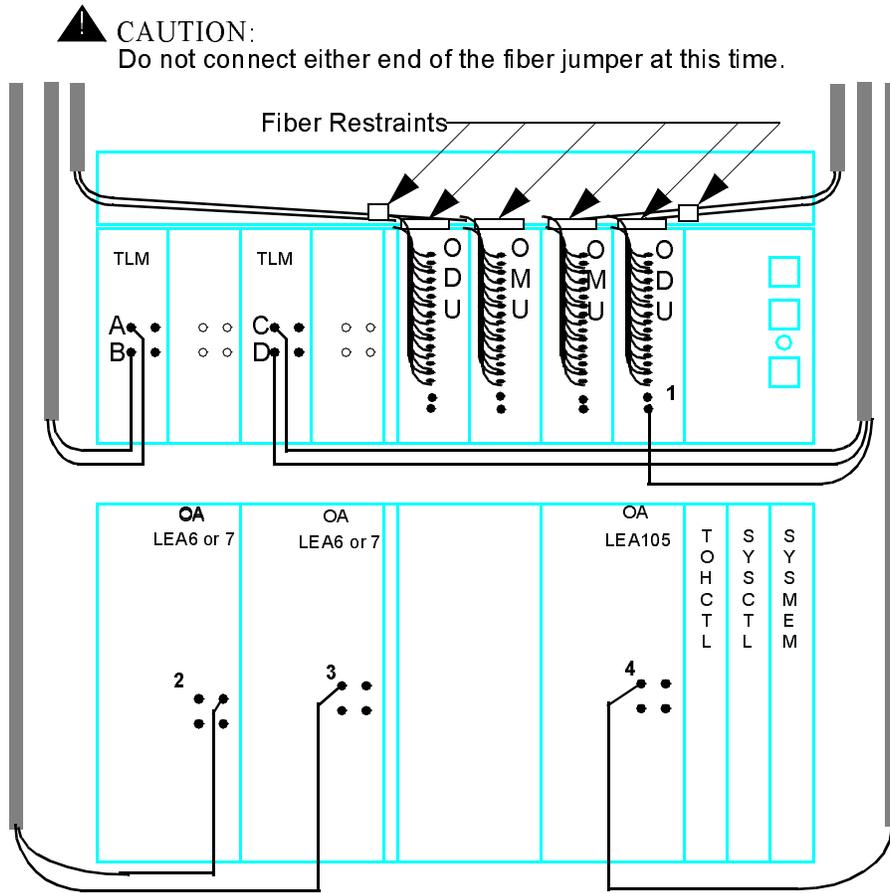
**Figure 7-22 . Two OA/One OA Dual Facing Shelf Outside Plant, Low Speed,
& Customer Maintenance Signal Fiber Jumpers**

Table 7-38 Two OA/One OA Dual Facing Shelf Low Speed Fiber Jumper - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Top Shelf Dual 2-Line
End Terminal	1	OMU 1B	OCHAN1 IN	LOWER 1M1	UPPER 1M1
		OMU 1B	OCHAN2 IN	LOWER 1M2	UPPER 1M2
Two OA/One OA Dual Facing Shelf		OMU 1B	OCHAN3 IN	LOWER 1M3	UPPER 1M3
		OMU 1B	OCHAN4 IN	LOWER 1M4	UPPER 1M4
Refer to Figure 7-22 on page 7-89 for connection points.		OMU 1B	OCHAN5 IN	LOWER 1M5	UPPER 1M5
		OMU 1B	OCHAN6 IN	LOWER 1M6	UPPER 1M6
		OMU 1B	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1B	OCHAN8 IN	LOWER 1M8	UPPER 1M8
		OMU 1B	OCHAN9 IN	LOWER 1M9	UPPER 1M9
		OMU 1B	OCHAN10 IN	LOWER 1M10	UPPER 1M10
		OMU 1B	OCHAN11 IN	LOWER 1M11	UPPER 1M11
		OMU 1B	OCHAN12 IN	LOWER 1M12	UPPER 1M12
		OMU 1B	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1B	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1B	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1B	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1A	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1A	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1A	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1A	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1A	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1A	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1A	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1A	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1A	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1A	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1A	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1A	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1A	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1A	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1A	OCHAN15 OUT	LOWER 1D15	UPPER 1D15
		ODU 1A	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-39 Two OA/One OA Dual Facing Shelf Low Speed Fiber Jumper - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
End Terminal	2	OMU 2B	OCHAN1 IN	LOWER 2M1	UPPER 2M1
		OMU 2B	OCHAN2 IN	LOWER 2M2	UPPER 2M2
Two OA/One OA Dual Facing Shelf		OMU 2B	OCHAN3 IN	LOWER 2M3	UPPER 2M3
		OMU 2B	OCHAN4 IN	LOWER 2M4	UPPER 2M4
Dual 2-Line (use lines 1&2 for each shelf)		OMU 2B	OCHAN5 IN	LOWER 2M5	UPPER 2M5
		OMU 2B	OCHAN6 IN	LOWER 2M6	UPPER 2M6
		OMU 2B	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2B	OCHAN8 IN	LOWER 2M8	UPPER 2M8
Refer to Figure 7-22 on page 7-89 for connection points		OMU 2B	OCHAN9 IN	LOWER 2M9	UPPER 2M9
		OMU 2B	OCHAN10 IN	LOWER 2M10	UPPER 2M10
		OMU 2B	OCHAN11 IN	LOWER 2M11	UPPER 2M11
		OMU 2B	OCHAN12 IN	LOWER 2M12	UPPER 2M12
		OMU 2B	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2B	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2B	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2B	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2A	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2A	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2A	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2A	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2A	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2A	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2A	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2A	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2A	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2A	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2A	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2A	OCHAN1 OUT	LOWER 2D12	UPPER 2D12
		ODU 2A	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2A	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2A	OCHAN15 OUT	LOWER 2D15	UPPER 2D15
		ODU 2A	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-22 on page 7-89 and Table 7-40 on page 7-92.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-40 Outside Plant LGX Fiber Jumpers For Two OA/One OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Two OA/One OA Dual Facing Shelf Refer to Figure 7-22 on page 7-89 for connection point	1	2	1A-OA	IN	1A-OA-IN
		3	1B-OA	OUT	1B-OA-OUT
	2	1	ODU-2B	IN	2B-ODU-IN
		4	2B-OA	OUT	2B-OA-OUT

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels then routing the fibers by referring to Figure 7-22 on page 7-89 and Table 7-41 on page 7-92.

Table 7-41 Customer Maintenance Fiber Jumpers For End Terminals

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Two OA/One OA Dual Facing Shelf Refer to Figure 7-22 on page 7-89for connection point	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT
	3	A	TLM 3A/B	CM IN	3A-TLM-CMIN
		B	TLM 3A/B	CM OUT	3A-TLM-CMOUT
	4	C	TLM 4A/B	CM IN	4A-TLM-CMIN
		D	TLM 4A/B	CM OUT	4A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-21 on page 7-87 and Figure 7-22 on page 7-89.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9 and Figure 7-21 on page 7-87.

➡ NOTE:
The fibers should be placed through the clips one at a time to avoid overstressing the clips.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 10 and for transmission in Section 11.

H - One OA/Two OA OLS Dual Facing Shelf Installation

This configuration is supported by Release 2.1 only.

This subsection covers the installation of a stand-alone Dual Facing Shelf. It is possible for a second shelf to be installed in the same bay, yet configured differently. If this is the case, refer to the appropriate subsection for the fibering of the other shelf.

This subsection covers the fiber and label installation for the One OA/Two OA Dual Facing Shelf Configuration. It has been broken into five procedures:

- Intrashelf Fiber Jumper Installation
- Low Speed Fiber Jumper Installation to OC-48 equipment
- Outside Plant Fiber Jumper Installation to LGX
- Customer Maintenance Signal Fiber Jumper Installation
- End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure For 2-Line Shelf

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the shelf:

- (1) LEA1 SYSCTL
- (1) LEA2 SYSMEM
- (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the shelf:

- (1) LEA105
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(5) Install, but do not seat, the following transmission circuit packs and units for line 2 in the shelf:

- (2) LEA6 or LEA7 OA
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(6) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 7 fiber jumpers per List 165 by adding the labels then routing the fibers by referring to Figure 7-23 and Table 7-42 on page 7-98. See Table 7-3 on page 7-5 for more information on fiber Lists.

⇒ NOTE:
The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets.

Figure 7-23 One OA/Two OA Dual Facing Shelf Intrashelf Fiber Jumpers

Table 7-42 Intrashelf Fiber Jumpers For One OA/Two OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	1	TLM 1A	IN	1A-TLM-IN
One OA/Two OA Dual Facing Shelf		1	ODU-1	SUPR.OUT	
		2	TLM 1A	OUT	1A-TLM-OUT
		2	OA 1A	TLM IN	1A-OA-TLMIN
		5	OMU 1B	OMU OUT	1-OMU-OUT
Refer to		5	OA 1A	IN	1A-OA-IN
Figure 7-23 on page 7-97	2	3	TLM 2A	IN	2A-TLM-IN
for connection point		3	OA 2A	TLM OUT	2A-OA-TLMOUT
		4	TLM 2A	OUT	2A-TLM-OUT
		4	OA 2A	TLM IN	2A-OA-TLMIN
		6	OMU 2A	OMU OUT	2A-OMU-OUT
		6	OA 2A	IN	2A-OA-IN
		7	ODU 2B	IN	2-ODU-IN
		7	OA 2B	OUT	2B-OA-OUT

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9, Figure 7-24 on page 7-99, Table 7-43 on page 7-100, Table 7-44 on page 7-101 and Table 7-45 on page 7-102.

CAUTION:
Do not connect either end of the fiber jumper at this time.

Figure 7-24 ne OA/Two OA Dual Facing Shelf Outside Plant, Low Speed, & Customer Maintenance Signal Fiber Jumpers

Table 7-43 One OA/Two OA Dual Facing Shelf Low Speed Fiber Jumper - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Top Shelf Dual 2-Line
End Terminal One OA/Two OA Dual Facing Shelf Refer to Figure 7-24 on page 7-99 for connection points.	1	OMU 1B	OCHAN1 IN	LOWER 1M1	UPPER 1M1
		OMU 1B	OCHAN2 IN	LOWER 1M2	UPPER 1M2
		OMU 1B	OCHAN3 IN	LOWER 1M3	UPPER 1M3
		OMU 1B	OCHAN4 IN	LOWER 1M4	UPPER 1M4
		OMU 1B	OCHAN5 IN	LOWER 1M5	UPPER 1M5
		OMU 1B	OCHAN6 IN	LOWER 1M6	UPPER 1M6
		OMU 1B	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1B	OCHAN8 IN	LOWER 1M8	UPPER 1M8
		OMU 1B	OCHAN9 IN	LOWER 1M9	UPPER 1M9
		OMU 1B	OCHAN10 IN	LOWER 1M10	UPPER 1M10
		OMU 1B	OCHAN11 IN	LOWER 1M11	UPPER 1M11
		OMU 1B	OCHAN12 IN	LOWER 1M12	UPPER 1M12
		OMU 1B	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1B	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1B	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1B	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1A	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1A	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1A	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1A	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1A	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1A	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1A	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1A	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1A	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1A	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1A	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1A	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1A	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1A	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1A	OCHAN15 OUT	LOWER 1D15	UPPER 1D15
		ODU 1A	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-44 One OA/Two OA Dual Facing Shelf Low Speed Fiber Jumper - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
I One OA/Two OA Dual Facing Shelf Refer toFigure 7-24 on page 7-99 for connection points	2	OMU 2A	OCHAN1 IN	LOWER 2M1	UPPER 2M1
		OMU 2A	OCHAN2 IN	LOWER 2M2	UPPER 2M2
		OMU 2A	OCHAN3 IN	LOWER 2M3	UPPER 2M3
		OMU 2A	OCHAN4 IN	LOWER 2M4	UPPER 2M4
		OMU 2A	OCHAN5 IN	LOWER 2M5	UPPER 2M5
		OMU 2A	OCHAN6 IN	LOWER 2M6	UPPER 2M6
		OMU 2A	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2A	OCHAN8 IN	LOWER 2M8	UPPER 2M8
		OMU 2A	OCHAN9 IN	LOWER 2M9	UPPER 2M9
		OMU 2A	OCHAN10 IN	LOWER 2M10	UPPER 2M10
		OMU 2A	OCHAN11 IN	LOWER 2M11	UPPER 2M11
		OMU 2A	OCHAN12 IN	LOWER 2M12	UPPER 2M12
		OMU 2A	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2A	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2A	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2A	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2B	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2B	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2B	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2B	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2B	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2B	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2B	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2B	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2B	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2B	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2B	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2B	OCHAN1 OUT	LOWER 2D12	UPPER 2D12
		ODU 2B	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2B	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2B	OCHAN15 OUT	LOWER 2D15	UPPER 2D15
		ODU 2B	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-24 on page 7-99 and Table 7-45 on page 7-102.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-45 Outside Plant LGX Fiber Jumpers For One OA/Two OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
ONE OA/Two OA Dual Facing Shelf	1	1	ODU-1	IN	1A-ODU-IN
		2	1A-OA	OUT	1A-OA-OUT
Refer to Figure 7-24 on page 7-99 for connection point	2	3	2A-OA	OUT	2A-OA-OUT
		4	2B-OA	IN	2B-OA-IN

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels then routing the fibers by referring to Figure 7-24 on page 7-99 and Table 7-46 on page 7-102.

Table 7-46 Customer Maintenance Fiber Jumpers For One OA/Two OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
One OA/Two OA Dual Facing Shelf	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT
Refer to Figure 7-24 on page 7-99for connection point	3	A	TLM 3A/B	CM IN	3A-TLM-CMIN
		B	TLM 3A/B	CM OUT	3A-TLM-CMOUT
	4	C	TLM 4A/B	CM IN	4A-TLM-CMIN
		D	TLM 4A/B	CM OUT	4A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-23 on page 7-97 and Figure 7-24 on page 7-99.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9 and Figure 7-23 on page 7-97.

⇒ NOTE:
The fibers should be placed through the clips one at a time to avoid overstressing the clips.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 10 and for transmission in Section 11.

I - One OA/One OA OLS Dual Facing Shelf Installation

This configuration is supported by Release 2.1 only.

Covered in this subsection is the fiber and circuit pack installation for a stand-alone One OA/One OA Dual Facing Shelf. It is possible that another shelf will be installed in the bay. Refer to the appropriate subsection for the installation of the second shelf.

This subsection covers the fiber, circuit pack and label installation for the One OA/ One OA Dual Facing Shelf Configuration. It has been broken into five procedures:

- ■ Intrashelf Fiber Jumper Installation

- ■ Low Speed Fiber Jumper Installation to OC-48 equipment

- ■ Outside Plant Fiber Jumper Installation to LGX

- ■ Customer Maintenance Signal Fiber Jumper Installation

- ■ End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure For 2-Line Shelf

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the shelf:

- · (1) LEA1 SYSCTL

- · (1) LEA2 SYSMEM

- · (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the shelf:

- (1) LEA105
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(5) Install, but do not seat, the following transmission circuit packs and units for line 2 in the shelf:

- (1) LEA105 OA
- (1) LDA1 TLM
- (1) 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)
- (1) 606B ODU (Leave the retainer screws for the unit on the shelf at this time.)

(6) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Fiber Jumper Installation

Intrashelf Fiber Jumper Installation

Install the 3 fiber jumpers per List 163 for *each* line (6 fibers for a fully equipped 2-line shelf) by adding the labels then routing the fibers by referring to Figure 7-25 and Table 7-47 on page 7-108. For more information on fiber lists refer to Table 7-3 on page 7-5.

⇒ NOTE:
The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets.
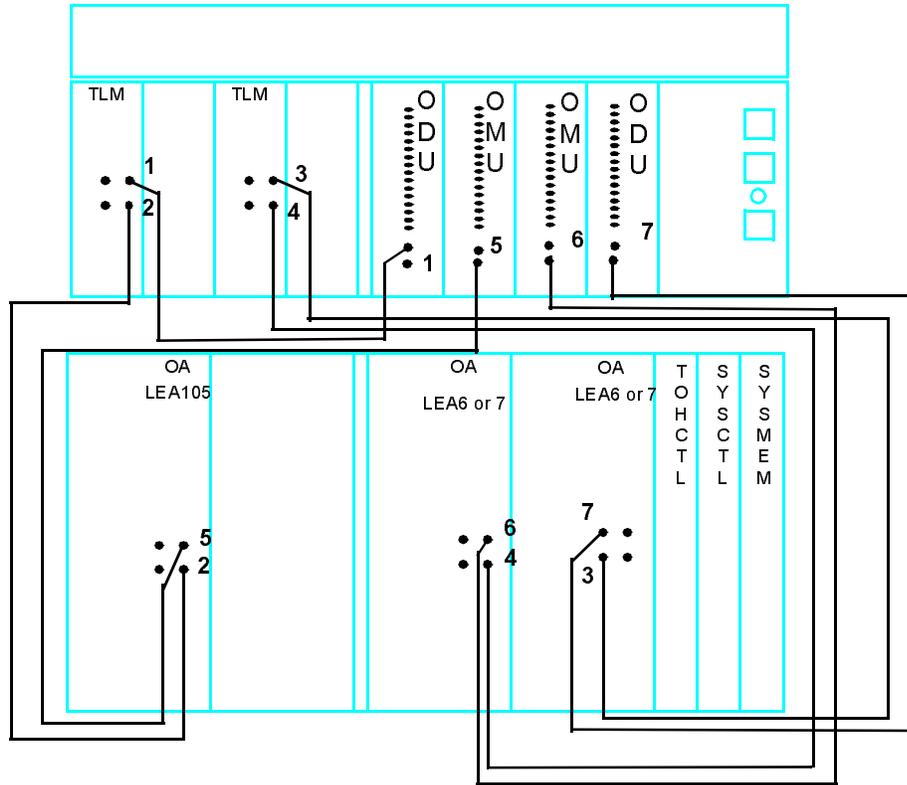
Figure 7-25 One OA/One OA Dual Facing Shelf Intrashelf Fiber Jumpers

Table 7-47 Intrashelf Fiber Jumpers For One OA/One OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal One OA/One OA Dual Facing Shelf Refer to Figure 7-25 on page 7-107 for connection point	1	1	TLM 1A	IN	1A-TLM-IN
		1	ODU-1	SUPR.OUT	
		2	TLM 1A	OUT	1A-TLM-OUT
		2	OA 1A	TLM IN	1A-OA-TLMIN
		5	OMU 1A	OMU OUT	1-OMU-OUT
		5	OA 1A	IN	1A-OA-IN
	2	3	TLM 2A	IN	2A-TLM-IN
		3	ODU 2B	SUPR.OUT	
		4	TLM 2A	OUT	2A-TLM-OUT
		4	OA 2B	TLM IN	2B-OA-TLMIN
		6	OMU 2A	OMU OUT	2A-OMU-OUT
		6	OA 2B	IN	2B-OA-IN

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9, Figure 7-26 on page 7-109, Table 7-48 on page 7-110, Table 7-49 on page 7-111 and Table 7-50 on page 7-112.
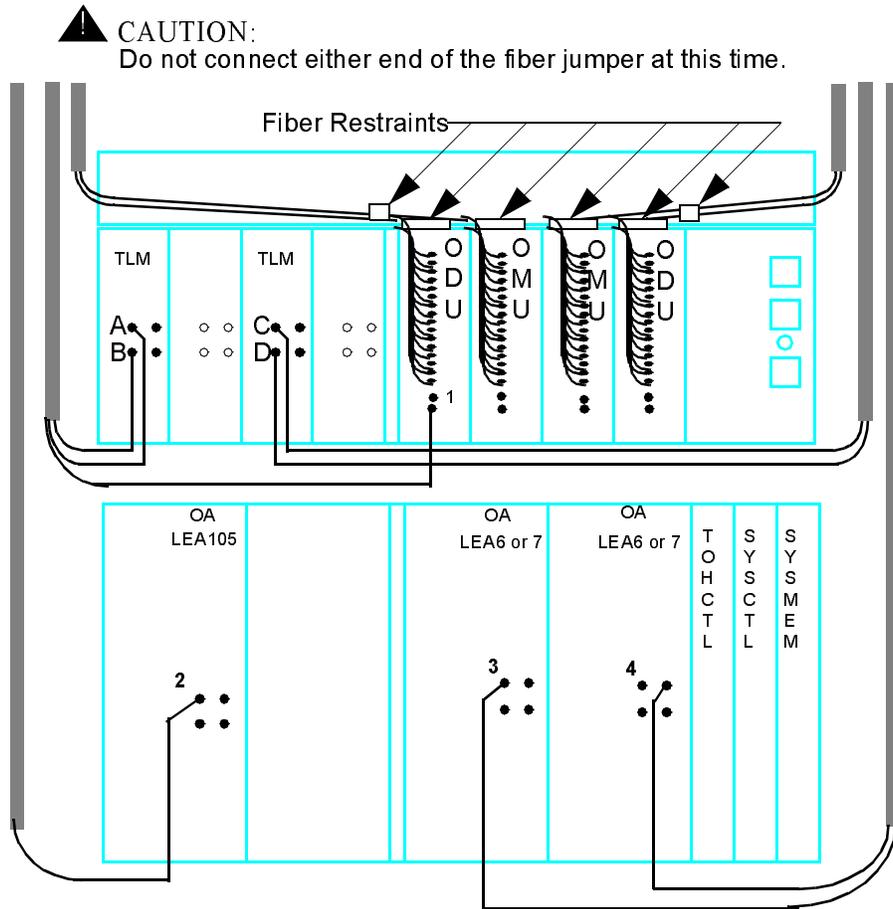
⚠ CAUTION:
Do not connect either end of the fiber jumper at this time.
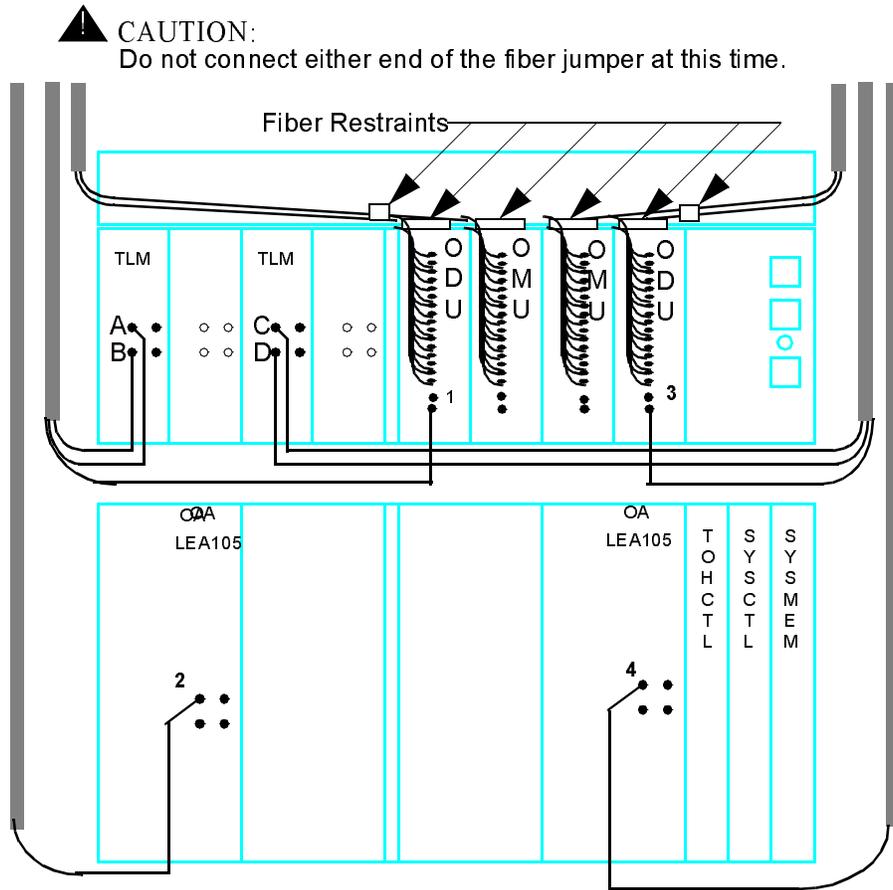
Figure 7-26 One OA/One OA Dual Facing Shelf Outside Plant, Low Speed, & Customer Maintenance Signal Fiber Jumpers

Table 7-48 One OA/One OA Dual Facing Shelf Low Speed Fiber Jumper - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Top Shelf Dual 2-Line
End Terminal One OA/One OA Dual Facing Shelf Refer to Figure 7-26 on page 7-109 for connection points.	1	OMU 1B	OCHAN1 IN	LOWER 1M1	UPPER 1M1
		OMU 1B	OCHAN2 IN	LOWER 1M2	UPPER 1M2
		OMU 1B	OCHAN3 IN	LOWER 1M3	UPPER 1M3
		OMU 1B	OCHAN4 IN	LOWER 1M4	UPPER 1M4
		OMU 1B	OCHAN5 IN	LOWER 1M5	UPPER 1M5
		OMU 1B	OCHAN6 IN	LOWER 1M6	UPPER 1M6
		OMU 1B	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1B	OCHAN8 IN	LOWER 1M8	UPPER 1M8
		OMU 1B	OCHAN9 IN	LOWER 1M9	UPPER 1M9
		OMU 1B	OCHAN10 IN	LOWER 1M10	UPPER 1M10
		OMU 1B	OCHAN11 IN	LOWER 1M11	UPPER 1M11
		OMU 1B	OCHAN12 IN	LOWER 1M12	UPPER 1M12
		OMU 1B	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1B	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1B	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1B	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1A	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1A	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1A	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1A	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1A	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1A	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1A	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1A	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1A	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1A	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1A	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1A	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1A	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1A	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1A	OCHAN15 OUT	LOWER 1D15	UPPER 1D15
		ODU 1A	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-49 One OA/One OA Dual Facing Shelf Low Speed Fiber Jumper - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
I One OA/One OA Dual Facing Shelf Refer to Figure 7-26 on page 7-109 for connection points	2	OMU 2A	OCHAN1 IN	LOWER 2M1	UPPER 2M1
		OMU 2A	OCHAN2 IN	LOWER 2M2	UPPER 2M2
		OMU 2A	OCHAN3 IN	LOWER 2M3	UPPER 2M3
		OMU 2A	OCHAN4 IN	LOWER 2M4	UPPER 2M4
		OMU 2A	OCHAN5 IN	LOWER 2M5	UPPER 2M5
		OMU 2A	OCHAN6 IN	LOWER 2M6	UPPER 2M6
		OMU 2A	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2A	OCHAN8 IN	LOWER 2M8	UPPER 2M8
		OMU 2A	OCHAN9 IN	LOWER 2M9	UPPER 2M9
		OMU 2A	OCHAN10 IN	LOWER 2M10	UPPER 2M10
		OMU 2A	OCHAN11 IN	LOWER 2M11	UPPER 2M11
		OMU 2A	OCHAN12 IN	LOWER 2M12	UPPER 2M12
		OMU 2A	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2A	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2A	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2A	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2B	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2B	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2B	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2B	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2B	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2B	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2B	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2B	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2B	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2B	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2B	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2B	OCHAN1 OUT	LOWER 2D12	UPPER 2D12
		ODU 2B	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2B	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2B	OCHAN15 OUT	LOWER 2D15	UPPER 2D15
		ODU 2B	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-26 on page 7-109 and Table 7-50 on page 7-112.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-50 Outside Plant LGX Fiber Jumpers For One OA/One OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
One OA/One OA Dual Facing Shelf	1	1	ODU-1	IN	1A-ODU-IN
		2	1A-OA	OUT	1B-OA-OUT
	2	3	ODU-2B	IN	2B-ODU-IN
Refer to Figure 7-26 on page 7-109 for connection point		4	2B-OA	OUT	2B-OA-OUT

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels then routing the fibers by referring to Figure 7-26 on page 7-109 and Table 7-51 on page 7-112.

Table 7-51 Customer Maintenance Fiber Jumpers For One OA/One OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
One OA/One OA Dual Facing Shelf	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
Refer to Figure 7-26 on page 7-109 for connection point	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-25 on page 7-107 and Figure 7-26 on page 7-109.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9 and Figure 7-25 on page 7-107.

➡ NOTE:
The fibers should be placed through the clips one at a time to avoid overstressing the clips.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested for controller communication between the slots and SYSCTL in Section 13. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 13 and for transmission in Section 14.

J - Two OA Dual Facing Shelf Installation

This configuration is available with Release 2.1 software only.

Covered in this subsection is the fiber, circuit pack and label installation for a stand-alone Two OA Dual Facing Shelf. It is possible that this shelf will be coupled with another shelf in the same bay frame. If that is the case, refer to the appropriate subsection for the installation of the other shelf. With Release 2.1, either 8 or 16 wavelengths is possible. If using only 8 wavelengths, disregard any references to wavelengths 9 to 16.

This subsection covers the installation of the Two OA Dual Facing Shelf Configuration. It has been broken into five procedures:

■ Intrashelf Fiber Jumper Installation

■ Low Speed Fiber Jumper Installation to OC-48 equipment

■ Outside Plant Fiber Jumper Installation to LGX

■ Customer Maintenance Signal Fiber Jumper Installation

■ End Terminal Circuit Pack and Unit Installation

⚠ CAUTION:
No fiber jumpers shall be connected to the circuit packs or units at this time. Do not connect the fiber jumpers until instructed to do so.

Fiber Routing Through Cabinet

For the fiber routing information for the OLS cabinet refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Circuit Pack Equip Procedure For 2-Line Shelf

(1) Review information on "OLS Fiber Cable Routing" on page 7-7 and "Circuit Pack Installation" on page 7-10 before beginning this procedure.

(2) Refer to Figure 7-8 on page 7-16 for circuit pack locations.

(3) Install, but do not seat, the following controller circuit packs in the shelf:

   · (1) LEA1 SYSCTL

   · (1) LEA2 SYSMEM

   · (1) LEA5 TOHCTL

(4) Install, but do not seat, the following transmission circuit packs and units for line 1 in the shelf:

- (2) LEA6 or LEA7

- (1) LDA1 TLM

- (1) 506A or 505A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(5) Install, but do not seat, the following transmission circuit packs and units for line 2 in the shelf:

- (2) LEA6 or LEA 7 OA

- (1) LDA1 TLM

- (1) or 505A or 506A OMU (Leave the retainer screws for the unit on the shelf at this time.)

- (1) 605A or 606A ODU (Leave the retainer screws for the unit on the shelf at this time.)

⇒ NOTE:
For 16 wavelength systems, remove the 0 dB LBO from the receive OA OUT and replace it with a 7 dB LBO included with the OA LBO kit.

(6) Proceed to the Intrashelf Fiber Jumper Installation paragraph.

Fiber Jumper Installation.

Intrashelf Fiber Jumper Installation

Install the 8 fiber jumpers per List 164 by adding the labels then routing the fibers by referring to Figure 7-27 and Table 7-52 on page 7-118. For more information on Fiber Lists, refer to Table 7-3 on page 7-5.

⇒ NOTE:
The fibers must pass in front of the bracket between the TLM and OMU/ODU slots. The fibers should be dressed behind the shelf mounting brackets.
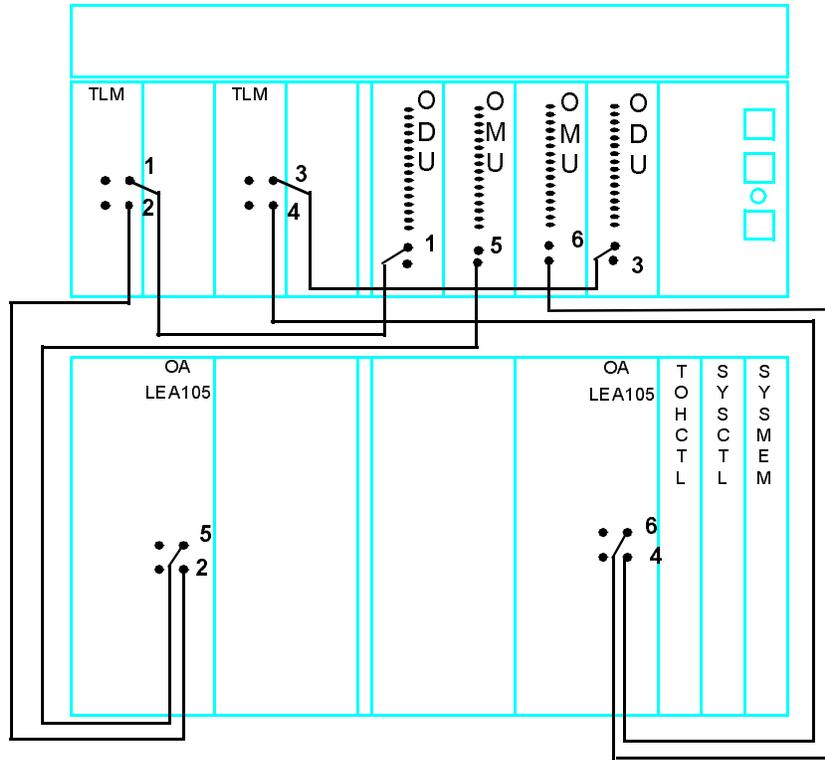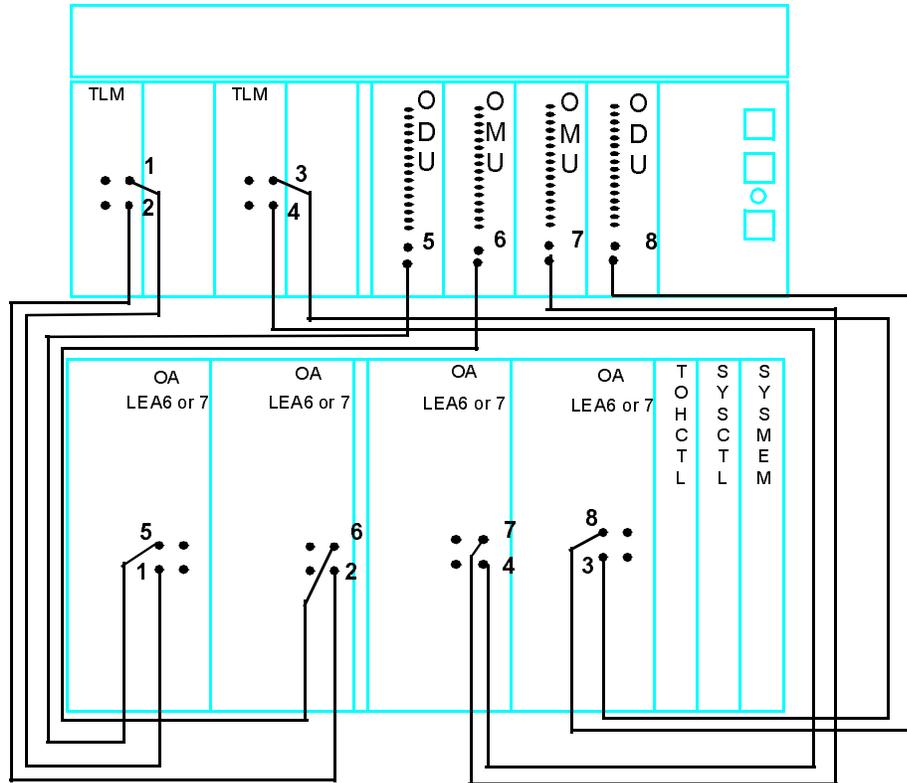
Figure 7-27 Two OA Dual Facing Shelf Intrashelf Fiber Jumpers

Table 7-52 Intrashelf Fiber Jumpers For Two OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
End Terminal	1	1	TLM 1A	IN	1A-TLM-IN
		1	1A -OA	OUT	1A-OA-OUT
Two OA Dual Facing Shelf		2	TLM 1A	OUT	1A-TLM-OUT
		2	OA 1B	TLM IN	1B-OA-TLMIN
		5	ODU 1A	IN	1A-ODU-IN
Refer to Figure 7-27 on page 7-117 for connection point		5	OA 1A	OUT	1A-OA-OUT
		6	OMU - 1B	OUT	1B-OMU-OUT
		6	OA-1B	OUT	1B-OA-OUT
	2	3	TLM 2A	IN	2A-TLM-IN
		3	OA 2B	TLM OUT	2B-OA-TLMOUT
		4	TLM 2A	OUT	2A-TLM-OUT
		4	OA 2A	TLM IN	2A-OA-TLMIN
		7	OMU 2A	OMU OUT	2A-OMU-OUT
		7	OA 2A	IN	2A-OA-IN
		8	ODU 2B	IN	2-ODU-IN
		8	OA 2B	OUT	2B-OA-OUT

Low Speed Fiber Jumper Installation

Install the fiber jumpers from the OLS to the OC-48 equipment by adding the labels then routing the fibers by referring to Figure 7-3 on page 7-9, Figure 7-28 on page 7-119, Table 7-53 on page 7-120, Table 7-54 on page 7-121 and Table 7-55 on page 7-122.
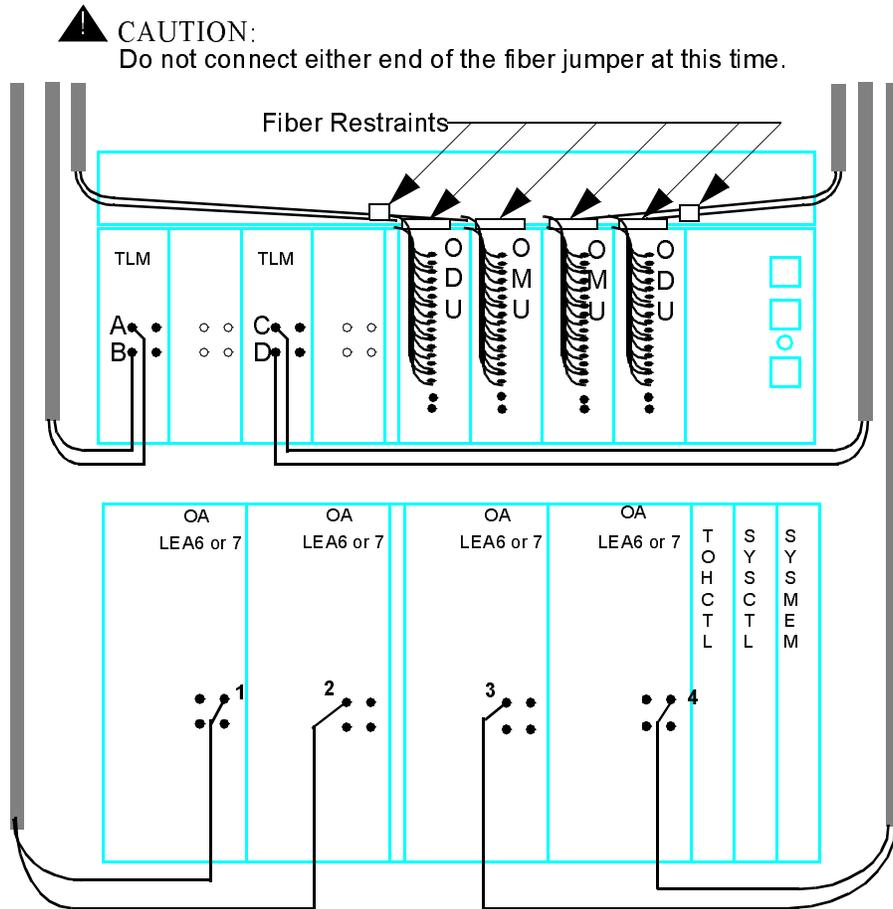
Figure 7-28 Two OA Dual Facing Shelf Outside Plant, Low Speed, & Customer Maintenance Signal Fiber Jumpers

Table 7-53 Two OA Dual Facing Shelf Low Speed Fiber Jumper - Line 1

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Top Shelf Dual 2-Line
End Terminal	1	OMU 1B	OCHAN1 IN	LOWER 1M1	UPPER 1M1
Two OA Dual Facing Shelf		OMU 1B	OCHAN2 IN	LOWER 1M2	UPPER 1M2
		OMU 1B	OCHAN3 IN	LOWER 1M3	UPPER 1M3
		OMU 1B	OCHAN4 IN	LOWER 1M4	UPPER 1M4
Refer to Figure 7-28 on page 7-119 for connection points.		OMU 1B	OCHAN5 IN	LOWER 1M5	UPPER 1M5
		OMU 1B	OCHAN6 IN	LOWER 1M6	UPPER 1M6
		OMU 1B	OCHAN7 IN	LOWER 1M7	UPPER 1M7
		OMU 1B	OCHAN8 IN	LOWER 1M8	UPPER 1M8
		OMU 1B	OCHAN9 IN	LOWER 1M9	UPPER 1M9
		OMU 1B	OCHAN10 IN	LOWER 1M10	UPPER 1M10
		OMU 1B	OCHAN11 IN	LOWER 1M11	UPPER 1M11
		OMU 1B	OCHAN12 IN	LOWER 1M12	UPPER 1M12
		OMU 1B	OCHAN13 IN	LOWER 1M13	UPPER 1M13
		OMU 1B	OCHAN14 IN	LOWER 1M14	UPPER 1M14
		OMU 1B	OCHAN15 IN	LOWER 1M15	UPPER 1M15
		OMU 1B	OCHAN16 IN	LOWER 1M16	UPPER 1M16
		ODU 1A	OCHAN1 OUT	LOWER 1D1	UPPER 1D1
		ODU 1A	OCHAN2 OUT	LOWER 1D2	UPPER 1D2
		ODU 1A	OCHAN3 OUT	LOWER 1D3	UPPER 1D3
		ODU 1A	OCHAN4 OUT	LOWER 1D4	UPPER 1D4
		ODU 1A	OCHAN5 OUT	LOWER 1D5	UPPER 1D5
		ODU 1A	OCHAN6 OUT	LOWER 1D6	UPPER 1D6
		ODU 1A	OCHAN7 OUT	LOWER 1D7	UPPER 1D7
		ODU 1A	OCHAN8 OUT	LOWER 1D8	UPPER 1D8
		ODU 1A	OCHAN9 OUT	LOWER 1D9	UPPER 1D9
		ODU 1A	OCHAN10 OUT	LOWER 1D10	UPPER 1D10
		ODU 1A	OCHAN11 OUT	LOWER 1D11	UPPER 1D11
		ODU 1A	OCHAN12 OUT	LOWER 1D12	UPPER 1D12
		ODU 1A	OCHAN13 OUT	LOWER 1D13	UPPER 1D13
		ODU 1A	OCHAN14 OUT	LOWER 1D14	UPPER 1D14
		ODU 1A	OCHAN15 OUT	LOWER 1D15	UPPER 1D15
		ODU 1A	OCHAN16 OUT	LOWER 1D16	UPPER 1D16

Table 7-54 Two OA Dual Facing Shelf Low Speed Fiber Jumper - Line 2

Application	Line	Circuit Pack	Connector	Label to Install For Lower Shelf	Label to Install For Upper Shelf Dual 2-Line
I Two OA Dual Fac-ing Shelf Refer toFigure 7-28 on page 7-119 for connection points	2	OMU 2A	OCHAN1 IN	LOWER 2M1	UPPER 2M1
		OMU 2A	OCHAN2 IN	LOWER 2M2	UPPER 2M2
		OMU 2A	OCHAN3 IN	LOWER 2M3	UPPER 2M3
		OMU 2A	OCHAN4 IN	LOWER 2M4	UPPER 2M4
		OMU 2A	OCHAN5 IN	LOWER 2M5	UPPER 2M5
		OMU 2A	OCHAN6 IN	LOWER 2M6	UPPER 2M6
		OMU 2A	OCHAN7 IN	LOWER 2M7	UPPER 2M7
		OMU 2A	OCHAN8 IN	LOWER 2M8	UPPER 2M8
		OMU 2A	OCHAN9 IN	LOWER 2M9	UPPER 2M9
		OMU 2A	OCHAN10 IN	LOWER 2M10	UPPER 2M10
		OMU 2A	OCHAN11 IN	LOWER 2M11	UPPER 2M11
		OMU 2A	OCHAN12 IN	LOWER 2M12	UPPER 2M12
		OMU 2A	OCHAN13 IN	LOWER 2M13	UPPER 2M13
		OMU 2A	OCHAN14 IN	LOWER 2M14	UPPER 2M14
		OMU 2A	OCHAN15 IN	LOWER 2M15	UPPER 2M15
		OMU 2A	OCHAN16 IN	LOWER 2M16	UPPER 2M16
		ODU 2B	OCHAN1 OUT	LOWER 2D1	UPPER 2D1
		ODU 2B	OCHAN2 OUT	LOWER 2D2	UPPER 2D2
		ODU 2B	OCHAN3 OUT	LOWER 2D3	UPPER 2D3
		ODU 2B	OCHAN4 OUT	LOWER 2D4	UPPER 2D4
		ODU 2B	OCHAN5 OUT	LOWER 2D5	UPPER 2D5
		ODU 2B	OCHAN6 OUT	LOWER 2D6	UPPER 2D6
		ODU 2B	OCHAN7 OUT	LOWER 2D7	UPPER 2D7
		ODU 2B	OCHAN8 OUT	LOWER 2D8	UPPER 2D8
		ODU 2B	OCHAN9 OUT	LOWER 2D9	UPPER 2D9
		ODU 2B	OCHAN10 OUT	LOWER 2D10	UPPER 2D10
		ODU 2B	OCHAN11 OUT	LOWER 2D11	UPPER 2D11
		ODU 2B	OCHAN1 OUT	LOWER 2D12	UPPER 2D12
		ODU 2B	OCHAN13 OUT	LOWER 2D13	UPPER 2D13
		ODU 2B	OCHAN14 OUT	LOWER 2D14	UPPER 2D14
		ODU 2B	OCHAN15 OUT	LOWER 2D15	UPPER 2D15
		ODU 2B	OCHAN16 OUT	LOWER 2D16	UPPER 2D16

Outside Plant LGX Fiber Jumper Installation

Install the fiber jumpers from the OLS to the outside plant LGX for each line by adding the labels then routing the fibers by referring to Figure 7-28 on page 7-119 and Table 7-55 on page 7-122.

⚠ CAUTION:
Do not connect either end to the fiber jumper at this time.

Table 7-55 Outside Plant LGX Fiber Jumpers For Two OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Two OA Dual Facing Shelf	1	1	OA-1A	IN	1A-OA-IN
		2	OA-1B	OUT	1B-OA-OUT
Refer to Figure 7-28 on page 7-119 for connection point	2	3	2A-OA	OUT	2A-OA-OUT
		4	2B-OA	IN	2B-OA-IN

Customer Maintenance Fiber Jumper Installation

If equipped, install the fiber jumpers from the OLS to any equipped customer maintenance facility or LGX by adding the labels then routing the fibers by referring to Figure 7-28 on page 7-119 and Table 7-56 on page 7-122.

Table 7-56 Customer Maintenance Fiber Jumpers For Two OA Dual Facing Shelf

Application	Line	Connect Point	Circuit Pack	Connector	Label to Install
Two OA Dual Facing Shelf	1	A	TLM 1A/B	CM IN	1A-TLM-CMIN
		B	TLM 1A/B	CM OUT	1A-TLM-CMOUT
Refer to Figure 7-28 on page 7-119 for connection point	2	C	TLM 2A/B	CM IN	2A-TLM-CMIN
		D	TLM 2A/B	CM OUT	2A-TLM-CMOUT

Fiber Protection

Using the blue fiber protection tubing supplied in the installation kit, protect the fibers that run down through the sides of the cabinet. Refer to Figure 7-2 on page 7-8 and Figure 7-3 on page 7-9.

Fiber Dressing

All fiber jumpers (except OMU inputs and ODU outputs) should dress from their circuit pack or unit connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf trough to the appropriate side as shown in Figure 7-27 on page 7-117 and Figure 7-28 on page 7-119.

Fiber jumpers for OMU inputs and ODU outputs should dress up through the clips located at the top of the units then horizontally out of the shelf as shown in Figure 7-3 on page 7-9 and Figure 7-27 on page 7-117.

⇒ NOTE:
The fibers should be placed through the clips one at a time to avoid overstressing the clips.

Circuit Pack/Unit Placement For Testing

The procedures to follow will place the OLS circuit packs and units into any unequipped slots where they will be tested for controller communication between the slots and SYSCTL in Section 10. Once the slots are tested, the circuit packs and units will be moved to their final locations and tested for controller communication between the slots and SYSCTL in Section 10 and for transmission in Section 11.

K - OT Fiber Installation

Overview

This section covers OT fiber installation. Included is fiber routing, fiber protection, and labeling.

Fiber Jumper And Label Installation

Fiber Routing and Installation

The following guidelines should be followed when installing fibers in the OT cabinet.

(1) Fibers are to enter and exit from the side of the shelf that the OTU is located. For OTUs located left of center, the fiber should be routed to the left. For OTUs located right of center, the fiber should be routed to the right

(2) Run fibers into split polyethylene tubes provided with the OT installation kit. Using cable ties to fasten them, run the tubes to the side of cabinet in the space between the shelves and the frame. If exiting at the top of cabinet run tubing through innermost rectangular hole at top of cabinet. See Figure 7-29 on page 7-126. For raised floor applications run the tube out through the bottom of the cabinet, exiting through large holes in cabinet frame.

(3) When routing fibers, do not remove protective covers at end of connector.

(4) Before routing fibers, verify which OTU locations are to be used for the initial installation. Install fibers only at slot locations that are to be used for this installation.

(5) To determine the approximate length of fiber required from the bottom of the shelf to the OTU input and OTU output, slide an OTU circuit pack into a shelf without inserting it and use it as gauge to determine fiber length. After determining the lengths for the input and output, remove OTU circuit pack.

⚠️ CAUTION:
Do not connect fibers to OTU circuit packs at this time. Fibers may have power levels that could damage OTU receivers.

(6) All fibers should dress from their OTU connectors down through the notches immediately below the connectors at the bottom edge of the shelf then horizontally along the shelf through to the appropriate side.

Fiber Protection

For protection, place the installed fibers in the blue fiber protection tubing suppled in the installation kit. Refer to Figure 7-29 on page 7-126.

Exit for Left Side
Fiber Tubes

Exit for Right Side
Fiber Tubes

Fiber Tubes
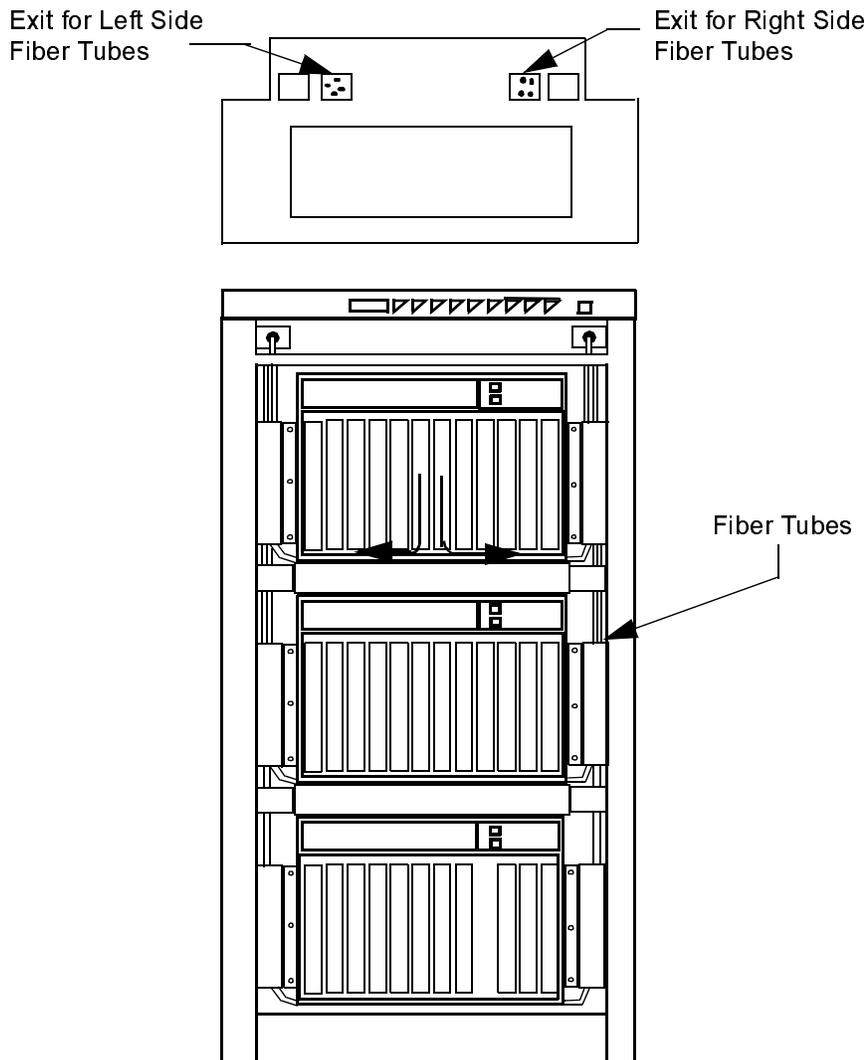
Figure 7-29 Fiber Routing for Overhead Rack Installations

OTU Fiber Labeling
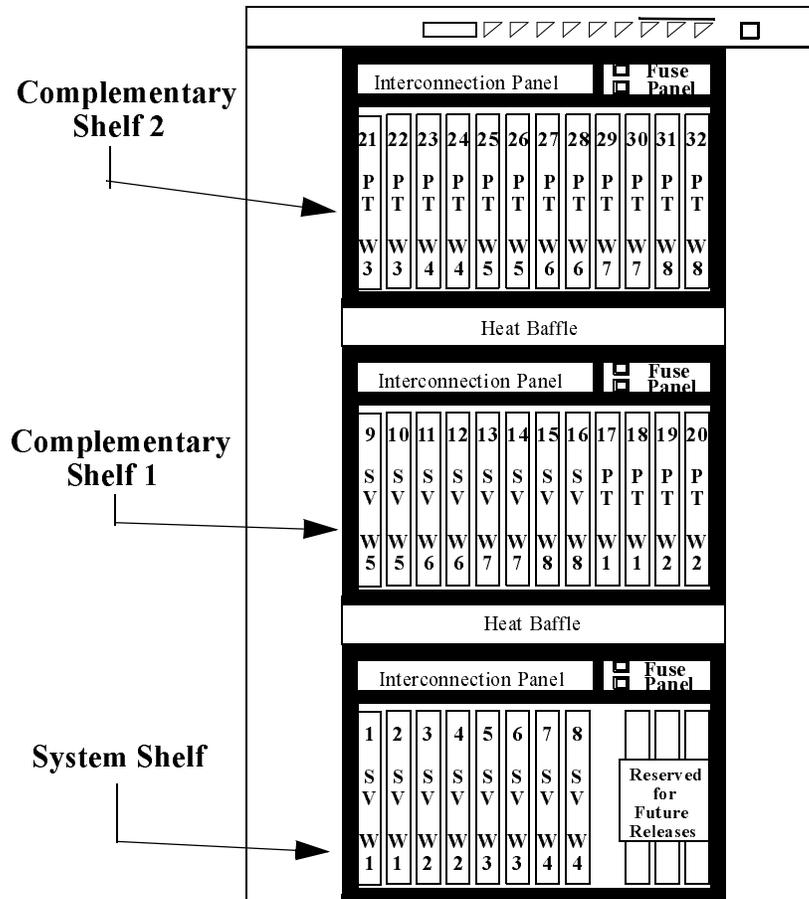
Figure 7-30 Fiber Labeling

the OTU number followed by out.

For Example: Two fibers are connected to an OTU at slot 26 in Complementary Shelf 2. The input fiber, which should be the longest fiber, will be labelled **OTU 26 IN** while the output fiber will be labelled **OTU 26 OUT.**

Follow the instructions on the label card for location on fiber connector and avoid running the label over embossed lettering on the connector.

QOTU Fiber Labeling

Each Quad Optical Translator Unit (QOTU) spans two slots in the OT in odd/even matched pairs. (25,26 or 3,4 for example). Each QOTU can contain up to four Optical Translator Port Modules each with an input and output. The labeling configuration for the fibers for the QOTU is illustrated in Figure 7-31.

⇒ NOTE:

The fiber to all OTPMs in a QOTU should be disconnected before the carrier in engaged or disengaged from the backplane. It should also be disconnected from the OTPMs when the OTPM is inserted or removed from the QOTU. All fibers should be disconnected if power is removed or applied to the shelf itself.
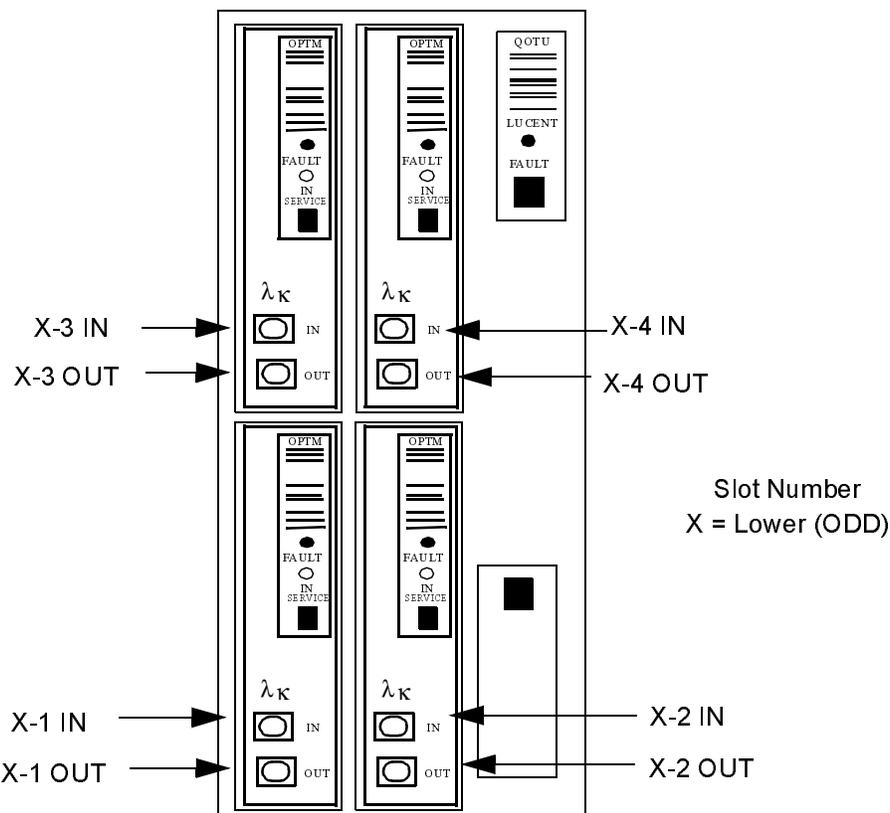
Figure 7-31 QOTU Input & Output Fiber Labeling

Final Verification

Perform the following steps to ensure that cables are properly installed:

(1) Verify that cables are properly secured and dressed.

(2) Verify that optical cable is protected properly.

(3) Verify that all cables are properly labeled.

(4) Verify that fibers are not connected at the OT cabinet.

Powering

8

Contents

Powering

8

Overview

This section describes procedures to:

- Power OLS Equipment
- Power OT Equipment

General Considerations

- Disconnect the office alarms from the OLS Network Element before performing any tests. Reconnect the office alarms after completing the testing.

Tools, Test Sets, and Accessories

The following equipment is required to complete the procedures in this section:

- Multimeter capable of measuring resistance (ohms) and DC volts from -40 to -60 volts.
- Wrist strap connected to the wrist strap ground jack of the user panel for ESD protection.

OLS & OT Cabinet Powering

Description

Two -48V DC power feeders connect to the OLS shelf fuses. From the fuses, power is channeled through a filter to the backplane of the shelf and to the circuit packs.

➡ NOTE:
The red power lead connects to -48V DC source. The white power lead connects to battery return. If a black lead with a red band near the connector is provided, this lead connects to -48V DC source.

Powering Procedure

Perform the following steps to power the OLS or OT shelf:

(1) Verify that all packing material has been removed from the cabinet and shelf.

(2) Verify the following:

- Breakers at the Battery Distribution and Fuse Bay (BDFB) are in the OFF position, or

- Fuses on the BDFB are not yet installed.

(3) Verify all circuit packs are unseated from all shelves. (OLS note: The OMU and ODUs shall be seated at this time. They are not connected to battery voltage.)

(4) Remove the fuses from both fuse holders on both shelves by opening the retainer by lifting up on the bottom edge of the retainer, then press lightly down on the top edge of the fuse cap. The fuse cap will pop out.

Check Battery Not Grounded

(5) Using an ohmmeter, measure the resistance from the top terminal, inside each fuse holder to frame ground. For OLS, refer Figure 8-1 on page 8-3 which shows where to take the measurement from the front of the shelf. For OT, refer to Figure 8-2 on page 8-3 which shows where to take the measurement from the front of the shelf.

Requirement: The resistance should show an open circuit (more than a megohm reading) for each fuse. If the resistance measurement requirement is not met then check the battery cables.

NOTE:
Measure the voltage at the top of the fuse holder, not at the rear.

MEASURE RESISTANCE
AND VOLTAGE AT TOP
OF FUSE HOLDER
NOT AT THE REAR.

10A, 60V
-48 A

10A, 60V
-48 B
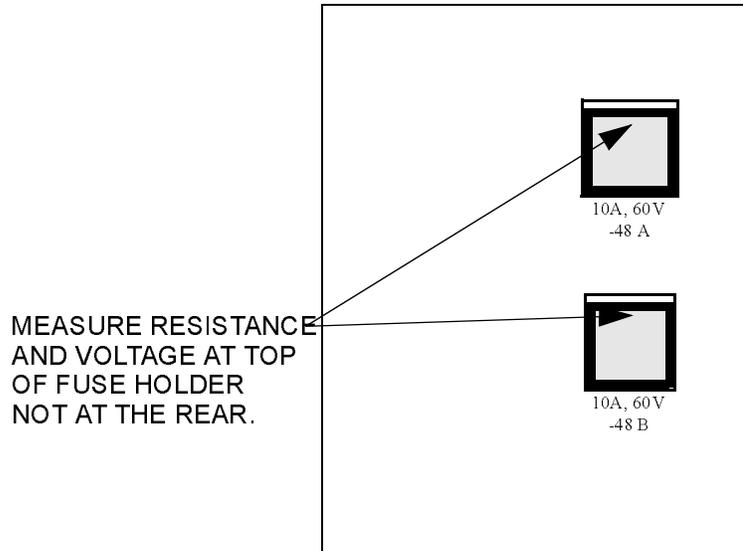
Figure 8-1 OLS Fuse Panel Measurement Point

-48A
10A
60V

-48B
10A
60V

MEASURE RESISTANCE
AND VOLTAGE AT TOP
OF FUSE HOLDER
NOT AT THE REAR
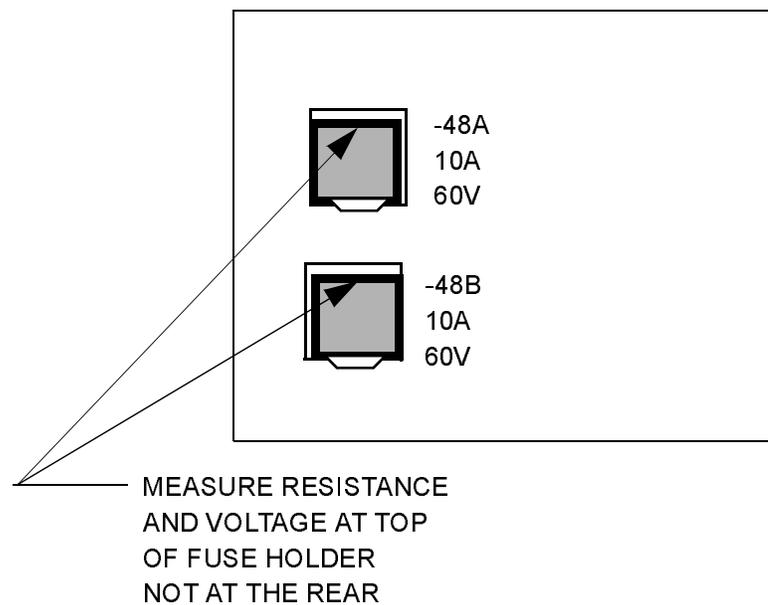
Figure 8-2 OT Fuse Panel Measurement Point

OLS Check Battery Return Cable Connection

➡ NOTE:

For OT only installation, proceed to Step 9.

(6) On the Lower shelf, remove the two screws from the fuse panel cover. Remove the cover. This will allow access to the two Power Filters. Power Filter A is on the top; Power Filter B is located below it.

(7) Remove the spade lug terminal from the bottom terminal of the A (Top) Power Filter. The wire color is BLACK and the end terminal is labeled -48VR. Using an ohmmeter, measure the resistance from the wire end to the unpainted cabinet frame ground.

Requirement: The resistance shall measure less than one (1) ohm. After completing the measurement, restore connection to the Power Filter.

(8) Remove the spade lug terminal from the bottom terminal of the B (Bottom) Power Filter. The wire color is SLATE/BLACK and the terminal is labeled -48VR. Using an ohmmeter, measure the resistance from the wire end to the unpainted cabinet frame ground.

Requirement: The resistance shall measure less than one (1) ohm. After completing the measurement, restore connection to the Power Filter. Replace the fuse cover panel and tighten with the two screw holding the panel in place.

➡ NOTE:

For OLS Only: Since the power cable is tied together for both shelves, the battery return measurement only needs to be done on the Lower Shelf.

➡ NOTE:

For OLS only installations, proceed to Step 11.

OT Check Battery Return Cable Connection

(9) Locate the Supply A Power Filter at the left side of the interconnection panel on Complementary Shelf 2 (Top Shelf). Remove the spade lug terminal from the **top** terminal of the filter. The wire color is **black** and the terminal is labeled -48VR. Using an ohmmeter, measure the resistance from the wire end to the cabinet frame ground.

Requirement: The resistance shall measure less than one(1) ohm. After completing the measurement, restore connection to power filter.

(10) At the top right side of Complementary Shelf 2, remove the screw that holds the fuse panel cover in place and swing out the fuse panel door. Locate the Supply B Power Filter at the right side of the interconnection panel. Remove

the spade lug terminal from the **bottom** terminal of the filter. The wire color is **SLATE/BLACK** and the terminal is labeled -48VR.Using an ohmmeter, measure the resistance from the wire end to cabinet frame ground.

Requirement: The resistance shall measure less than one (1) ohm. After completing the measurement, restore connection to power filter. Close fuse panel door and tighten holding screw.

➡ NOTE:
FOR OT ONLY: Since the power cable is tied together for all three shelves, the battery return measurement need only be done at one of the three shelves.

Power Cabinet/Check Voltage

(11) Insert 20 amp fuses into the OLS or OT power feeds at the BDFB. If breakers are being used, put them in the ON position.

(12) Using the voltmeter, measure the voltage from the top terminal of each fuse holder on both shelves to the terminal grounding cable. For OLS, refer to Figure 8-1 on page 8-3 which shows where to take the measurement from a front view of the terminal. For OT, refer to Figure 8-2 on page 8-3 which shows where to take the measurement from the front of the terminal.

Requirement: The voltage should be -48 volts (between -41.75 and -60.0 VDC) at each fuse holder.

Power Shelves

(13) Insert two 10 amp fuses into the fuse holders of the lower shelf per the following:

a. Open the retainer from the bottom edge and swing it up and out of the way.

b. Put the fuse in the fuse cap, and the entire assembly in the fuse position on the bay. Be sure to put the lettering right-side-up.

c. Push up and in gently on the bottom edge of the fuse. The fuse will secure in place.

d. Close the retainer over the fuse cap and snap it in place.

Requirement: The PWR ON LED is illuminated on the indicator strip for the lower shelf.

(14) **For OT only:** Insert two 10 amp fuses into the fuse holders of the middle shelf per the following:

a. Open the retainer from the bottom edge and swing it up and out of the way.

b. Put the fuse in the fuse cap, and the entire assembly in the fuse position on the bay. Be sure to put the lettering right-side-up.

c. Push up and in gently on the bottom edge of the fuse. The fuse will secure in place.

d. Close the retainer over the fuse cap and snap it in place.

Requirement: The PWR ON LED is illuminated on the indicator strip for the upper shelf.

(15) Insert two 10 amp fuses into the fuse holders of the top shelf per the following:

a. Open the retainer from the bottom edge and swing it up and out of the way.

b. Put the fuse in the fuse cap, and the entire assembly in the fuse position on the bay. Be sure to put the lettering right-side-up.

c. Push up and in gently on the bottom edge of the fuse. The fuse will secure in place.

d. Close the retainer over the fuse cap and snap it in place.

Requirement: The PWR ON LED is illuminated on the indicator strip for the upper shelf.

Verify A Feed

(16) Disconnect the B power feed by turning the breaker off or removing the fuse for the B power feed at the BDFB.

Requirement: The PWR ON LED for both shelves should remain illuminated.

(17) Remove the B fuse from the lower shelf fuse panel.

Requirement: Verify that the PWR ON LED is still on for the lower shelf.

If the LED is not on, then the A and B power feeders to the OLS or OT are swapped, since the shelf has lost power when it should still have it from battery B. Correct the error as needed and re-test.

(18) **For OT Only:** Remove the B fuse from the middle shelf fuse panel.

    Requirement: Verify that the PWR ON LED is still on for the upper shelf.

    If the LED is not on, then the A and B power feeders to the OT are swapped, since the shelf has lost power when it should still have it from battery B. Correct the error as needed and re-test.

    Requirement: Verify that the PWR ON LED is still on for the middle shelf.

(19) Remove the B fuse from the top shelf fuse panel.

    Requirement: Verify that the PWR ON LED is still on for the upper shelf.

    If the LED is not on, then the A and B power feeders to the OLS or OT are swapped, since the shelf has lost power when it should still have it from battery B. Correct the error as needed and re-test.

(20) Reinsert the B fuse into the fuse panel for all shelves.

(21) Turn the breaker on or replace the fuse for the B power feed at the BDFB.

Verify B Feed

(22) Disconnect the A power feed by turning the breaker off or removing the fuse for the A power feed at the BDFB.

    Requirement: The PWR ON LED for both shelves should remain illuminated.

(23) Remove the A fuse from the lower shelf fuse panel.

    Requirement: Verify that the PWR ON LED is still on for the lower shelf.

    If the LED is not on, then the A and B power feeders to the OLS or OT are swapped, since the shelf has lost power when it should still have it from battery B. Correct the error as needed and re-test

(24) .**For OT Only:** Remove the A fuse from the middle shelf fuse panel.

    Requirement: Verify that the PWR ON LED is still on for the middle shelf.

    If the LED is not on, then the A and B power feeders to the OT are swapped, since the shelf has lost power when it should still have it from battery B. Correct the error as needed and re-test.

(25) Remove the A fuse from the upper shelf fuse panel.

    Requirement: Verify that the PWR ON LED is still on for the upper shelf.

    If the LED is not on, then the A and B power feeders to the OLS or OT are swapped, since the shelf has lost power when it should still have it from battery B. Correct the error as needed and re-test.

(26) Reinsert the A fuse into the fuse panel for all shelves.

(27) Turn the breaker on or replace the fuse for the A power feed at the BDFB.

For OLS Installations: Software Availability

Verify appropriate software was ordered on the job and place it with the equipment at this time. The software will be installed in the next section.

For OT Only Installations:

Proceed to Section 11.

OLS Network Element Start Up and Provisioning

9

Contents

OLS Network Element Start Up and Provisioning

9

Overview

This section describes procedures to:

■ Install software into the SYSMEM circuit pack of the OLS Network Element

■ Install circuit packs into the OLS Network Element

■ Perform basic provisioning of the OLS Network Element so that installation testing can be performed

➡ NOTE:
It is assumed that the installer is familiar with PCs and its use as a CenterLink Console Manager. If instruction in this area is needed, refer to Appendix F for information including: performing software installation, setting up a PC for use with the OLS, logging in to the OLS using a CMC (CenterLink Management Console) PC, selecting commands, and basic provisioning. More information is also available in the Optical Line System (OLS) User/Service Manual (365-575-331).

General Considerations

Note the following before starting:

■ Disconnect the office alarms from the OLS Network Element before performing any tests. Reconnect the office alarms after completing the testing.

■ Required equipment is given in Section 1 of this document. Essential equipment for this part is: one personal computer (PC) with CMC software for use as CenterLink Management Console and connecting cable.

Tools, Test Sets, and Accessories

The following equipment is required to complete the procedures in this section:

■ Wrist strap connected to the wrist strap ground jack of the user panel for ESD protection.

■ A CD-ROM of Release 2.1-OLS network software and CMC.

OR

■ A set of Diskettes containing Release 2.1 OLS network software and CMC.

■ Personal computer for use as CMC. See requirements in Section 2.

■ A "straight-through" RS-232 cable. Figure 9-1 on page 9-2 shows the wiring required. The cable must have a DB25 male connector at one end to mate with FT-2000 DCE CIT port. Table 9-1, "Serial Port Pinout information," on page 9-3 may be used together with the figure to determine pin numbers to connect. Typically a DB9 female connector is needed to mate with the PC serial port (com port) at the other end.

DTR		DTR
DSR		DSR
RTS		RTS
CTS		CTS
DCD		DCD
TXD		TXD
RXD		RXD
FGD		FGD
SGD		SGD
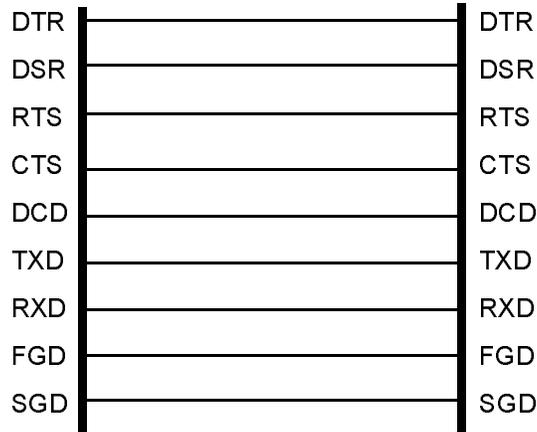
Figure 9-1 Required straight-through cable wiring

Table 9-1 Serial Port Pinout information

Signal	Name	DB9 Pin	DB25 pin	RJ45-8 pin	DCE I/O	DTE I/O
DCD	Data Carrier Detect	1	8	6	O	I
RXD	Received Data	2	3	5	O	I
TXD	Transmitted Data	3	2	3	I	O
DTR	Data Terminal Ready	4	20	4	I	O
SGD	Signal Ground	5	7	7	NA	NA
DSR	Data Set Ready	6	6	not present	O	I
RTS	Request to Send	7	4	2	I	O
CTS	Clear to Send	8	5	8	O	I
RI	Ring Indicator	9	22	not present	O	I
FGD	Frame Ground	not present	1	1	NA	NA

NOTE: Network Element (bay) CIT DCE port is DCE.
Network Element (bay) CIT DTE port is DTE.
PC serial port (com port) is DTE.
Modem ports are DCE.
Use straight through cable between unlike ports, use null modem between like ports.

Software Installation

Description

The software installation procedure for the OLS is provided below. Use this procedure only for new installations. The upgrade of software to in-service terminals should follow procedures given in the *Software Release Description* shipped with the diskettes or CD-ROM. The *Software Release Description* contains the most up-to-date instructions.

General Software Installation Considerations

■ Read the entire software installation procedure before beginning.

- Coordinate the software installation with the alarm monitoring group, if applicable, or disconnect office alarms if they have been connected. This is done by removing the connector from P29A interconnection panel. Alarms are immediately generated by OLS when the SYSCTL and SYSMEM circuits are inserted and remain until the system is in full operation.

- Installation of the CMC software to the hard drive of the PC takes about 3 minutes.

- Copying the Network Element software from the distribution diskettes to the PC hard drive takes about 1 minute.

- Installation of the Network Element (NE) software to the NE takes approximately 70-120 minutes, dependent upon the baudrate selected.

- The person(s) performing the software installation should be trained and have an understanding of the OLS.

- Perform the software installation procedure in the sequence provided. Any deviation may lead to unpredictable OLS behavior.

- Do not proceed if the network element software fails to install correctly. Install the software again from the beginning. If failure continues, write down the output message that the PC is displaying and contact your next level of support.

- Use care when handling circuit packs. Make use of the ESD wrist straps and static-safe bags.

- Do not enter a second command until the first command has completed.

- The software may be shipped on a CD-ROM Optical Disk or diskettes. Use care when handling the CD-ROM to avoid fingerprints on the mirror finish and possible breakage.

- If any mistakes are made while making selections, the displayed cancel button on the screen to back up and reenter the selection(s).

- If any error message windows are displayed, refer to the trouble shooting Section 13 of this manual to correct the problem.

Setting Up the PC for CenterLink Software Installation

(1) Be sure you have the proper CD-ROM or diskettes for OLS 2.1 CenterLink Console Manager.

▶ NOTE:
Power the PC from an AC source. Battery power of laptops may not last long enough to complete the installation.

⇒ NOTE:
For complete directions for installing the CenterLink Console Management software onto the PC from diskettes, go to Appendix F.

(2) Insert the CD-ROM drive of the computer (typically drive D). The CD will automatically start Centerlink.

(3) Follow the prompts to install Centerlink and the CMC software to your hard drive.

- CenterLink Installation Program will load Microsoft Internet Explorer software. Accept this program

- CenterLink Installation Program will load the Acrobat Reader software.

(4) Run the Internet Explorer from the desktop icon or using the Start Menu.

⇒ NOTE:
Cancel any error messages about being unable to connect to URL.

a. Select View-Options menu.

b. Select advanced tab.

c. Deselect "Disable Java JIT Compiler" (Make sure there is no check in the box).

d. Select the "Settings" button in the Temporary Internet files section of the screen.

e. Verify the circle next to "Every time you start Internet Explorer" is filled.

f. Click on OK.

g. Click on the Connection tab.

h. Disable "Connect through a proxy server." Verify there in no check in the box.

i. Click Apply, then OK

j. Select File-Open and type **http://locathost/Lucent3/** then the Enter key.

k. The CenterLink Introduction screen will be displayed. See Figure 9-2 on page 9-7. Listed below is a key to the parts of the CenterLink Management Console screen.

CenterLink Management Console
Screen Elements

Figure 9-2 on page 9-7 shows the Centerlink main screen and identifies the screen locations described below:

(1) Web Address - Displays the CenterLink home page on the PC that is being accessed using the Personal Web Server Software.

(2) Options Button - Clicking accesses the CenterLink options.

(3) Help Button - Clicking accesses CenterLink on-line help.

(4) Exit Button - Clicking Exits CenterLink.

(5) NE Command Manager - Clicking opens a command manager window and establishes a connection to a network element.

(6) NE SmartManual Manager - Clicking opens the SmartManual window.

(7) Software Installation Manager - Clicking begins the process of installing network element software into a blank system. Used during initial equipment installation only. A separate DOS Install application must be used when upgrading an OLS running an existing release.

(8) Reference Library - Clicking opens a window displaying an index of the documentation available.

(9) Notepad - Clicking opens a user note storage utility.

(10) NESERVER application - A Windows95 application that transfers data between the CenterLink Management Console software running on the web browser and the serial port of the PC. MUST be running for CenterLink to operate.

(11) Personal Web Server Application - A Windows95 application which allows the PC to operate as a web server. Needed to execute the JAVA scripts the CenterLink Management Console software uses.
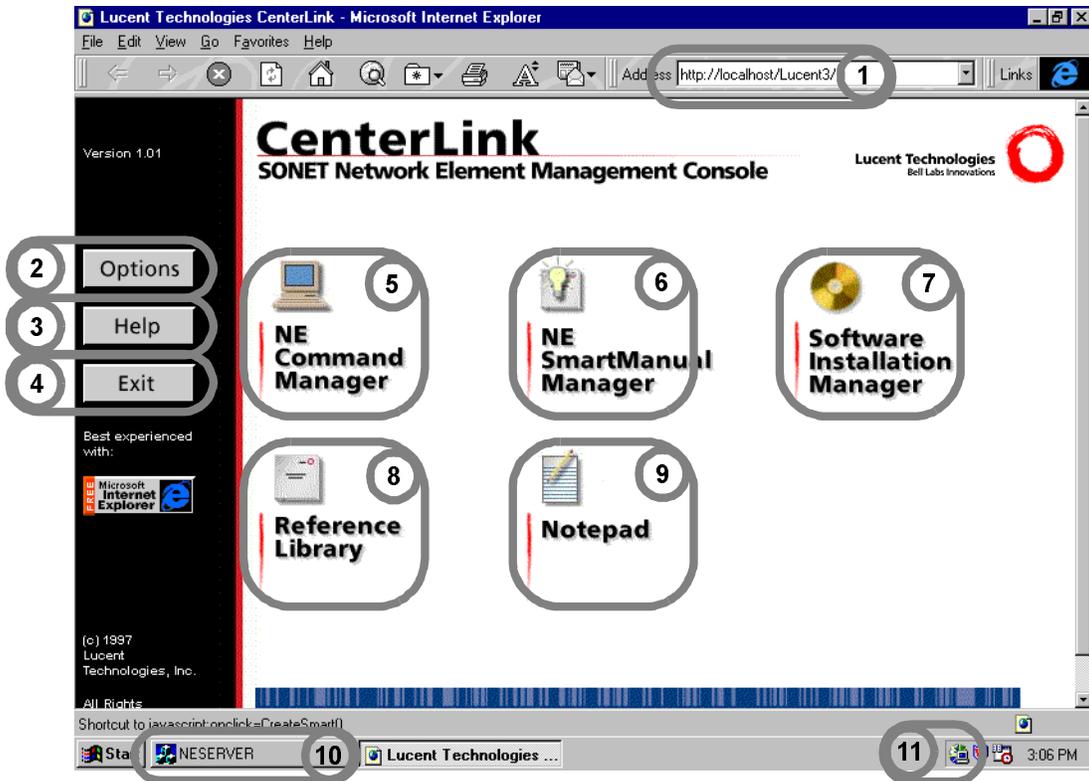
Figure 9-2 CenterLink Management Console

l. Still in the Internet Explorer, Select View-Options and the Navigation tab.

m. Click "Use Current" button.

n. Click Apply and then OK.

o. Close the Internet Explorer.

p. Exit the CenterLink Application

Network Element Software Installation

The operation will use the Software Installation Manager from the CenterLink Management Console.

(1) Verify that the LEA2 SYSMEM circuit pack is seated in the lower OLS shelf at the slot marked SYSMEM.

Requirement: The FAULT LED remains illuminated and the MJ LED is lit on the alarm panel.

(2) Verify that the LEA1 SYSCTL circuit pack is seated in the lower OLS shelf at the slot marked SYSCTL.

(3) Click on the Software Installation Manager from the Management Console.
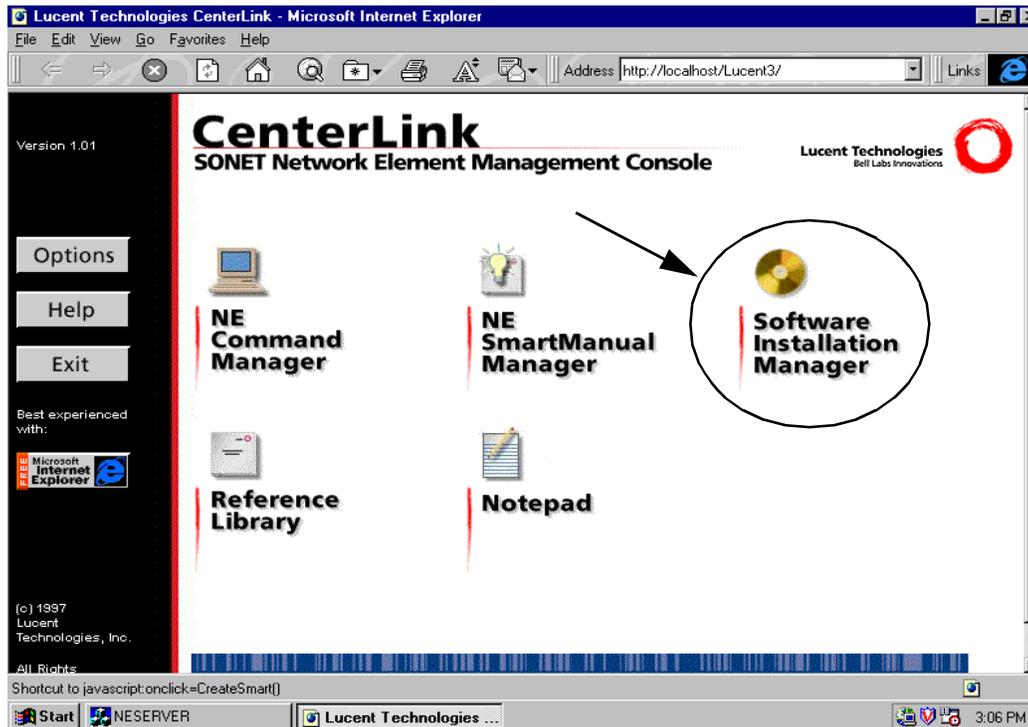
Figure 9-3 Software Installation Manager Selection

(4) Select the NE Software "2.1.0-OLS from the drop down window.
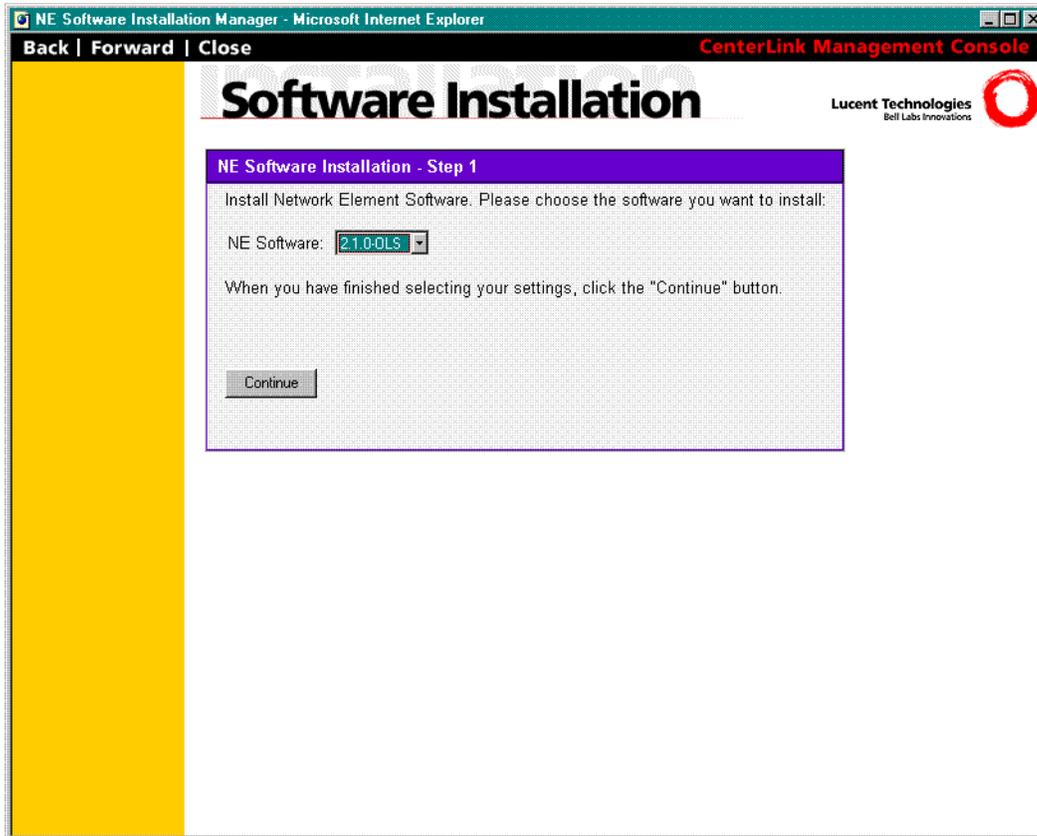
Figure 9-4 Software Installation Step 1

(5) The CenterLink Management Console (CMC) will connect to the network element and the screen shown below will be displayed.

■ If a connections **is** established, click "Continue" to proceed.

■ If a connection **is not** established:

■ Verify that the RS-232 cable is connected properly between the selected COM port (COM1 or COM2) and the DCE connector.

■ Verify NESERVER is running and using proper com port.

■ Close and restart the Software Installation Manager and attempt to connect 30 seconds after reseating the SYSCTL.
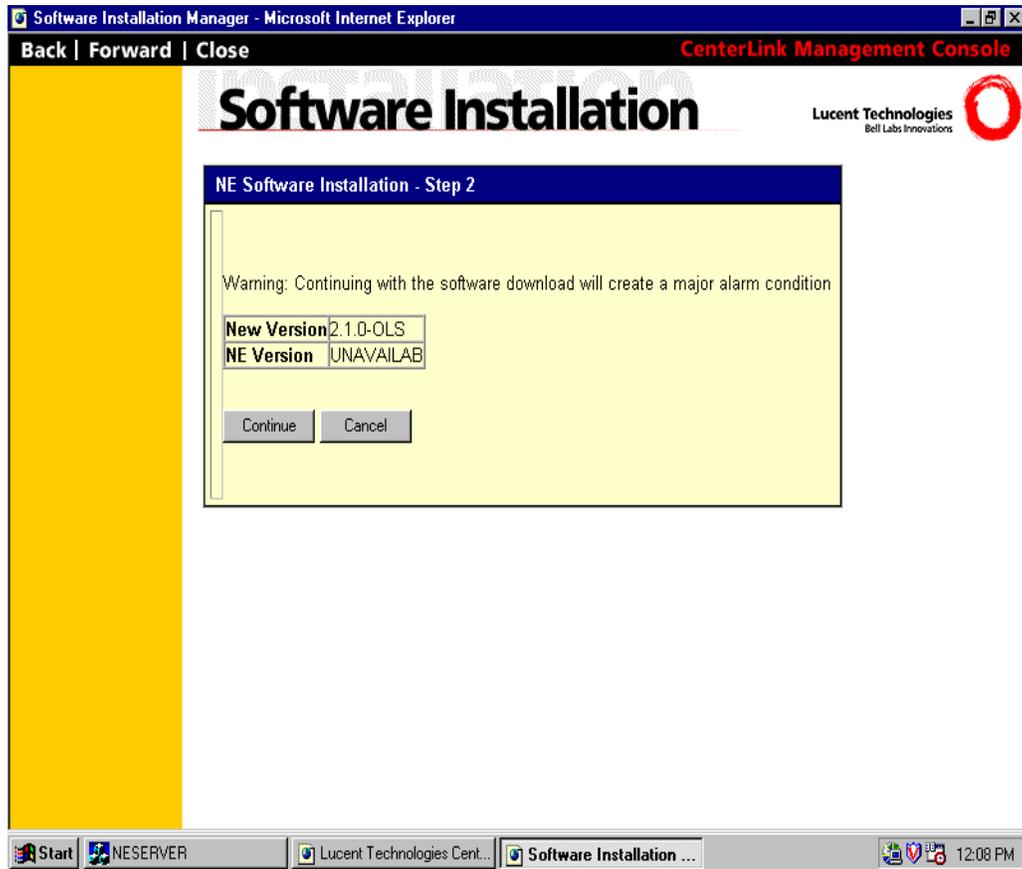
Figure 9-5 Software Installation Step 2

(6) The flash memory will be erased as described on the following screen. Proceed to the next step. This step takes about 2 minutes.
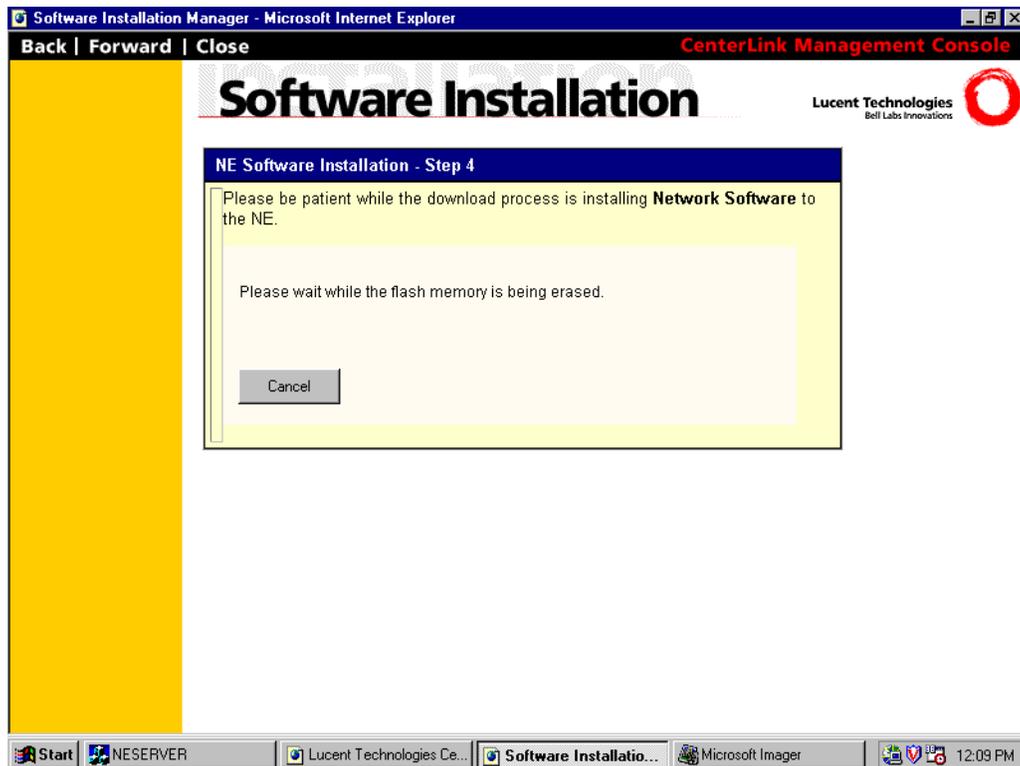
Figure 9-6 Flash Memory Screen

(7) After the erase in complete, the download will start as shown on the following screen:

➡ NOTE:

Both the SYSMEM and SYSCTL leds will stay on until the download is complete and the system resets itself.

The time for the download will be displayed on the screen. When the download is complete, proceed to the next step.
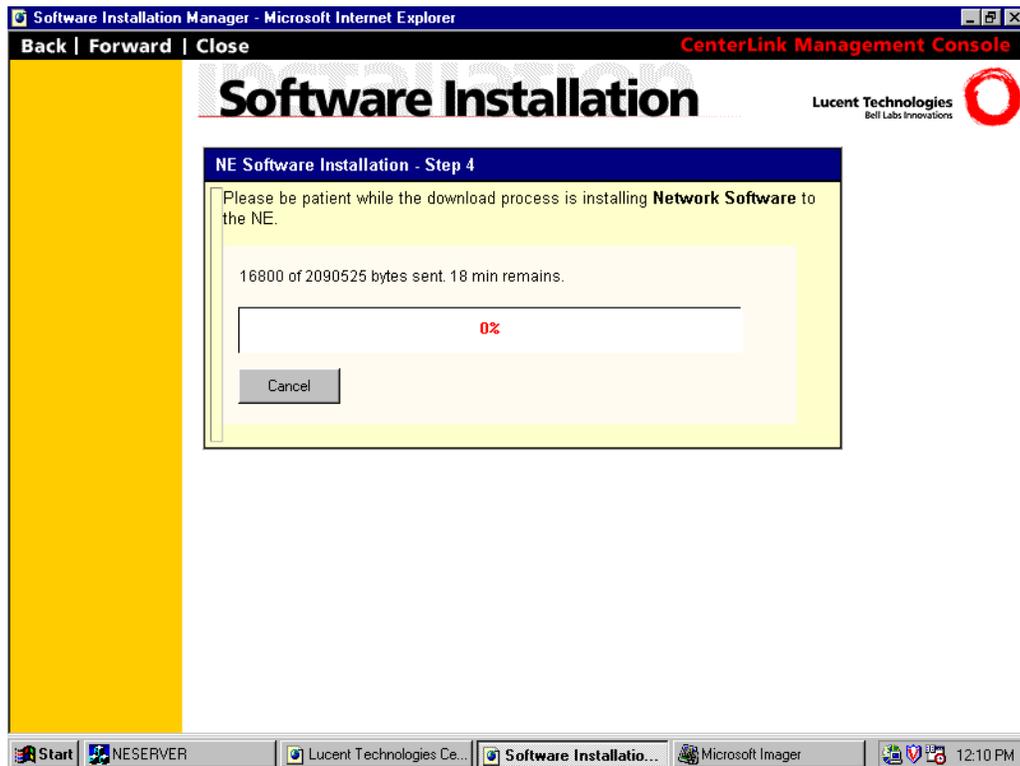
Figure 9-7 Network Element Download

(8) When the download completes, the following screen will be shown and the following actions will occur:

■ A reset will automatically be initiated by the system

■ LEDs on the SYSMEM and SYSCTL will go off after being reset.

Proceed to the next step.
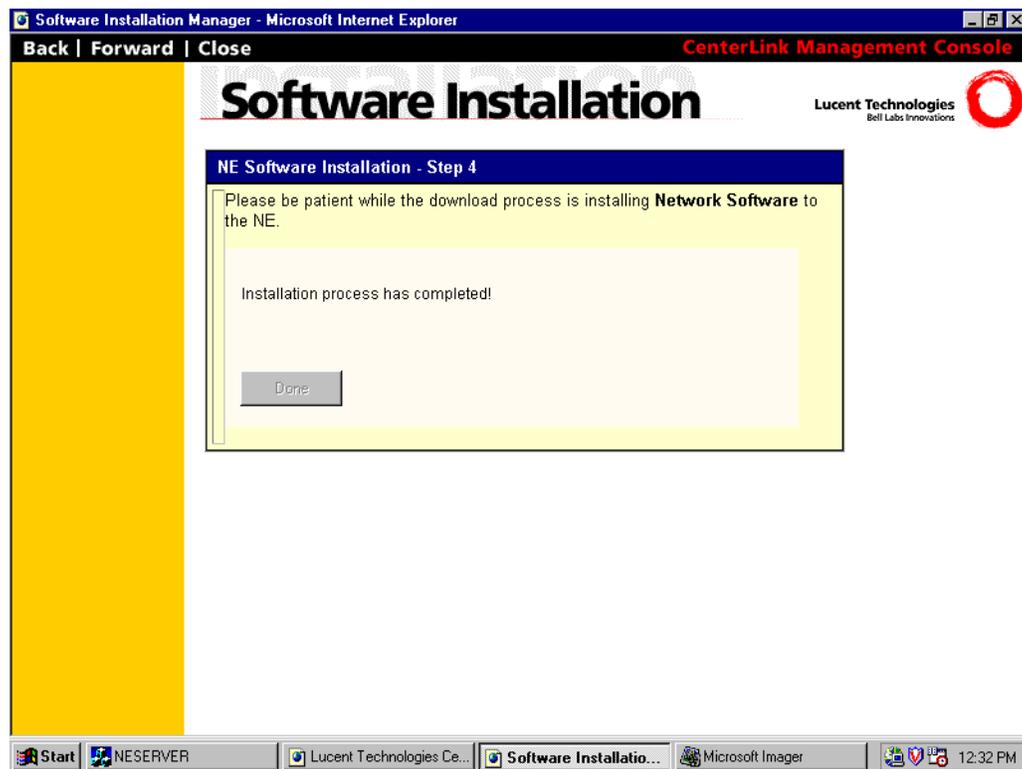
Figure 9-8 Network Element Download Completion

(9) Click "Close" to exit the Software Installation Manager.

(10) Enable the windows screen saver if desired.

(11) This completes the Blank System Software Installation Procedure.

Connecting to the Network Element

(1) Select Start-Programs-Lucent Technologies-NESERVER.

➡ NOTE:

The NEServer application provides the connection between the web browser and the COM port on the PC. It will automatically load when ever windows restarts because of its placement in the Start-up directory.

(2) Select Start-Programs-Lucent Technologies- Centerlink Home Page to start Centerlink Management Console.

(3) Click on the NE Command Manager Icon. See Figure 9-2 on page 9-7 for location.

(4) Enter the default Terminal Identifier (TID): LT-FT-2000. (Use capital letters and zeros.)
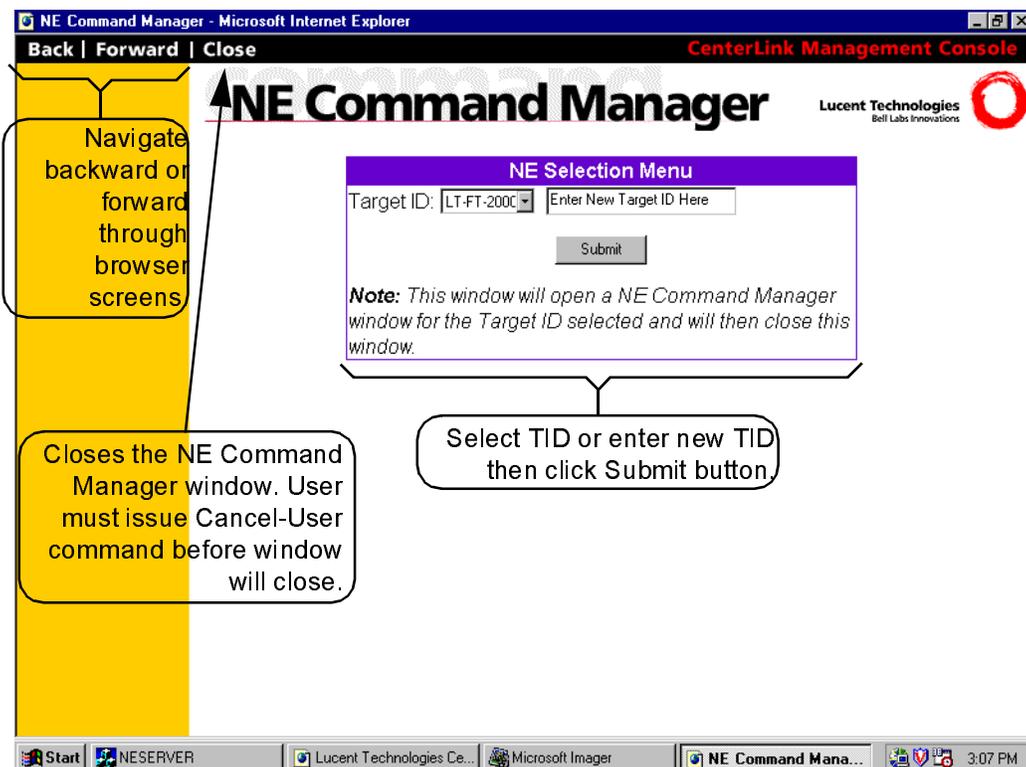
Figure 9-9 NE Selection Menu window

(5) Enter the TID, User ID, Password, and Privilege Level, then click Execute:

- ■ Default TID: LT-FT-2000 (All Caps with zeros.)

- ■ Default User ID: LT01 (All caps with a zero.)

- ■ Default Password: FT-2000 (All caps with zeros.)

- ■ To set the Level, click on the downward arrow and click on expert.
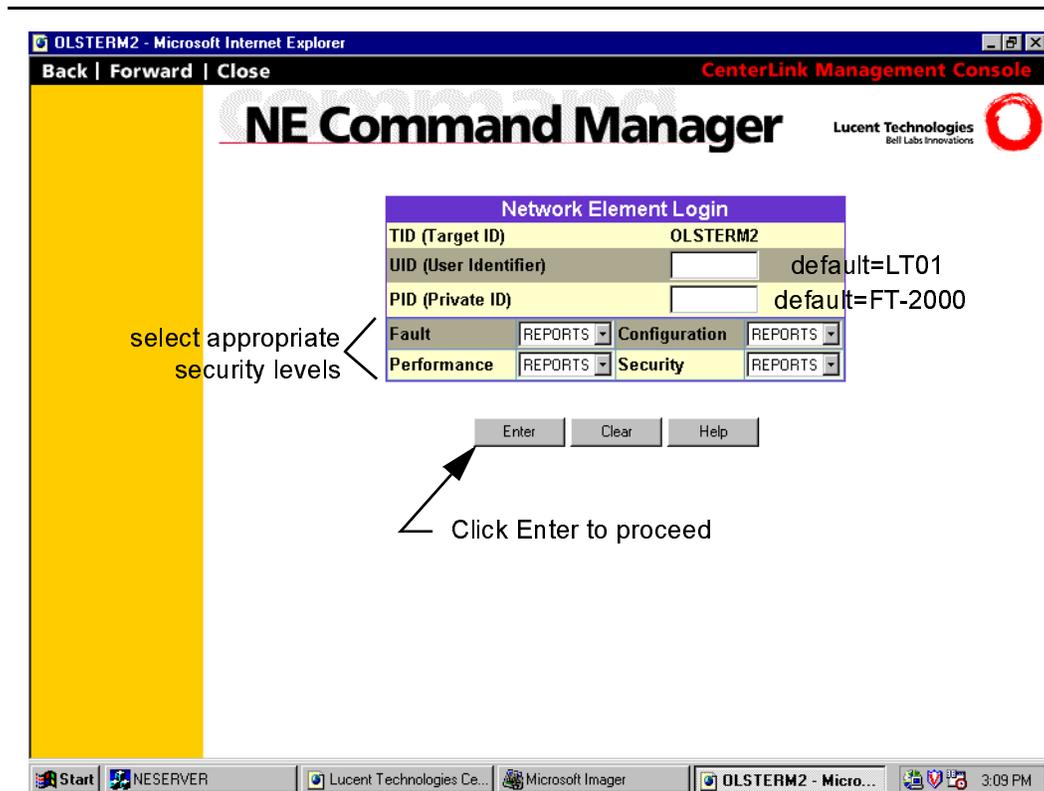
Figure 9-10 Network Element Login window
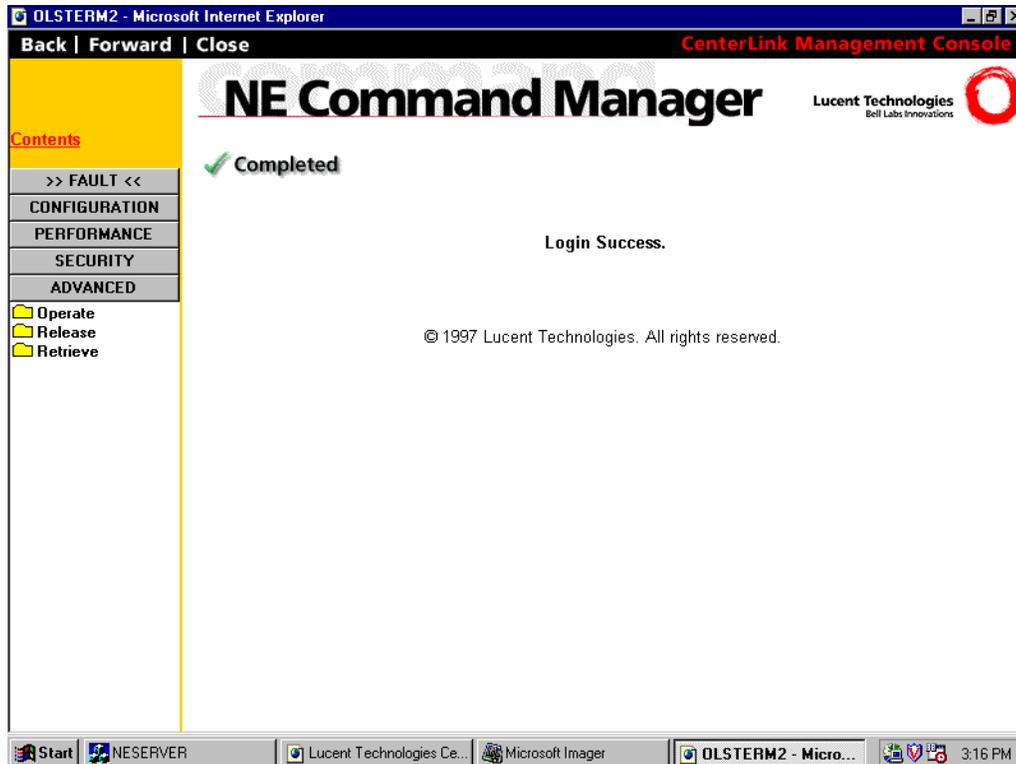
Figure 9-11 Successful Network Element Login window

(6) CenterLink will connect to the Network Element and a Login Successful confirmation will be received.

If no connection is established:

- Verify that the RS-232 cable is connected properly between the selected COM port (COM 1 or COM2) and the DCE connector.

- Verify NEServer is running.

- Return to the login command and try it again.

(7) This completes the Log Onto the Network Element using the CenterLink Procedure.

Initial Circuit Pack Insertion

General Circuit Pack Installation Consideration

- A wrist strap, connected to the wrist strap ground jack, must be worn when handling circuit packs.

- Circuit packs are keyed to prevent being inserted into the wrong shelf position.

- Before installing any circuit packs, inspect the __circuit pack side__ of the backplane for any bent or broken backplane pins. If any pins are found to be bent, straighten the pin if possible.

- Any broken pins or bent pins that cannot be straightened must be replaced using the BERG MT370-01 pin kit for the METRAL pins. Refer to Appendix B "Pin Repair".

- When installing circuit packs, use care to insert them straight to avoid damaging the circuit packs or the backplane pins.

- Fiber connectors on optical circuit packs should always be either connected to fiber or covered by protective covers. Note that the fibers should not be connected to the circuit packs or units at this time.

Install TOHCTL Circuit Pack

- Insert the LEA5 TOHCTL into its slot in the lower shelf

    Requirement: After a 5 minute reset the FAULT LED will extinguish.

Transmission Circuit Pack Insertion Procedure - Test Positions

- Verify the transmission circuit packs were placed, but not seated, in the high numbered line locations in Section 7 for each cabinet type.

⇒ NOTE:
To prevent potential damage to the Optical Amplifiers (LEA6, LEA105 or LEA7), connect the attenuated fiber to the "IN" and "OUT" ports **before** seating these transmission packs into the shelf or shelves.

⇒ NOTE:
After Optical Amplifier circuit packs have been inserted it maybe necessary to remove the fiber jumper before unseating the unit. Seat the transmission circuit packs into the shelf or shelves.

> **Requirement:** Verify that all the circuit pack FAULT LEDs are extinguished, except for the LEDs on OA circuit packs. At an End Terminal the OA circuit packs inserted on the B side (i.e. 1B, 2B, 3B, 4B) will be flashing because there is no optical signal input. At a Repeater, all of the OA circuit packs FAULT LEDS will be flashing.

OLS Initial Login And Provisioning

Description

This procedure provisions the basic Network Element values for:

- Target Identifier (TID)

- Directory Services-Network Element (DSNE)

- X.25 packet size

- Alarm Group

- Alarm Gateway Network Element (AGNE)

- End Terminal Direction (1A-TX, 1A-RCV, Dual)

- A, B, C, or 1_OA Power Attenuation Configuration (Side1_SYS, Side2_SYS)

- Enabling far end communications

- Time and date

This procedure should be done immediately after the software installation has taken place so there is no need to travel to all the sites repeatedly.

(1) Execute CONFIGURATION.Initialize.System, AID=all, PH=3 (Reset)

> **Requirement:** The command completes. The full reset time is about 10 minutes. The reset will cause the CMC to be disconnected from the network element.

⇒ NOTE:
Under certain circumstances, a Fault.Initialize.Level 3 will cause an erroneous oa-1a alarm. This alarm can be cleared with a CONFIGURATION.Update command.

(2) Log back into the network element.

Basic Network Element Provisioning

Using the CMC PC, perform the following steps:

(1) SECURITY.ENTER.SYSTEM: This commands sets the new Target ID (TID) of the network element, Alarm Group, Packet size, specifies if this NE is the Alarm Gateway Network Element (AGNE), specifies if this NE is the DIrectory Server-Network Element (DS-NE), and specifies if this NE is configured as a 1A-TX, 1A-RCV or Dual Facing Shelf. It also specifies the power attenuation configuration based on Table 9-3, "Power Configuration Selection," on page 9-20. To use this table, determine the type of OA being used, the maximum number of wavelengths possible with the equipped OMU/ODUs, and the number of spans for the total system. Look-up in the table the correct Side Configuration. If this command is not executed, the following default factory values will remain in place:

Table 9-2 Factory Default Values

Option	Default
TID	LT-FT-2000
Alarm Group	255
Packet Size	256
Alarm Gateway Network Element (AGNE)	No
Directory Server-Network Element (DS-NE)	No

⮞ NOTE:
A MJ alarm will result if this NE and another NE in the ring have the same TID. A Near End Activity Condition (DS-NE not reachable) will result if one NE in the ring is not specified as the DS-NE or if the specified DS-NE is not reachable for some reason. A MJ alarm (multiple DS-NEs defined) will result if this NE and one or more other NEs on the ring are specified as the DS-NE.

Table 9-3 Power Configuration Selection

OA	Side Configuration	# of Spans	Max. No. of Wavelengths
LEA6	A	1	8
		2	
		3	
	B	4	
		5	
	A	1	16
LEA7	A	1	16
		2	
		3	
	B	4	
		5	
	C	6	
		7	
		8	
LEA105	A	1	16
	1_OA	1	16

a. TID: Enter the new TID into the box provided. Hit the tab key or move the mouse pointer to the DS-NE box.

b. DS-NE: Select either yes or no from the box. Hit the tab key or move the mouse pointer AGNE: Select either the yes or no from the box. Hit the tab key or move the mouse pointer to the next appropriate box.

c. ALMGRP: Enter the appropriate alarm group if not using the default value. Hit the tab key or move the mouse pointer to the next appropriate box.

d. X25PS: Click on the appropriate packet size. Hit the tab key or move the mouse pointer to the next appropriate box.

e. DIRN: Click on the appropriate selection, 1A-TX, 1A-RCV, or Dual. Hit the tab key or move the mouse pointer to the next appropriate box.

f. SIDE1_SYS: Select the appropriate power configuration based on Table 9-3, "Power Configuration Selection," on page 9-20: A, B or C. Hit the tab key or move the mouse pointer to the next appropriate box.

g. SIDE2_SYS: If the DIRN selection is Dual, select the appropriate power configuration based on Table 9-3, "Power Configuration Selection," on page 9-20: A, B, C; Hit the tab key or move the mouse pointer to the next appropriate box.

h. When all entries have been made and verified, click on the enter box. If corrections need to be made, click on clear and reenter the information from step a

Figure 9-12 SECURITY.Enter.System

Requirement: The command completes, the TID now appears in the heading of all output from the bay. If the DS-NE value was changed, the TOHCTL will take about 5 minutes to reset.

➡ NOTE:

If the network element is not the DS-NE, then the TID will not be completely changed in the SYSMEM until communications with the DS-NE is established although it remains provisioned.

(2) Enable far end communications: SECURITY-ENTER-Far End Communications. Click on RAR Enabled.

(3) CONFIGURATION.Edit.Date_And Time: Set the date and time: where YY is year, MM is month, DD is day, HH is hour, MM is minutes, SS is seconds, XST is EST, CST, MST or PST, in most of the U.S., 04-xx is start of daylight savings time date (use actual date), 10-xx is end of daylight savings time date (use actual date), and XDT is EDT, CDT, MDT or PDT, in most of the U.S. If daylight savings time is not used, leave the start and stop dates both on the same date.
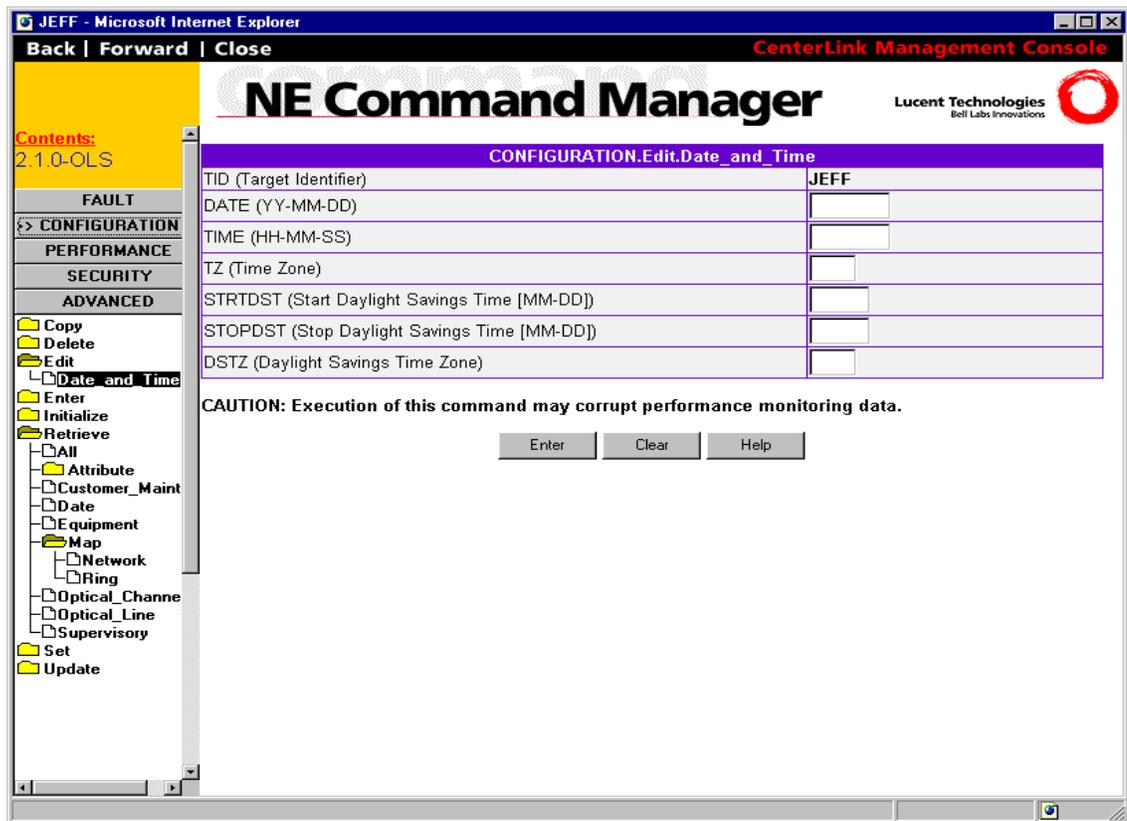
Figure 9-13 CONFIGURATION.Edit.Date_and_time

Requirement: Output from the bay now displays the correct date and time in the headings.

(4) Execute FAULT.Retreive.Condition-ALL to view alarms. Click on Enter.

Requirement: Verify the alarms shown: (Alarms may vary depending upon AGNE & DS-NE selections)

Figure 9-14 FAULT.Retreive.Condition.All

**Transmission Circuit Pack Insertion Procedure -
Final Positions**

(1) If the transmission circuit packs are in their final positions, proceed to the "Fiber Connection To Circuit Packs" procedure.

(2) At end terminal offices, remove the screws from the OMU and ODU slots for lines 1 and 2.

(3) Move the circuit packs and/or units from lines 3 and 4 back to lines 1 and 2. Refer to the appropriate configuration in Chapter 7 to verify assignments.

(4) Seat the transmission circuit packs and units into the shelf or shelves.

Requirement: Verify all the circuit pack FAULT LEDs are extinguished, except for the flashing LEDs on OA circuit packs because of no optical signal input.

(5) At end terminal offices install the screws from the OMU and ODU slots for all lines.

(6) Execute CONFIGURATION.Update.

(7) Execute FAULT.Retreive.Condition.All to view alarms.

Requirement: Verify the alarms shown for testing lines 1 and 2.

⇒ NOTE:
If the system alarms a circuit pack unequipped in lines 3 or 4 after the update has been performed, check for a short in the equipped lead cable running between shelves (P25-P26).

Final Hardware Installation Items

Fiber Connection To Circuit Packs

(1) Verify the intrashelf fiber jumpers were dressed into place in Section 7 for each cabinet type.

⚠ CAUTION:
To prevent potential damage to the Optical Amplifiers (LEA6, LEA7 or LEA105), connect the fiber to the "IN" and "OUT" ports **before** seating these transmission packs into the shelf or shelves.

Board Controller LAN Cable

On 4-Line Cabinets the ED7G028-20, G6 and G7 cable assemblies are equipped for the SYSCTL to communicate with lines 3 and 4. If lines 3 or 4 are not equipped with transmission circuit packs then terminate this LAN connection after line 2 as follows:

(1) Disconnect the ED7G028-20, G7 cable from P15 of the lower shelf.

(2) Remove the ED7G028-20, G6 (termination plug) from P15 of the upper shelf and reconnect it to P15 of the lower shelf.

(3) Cut cable tie(s) as necessary and connect the ED7G028-20, G7 cable end removed from P15 of the lower shelf to P15 of the upper shelf. See below

Factory Configuration if Lines 3&4 not used
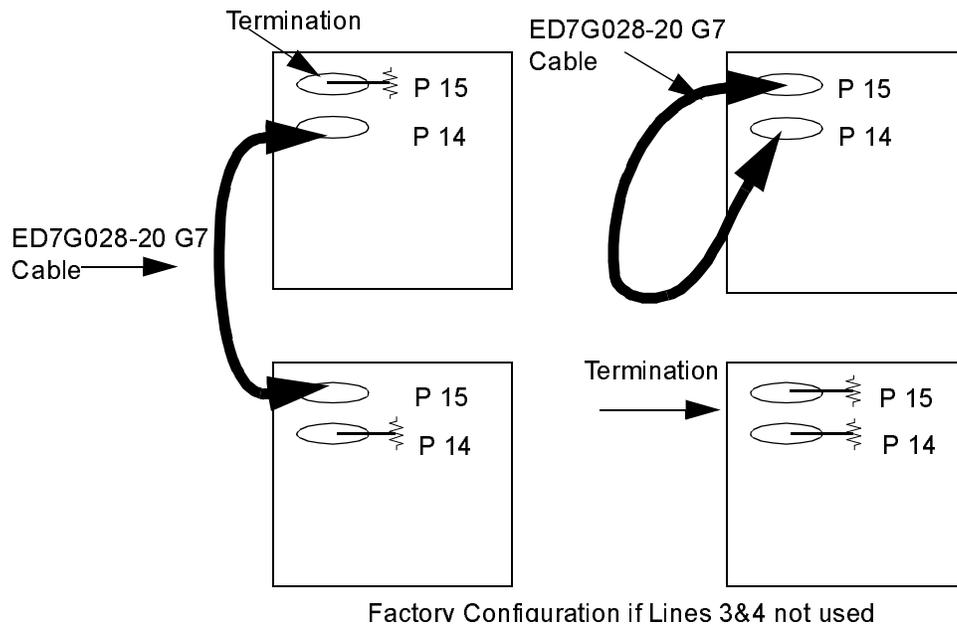
Figure 9-15 Cable and Termination Re-configuration if Lines 3 & 4 Unused

➡ NOTE:

If line 3 or 4 is added in the future then this cable and termination will need to be returned to their original locations.

Final Operations

Proceed to Chapter 10 for testing End Terminals or Repeaters.

OLS & OT Local Installation Testing

10

Contents

OLS & OT Local Installation Testing

10

Overview

This section describes the LED test, ODU and OMU Verification tests, and Installation Auto Turnup tests for the OLS at end terminal and repeater offices. Tests described in this section must be performed on each OLS.

It also describes testing of the Optical Translator (OT), the OTU slots, the miscellaneous discretes on each OTU and associated wiring to the EMDU, and the optical output of each OTU. Tests described in the OT subsection must be performed on each OTU and OT cabinet.

General Considerations

⚠️ CAUTION:
Installation Auto Turnup tests are performed only out of service. If these tests are performed in service, service will be interrupted.

⚠️ WARNING:
Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments. Avoid direct exposure to beam.

Note the following before starting installation Auto Turnup tests:

■ Disconnect the office alarm cable from the OLS and/or OT before performing any tests. Reconnect the office alarm cable after completing testing.

■ This procedure requires that the SYSCTL and the SYSMEM circuit packs have OLS software installed. Additionally, all circuit packs must be installed, with their FAULT LEDs off, except the OAs which have flashing LEDs. Software Installation and Circuit Pack Insertion procedures are in Section 9, "Network Element Start Up and Provisioning".

■ No circuit pack should be pulled or inserted while any of the Auto Turnup tests are in progress.

Tools, Test Sets and Accessories

The following equipment is required for performing installation tests at end terminal, repeater or OT offices:

Table 10-1 Local Installation Test Equipment

Equipment	# for End Term.	# for Repeater	# for OT
Wrist Strap connected to wrist strap ground jack on user panel	1	1	1
Single Mode Optical Fiber Cable with appropriate connectors on each end. Recommended length 2-4 Feet	2		
Multi-mode Optical Fiber Cable with appropriate connectors on each end. Recommended length 2-4 feet	2	4	
Optical 93AK8573 33dB Test cables for loopback testing and power Measurements (see Note below)	2	4	1
Optical Power Meter	1	1	1
PC for use as CMC (CenterLink Management Console) with CMC software loaded and straight and null modem cables	1	1	
Optical connector cleaning accessories (see Appendix C)	1	1	1
Any Sonet frame OC-48 optical signal or a test set that generates an OC-48 optical signal (see Note below)			1

➡ NOTE:
If the Optical Power Meter will accept +16 dBm, the 33 dB Test cable will not be needed.

➡ NOTE:
Signal Source such as Lucent Technologies OC-48 Optical Signal Source (ITE # 7089) or Tektronix Test Set ST2400 with option 12.

Testing Setup Procedure

Perform the following steps to connect the CMC computer to the OLS.

➡ NOTE:
The detailed CMC connection and login procedure is given in "OLS Login Procedure Overview" in Appendix F.

(1) Log back into the Network Element in expert mode as described in the previous chapter if not currently logged in.

➡ NOTE:
or OT ONLY: If testing a OT only, proceed to "OTU Miscellaneous Discrete Tests" on page 10-19. It is assumed that the OT is to be connected to an OLS system. If this is not the case, contact your next level of support for the proper procedure.

LED Tests

LED Test Description

The LED test verifies proper operation of LEDs in the OLS. Proper LED operation is necessary to assist in trouble isolation. If failed LEDs are indicated (they do not light), replace the circuit pack or module they are in. Only the PWR ON green LEDs are in sockets. Repeat the test until all LEDs pass the test. If a FAULT LED on a circuit pack works in one slot, it will work in any slot. There is no need to move circuit packs to unequipped slots.

LED Test Procedure

Perform the following steps to test all LEDs on the OLS:

(1) Select FAULT.Test.LED, enter 2 in the Repeat Value box and hit enter.

Requirement: Observe that all LEDs light for 10 seconds, then turn off for 10 seconds. The 20 second sequence repeats, then LEDs revert to their initial state.

➡ NOTE:
If the site under test is a repeater only site, proceed to "Auto Turnup Local" on page 10-7.

ODU Tests

ODU Test Description

The OLS optical amplifier output noise is used as a broadband signal source to verify continuity through the ODU.

⇒ NOTE:
The ODU and its associated OA must have been powered for at least 15 minutes prior to making any tests.

⚠ CAUTION:
To prevent potential damage to the Optical Amplifiers (LEA6, LEA7 or LEA105) or the fiber jumpers themselves, connect the fiber jumpers to the "IN" and "OUT" ports **before** seating or unseating these transmission packs into the shelf or shelves.

Line 1 Test

(1) Verify the connection between the output of an OA to the INPUT port of the ODU under test.

(2) Using a 33dB attenuated test cable, connect the optical power meter to OCHAN1 OUT of ODU1 A/B. Either note the power meter reading or zero the power meter for relative power measurements.

Requirement: The power meter should initially show that power is present. On 16 λ systems, the measurement could be below the resolution of the power meter. If this is the case, replace the 7 dB LBO on the OA with a 0 dB.

⇒ NOTE:
If you are using a power meter capable of +16 or greater input level, the 33 dB test cable will not be needed.

⇒ NOTE:
If a 33 test dB cable is not required, an ST-ST adapter and an ST-LC fiber jumper will have to be used for connection to the 16 wavelength OMU.

(3) Move the optical power meter to the next OCHAN OUT and measure the power level relative to that of OCHAN1 OUT. See Figure 10-1, "ODU Line 1 Verification Connections," on page 10-5.

Requirement: The power level should be within 1 or 2 dB of OCHAN1.

(4) Move the optical power meter to next OCHAN OUT and repeat steps 2 & 3 until all OCHAN OUTs have been tested.

(5) If the 7 dB LBO has been replace with a 0 dB, restore the 7 dB LBO to its original location.

(6) Return the intrashelf fiber jumpers to their original positions when complete.

Lines 2, 3 & 4 Tests

Repeat the test for Line 1 for all other lines, using the appropriate ODUs and OAs for each line.
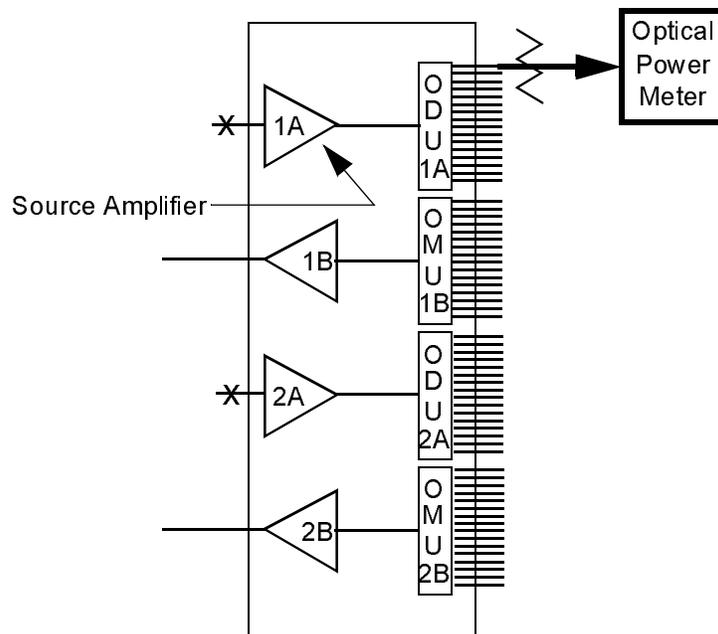
Figure 10-1 ODU Line 1 Verification Connections

OMU Tests

OMU Test Description

The OLS optical amplifier output noise is used as a signal source to verify continuity through the OMU. The ODU is used to filter the wide-band noise into a narrow band.

OMU Test Procedure

Line 1 Test

As shown in Figure 10-2 on page 10-7, use the output of the ODU from line 1 to test the OMU for line 1 as follows:

(1) Open the input to the test source amplifier by removing an input fiber from any OA. (Any one OA can be used in the Single OA configuration.)

(2) Connect the output of that OA to the input of the ODU.

(3) Using a 33 dB attenuated test cable if necessary, connect the optical power meter to OCHAN1 OUT of the ODU.

➡ NOTE:
If you are using a power meter capable of +16 or greater input level, the 33 dB test cable will not be needed.

(4) Note the power meter reading or zero the power meter for relative power measurement.

(5) Remove the power meter fro the ODU and connect it to the OMU OUT of OMU1.

(6) Connect OCHAN1 OUT of ODU1 to OCHAN1 IN of OMU1 with a fiber jumper.

(7) Verify a power level difference from the dfirst reading between -8 & -13dBm.

➡ NOTE:
The purpose of this test is to verify a single channel loss through the OMU of between 8.5 and 12.5 dB. The connection to the ODU does not change. If the measured value above is not met, compare the input and output levels of the OMU.

(8) Verify optical channels 2 through 8/16 by moving the connection on OMU1 from the measured OCHAN OUT to the next OCHAN OUT and repeating step 7.

(9) Return the intrashelf fiber jumpers to their original positions when complete.

Lines 2, 3 & 4 Test

Repeat the previous test for any other equipped lines.
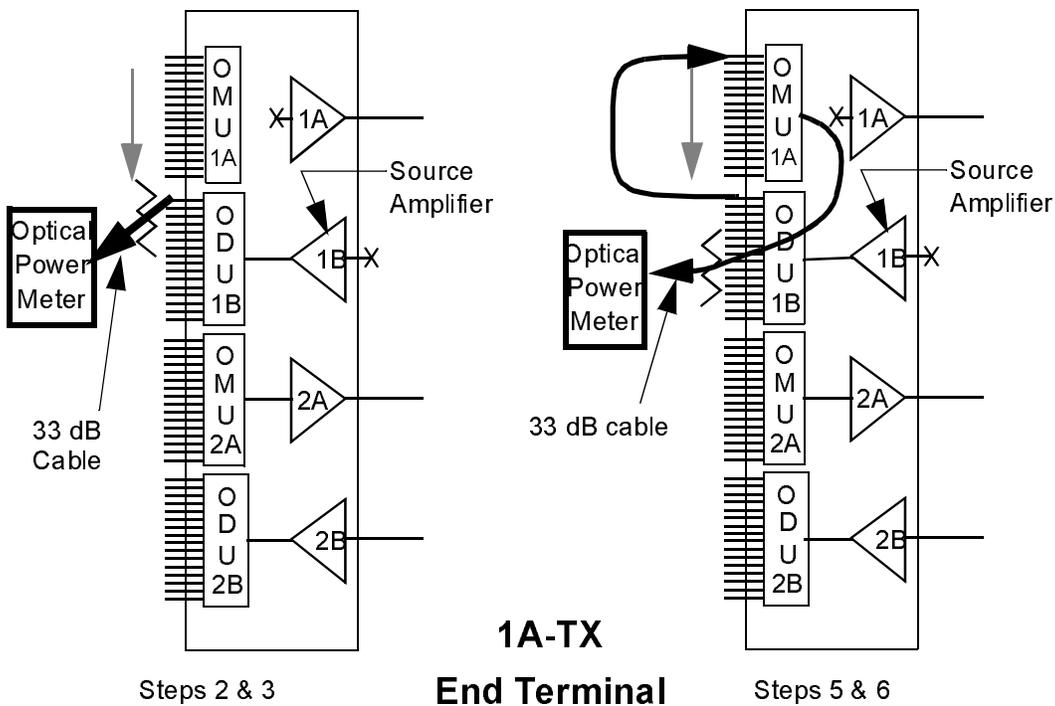
Figure 10-2 OMU Line 1 Verification Connections

Auto Turnup Local

Auto Turnup (local) Test Description

This test verifies the customer maintenance signal (CMS) connections on the TLM packs and verifies the supervisory (SUPR) signal path through the TLM and OA units and the intrashelf jumpers. The test may take up to 5 minutes to complete. A more detailed description of the test is given in Chapter 13.

⇒ NOTE:
   FOR END TERMINALS ONLY: Because the Optical Amplifiers require an input signal for the SUPR test to run, an OC-48 signal needs to be connected to the OMU for each line.

   If failed slots are indicated, replace the circuit pack. Repeat the test until all lines pass the test. If the line is not fully equipped, move circuit packs into unequipped lines and repeat the test. If many different circuit packs fail in the same slot, there may be a wiring problem on the shelf. If so, contact your next level of support. Also, since an optical loopback is required, this test verifies proper operation of the jumpers to the LGX.

Auto Turnup Local CMS Test Procedure

Perform the following steps for Auto Turnup Local CMS test:

(1) Verify there is no fiber connections to the OA input and output connectors at the LGX panel.

(2) Loop the customer maintenance signal connectors (CM IN to CM OUT) using **multimode** fiber jumpers.

   For End Terminals, loop both lines as shown in Figure 10-6 on page 10-11.

   For Repeaters, loop both line (2 loops per line) as shown in Figure 10-4 on page 10-10.

   For and Example of Single OA configurations, see Figure 10-5 on page 10-10.

(3) Execute CONFIGURATION.Update.

(4) Execute FAULT.Test.Auto.Local. In the first box, select CMS. In the second box click on ALL. See Figure 10-3, "FAULT.Test.Auto.Local. CMS Command," on page 10-9. This test will take up to 5 minutes, depending on how many lines are equipped. Login in expert mode if the command is not found.
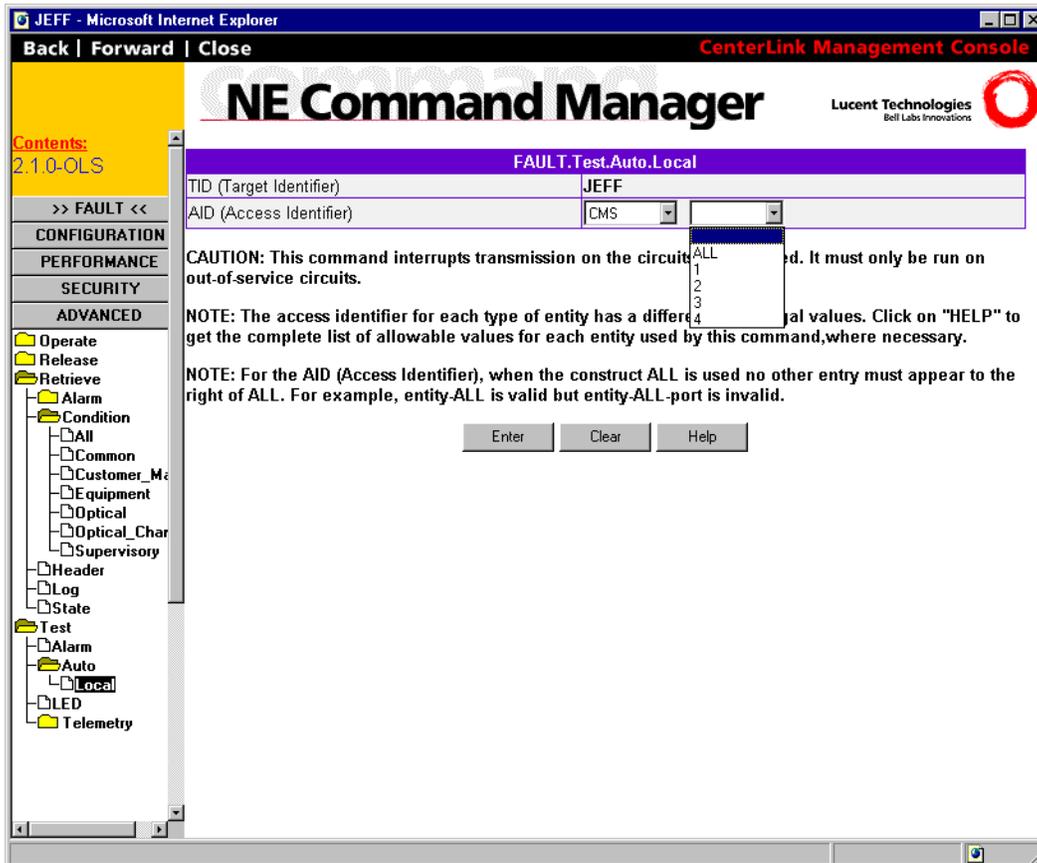
Figure 10-3 FAULT.Test.Auto.Local. CMS Command

Requirement: Results will be displayed on the CMC screen. Good slots will report as Good. Failed slots will report as Fail. A" -" represents an untested slot (not equipped). If any slot fails, move its circuit pack to a known good slot and retest. If the failure moves with the pack, it indicates a bad pack. If the slot fails when equipped with a known good circuit pack, it indicates a possible backplane problem. Contact your next level of support.

(5) Remove optical CMS loopback cables.

(6) Repeat steps 1 to 5 for any other equipped lines until all lines are tested.

(7) Execute CONFIGURATION-UPDATE.

Requirement: The command clears CMS loss of signal alarms.
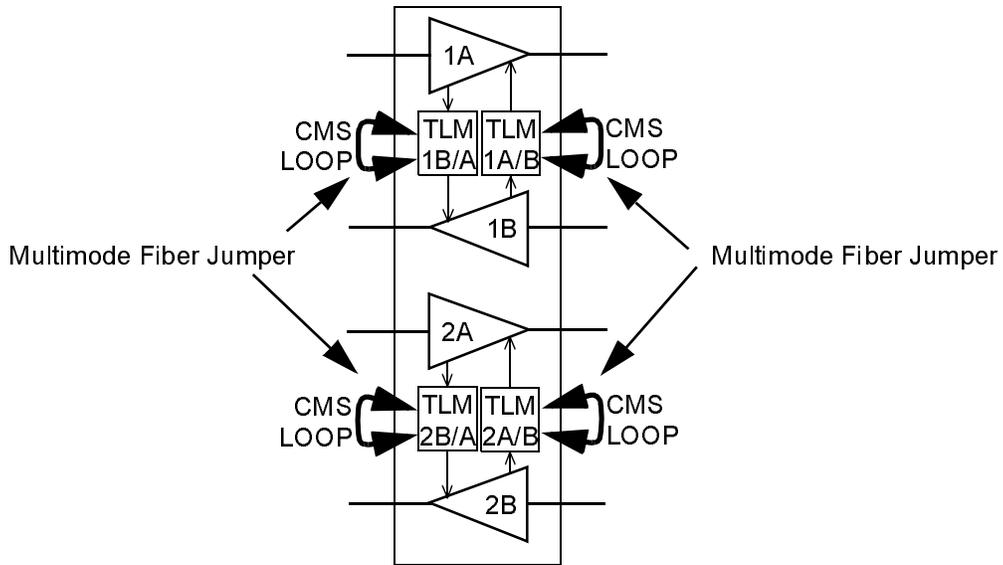
Figure 10-4 Auto-Turnup-Local CMS Connections for Repeaters
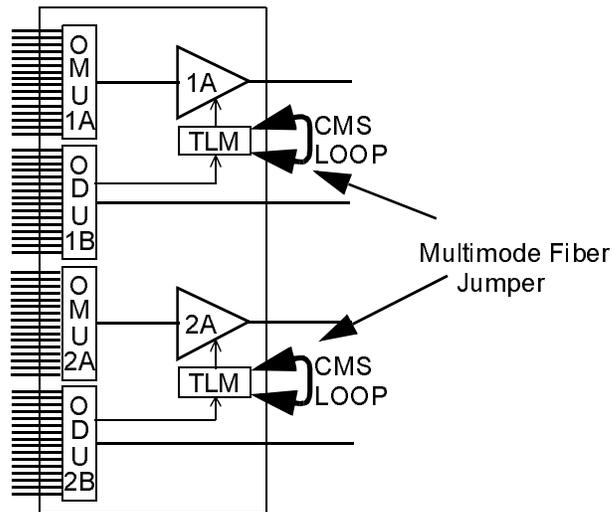
Figure 10-5 Auto-Turnup-Local CMS Connections for Single OAs
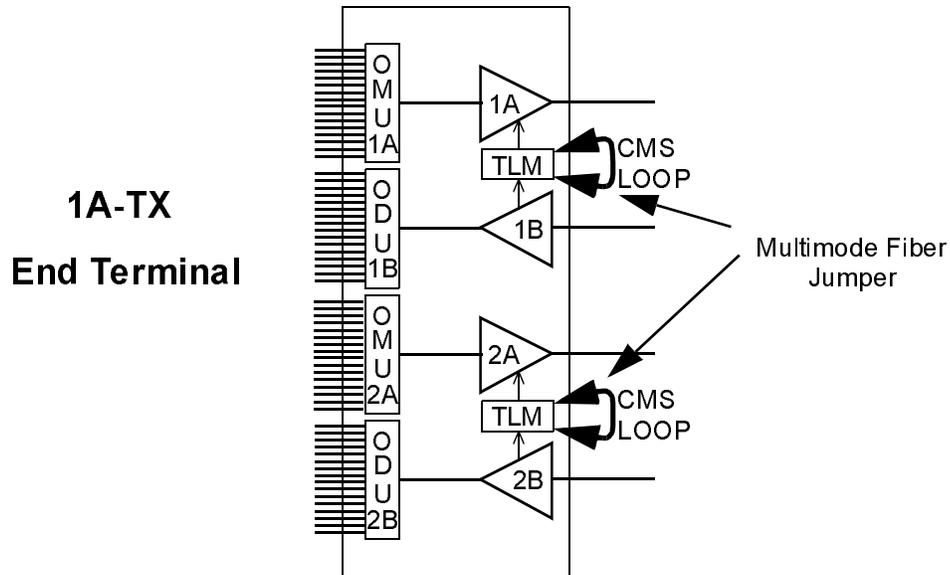
1A-TX

End Terminal

Figure 10-6 Auto-Turnup-Local CMS Connections(1A-TX shown)

Auto Turnup Local SUPR Test Procedure - End Terminals

For Repeater Installations, proceed to "Auto Turnup Local SUPR Test Procedure - Repeaters" on page 10-14.

⚠ CAUTION:
To prevent potential damage to the Optical Amplifiers (LEA6, LEA7 or LEA105) or the fiber jumpers themselves, connect the fiber jumpers to the "IN" and "OUT" ports **before** seating or unseating these transmission packs into the shelf or shelves.

Perform the following steps for Auto Turnup Local SUPR test:

(1) Loop back the line 1 high speed signal through an attenuated cable as follows:

 a. For end terminals, connect OA OUT of the transmitting OA to OA IN of the receiving OA through 33 dB of attenuation as shown in Figure 10-7.

      b. For Single OA applications - connect the transmit OA OUT to the ODU directly as shown in Figure 10-8 on page 10-13. There will be no receive OA for these applications. Use a 10 dB LBO on the OA OUT and a 5 dB LBO on the TLM IN and a fiber jumper in between; do not use the 33 dB cable.

(2) Loop back the line 2 high speed signal through an attenuated cable as follows:

      a. For end terminals - connect OA OUT of the transmitting OA to OA IN of the receiving OA through 33 dB of attenuation as shown in Figure 10-7.

      b. For Single OA applications - connect the transmit OA for Line 2 to the ODU directly, as shown in Figure 10-8 on page 10-13. There will be no receive OA for these applications. Use a 10 dB LBO on the OA OUT and a 5 dB LBO on the TLM IN and a fiber jumper in between; do not use the 33 dB cable.

(3) Verify the customer maintenance signal connectors (CM IN/CM OUT) are not looped.

(4) Execute CONFIGURATION.Update.

Requirement: The command clears loss of signal alarms. FAULT LEDs on all OAs are off and are not flashing.

(5) Execute FAULT.Test.Auto.Local. Click on SUPR in the first box. Click on All in the second box. This test will take up to 5 minutes, depending on how many lines are equipped (typically less than 1 minute).

Requirement: Results will be displayed on the CMC screen. A good slot will report Good. A failed slot will report FAIL. A - represents an untested slot (no circuit pack equipped). If any slot fails, move it's circuit pack to a good slot and verify the test again. Replace the circuit pack in the failed slot if indicated that the failure moves with the pack.

(6) Remove 33 dB optical loopback cables or the non attenuated optical loopback cables, the 10 dB LBOs on the OA OUT ports and the 5 dB LBOs on the TLM IN ports..

(7) Execute CONFIGURATION.Update.

(8) Repeat steps 1 to 7 for any other equipped lines (3 or 4) until all lines are tested.
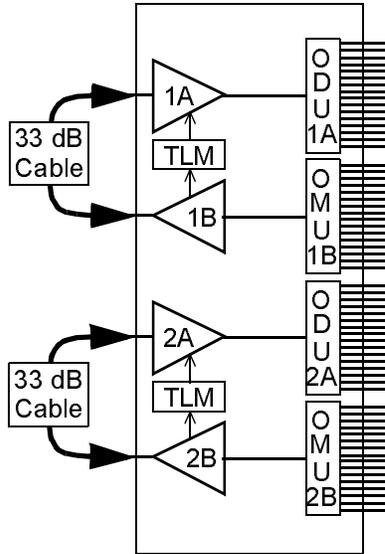
Figure 10-7 Auto-Turnup-Local SUPR Connections for 2 OAs (1A-RCV)
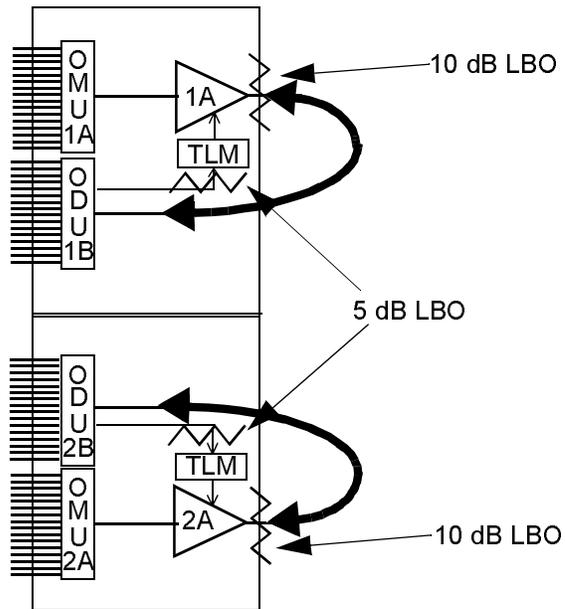
Figure 10-8 Auto-Turnup-Local SUPR Connections for Single OAs

**Auto Turnup Local SUPR Test Procedure -
Repeaters**

Perform the following steps for Auto Turnup Local SUPR test:

⚠ CAUTION:
To prevent potential damage to the Optical Amplifiers (LEA6, LEA7 or LEA105) or
the fiber jumpers themselves, connect the fiber jumpers to the "IN" and "OUT" ports
before seating or unseating these transmission packs into the shelf or shelves.

(1) Loop back the line 1 high speed signals through attenuator cables by connect-
ing the OA 1A output to the OA 1B input through 33 dB of attenuation and the
OA 1B output to the OA 1A input through 33 dB of attenuation as shown in Fig-
ure 10-7.

(2) Loop back the line 2 high speed signals through attenuator cables by
connecting the OA 1A output to the OA 1B input through 33 dB of attenuation
and the OA 1B output to the OA 1A input through 33 dB of attenuation as
shown in Figure 10-7 on page 10-13.

(3) Verify the customer maintenance signal connectors are not looped.

(4) Execute CONFIGURATION.Update.

Requirement: The command clears loss of signal alarms. FAULT LEDs on
both OAs are off and are not flashing.

(5) Execute FAULT.Test.Auto.Local. Select SUPR in the first box. Select All in the
second box. This test will take up to 5 minutes, depending on how many lines
are equipped.

Requirement: Results will be displayed on the CMC screen. A GOOD repre-
sents a good slot. A FAIL represents a failed slot. A - represents an untested
slot (no circuit pack equipped). If any slot fails, move its circuit pack to a good
slot and verify the test again. Replace the circuit pack in the failed slot if indi-
cated that the failure moves with the pack.

(6) Remove optical loopback cables.

(7) Execute CONFIGURATION.Update.

(8) Repeat steps 1 to 7 for any other equipped lines (3 or 4) until all lines are
tested.
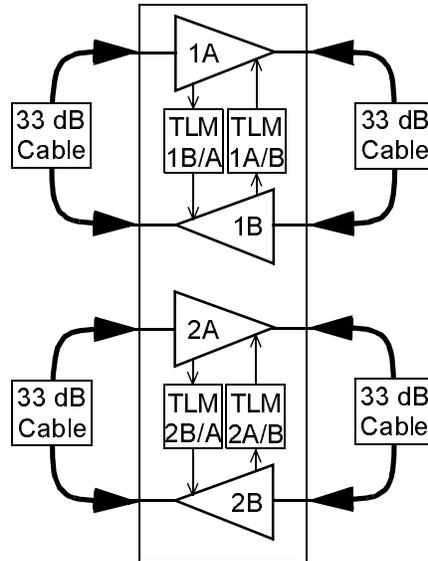
Figure 10-9 Auto-Turnup-Local SUPR Connections

Local Operational Tests

Local Operational Tests Description

The local operational tests verify that the office alarms and CIT-DTE connections are operating properly.

Local Alarm Test Procedure

(1) Notify alarm monitoring personnel that testing is taking place on the office alarm systems.

(2) Connect local alarm cable to P29 (OFFICE ALARMS) on the interconnect panel.

➡ NOTE:
If installing the office alarm cable on an End Terminal for 4 Bidirectional Optical Lines or a Repeater for 4 Bidirectional Lines, use the P29 connector located on the lower shelf. If the upper shelf is used, the ACO function will not work properly.

(3) Select FAULT.Test.Alarm, enter all in the first box, enter 2 in the Repeat Value box, and hit enter. The test will cycle through each alarm state and then repeat. The alarm states are tested in this order:

      a. CR alarm

      b. MJ alarm

      c. MN alarm

      d. All alarm LEDs off

Requirement: Verify that the office audible alarms, visual alarms, and the LEDs on the indicator strip are reflecting the correct alarm status. The NE ACTY will be lighted throughout the test.

➡ NOTE:
This tests the CR, MJ, and MN alarms. The ABN, FE ACTY, and NE ACTY are not tested.

(4) Select FAULT.Test.Alarm, enter MJ from the drop down menu and hit enter. During the alarmed 10 seconds, press the ACO button on the user panel.

Requirement: The audible alarms are silenced and the ACO button is lighted.

(5) Disconnect the local alarm cable from P29.

Parallel Telemetry Test Procedure

If parallel telemetry is used, perform the following steps to verify parallel telemetry.

(1) Select FAULT.Test.Telemetry.Parrallel, select ALL and hit enter.

Requirement: Parallel telemetry alarm is activated.

**Miscellaneous Discrete and Extended
Miscellaneous Discrete Alarm Tests**

If miscellaneous and/or extended miscellaneous discretes are equipped, perform the following steps to verify the miscellaneous discrete points.

(1) Activate the alarm closure to be tested. (open door, smoke alarm, etc.)

(2) Select FAULT.Retreive.Condition, enter all and hit enter.

Requirement: Verify the environmental alarm shows in the report.

CIT(CMC)-DTE Port Test Procedure

➡ NOTE:
This procedure requires the use of a null modem, since like ports (DTE and DTE) are to be connected together. Null-Handshake null modem wiring is given in Figure 10-10 on page 10-17. Also, refer to the troubleshooting section for the minimum CIT(CMC) Connection information. This type of connector is required for this test. Be sure to obtain a connector with the correct mating pins or sockets required for your cable and OLS DTE port.

```
          OLS                          PC

   20 DTR                          DTR 20
    6 DSR                          DSR 6
    4 RTS                          RTS 4
    5 CTS                          CTS 5
    8 DCD                          DCD 8
    2 TXD                          TXD 2
    3 RXD                          RXD 3
    1 FGD                          FGD 1
    7 SGD                          SGD 7
```
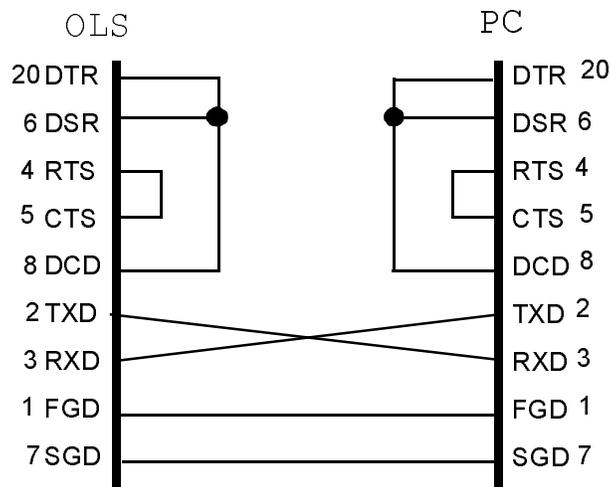
Figure 10-10 Null Handshake Null Modem Wiring

Serial Interface port signals and connector pinouts for DB9, DB25, and RJ45- 8 pin ports are given in Table 10-2, "Serial Port Pinout information," on page 10-18 for reference.

Table 10-2 Serial Port Pinout information

Signal	Name	DB9 Pin	DB25 pin	RJ45-8 pin	DCE I/O	DTE I/O
DCD	Data Carrier Detect	1	8	6	O	I
RXD	Received Data	2	3	5	O	I
TXD	Transmitted Data	3	2	3	I	O
DTR	Data Terminal Ready	4	20	4	I	O
SGD	Signal Ground	5	7	7	NA	NA
DSR	Data Set Ready	6	6	not present	O	I
RTS	Request to Send	7	4	2	I	O
CTS	Clear to Send	8	5	8	O	I
RI	Ring Indicator	9	22	not present	O	I
FGD	Frame Ground	not present	1	1	NA	NA

Perform the following steps to verify DTE port operation.

(1) Remove the CIT(CMC) cable from the user panel.

(2) Using the null modem adapter, connect the CIT(CMC) cable to the DTE connector on the interconnection panel.

Connecting to the Network Element

(1) Select START-PROGRAMS-Lucent Technologies-NESERVER.

➡ NOTE:
The NEServer application provides the connection between the web browser and the COM port on the PC. It will automatically load when ever windows restarts because of its placement in the Start-up directory.

(2) Select Start-Programs-Lucent Technologies- Centerlink Home Page to start Centerlink Management Console.

(3) Click on the NE Command Manager Icon.

(4) Enter the TID, User ID, Password, and Privilege Level, then click Execute:

  · Default TID: LT-FT-2000 (All Caps with zeros.)

  · Default User ID: LT01 (All caps with a zero.)

  · Default Password: FT-2000 (All caps with zeros.)

- To set the Level, click on the downward arrow and click on expert.

(5) CenterLink will connect to the Network Element and a Login Successful confirmation will be received.

If no connection is established:

- Verify that the RS-232 cable is connected properly between the selected COM port (COM 1 or COM2) and the DCE connector.

- Verify NEServer is running.

- Return to the login command and try it again.

(6) Logout from the CMC

(7) Remove the null modem from the cable.

Final OLS Operations

Perform the following to complete the testing of the OLS:

■ Put protective covers on all optical connectors.

■ If the OLS is to be a stand alone system (i.e. no OT installation at this time), proceed to Section 11, else continue for procedure for testing the OT system.

OTU Miscellaneous Discrete Tests

The testing of the miscellaneous discrete contacts will be performed as a combined OT/OLS test using a fully tested OLS. This test will verify the operation of the miscellaneous discretes on each OTU circuit board and at each OTU slot connector. It will verify the wiring to the EMDU, the EMDU, the TBOS link to the OLS, and the OLS software with each alarm.

To start testing of miscellaneous discretes the following steps must have been completed:

■ The OLS must be installed and tested.

■ The OLS must be loaded with Release 2.0 or greater software.

■ Wiring to the EMDU from the OT must be complete as described in Table 6-35, "OT System Shelf P2 Wiring to Dantel EMDU," on page 6-45 through Table 6-42, "OT Misc. Disc. Cable Wiring / OT to Harris EMDU," on page 6-52.

■ Wiring to the EMDU from the OLS and the -48 Volt supply voltage must be complete as specified in Appendix D or E.

- ■ Switch and strap settings on the EMDU must be completed as described in Appendix D or E. If switch setting must be changed, the DANTEL EMDU must be powered down for the new settings to be activated.

Testing OTU Miscellaneous Discrete Alarms

The procedure for testing miscellaneous discrete alarms is as follows:

1. Enable the Serial Telemetry Port by selecting the following command through the CMC. Select SECURITY.Enter.Channel_Identifier.Security. In the AID box select, SER_TLM1,in the PORTACC box click on enable.

    If a SER-TLM alarm comes on after enabling the port, communications is not being made with the EMDU (DANTEL or Harris). Check that the serial telemetry cable from the EMDU is connected to the SER TLM 1 port of the OLS. Check that the OLS end terminal that is receiving the Serial Telemetry cable has been activated. Verify wiring and switch setting at the EMDU. Check that EMDU is powered.

2. Verify that the OLS is alarm free using the command:

    FAULT.Retreive.Condition - all

3. If environmental alarms exist, clear the environmental alarms before proceeding. Use Table 10-3 on page 10-20 to identify the OTU slot associated with each alarm. The presence of an environmental alarm indicates that the alarm wiring has a short. Locate and repair short.

Table 10-3 OLS Alarm Numbers verses OTU Slot Number

OTU SLOT Number	Circuit Pack Fail OLS Alarm Number	Incoming Signal Failure OLS Alarm Number	OTU SLOT Number	Circuit Pack Fail OLS Alarm Number	Incoming Signal Failure OLS Alarm Number
1	17	49	17	33	65
2	18	50	18	34	66
3	19	51	19	35	67
4	20	52	20	36	68
5	21	53	21	37	69
6	22	54	22	38	70
7	23	55	23	39	71
8	24	56	24	40	71
9	25	57	25	41	73

OTU SLOT Number	Circuit Pack Fail OLS Alarm Number	Incoming Signal Failure OLS Alarm Number	OTU SLOT Number	Circuit Pack Fail OLS Alarm Number	Incoming Signal Failure OLS Alarm Number
10	26	58	26	42	74
11	27	59	27	43	75
12	28	60	28	44	76
13	29	61	29	45	77
14	30	62	30	46	78
15	31	63	31	47	79
16	32	64	32	48	80

4. Install, but do not seat OTU circuit packs into the Complementary Shelf 2 (top shelf) starting with OTU Slot 32 continuing in a decreasing numerical sequence. If the Complementary Shelf 2 becomes full, continue loading into Complementary Shelf 1 starting with OTU slot 20 and continuing to the next lowest slot number until all the OTUs have been installed. The OTU code location is not important at this time.

5. Following the general circuit pack installation considerations given at the beginning of this section, seat the OTU mounted in slot 32.

Requirement: The fault LED should be on continuously at initial circuit pack installation. Less than one minute after insertion, the fault LED will change to flashing and remain flashing.

6. Apply an OC-48 signal (-27 to-11 dBm) to the input of the OTU in slot 32. This signal may be obtained from an LCT, an OLS ODU with an OC-48 signal, other OC-48 equipment or a test set with an OC-48 source.

Requirement: Less than one minute after applying an OC-48 signal to the input of the OTU, the flashing LED will turn OFF.

7. One minute after the LED turns OFF, unseat the OTU while keeping the OC-48 fiber connected to the input of the OTU. The fiber with the OC-48 signal on it may be disconnected from the input ounce the pack has become unseated.

(8) . Verify the operation of the miscellaneous discrete alarms by reviewing the Alarm History report using the command: FAULT.Retrieve.Log. A sample report is shown in Figure 10-11 on page 10-22.

Figure 10-11 FAULT.Retreive.Log Sample Report

Requirement: The history report must show environment 48 ON and environment 80 ON. They must be followed by an environment 48 Cleared and environment 80 Cleared. the order in which the alarms clear is not a requirement. All other alarms must be OFF. If another environment alarm is ON, it may be shorted to one the OTU slot 32 alarms (env 48 or env 80).

(9) Repeat steps 5 through 8 at the next lowest OTU slot until all the OTUs that were installed have been tested. After testing the last OTU, remove this OTU from its slot and move it down to the next lowest numbered slot. Repeat steps 5 through 8. Repeat this sequence until all 32 slots have been tested.

(10) . Request a history report using the command:

FAULT.Retreive.Log

. **CRITICAL** - Verify proper operation of all the alarms. Report to be similar to an abbreviated report shown in Figure 10-11 on page 10-22.

Installing OTUs into Final Positions

The installation instructions will specify the location of each OTU circuit pack.

Following the precautions previously listed at the beginning of this section, install and seat all OTU circuit packs into their final positions. All OTUs at this time should have their faceplate LED flashing.

Provisioning of Miscellaneous Discretes

The miscellaneous discretes alarms (environmental alarms with an assigned number) will be assigned appropriate descriptions. Environmental alarms 17 through 48 will be CP FAIL OTU #. Environmental Alarms 49 through 80 will be identified as LOS OTU "N" where "N" is the associated OTU slot number. Only slots with OTUs in them need to be provisioned. Refer to Table 10-3 on page 10-20 to obtain the alarms associated with each OTU slot and its function.

In addition to the OTU miscellaneous discrete alarms, each shelf has two alarms to indicate an A or B power failure for a total of 6 alarms. The power fail alarms are environmental alarms 81 through 86. They are listed in Table 10-4 on page 10-23 along with their descriptions for provisioning.

Table 10-4 Power Fail Miscellaneous Discrete Alarms

Environmental Alarm No.	Alarm Description	Provisioned Description
81	A Power Fail - System Shelf	A PWR FAIL SYS
82	B Power Fail - System Shelf	B PWR FAIL SYS
83	A Power Fail - Complementary Shelf 1	A PWR FAIL CMP 1
84	B Power Fail - Complementary Shelf 1	B PWR FAIL CMP 1
85	A Power Fail - Complementary Shelf 2	A PWR FAIL CMP 2
86	B Power Fail - Complementary Shelf 2	B PWR FAIL CMP 2

To explain the provisioning process an example is presented.

Example: Provision an OTU mounted in slot 12.

Go to Table 10-3, "OLS Alarm Numbers verses OTU Slot Number," on page 6-20 and look up the alarms associated with OTU Slot 12. They are environmental alarm 28 (CP Fail) and 60 (LOS).

To provision each alarm enter the following command through the CMC:

CONFIGURATION.Set.Attribute.Environment, enter env in the AID box, select 28 in the second box.

In the ALarm Level Box, select MN_deferred.

In the ALMMSG box, type in capital letters CP FAIL OTU 12.

Click on Enter.

Repeat the process for environmental alarm 60 so that it will be provisioned LOS OTU 12.

Repeat the process until the alarms for all installed OTUs have been provisioned. OTU slots that are without OTU circuit packs need not to be provisioned at this time.

When the alarm provisioning has been completed, request a listing of the provisioned alarms using the following command:

CONFIGURATION.Retreive.Attribute. Select Env and All. Click on Enter.

Table 10-5 on page 10-25 shows a partial listing of all the provisioned alarms. Compare the sample provisioned alarm descriptions on the CMC screen with those given in Table 10-6, "OTU Code vrs. Wavelength, Output Power, and Tone Frequency," on page 10-26.

Table 10-5 Provision Alarm Descriptions

Address	Alarm Level	Description
env-46	MN	CP FAIL OTU 30
env-47	MN	CP FAIL OTU 31
env-48	MN	CP FAIL OTU 32
env-49	MN	LOS OTU 1
env-50	MN	LOS OTU 2
env-51	MN	LOS OTU 3

Final Testing of OTU Circuit Packs

Test Description

The purpose of this test will be to determine that the OTU receiver is operational and the transmitter output power is within specification. An OC-48 signal is required to perform this task. The OTU transmitter will not turn ON unless it is receiving an OC-48 signal at its input.

⇒ NOTE:
If the Quad Optical Translator Unit is used, the following considerations should be used: fiber to all OTPMs in a QOTU should be disconnected before the QOTU is engaged or disengaged from the backplane, the fibers should be disconnected from any OTPMs when inserted or removed from a QOTU, and the fibers to all OTPMs in a shelf should be disconnected before power is applied or removed from the shelf. Failure to disconnect the fiber can result in transmission hits on other channels being carried on the same OLS line.

Test Procedure

Perform the following steps to test the OTUs:

⚠ CAUTION:
High power optical signal levels may be present during the following test-ing. If using an optical power meter that is not rated for +16 dBm, use a 33 dB attenuator cable between the optical source and the meter.

(1) Obtain an OC-48 Signal from an LCT, an OLS ODU with an OC-48 signal, other OC-48 equipment, or a test set with an OC-48 source. Verify with an opti-cal power meter that the OC-48 source is within the input specification of the OTU (-27 to -11 dBm).

(2) Remove the ESD covers from one of the OTUs and connect the OC-48 signal to the input. Connect an optical power meter to the OTU output using an opti-cal fiber with appropriate connectors.

Requirement: The output power from the OTU Code shall be between the minimum and maximum power specified in Table 10-6 on page 10-26 and the fault LED shall be OFF.

(3) If the OTU meets requirement, replace the protective covers. Do not install input or output fibers.

(4) Repeat steps two and three until all the OTUs have been tested.

Table 10-6 OTU Code vrs. Wavelength, Output Power, and Tone Frequency

OTU CODE	Center Wavelength (nm)	Output Power Range (dBm)	Approximate Tone Frequency (KHz)
41A1B, 41A1C, 41C1B, 41C1C	1549.31	-5.0 to -3.0	5
41A2B, 41A2C, 41C2B, 41C2C	1550.91	-6.3 to -4.3	7
41A3B, 41A3C, 41C3B, 41C3C	1552.52	-7.5 to -5.5	9
41A4B, 41A4C, 41C4B, 41C4C	1554.13	-8.2 to -6.2	11
41A5B, 41A5C, 41C5B, 41C5C	1555.75	-8.7 to -6.7	15
41A6B, 41A6BC 41C6B, 41C6C	1557.36	-9.2 to -7.2	17

OTU CODE	Center Wavelength (nm)	Output Power Range (dBm)	Approximate Tone Frequency (KHz)
41A7B, 41A7C, 41C7B, 41C7C	1558.98	-9.0 to -7.0	19
41A8B, 41A8C, 41C8B, 41C8C	1560.60	-7.5 to -5.5	21
41A9B, 41A9C, 41C9B, 41C9C	1548.51	-1.3 to -2.7	23
41A10B, 41A10C, 41C10B, 41C10C	1550.11	-4.9 to -5.3	24
41A11B, 41A11C, 41C11B, 41C11C	1551.72	-5.1 to -6.5	25
41A12B, 41A12C, 41C12B, 41C12C	1553.33	-6.1 to -7.5	26
41A13B, 41A13C, 41C13B, 41C13C	1554.94	-6.7 to -8.1	27
41A14B, 41A14C, 41C14B, 41C14C	1556.55	-7.2 to -8.6	28
41A15B, 41A15C, 41C15B, 41C15C	1558.17	-7.4 to -8.9	29
41A16B, 41A16C, 41C16B, 41C16C	1559.79	-6.5 to -7.9	30
41BB	1310.00	0.0 to 2.0	NA

Miscellaneous Discrete Power Fail Test

The miscellaneous discrete Circuit Pack Fail Alarm is required to turn ON for all OTUs within a shelf when there is either an A or B supply failure. In addition, each shelf will have two miscellaneous discrete Power Fail alarms, one for the A power source and the other for the B power source.

The procedure for testing this alarm operation is as follows:

1. Verify that all OTUs are seated in their slots and are powered. All OTUs should have their faceplate LED flashing.

2. Verify by using the CMC command FAULT-RETRIEVE-ALARM-ALL that the slots with OTUs have only Incoming Signal Fail (LOS) Alarm (alarms 49 through 72). Alarm numbers 17 through 48 (CP FAIL) are to be OFF. Power Fail alarms, 81 through 86 are to Off.

3. Remove the A fuse from the System Shelf.

4. Verify using the CMC that the correct Power Fail Alarm has turned ON (refer to Table 10-4 on page 10-23). All other Power Fail alarms are to be OFF.

5. Verify that the circuit pack fail alarms (CP FAIL) turn ON for all the OTUs plugged into the System Shelf. These circuit pack fail alarms will only appear on the CMC terminal. The circuit pack faceplate LEDs will remain flashing during this test.

6. Replace the A fuse and **WAIT** until the alarms clear on the CMC.

7. Repeat the test for the B fuse on the System Shelf.

8. Repeat steps 3 and 7 for Complementary Shelves 1 and 2.

9. When completed, unplug circuit packs and leave in slots.

Final Operations

Complete the following checks before proceeding to integration testing.

- Verify that the OTUs are mounted in the correct slots
- Verify that the correct codes are in these slots.
- All OTUs should be unseated in their slots.
- All fibers shall be disconnected from the OTUs.
- Dust covers are to be on the input and output ports of each OTU.
- OTU fibers shall have protective covers on them.

This completes the start up and local installation testing of the OLS and OT. Proceed to the next section for further installation and testing.

OLS Fiber Connections

11

Contents

OLS Fiber Connections

11

Overview

This section describes how to establish the OLS system. Some general information on Lightwave jumpers, and optical line buildouts is given in the following sections as a quick reference. Refer to 365-575-301 OLS User/Service Manual for complete details. Read and understand the optical line buildout selection procedure before starting to connect fibers.

General Considerations

⚠ WARNING:
Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments. Avoid direct exposure to beam.

Note the following before starting the procedures which follow:

- Disconnect the office alarms cable at the OLS Network Element before performing any tests. Reconnect the office alarms cable after completing tests.

- Be sure each Network Element has completely passed all of the tests in the previous sections of this document.

- Required equipment is listed in Section 1 of this document, "Overall Installation and Test Considerations". An optical power meter is needed to perform the steps in this section.

- A general familiarity with the CMC is assumed, each and every key stroke is not detailed. Refer to the 365-575-311 OLS User/Service Manual, Tab 11, "Craft Interface Terminal Usage", or Appendix F of this document for complete CMC use instructions.

- Do not use cable ties with the optical fiber.

- Place optical fiber jumpers in protective tube or channel, such as polyvinyl chloride (PVC) tubing when running the cable from the OLS to the cable rack.

- Place optical fiber jumpers in the cable rack in a protective channel with nothing on top of them.

- Maintain a minimum of 1.5 inches of optical fiber bend radius.

- Optical fiber jumpers require ST, FC/PC, LC, or SC type connectors for connection to the OLS.

- Before removing a fiber jumper from an OA output connector, the safest way to avoid damage and minimize the power level is to first unseat the OA.

Table 11-1 lists some of the available jumpers for high speed fiber connection.

Table 11-1 High Speed Lightwave Jumpers

FS1EP-EP* Comcode	MS1EP-EP* Comcode	Length	Description
107 149 494	107 306 243	2 ft.	ST II+ - ST II+
107 149 536	107 306 292	10 ft.	ST II+ - ST II+
107 149 569	107 306 326	25 ft.	ST II+ - ST II+
107 149 601	107 306 367	50 ft.	ST II+ - ST II+
107 149 627	107 306 383	100 ft.	ST II+ - ST II+

* FS1EP is mini-cord (.063 in dia.) and MS1EP is standard fiber (1.2 in dia.)

Table 11-2, Lightwave Jumpers, on page 11-2 lists some of the available jumpers for Intrashelf fiber connection for use with the Optical Line System (OLS).

Table 11-2 Lightwave Jumpers

Code	Comcode	Length	Description
MS1EP-EP-1.67	108 108 705	20 in.	LC-ST II+
MS1LC-EP-10	108 108 853	10 ft.	LC-ST II+
MS1LC-EP-25	108 108 887	25 ft.	LC-ST II+
MS1LC-EP-50	108 108 937	50 ft.	LC-ST II+
MS1LC-EP-75	108 108 945	75 ft.	LC-ST II+
MS1LC-EP-100	108 108 960	100 ft.	LC-ST II+
MS1LC-EP	107 815 896	as req.	LC-ST II+

Optical Line Buildouts (LBO)

Faceplate LBOs must be chosen during installation for some OA inputs and outputs. All other inputs and outputs should always be equipped with a 0 dB LBO.

For Releases 1.0 and 2.0, the available LBO values are 0, 3, 5, 7, 10, 15, and 20 dB, corresponding to the nominal LBO attenuation at 1310 nm. The actual attenuation of each LBO depends on the wavelength of the attenuated optical signal. For wavelengths in the range of the OLS channels (1555 nm), the actual LBO attenuation is given in Table 11-3.

A wide variety of LBOs are available for Release 2.1. Refer to the SmartManual on the CD-Rom for further information on 2.1 LBO values.

⚠ WARNING:
The 15dB and higher LBOs are made using a carbon tinted filter lens material instead of the clear lens material used in the LBOs of lower attenuation. The tinted lenses experience localized heating that tends to increase their attenuation at input powers above 0 dBm. To minimize the long-term reliability risk and provide predictable attenuation, the 15 dB and up LBOs should not be used to attenuate signals of greater than +3 dBm.

Table 11-3 ST Connector LBO Values for Releases 1.0 & 2.0

LBO Size	Part No. for Lucent ST Buildout	Actual Attenuation at 1555 nm (dB)	Attenuation Range at 1555 nm (dB)
0	106795354	0.25 +/- 0.25	0.0 to 0.5
3	107380438	2.7 +/- 0.3	2.4 to 3.0
5	107406183	4.7 +/- 0.3	4.4 to 5.0
7	107107740	6.1 +/- 0.4	5.7 to 6.5
10	107408191	9.0 +/- 0.7	8.3 to 9.7
15	107406209	14.0 +/- 0.7	13.3 to 14.7
20	107406217	18.0 +/- 1.0	17.0 to 19.0

Optical LBO Selection Procedure

Description

This procedure is used to select the proper value of Line Build Out to be used on the faceplate of the OA IN jack based on received optical power. The Optical LBO

selection procedure is to be used in conjunction with the Receive OA Connection Procedures. Read and understand the procedure now so you will be familiar with it.

(1) Measure, and record for office records, the received optical power from the far end. Be sure to set the optical power meter for the wavelength of the light (1550nm) to be measured.

(2) Remove the 0 dB line buildout from the IN connector on the faceplate of the OA. To remove, press the tab on the top of the buildout with a small blunt tool, and rotate the buildout counterclockwise slightly. Slide the buildout out along the angle it is installed in the faceplate.

(3) Install the chosen buildout. To install, remove the protective cover from the chosen buildout. Clean the buildout connection of any material or dust. With the tab facing up towards you, slide the buildout into the faceplate of the OA over the fiber end in the faceplate at the angle of the connector block in the faceplate. The buildout will be fully inserted when the tab is very slightly rotated counterclockwise. To lock the buildout in position, rotate the buildout clockwise until a small click is heard. Check that the buildout is locked in position by lightly tugging at it.

Description of Procedures

This section contains procedures to start at the OLS DS-NE (assumed to be the 1A Transmit) office and connect sites sequentially to the AGNE (assumed to be the 1A Receive) office. The following procedures are included in this section:

- DS-NE Office Transmit OA Connection Procedure

- OLS Repeater A Direction Connection Procedure

- AGNE Office Receive OA Connection Procedure

- AGNE Office Transmit OA Connection Procedure

- OLS Repeater B Direction Connection Procedure

- DS-NE Office Receive OA Connection Procedure

Sequence of Operations

Operations in this section start at the DS-NE site (1A Transmit) and proceed in the A direction to the other end terminal (AGNE/1A Receive) as shown in Figure 11-1.

Once the test team reaches the AGNE site again they will proceed back in the B direction to the DS-NE site.

```
┌─────────────┐
│  OLS AB4    │
│    AGNE     │
│ 1A Receive  │
└─────────────┘
  (↓4) ▼▲ (↑3)
┌─────────────┐
│  OLS AB3    │
│             │
│  Repeater   │
└─────────────┘
  (↓5) ▼▲ (↑2)
┌─────────────┐
│  OLS AB2    │
│             │
│  Repeater   │
└─────────────┘
  (↓6) ▼▲ (↑1)
┌─────────────┐
│  OLS AB1    │
│   DS-NE     │
│ 1A Transmit │
└─────────────┘
```

NOTE:

OLSAB1 to OLSAB4
are example TIDS
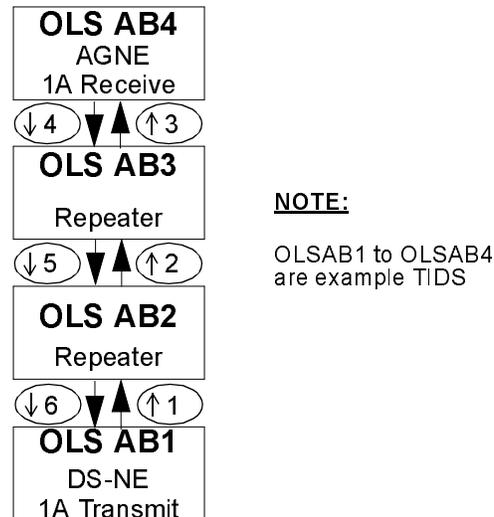
Figure 11-1. System Turnup Sequence of Example System

DS-NE Office Transmit OA Connection Procedure

⇒ NOTE:

The following procedure assumes lines 1 and 2 are both equipped. Ignore the procedures for unequipped lines.

Line 1 Connections

(1) Clean then connect 1A OA OUT to optical power meter through attenuated test cable. Test point 1P on Figure 11-2.

⇒ NOTE:

At any time throughout test procedure remove attenuated test cable if measured power is within the range of the optical power meter.

(2) Verify the OA Output Power by referring to the following tables:

■ Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.

- Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.
- For Release 2.1, refer to Table 11-4 on page 11-6.

Table 11-4 Output Levels for Release 2.1

# of equipped wavelengths	OA Type	Side Power Configuration	OA Output Power
0	LEA6	A	8 to 12dB
		B	7 to 11dB
	LEA7	A	8 to 12dB
		B	7 to 11dB
		C	4 to 8dB
	LEA105	A	4 to 8dB
		1_OA	4 to 8dB

(3) Clean then connect the fiber jumper to 1A OA OUT and the outside plant fiber at the LGX. (Test point 1P on Figure 11-2. on page 11-7). For 7-8 span applications, place a 3dB LBO on the OA OUT before connecting the fiber.

Line 2 Connections

(4) Clean then connect 2A OA OUT to optical power meter through attenuated test cable. Test point 1S on Figure 11-2.

(5) Verify the OA Output Power by referring to the following tables:

- Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.
- Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.
- For Release 2.1, refer to Table 11-4 on page 11-6.

(6) Clean then connect the fiber jumper to 2A OA OUT and the outside plant fiber at the LGX. Test point 1S on the figure below

If the next office is:	Then perform:
OLS Repeater	OLS Repeater A Direction Connection Procedure
AGNE End Terminal Office	AGNE Office Receive OA Connection Procedure

(7) For 7-8 span applications, place a 3dB LBO on the OA out before fibering.

(8) Execute the CONFIGURATION.Retreive.Optical_Line command and record the Channel Loading Factor for use in downstream offices.
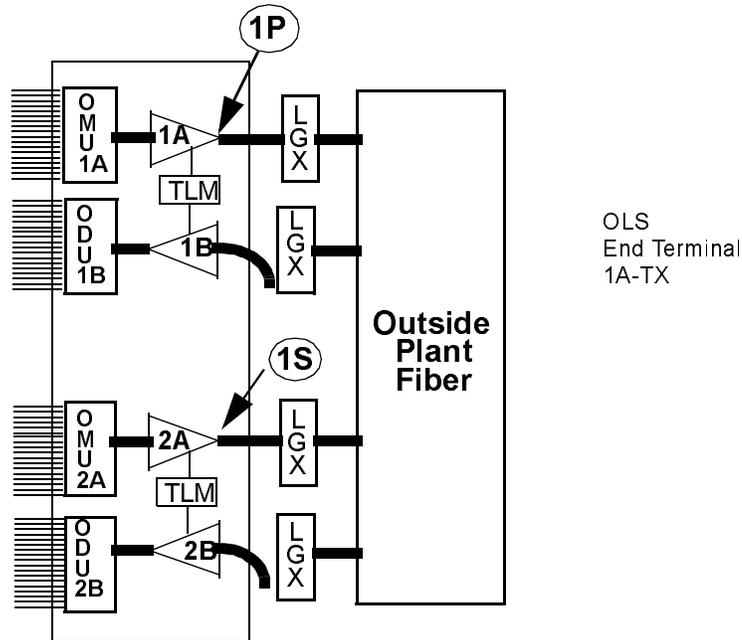
Figure 11-2. DS-NE Office Transmit OA Connection Points

OLS Repeater A Direction Connection Procedure

⟹ NOTE:

The following procedure assumes lines 1 and 2 are both equipped. Ignore the procedures for unequipped lines.

Line 1 Connections

(1) Clean then connect fiber assigned to 1A OA IN to optical power meter through attenuated test cable. Test point 1P on Figure 11-3.

▬▬▶ NOTE:
At any time throughout test procedure, remove attenuated test cable if measured power is within the range of the optical power meter.

(2) Clean then connect the other end of the jumper above to its assigned LGX location.

(3) Select an OA IN LBO based on the measured power and the number of OC-48 wavelengths (OLS channels) present.

- ■ For OA Input LBO Selection tables for Releases 1.0 and 2.0 refer to:

  - • Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.

  - • Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

  - • Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

  - • Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

  - • Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

  - • Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

- ■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

  - a. Login in to the Network Element.

  - b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

  - c. Click on 2.1.0

  - d. Click on Installation

  - e. Click on Tasks

  - f. Click on Optical Amplifier Input Line BuildOut Selection

  - g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

  - h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

  - i. Enter the Channel Loading Factor obtained at the previous office and click calculate

⚠ CAUTION:
Hitting the Return Key instead of clicking on Calculate may lead to erroneous results.

j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

⮕ NOTE:

If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(4) Install the appropriate LBO in 1A OA IN connector if necessary.

(5) Connect the jumper to the 1A OA IN connector.

   Requirement: The 1A OA FAULT LED shall stop flashing within 1 minute.

(6) Clean then connect 1A OA OUT to optical power meter through attenuated test cable. Test point 2P on Figure 11-3.

(7) Verify the OA Output Power by referring to the following tables:

   - Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.

   - Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.

   - For Release 2.1, refer to Table 11-4 on page 11-6.

(8) Clean then connect the jumper from OA 1A OUT to the LGX. Test point 2P on Figure 11-3. If the application is for 7-8 spans, install a 3 dB LBO on OA 1A OUT prior to installing the fiber.

Line 2 Connections

(9) Clean then connect fiber assigned to 2A OA IN to optical power meter through attenuated test cable. Test point 1S on Figure 11-3.

⮕ NOTE:

At any time throughout test procedure, remove attenuated test cable if measured power is within the range of the optical power meter.

(10) Clean then connect the other end of the jumper above to its assigned LGX location.

(11) Select an OA IN LBO based on the measured power and the number of OC-48 wavelengths (OLS channels) present.

   ■ For OA Input LBO Selection tables for Releases 1.0 and 2.0 refer to:

   - Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.

   - Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

   - Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

- Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

- Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

- Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

    a. Login in to the Network Element.

    b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

    c. Click on 2.1.0

    d. Click on Installation

    e. Click on Tasks

    f. Click on Optical Amplifier Input Line BuildOut Selection

    g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

    h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

    i. Enter the Channel Loading Factor obtained at the previous office and click calculate.

⚠ CAUTION:
Hitting Return instead of clicking on calculate can cause erroneous results.

    j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

⇒ NOTE:
If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(12) Install the appropriate LBO in 2A OA IN connector if necessary.

(13) Connect the jumper to the 2A OA IN connector.

    Requirement: The 2A OA FAULT LED shall stop flashing within 1 minute.

(14) Clean then connect 2A OA OUT to optical power meter through attenuated test cable. Test point 1S on Figure 11-2.

(15) Verify the OA Output Power by referring to the following tables:

- Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.

- Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.

• For Release 2.1, refer to Table 11-4 on page 11-6.

(16) If this is a 7-8 span application, install a 3dB LBO on the OA 2A OUT. Clean then connect the jumper from OA 2A OUT to the LGX. Test point 2S on Figure 11-3.

If the next office is:	Then perform:
OLS Repeater	OLS Repeater A Direction Connection Procedure (repeat this procedure)
AGNE End Terminal Office	AGNE Office Receive OA Connection Procedure
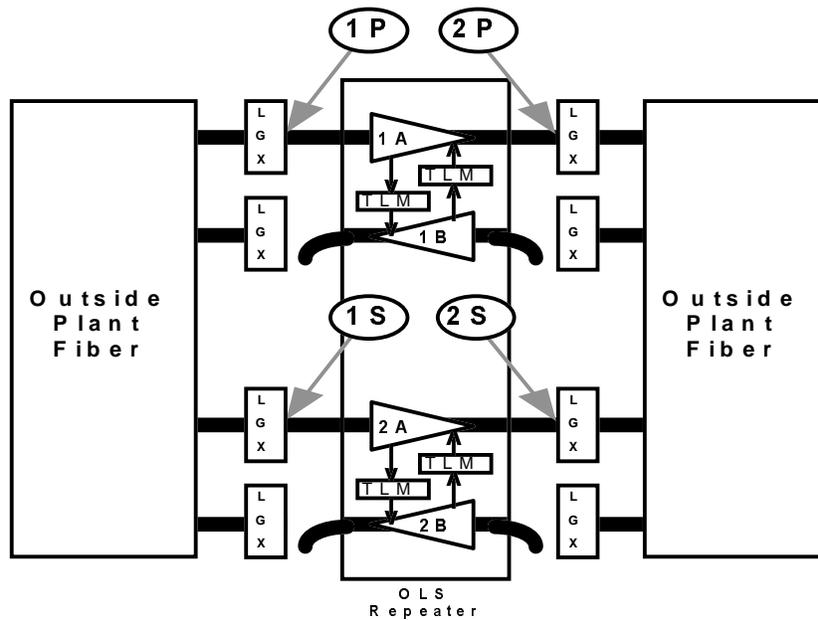
Figure 11-3. OLS Repeater A Direction Connection Points

AGNE Office Receive OA Connection Procedure

⇒ NOTE:
The following procedure assumes lines 1 and 2 are both equipped. Ignore the procedures for unequipped lines.

Line 1 Connections

(1) Clean then connect fiber assigned to 1A OA IN to optical power meter through attenuated test cable. Test point 1P on Figure 11-4.

⇒ NOTE:
At any time throughout test procedure, remove attenuated test cable if measured power is within the range of the optical power meter.

(2) Clean then connect the other end of the jumper above to the LGX location.

⇒ NOTE:
For Single OA applications (no receive OA), there will be no LBO used on the ODU. Connect the jumper to the ODU and proceed to Step 6.

(3) Select an OA IN LBO based on the measured power and the number of OC-48 wavelengths (OLS channels) present.

■ For OA Input LBO Selection tables for Releases 1.0 and 2.0, refer to:

• Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.

• Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

• Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

• Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

• Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

• Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

a. Login in to the Network Element.

b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

c. Click on 2.1.0

d. Click on Installation

e. Click on Tasks

f. Click on Optical Amplifier Input Line BuildOut Selection

g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

i. Enter the Channel Loading Factor obtained at the previous office and click calculate.

! CAUTION:
Hitting Return instead of clicking on Calculate may cause erroneous results.

j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

➡ NOTE:
If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(4) Install the appropriate LBO in 1A OA IN connector if necessary.

(5) Connect the jumper to the 1A OA IN connector.

Requirement: The 1A OA FAULT LED shall stop flashing within 1 minute.

Line 2 Connections

(6) Clean then connect fiber assigned to 2A OA IN to optical power meter through attenuated test cable. Test point 1S on Figure 11-4.

(7) Clean then connect the other end of the jumper above to the LGX location.

➡ NOTE:
For Single OA applications (no receive OA), there will be no LBO used on the ODU. Connect the jumper to the ODU and proceed to the next office.

(8) Select an OA IN LBO based on the measured power and the number of wavelengths (OLS channels) present.

■ For OA Input LBO Selection tables for Releases 1.0 and 2.0, refer to:

- Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.

- Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

- Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

- Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

- Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

- Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

   a. Login in to the Network Element.

   b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

   c. Click on 2.1.0

   d. Click on Installation

   e. Click on Tasks

   f. Click on Optical Amplifier Input Line BuildOut Selection

   g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

   h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

   i. Enter the Channel Loading Factor obtained at the previous office and click calculate.

⚠ CAUTION:
Hitting Return instead of clicking on Calculate could cause erroneous results.

   j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

⇒ NOTE:
If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(9) Install the appropriate LBO in 2A OA IN connector if necessary.

(10) Connect the jumper to the 2A OA IN connector.

Requirement: The 2A OA FAULT LED shall stop flashing within 1 minute.

If the Present office is:	Then perform:
AGNE Office	AGNE Office Transmit OA Connection Procedure
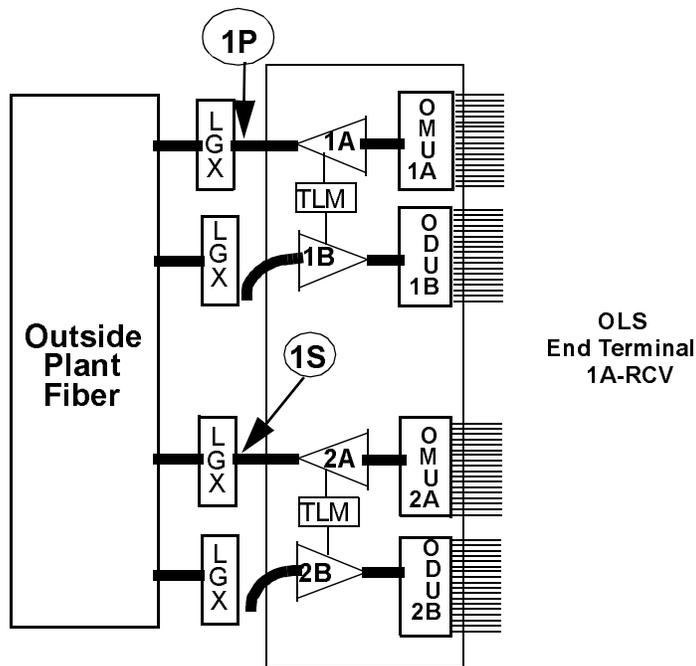
Figure 11-4. AGNE Office Receive OA Connection Points

AGNE Office Transmit OA Connection Procedure

⇒ NOTE:
The following procedure assumes lines 1 and 2 are both equipped. Ignore the procedures for unequipped lines.

Line 1 Connections

(1) Clean then connect 1B OA OUT to optical power meter through attenuated test cable. Test point 1P on Figure 11-5.

➡ NOTE:

At any time throughout test procedure remove, attenuated test cable if measured power is within the range of the optical power meter.

(2) Verify the OA Output Power by referring to the following tables:

- Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.

- Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.

- For Release 2.1, refer to Table 11-4 on page 11-6.

(3) For 7-8 span applications, install a 3dB LBO in the 1B OA OUT. Clean then connect the fiber jumper to 1B OA OUT and the outside plant fiber at the LGX. Test point 1P on Figure 11-5. on page 11-17.

Line 2 Connections

(4) Clean then connect 2B OA OUT to optical power meter through attenuated test cable. Test point 1S on Figure 11-5.

(5) Verify the OA Output Power by referring to the following tables:

- Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.

- Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.

- For Release 2.1, refer to Table 11-4 on page 11-6.

(6) For 7-8 span applications, install a 3dB LBO in 2B OA OUT. Clean then connect the fiber jumper to 2B OA OUT and the outside plant fiber at the LGX. Test point 1S on Figure 11-5. on page 11-17

(7) Execute the CONFIGURATION.Retreive.Optical_Line command and record the Channel Loading Factor for use in downstream offices.

If the next office is:	Then perform:
OLS Repeater	OLS Repeater B Direction Connection Procedure
DS-NE End Terminal Office	DS-NE Office Receive OA Connection Procedure
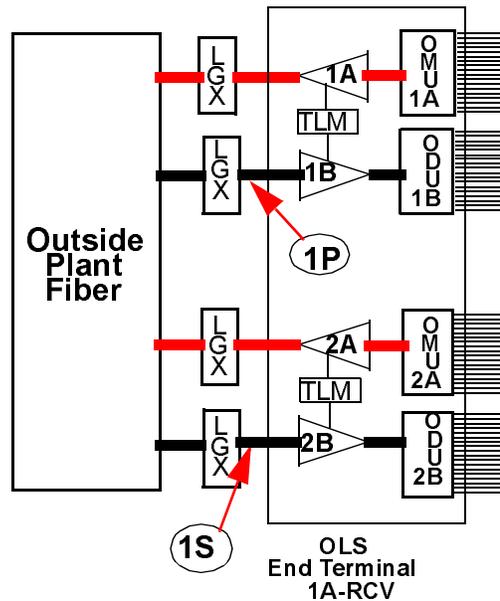
Figure 11-5. AGNE Office Transmit OA Connection Points

OLS Repeater B Direction Connection Procedure

⇛ NOTE:
The following procedure assumes lines 1 and 2 are both equipped. Ignore the procedures for unequipped lines.

Line 1 Connections

(1) Clean then connect fiber assigned to 1B OA IN to optical power meter through attenuated test cable. Test point 1P on Figure 11-6.

⟹ NOTE:
At any time throughout test procedure remove attenuated test cable if measured power is within the range of the optical power meter.

(2) Clean then connect the other end of the jumper above to its assigned LGX location.

(3) Select an OA IN LBO based on the measured power and the number of OC-48 wavelengths (OLS channels) present.

■ For OA Input LBO Selection tables for Releases 1.0 and 2.0, refer to:

- Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.

- Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

- Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

- Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

- Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

- Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

a. Login in to the Network Element.

b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

c. Click on 2.1.0

d. Click on Installation

e. Click on Tasks

f. Click on Optical Amplifier Input Line BuildOut Selection

g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

i. Enter the Channel Loading Factor obtained at the previous office and click calculate.

⚠ CAUTION:
Hitting Return instead of clicking on Calculate could cause erroneous results.

j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

⇒ NOTE:

If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(4) Install the appropriate LBO in 1B OA IN connector if necessary.

(5) Connect the jumper to the 1B OA IN connector.

   Requirement: The 1B OA FAULT LED shall stop flashing within 1 minute.

(6) Clean then connect 1B OA OUT to optical power meter through attenuated test cable. Test point 2P on Figure 11-6.

(7) Verify the OA Output Power by referring to the following tables:

   • Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.

   • Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.

   • For Release 2.1, refer to Table 11-4 on page 11-6.

(8) For 7-8 span applications, install a 3dB LBO in the OA 1B OUT. Clean then connect the jumper from OA 1B OUT to the LGX. Test point 2P on Figure 11-6.

Line 2 Connections

(9) Clean then connect fiber assigned to 2B OA IN to optical power meter through attenuated test cable. Test point 1S on Figure 11-6.

(10) Clean then connect the other end of the jumper above to its assigned LGX location.

(11) Select an OA IN LBO based on the measured power and the number of LCT wavelengths (OLS channels) present.

   ■ For OA Input LBO Selection tables for Releases 1.0 and 2.0, refer to:

   • Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.

   • Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

   • Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

   • Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

- Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

- Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

a. Login in to the Network Element.

b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

c. Click on 2.1.0

d. Click on Installation

e. Click on Tasks

f. Click on Optical Amplifier Input Line BuildOut Selection

g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

i. Enter the Channel Loading Factor obtained at the previous office and click calculate.

⚠ CAUTION:
Hitting Return instead of clicking on Calculate could lead to erroneous results.

j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

⇒ NOTE:
If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(12) Install the appropriate LBO in 2B OA IN connector if necessary.

(13) Connect the jumper to the 2B OA IN connector.

   Requirement: The 2B OA FAULT LED shall stop flashing within 1 minute.

(14) Clean then connect 2B OA OUT to optical power meter through attenuated test cable. Test point 2S on Figure 11-2.

(15) Verify the OA Output Power by referring to the following tables:

- Table A-1, OA LEA6 Output Levels For Release 1.0, on page A-2.

- Table A-2, LEA6 OA Output Levels For Release 2.0, on page A-2.

- For Release 2.1, refer to Table 11-4 on page 11-6.

(16) For 7-8 span applications, install a 3dB LBO in the OA 2B OUT. Clean then connect the jumper from OA 2B OUT to the LGX. Test point 2S on Figure 11-6.

If the next office is:	Then perform:
OLS Repeater	OLS Repeater B Direction Connection Procedure (repeat this procedure)
DS-NE End Terminal Office	DS-NE Office Receive OA Connection Procedure
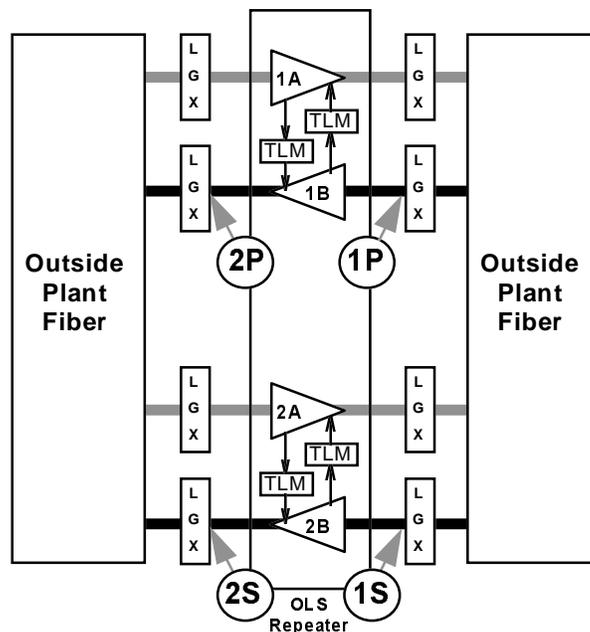
Figure 11-6. OLS Repeater B Direction Connection Points

DS-NE Office Receive OA Connection Procedure

➡ NOTE:
The following procedure assumes lines 1 and 2 are both equipped. Ignore the procedures for unequipped lines.

Line 1 Connections

(1) Clean then connect fiber assigned to 1B OA IN to optical power meter through attenuated test cable. Test point 1P on Figure 11-7.

⟹ NOTE:
At any time throughout test procedure, remove attenuated test cable if measured power is within the range of the optical power meter.

(2) Clean then connect the other end of the jumper above to its assigned LGX location.

⟹ NOTE:
For Single OA applications (no receive OA), there will be no LBO used on the ODU. Connect the jumper to ODU and proceed to Step 6.

(3) Select an OA IN LBO based on the measured power and the number of OC-48 wavelengths (OLS channels) present.

■ For OA Input LBO Selection tables for Releases 1.0 and 2.0, refer to:

• Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

• Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

• Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

• Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

• Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

a. Login in to the Network Element.

b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

c. Click on 2.1.0

d. Click on Installation

e. Click on Tasks

f. Click on Optical Amplifier Input Line BuildOut Selection

g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

i. Enter the Channel Loading Factor obtained at the previous office and click calculate.

⚠ CAUTION:
Hitting Return instead of clicking on Calculate could lead to erroneous results.

j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

⇒ NOTE:
If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(4) Install the appropriate LBO in 1B OA IN connector if necessary.

(5) Connect the jumper to the 1B OA IN connector.

Requirement: The 1B OA FAULT LED shall stop flashing within 1 minute.

Line 2 Connections

(6) Clean then connect fiber assigned to 2B OA IN to optical power meter through attenuated test cable. Test point 1S on Figure 11-7.

⇒ NOTE:
At any time throughout test procedure, remove attenuated test cable if measured power is within the range of the optical power meter.

(7) Clean then connect the other end of the jumper above to its assigned LGX location.

⇒ NOTE:
For Single OA applications (no receive OA), there will be no LBO used on the ODU. Connect the jumper to the ODU and proceed to Step 11.

(8) Select an OA IN LBO based on the measured power and the number of wavelengths (OLS channels) present.

■ For OA Input LBO Selection tables for Releases 1.0 and 2.0, refer to:

• Table A-3, LEA6 OA Input LBO Input Selection Guide for Nx33 Systems, on page A-3.

• Table A-4, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span, on page A-5.

- Table A-5, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans, on page A-8.

- Table A-6, LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans, on page A-11.

- Table A-7, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans, on page A-13.

- Table A-8, LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans., on page A-17.

■ For Release 2.1, follow the steps listed below to select the appropriate LBO.

a. Login in to the Network Element.

b. Click on the Smart Manual Manager to open. (Ignore the Future application notice.)

c. Click on 2.1.0

d. Click on Installation

e. Click on Tasks

f. Click on Optical Amplifier Input Line BuildOut Selection

g. Enter the OA type i.e. LEA6, LEA7, LEA105 and click continue

h. Enter the System Type i.e. A, B, C, 1_OA and click continue.

i. Enter the Channel Loading Factor obtained at the previous office and click calculate.

⚠ CAUTION:
Hitting Return instead of clicking on Calculate could lead to erroneous results.

j. The target power will be displayed. Measure the power from the incoming fiber and enter in the box. The appropriate LBO value will be calculated and displayed on the screen.

⇒ NOTE:
If the power measurement in not within range, clean the fiber and remeasure. If it is still out of range, contact your next level of support.

(9) Install the appropriate LBO in 2B OA IN connector if necessary.

(10) Connect the jumper to the 2B OA IN connector.

Requirement: The 2B OA FAULT LED shall stop flashing within 1 minute.

(11) Proceed to "OLS Ring Closure Verification Procedure".
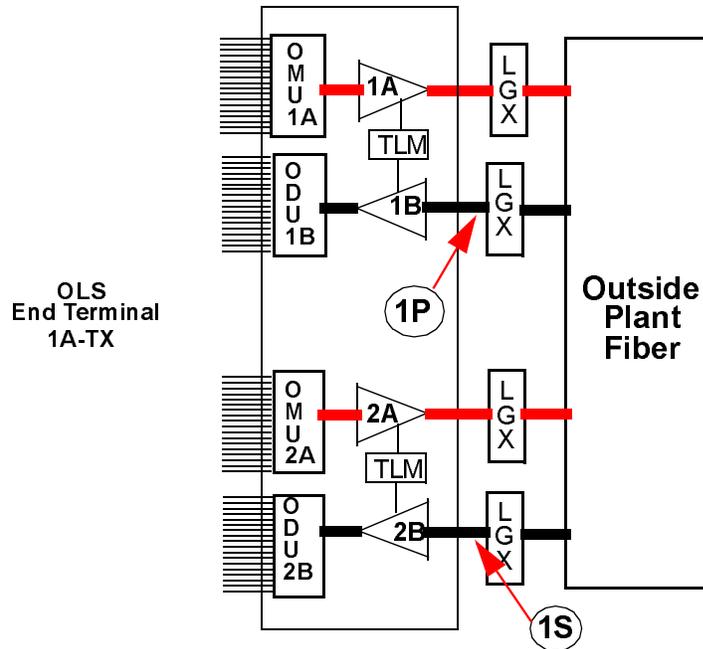
Figure 11-7. DS-NE Office Receive OA Connection Points

OLS Ring Closure Verification Procedure

Description

Line verification procedures check optical line continuity between OLS sites. This procedure assumes that the fiber has been connected at each OLS site as detailed earlier in this chapter.

Line Verification Procedure

Perform the following steps to verify that the fiber is properly connected and the OLS sites are communicating with each other.

⇒ NOTE:
If at any step the requirements are not met, resolve the problem using procedures in the 365-575-301 OLS User/Service Manual before proceeding.

(1) Login to any OLS site using the CMC PC.

(2) Execute CONFIGURATION.Retreive.Ring.Map.

Requirement: Verify that the TIDs are all listed correctly. Verify that the communication status is good for each site.

(3) Execute FAULT.Retreive.Alarms.Network.

Requirement: Verify that there are no alarms at the requested level.

(4) Execute FAULT.Retreive.Alarms.All.

Requirement: Verify there are no local alarms.

(5) Login to another site using the correct TID.

Requirement: Verify that the Alarm and Status Report displayed upon logging in reports no alarms.

(6) Repeat Step 5 for all sites in the OLS system.

Performance Monitor Bit Error Tests

Description

This procedure will verify that performance monitoring reports show proper optical power and zero B2 parity error rates. Login to any terminal node in the ring and perform the following:

⇒ NOTE:
If at any step the requirements are not met, resolve the problem using procedures in the 365-575-311 OLS User/Service Manual before proceeding.

Performance Monitors Bit Error Test Procedure

(1) Execute the PERFORMANCE.Retreive-Performance Monitoring-Supervisory command and fill in the AID with SUPR-ALL.

Requirement: The report should not indicate OUT OF RANGE for the last fifteen minutes.

➡ NOTE:
The previous requirement assumes the ring has been established for at least 15 minutes. If the ring is newly established, the 24 hour report may indicate Out of Range.

(2) Execute the PERFORMANCE.Retreive-Performance Monitoring-Optical Line command and fill in the AID with OLINE ALL.

Requirement: The report should indicate 0 B2 errors in the last fifteen minutes.

➡ NOTE:
If the ring is newly established there will be a "?" in the 24 hour report. A "0?" indicates that the data is not valid, wait for another fifteen minute interval to elapse. Errors in the last fifteen minutes could be due to faulty OAs, TLMs, or dirty fiber connections. There are other causes as well. Remember that PM data is given for incoming signals only, but the problem could be at the transmitting end or the receiving end.

Final Installation Operations

This completes the turnup procedures for the OLS. Proceed to Chapter 12 to connect OC-48 systems to the OLS.

Connecting OC-48, OC3 & OC12 Signals to OLS

12

Contents

Connecting OC-48, OC3 & OC12 Signals to OLS

12

Overview

This chapter covers fiber jumper installation and testing between OC-48, OC-3, and OC-12 Signals and the OLS at OLS Dual Facing Shelves or End Terminal offices.

⚠ **CAUTION:**
Procedures in this installation manual are only to be performed by trained personnel.

General Considerations

⚠ **WARNING:**
Unterminated optical connectors may emit laser radiation and should not be viewed with optical instruments other than indirect image-converting devices. Also avoid direct exposure to beam.

Keep the following information under consideration during cable installation:

- Do not use cable ties with the optical fiber.

- Place optical fiber jumpers in protective tube or channel, such as polyvinyl chloride (PVC) tubing when running the cable from the OLS to the cable rack.

- Place optical fiber jumpers in the cable rack in a protective channel with nothing on top of them.

- Maintain a minimum of 1.5 inches of optical fiber bend radius.

- Optical fiber jumpers require ST, FC/PC, LC, or SC type connectors for connection to the OLS.

- Before removing a fiber jumper from an OA output connector, the safest way to avoid damage and minimize the power level is to first unseat the OA. An alternate procedure is:

    To disconnect the output jumper:

    1. Allow the pack to boot (that is the LED is off)

    2. Remove the INPUT jumper

    3. Wait for the software to respond to the loss of signal (within about 5 seconds)

    4. Remove the OUTPUT jumper

    5. Insert port protector

    6. Insert INPUT jumper

    To insert the output jumper:

    1. Allow the pack to boot (that is the LED is off)

    2. Remove the INPUT jumper

    3. Wait for the software to respond to the loss of signal (within about 5 seconds)

    4. Remove the port protector

    5. Insert the OUTPUT jumper

    6. Insert INPUT jumper

- For Optical Amplifier Output Power Level requirements, refer to the following tables:

    - Table A-1, entitled "OA LEA6 Output Levels For Release 1.0" on page A-2.

    - Table A-2, entitled "LEA6 OA Output Levels For Release 2.0" on page A-2.

    - For Release 2.1, refer to the SmartManual furnished with the CMC.

LBO Information

Faceplate LBOs must be chosen during installation for some OA inputs and outputs, all TLM CM inputs, some ODU outputs, some TRMTR outputs, and some RCVR inputs. All other inputs and outputs should always be equipped with a 0 dB LBO.

The available LBO values for Releases 1.0 & 2.0 are 0, 3, 5, 7, 10, 15, and 20 dB, corresponding to the nominal LBO attenuation at 1310 nm. The actual attenuation of each LBO depends on the wavelength of the attenuated optical signal. For wavelengths in the range of the OLS channels (1555 nm), the actual LBO attenuation is given in Table 12-1.

For Release 2.1 there is a wide variety of LBO values available in additional to the ones listed above. See the SmartManual furnished with the CMC for further information.

The 15 and higher dB LBOs are made using a carbon tinted filter lens material instead of the clear lens material used in the LBOs of lower attenuation. The tinted lenses experience localized heating that tends to increase their attenuation at input powers above 0 dBm. To minimize the long-term reliability risk and provide predictable attenuation, the 15 and 20 dB LBOs should not be used to attenuate signals of greater than +3 dBm.

Table 12-1 ST LBO Values for Releases 1.0 & 2.0

LBO Size	Part No. for ST Buildout	Attenuation Range at 1555 nm (dB)
0	106 795 354	0.0 to 0.5
3	107 380 438	2.4 to 3.0
5	107 406 183	4.4 to 5.0
7	107 107 740	5.7 to 6.5
10	107 408 191	8.3 to 9.7
15	107 406 209	13.3 to 14.7
20	107 406 217	17.0 to 19.0

Connect OC-48 To Optical Line System

This procedure is broken into three parts:

- Connect Generic OC-48 to Optical Translator

- Connect Generic OC-3, OC-12 to Optical Translator Post Modules

- Connect Compatible OC-48 to Optical Line System

.
As of this writing, compatible OC-48 transmitters include:

- Optical Translator Units - 41A()B, 41A()C, 41BB, 41C()B or 41C()C

- FT-2000 Add/Drop-Rings Terminal with Release 7.2 or later - 739E() or 739G()

- FT-2000 Large Capacity Terminal with Release 1.0 or later - 739D() or 739F()

- Optical Translator Port Modules - 42A(), 43A(), 42B, 43B

Connect Generic OC-48 To OT

For OC-48 systems with OLS compatible transmitters, proceed to the "Connect Compatible OC-48 to Optical Line System" paragraph on page 12-3.

Measure Level Into OT

(1) At the OC-48 system, clean and connect the assigned jumper to the proper output jack.

(2) At OTU, clean then connect the fiber jumper from OC-48 system to an optical power meter through attenuated cable.

⇒ **NOTE:**
At any time throughout test procedure, remove attenuated test cable if measured power is within the range of the optical power meter.

(3) Momentarily remove then reconnect the fiber on the OC-48 system output jack.

Requirement: The optical power meter shows a momentary loss of optical power. (Power drops at least 25 dB on the meter.)

(4) Select an optical LBO that will attenuate the measured signal to provide a signal into the receiver of between -12 and -22 dBm (-45 to -55 dBm after 33 dB attenuated test cable).

If an attenuated LBO is needed, install it as follows:

a. Remove the 0 dB LBO in the faceplate of the RCVR. To remove, press the tab on the top of the buildout with a small blunt tool, and rotate the buildout counterclockwise slightly. Slide the LBO out along the angle it is installed in the faceplate.

b. Install the chosen LBO. To install, remove the protective cover and clean the LBO. With the tab facing up towards you, slide the LBO into the faceplate of the RCVR over the fiber end in the faceplate at the angle of the connector block in the faceplate. To lock the LBO in position, rotate the LBO clockwise until a small click is heard. Check that the LBO is locked by lightly tugging on it.

(5) At the OTU, connect the measured jumper to the IN jack.

   Requirement: The OTU FAULT LED shall stop flashing within 1 minute.
                      (Loss of Signal (LOS) alarm extinguishes.)

(6) Proceed to the next paragraph.

Connect Generic OC-3, OC-12 to Optical Translator Port Modules

(1) At the OC-3 or OC-12 system, clean the connect the assigned jumper to the proper output connection.

(2) At the OTPM, clean then connect the fiber jumper form OC-3 or)C-12 system to an optical power meter through and attenuated cable.

⇒ **NOTE:**
At any time throughout test procedure, remove attenuated test cable if measured power is wthin the range of the optical power meter.

(3) Momnetarily remove then reconnect the fiber on the OC-3 or OC-12 system output jack.

   Requirement: The optical power meter show a momentary loss of optical
                     power. (Power drops at least 25 dB on the meter.)

(4) Select an optical LBO that will attenuate the measured signal to provide a signal into the receiver of between -12 and -22 dBm (-45 to -55 after the 33 dB attenuated test cable.)

   If an attenuated LBO is needed, install as follows:

   a. Remove the 0dB LBO in the faceplate of the OTPM. To remove a ST LBO, press the tab on the top of the buildout with a small blunt tool and rotate the LBO counterclockwise slightly. Slide the LBO out maintaining the same angle as installed.

   b. Install the chosed LBO. To install, remove the protective cover and clean LBOs, with the tab facing up, slide the LBO into the faceplate of the OTPM IN at the angle of the connector block in the faceplate. To lock the LBO in position, rotate the LBO clockwise until a small click is heard. Check that the LBO is locked by lightly tugging.

(5) At the OTPM, connect the measured jumper to the IN Jack.

   Requirement: The OTU FAULT LED shall stop flashing within 1 minute. (Loss of Signal (LOS) alarm extinguishes.)

(6) Repeat steps 1 - 5 until all OC-3 or OC-12 signals are connected to the OTPMs, then proceed to the next paragraph.

Connect Compatible OC-48 to Optical Line System

(1) At transmitter or OTU, verify proper LBO is installed on the output jack as listed on the faceplate label.

(2) At transmitter or OTU, clean then connect assigned fiber jumper to OUT jack.

(3) At OLS, clean then connect fiber jumper from the transmitter or OTU to an optical power meter.

> **Requirement:** Refer to Table 12-2.

Table 12-2 OLS Compatible Transmitter Output Levels

FT-2000 ADR Transmitters	FT-2000 LCT Transmitters	Optical Translator Units	Output Connector Power Level
739E1/739G1	739D1/739F1	41A1B, 41A1C, 41C1B, 41C1C	-5.0 to -3.0 dBm
739E2/739G2	739D2/739F2	41A2B, 41A2C, 41C2B, 41C2C	-6.3 to -4.3 dBm
739E3/739G3	739D3/739F3	41A3B, 41A3C, 41C3B, 41C3C	-7.5 to -5.5 dBm
739E4/739G4	739D4/739F4	41A4B, 41A4C, 41C4B, 41C4C	-8.2 to -6.2 dBm
739E5/739G5	739D5/739F5	41A5B, 41A5C, 41C5B, 41C5C	-8.7 to -6.7 dBm
739E6/739G6	739D6/739F6	41A6B, 41A6C, 41C6C, 41C6C	-9.2 to -7.2 dBm
739E7/739G7	739D7/739F7	41A7B, 41A7C, 41C7B, 41C7C	-9.0 to -7.0 dBm
739E8/739G8	739D8/739F8	41A8B, 41A8C, 41C8B, 41C8C	-7.5 to -5.5 dBm
739E9/739G9	739D9/739F9	41A9B, 41A9C, 41C9B, 41C9C	-1.0 to -3.0 dBm
739E10/739G10	739D10/739F10	41A10B, 41A10C, 41C10B, 41C10C	-3.6 to -5.6 dBm
739E11/739G11	739D11/739F11	41A11B, 41A11C, 41C11B, 41C11C	-4.8 to -6.8 dBm
739E12/739G12	739D12/739F12	41A12B, 41A12C, 41C12B, 41C12C	-5.8 to -7.8 dBm
739E13/739G13	739D13/739F13	41A13B, 41A13C, 41C13B, 41C13C	-6.4 to -8.4 dBm
739E14/739G14	739D41/739F14	41A14B, 41A14C, 41C14B, 41C14C	-6.9 to -8.9 dBm
739E15/739G15	739D15/739F15	41A15B, 41A15C, 41C15B, 41C15C	-7.1 to -9.1 dBm
739E16/739G16	739D16/739F16	41A16B, 41A16C, 41C16B, 41C16C	-6.2 to -8.2 dBm

(4) Momentarily remove then reconnect the fiber on the transmitter or OTU OUT jack.

> **Requirement:** The optical power meter shows a momentary loss of optical power. (Power drops at least 25 dB on the meter.)

(5) At the OLS, connect the measured jumper to the proper OMU Port as follows:

Channel 1 goes to OMU OCHAN1 IN jack
Channel 2 goes to OMU OCHAN2 IN jack
Channel 3 goes to OMU OCHAN3 IN jack
Channel 4 goes to OMU OCHAN4 IN jack
Channel 5 goes to OMU OCHAN5 IN jack
Channel 6 goes to OMU OCHAN6 IN jack
Channel 7 goes to OMU OCHAN7 IN jack
Channel 8 goes to OMU OCHAN8 IN jack
Channel 9 goes to OMU OCHAN9 IN jack
Channel 10 goes to OMU OCHAN10 IN jack
Channel 11 goes to OMU OCHAN11 IN jack
Channel 12 goes to OMU OCHAN12 IN jack
Channel 13 goes to OMU OCHAN13 IN jack
Channel 14 goes to OMU OCHAN14 IN jack
Channel 15 goes to OMU OCHAN15 IN jack
Channel 16 goes to OMU OCHAN16 IN jack

Requirement: The FAULT LED shall extinguish on the transmitting OA when the first channel is added.

(6) Proceed to "Connect Optical Line System To OC-48" paragraph to confirm the new wavelength end-to-end.

Connect Optical Line System To OC-48

This procedure is broken into two parts:

■ Connect Optical Line System to Compatible OC-48.
As of this writing, compatible OC-48 receivers include:

- Optical Translator Units - 41A()B, 41A()C, 41BB, 41C()B or 41C()C

- FT-2000 Add/Drop-Rings Terminal with Release 7.2 or later - 839E5

- FT-2000 Large Capacity Terminal with Release 1.0 or later - 839B4 or 839B4B

■ Connect Optical Translator Output to Generic OC-48

Connect OLS To Compatible OC-48

Procedures in this paragraph connect the OLS output to the OC-48 system.

(1) At the OLS, clean and connect the assigned jumper to the proper ODU output Port as follows:

    ODU OCHAN1 OUT jack goes to receiver or OTU for Channel 1
    ODU OCHAN2 OUT jack goes to receiver or OTU for Channel 2
    ODU OCHAN3 OUT jack goes to receiver or OTU for Channel 3
    ODU OCHAN4 OUT jack goes to receiver or OTU for Channel 4
    ODU OCHAN5 OUT jack goes to receiver or OTU for Channel 5
    ODU OCHAN6 OUT jack goes to receiver or OTU for Channel 6
    ODU OCHAN7 OUT jack goes to receiver or OTU for Channel 7
    ODU OCHAN8 OUT jack goes to receiver or OTU for Channel 8
    ODU OCHAN9 OUT jack goes to receiver or OTU for Channel 9
    ODU OCHAN10 OUT jack goes to receiver or OTU for Channel 10
    ODU OCHAN11 OUT jack goes to receiver or OTU for Channel 11
    ODU OCHAN12 OUT jack goes to receiver or OTU for Channel 12
    ODU OCHAN13 OUT jack goes to receiver or OTU for Channel 13
    ODU OCHAN14 OUT jack goes to receiver or OTU for Channel 14
    ODU OCHAN15 OUT jack goes to receiver or OTU for Channel 15
    ODU OCHAN16 OUT jack goes to receiver or OTU for Channel 16

(2) At receiver or OTU, clean then connect fiber jumper from the OLS ODU to an optical power meter through an attenuated test cable.

(3) Momentarily remove then reconnect the fiber on the OLS ODU OUT jack.

Requirement: The optical power meter shows a momentary loss of optical power. (Power drops at least 25 dB on the meter.)

(4) For Release 1.0 or 2.0, select and install ODU output and Receiver input LBOs based upon the measured power, number of equipped wavelengths, wavelength being installed, and type of OLS installed be referring to the following tables:

    • Table A-9, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 1 or 2 for Nx33 Systems" on page A-21.

    • Table A-10, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 3 through 8 for Nx33 Systems" on page A-23.

    • Table A-11, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelength 1 for Mx24 and Px25 Systems" on page A-27.

    • Table A-12, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 2 through 8 for Mx24 and Px25 Systems" on page A-28.

(5) For Release 2.1, refer to the SmartManual furnished by the CMC.

(6) At the receiver or OTU, connect the measured jumper to the input connector.

  Requirement: The FAULT LED shall stop flashing within 1 minute. (Loss of Signal (LOS) alarm extinguishes.)

(7) At the transmitting end of the OLS (the previous OC-48 node), momentarily remove then reconnect the fiber from the OC-48 transmitter.

  Requirement: The optical power meter shows a momentary loss of optical power. (Power drops at least 25 dB on the meter.)

(8) Proceed to "Add Additional Wavelengths" for systems with OLS compatible receivers. Proceed to "Connect OT To Generic OC-48" for systems without OLS compatible receivers.

Connect OT To Generic OC-48

(9) Connect the optical power meter to the output of the 41B OTU.

  Requirement: 0.0 to 2.0 dBm.

(10) Connect a fiber jumper to the output of the 41B OTU.

(11) At the OC-48 receiver end of the jumper from the 41B OTU, measure and adjust the level as appropriate for the OC-48 system.

(12) Verify the OC-48 loss of signal clears when the jumper is connected at the appropriate level.

Add Additional Wavelengths

(13) Repeat this chapter up to this point for all remaining wavelengths (channels) being installed.

(14) Proceed to "System Verification" when all wavelengths have been installed.

System Verification

OC-48 to OLS Verification

(1) Momentarily remove the fiber from an OC-48 transmitter.

  Requirement: Verify the OC-48 receiver at the other end FAULT LED begins flashing (Loss of Signal (LOS) alarm) and the OLS has an optical channel loss of signal for the wavelength disconnected.

(2) Reconnect the fiber to the transmitter.

Requirement: The receiver FAULT LED shall stop flashing and the OLS opti-
cal channel loss of signal will extinguish within 1 minute.

(3) Repeat steps 1 and 2 for all transmitter/receiver pairs equipped.

OLS Troubleshooting

13

Contents

OLS Troubleshooting

13

Overview

This section provides basic troubleshooting information for the OLS.

Troubleshooting Table

Troubleshooting an Optical Line System begins by referencing the 365-575-301 OLS User/Service Manual. COACH login access will also have news and diagnostic dictionary listings of the most up-to-date issues and solutions. A quick trouble shooting reference is given here in Table 13-1, "Installation Trouble Shooting," on page 13-1 for problems which may come up during installation

.

Table 13-1 Installation Trouble Shooting

Trouble or Error message	Probable Cause	Suggested Solution
Connect failed. Network Element not Responding to the connect request. (CIT-DCE port to PC Serial Port)	Serial Port Cable is not connected, or is improper type (not straight-through).	Inspect cable connection, review Table 10-2, "Serial Port Pinout information," on page 10-18 and Figure 10-10 on page 10-17 for CMC minimum connections. Also see the CMC Connection Requirements paragraph later in this section.

Table 13-1 Installation Trouble Shooting

Trouble or Error message	Probable Cause	Suggested Solution
Connect failed. Network Element not Responding to the connect request. (CIT-DTE port to PC serial Port)	Serial Port Cable is not connected, or is improper type (not null modem)	Inspect cable connection, review Figure 10-10 on page 10-17 and Table 10-2, "Serial Port Pinout information," on page 10-18. Also see the CMC Connection Requirements paragraph later in this section.
Communication with OLS cannot be established (To CIT-DCE or DTE).	SYSCTL and SYSMEM circuits have not finished resetting.	Wait up to 6 minutes or until LEDs of circuit packs and User Panel stop changing. Also see the CMC Connection Requirements paragraph later in this section.
	PC serial port not powered.	Check PC hardware manual for power saver instructions. Also see the CMC Connection Requirements paragraph later in this section.
	PC serial port BAUD rate does not operate below 9600 BAUD.	Check PC hardware manual Also see the CMC Connection Requirements paragraph later in this section.
	PC has background processes running.	Refer to Appendix F for examples on clearing. Also see the CMC Connection Requirements paragraph later in this section.
	PC is not detecting CTS and DSR leads as high.	Check hardware manual for PC from PC back to CTS and DSR. Also see the CMC Connection Requirements paragraph later in this section.
	STSCTL failure.	Rule out other causes: Replace SYSCTL. Also see the CMC Connection Requirements paragraph later in this section.
Flash EEPROM write error, during software installation.	Power saver feature of PC has powered down serial port.	Check PC hardware setup and disable power saver feature.
	SYSMEM failure.	Rule out other causes: Replace SYSMEM.

Table 13-1 Installation Trouble Shooting

Trouble or Error message	Probable Cause	Suggested Solution
FAULT LED on after Reset, Alarm report says Unrecognized Pack Type.	Slot had circuit pack in it before and circuit pack has been changed to new type.	Use Update command from CMC if new type circuit is what's wanted. Otherwise restore original type circuit pack.
	Failed circuit pack.	Replace circuit pack.
An incorrect disk was inserted, during software installation.	Disks are not stored in order.	Check disk labeling, insert disk requested.
	Disks are labeled incorrectly.	Workaround Only: obtain disks from another site of SAME GENERIC and use those. To correct: Contact Customer service for replacement disks.
FAULT LED flashing	On transmission circuit pack, input signal not present or not proper format.	Check presence and format of input signal. If input is not supposed to be present, use Update command to clear trouble.
	On SYSMEM.	Software mismatch between SYSCTL and SYSMEM. If version in SYSMEM is to be used, use Reset command. If version in SYSCTL is to be used, use Install program to load that version into SYSMEM.
Not enough Disk space to copy Centerlink Management Console program on Hard Drive.	PC has limited Disk capacity.	Delete unneeded files (games) on disk. Or, Install NE software from distribution diskettes.

Troubleshooting Information

The following paragraphs are called out by other procedures throughout this manual.

CMC Connection Requirements

This paragraph describes the minimum requirements for the physical connection between the CMC PC and the OLS.

Figure 13-1 on page 13-4 shows the minimum cabling needed. The RS-232 control lead values are listed for the DCE (user panel) and DTE (backplane) connectors. The OLS terminal does not change these control lead values or do

any active handshaking during communications sessions. The CMC program does actively handshake as follows:

■   When a carriage return is entered from the product selection menu of the CMC program prior to the login screen, the PC DTR and RTS leads go high.

■   After the DTR and RTS leads are set to high the CMC program expects the CTS and DSR leads to go high.

If the CTS and DSR leads do not both go high on the correct COM port then the CMC program will immediately issue a "Communication with the OLS cannot be established" error message. If the error message is reported after several seconds then the handshaking is probably correct and the problem is with the data transmission being garbled. If a local area network is used to connect the CMC PC to the OLS, XON/XOFF handshaking must be disabled at both ends of the network connection.
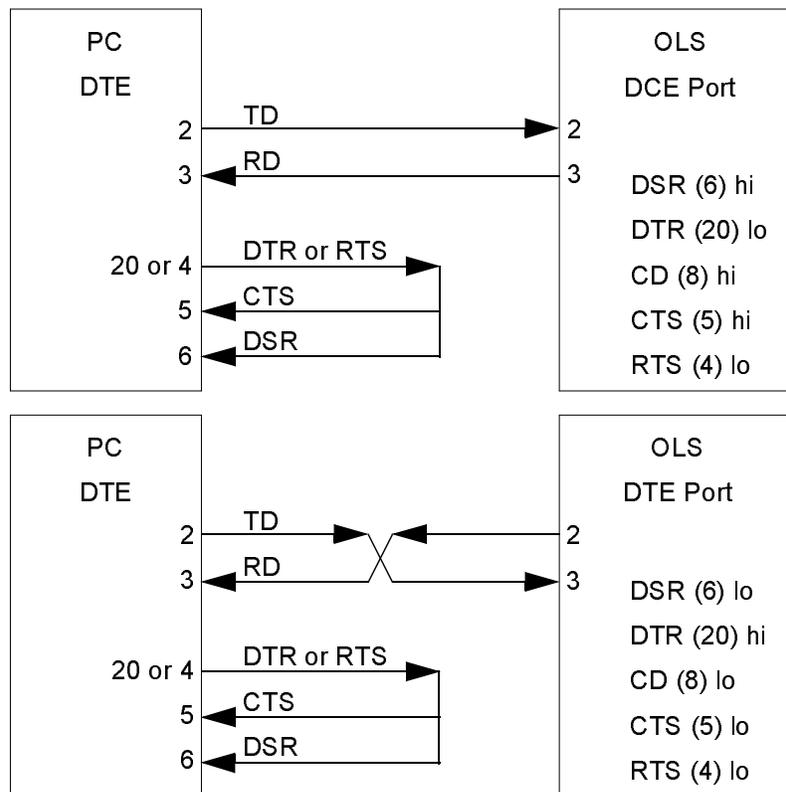
Figure 13-1 CIT(CMC) Minimum Connections

Test-Auto Turnup-Local Description

The Auto Turnup-Local test is an automated test which verifies an Optical Line System (OLS) has been installed properly. The test detects cabling errors that might otherwise not be detected until customer traffic is placed on the system. The TEST-AUTO TURNUP-LOCAL test verifies continuity through one of two possible paths emanating from OLS Telemetry packs within an OLS End Terminal or Repeater Bay:

(1) The Telemetry Pack-to-Optical Amplifier Pack (Supervisory) Channel, or

(2) The Customer Maintenance Signal (CMS) In/Out Port.

LOCAL Installation Self-Test is divided into two "types" according to the channel type under test: CMS Ports (CMS) or Supervisory Channels (SUPR). Within each OLS Optical Line under test, the entities tested and reported to the CMC are equipped TLM packs. For OLS End Terminals, tests are performed on A-TLM slots only, while for OLS Repeater Bays, A and B TLM slots are reported. If an OA pack within a Supervisory Channel loop fails, then the TLM pack involved in the Supervisory Channel loop under test is marked failed. The CMS Port involves only the TLM pack itself. There is no self-test of the OMU, ODU, or TOHCTL. The OMU/ODU is tested manually with noise measurements; the TOHCTL and cabling between terminals is tested via system level verification.

This test is invoked at the CMC in PRIVILEDGED mode with the "TEST-AUTO TURNUP-LOCAL" command. Installation Self-Test requires the user to manually configure optical fibers and insert, if necessary, the proper optical attenuation. The details of user setup, user commands, and operation of the "LOCAL" test are covered in Chapter 10 of this document.

No active conditions (as indicated by the "FAULT-RETREIVE-ALARM can be present for the OLS-under-test, except for conditions that arise as a result of test setup. The following are conditions that could be caused by the test setup in preparation for self-test:

■   OLS system incomplete

■   DS-NE not reachable

■   test auto turnup in progress

■   inc. (from Supr.) DCC Failure

■   incoming CMS LOF

■   incoming CMS SD

■   incoming supr chnl LOF

■   incoming supr chnl SD

■   incoming optical channel LOS

■   incoming optical channel SNR

■   optical line ID error

■ multiple DS-NEs defined

■ NE status comm failure

■ incoming optical line LOS (CMS Port Test Only)

The self-test request is denied if conditions other than those listed above are active.

Supervisory Channel Automatic Setup

Figure 13-2 on page 13-7 is a block diagram showing the Supervisory Channel test configuration for a TLM circuit pack within an OLS Optical line under test. After the OLS optical line fibers from OA(out)-to-OA(in) having been looped (via LGX), attenuators inserted in the loops, the CMS Ports opened, and CONFIGURATION.Update command issued at the CMC, the board controller for each TLM pack of the OLS Optical Line(s) under test will automatically:

■ switch TLM pack synchronization source to the internal 51.84 MHz Stratum 3 Clock Generator

■ have the S-STS13BP device insert PATH AIS signal in the transmit direction of the Supervisory Signal carried over the Supervisory Channel under test.

OLS Installation Self-Test uses the PAIS signals as controllable "good" signal sources for both the Supervisory Channel and CMS Port continuity tests.

Supervisory Channel Continuity Test Operation

Once setup and initialization are complete, the following operations are performed to confirm Supervisory Channel continuity per TLM slot:

(1) Verify no C1 parity error is detected at the S-STS13BP device of the TLM pack by enabling parity error insertion via TEQPAREN function, sending good parity via TEQPARTST function, and reading REQPARER.

(2) Insert C1 parity error at the S-STS13BP device of the TLM pack via TEQPARTST function.

(3) Verify C1 parity error is detected at the S-STS13BP by reading REQPARER.

(4) Remove C1 parity error at the S-STS13BP via TEQPARTST function.

(5) Verify no C1 parity error detected at the S-STS13BP by reading REQPARER.
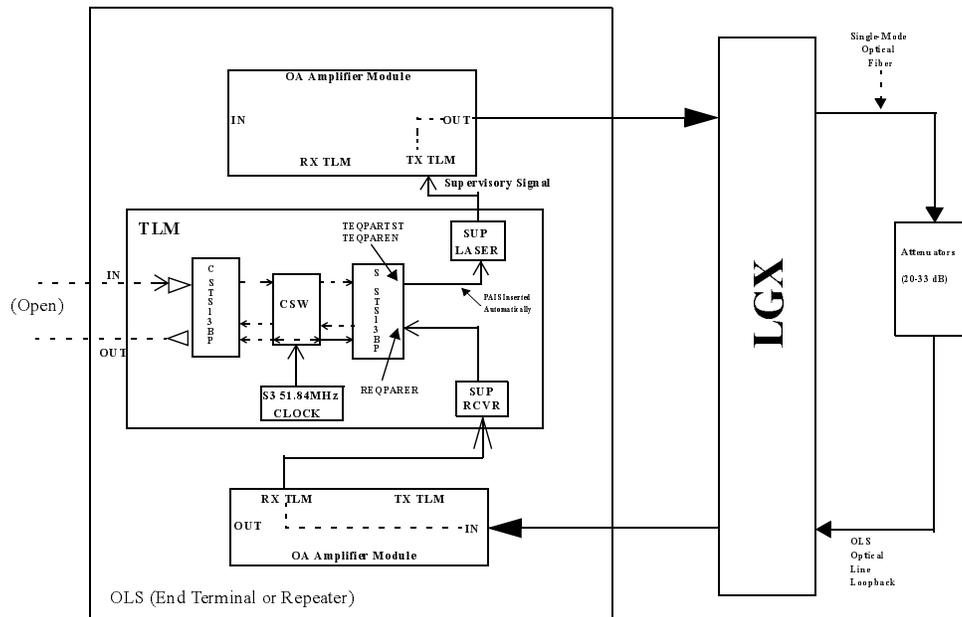
Figure 13-2 Auto-Turnup-Local SUPR Test

CMS In/Out Port Automatic Setup

Figure 13-2 on page 13-7 is a block diagram showing the CMS In/Out Port test configuration for a TLM circuit pack within an OLS Optical line under test. Upon completion of the Supervisory Channel Test, the OLS Optical Line fibers from transmit OA(out)-to-OA(in) are opened, and the CMS fibers (and optional attenuators) looped. After issuing the CONFIGURATION.Update command at the CMC, the board controller for each TLM pack of the OLS Optical Line(s) under test will automatically:

■ switch TLM pack synchronization source to the internal 51.84 MHz Stratum 3 Clock Generator

■ have the C-STS13BP device insert PATH AIS signal in the Out direction of the CMS In/Out Port.

CMS In/Out Port Continuity Test Operation

Once setup and initialization are complete, the following operations are performed to confirm CMS In/Out Port continuity per TLM slot:

(1) Verify no C1 parity error is detected at the C-STS13BP device of the TLM pack by enabling parity error insertion via TEQPAREN function, sending good parity via TEQPARTST function, and reading REQPARER.

(2) Insert C1 parity error at the C-STS13BP device of the TLM pack via TEQPARTST function.

(3) Verify C1 parity error is detected at the C-STS13BP by reading REQPARER.

(4) Remove C1 parity error at the C-STS13BP via TEQPARTST function.

(5) Verify no C1 parity error detected at the C-STS13BP by reading REQPARER.

User Test Termination

After the user invokes a self-test, the CMC does not accept any commands until the test completes. A self-test can be aborted by the user via the CMC at any time. A self-test can also terminate prematurely if a condition arises that prevents the self-test from completing.
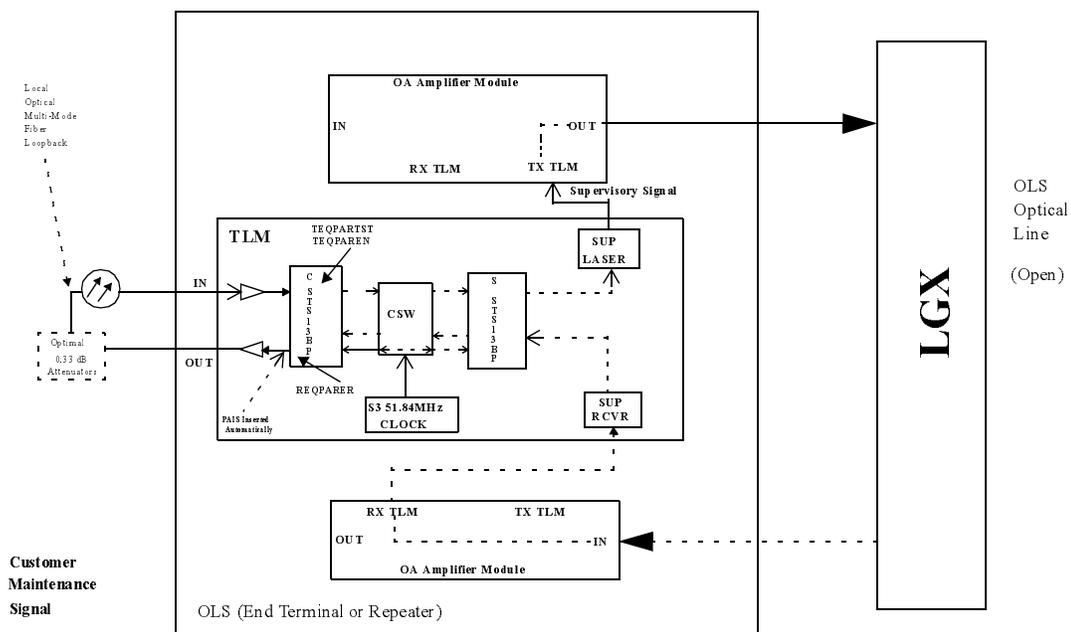
Figure 13-3 Auto-Turnup-Local CMS Test

Release 1.0 & 2.0 LBO Selection Tables

A

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Release 1.0 & 2.0 LBO Selection Tables

A
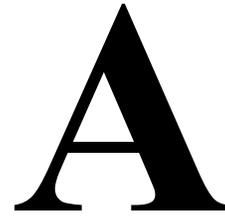
Overview

This chapter provides the LBO selection tables for installing OLS/OT/OC-48 networks.

For selection of LBOs for Release 2.1 refer to the SmartManual furnished with the CMC software.

The following tables are included in this chapter:

- Table A-1, entitled "OA LEA6 Output Levels For Release 1.0" on page A-2.

- Table A-2, entitled "LEA6 OA Output Levels For Release 2.0" on page A-2.

- Table A-3, entitled "LEA6 OA Input LBO Input Selection Guide for Nx33 Systems" on page A-3.

- Table A-4, entitled "LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span" on page A-5.

- Table A-5, entitled "LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans" on page A-8.

- Table A-6, entitled "LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans" on page A-11.

- Table A-7, entitled "LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans" on page A-13.

- Table A-8, entitled "LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans." on page A-17.

- Table A-9, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 1 or 2 for Nx33 Systems" on page A-21.

■ Table A-10, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 3 through 8 for Nx33 Systems" on page A-23.

■ Table A-11, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelength 1 for Mx24 and Px25 Systems" on page A-27.

■ Table A-12, entitled "RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 2 through 8 for Mx24 and Px25 Systems" on page A-28.

Table A-1 OA LEA6 Output Levels For Release 1.0

Number of Equipped Wavelengths	Output Power (dBm) for 3x33dB Systems	
	OA Output Power (dBm)	Measured Value After 33 dB Test Cable (dBm)
0	+11.0 to +12.8	-22.0 to -20.2
1	+11.7 to +13.1	-21.3 to -19.9
2	+11.7 to +13.1	-21.3 to -19.9
3	+13.0 to +14.4	-20.0 to -18.6
4	+13.8 to +15.2	-19.2 to -17.8
5	+14.5 to +15.9	-18.5 to -17.1
6	+15.0 to +16.4	-18.0 to -16.6
7	+15.3 to +16.7	-17.7 to -16.3
8	+15.3 to +16.7	-17.7 to -16.3

Table A-2 LEA6 OA Output Levels For Release 2.0

Number of Equipped Wavelengths	Output Power (dBm) for 3x33dB Systems	
	OA Output Power (dBm)	Measured Value After 33 dB Test Cable (dBm)
0	+9.1 to +10.9	-23.9 to -22.1
1	+11.6 to +13.0	-22.4 to -20.0
2	+11.6 to +13.0	-22.4 to -20.0
3	+13.0 to +14.4	-20.0 to -18.6
4	+13.8 to +15.2	-19.2 to -17.8

Table A-2 LEA6 OA Output Levels For Release 2.0

	Output Power (dBm) for 3x33dB Systems	
5	+14.5 to +15.9	-18.5 to -17.1
6	+15.0 to +16.4	-18.0 to -16.6
7	+15.3 to +16.7	-17.7 to -16.3
8	+15.3 to +16.7	-17.7 to -16.3

Table A-3 LEA6 OA Input LBO Input Selection Guide for Nx33 Systems

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after Faceplate LBO	Measured OA Input (dBm) before Faceplate LBO (value in () is power measured after 33 dB Test Cable)[1]	Recommended Size for OA Input LBO (dB)
0-2	-14.0 to -9.0	-22.0(-55.0) to -9.0(-42.0)	0
		-9.0(-42.0) to -4.5(-37.5)	5
		-4.5(-37.5) to -0.5(-33.5)	10
		>-0.5(-33.5)	Put 10 dB LBO in output of upstream OA output and remeasure input power. If input power is still greater than -0.5 dBm, contact your next level of support.
3	-13.0 to -8.0	-20.0(-53.0) to -8.0(-41.0)	0
		-8.0(-41.0) to -3.5(-36.5)	5
		-3.5(-36.5) to +0.5(-32.5)	10
		>+0.5(-32.5)	Put 10 dB LBO in output of upstream OA output and remeasure input power. If input power is still greater than +0.5 dBm, contact your next level of support

Table A-3 LEA6 OA Input LBO Input Selection Guide for Nx33 Systems

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after Faceplate LBO	Measured OA Input (dBm) before Faceplate LBO (value in () is power measured after 33 dB Test Cable)[1]	Recommended Size for OA Input LBO (dB)
4	-12.0 to -7.0	-19.2(-52.2) to -7.0(-40.0)	0
		-7.0(-40.0) to -2.5(-35.5)	5
		-2.5(-35.5) to +1.5(-31.5)	10
		>+1.5(-31.5)	Put 10 dB LBO in output of upstream OA output and remeasure input power. If input power is still greater than +1.5 dBm, contact your next level of support.
5	-11.5 to -6.5	-18.5(-51.5) to -6.5(-39.5)	0
		-6.5(-39.5) to -2.0(-35.0)	5
		-2.0(-35.0) to +2.0(-31.0)	10
		>+2.0(-31.0)	Put 10 dB LBO in output of upstream OA output and remeasure input power. If input power is still greater than +2.0 dBm, contact your next level of support.
6	-11.0 to -6.0	-18.0(-51.0) to -6.0(-39.0)	0
		-6.0(-39.0) to -1.5(-34.5)	5
		-1.5(-34.5) to +2.5(-30.5)	10
		>+2.5(-30.5)	Put 10 dB LBO in output of upstream OA output and remeasure input power. If input power is still greater than +2.5 dBm, contact your next level of support.

Table A-3 LEA6 OA Input LBO Input Selection Guide for Nx33 Systems

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after Faceplate LBO	Measured OA Input (dBm) before Faceplate LBO (value in () is power measured after 33 dB Test Cable)[1]	Recommended Size for OA Input LBO (dB)
7-8	-10.0 to -5.0	-17.4(-50.4) to -5.0(-38.0)	0
		-5.0(-38.0) to -0.5(-33.5)	5
		-0.5(-33.5) to +3.5(-29.5)	10
		>+3.5(-29.5)	Put 10 dB LBO in output of upstream OA output and remeasure input power. If input power is still greater than +3.5 dBm, contact your next level of support.

1. Use measured value stamped on test cable.

Table A-4 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
0	-12.0 to -18.0	less than -23.5	Span Loss Too High
		-23.5 to -12.0	0
		-12.0 to -8.0	5
		-8.0 to -3.7	10
		-3.7 or greater	Put a 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater then -3.7 dBm, some attenuation must be added to the outside plant.

Table A-4 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span

Total Number of Equipped OLS Channels	**Target OA Input Power (dBm) after faceplate LBO**	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
1-2	-9.6 to -15.6	less than -21.1	Span Loss Too High
		-21.1 to -9.6	0
		-9.6 to -5.5	5
		-5.5 to -1.3	10
		-1.3 or greater	Put a 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater than -1.3 dBm, some attenuation must be added to the outside plant.
3	-8.3 to -14.3	less than -19.8	Span Loss Too High
		-19.8 to -8.3	0
		-8.3 to -4.2	5
		-4.2 to 0.0	10
		0.0 or greater	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.0 dBm, some attenuation must be added to the outside plant.
4	-7.5 to -13.5	less than -19.0	Span Loss Too High
		-19.0 to -7.5	0
		-7.5 to -3.4	5
		-3.4 to 0.8	10
		0.8 or greater	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.8 dBm, some attenuation must be added to the outside plant.

Table A-4 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 1 span

Total Number of Equipped OLS Channels	**Target OA Input Power (dBm) after faceplate LBO**	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
5	-6.8 to -12.8	less than -18.3	Span Loss Too high
		-18.3 to -6.8	0
		-6.8 to -2.7	5
		-2.7 to 1.5	10
		1.5 or greater	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 1.5 dBm, some attenuation must be added to the outside plant.
6	-6.3 to -12.3	less than -17.8	Span Loss Too High
		-17.8 to -6.3	0
		-6.3 to -2.2	5
		-2.2 to 2.0	10
		greater than 2.0	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 2.0 dBm, some attenuation must be added to the outside plant
7-8	-5.5 to -11.5	less than -17.0	Span Loss Too High
		-17.0 to -5.5	0
		-5.5 to -1.4	5
		-1.4 to 2.8	10
		less than 2.8	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 2.8 dBm, some attenuation must be added to the outside plant

▷ **NOTE:**
The LEA7 Nx33 configuration with 2 spans is not a true 33dB span. The maximum span loss is 30dB.

Table A-5 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
0	-12.0 to -18.0	less than -20.5	Span Loss too High
		-20.5 to -12.0	0
		-12.0 to -8.0	5
		-8.0 to -3.7	10
		greater than -3.7	Put a 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater then -3.7 dBm, some attenuation must be added to the outside plant.
1-2	-9.6 to -15.6	less than -18.1	Span Loss Too High
		-18.1 to -9.6	0
		-9.6 to -5.5	5
		-5.5 to -1.3	10
		greater than -1.3	Put a 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater than -1.3 dBm, some attenuation must be added to the outside plant.
3	-8.3 to -14.3	less than -16.8	Span Loss Too High
		-16.8 to -8.3	0
		-8.3 to -4.2	5
		-4.2 to 0.0	10
		greater than 0.0	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.0 dBm, some attenuation must be added to the outside plant.

Table A-5 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans

Total Number of Equipped OLS Channels	**Target OA Input Power (dBm) after faceplate LBO**	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
4	-7.5 to -13.5	less than -16.0	Span Loss Too High
		-16.0 to -7.5	0
		-7.5 to -3.4	5
		-3.4 to 0.8	10
		greater than 0.8	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.8 dBm, some attenuation must be added to the outside plant.
5	-6.8 to -12.8	less than -15.3	Span Loss Too high
		-15.3 to -6.8	0
		-6.8 to -2.7	5
		-2.7 to 1.5	10
		greater than 1.5	Put a 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 1.5 dBm, some attenuation must be added to the outside plant.
6	-6.3 to -12.3	less than -14.8	Span Loss Too High
		-14.8 to -6.3	0
		-6.3 to -2.2	5
		-2.2 to 2.0	10
		greater than 2.0	Put a 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 2.0 dBm, some attenuation must be added to the outside plant

Table A-5 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 2 spans

Total Number of Equipped OLS Channels	**Target OA Input Power (dBm) after faceplate LBO**	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
7-8	-5.5 to -11.5	less than -14.0	Span Loss Too High
		-14.0 to -5.5	0
		-5.5 to -1.4	5
		-1.4 to 2.8	10
		less than 2.8	Put a 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 2.8 dBm, some attenuation must be added to the outside plant

NOTE:
The LEA7 Nx33 Configuration with 3 spans does not support a 33 dB loss. The maximum span loss for LEA7 Nx33 with 3 spans is 28 dB.

Table A-6 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
0	-12.0 to -18.0	less than -18.5	Span Loss too High
		-18.5 to -12.0	0
		-12.0 to -8.0	5
		-8.0 to -3.7	10
		greater than -3.7	Put a 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater then -3.7 dBm, some attenuation must be added to the outside plant.
1-2	-9.6 to -15.6	less than -16.1	Span Loss Too High
		-16.1 to -9.6	0
		-9.6 to -5.5	5
		-5.5 to -1.3	10
		greater than -1.3	Put a 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater than -1.3 dBm, some attenuation must be added to the outside plant.
3	-8.3 to -14.3	less than -14.8	Span Loss Too High
		-14.8 to -8.3	0
		-8.3 to -4.2	5
		-4.2 to 0.0	10
		greater than 0.0	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.0 dBm, some attenuation must be added to the outside plant.

Table A-6 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans

Total Number of Equipped OLS Channels	**Target OA Input Power (dBm) after faceplate LBO**	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
4	-7.5 to -13.5	less than -14.0	Span Loss Too High
		-14.0 to -7.5	0
		-7.5 to -3.4	5
		-3.4 to 0.8	10
		greater than 0.8	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.8 dBm, some attenuation must be added to the outside plant.
5	-6.8 to -12.8	less than -13.3	Span Loss Too high
		-13.3 to -6.8	0
		-6.8 to -2.7	5
		-2.7 to 1.5	10
		greater than 1.5	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 1.5 dBm, some attenuation must be added to the outside plant.
6	-6.3 to -12.3	less than -12.8	Span Loss Too High
		-12.8 to -6.3	0
		-6.3 to -2.2	5
		-2.2 to 2.0	10
		greater than 2.0	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 2.0 dBm, some attenuation must be added to the outside plant

Table A-6 LBO Selection for LEA7 Type OAs for Nx33 Configurations with 3 spans

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
7-8	-5.5 to -11.5	less than -12.0	Span Loss Too High
		-12.0 to -5.5	0
		-5.5 to -1.4	5
		-1.4 to 2.8	10
		less than 2.8	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 2.8 dBm, some attenuation must be added to the outside plant

Table A-7 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
0	-15.0 to -20.0	less than -20.7	Span Loss too High
		-20.7 to -15.0	0
		-15.0 to -12.0	5
		-12.0 to -9.8	7
		-9.8 to -6.7	10
		greater than -6.7	Put 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater then -3.7 dBm, some attenuation must be added to the outside plant.

Table A-7 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans

Total Number of Equipped OLS Channels	**Target OA Input Power (dBm) after faceplate LBO**	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
1	-12.4 to -17.4	less than -18.1	Span Loss Too High
		-18.1 to -12.4	0
		-12.4 to -9.4	5
		-9.4 to -7.2	7
		-7.2 to -4.1	10
		greater than -4.1	Put 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater than -4.1 dBm, some attenuation must be added to the outside plant.
2	-11.9 to -16.9	less than -17.6	Span Loss Too High
		-17.6 to -11.9	0
		-11.9 to -8.9	5
		-8.9 to -6.7	7
		-6.7 to -3.6	10
		greater than -3.6	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than -3.6 dBm, some attenuation must be added to the outside plant.
3	-10.2 to -15.2	less than -15.9	Span Loss Too High
		-15.9 to -10.2	0
		-10.2 to -7.2	5
		-7.2 to -5.0	7
		-5.0 to -1.9	10
		greater than -1.9	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than -1.9 dBm, some attenuation must be added to the outside plant.

Table A-7 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
4	-9.2 to -14.2	less than -14.9	Span Loss Too high
		-14.9 to -9.2	0
		-9.2 to -6.2	5
		-6.2 to -4.0	7
		-4.0 to -0.9	10
		greater than -0.9	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than -0.9 dBm, some attenuation must be added to the outside plant.
5	-8.3 to -13.3	less than -14.0	Span Loss Too High
		-14.0 to -8.3	0
		-8.3 to -5.3	5
		-5.3 to -3.1	7
		-3.1 to 0.0	10
		greater than 0.0	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.0 dBm, some attenuation must be added to the outside plant
6	-7.7 to -12.7	less than -13.4	Span Loss Too High
		-13.4 to -7.7	0
		-7.7 to -4.7	5
		-4.7 to -2.5	7
		-2.5 to +0.6	10
		greater than +0.6	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than +0.6 dBm, some attenuation must be added to the outside plant

Table A-7 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 4-6 spans

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
7	-7.1 to -12.1	less than -12.8	Span Loss Too High
		-12.8 to -7.1	0
		-7.1 to -4.1	5
		-4.1 to -1.9	7
		-1.9 to +1.2	10
		greater than +1.2	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than +1.2 dBm, some attenuation must be added to the outside plant.
8	-6.9 to -11.9	less than -12.6	Span Loss Too High
		-12.6 to -6.9	0
		-6.9 to -3.9	5
		-3.9 to -1.7	7
		-1.7 to +1.4	10
		greater than +1.4	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than +1.4 dBm, some attenuation must be added to the outside plant.

➡ **NOTE:**

A 3dB LBO must be installed on the output of all OAs in 7 & 8 span configurations. This 3 dB LBO must be in place in the upstream OA before using the following table.

Table A-8 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans.

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
0	-14.0 to -19.0	less than -19.7	Span Loss Too High
		-19.7 to -14.0	0
		-14.0 to -11.0	5
		-11.0 to -8.8	7
		-8.8 to -5.7	10
		greater than -5.7	Put 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater then -5.7 dBm, some attenuation must be added to the outside plant.
1	-11.4 to -16.4	less than -17.1	Span Loss Too High
		-17.1 to -11.4	0
		-11.4 to -8.4	5
		-8.4 to -6.2	7
		-6.2 to -3.1	10
		greater than -3.1	Put 10 dB LBO in the output of upstream OA and re-measure input power. If input power is still greater than -3.1 dBm, some attenuation must be added to the outside plant.

Table A-8 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans.

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
2	-10.9 to -15.9	less than -16.6	Span Loss Too High
		-16.6 to -10.9	0
		-10.9 to -7.9	5
		-7.9 to -5.7	7
		-5.7 to -2.6	10
		greater than -2.6	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than -2.6 dBm, some attenuation must be added to the outside plant.
3	-9.2 to -14.2	less than -14.9	Span Loss Too High
		-14.9 to -9.2	0
		-9.2 to -6.2	5
		-6.2 to -4.0	7
		-4.0 to -0.9	10
		greater than -0.9	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than -0.9 dBm, some attenuation must be added to the outside plant.
4	-8.2 to -13.2	less than -13.9	Span Loss Too high
		-13.9 to -8.2	0
		-8.2 to -5.2	5
		-5.2 to -3.0	7
		-3.0 to +0.1	10
		greater than +0.1	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 0.1 dBm, some attenuation must be added to the outside plant.

Table A-8 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans.

Total Number of Equipped OLS Channels	**Target OA Input Power (dBm) after faceplate LBO**	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
5	-7.3 to -12.3	less than -13.0	Span Loss Too High
		-13.0 to -7.3	0
		-7.3 to -4.3	5
		-4.3 to -2.1	7
		-2.1 to +1.0	10
		greater than +1.0	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than 1.0 dBm, some attenuation must be added to the outside plant
6	-6.7 to -11.7	less than -12.4	Span Loss Too High
		-12.4 to -6.7	0
		-6.7 to -3.7	5
		-3.7 to -1.5	7
		-1.5 to +1.6	10
		greater than +1.6	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than +1.6 dBm, some attenuation must be added to the outside plant
7	-6.1 to -11.1	less than -11.8	Span Loss Too High
		-11.8 to -6.1	0
		-6.1 to -3.1	5
		-3.1 to -0.9	7
		-0.9 to +2.2	10
		greater than +2.2	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than +2.2 dBm, some attenuation must be added to the outside plant.

Table A-8 LBO Selection for LEA7 Type OAs for Px25/Mx24 Configurations with 7-8 spans.

Total Number of Equipped OLS Channels	Target OA Input Power (dBm) after faceplate LBO	Measured OA Input Power (dBm) before faceplate LBO	Recommended Size for OA Input LBO (dB)
8	-5.9 to -10.9	less than -11.6	Span Loss Too High
		-11.6 to -5.9	0
		-5.9 to -2.9	5
		-2.9 to -0.7	7
		-0.7 to +2.4	10
		greater than +2.4	Put 10 dB LBO in output of upstream OA and re-measure input power. If input power is still greater than +2.4 dBm, some attenuation must be added to the outside plant.

Table A-9 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 1 or 2 for Nx33 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output **(value in () is power measured after 33 dB Test Cable)**[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
1	-3.3(-36.3) to -2.0(-35.0)	7	5
	-2.0(-35.0) to -1.2(-34.2)	10	3
	-1.2(-34.2) to -0.2(-33.2)	7	7
	-0.2(-33.2) to +1.5(-31.5)	15	0
	+1.5(-31.5) to +2.6(-30.4)	10	7
	+2.6(-30.4) to +4.3(-28.7)	15	3
	+4.3(-28.7) to +4.9(-28.7)	10	10
	+4.9(-28.7) to +6.2(-26.8)	15	5
	>+6.2(-26.8)	15	7
2	-11.1(-44.1) to -9.4(-42.4)	10	0
	-9.4(-42.4) to -8.1(-41.1)	7	5
	-8.1(-41.1) to -7.5(-40.5)	10	3
	-7.5(-40.5) to -6.3(-39.3)	7	7
	-6.3(-39.3) to -4.7(-37.7)	15	0
	-4.7(-37.7) to -3.5(-36.5)	10	7
	-3.5(-36.5) to -1.9(-34.9)	15	3
	-1.9(-34.9) to -1-1(-34.1)	10	10
	>-1-1(-34.1)	15	5

Table A-9 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 1 or 2 for Nx33 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output **(value in () is power measured after 33 dB Test Cable)**[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
3	-12.1(-45.1) to 10.4(-43.4)	10	0
	-10.4(-43.4) to -9.1(-42.1)	7	5
	-9.1(-42.1) to -8.5(-41.5)	10	3
	-8.5(-41.5) to -7.3(40.3)	7	7
	-7.3(-40.3) to -5.7(-38.7)	15	0
	-5.7(-38.7) to -4.5(-37.5)	10	7
	-4.5(-37.5) to -2.9(-35.9)	15	3
	-2.9(-35.9) to -2.'(-35.1)	10	10
	>-2.1(-35.1)	15	5
4-8	-14.5(-47.5) to -13.1(-46.1)	5	3
	-13.1(-46.1) to -11.4(-44.4)	10	0
	11.4(-44.4) to -10.1(-43.1)	7	5
	-10.1(-43.1) to -9.5(-42.5)	10	3
	-9.5(-42.5) to -8.3(-41.3)	7	7
	-8.3(-41.3) to -6.7(-39.7)	15	0
	-6.7(-39.7) to -5.5(-38.5)	10	7
	-5.5(-38.5) to -3.9(-36.96)	15	3
	-3.9(-36.9) to -3.1(-36.1)	10	10
	>-3.1(-36.1)	15	5

1. Use measured value stamped on test cable.

Table A-10 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 3 through 8 for Nx33 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output (value in () is power measured after 33 dB Test Cable)[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
1	-2.6(-35.6) to -2.0(-35.0)	10	3
	-2.0(-35.0) to -0.8(-33.8)	7	7
	-0.8(-33.8) to +0.8(-32.2)	15	0
	+0.8(-32.2) to +2.0(-31.0)	10	7
	+2.0(-31.0) to +3.6(-29.4)	15	3
	+3.6(-29.4) to +4.4(-28.6)	10	10
	+4.4(-28.6) to +5.5(-27.5)	15	5
	>+5.5(-27.5)	15	7
2	-5.6(-38.5) to -5.0(-38.0)	10	3
	-5.0(-38.0) to -3.8(-36.8)	7	7
	-3.8(-36.8) to -2.2(-35.2)	15	0
	-2.2(-35.2) to -1.0(-34.0)	10	7
	-1.0(-34.0) to +0.6(-32.4)	15	3
	+0.6(-32.4) to +1.4(-31.6)	10	10
	+1.4(-31.6) to +2.5(-30.5)	15	5
	+2.5(-30.5) to +4.8(-28.2)	15	7
	>+4.8(-28.2)	15	10

Table A-10 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 3 through 8 for Nx33 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output (value in () is power measured after 33 dB Test Cable)[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
3	-7.4(-40.4) to -6.1(-39.1)	7	5
	-6.1(-39.1) to -5.5(-38.5)	10	3
	-5.5(-38.5) to -4.3(-37.3)	7	7
	-4.3(-37.3) to -2.7(-35.7)	15	0
	-2.7(-35.7) to -1.5(-34.5)	10	7
	-1.5(-34.5) to +0.1(-32.9)	15	3
	+0.1(-32.9) to +0.9(-32.1)	10	10
	+0.9(-32.1) to +2.0(-31.0)	15	5
	+2.0(-31.0) to +4.3(-28.7)	15	7
	>+4.3(-28.7)	15	10
4	-9.6(-42.6) to -7.9(-40.9)	10	0
	-7.9(-40.9) to -6.6(-39.6)	7	5
	-6.6(-39.6) to -6.0(-39.0)	10	3
	-6.0(-39.0) to -4.8(-37.8)	7	7
	-4.8(-37.8) to -3.2(-36.2)	15	0
	-3.2(-36.2) to -2.0(-35.0)	10	7
	-2.0(-35.0) to -0.4(-33.4)	15	3
	-0.4(-33.4) to +0.4(-32.6)	10	10
	+0.4(-32.6) to +1.5(-31.5)	15	5
	+1.5(-31.5) to +3.8(-29.2)	15	7
	>+3.8(-29.2)	15	10

Table A-10 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 3 through 8 for Nx33 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output **(value in () is power measured after 33 dB Test Cable)**[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
5	-11.5(-44.5) to -10.1(-43.1)	5	3
	-10.1(-43.1) to -8.4(-41.4)	10	0
	-8.4(-41.4) to -7.1(-40.1)	7	5
	-7.1(-40.1) to -6.5(-39.5)	10	3
	-6.5(-39.5) to -5.3(-38.3)	7	7
	-5.3(-38.3) to -3.7(-36.7)	15	0
	-3.7(-36.7) to -2.5(-35.5)	10	7
	-2.5(-35.5) to -0.9(-33.9)	15	3
	-0.9(-33.9) to -0.1(-33.1)	10	10
	-0.1(-33.1) to +1.0(-32.0)	15	5
	+1.0(-32.0) to +3.3(-29.7)	15	7
	>+3.3(-29.7)	15	10
6	-13.3(-46.3) to -12.0(-45.0)	7	0
	-12.0(-45.0) to -10.6(-43.6)	5	3
	-10.6(-43.6) to -8.9(-41.9)	10	0
	-8.9(-41.9) to -7.6(-40.6)	7	5
	-7.6(-40.6) to -7.0(-40.0)	10	3
	-7.0(-40.0) to -5.8(-38.8)	7	7
	-5.8(-38.8) to -4.2(-37.2)	15	0
	-4.2(-37.2) to -3.0(.36.0)	10	7
	-3.0(-36.0) to -1.4(-34.4)	15	3
	-1.4(-34.4) to -0.6(-33.6)	10	10
	-0.6(-33.6) to +0.5(-32.5)	15	5
	+0.5(-32.5) to +2.8(-30.2)	15	7
	>+2.8(-30.2)	15	10

Table A-10 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 3 through 8 for Nx33 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output (value in () is power measured after 33 dB Test Cable)[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
7	-13.5(-46.5) to -12.5(-45.5)	7	0
	-12.5(-45.5) to -11.1(-44.1)	5	3
	-11.1(-44.1) to -9.4(-42.4)	10	0
	-9.4(-42.4) to -8.1(-41.1)	7	5
	-8.1(-41.1) to -7.5(-40.5)	10	3
	-7.5(-40.5) to -6.3(-39.3)	7	7
	-6.3(-39.3) to -4.7(-37.7)	15	0
	-4.7(-37.7) to -3.5(-36.5)	10	7
	-3.5(-36.5) to -1.9(-34.9)	15	3
	-1.9(-34.9) to -1.1(-34.1)	10	10
	-1.1(-34.1) to 0.0(-33.0)	15	5
	0.0(-33.0) to +2.3(-31.7)	15	7
	>+2.3(-31.7)	15	10
8	-13.5(-46.5) to -12.1(-45.1)	5	3
	-12.1(-45.1) to -10.4(-43.4)	10	0
	-10.4(-43.4) to -9.1(-42.1)	7	5
	-9.1(-42.1) to -8.5(-41.5)	10	3
	-8.5(-41.5) to -7.3(-40.3)	7	7
	-7.3(-40.3) to -5.7(-38.7)	15	0
	-5.7(-38.7) to -4.5(-37.5)	10	7
	-4.5(-37.5) to -2.9(-35.9)	15	3
	-2.9(-35.9) to -2.1(-35.1)	10	10
	-2.1(-35.1) to -1.0(-34.0)	15	5
	-1.0(-34.0) to +1.3(-31.7)	15	7
	>+1.3(-31.7)	15	10

1. Use measured value stamped on test cable.

Table A-11 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelength 1 for Mx24 and Px25 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output **(value in () is power measured after 33 dB Test Cable)**[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
1	-6.5(-39.5) to -5.0(-38.0)	5	3
	-5.0(-38.0) to -3.4(-36.4)	10	0
	-3.4(-36.4) to -2.1(-35.1)	7	5
	-2.1(-35.1) to -1.5(-34.5)	10	3
	-1.5(-34.5) to -0.3(-33.3)	7	7
	-0.3(-33.3) to +1.3(-31.7)	15	0
	+1.3(-31.7) to +1.8(-31.2)	10	7
	+1.8(-31.2) to +4.1(-28.9)	15	3
	>+4.1(-28.9)	10	10
2-8	-17.0(-50.0) to -15.3(-48.3)	5	0
	-15.3(-48.3) to -14.0(-47.0)	7	0
	-14.0(-47.0) to -12.6(-45.6)	5	3
	-12.6(-45.6) to -10.9(-43.9)	10	0
	-10.9(-43.9) to -9.6(-42.6)	7	5
	-9.6(-42.6) to -9.0(-42.0)	10	3
	-9.0(-42.0) to -7.8(-40.8)	7	7
	-7.8(-40.8) to -6.2(-39.2)	15	0
	-6.2(-39.2) to -5.0(-38.0)	10	7
	-5.0(-38.0) to -3.4(-36.4)	15	3
	-3.4(-36.4) to -2.6(-35.6)	10	10
	-2.6(-35.6) to -1.5(-24.5)	15	5
	>-1.5(-24.5)	15	7

1. Use measured value stamped on test cable.

Table A-12 RCVR/OTU Input and ODU Output LBO Selection Guide for Wavelengths 2 through 8 for Mx24 and Px25 Systems

Total Number of Equipped OLS Channels	Measured Receiver Input Power (dBm) before Faceplate LBO with 0 dB LBO on ODU Output (value in () is power measured after 33 dB Test Cable)[1]	Recommended Size for RCVR Input LBO (dB)	Recommended Size for ODU Output LBO (dB)
1	-7.0(-40.0) to -5.5(-38.5)	5	3
	-5.5(-38.5) to -3.9(-36.9)	10	0
	-3.9(-36.9) to -2.6(-35.6)	7	5
	-2.6(-35.6) to -2.0(-35.0)	10	3
	-2.0(-35.0) to -0.8(-33.8)	7	7
	-0.8(-33.8) to +0.8(-32.2)	15	0
	+0.8(-32.2) to +2.0(-31.0)	10	7
	+2.0(-31.0) to +3.6(-29.4)	15	3
	>+3.6(-29.4)	10	10
2-8	-15.0(-48.0) to -13.3(-46.3)	5	0
	-13.3(-46.3) to -12.0(-45.0)	7	0
	-12.0(-45.0) to -10.6(-43.6)	5	3
	-10.6(-43.6) to -8.9(-41.9)	10	0
	-8.9(-41.9) to -7.6(-40.6)	7	5
	-7.6(-40.6) to -7.0(-40.0)	10	3
	-7.0(-40.0) to -5.8(-38.8)	7	7
	-5.8(-38.8) to 46.2(-37.2)	15	0
	-4.2(-37.2) to -3.0(-36.0)	10	7
	-3.0(-36.0) to -1.4(-34.4)	15	3
	-1.4(-34.4) to -0.6(-33.6)	10	10
	-0.6(-33.6) to +0.5(-32.5)	15	5
	+0.5(-32.5) to +2.8(-30.2)	15	7
	>+2.8(-30.2)	15	10

1. Use measured value stamped on test cable.

Pin Repair

B

Contents

Pin Repair

B

General

This section describes the procedures for terminal repair in METRAL technology using the BERG MT370-01 Tool Kit for the METRAL technology. The tools were designed to remove and replace pins in MLPWB (Multilayer Printed Wiring Board) backplane areas equipped with or without spacer aligners.

Metral Tool Kit Descriptions

METRAL Press-Fit Repair Kit

- Repair Tool Kit: BERG MT370-01
- Individual Pins: See Table B-1

Pin Designations

Table B-1 METRAL Pin Codes

PIN ID	Part Number
A	88929-102
C	88929-119
D	88930-101
F	88929-106

OLS Circuit Pack and Equipment Location

Table B-2 OLS Equipment Location

Circuit Pack	Backplane Location
SYSMEM (LEA2)	20-604
SYSCTL (LEA1)	20-534
TOHCTL (LEA5)	20-554
OA (LEA6)	20-534, 20-434, 20-330, 20-230
TLM (LDA1)	52-180, 52-230 52-280, 52-330
OMU/ODU (505A/605A)	52-382, 52-430 52-478, 52-526
USER PNL	45-557
PWR A	50-597
PWR B	44-597

OT Circuit Pack and Equipment Location

Table B-3 OT Equipment Location

Circuit Pack	Backplane Location	
SYSMEM	20-605	
SYSCTL	20-565	
TOHCTL	20-525	
OTU (System Shelf)	20-163 20-203 20-243 20-283 20-323 20-363 20-405 20-445 *20-485	*Note: Location 20-485 is not populated with andy circut pack at this time. Its inclusion is for accuracy.
OTU (Complimentary Shelves 1&2)	20-163 20-203 20-243 20-283 20-323 20-363 20-405 20-445 20-485 20-525 20-565 20-605	
PWR A	39-184	
PWR B	39-570	

Procedures for Pin Replacement

⚠ CAUTION:
This procedure must been done with the shelf out of service and powered down to insure no further damage to the equipment or to the person doing the pin replacement.

⚠ CAUTION:
Proper ESD precautions must be used.

(1) Determine if the bent or broken pin is in an OLS, or an OT Bay or miscellaneous mounted shelf.

(2) Determine the shelf in which the bent or broken pin resides.

(3) Determine the circuit pack slot in which the pin resides.

(4) Determine the number and column location of the pin.

(5) Refer to the correct figure (Figures B1-B8 on pages B5-B12) to determine the letter pin code associated with the pin.

(6) Using Table 1, "METRAL Pin Codes," on page 2, determine the type of pin and the correct part number for the replacement pin.

(7) Obtain the correct replacement pin (see the Applications, Planning and Ordering Guide).

(8) Refer to "METRAL Press-Fit Repair Kit MT370-01" documentation for proper procedures to remove and replace the bent or broken pin.

Optical Line System (OLS) - Pin Type Location
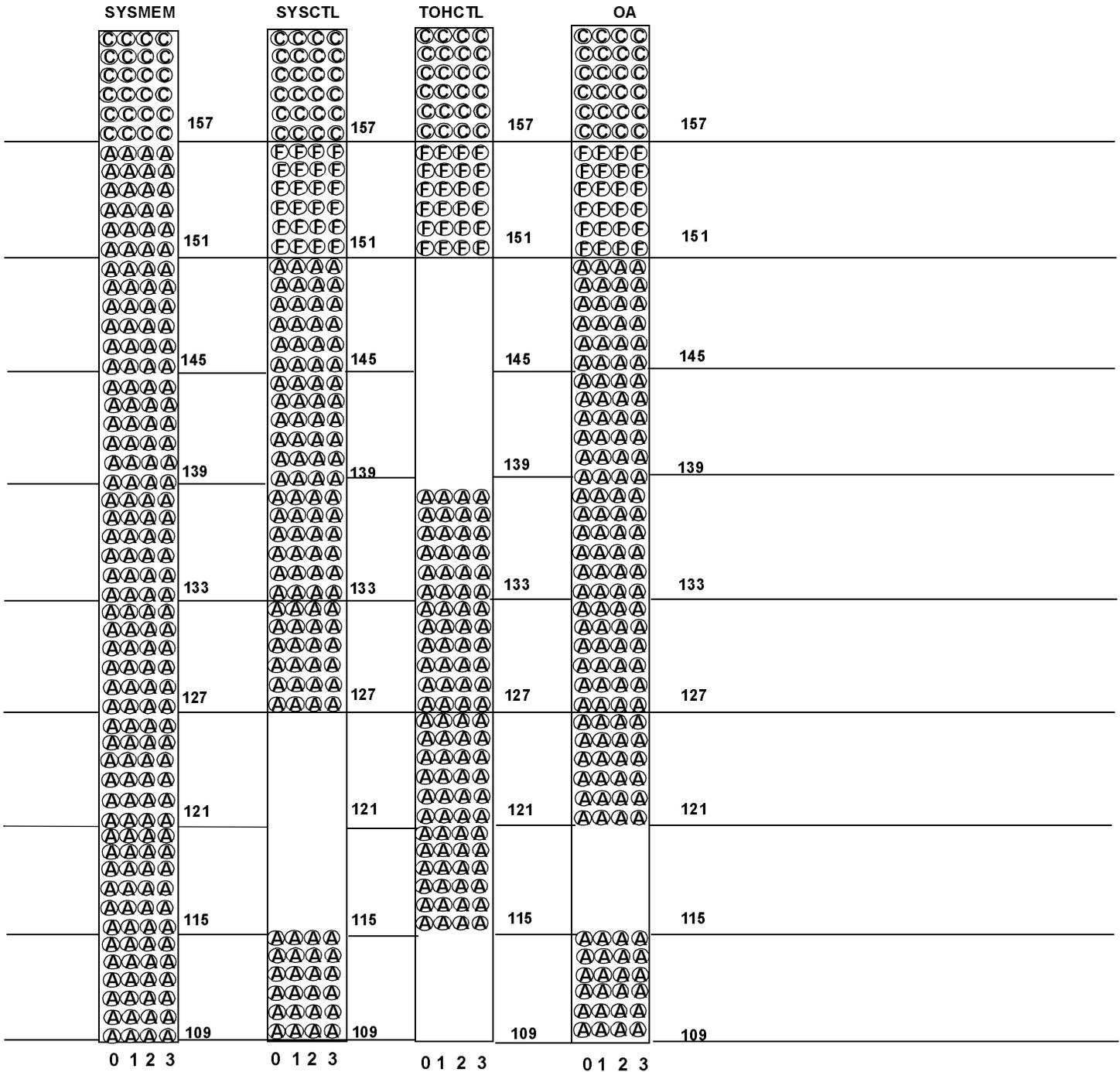
Figure B-1 Optical Line System - All Shelves
Component Side View

Optical Line System (OLS)- Pin Type Location
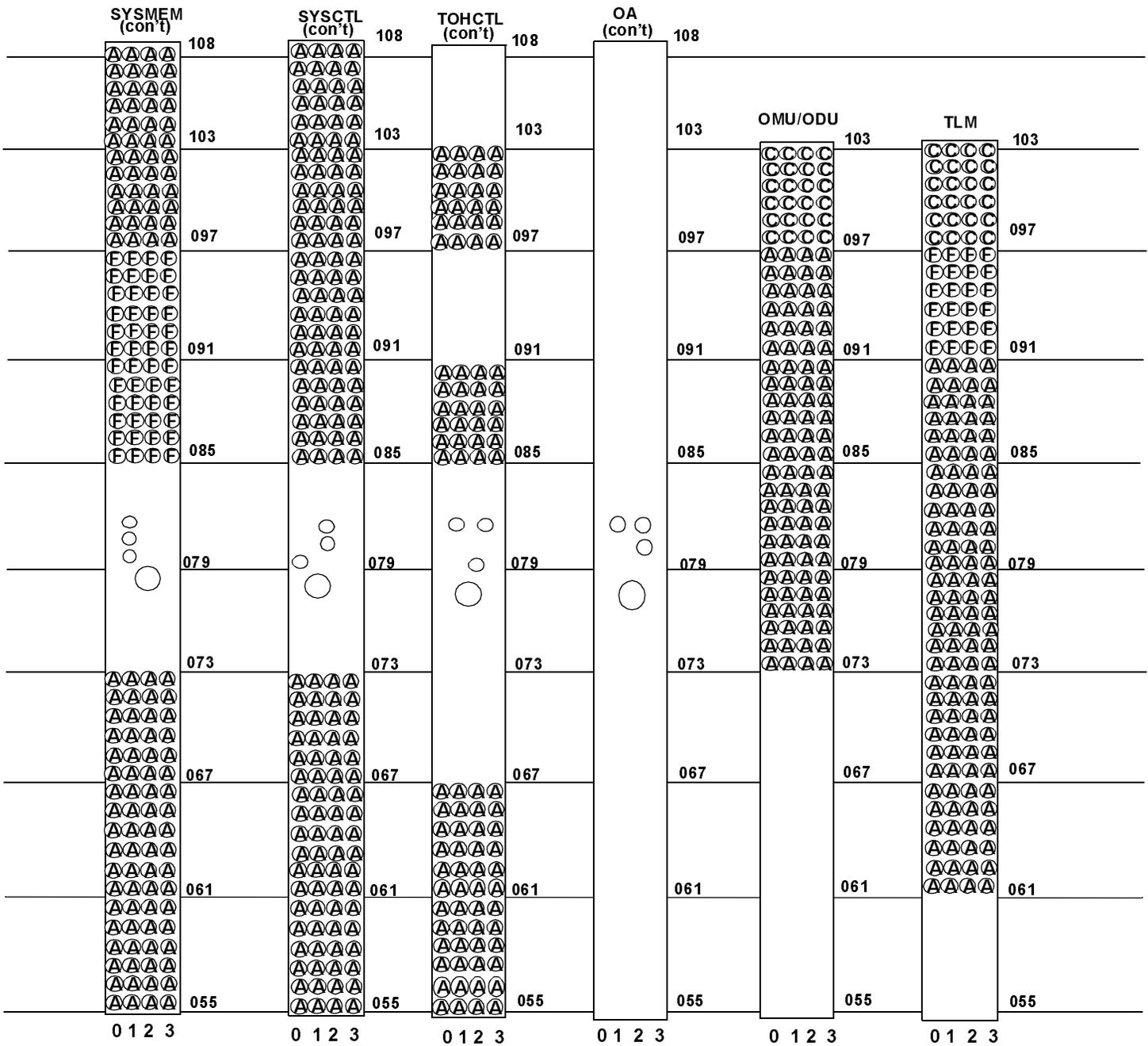
Figure B-2 Optical Line System (Middle)
Component Side View

Optical Line System (OLS) - Pin Type Location
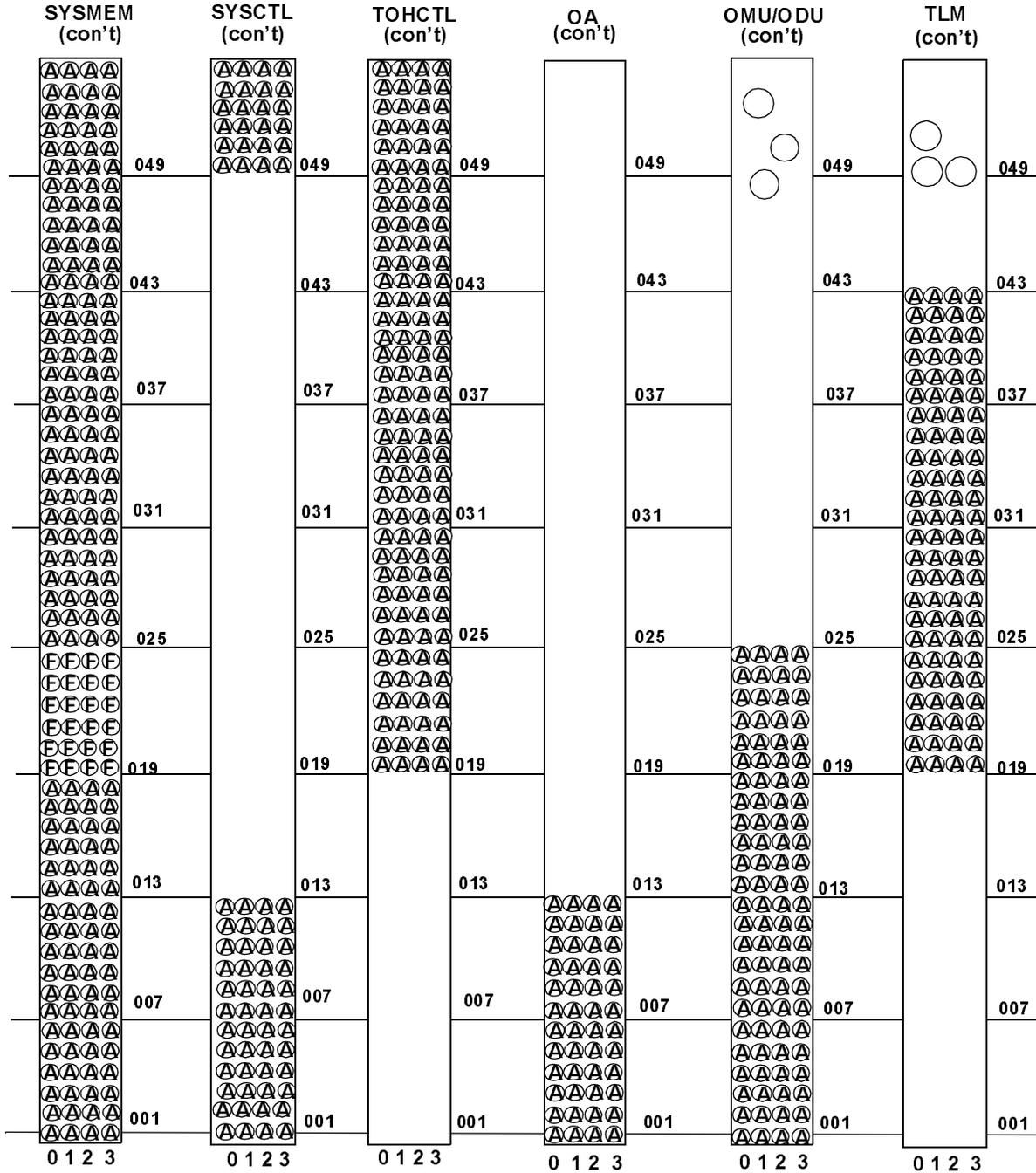
Figure B-3 Optical Line System (Lower)
Component Side View

Optical Line System (OLS) - Pin Type Location
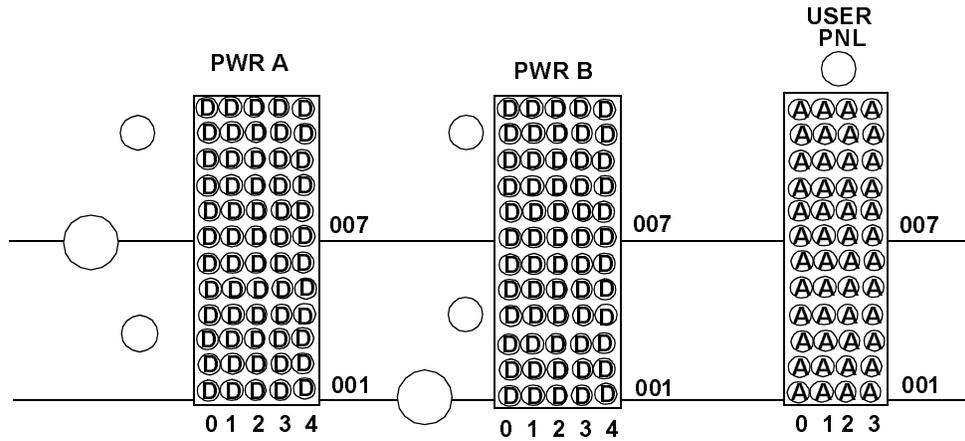
Figure B-4 OLS - Power and User Panel
Component Side View

Optical Translator (OT) - Pin Type Location
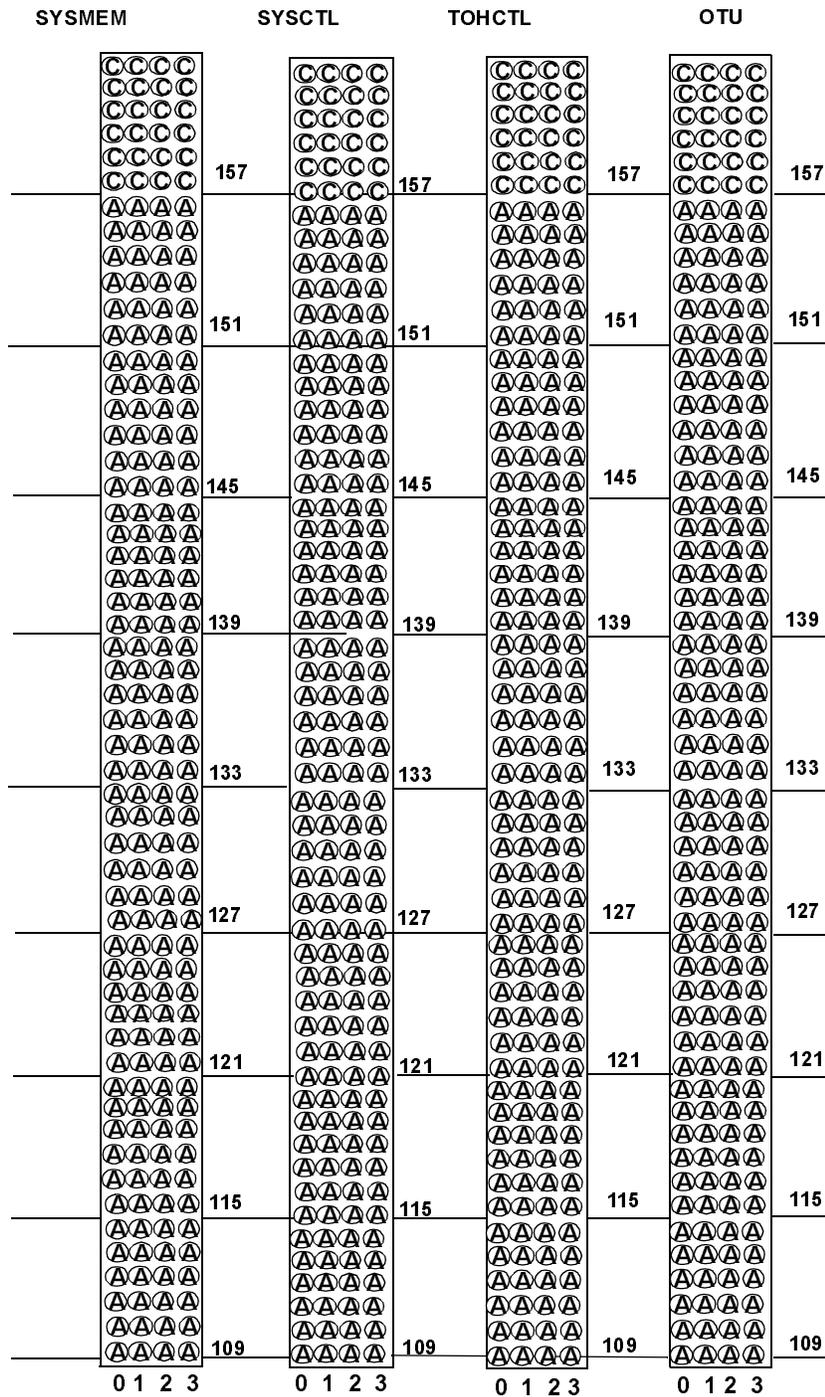
**Figure B-5 Optical Translator (OT) - All Shelves
Component Side View**

Optical Translator (OT) - Pin Type Location

Figure B-6 Optical Translator (Middle)

Component Side View

OPTICAL TRANSLATOR (OT) - Pin Type Location
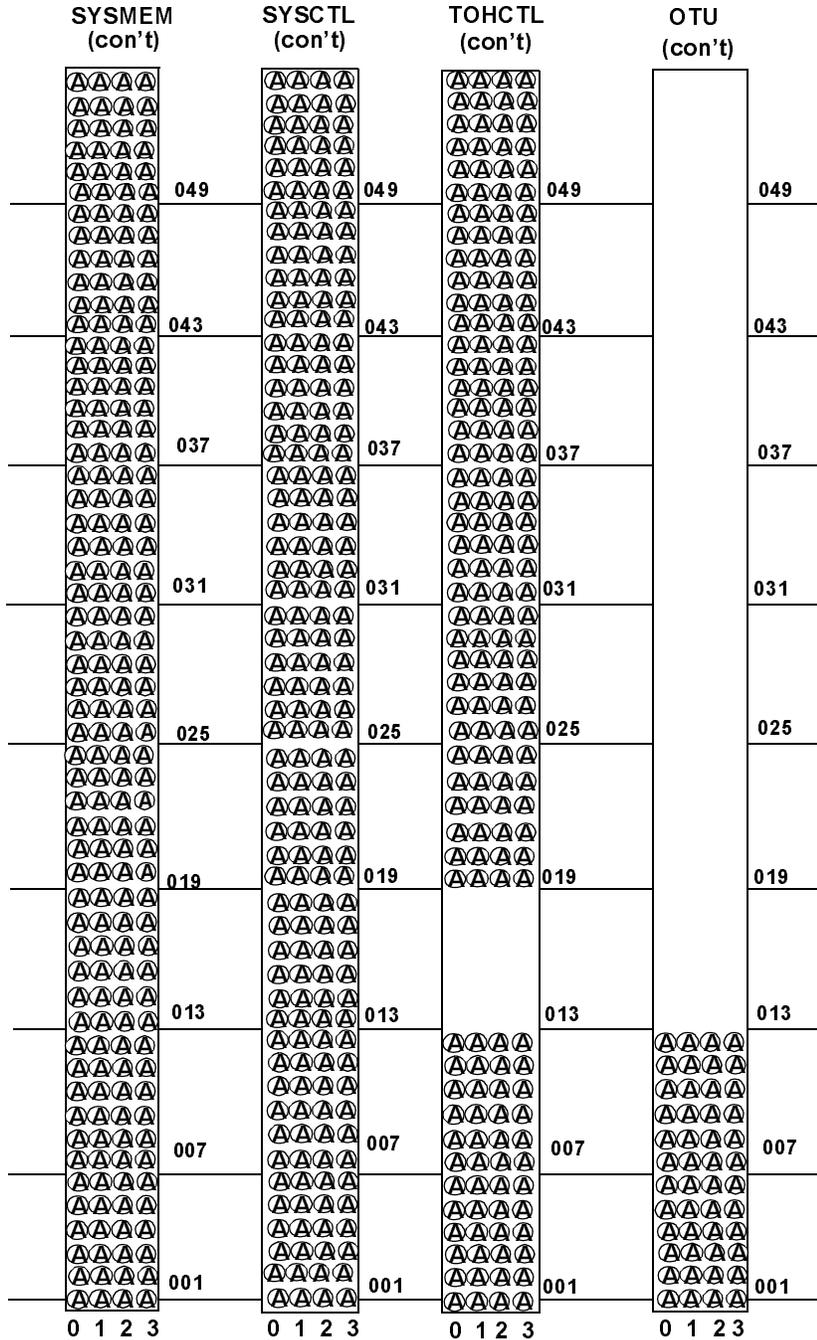
Figure B-7 Optical Translator (Lower)
Component Side View

OPTICAL TRANSLATOR SYSTEM (OT) - Pin Type Location
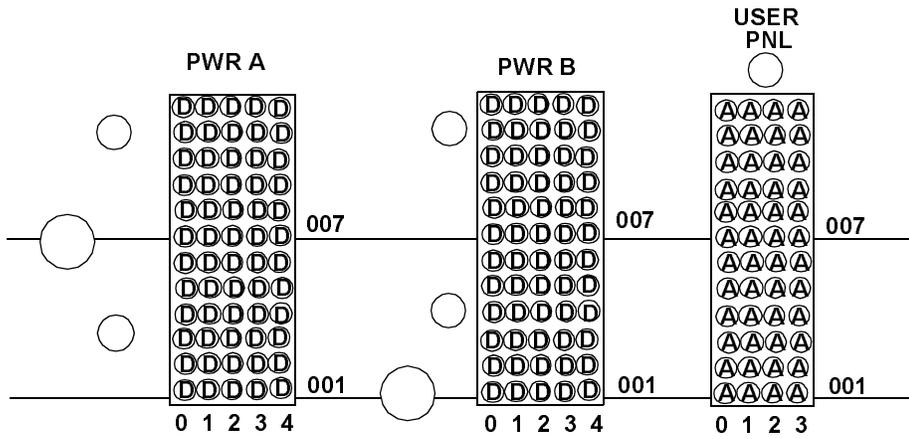
Figure B-8 Optical Translator - Power and User Panel Component Side View

Fiber Cleaning

C

Contents

Fiber Cleaning

C

Description

It is critical that optical connectors be kept clean to avoid connector damage.

The presence of hydrocarbons and other contaminates on optical connectors has been related to catastrophic damage at high optical power levels such as those encountered in the OLS system.

⚠ **WARNING:**
> *Disconnected or separated optical connectors may emit invisible laser radiation. Do not view the lightwave beam with an optical instrument. Avoid direct exposure to the beam.*

⟹ **NOTE:**
> All optical fiber connectors (ST, FC/PC, LC, and SC types), lightguide buildouts, and buildout blocks or equivalents should be cleaned before making initial connections or reconnections per the following instructions. Only the components being assembled at this particular time should be cleaned.

Keep all dust caps and plugs in place until time to make connections.

Equipment Required

Recommended Procedure:

- CLETOP Reel Type A[1]

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1. Available from Speer Fiber Optics, 18 Pierson Drive, Belle Mead, NJ 08502, Phone (908) 359-1173

■ CLETOP Stick Type

■ Optical quality tissue

■ Isopropyl (Reagent Grade) alcohol

Fiber Cleaning Procedure

Disassemble

(1) Remove (if necessary) lightguide jumper from buildout, or remove dustcap (if necessary) from the optical connector.

(2) Remove (if necessary) lightguide buildout from buildout block. Unlock the tab by depressing the locking beam on the buildout and pushing in and rotate in counterclockwise direction and separate from the buildout block by sliding apart.

⚠ **CAUTION:**
Locking beam must only be pushed along a line perpendicular to buildout body in direction towards the buildout in order to avoid damage to the locking beam.

Cleaning

Optical jumpers and pigtails

➡ **NOTE:**
All disconnected fiber optic connectors should be capped. All optical connectors should be cleaned before each use and before being assembled in the line build-out.

(1) Remove (if necessary) lightguide jumper from buildout, or remove dustcap (if necessary) from the optical connector.

(2) Remove (if necessary) lightguide buildout from buildout block. Unlock the tab by depressing the locking beam on the buildout and pushing in and rotate in counterclockwise direction and separate from the buildout block by sliding apart.

⚠ **CAUTION:**
Locking beam must only be pushed along a line perpendicular to buildout body in direction towards the buildout in order to avoid damage to the locking beam.

(3) Clean (if necessary) the cylindrical surface of the connector ferrule with a tissue dampened with isopropyl (reagent grade) alcohol.

(4) Hold CLETOP Reel Type A cleaner in the palm of your left hand and rotate the lever with your thumb. This opens the shutter and winds the cleaning cloth.

(5) While holding the lever down, press the optical ferrule endface against the cleaning cloth and drag the plug towards you.

(6) Rotate the connector 90°, press the optical ferrule endface against the cleaning cloth in the right slot and drag it toward you.

(7) Be sure the optical plug is pressed firmly against the cleaning tape surface while dragging the plug. Insufficient cleaning may result from not enough pressure.

(8) Release the lever, allowing it to return to its initial position. The shutter will close when this is done.

Optical connectors inside the faceplate and other receptacled devices

⇒ **NOTE:**
To prevent contamination, the optical ports should be covered with a dust cap when not in use.

(1) Removing (if necessary) the Line Buildout.

(2) Use the stick type CLETOP cleaners to clean connector ferrule endfaces in hard to reach places such as inside of LBOs by first wiping the cleaning cloth on the tip of the CLETOP stick against the ferrule end face.

(3) Replace the line buildout.

Reassemble

(1) Assemble by inserting the buildout into the block by aligning the buildout with the slot in the block.

(2) Align the buildout with the slot in the buildout block, push in, and rotate clockwise until locked into position.

(3) Slide the connector onto the buildout and rotate it clockwise until locked into position.

CMC Dantel Alarm and Control Block Installation Extended Miscellaneous Discretes

D

Contents

CMC Dantel Alarm and Control Block Installation Extended Miscellaneous Discretes

D

Description

The Extended Miscellaneous Discretes feature for the Optical Line System Release 2.0 & 2.1 - OLS provides additional miscellaneous discrete inputs and outputs to supplement the miscellaneous discretes feature. It consists of an additional 128 alarm and status input points and 32 control output points, bringing the total number of miscellaneous discrete inputs for the network element to 144 inputs and 36 outputs.
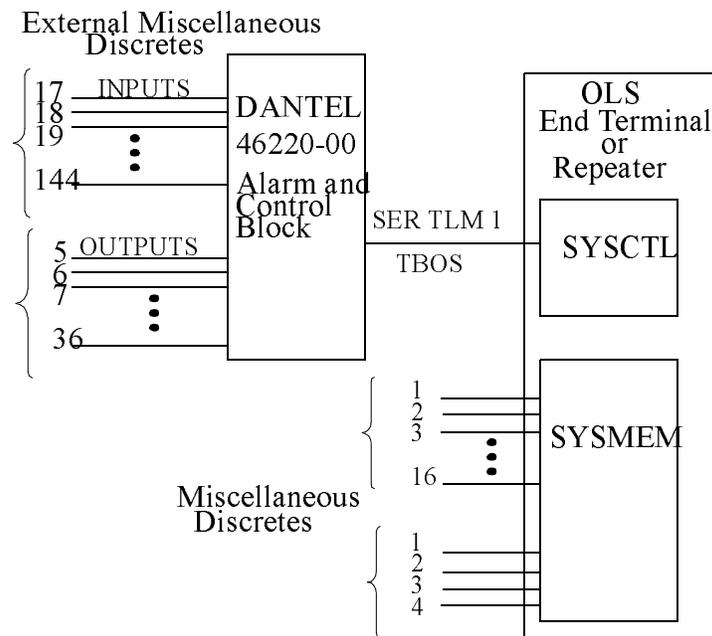
Figure D-1 Miscellaneous Discretes Applications

Ordering Information

Table D-1 Ordering Information

Description	Order Number	Comcode Number
Alarm Control Block	Model No. 46220-00	407567924
Mounting Bar	A25-00508-01	406863621
SER TLM1 Cable	ED7G028-22	

Tools Required

- Phillips Screwdriver
- Small standard screwdriver
- 11/32-inch wrench

Equipment Required

- Alarm Control Block
- 23" Mounting Bar
- Standard WECO Distribution Frame
- ED7G028-22 Cable

Installation Procedure

A detailed installation procedure is provided in the DANTEL Installation & Operation Manual provided with the 46220-00 Alarm and Control Block. The following procedure is provided to facilitate its use with Lucent's Release 2.0 & 2.1 Optical Line System.

Assemble

(1) Attach the Alarm and Control Block to the Mounting Bar.

(2) Attach the mounting bar to the distribution frame. The mounting bar is rear mounted to the distribution frame.

(3) Run the ED7G028-22 cable from the SER TLM1 port of the OLS to the Alarm Control Block.

(4) The SER TLM1 Cable needs to be wired to the Alarm and Control block.

Wiring

(1) In order to access the power supply board of the Dantel Alarm Block the unit must be opened by placing your thumbs under the sides of the unit and gently pushing outwards as in Figure D-3 on page D-4.

PLACE THUMB
HERE
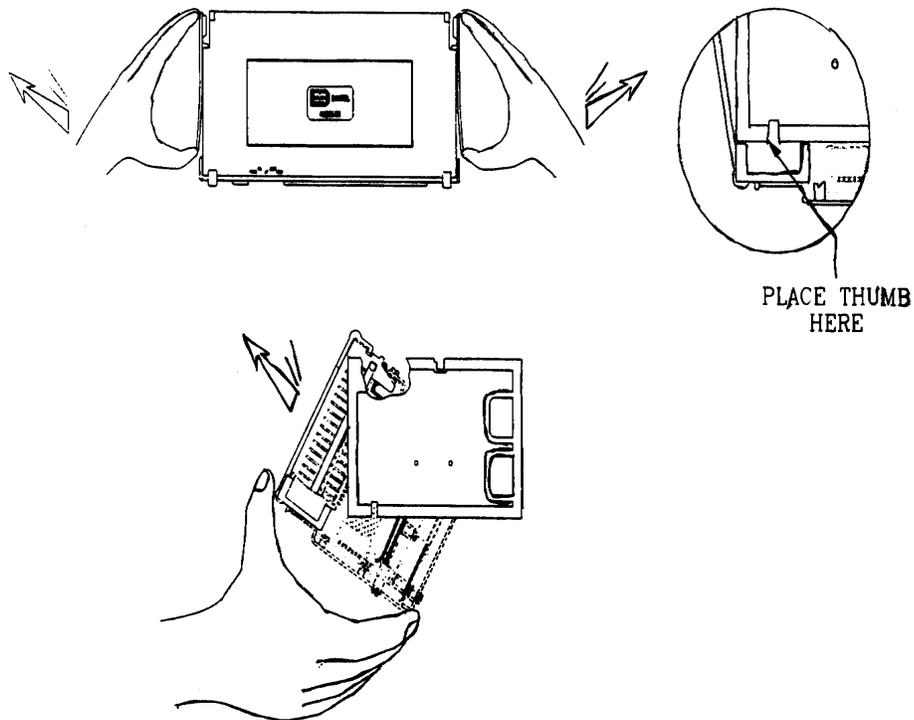
Figure D-2 Opening the Dantel Alarm Block
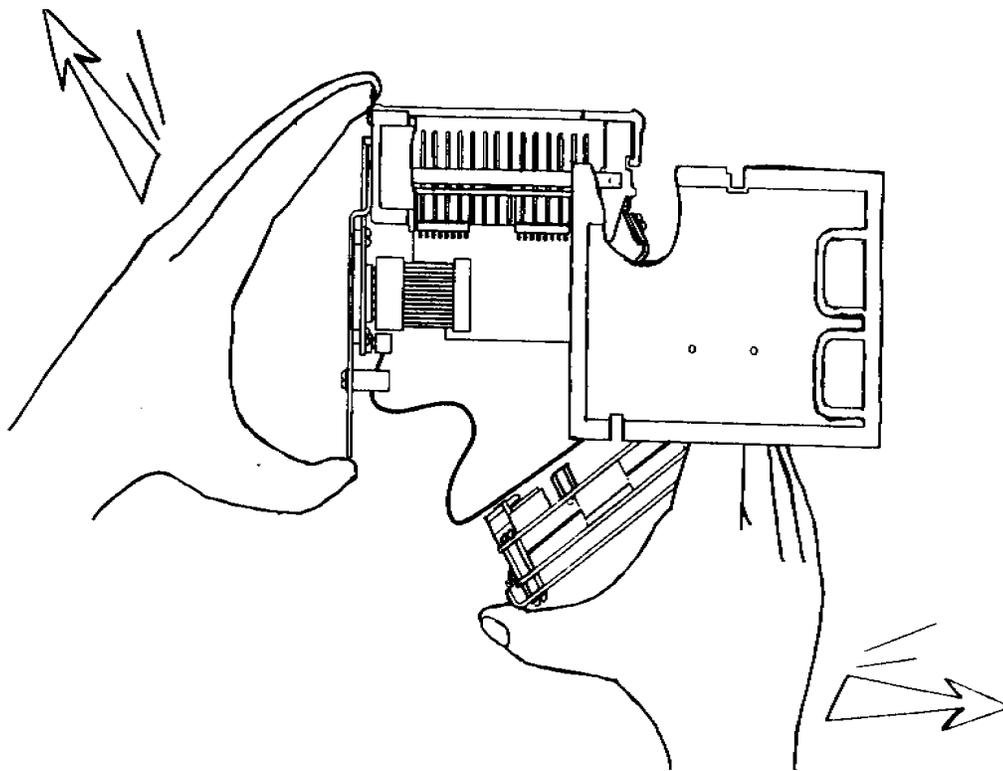
Figure D-3 Pulling Down the Power Supply and CPU

(2) Pull the Power Supply board and CPU board down. Refer to Figure D-3 on page D-4.

(3) On the power supply board, wire negative battery (-21 to -56 VDC) to connector TB1 (Refer to Figure D-4 on page D-5).

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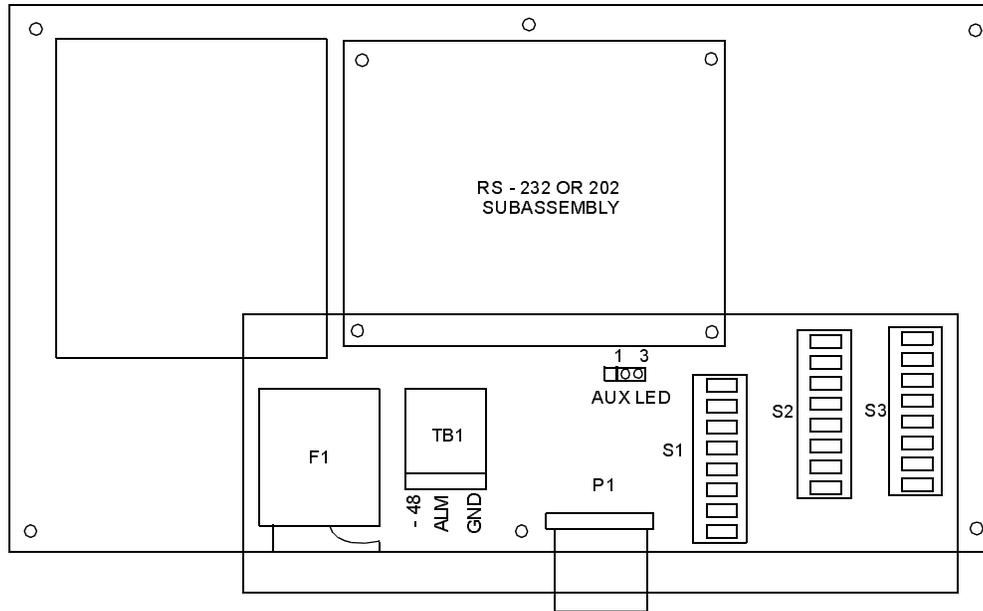
Figure D-4 Power Supply Board Component Location

(4) Wire the alarm inputs (refer to Figure 5). There are two pins for each alarm input. One is for ground and the other is for alarm input. The dark-colored columns are grounds and are wired together. Wire Pin 30 S back to the Battery return ground terminal (GND) on TB-1 (refer to Figure D-4 on page D-5). Pin 1 will begin with Input Point 17 (See Figure D-5 on page D-6). Table D-2, on page D-6 list the SER TLM1 cable connections and designations and the Dantel Pin designations.

(5) The TBOS Transmit and Receive Positive and Negative (see Table D-2 on page D-6) need to be wire-wrapped to pins 32 E-H on the Alarm and Control Block (See Figure D-5 on page D-6).

CABLE 1	CABLE 2
1. TBASTXP (W) to 32-E	3. TBASRXP (W) to 32-G
2. TBASTXN (BL) to 32-F	4. TBASRXN (O) to 32-H

Figure D-5 Dantel Wire Wrap Pin Designations
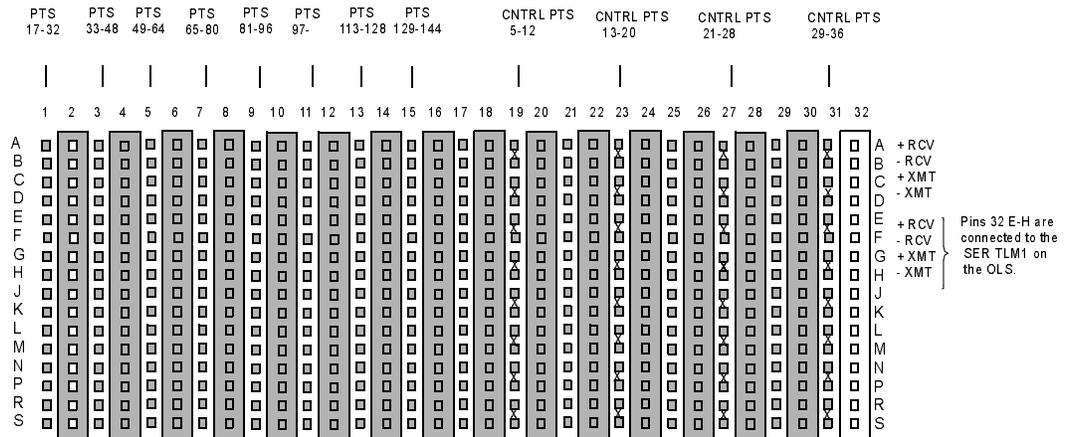
Table D-2 SER TLM 1 Cable Connections and Designations

Name	Designation	Pin	Wire Color	Dantel Pin Designation*
TBOS TRM Transmit N	TBASTXN	1	BL (CA1)	32-F (-RCV)
No Connection	none	2	none	
TBOS TRM Receive N	TBASRXN	3	O (CA2)	32-H (-XMT)
No Connection	none	4	none	
No Connection	none	5	none	
TBOS TRM Transmit P	TBASTXP	6	W (CA1)	32-E (+RCV)
No Connection	none	7	none	
TBOS TRM Receive P	TBASRXP	8	W (CA2)	32-G (+XMT)
No Connection	none	9	none	

* See Figure D-5 on page D-6 for location.
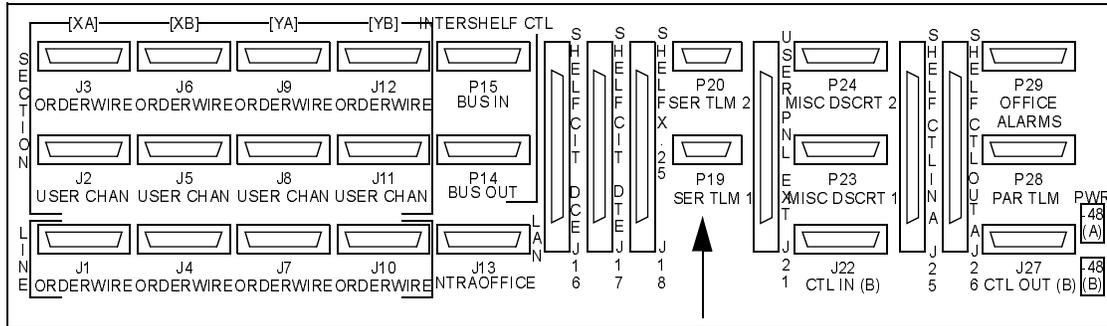
Figure D-6 OLS Interconnection Panel (SER TLM1 at arrow)

Switch and Strap Settings

On the Dantel Alarm and Control Block there are three (3) switches located on the Power Supply Board (Figure D-4 on page D-5). With Lucent's Optical Line System the following switch settings must be made:

Table D-3 Switch Settings for Lucent OLS

	S1 Switch Settings	S2 Switch Settings	S3 Switch Settings
1	OFF	OFF	OFF
2	OFF	ON	ON
3	OFF	OFF	OFF
4	ON	OFF	ON
5	OFF	OFF	ON
6	OFF	OFF	OFF
7	OFF	OFF	OFF
8	OFF	ON	OFF

Provisioning Extended Miscellaneous Discretes

Enabling SER TLM 1 Port

The SER TLM Port must first be enabled through the CMC by using the following Command: SECURITY-ENTER-Channel Identifier-Security, AID=SER_TLM1, PORT ACC=enable

Extended Miscellaneous Discrete Assignments

The Miscellaneous Discrete Assignments are provisioned by using the following command through the CMC:
`CONFIGURATION_Set_Attribute_Enviroment_`

This input sets the Descriptions and Alarm Levels for the miscellaneous discrete inputs.

— The Point parameter selects the miscellaneous discrete input point to provision

⇒ **NOTE:**

The miscellaneous discrete points 1-16 are assigned to the original miscellaneous discrete ports. Therefore the extended miscellaneous discretes will begin their assignment with point number 17 and continue through point number 144.

— The Alarm Level Parameter provisions the severity of the condition associated with the closing of the selected miscellaneous discrete input point. The choices are:

— "CR": critical

— "MJ": major

— "MN": minor

— "NA": status not alarmed

— "NR": status not alarmed and not reported to the OS.

— The Description parameter is the text string associated with the selected miscellaneous discrete environmental input point. It is character string of up to 26 characters, where the characters are letters, digits, or spaces. It is used to identify the point in the FAULT-RETREIVE-LOG and FAULT-RETREIVE-ALARMS reports.

Extended Miscellaneous Discrete Assignments
used to Monitor the Optical Translator

When used to monitor the Optical Translator (OT), Miscellaneous Discrete Points 17-80 (1-64 on the DANTEL Alarm and Control Block) will be provisioned with the description parameters assigned in the following Table:

Table D-4 Miscellaneous Discrete Assignments - Monitoring OT

Point No.	Description	Point No.	Description	Point No.	Description
17.	CP Fail OTU 1	40.	CP Fail OTU 24	63.	I S Fail OTU 15
18.	CP Fail OTU 2	41.	CP Fail OTU 25	64.	I S Fail OTU 16
19.	CP Fail OTU 3	42.	CP Fail OTU 26	65.	I S Fail OTU 17
20.	CP Fail OTU 4	43.	CP Fail OTU 27	66.	I S Fail OTU 18
21.	CP Fail OTU 5	44.	CP Fail OTU 28	67.	I S Fail OTU 19
22.	CP Fail OTU 6	45.	CP Fail OTU 29	68.	I S Fail OTU 20
23.	CP Fail OTU 7	46.	CP Fail OTU 30	69.	I S Fail OTU 21
24.	CP Fail OTU 8	47.	CP Fail OTU 31	70.	I S Fail OTU 22
25.	CP Fail OTU 19	48.	CP Fail OTU 32	71.	I S Fail OTU 23
26.	CP Fail OTU 10	49.	I S Fail OTU 1	72.	I S Fail OTU 24
27.	CP Fail OTU 11	50.	I S Fail OTU 2	73.	I S Fail OTU 25
28.	CP Fail OTU 12	51.	I S Fail OTU 3	74.	I S Fail OTU 26
29.	CP Fail OTU 13	52.	I S Fail OTU 4	75.	I S Fail OTU 27
30.	CP Fail OTU 14	53	I S Fail OTU 5	76.	I S Fail OTU 28
31.	CP Fail OTU 15	54.	I S Fail OTU 6	77.	I S Fail OTU 29
32.	CP Fail OTU 16	55.	I S Fail OTU 7	78.	I S Fail OTU 30
33.	CP Fail OTU 17	56.	I S Fail OTU 8	79.	I S Fail OTU 31
34.	CP Fail OTU 18	57.	I S Fail OTU 9	80.	I S Fail OTU 32
35.	CP Fail OTU 19	58.	I S Fail OTU 10		
36.	CP Fail OTU 20	59.	I S Fail OTU 11		
37.	CP Fail OTU 21	60.	I S Fail OTU 12		
38.	CP Fail OTU 22	61.	I S Fail OTU 13		
39.	CP Fail OTU 23	62.	I S Fail OTU 14		

Harris C-1000 Centurion Installation -Extended Miscellaneous Discretes

E

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Harris C-1000 Centurion Installation - Extended Miscellaneous Discretes

E

Description

The Extended Miscellaneous Discretes feature for the Optical Line System Release 2.0 & 2.1 - OLS provides additional miscellaneous discrete inputs and outputs to supplement the OLS Release 1.0 miscellaneous discretes feature. It consists of an additional 128 alarm and status input points and an additional 32 control output points (See Figure E-1 on page E-2). This will bring the total number of miscellaneous discrete inputs for the network element to 144 inputs and 36 outputs.

Figure E-1 Miscellaneous Discrete Applications

External Miscellaneous Discretes
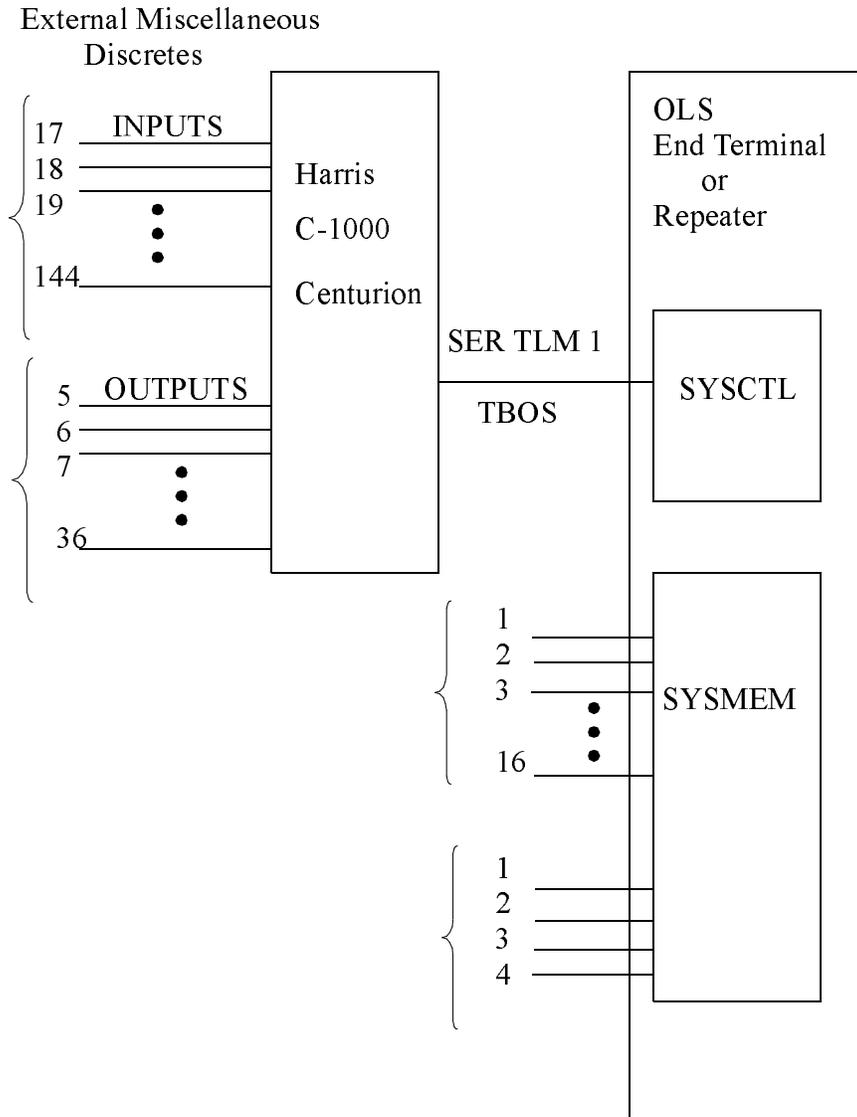
Ordering Information

Table E-1 Ordering Information

Description	Order Number	Commcode Number
C-1000 Centurion	594-T043	407567932
Rer Access Wire Wrap Connector	620-T030	407532217
SER TLM1 Cable	ED7G028-22	

Tools Required

- Phillips Screwdriver
- Small standard screwdriver
- 11/32-inch wrench

Equipment Required

- C-1000 Centurion
- Mounting Brackets
- Standard WECO Distribution Frame
- ED7G028-22 Cable

Installation Procedure

A complete and detailed installation procedure is provided in the Harris C1000 User Guide provided with the Centurion C-1000. The following procedure is provided to facilitate its use with Lucent's Release 2.0 & 2.1 Optical Line System.

Assembly

(1) Attach the Mounting Brackets to the Harris C-1000 Centurion.The Mounting Brackets are then front mounted to the distribution frame.

(2) Run the ED7G028-22 cable from the SER TLM1 port of the OLS to J9 on the rear of the C-1000 Centurion (See Figure 2-1 of the C-1000 Centurion User Guide).

(3) J1 - J8 are the ports to be used for inputs and control outputs (See Table 2-1 of the C-1000 Centurion User Guide).

Powering the Unit

(1) Power must be provided from a fuse panel using #14 to #24 (#20 is optimum) AWG power and ground wire. The input voltage range is -20 to -60 VDC. Fuse protection should be removed before inserting or removing power wires.

(2) Power connections are located at J11 on the rear panel of the C1000 Centurion (See Figure 2-1 in the C-1000 Centurion User Guide). The Positive and Negative connections are marked at J11 (See also Figure 2-2 in the C-1000 Centurion User Guide).

Switch Settings

(1) Each C1000 unit is configured by using Configuration DIP switches on the front of the unit (See Figure 1-1 in the C-1000 Centurion User Guide). Units, such as the OLS, that can handle 128 or less discrete points use the 10-switch block on the Left (S1). The 10-switch block on the right (S2) is not used. The settings should be as follows:

1. S1-1 to S1-8 OFF (down)

2. S1-9 to S1-10 ON (up)

3. S2-1 to S1-10 OFF (down)

Provisioning Extended Miscellaneous Discretes

Enabling SER TLM 1 Port

The SER TLM Port must first be enabled through the CMC by using the following command: SECURITY-ENTER-Channel Identifier-SECURITY. Enter SER_TLM1 in the AID and at Port ACC enter ACC.

Extended Miscellaneous Discrete Assignments

The Miscellaneous Discrete Assignments are provisioned by using the following command through the CMC: CONFIGURATION-SET-ATTRIBUTE-ENVIRONMENT. Enter the Alarm number (i.e. 28) in the blank AID box.

This input sets the Descriptions and Alarm Levels for the miscellaneous discrete inputs.

— The Point parameter selects the miscellaneous discrete input point to provision

⇒ **NOTE:**

The miscellaneous discrete points 1-16 are assigned to the original miscellaneous discrete ports. Therefore the extended miscellaneous discretes will begin their assignment with point number 17 and continue through point number 144.

— The Alarm Level Parameter provisions the severity of the condition associated with the closing of the selected miscellaneous discrete input point. The choices are:

— "CR": critical

— "MJ": major

— "MN": minor

— "NA": status not alarmed

— "NR": status not alarmed and not reported to the OS.

— The Description parameter is the text string associated with the selected miscellaneous discrete environmental input point. It is character string of up to 26 characters, where the characters are letter, digits or spaces. It is used to identify the point in the FAULT-RETREIVE-LOG and FAULT-RETREIVE-ALARMS reports.

Extended Miscellaneous Discrete Assignments used to Monitor the Optical Translator

When used to monitor the Optical Translator (OT), Miscellaneous Discrete Points 17-80 (1-64 on the DANTEL Alarm an Control Block) will be assigned with the description parameter provisioned in the following Table:

Table E-2 Miscellaneous Discrete Assignments - Monitoring OT

Point No.	Description	Point No.	Description	Point No.	Description
17.	CP Fail OTU 1	40.	CP Fail OTU 24	63.	I S Fail OTU 15
18.	CP Fail OTU 2	41.	CP Fail OTU 25	64.	I S Fail OTU 16
19.	CP Fail OTU 3	42.	CP Fail OTU 26	65.	I S Fail OTU 17
20.	CP Fail OTU 4	43.	CP Fail OTU 27	66.	I S Fail OTU 18
21.	CP Fail OTU 5	44.	CP Fail OTU 28	67.	I S Fail OTU 19
22.	CP Fail OTU 6	45.	CP Fail OTU 29	68.	I S Fail OTU 20

Table E-2 Miscellaneous Discrete Assignments - Monitoring OT

Point No.	Description	Point No.	Description	Point No.	Description
23.	CP Fail OTU 7	46.	CP Fail OTU 30	69.	I S Fail OTU 21
24.	CP Fail OTU 8	47.	CP Fail OTU 31	70.	I S Fail OTU 22
25.	CP Fail OTU 19	48.	CP Fail OTU 32	71.	I S Fail OTU 23
26.	CP Fail OTU 10	49.	I S Fail OTU 1	72.	I S Fail OTU 24
27.	CP Fail OTU 11	50.	I S Fail OTU 2	73.	I S Fail OTU 25
28.	CP Fail OTU 12	51.	I S Fail OTU 3	74.	I S Fail OTU 26
29.	CP Fail OTU 13	52.	I S Fail OTU 4	75.	I S Fail OTU 27
30.	CP Fail OTU 14	53	I S Fail OTU 5	76.	I S Fail OTU 28
31.	CP Fail OTU 15	54.	I S Fail OTU 6	77.	I S Fail OTU 29
32.	CP Fail OTU 16	55.	I S Fail OTU 7	78.	I S Fail OTU 30
33.	CP Fail OTU 17	56.	I S Fail OTU 8	79.	I S Fail OTU 31
34.	CP Fail OTU 18	57.	I S Fail OTU 9	80.	I S Fail OTU 32
35.	CP Fail OTU 19	58.	I S Fail OTU 10		
36.	CP Fail OTU 20	59.	I S Fail OTU 11		
37.	CP Fail OTU 21	60.	I S Fail OTU 12		
38.	CP Fail OTU 22	61.	I S Fail OTU 13		
39.	CP Fail OTU 23	62.	I S Fail OTU 14		

PC Setup & Usage For CenterLink Management Console

F

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PC Setup & Usage For CenterLink Management Console

F

Introduction

This chapter provides procedures to set up a personal computer to run the CenterLink Management Console software.

PC Requirements

PC Hardware Requirements

The following are the recommended minimum hardware requirements for running the CenterLink Management Console:

- CPU: Pentium 66 MHz

- RAM: 16 Mbyte

- Available Hard Disk Space: 20 Mbyte

- Display: 800x600 (256 Color) SVGA

- Network Interface Card or Modem

- Optional: 16-bit Sound Card, Printer

- EIA RS-232 straight through cable to connect PC COM port (9 or 25 pin) to the DB25 CIT-DCE port.

PC Software Requirements

The following are the recommended software requirements for running the CenterLink Management Console:

- Microsoft Windows 95 - The original master disks or CD-ROM may be needed to load operating system components.

- Microsoft TCP/IP (available with Windows 95)

- Microsoft Personal Web Server v1.0a - Included with Windows 95 and Internet Explorer on newer PCs, or available from the Microsoft Web site at http://www.microsoft.com/ie/downloads (scroll down to Internet Explorer Components.

- Microsoft Internet Explorer v3.02 - Included on the R2.1.0-OLS CD-ROM or with Windows 95 on newer PCs. Also available from the Microsoft Web site at http://www.microsoft.com/ie/downloads.

- Adobe Acrobat Reader V2.1 or later - Version 3.01 is included on the R2.1.0-OLS CD-ROM or it is available from the Adobe Web site at http://www.adobe.com/acrobat.

Precautions and Recommendations

- Read the entire setup procedure before beginning.

- The person(s) performing the software loading must be trained and have an understanding of Windows 95 operation.

- Perform the software installation procedure in the sequence provided.

Verify PC Capability

Use Table F-1 to verify the PC is capable of running the CenterLink software.

Table F-1 Verify PC Capability For CenterLink

the boxes to check off the steps as they are completed

❑	1	Verify the PC hardware requirements listed on page A-1.
❑	2	Verify the PC software requirements listed on page A-2.
		The software should already be loaded or should be available for installing as instructed in this chapter.
❑	3	Using Windows Explorer or another file manager utility, check for a directory C:\210-OLS.
		If one does not exist, proceed to the next step.
		If one does exist, it should be moved or renamed because the CenterLink installation will create this directory if the release 2.0 to 2.1 upgrade is installed.

Windows 95 Networking Verification

Use Table F-2 to verify and set up the PC for Windows 95 networking. The procedures included show a typical PC setup. Other Windows components may already be installed prior to this setup.

Table F-2 Verify Windows 95 Networking

the boxes to check off the steps as they are completed

❑ 1   Select Start->Settings->Control Panel. A typical Control Panel window is shown below:
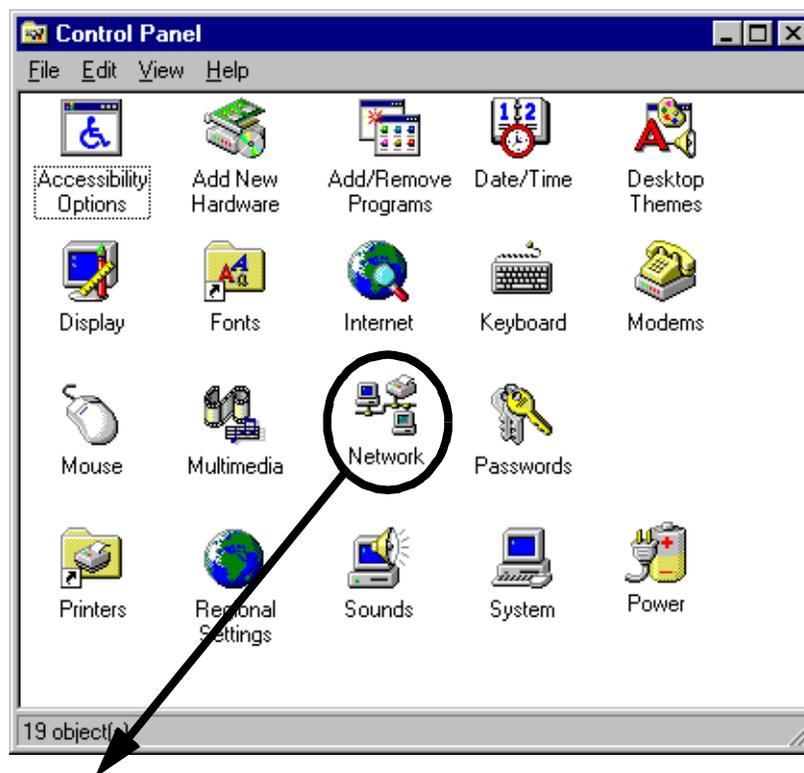
❑ 2   Open Network Icon to observe the Network Dialog Box with the Configuration tab highlighted. The Network Dialog Box (Configuration) is shown in Figure F-1

Table F-2 Verify Windows 95 Networking

❑   3   Verify "TCP/IP" protocol is listed as a network component. Refer to point 1 in Figure F-1.

If TCP/IP is not listed, refer to Windows Help or Table F-3 on page F-10 to install.
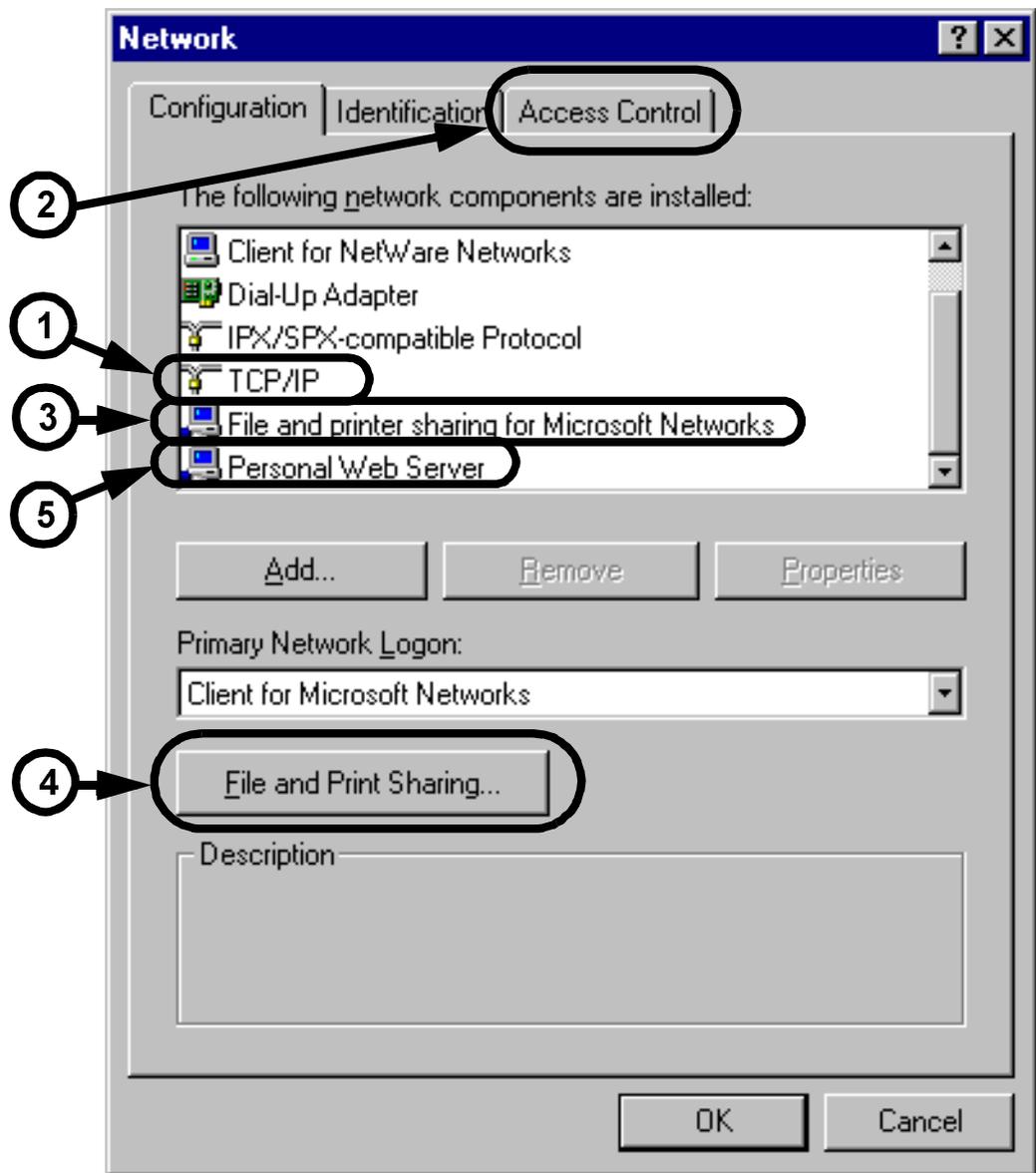
Figure F-1 Network Dialog Box (Configuration)

Table F-2 Verify Windows 95 Networking

❑   4   Select the Access Control tab. Refer to point 2 in Figure F-1 The
          Network Dialog Box (Access Control) will open as shown in Figure F-2
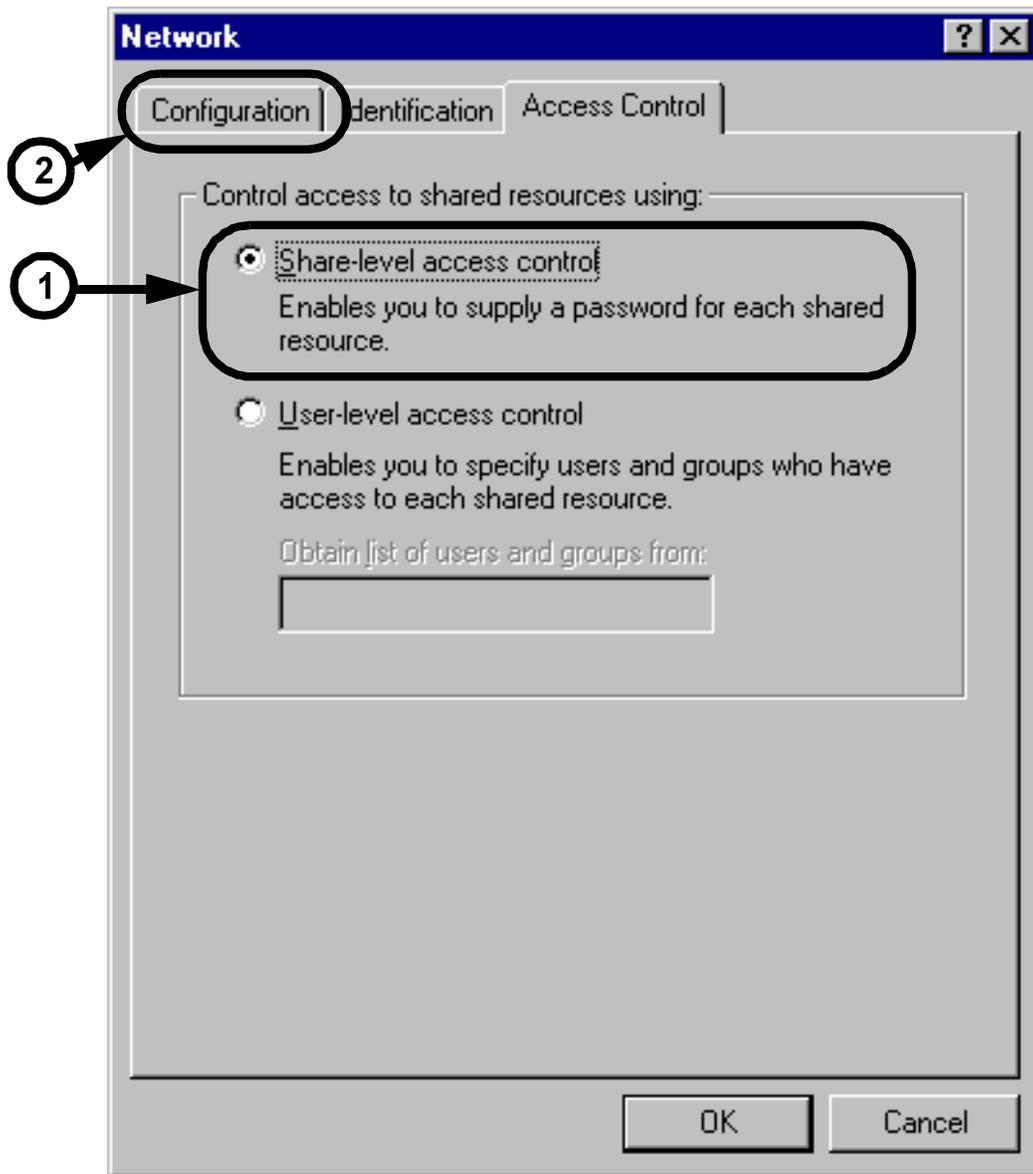
Figure F-2 Network Dialog Box (Access Control)

Table F-2 Verify Windows 95 Networking

❑	5	Verify Share-level access control is selected. Refer to point 1 in Figure F-2
		If Share-level access control is not selected, select it.
❑	6	Select the Configuration Control tab. Refer to point 2 in Figure F-2
❑	7	Verify "File and printer sharing for Microsoft Networks" is listed as a network component. Refer to point 3 in Figure F-1
		If "File and printer sharing for Microsoft Networks" is not listed, click the "File and Print Sharing..." button. Refer to point 4 in Figure F-1
		On the File and Print Sharing dialog box as shown below, select "I want to be able to give others access to my files" (printer access is optional) and click "OK".
❑	8	Click the "OK" button for the Network dialog box to accept the network components.
❑	9	If Windows does not ask for master disks, proceed to the next step.
		If Windows does ask for master disks to be inserted at this time:
		— Use your original Windows floppies or CD-ROM, or the images of these disks may be located on your hard drive in C:\WINDOWS\CABS.
		— If Windows asks to keep newer files and not load older files click "Yes".
		— After Windows has loaded the files it is looking for it will ask to reboot, click "Yes". Remove any floppy disk in the A drive.
		— Repeat this table from the beginning to confirm the new settings.

Table F-2 Verify Windows 95 Networking

❑	10	Verify Dial-Up Networking is installed by selecting Start->Programs->Accessories menu and observe if "Dial-Up Networking" is present. If Dial-Up Networking is not installed, refer to Windows help or Table F-4 on page F-14 to install it.
❑	11	If the Control Panel is not open on the desktop, open it by selecting Start->Settings->Control Panel.
❑	12	Open the Network icon and verify Personal Web Server is listed as a network component. It may be necessary to scroll the list. Refer to point 5 in Figure F-1 If "Personal Web Server" is not present install as follows: — Obtain the Personal Web Server software as described in "PC Software Requirements" on page F-2. — Run "Pws10a.exe" to install the Personal Web Server. — Windows may need the master disks to load driver files. — Restart PC after software installed. Remove any floppy from the disk drive.
❑	13	Click "OK" to close the Network dialog box.
❑	14	Personal Web Server Open the Personal Web Server icon to get the Personal Web Server Properties dialog box.

Table F-2 Verify Windows 95 Networking

| ❑ | 15 | Click the Startup tab and verify:

— Under "Web Server State" verify "The Web server is Running" is displayed and the "Start" button is grayed out. If not, click on the "Start" button.

— Under "Options" verify both are checked. |

| ❑ | 16 | Click the Services tab and verify the HTTP Service has the following properties:
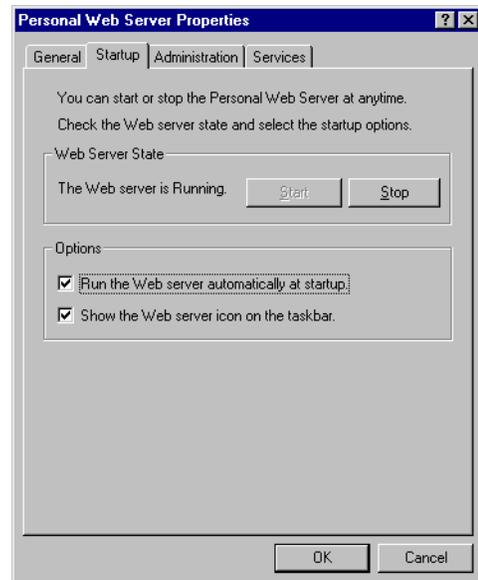
Status: Running
Startup: Automatic

If not, follow the instructions on the dialog box. |

| ❑ | 17 | Click the "OK" button to accept the settings and close the dialog box. |

| ❑ | 18 | Close the Control Panel window. |
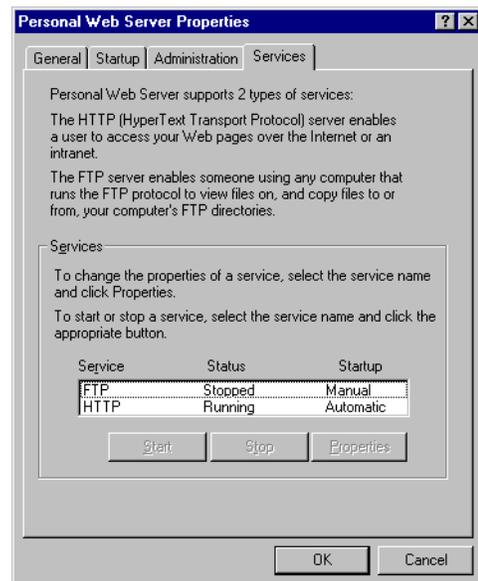
Table F-2 Verify Windows 95 Networking

❑   19   This completes the Verify Windows 95 Networking Procedure. If you do not have enough time to complete the next procedure, this is considered to be a **SAFE-STOP**.

               If continuing, proceed to Table F-5 on page F-17 to verify and setup Microsoft Internet Explorer.

Install TCP/IP Protocol

Use Table F-3 to install the TCP/IP protocol.

Table F-3 Install TCP/IP Protocol

the boxes to check off the steps as they are completed

❑   1   With no network components installed the Network Dialog Box will look like that shown at right:

            ⟹ **NOTE:**
               There may already be some network compo-nents listed other than TCP/IP, which we will add in the next few steps.
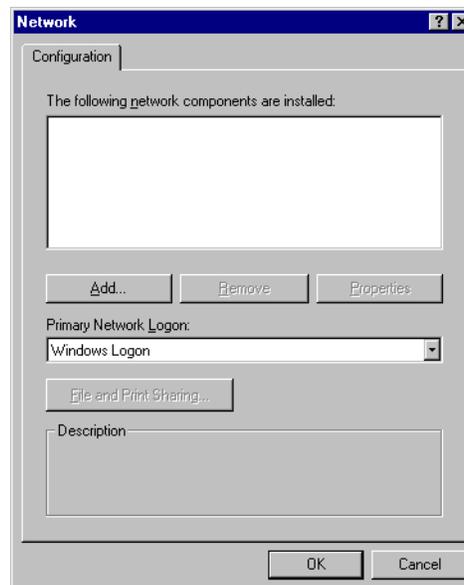
Table F-3 Install TCP/IP Protocol

❑	2	Click the "Add..." button. The Select Network Component Type Dialog Box will open.
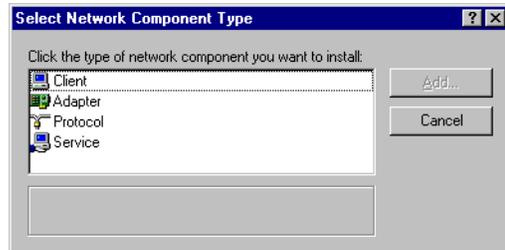
❑	3	Highlight "Protocol" then click the "Add..." button. The Select Network Protocol Dialog Box will open.
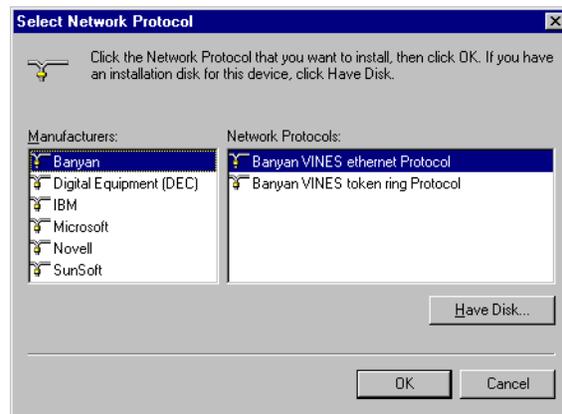
❑	4	Highlight "Manufacturers: Microsoft" then highlight "Network Protocols: TCP/IP". The Select Network Protocol Dialog Box is shown at right.
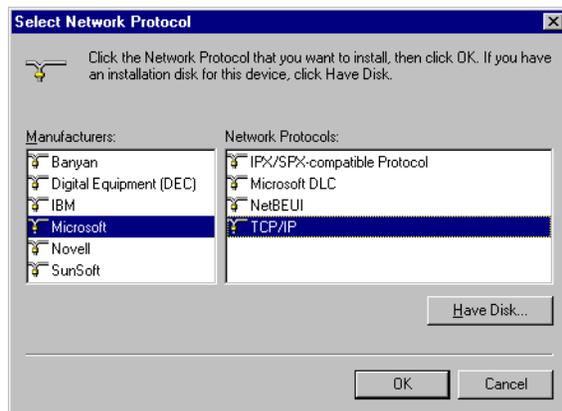
Table F-3 Install TCP/IP Protocol

☐	5	Click the "OK" button. If no network adapter has been installed, the Select Device dialog box will open. If a network adapter was previously installed proceed to Step 8	
☐	6	Scroll to highlight "Manufacturers: Microsoft" then highlight "Models: Dial-Up Adapter". The Select Device Dialog Box is shown at right.	
☐	7	Click the "OK" button for the Select Device dialog box.	
☐	8	The Network dialog box will now be displayed with the new network components listed. ⇒ **NOTE:** Windows may have added network components in addition to those asked for in this procedure. Ignore these additional components.	
☐	9	Select the Access Control tab. Refer to point 2 in Figure F-1. The Network Dialog Box (Access Control) will open as shown in Figure F-2.	
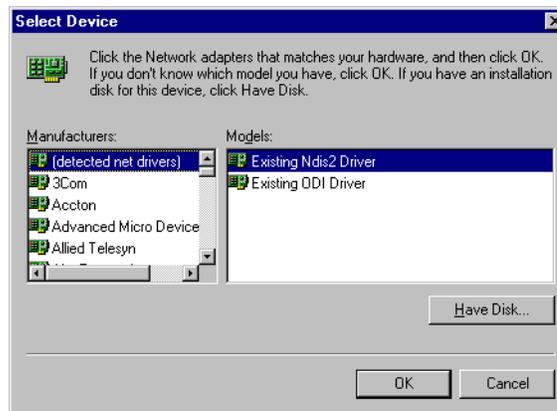
Table F-3 Install TCP/IP Protocol

❑	10	Verify "Share-level access control" is selected. Refer to point 1 in Figure F-2. If "Share-level access control" is not selected, select it.
❑	11	Select the Configuration Control tab. Refer to point 2 in Figure F-2.
❑	12	Verify "File and printer sharing for Microsoft Networks" is listed as a network component. Refer to point 3 in Figure F-1. If "File and printer sharing for Microsoft Networks" is not listed, click the "File and Print Sharing..." button. Refer to point 4 in Figure F-1. On the File and Print Sharing dialog box as shown below, select "I want to be able to give others access to my files" (printer access is optional) and click "OK".
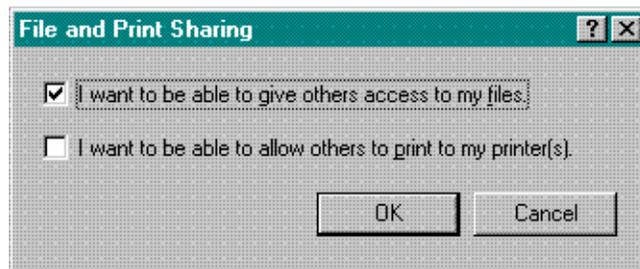
❑	13	Click the "OK" button for the Network dialog box to accept the network components. Windows will now ask for master disks to be inserted. These may be your original Windows floppies or CD-ROM, or the images of these disks may be located on your hard drive in C:\WINDOWS\CABS.
❑	14	If Windows asks to keep newer files and not load older files click "Yes".
❑	15	After Windows has loaded the files it is looking for it will ask to reboot, click "Yes". Remove any floppy disk in the A drive.
❑	16	Windows may ask for a login and password on reboot. Enter as desired. leaving the password field blank will avoid the questions on later reboots.
❑	17	This completes the Install TCP/IP Protocol Procedure. If you do not have enough time to complete the next procedure, this is considered to be a **SAFE-STOP**. If continuing, repeat Table F-2 on page F-4 to verify settings.

Install Dial-Up Networking

Use Table F-4 to install the Dial-Up Networking.

Table F-4 Install Dial-Up Networking

the boxes to check off the steps as they are completed

❑ 1 Select Start->Settings->Control Panel.

A typical Control Panel window is shown below:

❑ 2 Open Add/Remove Programs Icon to observe the Add/Remove Programs Properties Dialog Box with the Install/Uninstall tab highlighted.

Table F-4 Install Dial-Up Networking

❑ 3 Click the "Windows Setup" tab and highlight "Communications" as shown at right.
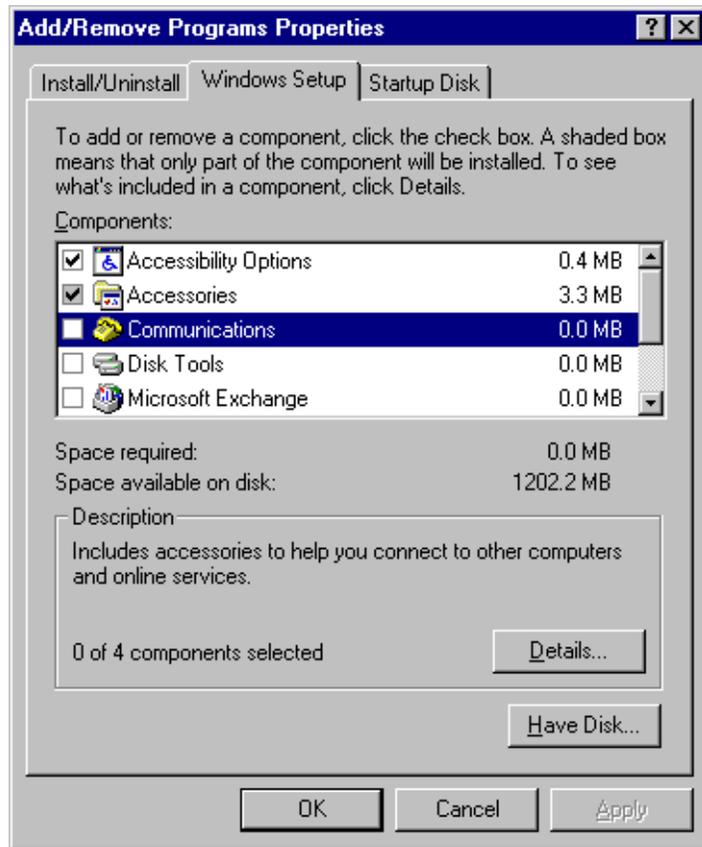
Table F-4 Install Dial-Up Networking

❑	4	Click the "Details..." button and the Communications dialog box will open.
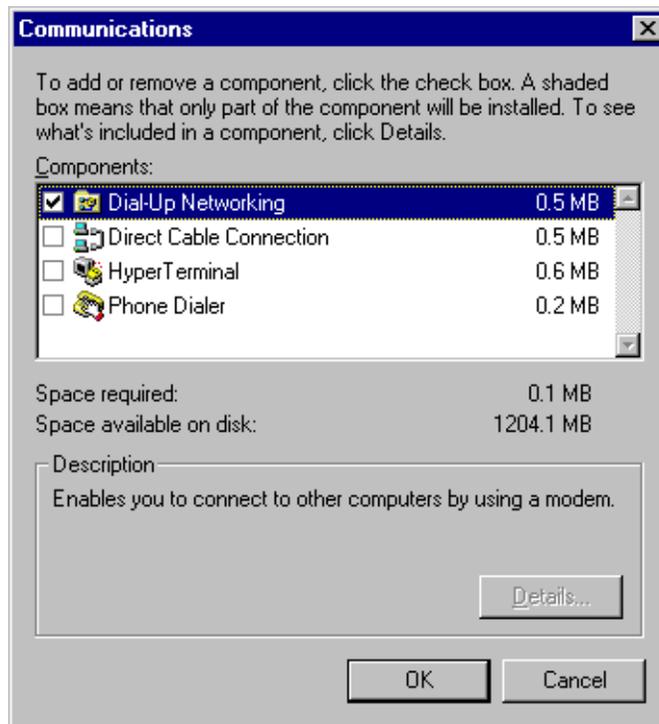
❑	5	Select "Dial-Up Networking" (a check in the box appears).
❑	6	Click on the "OK" button and return to the Add/Remove Programs Properties dialog box.
❑	7	Click the "OK" button for the Add/Remove Programs Properties dialog box. Windows will now ask for master disks to be inserted. These may be your original Windows floppies or CD-ROM, or the images of these disks may be located on your hard drive in C:\WINDOWS\CABS.
❑	8	If Windows asks to keep newer files and not load older files click "Yes".
❑	9	If Windows asks to reboot, click "Yes". If Windows does not ask restart the PC manually. Remove any floppy disk in the A drive.
❑	10	This completes the Install Dial-Up Networking Procedure. If you do not have enough time to complete the next procedure, this is considered to be a **SAFE-STOP**.
		If continuing, repeat Table F-2 on page F-4 to verify settings.

Microsoft Internet Explorer Setup

Internet Explorer Installation

Use Table F-5 to verify and set up the PC for Internet Explorer.

Table F-5 Microsoft Internet Explorer Installation

		the boxes to check off the steps as they are completed
❑	1	Determine if Microsoft Internet Explorer v 3.02 is loaded onto the PC. Typically there will be a icon similar to that at right on the desktop. Or look on the Start->Programs menu. If Microsoft Internet Explorer v 3.02 is not loaded, proceed to the next step. If Microsoft Internet Explorer v 3.02 is loaded, proceed to Table F-6 on page F-23.
❑	2	For R2.1.0-OLS software purchased on CD-ROM, proceed to the next step to load Internet Explorer from CD-ROM. For R2.1.0-OLS software purchased on floppy disk, load Internet Explorer from another source. Refer to "PC Software Requirements" on page F-2 for additional information. Go to Step 6 on page F-19 for loading guidelines.

Table F-5 Microsoft Internet Explorer Installation

☐ 3 Insert the CD-ROM into the PC. The autorun feature will open the CenterLink CD Browser as shown below.

> ➡ **NOTE:**
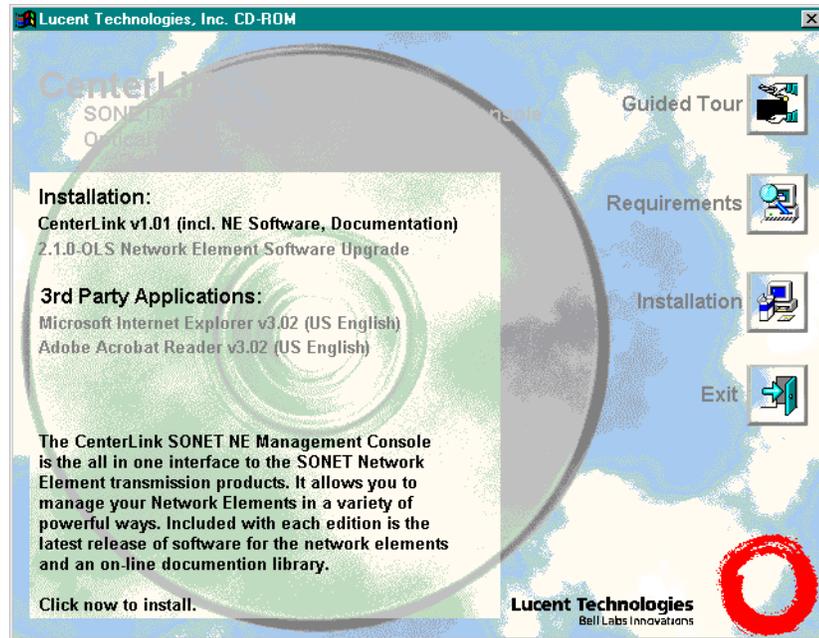> If the Windows autorun feature is disabled, run the setup.exe file on the CD-ROM.
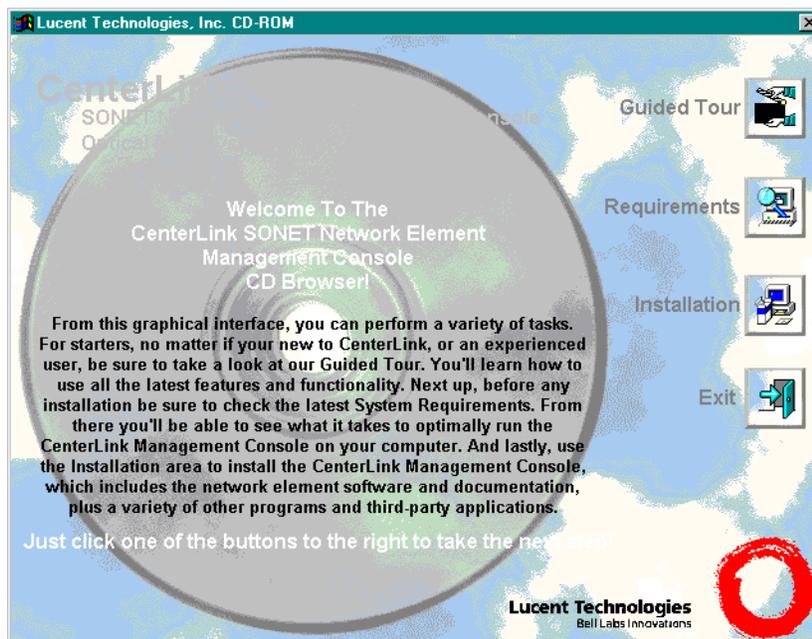
Table F-5 Microsoft Internet Explorer Installation

❑ 4 Click on the Installation icon to get the window shown below.

❑ 5 Click on "Microsoft Internet Explorer v3.02" under "3rd Party Applications" to start the installation.

❑ 6 Click "Yes" to confirm license conditions.

❑ 7 When asked "Would you like to select which optional Internet Components are installed?" click "Yes".

❑ 8 Deselect all components as shown at right then click "OK".
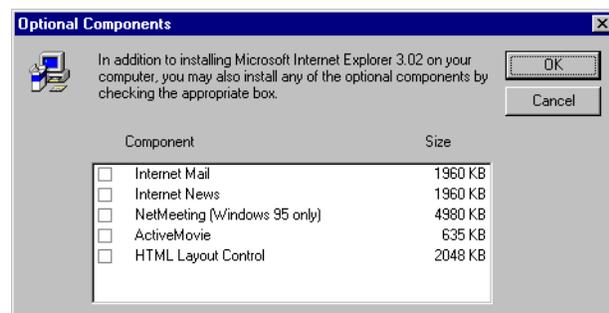
❑ 9 After Windows has loaded the files it is looking for it will ask to reboot, click "Yes". Remove any floppy disk in the A drive.

❑ 10 When the PC has finished rebooting, proceed to the next step.

Table F-5 Microsoft Internet Explorer Installation

❑   11   Run Internet Explorer from the desktop icon or using the Start menu. When run for the first time the following window will open.
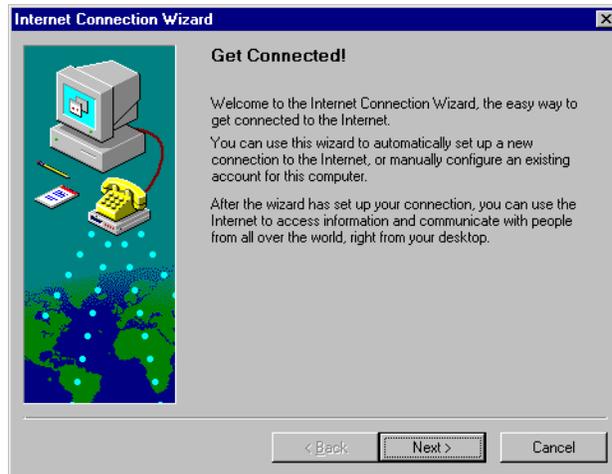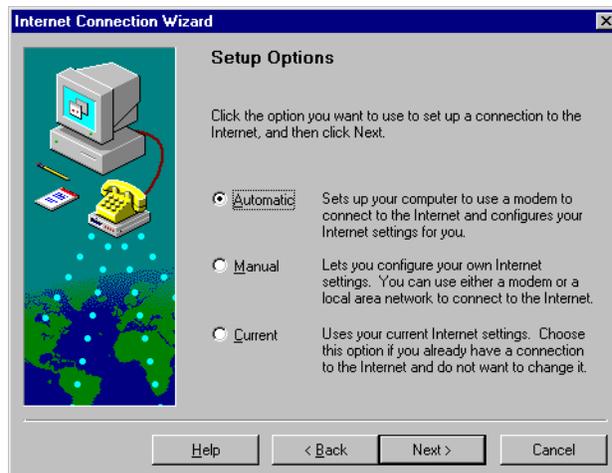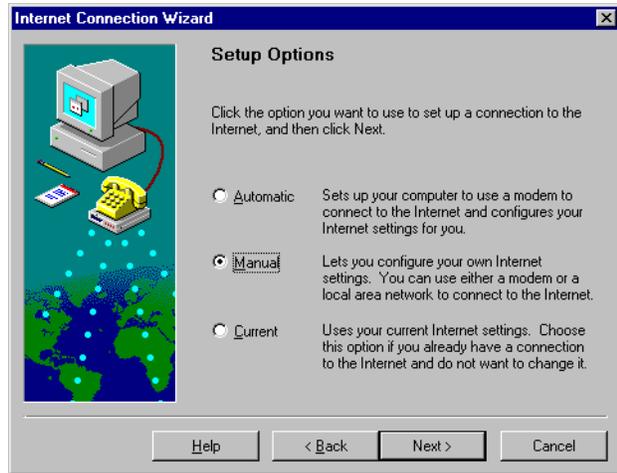

❑   12   Click "Next" to get the following window.

Table F-5 Microsoft Internet Explorer Installation

❑   13   Select "Manual" as shown at right.

❑   14   Click "Next" to get the following window.

❑   15   Click "Next".

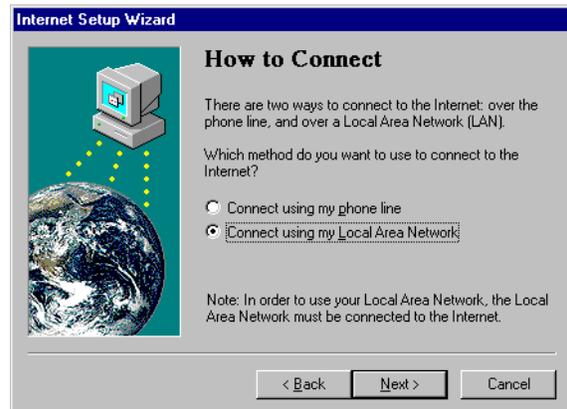Select "Connect using my Local Area Network" to get the following window.

Table F-5 Microsoft Internet Explorer Installation

❑	16	Click "Next".	
		Select "No, I don't want to use Windows Messaging" to get the following window.	
❑	17	Click "Next" to get the following window.	
❑	18	Click "Next" to get the following window.	
❑	19	Click "Finish".	

Table F-5 Microsoft Internet Explorer Installation

❑	20	This completes the Microsoft Internet Explorer Installation Procedure. If you do not have enough time to complete the next procedure, this is considered to be a **SAFE-STOP**.
		If continuing, proceed to Table F-6 on page F-23.

Internet Explorer Configuration

Use Table F-6 to configure the Internet Explorer.

Table F-6 Microsoft Internet Explorer Configuration

| ❑	1	Run Internet Explorer from the desktop icon or using the Start menu.
❑	2	Click "OK" to cancel any error message about unable to connect like that shown at right.

❑	3	Select the View->Options menu.

Table F-6 Microsoft Internet Explorer Configuration

☐ 4 Under the Advanced tab, verify the "Enable Java JIT Complier" is not checked.

If it is, deselect and ignore the restart request at this time.
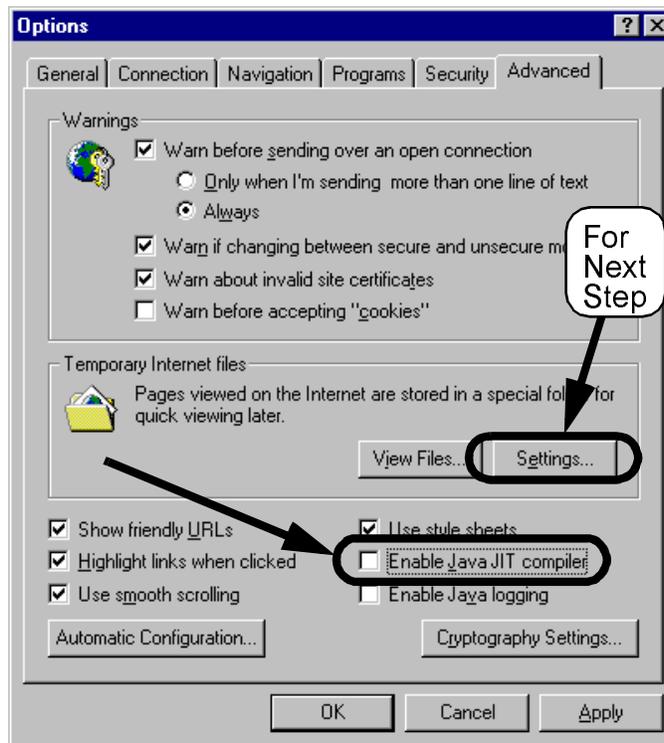
☐ 5 Under the Advanced tab,
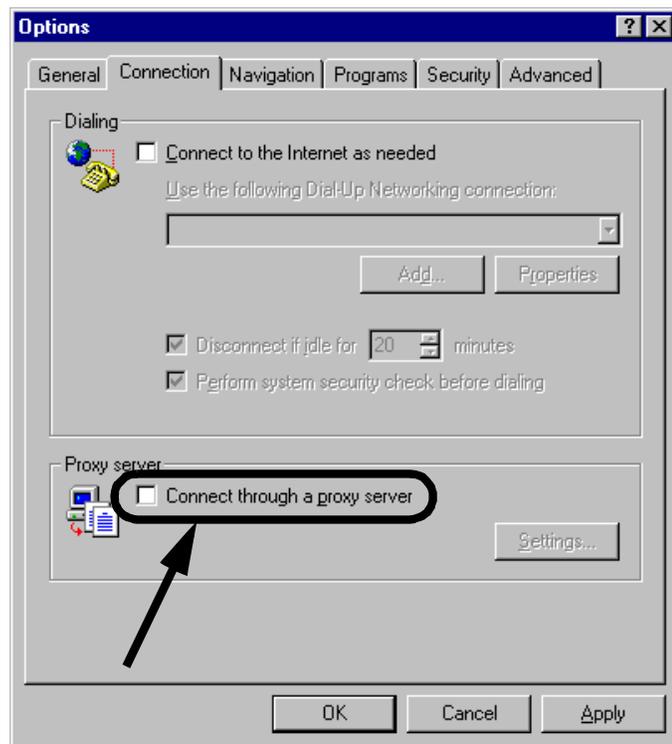
click the "Temporary Internet Files" "Settings" button and

verify "Every time you start Internet Explorer" is selected.

Click "OK"

Table F-6 Microsoft Internet Explorer Configuration

❑ 6 Under the Connection tab,

verify "Connect through a proxy server" is disabled.

Click "Apply" and "OK".

❑ 7 Close Internet Explorer.

❑ 8 This completes the Microsoft Internet Explorer Configuration Procedure. If you do not have enough time to complete the next procedure, this is considered to be a **SAFE-STOP**.

If continuing, proceed to Table F-7 on page F-26.

Adobe Acrobat Setup

Installation

Use Table F-7 to verify and set up the PC for Adobe Acrobat.

Table F-7 Adobe Acrobat Installation

the boxes to check off the steps as they are completed

❑	1	Determine if Adobe Acrobat Reader or Exchange is loaded onto the PC.
		Typically there will be a Start->Programs->Adobe Acrobat menu.
		If Adobe Acrobat Reader or Exchange is not loaded, proceed to the next step.
		If Adobe Acrobat Reader or Exchange is loaded, this chapter is complete.
		⇛ **NOTE:** If the PC already has Acrobat Exchange loaded do not load Reader. Exchange handles all Reader's functions plus more.
❑	2	For R2.1.0-OLS software purchased on CD-ROM, proceed to the next step to load Adobe Acrobat Reader from CD-ROM.
		For R2.1.0-OLS software purchased on floppy disk, load Adobe Acrobat Reader or Exchange from another source. Refer to "PC Software Requirements" on page F-2 for additional information. This chapter is complete after loading. Refer to Chapter 4 or the Software Release Description for installing or upgrading R2.1.0-OLS network element software.

Table F-7 Adobe Acrobat Installation

❑ 3 Insert the CD-ROM into the PC. The autorun feature will open the CenterLink CD Browser as shown below.

⇒ **NOTE:**
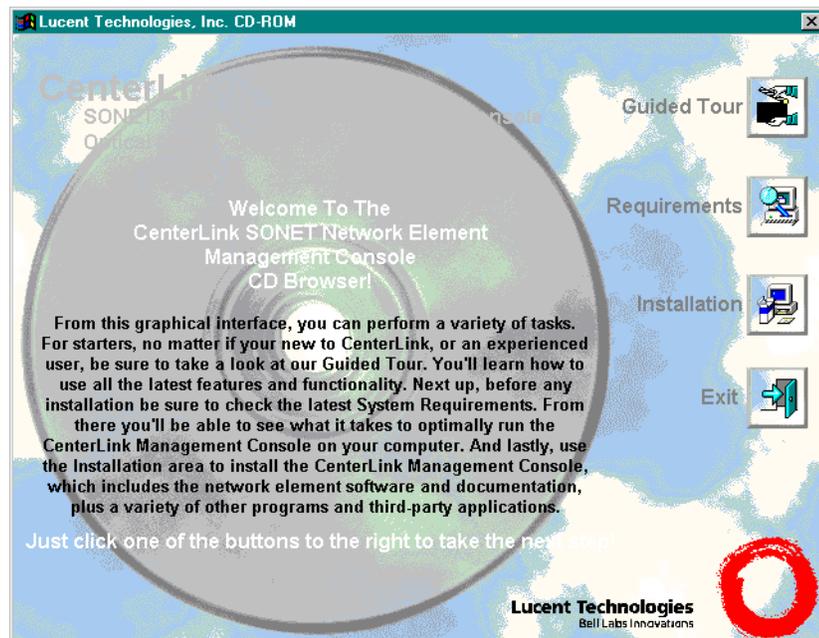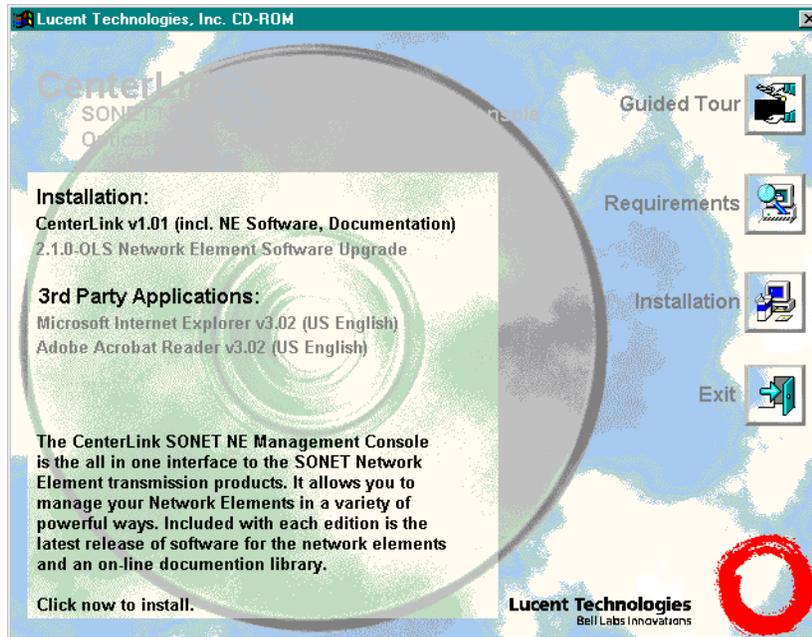If the Windows autorun feature is disabled, run the setup.exe file on the CD-ROM.

Table F-7 Adobe Acrobat Installation

❑	4	Click on the Installation icon to get the window shown below.

❑	5	Click on Adobe Acrobat Reader v3.02 under 3rd Party Applications to start the installation. Accept the default values when asked for information.
❑	6	After Windows has loaded the files it is looking for it will ask to reboot, click "Yes". Remove any floppy disk in the A drive.
❑	7	Click "Exit" to close the CD Browser.
❑	8	This completes the Adobe Acrobat Reader Installation Procedure. This is considered to be a **SAFE-STOP**. This completes the PC Setup for CenterLink chapter. Refer to Chapter 4 of the Software Release Description for installing or upgrading R2.1.0-OLS network element software.

Centerlink Management Console Usage

Software Components

The CenterLink Management Console software uses several software components to operate as described below:

- CenterLink Management Console

  A series of HTML files and JAVA scripts running on a web browser which provides the graphical user interface to the user for communicating to the network element. Available on the Release 2.1.0-OLS CD-ROM or floppies.

- NESERVER

  A Windows95 application that transfers data between the CenterLink Management Console software running on the web browser and the serial port of the PC. Available on the Release 2.1.0-OLS CD-ROM or floppies.

- Microsoft Internet Explorer v3.0.2

  Microsoft Corporation's standard web browser. Available on the Release 2.1.0-OLS CD-ROM, from the Microsoft web site, or supplied with newer PCs equipped with Windows95.

- Microsoft Personal Web Server

  Microsoft Corporation's add-on to Windows95 that turns any PC into a web server. Needed to execute the JAVA scripts the CenterLink Management Console software uses. PWS is included with most new Windows95 PCs or is available from the Microsoft web site.

- Windows95 Networking

  Dial-Up Networking or other networking components of Windows95 must be installed to provide the operating system support for the rest of the software.

■ Adobe Acrobat Reader

Used to read the customer documentation included on the CD-ROM which are distributed using Reader pdf format.

CenterLink Management Console Screen Elements

Figure F-3 shows the Centerlink main screen and identifies the screen locations described below:

(1). Web Address - Displays the CenterLink home page on the PC that is being accessed using the Personal Web Server Software.

(2) Options Button - Clicking accesses the CenterLink options.

(3) Help Button - Clicking accesses CenterLink on-line help.

(4) Exit Button - Clicking Exits CenterLink.

(5) NE Command Manager - Clicking opens a command manager window and establishes a connection to a network element.

(6) NE SmartManual Manager - Clicking opens the SmartManual window.

(7) Software Installation Manager - Clicking begins the process of installing network element software into a blank system.

(8) Reference Library - Clicking opens a window displaying an index of the documentation available.

(9) Notepad - Clicking opens a user note storage utility.

(10) NESERVER application - A Windows95 application that transfers data between the CenterLink Management Console software running on the web browser and the serial port of the PC. MUST be running for CenterLink to operate.

(11) Personal Web Server Application - A Windows95 application which allows the PC to operate as a web server. Needed to execute the JAVA scripts the CenterLink Management Console software uses.
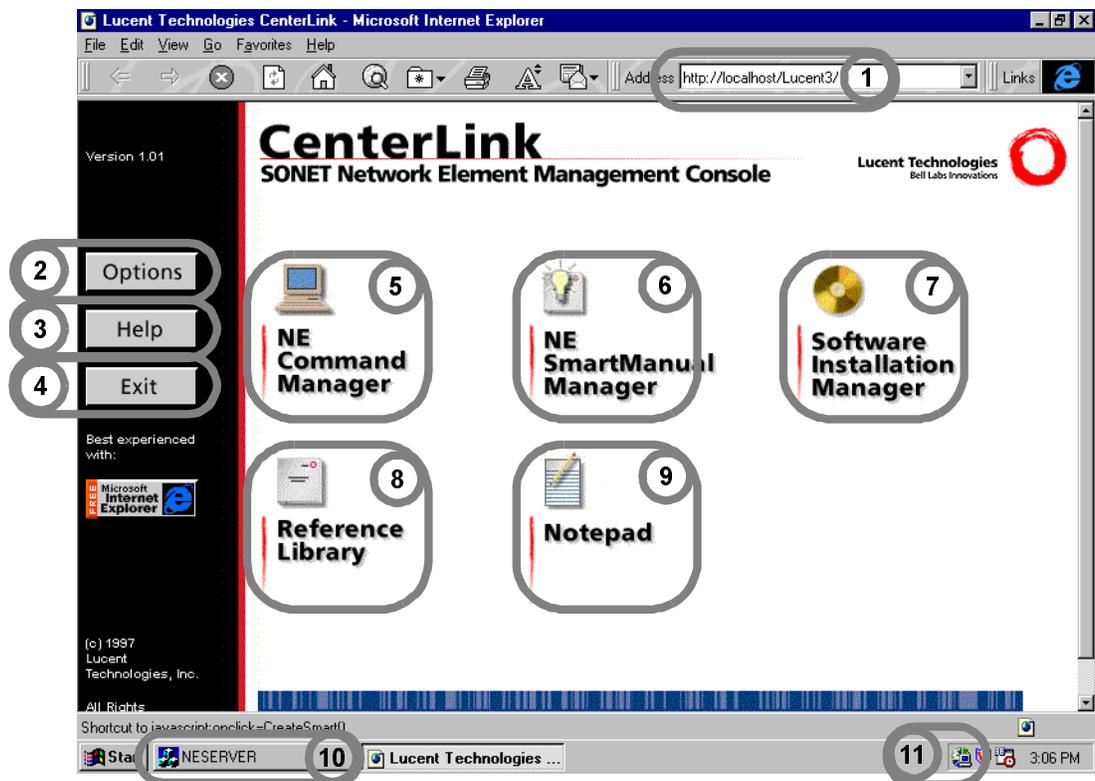
Figure F-3 CenterLink Management Console

CenterLink Management Console Operations

The following paragraphs describe using the CenterLink Management Console to log into a network element and run an example command.

Network Element Login Procedure

(1). Verify the PC is connected to the network element CIT port.

(2) Verify the NESERVER application com port assignment is correct by opening the NESERVER application and using the Settings->Com Port Selection menu.

(3) From the CenterLink Network Element Console window (Figure F-3) click on the NE Command Manager icon.

NE Command Manager

(4) A NE Command Manager window will open with the NE Selection Menu displayed as shown in Figure F-4.

(5) Select the target TID from the drop down list or enter a new TID. Click on the Submit button to proceed.

(6) The NE Command Manager window will then display the Network Element Login request as shown in Figure F-5.

(7) Enter the appropriate TID, User ID, Password, and Privilege Level (Expert) then click Enter.

For new installations use:

Default TID:	LT-FT-2000	(three zeros)
Default User ID:	LT01	(that's a zero, not a capital letter "o")
Default Password:	FT-2000	(three zeros)

For existing systems use the TID, User ID, and Password assigned by the system login administrator.

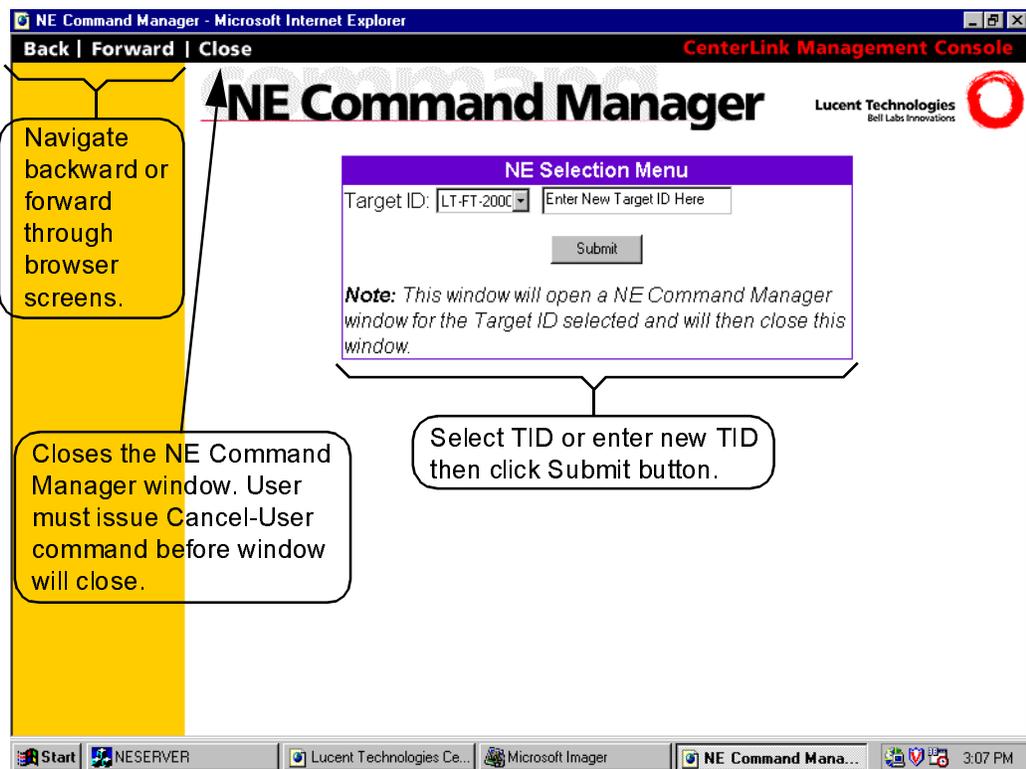(8) The NE Command Manager will then display the Login Success window as shown in Figure F-6.
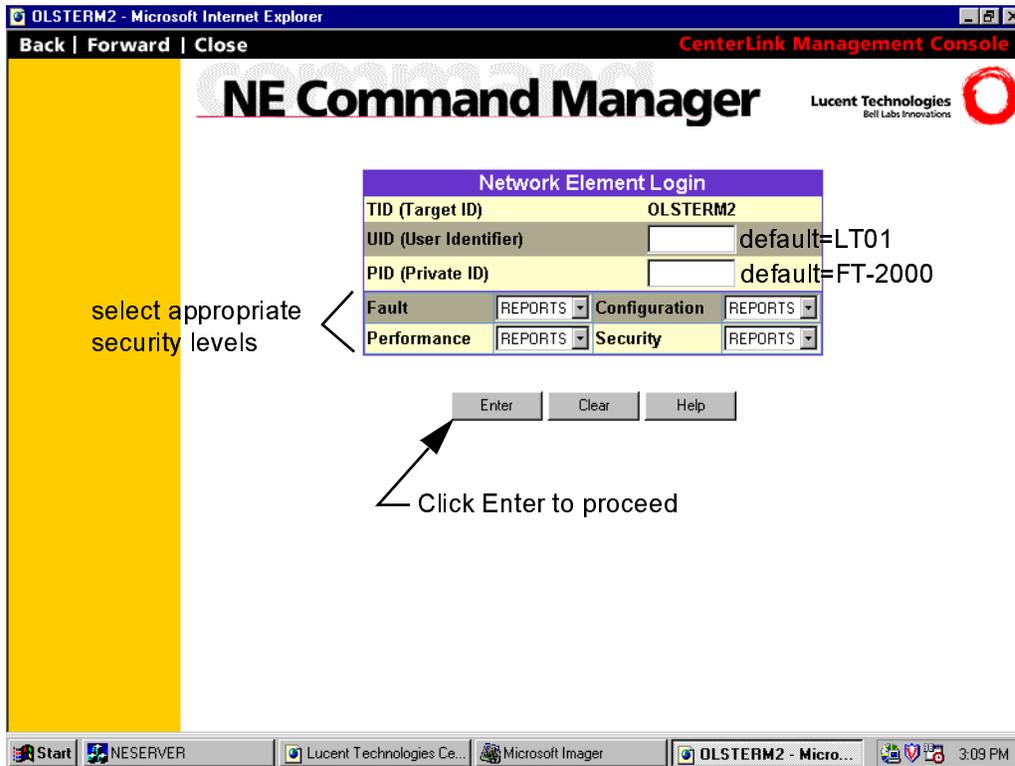
Figure F-4 NE Selection Menu window

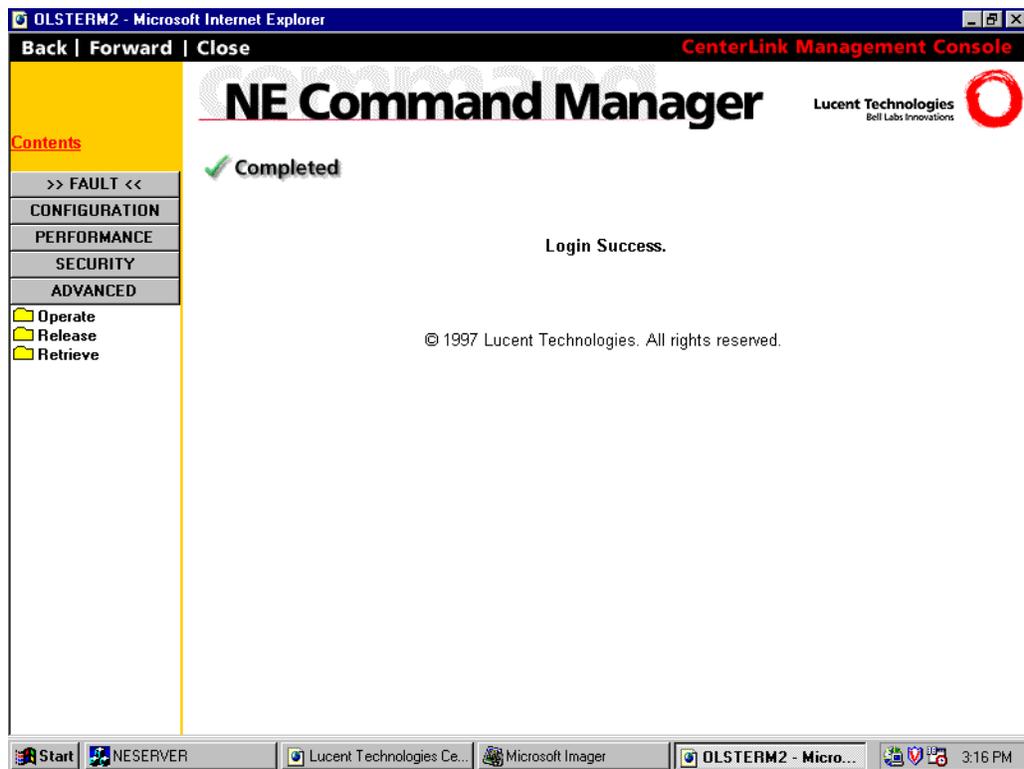**Figure F-5 Network Element Login window**

Figure F-6 Successful Network Element Login window

Network Element Command Execution

When the NE Command Manager is logged onto the network element the window will look similar to Figure F-7 or Figure F-8. These figures show the input and output screens from the CONFIGURATION.Retrieve.Map.Network command.

In general, the larger right frame area will display the input parameters to commands or output results from commands. The smaller left frame area will display the five command categories (FAULT, CONFIGURATION, PERFORMANCE, SECURITY, and ADVANCED) at the top of the frame and will display the commands available for the selected category at the bottom of the left frame. Open a folder to access the commands available. For example, clicking on retrieve opens commands and additional folders under it.
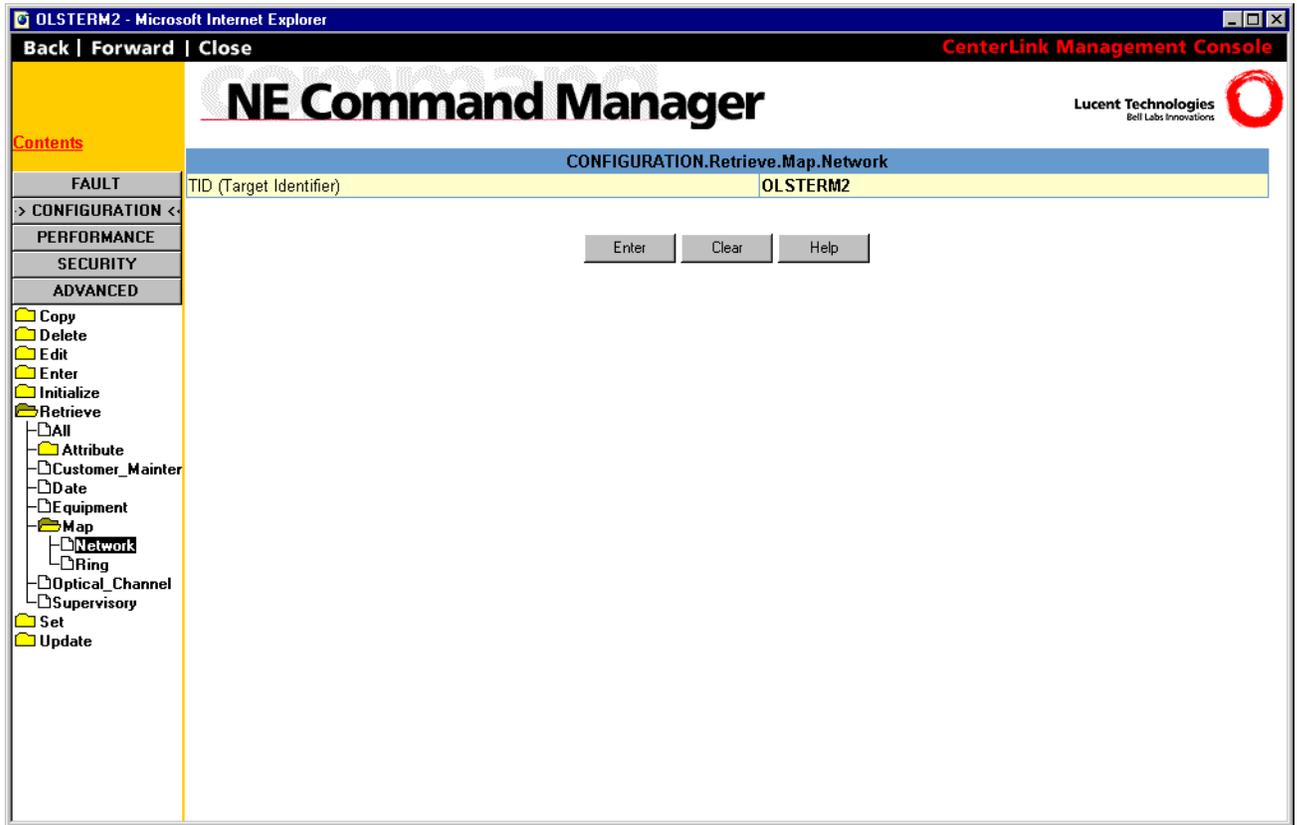
Figure F-7 NE Command Manager - Command Input

Figure F-8 NE Command Manager - Command Output

Related Equipment

G

Contents

Related Equipment

G

Dantel Orderwire Overview

OLS fully supports 64 kb/s Orderwire use. Line and Section Orderwire channels (E2 and E1 bytes) are supported by OLS. Line Orderwire is carried between adjacent nodes.

The current Section or Line Orderwire system provides basic party-line service; any person can pick up the handset from the front of the Dantel unit and immediately speak to anyone else on the system. Voice party-line capability is the nominal state of this system and is operational as long as the fiber line between the Orderwire sites is good. Figure G-1 shows an example application of the current orderwire system in an OLS. Unlike the section DCC and payload, the E1 byte of the section overhead is not automatically protected from fiber cuts or other transmission affecting impairments. The Orderwire Sets can also provide bridging between orderwire channels in the East and West directions that allows for orderwire connectivity around the ring.

Remote CMC access is also possible from any site to the other site over the orderwire by using the internal and external 1200 baud modems. The orderwire cannot be used for voice and CMC access simultaneously.

In ring applications, one of the nodes should be chosen as the break point (it is recommended the TID associated with the DS-NE be the break point) to avoid oscillating audio in the system. At this node the Dantel is configured in terminal mode[1] so that the Dantel channel 1 is the operational channel and channels 1 and 2 (East and West directions) are not bridged. The SONET section orderwire (E1 byte) is not automatically protected from fiber cuts or other transmission failures so a transmission failure somewhere in the ring can cut off the orderwire service to some nodes. For most single failures in a ring, orderwire access to nodes that

---

1. The switch and strap settings for terminal mode will be described in the final version of the Dantel practice.

have been cut off by the failure can be accessed by simply swapping the East and West orderwire connectors.

For voice application, the system operates as a standard order-wire when you pick up the handset on the front of the order-wire panel and call someone at a remote terminal (station 1 code). The voice circuit uses channel 1 of the system.

For data circuit applications, dial a different number (station 2 code) to call the same remote terminal to set up a data communications path.

The data circuit works as listed below:

(1) Select channel 1 on the 41096 order-wire panel, then pick up the handset and call the remote terminal (station 2 code).

At the remote end, the 00330 order-wire terminal pack answers the call and operates an M lead driver that opens a communications channel through the 44202 202 Compatible Modem pack.

(2) Select both channels 1 and 2 on the 41096 panel. This connects the computer and external modem to the system. At the same time the optical coupler (O.C.) circuit disables the side tone in the 00330 order-wire terminal so that the modem does not receive its own data.

(3) Hang up the handset and start sending or receiving digital data.

(4) When done, press the # key to disconnect the modem at the remote terminal. Release the channel 2 push button. The channel 2 button can be released or left pushed in since it is used for both voice and data communications.

Recommended Orderwire System

The voice only Dantel Orderwire system recommended is orderable as J68974L-1 L300 for a Terminal Office, equivalent to part number A18-04588-02 from Dantel. The new voice and data Dantel Orderwire system recommended is orderable as J68974L-1 L301 for a Terminal Office, equivalent to part number A18-05547-01 from Dantel.

Orderwire Shelf Mounting and Powering

The Dantel Orderwire shelf ships separately from the bay. It is may be mounted in, or powered from the Miscellaneous Mounted OLS or OT bay. Consult Dantel documentation for powering and mechanical mounting information.

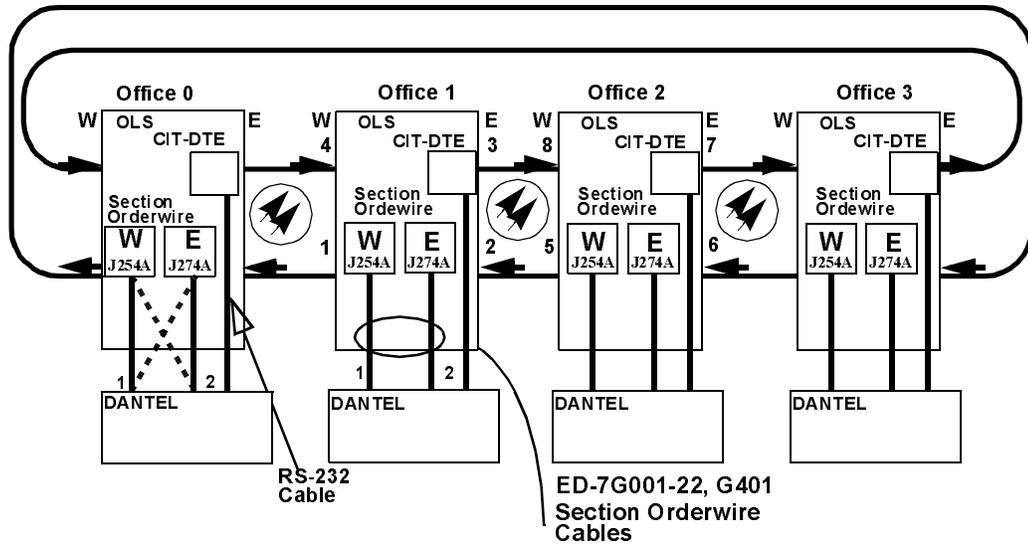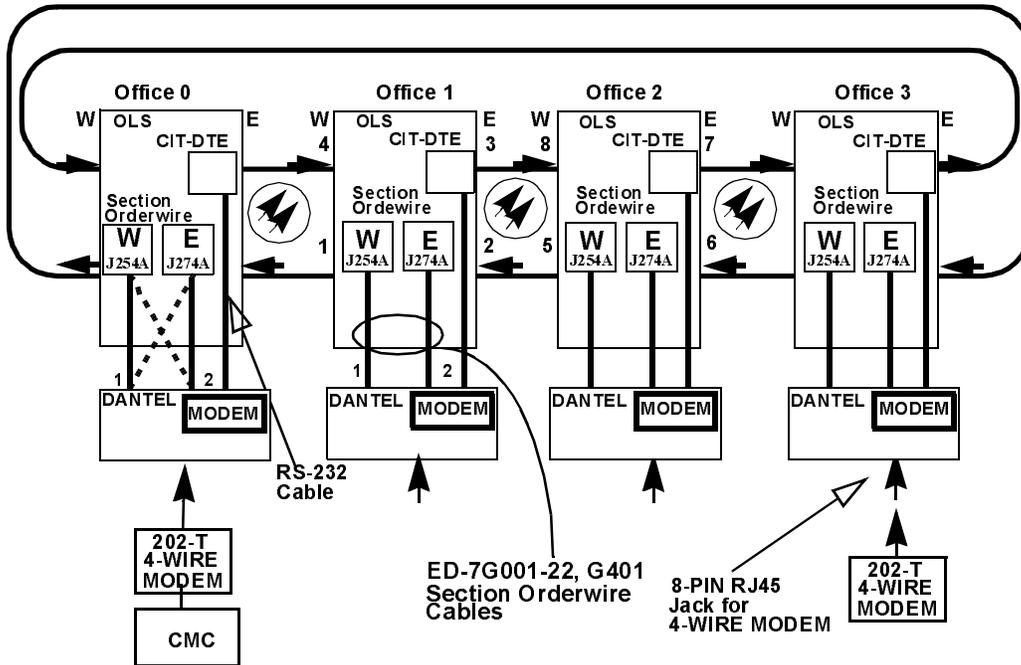**Figure G-1 Orderwire for Voice Communication**

**Note: The Dantel Shelf at the breakpoint (DSNE Office 0) is configured in Terminal mode.
All other Dantel Shelves are in Repeater mode.**

Figure G-2 Orderwire for Voice and Data Communication

Dantel Options Setting

The shelf consists of several Plug-in Modules. Switch and strap settings compatible with FT-2000 use are given in Table G-1 and Table G-2 for each Module.

Table G-1 Dantel Orderwire Options Settings For Voice Communications

Module	Settings
Backplane	Set S1 to BRIDGE Set S2 to IN Set S3 to IN.
41096	Set CTL LMT A strap, to IN position to prevent the ALL CHAN volume control knob from turning off the speaker. Set CTL LMT A strap, to OUT position to allow the ALL CHAN volume control knob to turn off the speaker. Set CTL LMT B strap, to IN position to prevent the CHAN SELECT volume control knob from turning off the speaker. Set CTL LMT B strap, to OUT position to allow the CHAN SELECT volume control knob to turn off the speaker.
46105	Set S1 (BRDG) switch, to TERM at the breakpoint (DSNE Office 0) Terminal site. Set S1 (BRDG) switch, to RPTR at all repeater and all other Terminal sites. Set S2 (LPBK 1) in OFF. Set S101 (LPBL 2) in OFF. Set the XMT CLK 1 and XMT CLK 2 straps in TERM. Set the RCV CLK 1 and RCV CLK 2 straps in TERM. Set the RCV DATA 1 and RCV DATA 2 2 straps in TERM. Set the M LEAD 1 and M LEAD 2 straps in YES. Set the MODE strap, set to TERM at the breakpoint (DSNE Office 0) Terminal site. Set the MODE strap, set to RPTR at all Repeater and all other Terminal sites. Reinstall the module in the left slot in the top equipment shelf.
44020	49018 child board, set the station 1 code with S1, S2 and S3 = three digit address for primary voice Orderwire. S1 is the first digit. Each site must have a unique address, it is recommended to use the Target ID (TID). 49018 child board S4, S5 and S6 = three digit address for All-Call. This address must be unique from all the primary voice Orderwire addresses assigned in the ring. Reinstall the module in the left slot in the bottom equipment shelf.
44022	Set the 2W/4W switch to 4w Set the 0 OHM/600 OHM to 600 OHMs. Reinstall the module in the middle slot in the bottom equipment shelf.
49920	Set RING-BACK TONE STRAPS to ON Set INTERRUPT STRAPS to NORM Set S2 switch to ON. Reinstall the module in the right slot in the bottom equipment shelf.

Table G-2 Dantel Orderwire Options Settings For Voice and Data Communications

Module	Settings
Backplane	Set S1 to BRIDGE Set S2 to OUT Set S3 to IN.
41096	Set CTL LMT A strap, to IN position to prevent the ALL CHAN volume control knob from turning off the speaker. Set CTL LMT A strap, to OUT position to allow the ALL CHAN volume control knob to turn off the speaker. Set CTL LMT B strap, to IN position to prevent the CHAN SELECT volume control knob from turning off the speaker. Set CTL LMT B strap, to OUT position to allow the CHAN SELECT volume control knob to turn off the speaker.
46105	Set S1 (BRDG) switch, to TERM at the breakpoint (DSNE Office 0) Terminal site. Set S1 (BRDG) switch, to RPTR at all Repeater and all other Terminal sites. Set S2 (LPBK 1) in OFF. Set S101 (LPBL 2) in OFF. Set the XMT CLK 1 and XMT CLK 2 straps in TERM. Set the RCV CLK 1 and RCV CLK 2 straps in TERM. Set the RCV DATA 1 and RCV DATA 2 2 straps in TERM. Set the M LEAD 1 and M LEAD 2 straps in YES. Set the MODE strap, set to TERM at the breakpoint (DSNE Office 0) Terminal site. Set the MODE strap, set to RPTR at all Repeater and all other Terminal sites. Reinstall the module in the left slot in the top equipment shelf.

44202 202	Set the TEST, ALB, and DLB switches in the DOWN positions on faceplate.
	Set the 2W/4W switch to 4w.
	set the S5 dip switch as follows:
	    S5-1, S5-3, and S5-4 ON.
	    S5-2 and S5-5 OFF.
	Set the RCV GAIN strap to HIGH.
	Set the XMT GAIN strap to LOW.
	Set XMT and RCV straps to MASTER.
	Set 485TD, 422RTS, and 422TD straps to O (OUT).
	Reinstall the module in the middle slot in the top equipment shelf.

44020	49018 child board, set the station 1 code with S1, S2 and S3 = unique three digit voice orderwire address (000-999) for each site. S1 is the first digit. It is recommended to use the Target ID (TID). 49018 child board S4, S5 and S6 = unique three digit (and other) modem address (000-999) for each site. This address must be unique from all the primary voice Orderwire addresses assigned in the ring. Reinstall the module in the left slot in the bottom equipment shelf.
44022	Set the 2W/4W switch to 4w Set the 0 OHM/600 OHM to 600 OHMs. Set the Remote Lead to OUT. Reinstall the module in the middle slot in the bottom equipment shelf.
49920	Set RING-BACK TONE STRAPS to ON Set INTERRUPT STRAPS to NORM Set S2 switch to ON. Reinstall the module in the right slot in the bottom equipment shelf.

Cabling to OLS

Basic cable information is given in Section 6, "Wired Cable Installation" of this document. This appendix provides information about connections at the Dantel Orderwire Shelf.

Table G-3 Gives Channel 1 wire connection information.

Table G-3 Channel 1 Dantel Orderwire Connections (For Reference Only)

Wire Color	BL-W	W-BL	G-W	W-G	BL-R	R-BL	BR-W	W-BR
ED-7G028-22, G401	1	9	3	11	6	14	4	12
Dantel 46105 Connector End	52	51	48	47	46	45	44	43

Table G-4 Gives Channel 2 wire connection information

Table G-4 Channel 2 Dantel Orderwire Connections (For Reference Only)

Wire Color	BL-W	W-BL	G-W	W-G	BL-R	R-BL	BR-W	W-BR
ED-7G028-22, G401	1	9	3	11	6	14	4	12
Dantel 46105 Connector End	6	5	10	9	12	11	14	13

Figure G-3 diagrams the Dantel connector.

CIRCUIT (TOP) SIDE OF CIRCUIT BOARD

PRINTED WIRING (BOTTOM) SIDE OF CIRCUIT BOARD

Left Pin		Right Pin	
XMT 1 INPUT	56	55	RCV 1 OUTPUT
XMT 1 INPUT	54	53	RCV 1 OUTPUT
XMT CLK INPUT (-)	52	51	XMT CLK INPUT (+)
XMT CLK 1 OUTPUT (-)	50	49	XMT CLK 1 OUTPUT (+)
XMT DATA 1 OUTPUT (-)	48	47	XMT DATA 1 OUTPUT (+)
RCV CLK 1 INPUT (-)	46	45	RCV CLK 1 INPUT (+)
RCV DATA 1 INPUT (-)	44	43	RCV DATA 1 INPUT (+)
M LEAD 1 INPUT (-)	42	41	M LEAD 1 INPUT
E LEAD 1 OUTPUT	40	39	E LEAD 1 OUTPUT
	38	37	
	36	35	BATTERY INPUT (-21 TO -56 VDC)
	34	33	
+5 VDC OUTPUT	32	31	
	30	29	GROUND
	28	27	GROUND
	26	25	GROUND
	24	23	GROUND
	22	21	
E LEAD 2 OUTPUT	20	19	E LEAD 2 OUTPUT
	18	17	GROUND
M LEAD 2 INPUT 2 (-)	16	15	M LEAD 2 INPUT (+)
RCV DATA 2 INPUT (-)	14	13	RCV DATA 2 INPUT (+)
RCV CLK 2 INPUT (-)	12	11	RCV CLK 2 INPUT (+)
XMT DATA 2 OUTPUT (-)	10	9	XMT DATA 2 OUTPUT
XMT CLK 2 OUTPUT (-)	8	7	XMT CLK 2 OUTPUT (+)
XMT CLK 2 INPUT (-)	6	5	XMT CLK 2 INPUT (+)
XMT 2 INPUT	4	3	RCV 2 OUTPUT
XMT 2 INPUT	2	1	RCV 2 OUTPUT

Figure G-3 View of 46105 Edge Connector from Backplane

Glossary

1A-TX

1A-Transmit. A dual or 4 line end terminal whose optical amplifier "A" lines are used in the transmit direction.

1A-RCV

1A-Receive. A dual or 4 line end terminal whose optical amplifier "A" lines are used in the receive direction.

0x1 Line Operation

A 0x1 protection system has one service line and no protection line.

1+1 Line Protection

A 1+1 protection system has two OC-48 high speed lines. The transmitting terminal transmits the same signal on two lines. The receiving terminal monitors two lines independently and chooses one line as the active line and the other line as the standby line. When a protection switch occurs, the receiving terminal selects the signal from the standby line which causes the standby line to be the new active line. The original active line becomes the standby line.This status remains the same (nonrevertive) after the fault clears.

1x1 Line Protection

A 1x1 protection system has two OC-48 high speed lines. One line is designated as the service line, and the other line is designated as the protection line. The service line normally carries traffic. When a protection switch occurs, the protection line is selected to carry traffic. When the fault clears, the original service line is selected (revertive). Also see Revertive Switching.

A

ABN

Abnormal - An LED on the user panel that is lighted when a temporary condition potentially affecting transmission, exists; for example, a CIT-initiated protection switch or lockout, or loopback.

ACO

Alarm Cutoff - A push-button switch on the user panel that can be used to retire an audible office alarm. The alarm cutoff function is also available from the CIT and from an operations system.

AGNE

Alarm Gateway Network Element

AID

Access Identifier — A unique identifier used to address equipment slots and ports, as well as facility tributaries, that are defined for the OLS architecture.

AIS

Alarm Indication Signal - A maintenance signal transmitted downstream in a digital network that shows that an upstream failure has been detected and alarmed.

ANSI

American National Standards Institute - An organization consisting of producer, consumer, and general interest groups that establishes the procedures by which accredited organizations create and maintain voluntary industry standards in the United States.

APD

Avalanche Photodiode - A highly sensitive optical detector.

APS

Automatic Protection Switch

AS&C

Alarm, Status, and Control

ASCII

American Standard Code for Information Interchange - A standard 8-bit code used for exchanging information among data processing systems and associated equipment.

ASN.1

Abstract Syntax Notation 1

Asynchronous

Refers to network elements that are not timed from references traceable to a single timing source.

AUTO

Automatic - One possible state of a low speed port or slot. When a port is in the automatic state and the presence of a good signal is detected, the port is automatically placed in the IS (in service) state. When a slot is in the automatic state and the presence of a circuit pack is detected, the slot is automatically placed in the EQ (equipped) state.

Autonomous Indicators

Autonomous indicators are those indicators that are subject to incoming signal alarm delay. These include office alarm outputs, parallel telemetry outputs, TL1 autonomous messages, the alarm LEDs (CR, MJ, and MN) on the user panel, and the network element status field in the upper left-hand corner of the CIT.

B

BCLAN

Board Controller Local Area Network - The internal local area network that provides communications between the System Controller circuit pack and board controllers on the circuit packs.

BDFB

Battery Distribution and Fuse Bay

BER

Bit Error Rate - The ratio of bits received in error to bits sent.

BIP

Bit Interleaved Parity - A method of error monitoring over a specified number of bits (BIP-3 or BIP-8).

BIP-N

Bit Interleaved Parity - N - A method of error monitoring. With even parity, an N-bit code is generated by the transmitting equipment over a specified portion of the signal in such a way that the first bit of the code provides even parity over the first bit of all N-bit sequences in the covered portion of the signal. The second bit provides even parity over the second bits of all the N-bit sequences within the specified portion, etc. Even parity is generated by setting the BIP-N bits so that there are an even number of ones in each of all the N-bit sequences including the BIP-N.

BITS

Building Integrated Timing Supply - A single clock that provides all the DS1 and DS0 synchronization references required by clocks in a building.

BOC

Bell Operating Company

BRT

Business Remote Terminal

C

CC

Clear Channel - A provisionable mode for the DS3 output that causes parity violations to not be monitored or corrected before the DS3 signal is B3ZS-encoded.

CCITT

International Telephone and Telegraph Consultative Committee - An international advisory committee under United Nations sponsorship that has composed and recommended for adoption worldwide standards for international communications.

CIT

Craft Interface Terminal - A personal computer that meets OLS minimum requirements loaded with the OLS CIT-PC software.

CLEI

Common Language Equipment Identifier

CMS

See customer maintenance signal

CO

Central Office - A telephone company building where switching and/or transmission system equipment is located.

COACH

A set of software tools designed to assist Lucent Technologies Network Systems provide quality service to our customers for a variety of transmission products. Customers can proactively use the tools to keep abreast of the latest product information and to communicate with the Technical Support groups and product designers.

Condition

Conditions persist in time and indicate that there is something not normal about the system. Conditions appear in the Retrieve-Alarm Report.

CR

Critical (alarm)

CS&O

Customer Support and Operations

CTS

Customer Technical Support - An Lucent Technologies organization that helps customers maintain installed systems.

Current Value

The value currently assigned to a provisionable parameter.

Customer Maintenance Signal

A 155Mb/s optical signal originating from customer supplied equipment, which is used for customer maintenance activities. It is carried as part of the supervisory signal.

CV

Coding Violation

D

DACS

Digital Access and Cross-Connect System

DACS III-2000

One of Lucent Technologies' Digital Access and Cross-connect Systems.

DACS IV-2000

One of Lucent Technologies' Digital Access and Cross-connect Systems.

Data

A collection of system parameters and their associated values.

DCC

Data Communications Channel - The embedded overhead communications channel in the SONET line. This is used for end-to-end communications and maintenance. It carries alarm, control, and status information between network elements in a SONET network.

DCE

Data Communications Equipment - The equipment that provides the signal conversion and coding between the data terminating equipment and the line. The DCE may be separate equipment or a part of the data terminating equipment.

DDM-2000

Lucent Technologies' SONET network multiplexer that can function as a lightwave terminal. It is designed primarily for loop feeder and interoffice applications that will work in existing asynchronous as well as the emerging SONET networks.

Demultiplexing

A process applied to a multiplexed signal for recovering signals combined within it and for restoring the distinct individual channels of these signals.

DM

Degraded Minutes

Doping

The addition of impurities in a substance to achieve desired properties.

DPLL

Digital Phase-Locked Loop

DRAM

Dynamic Random Access Memory - Semiconductor random-access memory that requires short interval refreshing to retain its contents.

Drop Side Signal

An optical signal suitable for transmission over OLS, an OC-48 signal.

DS-NE

Directory Service Network Element — A designated network element that is responsible for administering a database that maps network element names (TIDs) to addresses (NSAPs). There can be only one DS-NE per ring.

DTE

Data Terminating Equipment - The equipment that originates data for transmission and accepts transmitted data.

DWDM

Dense Wave Division Multiplexing

E

ECI

Equipment Catalog Item

EEPROM

Electrically Erasable Programmable Read-Only Memory - Readable memory that is nonvolatile in nature, erased electrically, and programmed externally from the processor that uses it.

EIA

Electronic Industries Association - A trade association of the electronics industry that establishes electrical and functional standards.

EMC

Electromagnetic Compatibility

EMI

Electromagnetic Interference - High-energy, electrically induced magnetic fields that cause data corruption in cables passing through the fields.

EPROM

Erasable Programmable Read-Only Memory - Readable memory that is nonvolatile in nature, erased by exposure to intense ultraviolet light, and programmed externally from the processor that uses it.

EQ

Equipped - A memory administrative state for slots. EQ refers to a slot that is fully monitored and alarmed.

Erbium

A soft rare earth element used in metallurgy and nuclear research.

Erbium Doped Fiber Amplifier (EDFA)

A form of optical amplification by which the light signal passes through a section of erbium doped fiber and is amplified by a laser pump diode.

ES

Errored Seconds - A second in which one or more parity violation are detected. Errored seconds are monitored for the OC-48 line, OC-48 section, and STS-1 path.

ESD

Electrostatic Discharge - The discharge of static electricity into equipment that potentially causes component damage and logic errors.

Event

Events happen at a particular time (do not persist in time) and appear in the Retrieve-History Report.

ET

End Terminal — Equipment that terminates optical line signals.

F

FDA

Food and Drug Administration

FE ACTY

Far-End Activity - An LED on the user panel that is lighted when an alarm or status condition exists at a remote FT-2000 OC-48 Network Element.

FEBE

Far-End-Block Error - An indication returned to the transmitting terminal that an errored block has been detected at the receiving terminal. A block is a specified grouping of bits.

FERF

Far-End-Receive Failure - An indication returned to a transmitting terminal that the receiving terminal has detected an incoming section failure.

Flash EPROM

A technology that combines the nonvolatility of EPROM with the in-circuit reprogrammability of EEPROM (electrically-erasable PROM).

FLS

Frame Loss Seconds

G

Gb/s

Gigabits (10^9 bits) per Second

GNE

Gateway Network Element - A network element that passes information between other network elements and operations systems via a data communication network.

I

IEC

International Electrotechnology Commission or Interexchange Carrier

I/O

Input/Output

IR

Intermediate Reach

IS

In Service - A memory administrative state for ports. IS refers to a port that is fully monitored and alarmed.

ITCO

Independent Telephone Company

IXC

Interexchange Carrier

J

Jitter

Timing jitter is defined as short-term variations of the significant instants of a digital signal from their ideal positions in time.

K

Krypton line

1547.82 nm — the wavelength used in a standard laser source.

L

LAN

Local Area Network

LBO

See Optical Line Build-out.

LCT

FT-2000 OC-48 Lightwave System Large Capacity System

LEC

Local Exchange Carrier

LED

Light-Emitting Diode

LGX

Lightguide Cross-connect

Line

An optical transmission line. In T1/Bellcore terminology, line refers to a transmission medium, together with the associated high speed equipment, required to provide the means of transporting information between two consecutive Network Elements, one of which originates the line signal and the other terminates the line signal.

LOF

Loss of Frame - A failure to synchronize to an incoming signal.

LOP

Loss of Pointer - A failure to extract good data from an STS-1 payload.

LOS

Loss of Signal - The complete absence of an incoming signal.

M

mm

Micrometer - 10^{-6} meters

Menu

A set of possible values for a parameter.

Midspan Meet

The capability to interface between two lightwave terminals of different vendors. This applies to high speed optical interfaces.

Miscellaneous Discretes

A user settable interface which allows an OS to monitor and control equipment external to OLS such as open doors or fire alarms.

MJ

Major (alarm)

MML

Human-Machine Language

MM Fiber

Multi-mode fiber.

MN

Minor (alarm)

MTBF

Mean Time Between Failures

MTBMA

Mean Time Between Maintenance Activities

Multiplexing

The process of combining several distinct digital signals into a single composite digital signal.

N

NCDRH

National Center for Devices and Radiological Health

NE

Network Element - Refers to an OLS node in a network.

NE ACTY

Near-End Activity - An LED on the user panel that is lighted when an alarm or status condition exists at the local FT-2000 OC-48 Network Element.

NEBS

Network Equipment-Building System

nm

Nanometer - 10^{-9} meters

NMA

Network Monitoring and Analysis System - Bellcore's alarm surveillance operations system.

NMON

Not Monitored - A memory administrative state for ports. This refers to a port that is not monitored and will not transition to the IS state if a good signal is detected.

Nonautonomous Indicators

The nonautonomous indicators are those indicators that are not subject to incoming signal alarm delay. These indicators include the circuit pack FAULT LEDs, all CIT reports, TL1 command response messages, and the LEDs on the user panel (except CR, MJ, and MN).

Nonrevertive switching

In nonrevertive switching, there is a active and standby high speed line, circuit pack, etc. When a protection switch occurs, the standby line, circuit pack, etc., is selected causing the old standby line, circuit pack, etc., to be used for the new active line, circuit pack, etc. The original active line, circuit pack, etc., becomes the standby line, circuit pack, etc. This status remains in effect when the fault clears. Therefore, this protections scheme is nonrevertive in that there is no switch back to the original status in effect before the fault occurred. Also see 1+1 Line Protection.

NRZ

Nonreturn to Zero

NSA

Non-Service Affecting

NSAP Address

Network Service Access Point Address — An automatically assigned number that uniquely identifies a Network Element for the purposes of routing DCC messages.

O

OA

Optical Amplifier

O&M

Operation and Maintenance

OALAN

Overhead Access Local Area Network — The internal local area network that provides communications between the System Controller circuit pack and the Overhead Controller circuit pack.

OAM&P

Operations, Administration, Maintenance, and Provisioning

OC, OC-n

Optical Carrier — The optical signal that results from an optical conversion of an STS signal; that is, OC-1 from STS-1 and OC-n from STS-n.

ODU

Optical Demultiplexer — takes the OLS optical signal and separates it into the 8 OC-48 signals.

OLS

Optical Line System

OMU

Optical Multiplexer — takes up to 8 OC-48 signals and combines them into 1 optical signal.

OOF

Out-of-Frame

Operations Interface

Any interface that provides information on the system behavior or control. These include the equipment LEDs, user panel, CIT, office alarms, and all telemetry interfaces.

Operations Interworking

The capability to access, operate, provision, and administer remote systems through CIT access from any site in a SONET network or from a centralized operations system.

Optical Channel

A single OC-48 signal within the optical line signal. There are 8 channels in one line signal.

Optical Line

A fiber transmission facility extending from the output of the OMU to the input of the ODU.

Optical Line Build-out (LBO)

An attenuator placed on the faceplate of optics units to attenuate the optical signals as needed.

Optical Line ID

A portion of the supervisory signal that identifies optical lines to prevent misconnections between sites. Optical Line Signal A wavelength division multiplexed optical signal.

Optical Section

A portion of OLS between adjacent network elements.

Orderwire

A section of the supervisory signal that is used for communication between sites.

Original Value

The value given to a CIT provisionable parameter at the factory.

Original Value Provisioning

The original values are the values given to CIT provisionable parameters at the factory. At system start-up, the original values are copied and become the current values. These current values can be changed using local or remote provisioning. The original values can never be changed.

OS

Operations System - A central computer-based system used to provide operations, administration, and maintenance functions.

P

Parallel Telemetry

A set of alarms and status information reported to an operations center.

Parameter

A characteristic of the system that affects its operation.

PC

Personal Computer

Phase Locked

An operating condition of a network element in which it is locked to an external reference.

Platform

In OLS, a platform is a family of equipment and software configurations designed to support a particular set of applications.

PLL

Phase Locked Loop

PM

Performance Monitoring - Measures the quality of service and identifies degrading or marginally operating systems (before an alarm would be generated).

POH

Path Overhead - Overhead assigned to and transported with the payload until the payload is demultiplexed. It is used for functions that are necessary to transport the payload.

Preprovisioning

The capability to provision a slot before installing a circuit pack.

Proactive Maintenance

Refers to the process of detecting degrading conditions not severe enough to initiate protection switching or alarming, but indicative of an impending signal fail or signal degrade defect.

PROTN

Protection

Provisioning

Assigning a value to a parameter in memory.

PWR

Power

R

RCV

Receive

RDI

Remote Defect Indication - An indication returned to a transmitting terminal that the receiving terminal has detected an incoming failure. Also refer to far-end-receive-failure (FERF).

Repeater

Equipment that repeats optical line signals.

Reactive Maintenance

Refers to detecting defects/failures and clearing them.

Regeneration

The process of reconstructing a digital signal to eliminate the effects of noise and distortion.

Revertive Switching

In revertive switching, there is a service and protection high speed line, circuit pack, etc. When a protection switch occurs, the protection line, circuit pack, etc. is selected. When the fault clears, service reverts back to the original service line. Also see 1x1 Line Protection.

RF

Radio Frequency

RFI

Remote failure indication — (Previously called yellow signals.) A signal that alerts upstream STS-1 path terminating equipment that a down stream failure has been alarmed along the STS-1 path. This action prevents multiple alarms from being activated for the same failure and ensures that craft will be dispatched to the correct location of the failure.

RPP

Reliability Prediction Procedure

RTAC

Regional Technical Assistance Center - A Lucent organization that helps customers maintain installed systems.

S

SA

Service Affecting

SD

Signal Degrade - A provisionable parameter for the incoming OC-48 high speed signal and DS3 signal (from cross-connect panel) that determines the threshold at which a signal degrade condition is declared.

SDH

Synchronous Digital Hierarchy — a European standard

SEFS

Severely Errored Frame Seconds - The number of seconds during which an out-of-frame event occurred.

SES

Severely Errored Seconds - A second in which the parity violations detected reach a fixed threshold.

SF

Signal Fail - Refers to a condition when an incoming signal's bit error rate exceeds a fixed value.

SM Fiber

Single Mode Fiber

SONET

Synchronous Optical Network - The American National Standards Institute's optical signal standard for broadband transmission.

SNR

Signal to Noise ratio

Span

See Optical Section

Span Growth

A type of growth in which one wavelength is added to all lines before the next wavelength is added.

SPE

Synchronous Payload Envelope - A 125-microsecond frame structure composed of STS path overhead and bandwidth for the payload.

Status

Status means a condition that does not raise an alarm.

STS, STS-n

Synchronous Transport Signal - The basic logical building block signal with a rate of 51.840 Mb/s for an STS-1 signal and a rate of n times 51.840 Mb/s for an STS-n signal.

STM-n

Synchronous Transport Module level n — the basic building block of SDH.

Supervisory Signal

An optical signal originating with the TLM circuit pack that is used to communicate maintenance information from node to node.

SUPR

See Supervisory Signal

Synchronous

Refers to network elements that are timed from references traceable to a single timing source.

Synchronous Network

The synchronization of synchronous transmission systems with synchronous payloads to a master (network clock that can be traced to a single reference clock).

SYSCTL

The System Controller and System Memory circuit packs provide the highest level of system control for the OLS. The System Controller circuit pack provides overall administrative control of the system.

SYSMEM

The System Memory and System Controller circuit packs provide the highest level of system control for the OLS. The System Memory circuit pack provides memory support for the SYSCTL circuit pack.

T

T1X1 and T1M1

The ANSI committees responsible for telecommunications standards.

TA

Technical Advisory

TBOS

Telemetry Byte-Oriented Serial (Protocol) - Defines one physical interface for direct connection between the telemetry remote and the monitored equipment. An EIA-422 port is used to provide the operations system with enough alarm and status information to localize a problem and determine the severity.

TCA

Threshold-Crossing Alert - A condition set when a counter exceeds a user-selected high or low threshold. A TCA does not generate an alarm but is available on demand through the CIT.

TEC

Thermo-Electric Cooler

TID

Target Identifier - A provisionable parameter used to identify an FT-2000 OC-48 Lightwave System.

TL1

Transaction Language 1 - A machine-to-machine communications language that is a subset of CCITT's human-machine language.

TLM

Telemetry circuit pack

TOHCTL

Tributary Overhead Controller. This circuit pack provides access to the SONET Section DCC (D1 - D3) bytes present in OC-3 low speed interfaces that terminate in the Low Speed Shelf - System Controller. The TOHCTL processes both the transmit and receive directions of the DCC.

Tone

An AM signal in the 5 - 30 kHz range that is superimposed on the drop side signal for power measurements.

TR

Technical Reference

Tributary

A 51.84 Mb/s signal (STS-1 level) or 155 Mb/s signal (STS-3 level) within the FT-2000 OC-48 Lightwave System. The maximum capacity of an OC-48 signal is forty-eight 51.84 Mb/s tributaries (or sixteen 155 Mb/s tributaries).

TX

Transmit

U

UAS

Unavailable Seconds - A second during which the STS-1 path is unavailable.

Upgrade

An upgrade is the addition of new capabilities (features) to an existing platform. This requires new software and may require new hardware.

V

Value

A number, text string, or other menu selection associated with a parameter.

VM

Violation Monitor - A provisionable mode for the DS3 output that causes parity violations to be monitored but not corrected before the DS3 signal is B3ZS encoded.

VMR

Violation, Monitor, and Removal - A provisionable mode for the DS3 output that causes parity violations to be monitored and corrected before the DS3 signal is B3ZS encoded.

VT

Virtual Tributary - A structure designed for transport and switching of sub-STS-1 payloads. There are currently four sizes: VT1.5 (1.728 Mb/s), VT2 (2.304 Mb/s), VT3 (3.456 Mb/s), and VT6 (6.912 Mb/s).

VT-G

Virtual Tributary Group - A 9-row by 12-column structure (108 bytes) that carries one or more VTs of the same size. Seven VT groups (756 bytes) are byte interleaved with the VT-organized synchronous payload envelope.

W

Wavelength growth

A type of growth in which all eight wavelengths are added to a single line before more lines are added.

X

X.25

Communications protocol.

Z

Zero Code Suppression

A technique used to reduce the number of consecutive zeros in a line-codes signal (B3ZS for DS3 signals).

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X