Lucent Technologies
Bell Labs Innovations

LambdaXtreme™ Transport

Installation Manual and System Turn-up Services

Release 1.1

365-575-782R1.1
Issue 2.0
July 2002

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LambdaXtreme™ Transport
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About this information product

Purpose

This manual provides instructions for installation, turn-up and testing of the LambdaXtreme™ Transport. This manual is not a service manual. Refer to 365-575-781, LambdaXtreme™ Transport User Operations Guide (UOG) for any activities involving circuit turn-up, or 365-575-783, LambdaXtreme™ Transport Alarm Message and Trouble Clearing Guide (AMTCG) for trouble analysis and regular maintenance.

Reason for revision

This is the first issue.

Safety labels

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.

Intended audience

This installation manual portion of this document is for personnel who will install LambdaXtreme™ Transport equipment. The System Turn-up and Test (also called Integration) is for personnel who will integrate the NEs into a complete OLS system.

This manual is intended ONLY for use in a central office environment in Network Equipment Building Standards (NEBS) installations and for installation and testing performed prior to turnover to central office personnel.

How to use this information product

This manual is divided into four parts each containing several chapters. The first part explains the installation sequence at a high level. It is useful to the trained installer or job planner. The other parts provide instructional steps for personnel needing additional detail or background information. The chapters in each part are numbered in the order which they are to be performed. See *Chapter 1, Overall Installation Planning* for more information about this document.

Related documentation

The following documents provide additional information about the LambdaXtreme™ Transport:

- 365-575-780, LambdaXtreme™ Transport Applications Planning Guide
- 365-575-781, LambdaXtreme™ Transport User Operations Guide
- 365-575-783, LambdaXtreme™ Transport Alarms, Messages, and Trouble Clearing Guide
- Comcode 109266585, LambdaXtreme™ Transport R1.1, Software Release Description

The following drawings provide additional information about the LambdaXtreme™ Transport:

- ED-8C861-10 Common Systems LambdaXtreme™ Transport Ordering Information Equipment list (Addendum to AOG paper copy)
- ED-8C861-20 Interconnect Drawings (Addendum to IG paper copy)

Related training

The Lucent Learning Organization (LLO) provides courses for system planning, engineering, and ordering, as well as courses to train telecommunications technicians in installation, operations, and maintenance. Suitcasing of these courses is also available. Contact the Lucent Learning Organization at 1-888-LUCENT8 (1-888-582-3688) to enroll in training classes. To arrange suitcase sessions, call the

Product Training Manager at 1-800-432-6317 (within USA) or 1-614-764-5542 (worldwide). For a list of available courses, see the LLO website at http://www.lucent.product-training.com.

Courses applicable to this product include:

- LW2271 LambdaXtreme™ Transport Applications and Training
- LW2471 LambdaXtreme™ Transport Installation and Testing
- LW2671 LambdaXtreme™ Transport Operations and Maintenance
- ND2200 Fiber-Optic Products: Basic Installation Procedures (5 days)
- ND2633 Fiber-Optic Installation, Splicing and Testing (10-day certification course)
- TR9210 Lucent Technologies Fiber Cleaning (4-hour self paced CD-ROM)

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This manual was developed by Dense Wave Division Multiplexing (DWDM) Technical Support Services (TSS). The TSS organization 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 +1-978-960-1992 or the number shown on the form.

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Bell Labs Innovations

1 Overall Installation Planning

Overview

Purpose The purpose of this chapter is to provide the information needed to plan the installation of a LambdaXtreme™ Transport system.

Reason for revision This is the first issue.

Contents This chapter contains the following:

Installation Planning	1-2
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Installation Planning

Scope of Job

Installation of the LambdaXtreme™ Transport equipment is similar to other lightwave telecommunications equipment. The general phases of the installation job are:

1. Prepare central office for new equipment.
2. Physically install LambdaXtreme™ Transport equipment.
3. Power up the LambdaXtreme™ Transport equipment.
4. Install circuit packs and associated fibers.
5. Cable (copper) the LambdaXtreme™ Transport equipment.
6. Install the software.
7. Provision and perform any local tests in the central office.
8. Connect LambdaXtreme™ Transport NEs and establish network.
9. Perform system tests and connect traffic to LambdaXtreme™ Transport.
10. Turn over system to local operations and maintenance personnel.

Items two through nine are included in this document. Items one and ten are beyond the scope of this document.

> **Important!** Please check with your Customer Team to determine which of the above items are included in your contract with Lucent. Contracts can vary widely.

Equipment Installation

Use Part I, Chapters 2 through 4 of this document to perform the physical and power installation of the LambdaXtreme™ Transport equipment. Use Part II, Chapters 5 through 11 of this document to perform the stand-alone installation and testing. Use Part III, Chapters 12 and 13 of this document to perform System Turn-up. Part IV, Chapters 100 through 105 provide additional detail or reference information.

Installation Documents

Besides the Installation Manual, the Technician should also read:

- Installation Specification sheets (generated by SITE tool)
- Fiber Characterization specification
- Floor Plan Information
- Software Release Description (latest version of applicable release with Known Problem List)

Important! Network Element type determines Chapter sequence via downward flow beneath NE type name

Table 1-1 Job Planning Flowchart for LambdaXtreme™ Transport

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<tr><td rowspan="3">PART I</td><td colspan="3">Chapter 1, Overall Installation Planning</td></tr>
<tr><td rowspan="2">Chapter 2, Repeater Shelf - Physical and Power Installation</td><td colspan="2">Chapter 3, Terminal Frame - Physical Installation</td></tr>
<tr><td colspan="2">Chapter 4, Bay Powering</td></tr>
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<tr><td colspan="2">Chapter 8, Control and External Connections for End/OADM Terminals</td></tr>
<tr><td colspan="2">Chapter 9, OT Circuit Pack and Fiber Installation for End and OADM Terminals</td></tr>
<tr><td colspan="3">Chapter 10, Stand-Alone Node Start-Up</td></tr>
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<tr><td rowspan="4">PART III</td><td colspan="3">Chapter 12, Overall Integration Planning</td></tr>
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<tr><td></td><td colspan="2">Chapter 14, Port/WaveLength Servicing</td></tr>
<tr><td colspan="3">Chapter 15, Performance Verification Testing</td></tr>
<tr><td rowspan="6">PART IV</td><td colspan="3">Chapter 100, Backplane Pin Repair/Replacement</td></tr>
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<tr><td colspan="3">Chapter 102, Miscellaneous Discretes/Remote Restart</td></tr>
<tr><td colspan="3">Chapter 103, Fiber Management</td></tr>
<tr><td colspan="3">Chapter 104, Fiber Kit Descriptions</td></tr>
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</table>

Note: Part III, Chapters 12-15, are not part of the Installation Manual. Procedures in those chapters are contained in the System Turn-up and Testing Services portion of this document, and are performed by Network Integration personnel.

Checklists

Description The following tables provide Installation Checklists for each network element type to aid in the installation process. The associated NE is the value provisioned into the software to define the equipment capabilities.

LambdaXtreme™ Transport Configuration	NE Type	Installation Checklist
LambdaXtreme™ Transport Repeater	2-Fiber Repeater [2F_RPT]	Installation Checklist for Repeaters: page 1-5
LambdaXtreme™ Transport End Terminal	2-Fiber End Terminal [2F_ET]	Installation Checklist for End Terminals: page 1-7
LambdaXtreme™ Transport OADM	2-Fiber OADM [2F_OADM]	Installation Checklist for OADM Terminals: page 1-9

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Installation Checklist for Repeaters

Office Location ______________________________

Customer Order /TEO number ______________________________

Office Prep Items

The following items should be done in the office to support the LambdaXtreme™ Transport installation.

Check When Done	Item to Check
	AC Power Available (for Commercial Use)
	DC Power Run and Labeled (battery to fuse/breaker to LambdaXtreme™ Transport location)
	LambdaXtreme™ Transport ODF available and identified
	Fiber Ducts available

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Physical and Power Installation Items

Check that the following items are completed in the office.

Check When Done	Item to Check	Location in IM
	Shelf Installed	*Chapter 2, Repeater Shelf - Physical and Power Installation*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Installation Checklist for Repeaters: Page 1 of 2

Stand-Alone Installation and Testing Items

Check that the following LambdaXtreme™ Transport items are completed in the office.

Check When Done	Item to Check	Location in IM
	Circuit Packs and Fibers Installed Telemetry and Alarm Cables Installed	*Chapter 5, Circuit Pack and Fiber Installation for Repeater*
	Software Release: ______________	*Chapter 10, Stand-Alone Node Start-Up*
	Local LED and Internal Path Continuity Tests	*Chapter 11, Local Installation Testing*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Installation Checklist for Repeaters: Page 2 of 2

Installation Checklist for End Terminals

Office Location ______________________________

Customer Order /TEO number ______________________________

Office Prep Items

The following items should be done in the office to support the LambdaXtreme™ Transport installation.

Check When Done	Item to Check
	AC Power Available (for Commercial Use)
	DC Power Run and Labeled (battery to fuse/breaker to LambdaXtreme™ Transport location)
	LambdaXtreme™ Transport ODF available and identified
	Fiber Ducts available

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Physical and Power Installation Items

Check that the following items are completed in the office.

Check When Done	Item to Check	Location in IM
	Bay Frame(s) Installed	*Chapter 3, Terminal Frame - Physical Installation*
	Power connection torqued to 275 in-lbs	*Chapter 4, Bay Powering*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Stand-Alone Installation and Testing Items

Check that the following LambdaXtreme™ Transport items are completed in the office.

Check When Done	Item to Check	Location in IG
	Circuit Packs and Fibers Installed	*Chapter 6, Non-OT Circuit Pack and Fiber Installation for End Terminals*
	Cabling	*Chapter 8, Control and External Connections for End/OADM Terminals*
	Install and Fiber OTs	*Chapter 9, OT Circuit Pack and Fiber Installation for End and OADM Terminals*
	Software Release: ______________	*Chapter 10, Stand-Alone Node Start-Up*
	Local LED and Internal Path Continuity Tests	*Chapter 11, Local Installation Testing*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Installation Checklist for End Terminals: Page 2 of 2

Installation Checklist for OADM Terminals

Office Location ____________________

Customer Order /TEO number ____________________

Office Prep Items

The following items should be done in the office to support the LambdaXtreme™ Transport installation.

Check When Done	Item to Check
	AC Power Available (for Commercial Use)
	DC Power Run and Labeled (battery to fuse/breaker to LambdaXtreme™ Transport location)
	LambdaXtreme™ Transport ODF available and identified
	Fiber Ducts available

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Physical and Power Installation Items

Check that the following items are completed in the office.

Check When Done	Item to Check	Location in IG
	Bay Frame(s) Installed	*Chapter 3, Terminal Frame - Physical Installation*
	Power connection torqued to 275 in-lbs	*Chapter 4, Bay Powering*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Stand-Alone Installation and Testing Items

Check that the following LambdaXtreme™ Transport items are completed in the office.

Check When Done	**Item to Check**	**Location in IG**
	Circuit Packs and Fibers Installed	*Chapter 7, Non-OT Circuit Pack and Fiber Installation for OADM Terminals*
	Cabling	*Chapter 8, Control and External Connections for End/ OADM Terminals*
	Install and Fiber OTs	*Chapter 9, OT Circuit Pack and Fiber Installation for End and OADM Terminals*
	Software Release: ______________	*Chapter 10, Stand-Alone Node Start-Up*
	Local LED and Internal Path Continuity Tests	*Chapter 11, Local Installation Testing*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

Installation Checklist for OADM Terminals: Page 2 of 2

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Tools and Test Equipment

General Included in this section are the tools and test equipment needed for installing and testing LambdaXtreme™ Transport equipment.

Lucent Installers can refer to the following website for tool and test set information: http://tooltest.ih.lucent.com.

Tools Listed below are the tools needed for installing and testing.

Description	Commercial or Comcode	Notes
ESD wrist strap	(R TOOL #4987C)	For ESD protection.
Vacuum Cleaner		For cleaning up drilling debris
Safety Goggles		For use when drilling
Metral Pin Repair Kit (optional, as required)	BERG MT370-01 Kit 106423859 ***OR*** IMDARC R-6004 407959881	For replacing any damaged METRAL pins Refer to Appendix A for more details
Drilling Hammer for 5/8” drill	R4416	For use with concrete floors
#54720 C-Tap connector	Thomas & Betts™ (54720)or Brundy (YC4L12) Brown.	See Thomas & Betts website at http://www.tnb.com
TBM5 Crimping Tool or TBM5S Crimping Tool	R-5584 R5584B	Hand Hydraulic Battery Hydraulic
Brown or Pink Die code for TBM5 or TBM5S crimper	R5584D1	Use die #1 for C Tap connector.
TBM6 Crimper	R4875	2nd alternate crimper
Die TBM6 Crimper	R4875D1	Die for 2nd alternate crimper

Description	Commercial or Comcode	Notes
Torque Wrench	R-5941A or R-5941	Insulated 275 in-lbs. (or 33.8 N/M) for Power Connector Non-Insulated 275 in-lbs. (or 33.8 N/M) for Power Connector
#2 Phillips Screwdriver	406693432 (R-5770 D4) or Local purchase	For use with Power Connectors
Jewelers Screwdriver		For setting switches on CIO circuit pack
Wire Cutter	401049465 (R-4131) or 407257625 (R-5482A)	For use with Power Feeds Ratchet Type
Wire Stripper	407578756 (R-5962) R-5875 R-2761	Non-Insulated Insulated Power Knife
5/16” Hex Bit Socket	405000332 (R-5384 D13)	For use with power connectors. Included with Installation Kit

Test Equipment

Listed below is the test equipment needed while installing and testing.

Description	Commercial or Comcode	Notes
Multimeter	Protek D981(ITE #6930 or Fluke 189 (ITE #6379A) or equivalent	For measuring 40-60 V DC and ground continuity.
Optical power meter with appropriate connectors	ITE #7116 Noyes -Model with SC, ST and LC adapter. or ITE#71992D2 Acterna/WG with universal adapter of 2.5-FC, SC, ST and LC. or equivalent	For optical power measurements

Description	Commercial or Comcode	Notes
Laptop Computer	(ITE # 6938G)	For use as Craft Interface Terminal
LAN Card	Comes with (ITE # 6938G) computer, Xircom RealPort Combo Card (ITE_6727 List 8) or ITE #6927 3Com Lan Adapter card	For use with Laptop Computer (see the PC Hardware Requirements section of the Software Release Description (SRD) document for PC specifications)

Test Accessories Listed below are the test accessories needed for installing and testing.

Description	Commercial or Comcode	Notes
Single Mode Fiber Jumpers	ITE #7117 D1 6’ SC to FC fiber jumper ITE #7155 D1 10’ SC to ST fiber Jumper ITE #8624 L2 10’ SC to LC fiber jumper	
RJ45 Category 5 4 pair Straight Cable	ITE #7154	For connection from the PC to the Network Element

Fiber Cleaning Tools The following tools are used to clean and inspect all fibers before making a fiber connection:

Important! For cleaning and inspection procedures see *Chapter 105, Fiber Cleaning*.

Description	Commercial or Comcode	Installation Order Number
Fiber cleaning Kit	TK-0621 Kit includes the following ITE #6408A D6 Case ITE #7051 Coupler, Fiber (ST-ST) ITE #7093 Coupling Duplex SC ITE #7125 Coupler LC-LC fiber ITE #7134 Luminex Stick Port cleaner 1.25 mm ITE #7135 Luminex Stick Port cleaner 2.5 mm 33713500 ITE #7136 Wipes, Alcohol 33713600 ITE #7137 CLETOP cleaning cassette Type B. 33713700 ITE #7137A D1 CLETOP cleaning cassette refills. 3371370 ITE #7177 Optical fiber Microscope, Westover R-6033 Cloth, Lumionex. 23603300	Each item can be ordered separately

Fiber Microscope	ITE #7177	
Video Fiber Scope (VFS-1) (used to inspect circuit pack faceplate fiber ports)	408356830 (ITE #7146)	41714600
1.25mm Adapter for VFS-1	408356848 (ITE #7146D1)	33714601
2.5mm Adapter for VFS-1	408356855 (ITE #7146D2)	33714602
FC Adapter for VFS-1	408356863 (ITE #7146D3)	33714603
LC Adapter for VFS-1	408356889 (ITE #7146D4)	33714604
SC Adapter for VFS-1	408356954 (ITE #7146D5)	33714605
ST Adapter for VFS-1	408356962 (ITE #7146D6)	33714606
Noyes OFS 300-200X Optical Fiber Scope (used to inspect fiber)	408463636 (ITE #7129)	33712900
2.5mm Adapter for Noyes OFS	408197044 (ITE #7129D1)	33712901
1.25mm Adapter for Noyes OFS	408197069 (ITE #7129D2)	33712902

Safety Instructions

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 front, side and top are provided for ventilation. To protect the product 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 four -48V/-60V DC input power feeders per bay (two feeds for single repeaters). Disconnecting one power feeder will not deenergize the product. To reduce the risk of injury, disconnect the two power supply cables to remove 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, any replacement fuse MUST be of the same type and rating as the original 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. Viewing optics tends to focus the energy from an optical connector increasing 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 LambdaXtreme™ Transport uses a Class I, Class IIIB or Class 4 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 Administration (FDA) as a Class I system (exempt lasers and laser systems). All sections of the LambdaXtreme™ Transport 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. The compliance label is located on the rear of the equipment bays. 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.

Fiber Cleaning Considerations

Observe the following precautions when handling fibers to prevent contaminates from adhering to the fibers and creating potential errors and unnecessary losses:

- Assume that all fibers are dirty and must be inspected and cleaned before connection to equipment.
- Always inspect fibers for contaminants and clean where required.
- Do not remove the protective end caps on fibers or fiber ports until ready to connect.
- If a fiber or port is suspected to been contaminated during test or turn up procedures, reinspect and clean as necessary.

Important! See *Chapter 105, Fiber Cleaning*, for further information on cleaning and inspecting fibers.

Electrostatic Discharge (ESD) Considerations

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

CAUTION

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.

- Assume all circuit packs and units contain solid state electronic components that can be damaged by ESD.
- Always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat when handling circuit packs (storing, inserting, removing, and so forth) 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 all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats.

- Always store and transport 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.

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

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Technical Support Functions

Technical Assistance

Many of our customers have established their own support procedures. These procedures usually involve escalation within their own companies. However, some issues may require additional assistance from Lucent Technologies.

Lucent Technologies has been and continues to be committed to providing excellence in technical customer support for its products and services. Therefore, we provide a hierarchical support structure ready and available to solve any LambdaXtreme™ Transport technical issue.

When additional technical assistance is needed, the Lucent Technologies **C**ustomer **T**echnical **A**ssistant **M**anagement (**CTAM**) center is your first point of contact. A **CTAM** operator can direct your call to engineers that are highly trained and skilled at resolving issues involving Lucent Technologies products. Technical assistance is available 24 hours a day, 7 days a week.

Lucent Technologies Customer Technical Assistance Management (CTAM) center

1-866-LUCENT8 (1-866-582-3688) (continental U.S.)

(24 hours a day, 7 days a week)

By using **CTAM** as the entry point for Lucent Technologies support, you will be assured of timely and effective technical support services.

Outside the continental US, call **+1-630-224-4672**

Customer Assistance Request Entry System (TSS Cares)

TSS CARES (Customer Assistance Request Entry System) is an internal Customer Technical Support tool that allows Lucent engineers to record customer requests for a variety of products. TSS CARES has replaced all legacy systems within Lucent Technologies, Inc. such as CAROD, QUES/DIAS, CTSS, and GTSIP (www.lucentsupport.com).

The Customer Web Access tools provide customers an easy method to access data about Lucent Products using the World Wide Web. Customers can choose to search for data in three different applications:

- Assistance Request

  The Assistance Request Tool allows external customers to search their Assistance Requests and to submit new Assistance Requests. In addition, customers can send e-mail notifications to the Lucent Assignee and Owner of the Assistance Request. Customers using the web access can search the Assistance Request database using a number of fields such as, AR Number, product or priority.

- Solutions

  The Solutions access tool allows customers to view and search known problems and solutions for products. Entries are created within CARES by a Lucent engineer. Customers using the web access can search for solutions using a number of fields such as product, subproduct, created date or description. Only solutions with a state of active will be returned.

- Product Notifications

  The Product Notification access tool allows customers to view and search for information regarding Lucent products that have an issue which needs to be communicated immediately to their customers. A detailed text description of the issue and the urgency of the issue is the kind of information available in the Product Notification database. Customers using the web access can search the Product Notification database using a number of fields such as Product Notification ID, product or created date.

To inquire about obtaining a login, contact Customer Technical Assistance Management (CTAM)/ Virtual Call Center (VCC) at 1-866-LUCENT8 or WECARE/VCC at 1-800-932-2273 or Non-US at 1-630-224-4672. Please make sure you ask for a CARES Customer Web Access Login. An agent will create an Assistance request in TSS CARES and forward your request to the appropriate login administrator.

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Part I: Physical and Power Installation

Overview

Introduction This part of the Installation Guide includes the chapters to physically install and power a LambdaXtreme™ Transport NE. These chapters are written assuming working knowledge of the LambdaXtreme™ Transport and its operations.

Contents This part of the document contains the following chapters:

Repeater Shelf - Physical and Power Installation	2
Terminal Frame - Physical Installation	3
Bay Powering	4

2 Repeater Shelf - Physical and Power Installation

Overview

Purpose

This chapter provides the information to install the miscellaneously mounted 2-Fiber Repeater shelf into an existing bay frame. If a bay frame must be installed for a repeater shelf or if installing a terminal bay, proceed to *Chapter 3, Terminal Frame - Physical Installation.*

Reason for revision

This is the first issue.

Contents

This chapter contains the following:

Installation Options/Requirements	2-2
Mounting Information	2-4
Power Cable Connection	2-5
Shelf Powering	2-7
Verify Battery A/B Assignments	2-9

Installation Options/Requirements

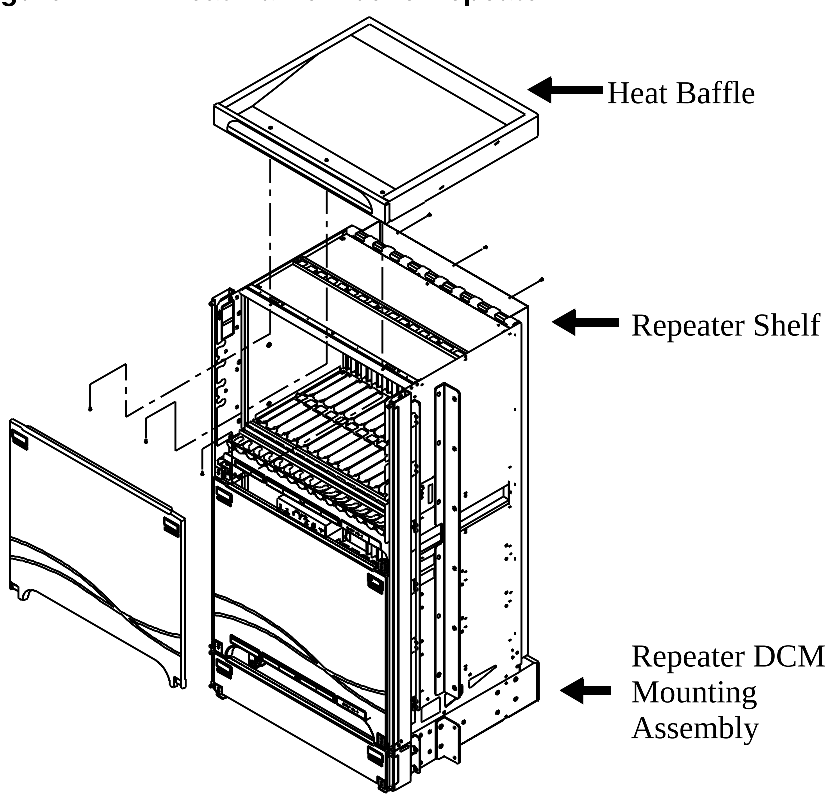
Bay Frame Options

The LambdaXtreme™ Transport Repeater Shelf is for 2-fiber applications and may be mounted into a customer installed bay frame. The shelf is compatible with a Lucent Seismic Bay (Comcode 848808960), Lucent ETSI Bay (Comcode 848808952) or a frame that complies with ETSI ETS 300119-3 Standards. It is assumed that the customer has installed the bay frame properly, including earthquake mounting and grounding. If a bay frame needs to be installed at the site refer to *Chapter 3*, *Terminal Frame Installation*.

Positioning Requirements

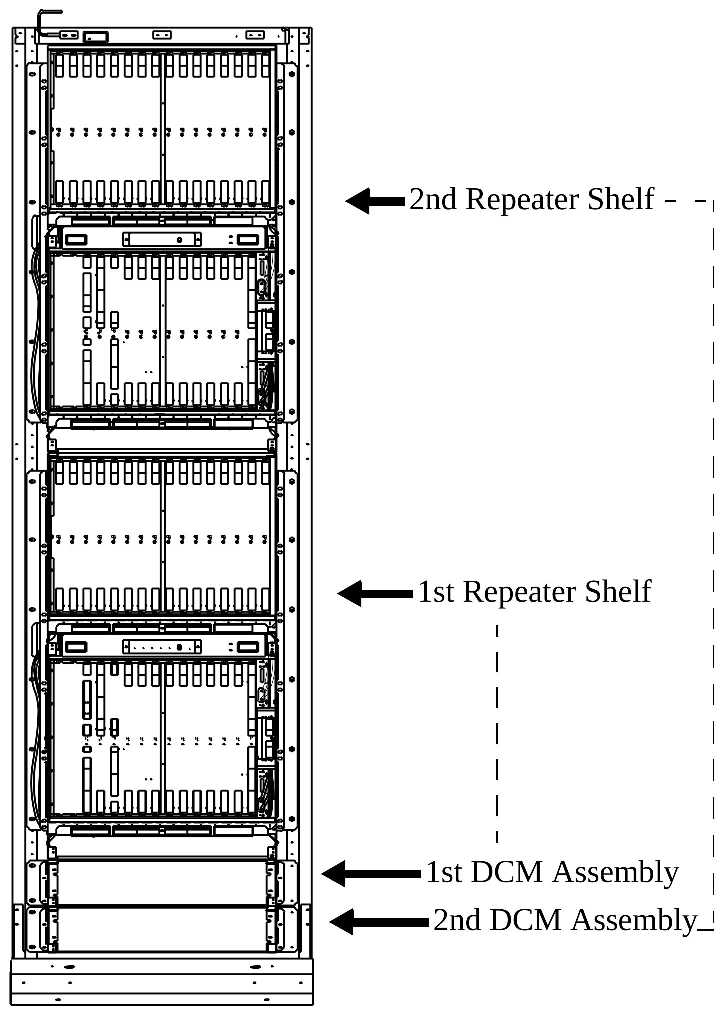
The vertical space required to mount the Xtreme Repeater Shelf in a customer provided bay frame is 43.2 inches. The Repeater Shelf requires 39.2 inches (including the DCM mounting assembly) and 4 inches for a heat baffle to be installed above the shelf. If the Repeater Shelf is to be mounted in the highest position in the bay, then a baffle is not required. If it is mounted anywhere else, a heat baffle should be used. Its purpose is to keep other equipment that may be mounted above a repeater, from blocking the air flow.

Figure 2-1 Heat Baffle Above Repeater



If two Repeaters are to be located in the same bay, both DCM mounting assemblies must be mounted at the very bottom of the bay. If they are mounted in any other position, they will block cooling air to the shelves and cause overheating. The DCM mounting assembly at the very bottom of the bay is associated with the upper repeater shelf. Fiber kit XS9 has longer DCM fibers to make the DCM to circuit pack connections. Heat baffles must not be used in this situation.

Figure 2-2 Two Repeater Bay Layout



Mounting Information

Repeater Bay Mounting

Proceed as follows:

1. Determine the Repeater Shelf mounting position from the Installation specification sheet.

2. Using the instruction sheet enclosed in the Repeater Shelf packing material, mount the shelf in the prescribed ETSI, Lucent ETSI, or Seismic Bay. (Reference Drawing Comcode No. 84882638)

3. Install all shelf covers, side plates, supportive fiber ductwork and other miscellaneous materials to insure their presence, conformity to the customer order and functionality.

   Important! Plastic covers can be cleaned by wiping with isopropyl alcohol and a cotton cloth. If isopropyl alcohol is not available a liquid glass cleaner may be used. Avoid using paper products as these can scratch the plastic surface

END OF STEPS

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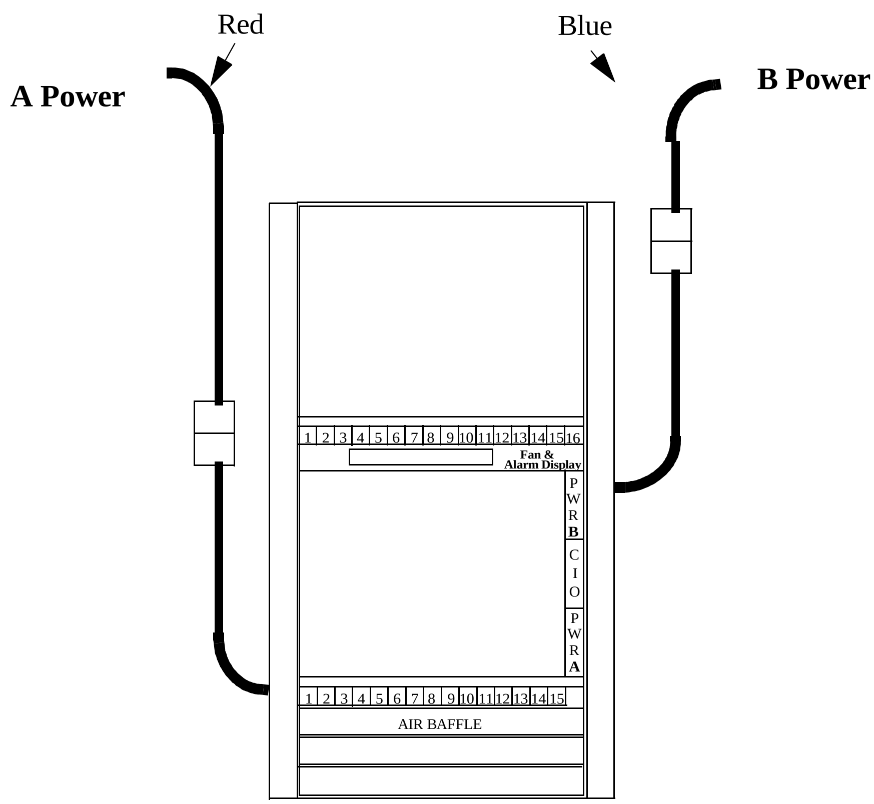
Power Cable Connection

Miscellaneously Mounted Repeater Powering

The Repeater Shelf comes with A and B power wires which are connected to the power filters in the shelf and are routed to the left and right side of the shelf respectively. Two feet of wire exists outside of the shelf to permit positioning of this connector on the bay upright. The ends of the two power wires are connectorized. In the Repeater Installation Kit provided with each shelf are mating connectors pre-terminated onto 15 feet of #6 AWG feeder wire.

Figure 2-3 Repeater Shelf Power Connections



Miscellaneously Mounted Repeater Power Connections

Perform the following steps to connect power:

1 Verify that the packing material has been removed from the shelf.

2 Verify that the breakers at the BDFB (or equivalent) are in the **OFF** position OR the fuses are **not installed.**

Important! There should be no circuit packs installed at this time.

3 Uncoil both A and B power feeders and route along bay frame.

4 Crimp and assemble connectors supplied in the installation kit to the customer supplied #6 AWG A feeder wire.

5 Crimp and assemble connectors supplied in the installation kit to the customer supplied #6 AWG B feeder wire).

6 Route feeder upward for above rack feeders or downward for raised floor applications.

7 Connect equipment connectors to feeder connector for A and B power.

END OF STEPS

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Shelf Powering

Description

The LambdaXtreme™ Transport Repeater is powered by -48V/-60V direct current (DC). Power filtering and fusing are performed at the shelf level. DC-to-DC on board power converters convert power on individual circuit packs.

Procedure

The following steps outline the power check procedure.

1 Remove the power connectors from both power filters on the shelf A1, slots 16A and 16C.

2 Check the battery return continuity for both power filters by measuring the resistance from battery return cable spade inside the connector just removed to frame ground. (On the A side this is a red/black striped cable, on the B side, blue/black striped.)

Important! The ESD Wrist Strap Ground jack is at frame ground. The ground test point on the power filter is not at frame ground.

Requirement: A reading of less than 1 ohm indicates a good ground connection, however digital multimeters may not be able to make this reading in the presence of ground currents. An analog meter is not as susceptible to ground currents.

3 Check the battery connection for both power filters by measuring the resistance from battery feed cable spade inside the connector just removed to frame ground. (On the A side this will be the solid red cable; on the B side this will be the solid blue cable.)

Requirement: The resistance should show an open circuit (more than a mega-ohm reading) for each fuse. If the resistance measurement requirement is not met, check the battery cables.

4 Reattach all connectors to power filters.

5 Set each power filter switch to the OFF position.

6 Insert 60-amp fuses or operate circuit breakers at the BDFB for the A and B feeders.

7 Set one of the power filters to the ON position.

8 Using a voltmeter, measure the voltage at the voltage test points on the power filter.

Requirement: The voltage should be -48 volts (between -41.75 and -60.0 VDC) at each power filter for -48V power plants, and -60 volts (between -48 and -68 VDC) for -60V power plants.

Requirement: The associated Green LED should be on.

9 Switch the other power filter on and check the voltage range.

10 Verify the power cable connectors and crimps by comparing the voltage at the BDFB to the voltage at the LambdaXtreme™ Transport power filters.

Requirement: The difference should be less than 1 volt.

END OF STEPS

☐

Verify Battery A/B Assignments

Verifying Feed A

The steps below verify that Feed A is working and connected correctly.

1 Disconnect the B power feed by turning off the breaker or removing the fuse for the B power feed at the BDFB. Wait approximately 10 seconds for the appropriate power failure LED to turn on after the power is shut off.

Requirement: The PWR OUTPUT LED on the A side power filter should remain illuminated.

Requirement: The PWR OUTPUT LED on the B side power filter should be extinguished.

> **Important!** If the PWR OUTPUT LED is not on and the B LED is on, the A and B power feeders to the bay are swapped. Correct the error as needed and re-test.

2 Reconnect the B power feed by turning the breaker on or replacing the fuse for the B power feed at the BDFB.

END OF STEPS

Verifying Feed B

The steps below verify that Feed B is working and connected correctly.

1 Disconnect the A power feed by turning off the breaker or removing the fuse for the A power feed at the BDFB. Wait approximately 10 seconds for the appropriate power failure LED to turn on after the power is shut off.

Requirement: The PWR OUTPUT LED on the B side power filter should remain illuminated.

Requirement: The PWR OUTPUT LED on the A side power filter should be extinguished.

□

3 Terminal Frame - Physical Installation

Overview

Purpose

This chapter covers the general requirements and methods to install LambdaXtreme™ Transport equipment bay frames at a customer location.

Each bay is shipped with the wired shelves assembled, but without the circuit packs in place. Circuit packs are shipped separately for their protection.

Reason for revision

This is the first issue.

Contents

This chapter contains the following:

Installation Requirements	3-2
Equipment Bays and Frames	3-3
Materials and Tools	3-4
Unpacking and Moving the Equipment Bay	3-5
Marking and Drilling Holes	3-8
Erecting and Mounting the Equipment Bay Frame	3-10
Connecting the Equipment Bay Frame to Building Ground	3-11

Installation Requirements

Customer Installation Requirements

The LambdaXtreme™ Transport equipment bay frames may be mounted on concrete or raised floors and may accept power and network connections from above or below the frames.

Lucent engineering services is responsible for engineering the site in accordance with the LambdaXtreme™ Transport system engineering guidelines and determining the seismic rating for the location.

The mounting recommendations for Lucent Seismic Frames are:

Seismic Zone	Mounting Base	Lucent Seismic Frame Recommendations
0, 1, & 2	Concrete Floor	Four Mounting Bolts using Drop-in Anchors
3 & 4	Concrete Floor	Four Mounting Bolts using Heavy Duty Anchors

Important! The customer shall provide mounting recommendations for use with the raised floor system at their location. For example, the LambdaXtreme™ Transport frames may be attached to the raised floor framework or directly to the solid floor underneath.

Installer Information

The customer order/specification sheet will provide the installer with:

- Floor plan locations for mounting the LambdaXtreme™ Transport equipment bay frames
- Physical mounting arrangements based on the specific office requirements

□

Equipment Bays and Frames

Frame Types

The LambdaXtreme™ Transport equipment bays may be ordered in the following types of frames:

1. Lucent Seismic Network Bay Frame (848808960)
2. Lucent ETSI Frame (848808952)

Equipment Bays

The equipment bays come in three configurations

1. System Bay
2. Line Bay
3. Extension Bay

Identify Bays

The three types of bays can be visually identified by the affixed label on the back of each bay.

Bay Lineups

LambdaXtreme™ Transport bays are organized into a system control group and up to 11 remote control groups. The system control group consists of the system bay, possibly a line bay and extension bays. Up to five bays comprise the system group and they are consecutively numbered A1-A5. The system bay is always designated A1. Any line bay, positioned either to the right or to the left of the system bay, is designated A2. Left to right bay growth is preferred, but right to left is permitted. Extension Bays in the system group are numbered A3-A5.

Extension Bays in remote groups can be located up to 100 cable meters from the System Bay (A1). There can be up to 11 remote group bays designated (B-H,J-M)1. The limiting distance factor is the 100 meter maximum cable length between the SIO circuit pack in bay A1 and the CIO circuit pack in shelf 1 of bays (B-H, J-M)1 in each remote group.

> **Important!** The System Bay and Line Bay must be located adjacent to each other in the same lineup as fixed length red fibers are provided to interconnect all non-OT circuit packs in these bays.

□

Materials and Tools

Equipment

Verify that the LambdaXtreme™ Transport equipment bays shipped to the location match the customer order.

Mounting Materials

Verify that the specified mounting materials and bay frame accessories are available:

- Hold-down plates and washers
- Anchors for concrete floors
- Mounting studs or bolts and nuts
- Mounting shims

Installation Tools

The installer is expected to have access to small hand tools normally used for assembling equipment frame hardware. Other suggested tools are listed below:

- Vacuum for cleaning up drilling debris
- Drilling hammer for 5/8” drill (for use with concrete floors)
- #54720 C-Tap connector Thomas & Betts™ or equivalent
- TBM5 or TBM5S Crimping tool Thomas & Betts or equivalent
- Brown or Pink Die Code Crimping Die Thomas & Betts or equivalent
- Torque Wrench with minimum 25 ft.-lb capacity
- Safety Goggles

□

Unpacking and Moving the Equipment Bay

Introduction

This section covers procedures and cautions associated with unpacking the bays and moving them to the specified location.

Cautions

- Do NOT store containers in any position other than marked position.
- Do NOT stack equipment more than two bays high.
- Move container in shipping position only.
- Unpack all material in a location away from the equipment room to avoid contamination of other equipment.
- Use care while unpacking to avoid damage to the equipment bay.
- Avoid sudden shock or strain to the equipment bay while moving.
- Physical size and weight may create hazards for installation personnel.

Tools and/or Equipment required

Listed in the table below are tools needed to unpack and move the bay frames into position:

Tool/Equipment	Purpose
Pinch-bar	Unpacking the bays
Claw-type Hammer	Unpacking the bays
Lifting and/or transporting device	Moving the bay into position

CAUTION

Verify that all lifting and/or transporting devices meet the local codes and regulations and that installation personnel have been trained in their use.

Uncrating the Bay

Listed below are the steps used to unpack the bay:

1 Using a pinch-bar and claw type hammer in areas that have been nailed, unpack the bay in its shipping position. The bottom plate where the bay rests may remain until the equipment bay is at its final position.

2 Remove the plastic bag and all foreign materials.

3 Remove the stile strips secured to the sides of the bay and set aside, if equipped.

END OF STEPS

Moving the Bay - Supplementary Information

This section includes supplementary information for moving the bay to the designated site.

CAUTION

The weight of the LambdaXtreme™ Transport equipment bay may exceed 450 pounds. Verify that all lifting and transporting devices are rated to accept the weight of the equipment bay. Two or more installers should be used to move a LambdaXtreme™ Transport equipment bay.

- Use the channel-type framework of the bay when lifting and moving the bay.
- Threaded holes for 5/8-11 eye bolts are provided in the top of the bay frame for the attachment of lifting devices.
- The bottom shipping detail should be removed if a transport dolly is to be attached to the base of the bay. Removal can take place after the bay has been hoisted to the upright position.
- The top shipping detail should remain in place until the bay is in its final floor location. It may be temporarily removed for entry or door clearance, but should be replaced prior to additional movement.

Procedures for Moving the Bay

Below are listed the steps for moving the equipment bay the specified location:

1 Plan out the moving procedure before starting to move the equipment. Two or more installers should be used for this operation.

2 Move the equipment bay to the designated location.

END OF STEPS

Marking and Drilling Holes

Customer Order Information

The customer order must provide a floor layout or floor plan showing the positions of the LambdaXtreme™ Transport equipment bays. This information will be used to mark the floor for drilling.

For raised floor installations, mark and drill mounting holes per the customer's instructions. Additional cutout areas may be designated to allow for power and network connections to be routed below the raised floor.

Special Considerations

It is recommended that a 1/8" (3.2 mm) clearance between adjacent bay frames be provided.

Procedures

Listed below are the steps for marking the floor and drilling the holes in concrete floors:

1 Obtain or create a template to match the four mounting holes in the base of the bay frame.

2 Mark the location of the mounting holes on the floor using the template.

3 Drill four holes in the floor at the locations marked for the anchors.

CAUTION

Always wear safety glasses when drilling holes in concrete.

4 For raised floor applications, obtain or create a template for the guard rail that is an extension of the bay template (Seismic only), for cutting the rectangular holes for the power cables.

5 Insert the drop-in anchors or heavy duty anchors as specified by job requirements.

6 Follow the manufacturer’s anchor assembly and setting instructions.

7 Remove all debris from the mounting area.

8 Determine if floor mounting area is level and if shims may be needed.

END OF STEPS

□

Erecting and Mounting the Equipment Bay Frame

Assembly Instructions

Drawings 848808960 (Seismic) and 848808952 (ETSI) show assembly of bay frame related parts that are shipped with the installation kits. Drawings 848826343 (Seismic) and 848826350 (ETSI) show assembly of the remainder of the installation kit items (covers, labels, and so forth). All the above mentioned drawings are supplied with the kits.

1 Using the instructions and drawings, erect and mount the LambdaXtreme™ Transport equipment in its designated location.

2 Install all shelf covers, side plates, supportive fiber ductwork and other miscellaneous materials to insure their presence, conformity to the customer order and functionality.

> **Important!** Plastic covers can be cleaned by wiping with isopropyl alcohol and a cotton cloth. If isopropyl alcohol is not available a liquid glass cleaner may be used. Avoid using paper products as these can scratch the plastic surface

END OF STEPS

□

Connecting the Equipment Bay Frame to Building Ground

Introduction

The following section provides the procedures necessary to connect the frames to the building or the office ground so they have:

- Direct earth ground connection for lightning protection
- Common ground potential for electrostatic discharge (ESD) protection

Additional information

All LambdaXtreme™ Transport equipment bay frames are shipped with a ground cable assembly. The ground cable should be connected between the bay frame ground connection point and a suitable building ground connection point immediately after the bay frame has been mounted to the floor.

Connecting the Bay Frame to Building Ground

Follow the steps listed below to connect the Bay Frame to the building ground:

1. The ground cable lug is attached to the bay frame at the unpainted area in the upper left front corner on the frame with two (2) #12-24 x 1/4 screws.

   Important! The building ground cable associated with raised floor installations may be below the floor. It is permissible to attach a ground wire near the base of the frame to one of the two contact areas that have pre-screened bare metal areas and two holes for screws. An upper right contact area is also available. Be sure to prepare all bare metal areas with No-Ox.

2. Connect the six-gauge stranded ground wire to the building ground cable using a crimped Thomas & Betts 54720 C-tap lug. The recommended crimping tool is a Thomas & Betts TBM5S with die code “brown.”

END OF STEPS

□

4 Bay Powering

Overview

Purpose

This chapter describes procedures to power up a LambdaXtreme™ Transport System, Line, and Extension Bays. To connect power to a Repeater, refer to *Chapter 2, Repeater Shelf - Physical and Power Installation*.

Reason for revision

This is the first issue.

Contents

This chapter contains the following.

LambdaXtreme™ Transport Powering	4-2
Verifying Voltages and Resistances	4-9
Verify Battery A/B Assignments	4-11

LambdaXtreme™ Transport Powering

Description

The LambdaXtreme™ Transport is powered by -48V direct current (DC). Power filtering and fusing are performed on the lower shelf of the dual shelf (Shelves 1 and 3). DC-to-DC on board power converters convert power on individual circuit packs.

Power Distribution

All LambdaXtreme™ Transport Bays require four power feeders: A1, A2, B1, and B2. The A and B Lines of the shelves are protected with 50A circuit breakers,

Important! The power feeders from the BDFB (or equivalent) should be directly connected to the bay mounted power connector assemblies. The power feeder cables from the BDFB to the bay mounted power connector assemblies are provided by the customer. The A1 and A2 feed cables must be six gauge (15 sq mm) to one gauge (40 sq mm) tray cable or 1/0 (53 sq mm) to 4/0 (107 sq mm) cable-tray rated cable. The B1 and B2 feed cables must be six gauge (15 sq mm) to one gauge (40 sq mm) tray cable or 1/0 (53 sq mm) to 4/0 (107 sq mm) cable-tray rated cable. The power cables within the bay are factory installed.

Table 4-1 Power Connector Assembly Locations

-48V Feeder	Power Connector Assembly Location
-48V A1 Feeder and A1 Return - Red cable jacket	Left rear (as viewed from front) side at the bottom or shelf position 1 level
-48V B1 Feeder and B1 Return - Blue cable jacket	Right rear (as viewed from front) side at the bottom or shelf position 1 level
-48V A2 Feeder and A2 Return - Red cable jacket	Left rear (as viewed from front) side at the middle or shelf position 3 level
-48V B2 Feeder and B2 Return - Blue cable jacket	Right rear (as viewed from front) side at the middle or shelf position 3 level

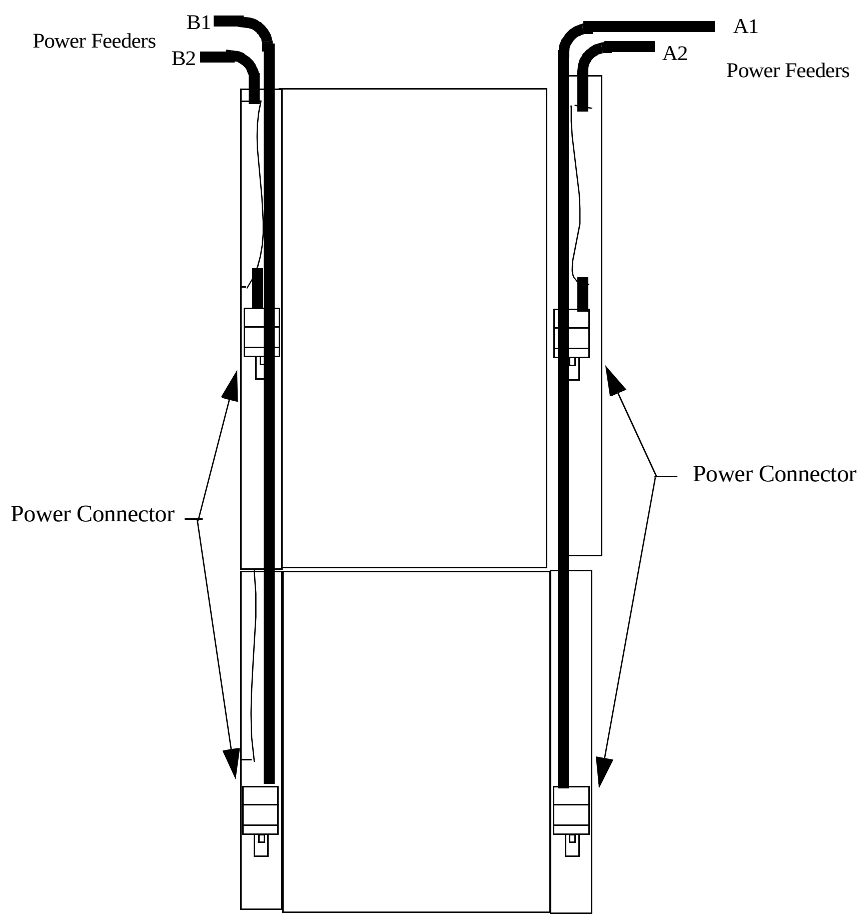
Overhead Power Cable Routing

The following steps detail the overhead power cable routing.

1 Standing at the rear of the bay, route the Red battery cable (A1 and A2 feeders) through the top of the bay and down the right side of the bay to the LambdaXtreme™ Transport power connector(s).

2 Standing at the rear of the bay, route the Blue battery cable (B1 and B2 feeders) through the top of the bay and down the left side of the bay to the LambdaXtreme™ Transport power connector(s).

3 Refer to the Connecting Feed Cables to the Power Connector Assembly section for actual connection procedure.

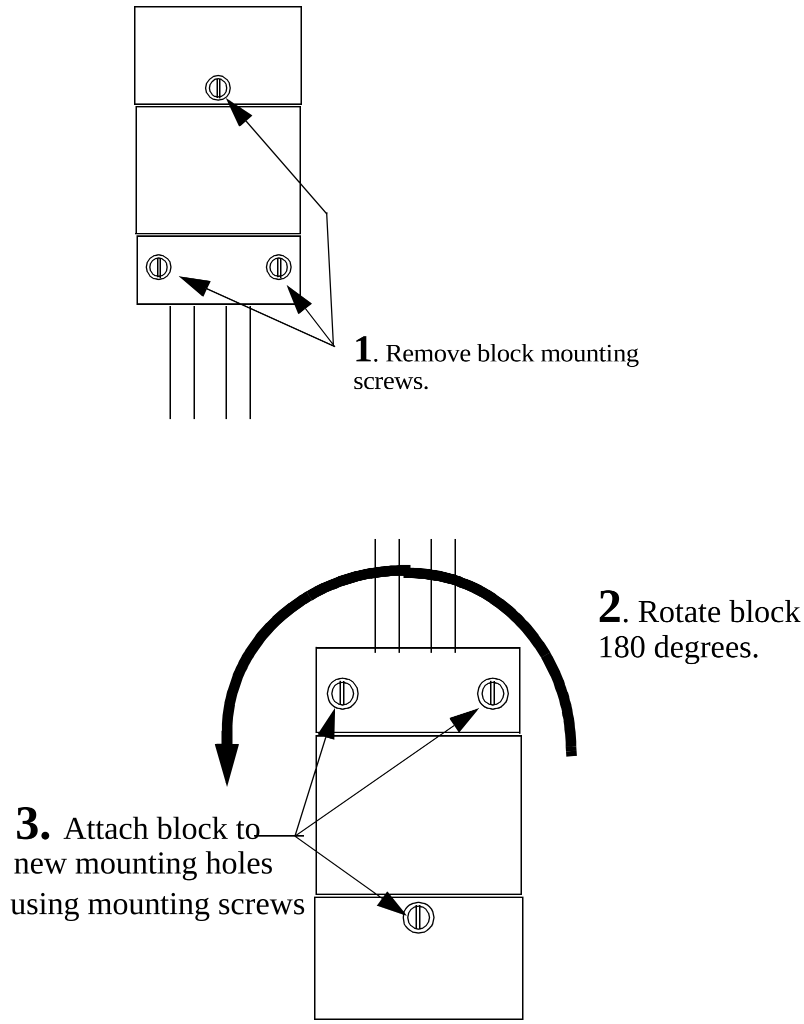


Important! Seismic Bay power blocks are mounted to the Bay Frame. ETSI Bay Power Blocks are mounted on the rear heat cover.

Connector Prep for Raised Floor Powering

In order to facilitate the power feeder coming up from raised flooring, the power connector assembly must be rotated 180 degrees to facilitate power connections from the bottom.

The following steps detail the raised floor power cable routing.



Connecting Feed Cables to the Power Connector Assembly

Bay Preparation

1 Verify that all packing material has been removed from the bay frame and shelves.

2 Verify that the breakers at the BDFB (or equivalent) are in the **OFF** position OR the fuses are **not installed**.

3 Verify that **no** circuit packs have been seated in any shelf.

END OF STEPS

Wire Preparation

1 Run the A and B power feeders from the BDFB per local instructions to the LambdaXtreme™ Transport bay positions.

2 Make certain the cable end is cut squarely.

3 If the cable is a jacketed pair, then strip the jacket back 2 1/8”-2 1/4” (see Figure 4-1).

4 Strip the conductor(s) insulation back 3/4”-13/16” (see Figure 4-1).

5 For a jacketed pair, spread the two conductors apart so that the ends are parallel at approximately 1 3/8” centerline difference (see Figure 4-1).

END OF STEPS

Figure 4-1 Power Feed Cable Preparation View

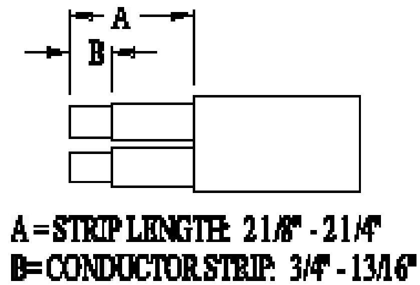
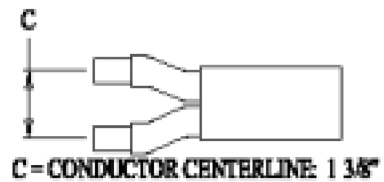


Figure 4-2 Jacketed Pair Power Feed Preparation View



Wire Installation

Important! Use Figure 4-3 for reference during Wire Installation Procedure.

1 Remove the main body lid.

2 Remove the strain relief clamp.

3 If the power cables route up from a raised floor, verify the terminal block was rotated 180 degrees to allow the power cables to connect from below.

4 It may be necessary to loosen (**counterclockwise**) the wire clamp screw slightly to accept the larger size conductors.

5 Observe polarity and insert the conductors into the center of the individual terminal blocks until the conductor ends contact the back of the terminal block.

6 Use a 5/16” hex bit socket to hand tighten (**clockwise**) the wire clamp screws onto the conductor(s).

7 Finish tightening the terminal block clamp with a torque wrench to 275 inch-pounds (31 Newton Meters).

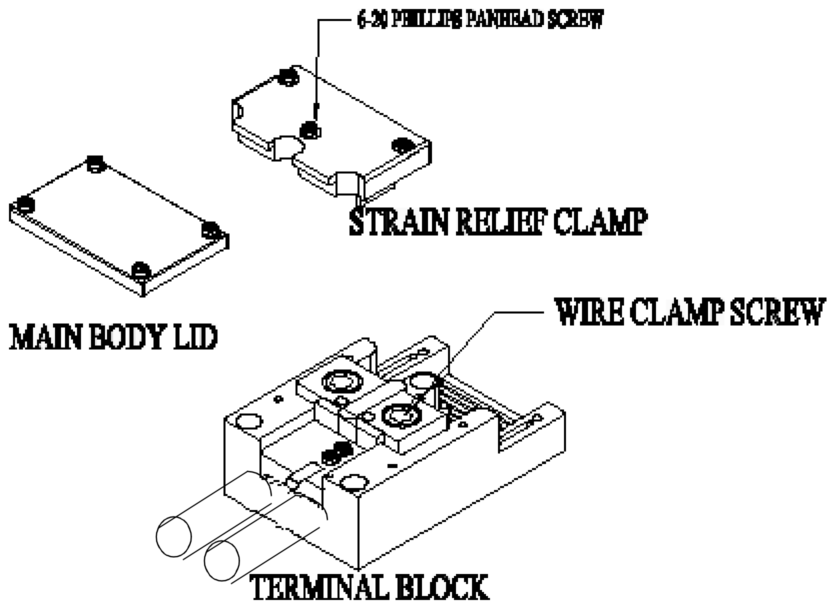
Important! It is very important that this connection be tightened to 275 inch-pounds.

8 Install the main body lid.

9 Reinstall the strain relief clamp by alternating the tightening of the three screws to draw the clamp down evenly.

E N D O F S T E P S

Figure 4-3 Terminal Block Assembly



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Verifying Voltages and Resistances

Background This section covers the methods and requirements for power and ground measurements for the LambdaXtreme™ Transport equipment.

Procedure The following steps outline the power check procedure.

1 Remove the power connectors from both power filters.

2 Check the battery return connection for all power filters by measuring the resistance from battery return cable spade inside the connector just removed to frame ground. (On the A side this is a red/black striped cable, on the B side, a blue/black striped cable).

> **Important!** The ESD Wrist Strap Ground jack is at frame ground. The ground test point on the power filter is not at frame ground.

Requirement: The resistance should measure less than one (1) ohm.

3 Check the battery feed connection for all power filters by measuring the resistance from battery return cable spade inside the connector just removed to frame ground. (On the A side, this will be the solid red cable; on the B side, this will be the solid blue cable.)

Requirement: The resistance should show an open circuit (more than a megohm reading) for each fuse. If the resistance measurement requirement is not met, check the battery cables.

4 Reattach all connectors to all power filter.

5 Set each power filter switch to the OFF position.

6 Insert fuses or operate circuit breakers at the BDFB for the A and B feeders. The following table shows the amperage values.

Fuse/Breaker Value	Type of Bay
60 Amp	System Bay.
60 Amp	Line Bay.
60 Amp	Extension Bay

7 Set one of the power filters to the ON position.

8 Using a voltmeter, measure the voltage at the voltage test points on the power filter.

Requirement: The voltage should be -48 volts (between -41.75 and -60.0 VDC) at each power filter for -48V power plants, and -60 volts (between -48 and -68 VDC) for -60V power plants.

Requirement: The associated Green LED should be on.

9 Switch each power filter on and check the voltage range.

10 Verify the power cable connections by comparing the voltage at the BDFB to the voltage at the LambdaXtreme™ Transport power filters.

Requirement: The two readings should be within approximately 1 volt from each other. If this requirement is not met, check the power feeds and cable crimps for high resistance.

END OF STEPS

☐

Verify Battery A/B Assignments

Verifying Feed A

The steps below verify that Feed A is working and connected properly.

Important! Perform verification for both A1 & A2

1 Disconnect the B power feed by turning off the breaker or removing the fuse for the B power feed at the BDFB.

Requirement: The PWR OUTPUT LED on the A side power filter should remain illuminated.

Requirement: The PWR OUTPUT LED on the B side power filter should be extinguished.

Important! It takes approximately 10 seconds for the appropriate power failure LED to turn on after power is shut off.

Important! If the PWR A OUTPUT LED is not lit and the B LED is lit, the A and B power feeders to the bay are swapped. Correct the error and re-test.

2 Reconnect the B power feed by turning the breaker on or replacing the fuse for the B power feed at the BDFB.

END OF STEPS

Verifying Feed B

The steps below verify that Feed B is working and connected properly.

Important! Perform verification for B1 and B2.

1 Disconnect the A power feed by turning off the breaker or removing the fuse for the A power feed at the BDFB.

Requirement: The PWR OUTPUT LED on the B side power filter should remain illuminated.

Requirement: The PWR OUTPUT LED on the A side power filter should be extinguished.

Important! If the LEDs on the B side are not lit and the A side LEDs are lit, the A and B power feeds are swapped. Correct the error and re-test.

2 Reconnect the A power feed by turning the breaker on or replacing the fuse for the A power feed at the BDFB.

3 Reset the switches on the A power filters to ON.

END OF STEPS

Part II: Stand-Alone Installation and Testing

Overview

Introduction

This part of the Installation Guide includes chapters to install and test a stand-alone LambdaXtreme™ Transport node and its ability to be connected to its adjacent LambdaXtreme™ Transport NEs. These chapters are written assuming working knowledge of the LambdaXtreme™ Transport and its operation. Additional information is included in Part IV .

Contents

This part of the document contains the following chapters.

Circuit Pack and Fiber Installation for Repeater	5
Non-OT Circuit Pack and Fiber Installation for End Terminals	6
Non-OT Circuit Pack and Fiber Installation for OADM Terminals	7
Control and External Connections for End/OADM Terminals	8
OT Circuit Pack and Fiber Installation for End and OADM Terminals	9
Stand-Alone Node Start-Up	10
Local Installation Testing	11

5 Circuit Pack and Fiber Installation for Repeater

Overview

Purpose

This chapter provides the information necessary to install all the ordered circuit packs and fibers into the appropriate positions in the miscellaneously mounted 2-Fiber Repeater shelf.

Reason for revision

This is the first issue.

Contents

This chapter contains the following:

Precautions	5-2
Circuit Pack Installation	5-3
DCM Placement and Gain Fiber	5-5
CIO Configuration	5-6
Interconnect Cabling	5-7
External Cabling	5-10
Outside Plant Fiber Connections	5-14
Fiber Information	5-16
Fiber Tables and Diagrams	5-17
Fibering Instructions	5-18

Precautions

ESD

CAUTION

Many of these circuit packs are sensitive to ESD. Always used and ESD wrist strap when handling circuit packs

Handling

CAUTION

Care should be used while handling Circuit Packs to prevent damage to the internal fibers on the circuit packs or causing them to come loose.

Switch Protection Port Cases

If a contaminated (dirty) fiber is disconnected with high levels of power present permanent damage to the fiber can occur. Switch protection is designed to protect the fiber by insuring that the power has been turned down prior to disconnecting the fiber. The switch protection mechanism combines a movable hinged cover, located over the fiber connection on the circuit pack faceplate, with a switch. With the cover in the down position the fiber connection cannot be physically accessed. With the cover in the down position high power light can flow through the fiber. Unlatching the cover and raising it to the up position causes the system to turn down the necessary pumps to make it safe to remove the fiber connection. The time interval between moving the hood to the up position and removing the fiber connection is sufficient for the pumps to be turned down.

☐

Circuit Pack Installation

Circuit Pack Placement

The circuit pack equipage for the Repeater Shelf is listed in Table 5-1 below and shown in Figure 5-1 on page 5-4. Location of DCMs is also shown in Figure 5-1. Refer to Figure 2-2 on page 2-3, for applications with dual repeaters. Dual repeaters require the use of separate fiber kits.

1 Install all circuit packs at this time. (Note: DCM placement is covered in the next section.)

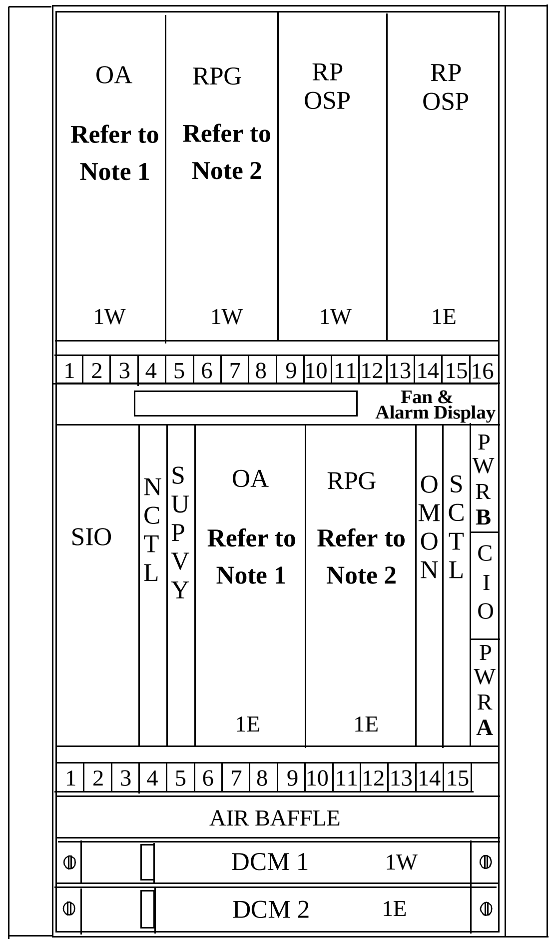
The OAs and RPGs may be different for the 1W and 1E lines. Refer to customer order for their correct location.

Table 5-1 Repeater Circuit Pack Layout

Pack Code	Pack Name	Line	Shelf	Slot(s)
WWAD04	SIO	--	1	1-3
WWAD02	NCTL	--	1	4
WWAD05	SUPVY	--	1	5
WWAA05 **or** WWAA06 **or** WWAA07	OA (RAMAN) OA (RAMAN, EDFA) OA (DGEF)	1E	1	6-9
WWAD08	OMON	--	1	14
WWAD03	SCTL	--	1	15
WWAA05 **or** WWAA06 **or** WWAA07	OA (RAMAN) OA (RAMAN, EDFA) OA (DGEF)	1W	2	1-4
WWAF01	RP (OSP)	1W	2	9-12
WWAF01	RP (OSP)	1E	2	13-16
WWAF04[1] **or** WWAF03[2]	RPG (EXP, DCF) RPG (EXP)	1E	1	10-13
WWAF04[1] **or** WWAF03[2]	RPG (EXP, DCF) RPG (EXP)	1W	2	5-8

1. Not Required for most installations. When required used only with OA (RAMAN) and OA (RAMAN,EDFA).
2. Not Required for most installations. When required used only with OA (DGEF).

Figure 5-1 Repeater Shelf Circuit Pack and DCM Slots



<u>Note 1</u>: Each of the OA 1E and 1W locations may have one of the following: OA(RAMAN), OA(RAMAN, EDFA), or OA(DGEF). The 1E OA and 1W OA may or may not be the same code. Check the customer order for equipage of these locations.

<u>Note 2</u>: Each of the RPG 1E and 1W locations may have one of the following: <u>NO</u> Circuit Pack, RPG(EXP,DCF), or RPG(EXP). Check the customer order for equipage of these locations.

□

DCM Placement and Gain Fiber

DCM Overview

At the bottom of every LambdaXtreme™ Transport repeater is a DCM mounting assembly. DCMs are modules which slide into the DCM mounting assembly and are retained by two thumb screws. DCM placement is designated on the Customer Specification order for each site.

1 Unpack DCM units.

2 Place DCM units in their designated locations as specified on the customer order.

END OF STEPS

DCM Gain Fiber

DCMs come equipped with either three jacks and one plug on each unit, or with just two jacks on a unit. For the units with a plug, attaching the plug into a specific jack allows the user to either serially connect an internal gain fiber or bypass it. The gain fiber selection must be made prior to fibering the Terminal. As the following table shows, the gain fiber is never used in conjunction with an OA (DGEF) [WWAA07] circuit pack.

OA Location	OA Type	Gain Fiber Usage
A1-2-4	WWAA05 WWAA06	DCM1 Gain Fiber Used
	WWAA07	DCM1 Gain Fiber **Not** Used
A1-1-9	WWAA05 WWAA06	DCM2 Gain Fiber Used
	WWAA07	DCM2 Gain Fiber **Not** Used

□

CIO Configuration

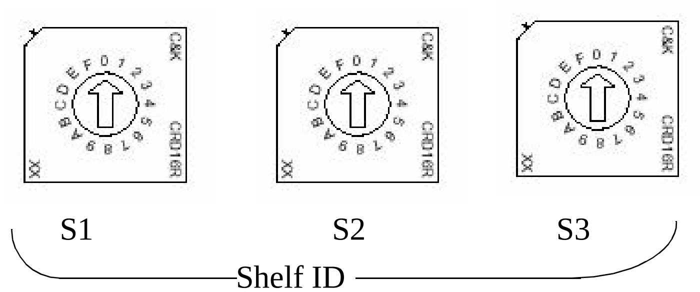
Background The CIO circuit pack has three switches that are utilized to identify the Group (S3), Bay within a Group (S2), and shelf location of the applicable Shelf Controller (S1). They must be set properly prior to software installation.

Procedures Use the following procedures to properly set the switches on the CIO circuit pack to their appropriate value for a Repeater configuration.

1 Remove the CIO card.

2 Locate the switches: S1, S2, and S3 on the CIO card

Figure 5-2 CIO Card Switch Locations



3 Using a Jewelers screwdriver, set the switches on the CIO circuit packs as follows: S1=1. S2=1. S3=A

4 After setting the switches, place the CIO card back in its slot.

END OF STEPS

Interconnect Cabling

Interconnect cabling

Interconnect cabling in a Repeater allows the Network Controller (NCTL) to communicate with the Shelf Controller (SCTL).

Interconnection between the NCTl and SCTL are provided by a cable between the designated SIO port and J10 of the CIO port.

Table 5-2 Interconnect Cabling Table

Bay	SIO Port	CIO Port	Length (ft)	Product Code	Comcode
A1	A1-1-3 GRP A J20	A1-1-16B J10	20	LCCADSA-A-BB-BB-020	109251686

1 Plug the cable in the Group A (J20) port of SIO port located in shelf 1, slot 3.

2 Route the cable through opening to the upper left side of the SIO card

3 For frames with sub-floor duct work, route the cable down the left side through the duct work and around and up the right side of the repeater shelf. For frames with overhead duct work, route the cable up the right side, over the top through the overhead duct work, and down the right side of the repeater shelf.

4 Route the cable in through the right side opening and attach it to J10 of the CIO.

5 In larger system installations, multiple cables attaching to the SIO board will require that the cable channel guard be temporarily removed. The fan unit must be also be removed to facilitate the channel guard removal. (See Figure 5-3 & Figure 5-4 on page 5-8)

Figure 5-3 Channel guard pictured in place

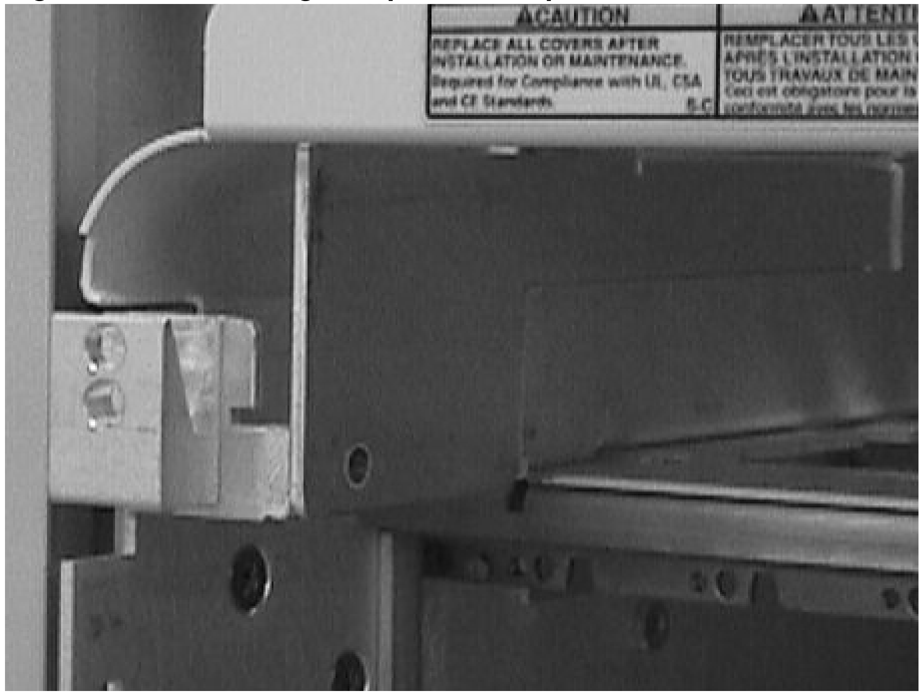
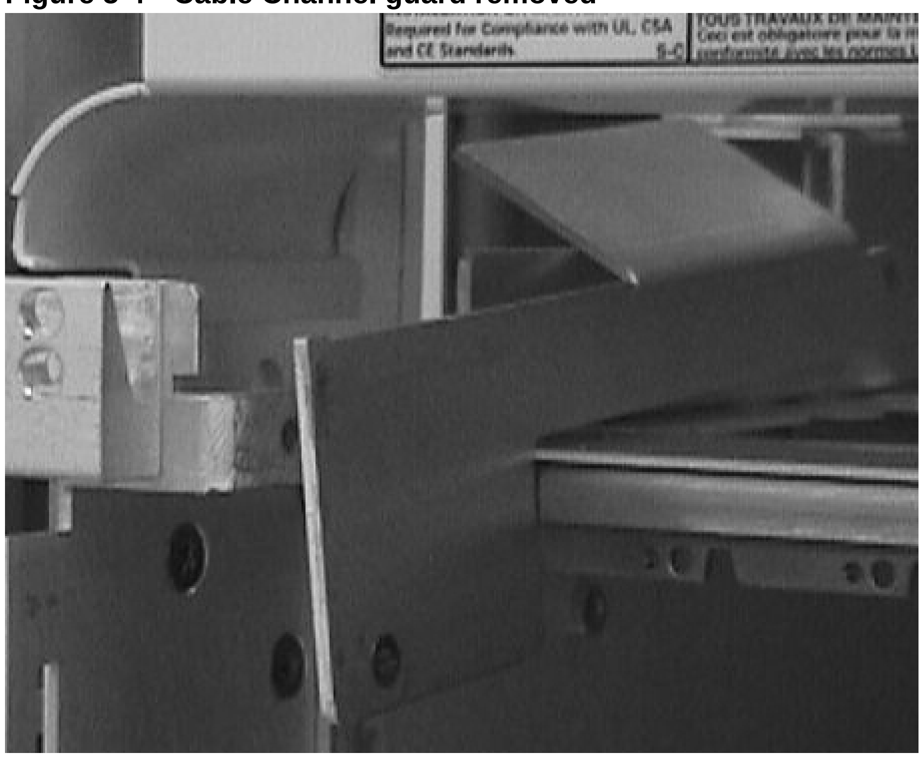


Figure 5-4 Cable Channel guard removed



6 If Telemetry and Alarm cables are also to be routed through to the cable channel, leave the guard removed until those operations are completed (See External Cabling: page 5-10), other wise reinstall the cable channel guard and reinstall the fan unit.

7 Secure the cables in the customer specified manner (cable ties, string, etc.) to the tie bar on the left or right side of the bay frame.

Figure 5-5 Interconnect cable routing

☐

External Cabling

Cables in a Repeater

1 Verify the external telemetry, control and alarm installation information on the customer order including the cable routing paths from the LambdaXtreme™ Transport Repeater to the specified terminations on the local office interface equipment.

> **Important!** External telemetry, control and alarm cabling encompasses connections to element management systems (EMS), TBOS ports, Orderwire, Miscellaneous Discretes, Office Alarms, and various customer LAN networks.

2 Connect the external and alarm cables as specified on the customer order to the corresponding jacks on the SIO Circuit Pack (A1-1-3). See Table 5-3 on 5-12 for the cable and corresponding jack information.

3 If necessary, remove the cable channel guard located above the SIO card. This may already have been removed during the interconnect cable routing (Interconnect Cabling: page 5-7). Refer to that section and Figure 5-3 & Figure 5-4 on page 5-8 for visual guidance.

4 Route all external cables out above the upper left side of the SIO card. (Figure 5-6 on page 5-11)

5 Route these cables up into the bay frame space and out of the Bay. (For raised floor applications, run the telemetry and alarm cables down the bay frame space and then under the floor space.)

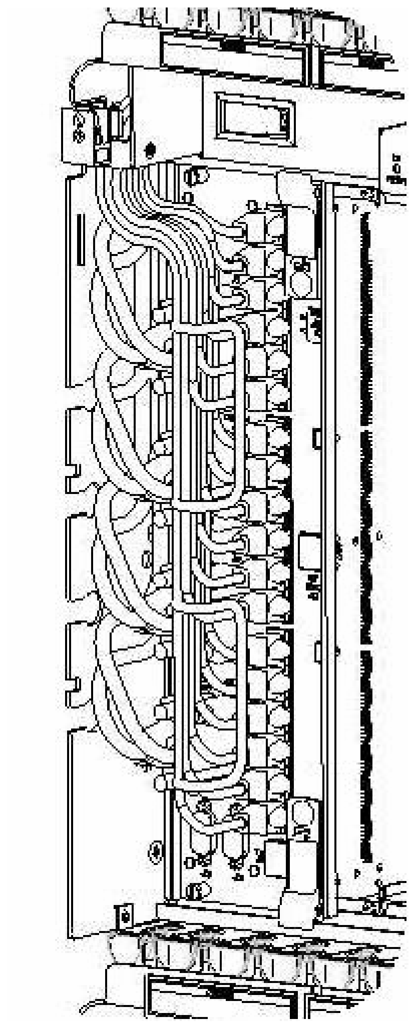
6 Run the external telemetry and alarm cables in the office per the customer's order and terminate at the local office interface equipment.

7 Secure all external cables on the bay utilizing customer prescribed methods. (i.e. velcro, cable ties, string)

8 If necessary, reinstall the cable channel guard, and reinstall the fan unit.

9 Secure all 4 pair cables to the guide bars on the SIO pack.

Figure 5-6 SIO Cable Routing



END OF STEPS

Table 5-3 Telemetry and Alarm Cables — System Input/ Output (SIO) Circuit Pack

Telemetry or Alarm Application	Comcodes (Note Could be Several)	Length Feet	System Shelf Marking	SIO Label
Orderwire - OW1	109068361 109068379 109068387 109068395 109068403	50 100 150 200 300	ORDRWR1	J62
Orderwire - OW2			ORDRWR2	J64
Orderwire - OW3			ORDRWR3	J66
Orderwire - OW4			ORDRWR4	J63
Orderwire - OW5			ORDRWR5	J65
Orderwire - OW6			ORDRWR6	J67
Office Alarm			OFC ALRM	J60
Miscellaneous Discretes/ Remote Restart	109068411	50	MD INTFC/ RMT RST	J61
	109068429	100		
	109068437	150		
	109068445	200		
	109068452	300		
Supervisory	109251710 109251728 109251736 109251744 109251751	50 100 150 200 300	SUPVY	J69
Operations Systems			EMS	J40
TBOS			TBOS	J46

Important! For additional information on connecting orderwire refer to *Chapter 101, Orderwire Installation*.

Important! For additional information on connecting miscellaneous discretes refer to *Chapter 102, Miscellaneous Discrete.*

Office Alarm Connections

Table 5-4 on page 5-13 lists Office Alarm Cable connections and designations.

Table 5-4 Office Alarms Connections

Name	Designation	Pin	Wire Color
Major Visual Alarm	MJVIS	1	W-BL
Major Audible Alarm	MJAUD	2	W-O
Minor Visual Alarm	MNVIS	3	W-G
Minor Audible Alarm	MNAUD	4	W-BR
Critical Visual Alarm	CRVIS	5	W-S
Critical Audio Alarm	CRAUD	6	R-BL
Power Telemetry Alarm	PWRTLM	7	R-O
No Connection	None	8	R-G
Major Visual Alarm - Return	MJVISR	9	BL-W
Major Audible Alarm - Return	MJAUDR	10	O-W
Minor Visual Alarm - Return	MJVISR	11	G-W
Minor Audible Alarm - Return	MJAUDR	12	BR-W
Critical Visual Alarm - Return	CRVISR	13	S-W
Critical Audio Alarm - Return	CRAUDR	14	BL-R
Power Telemetry Alarm - Return	PWRTLMR	15	O-R

□

Outside Plant Fiber Connections

Equipment needed Obtain ladder, tile puller or other equipment needed as necessary.

Fiber Precautions

CAUTION

Fiber is constructed of glass and should be treated with care. It should not be pulled or stretched. This could cause damage to the fiber or the fiber connector.

CAUTION

Fiber should not be bent in a radius of less than 1-1/2”.

Procedure

1 Arrange to, and obtain, access to the areas that contain both the NE and the Optical Distribution Frame (ODF) that connects to the outside plant fiber.

Important! Advance arrangements may have to be made to obtain access to other vendor co-locate areas.

Contact ______________________________________

Phone/Pager __________________________________

2 Verify path between NE and ODF as specified on customer order.

3 Verify connector types on both ends of the fiber match what is expected at the NE and ODF.

4 Verify through visual approximation that the length of fiber is sufficient.

5 Pre-label both ends of the fiber(s) with information as specified on the customer order.

Important! Do not remove protective caps on fiber.

Important! Labeling information should always be present on fibers.

6 Remove applicable floor tiles or fiber duct covers to facilitate running fiber.

7 Run fiber between NE and ODF.

Important! Do not connect fiber to ODF unless directed to do so by the customer. If directed to do connect fiber to ODF, observe fiber cleaning procedures as specified in *Chapter 105, Fiber Cleaning*

Important! Do not connect fiber to the NE. This will be done in a later chapter

Important! Run all outside fiber connections to the shelf A2.

8 Replace removed fiber duct covers and/or floor tiles as applicable.

END OF STEPS

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Fiber Information

Fiber Routing

Refer to *Chapter 103, Fiber Management* for care, handling, labeling, testing and routing of fibers.

Fiber Inspection and Cleaning

Refer to *Chapter 105, Fiber Cleaning* for the correct fiber cleaning procedures.

Fiber Precautions

CAUTION

Fiber is constructed of glass and should be treated with care. It should not be pulled or stretched. This could cause damage to the fiber or the fiber connector.

CAUTION

Fiber should not be bent in a radius of less than 1-1/2”.

Repeater Fiber Kits

There are several fiber kits available for the installation of a Repeater Shelf. The kits and their application are listed in the table below. Details on the individual fibers that make up these kits is provided in *Chapter 104, Fiber Kit Descriptions.*

Table 5-5 Fiber/Label Kits

Fiber Kit	Description	System Name
109105965	LambdaXtreme™ Transport Kit XS3 (provides all fibers for a basic repeater)	2F- Repeater Fibers
109105999	LambdaXtreme™ Transport Kit XS6 (optional) (provides additional fibers if RPG packs are used)	RPG Fibers for 2F Repeater
109180547	LambdaXtreme™ Transport Kit XS9 (optional) (provides longer DCM fibers for Dual Repeater Bay applications)	DCM Fibers for second Repeater in a Bay
848835914	Repeater Fiber Jumper Designation Labels	
848835922	RPG Fiber Jumper Designation Labels (optional)	

Fiber Tables and Diagrams

Introduction

Fiber tables and diagrams are provided for 1E and 1W lines for Repeaters equipped with OA (Raman) or OA (Raman, EDFA) and Repeaters equipped with an OA (DGEF). Each table and diagram includes information for fibering the optional RPG circuit packs if required. Each fiber has its associated diagram on the adjacent page.

The tables give the name and location of each circuit pack by Shelf, Slot, and Port where the fiber connection will take place. They designate the fiber length, the route to take with the fiber out of the packs and the Label name to be used on each end of the fiber.

Below is an explanation of the Headers of the Tables:

- **Done** - Place a check here when the fiber is complete
- **Fiber Number-** Number used to designate fiber in Fiber Diagram. Fiber. Fibers marked with an asterisk (*) optional.
- **Circuit Pack-** Name of the pack and its label (NOTE: CPs marked with a (#) are optional growth packs. Information contained in parentheses following Circuit pack name in the fiber table is not listed on circuit pack label).
- **Bay** - Bay number
- **Shelf** - Shelf number starting with the bottom shelf as shelf 1
- **Slot** - Slot number found below the pack (some packs span multiple slots)
- **Port** - Name of the Port on the pack where the fiber will be connected
- **Route** - How to run the fiber
- **Fiber Length** - Length of the fiber in inches
(NOTE: 2nd fiber length is for optional kit XS9 for 2nd repeater in a bay. [Uppermost repeater with bottom DCM housing unit]).
- **Fiber Label (Color)** - Indicates which labels are to be placed on the ends of each fiber. The fibers in the East side will always be blue (B), while the ones in the West side will always be green (G). Fibers interconnecting the two sides will utilize both label colors, and be listed as either BG or GB. The Blue label will be used on on the end connecting to the 1E circuit pack, while the Green label will be used on the end connecting to a 1W pack.

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Fibering Instructions

Procedures

The steps below provide instructions for fibering the Repeater Shelf. Read the steps in their entirety before proceeding to fiber. Since LambdaXtreme™ Transport uses higher optical power levels and faster bit rates than previous Lucent DWDM systems, **inspection and cleaning of all fiber jumpers is mandatory.** Detailed instruction on fiber inspection and cleaning is provided in *Chapter 105, Fiber Cleaning*. Inspection and cleaning of circuit pack connectors is not required if the circuit pack is fresh out of the box and the dust covers are all in place.

1 Turn OFF the A and B shelf power at either the shelf breakers or at the BDFB.

2 Determine fibering table and diagram to follow for the **1E** Line by determining the Optical Amplifier (OA) Type used in **Shelf 1 Slots 6-9**.

If the OA is an OA(Raman) [WWAA05] or OA(Raman, EDFA)[WWAA06] use Table 5-6 and Table 5-7 on page 5-22 (and associated diagram figures).
If the OA is an OA(DGEF) [WWAA07]use Table 5-10 and Table 5-11 on page 5-30 (and the associated diagram figures).

3 Starting with first fiber connection in fibering table, locate proper fiber jumper from kit and install label to both ends of the jumper.

> **Important!** See the Fiber Labels section of *Chapter 103, Fiber Management* for instruction on applying labels correctly.

4 Remove dust cap from the connector at one end of the fiber jumper. **INSPECT** fiber end and **CLEAN** if required.

5 Using fibering table and fibering diagram locate circuit pack connection. Remove protective cap from circuit pack and complete connection. If protective cap has already been removed, the circuit pack connector will have to be inspected using a probe and cleaned if required.

6 Route the fiber to the correct destination and repeat Steps 4 and 5 for other end of fiber jumper.

7 Check off the “Done” column for each completed fiber.

8 Continue until all the fiber connections have been completed for the **1E** line including the RPG pack fibering if required. (NOTE: RPG packs are marked with an [#] on the fiber tables, designating them as optional packs)

9 Determine fibering table and diagram to follow for the **1W** Line by determining the Optical Amplifier (OA) type used in **Shelf 2 Slots 1-4**.

If the OA is an OA(Raman) [WWAA05]or OA(Raman, EDFA) [WWAA06] use Table 5-8 on page 5-24 and Table 5-9 on page 5-26 (and associated diagram figures).
If the OA is an OA(DGEF) [WWAA07] use Table 5-12 on page 5-32 and Table 5-13 on page 5-34 (and the associated diagram figures).

10 Repeat Steps 3 through 7 until all the **1W** fibers have been installed including the optional (#) RPG pack fibering if required. This completes the fibering required for the Repeater Shelf.

END OF STEPS

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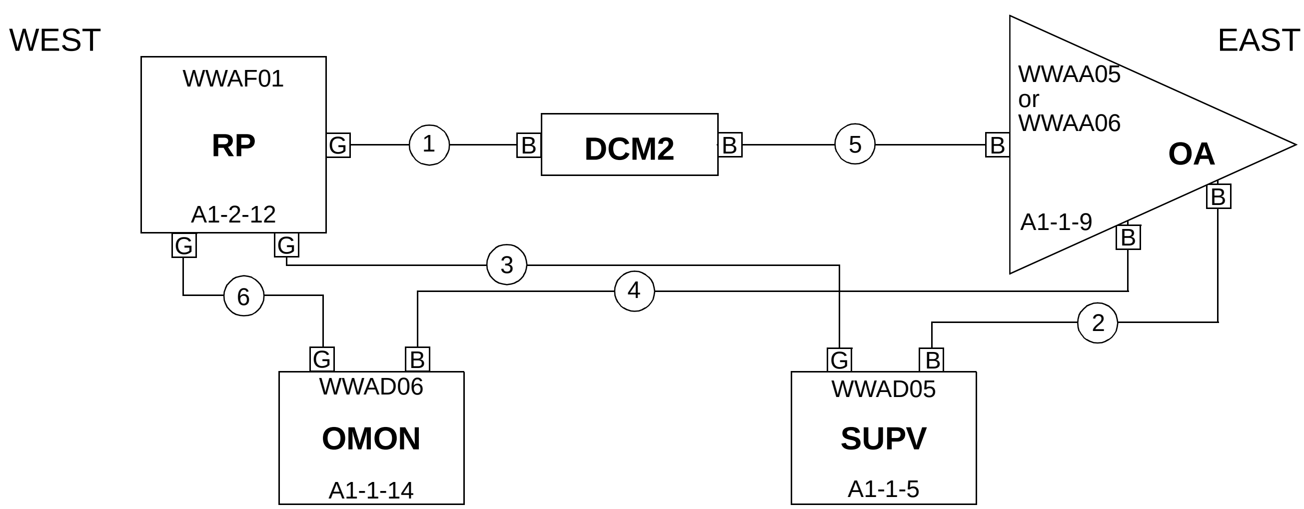
Table 5-6 1E Repeater OA (Raman/Raman EDFA)

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
1	RP(OSP))	A1	2	12	OUT SIG	DCM2	A1	--	--	IN DCM	53.0 (GB) XS3 92.0 (GB) XS9
	DOWN THRU SLOT 10, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										RP-OUT SIG-1W / DCM2-IN DCM-1E
2	SUPVY	A1	1	5	IN1	OA	A1	1	9	OUT SUP	14.5 (B) XS3
	DOWN THRU SLOT 5, RIGHT TO SLOT 7 AND UP										SUPVY-IN1 / OA-OUT SUP-1E
3	SUPVY	A1	1	5	OUT 2	RP (OSP)	A1	2	12	IN SUP	49.0 (G) XS3
	DOWN THRU SLOT 5, RIGHT TO FIBER DUCT, UP TO SHELF 2, LEFT IN FIBER TRAY TO SLOT 10 AND UP										SUPVY-OUT2 / RP-IN SUP -1W
4	OA	A1	1	9	OMON	OMON	A1	1	14	IN1	24.O (B) XS3
	DOWN THRU SLOT 7, RIGHT TO SLOT 14 AND UP										OA-OMON / OMON-IN1-1E
5	OA	A1	1	9	IN DCM	DCM 2	A1	--	--	OUT DCM	31.5 (B) XS3 70.0 (B) XS9
	DOWN THRU SLOT 7, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-IN DCM / DCM2-OUT DCM-1E
6	OMON	A1	1	14	IN 4	RP (OSP)	A1	2	12	OMON	42.0 (G) XS3
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 2, LEFT IN FIBER TRAY TO SLOT 10 AND UP										OMON-IN4 / RP-OMON-1W

Figure 5-7 Functional Block w/Pack Codes (1E Raman/EDFA)



Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 5-8 1E Repeater OA (Raman/Raman EDFA)

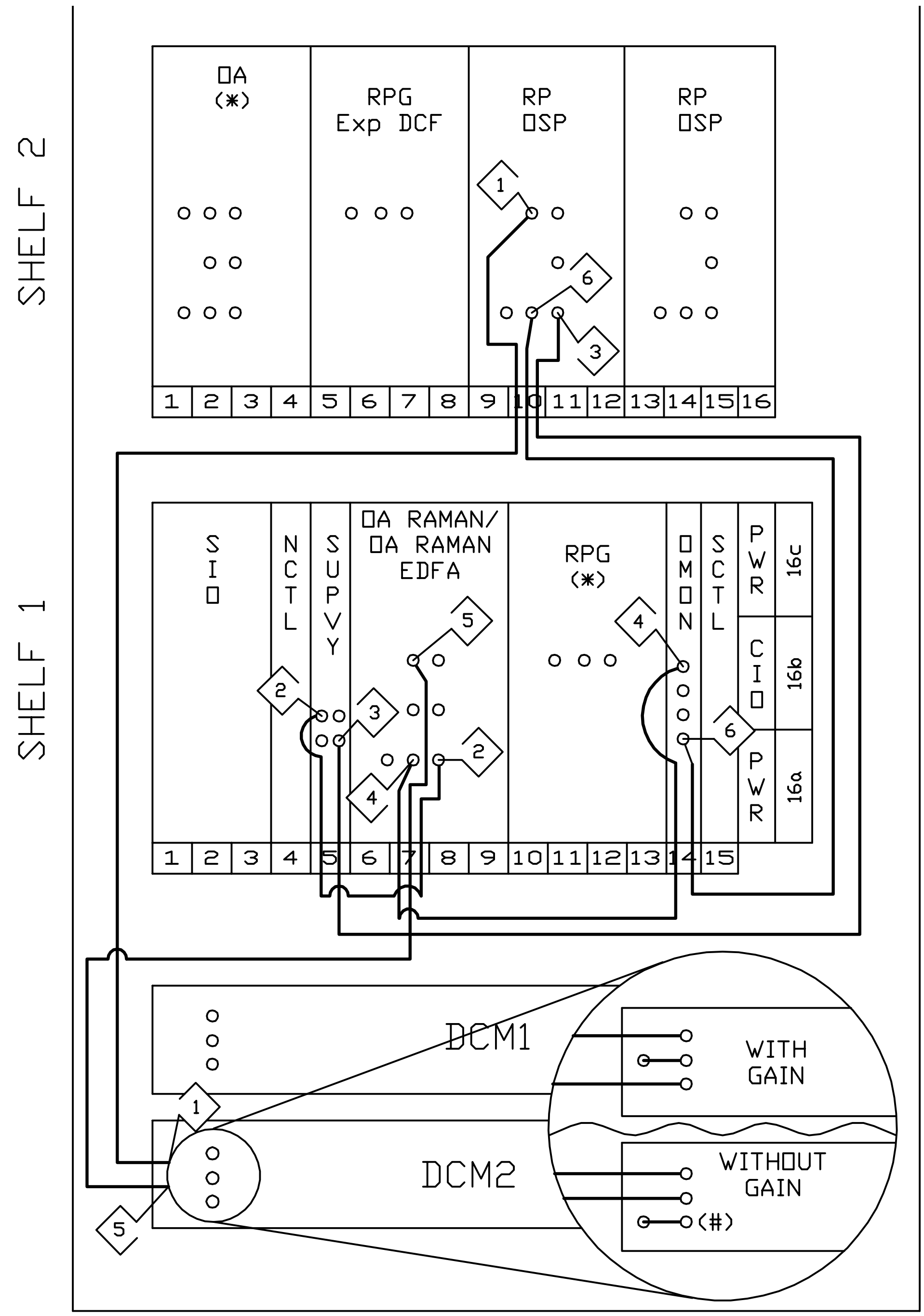
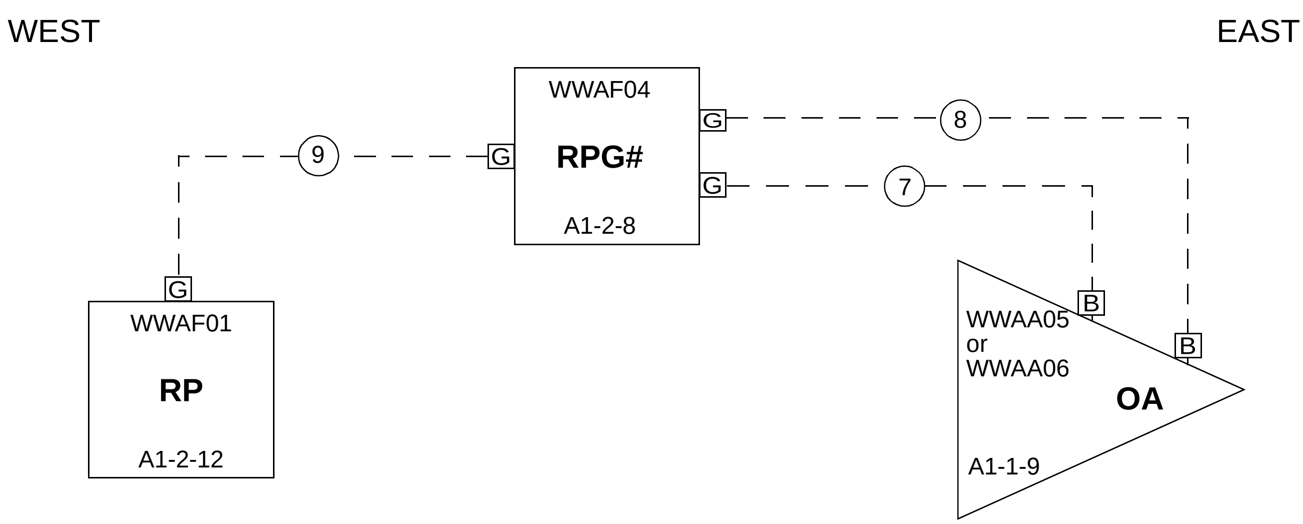


Table 5-7 1E Growth (Raman/Raman EDFA)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
7*	RPG#	A1	2	8	OUT CORP	OA	A1	1	9	IN CORP	63.0 (GB) XS6
	DOWN THRU SLOT 6, RIGHT TO FIBER DUCT, DOWN TO SHELF 1, LEFT TO SLOT 7 AND UP										RPG-OUT CORP-IW / OA-IN CORP-1E
8*	RPG#	A1	2	8	OUT RPG	RP (OSP)	A1	2	12	IN RPG	26.0 (G) XS6
	DOWN THRU SLOT 6, RIGHT TO SLOT 10 AND UP										RPG-OUT RPG / RP-IN RPG-1W
9*	RPG#	A1	2	8	OUT DCF	OA	A1	1	9	IN DCF	63.0 (GB) XS6
	DOWN THRU SLOT 6, RIGHT TO FIBER DUCT, DOWN TO SHELF 1, LEFT TO SLOT 7 AND UP										RPG-OUT DCF-1W / OA-IN DCF-1E

Figure 5-9 Block Diagram with Pack Codes (1E Growth Raman/EDFA)



Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 5-10 1E Repeater OA (Raman/Raman EDFA)

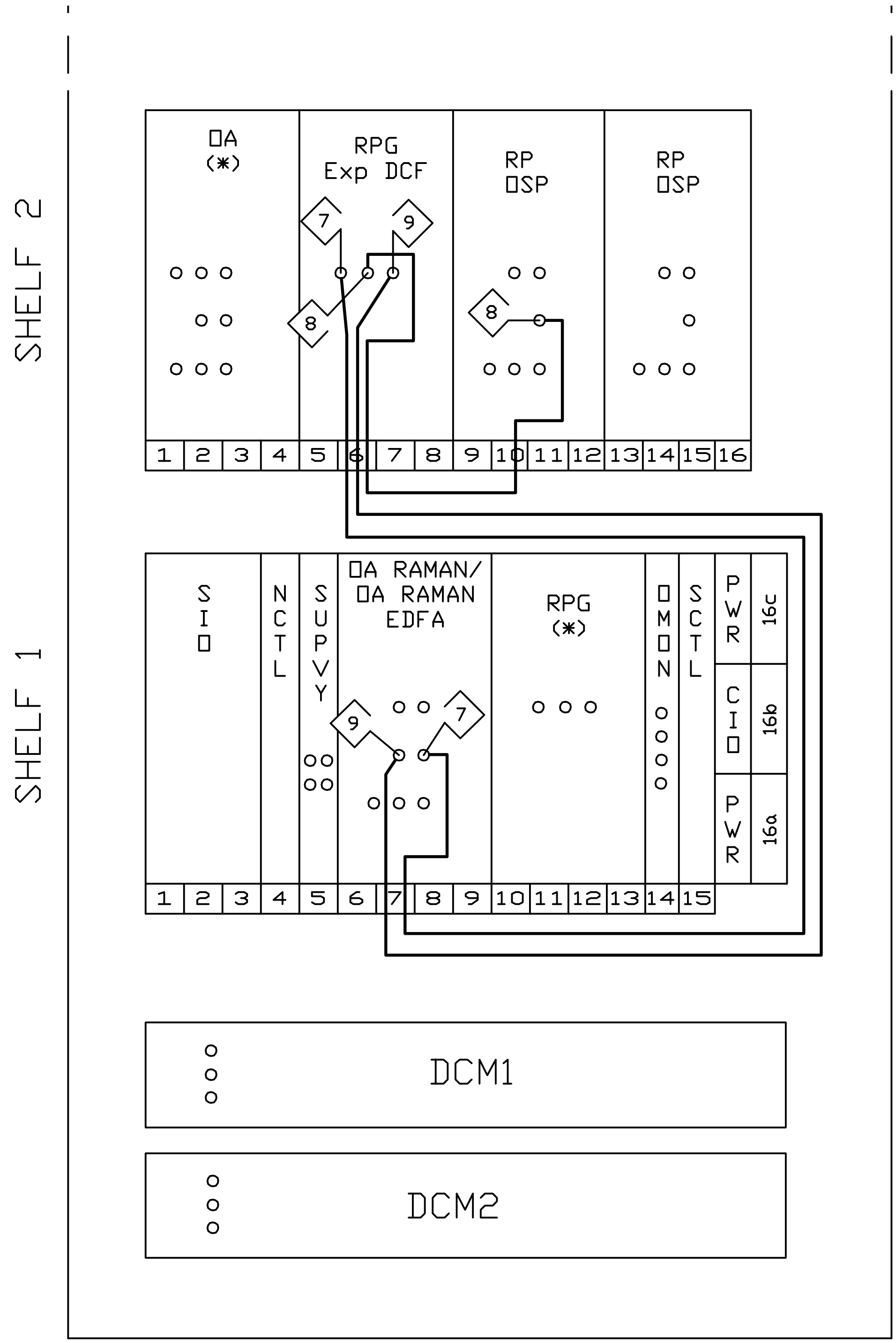
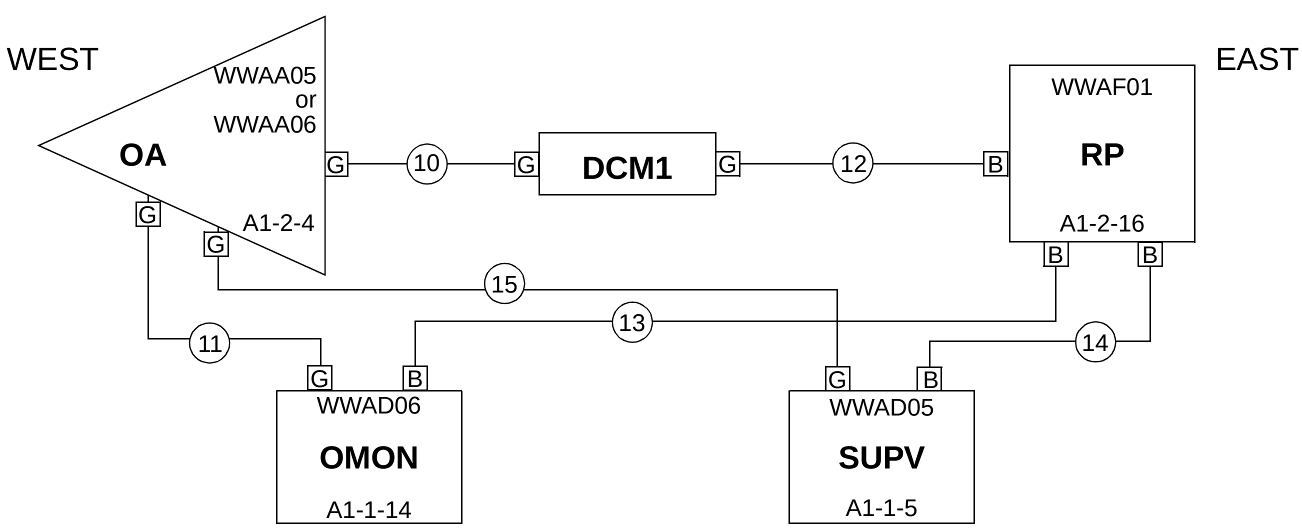


Table 5-8 1W Repeater Raman/Raman EDFA

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) Label Color Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
10	OA	A1	2	4	IN DCM	DCM1	A1	--	--	OUT DCM	40.5 (G) XS3 80.0 (G) XS9
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-IN DCM / DCM1-OUT DCM-1W
11	OA	A1	2	4	OMON	OMON	A1	1	14	IN3	49.0 (G) XS3
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, DOWN TO SHELF 1, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										OA-OMON / OMON-IN3-1W
12	RP(OSP)	A1	2	16	OUT SIG	DCM1	A1	--	--	IN DCM	55.0 (BG) XS3 94.0 (BG) XS9
	DOWN THRU SLOT 14, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										RP-OUT SIG-1E / DCM1-IN DCM-1W
13	RP(OSP)	A1	2	16	OMON	OMON	A1	1	14	IN 2	65.0 (B) XS3
	DOWN THRU SLOT 14, LEFT TO FIBER DUCT, DOWN TO SHELF 1, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										RP-OMON / OMON-IN2-1E
14	SUPVY	A1	1	5	OUT 1	RP(OSP)	A1	2	16	IN SUP	48.O (B) XS3
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										SUPVY-OUT1 / RP-IN SUP-1E
15	SUPVY	A1	1	5	IN 2	OA	A1	2	4	OUT SUP	36.0 (G) XS3
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 2 AND UP										SUPVY-IN2 / OA-OUT SUP-1W

Figure 5-11 Block Diagram With Pack Codes (1W Raman)



Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 5-12 1W Repeater OA (Raman/Raman EDFA)

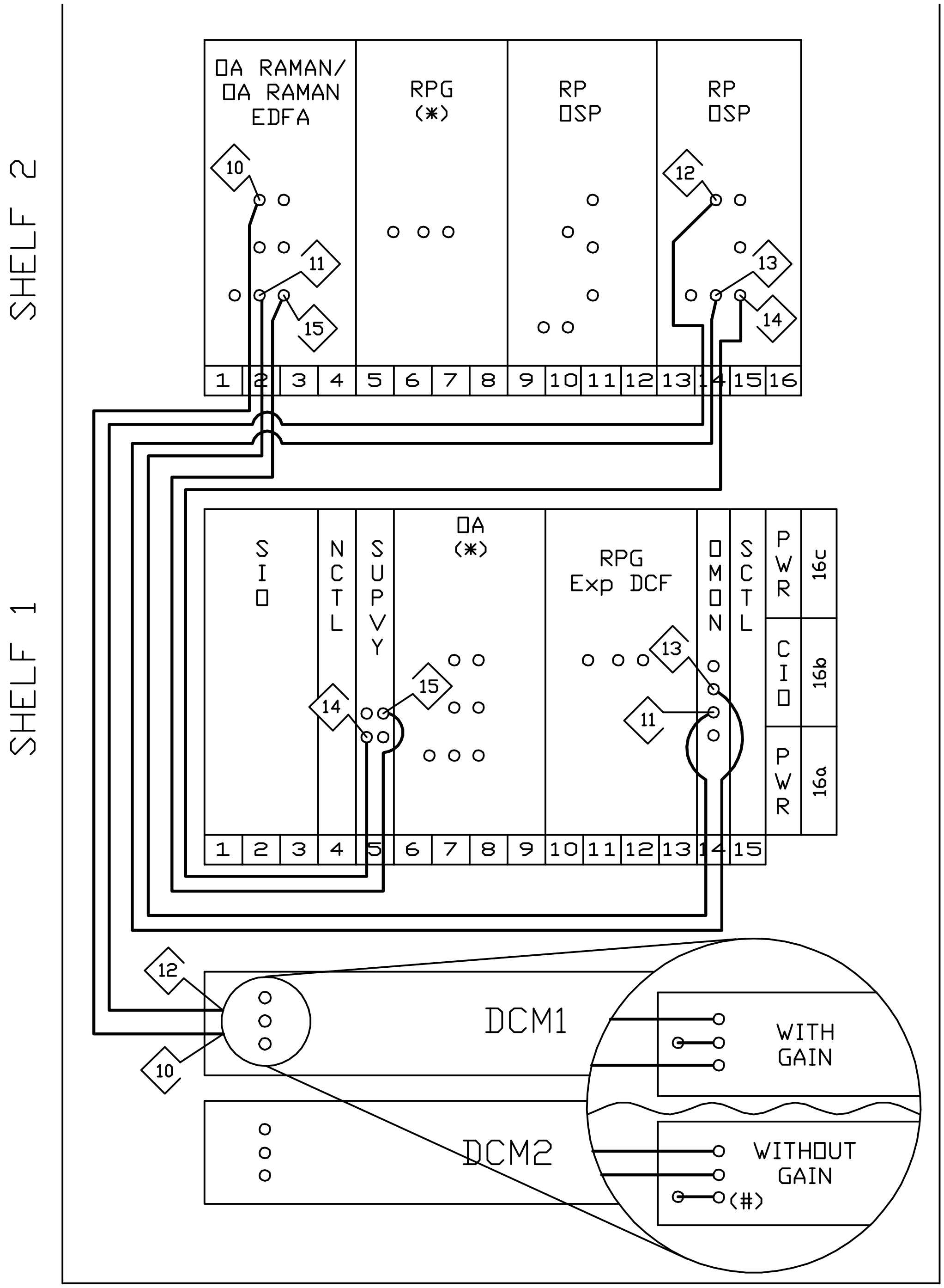
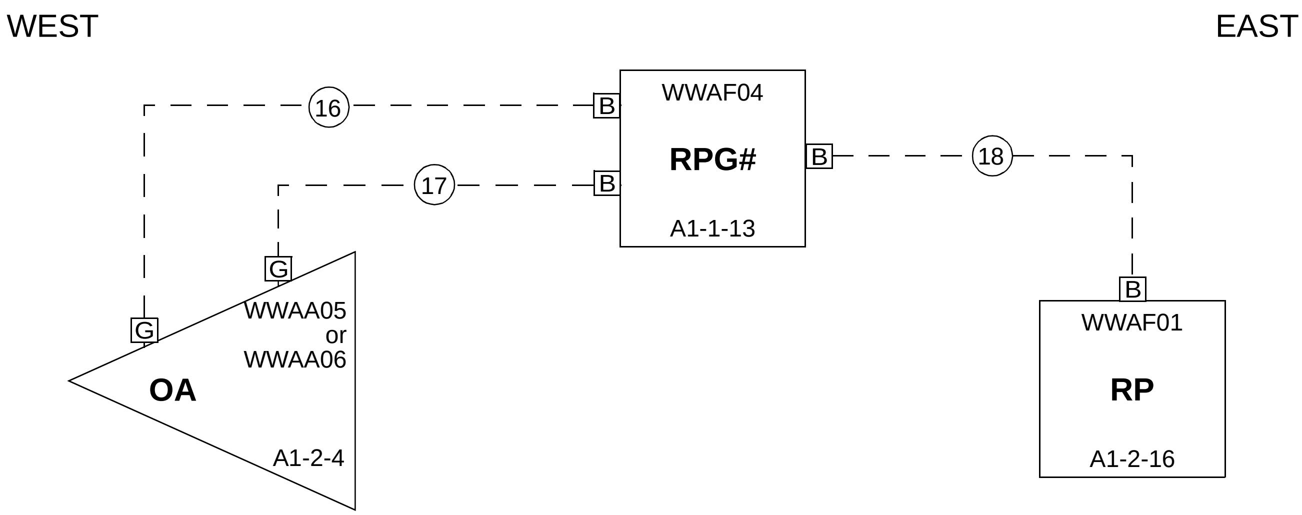


Table 5-9 1W Repeater Raman/Raman EDFA (Growth)

Fiber number/Done	FROM					TO					
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
16*	RPG#	A1	1	13	OUT DCF	OA	A1	2	4	IN DCF	52.5 (BG) XS6
	DOWN THRU SLOT 11, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 2 AND UP										RPG-OUT DCF-1E / OA-IN DCF-1W
17*	RPG#	A1	1	13	OUT CORP	OA	A1	2	4	IN CORP	52.5 (BG) XS6
	DOWN THRU SLOT 11, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 2 AND UP										RPG-OUT CORP-1E / OA-IN CORP-1W
18*	RPG#	A1	1	13	OUT RPG	RP(OSP)	A1	2	16	IN RPG	67.0 (B) XS6
	DOWN THRU SLOT 11, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 14 AND UP										RPG-OUT RPG / RP-IN RPG-1E

Figure 5-13 Block Diagram with Pack Codes (1W Raman/EDFA Growth)



Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 5-14 1W Repeater OA (Raman/Raman EDFA)

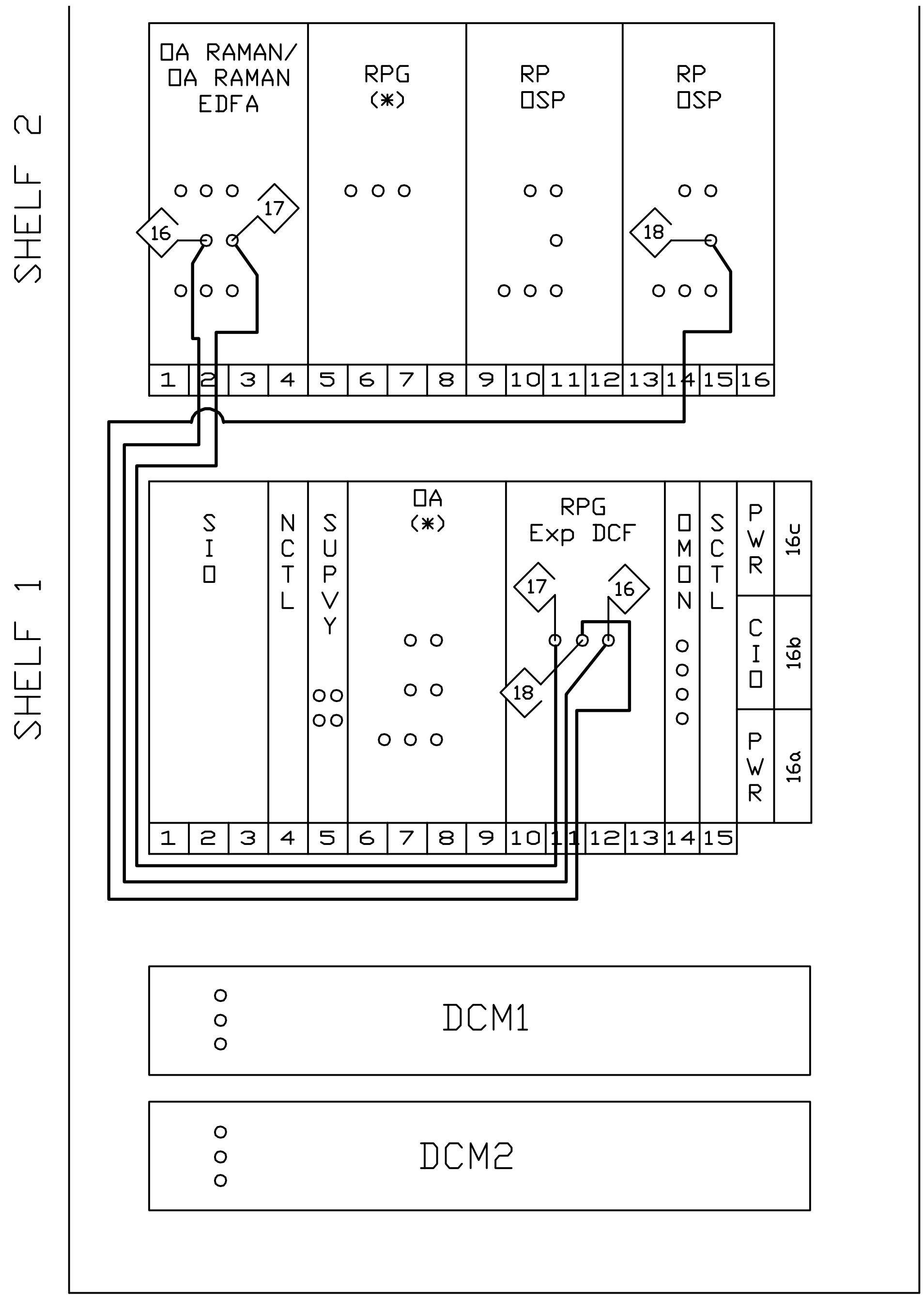
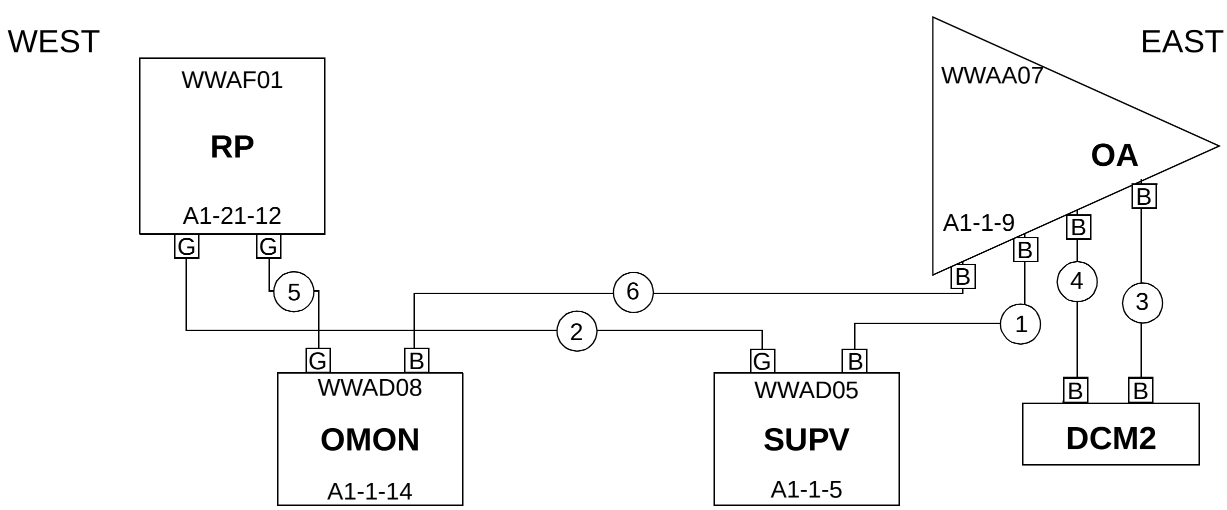


Table 5-10 1E Repeater OA (DGEF)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
1	SUPVY	A1	1	5	IN1	OA	A1	1	9	OUT SUP	14.5 (B) XS3
	DOWN THRU SLOT 5, RIGHT TO SLOT 7 AND UP										SUPVY-IN1 / OA-OUT SUP-1E
2	SUPVY	A1	1	5	OUT 2	RP (OSP)	A1	2	12	IN SUP	49.0 (G) XS3
	DOWN THRU SLOT 5, RIGHT TO FIBER DUCT, UP TO SHELF 2, LEFT IN FIBER TRAY TO SLOT 10 AND UP										SUPVY-OUT2 / RP-IN SUP -1W
3	OA	A1	1	9	OUT DCM	DCM2	A1	--	--	IN DCM	31.5 (B) XS3 70.0 (B) XS9
	DOWN THRU SLOT 7, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-OUT DCM / DCM2-IN DCM-IE
4	OA	A1	1	9	IN DCM	DCM 2	A1	--	--	OUT DCM	31.5 (B) XS3 70.0 (B) XS9
	DOWN THRU SLOT 7, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-IN DCM / DCM2-OUT DCM-1E
5	OMON	A1	1	14	IN 4	RP (OSP)	A1	2	12	OMON	42.0 (G) XS3
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 2, LEFT IN FIBER TRAY TO SLOT 10 AND UP										OMON-IN4 / RP-OMON-1W
6	OA	A1	1	9	OMON	OMON	A1	1	14	IN1	24.O (B) XS3
	DOWN THRU SLOT 7, RIGHT TO SLOT 14 AND UP										OA-OMON / OMON-IN1-1E

Figure 5-15 Block Diagram with Pack Codes (1E DGEF #1)



Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 5-16 1E Repeater OA (DGEF) #1

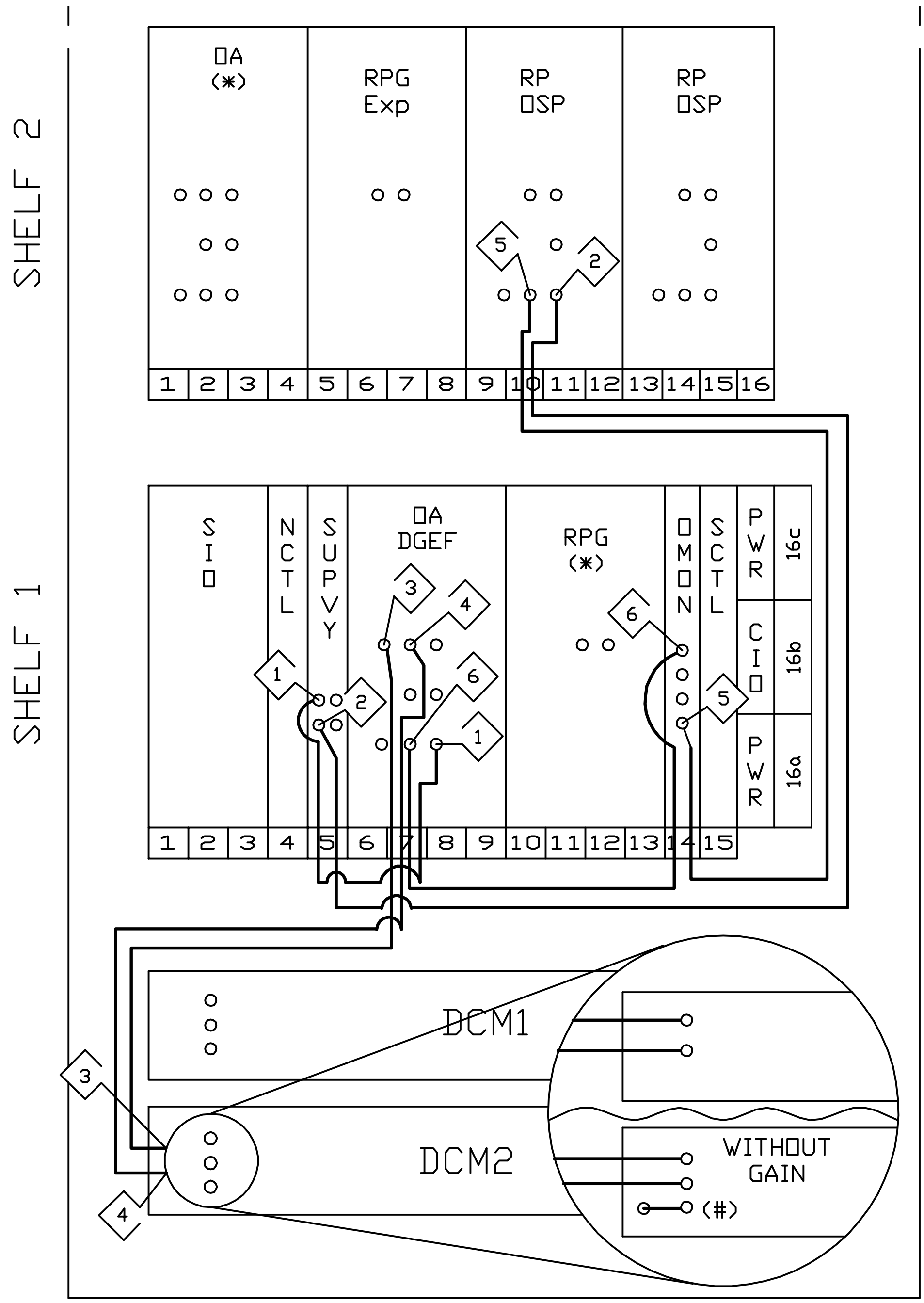
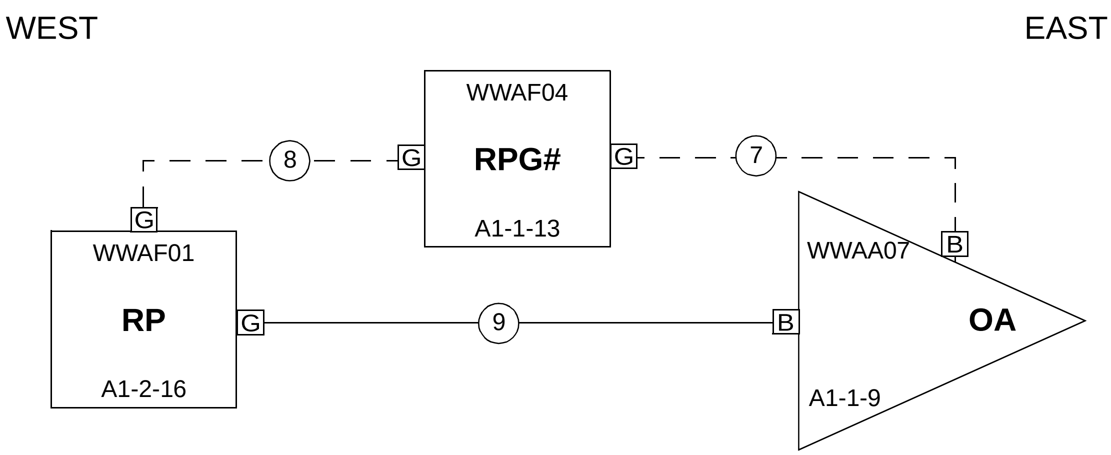


Table 5-11 1E Repeater OA (DGEF) #2

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) Label Color Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
7*	RPG#	A1	2	8	OUT CORP	OA	A1	1	9	IN CORP	63.O (GB) XS6
	DOWN THRU SLOT 6, RIGHT TO FIBER DUCT, DOWN TO SHELF 1, LEFT TO SLOT 7 AND UP										RPG-OUT CORP-1W / OA-IN CORP-1E
8*	RPG#	A1	2	8	OUT RPG	RP (OSP)	A1	2	12	IN RPG	26.0 (G) XS6
	DOWN THRU SLOT 6, RIGHT TO SLOT 10 AND UP										RPG-OUT RPG / RP-IN RPG-1W
9	OA	A1	1	9	IN SIG	RP (OSP)	A1	2	12	OUT SIG	58.0 (BG) XS3
	DOWN THRU SLOT 7, RIGHT TO FIBER DUCT, UP TO SHELF 2, LEFT IN FIBER TRAY TO SLOT 10 AND UP										OA-IN SIG-1E/RP-OUT SIG-1W

Figure 5-17 Block Diagram With Pack Codes (1E DGEF #2)



Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 5-18 1E Repeater OA (DGEF)

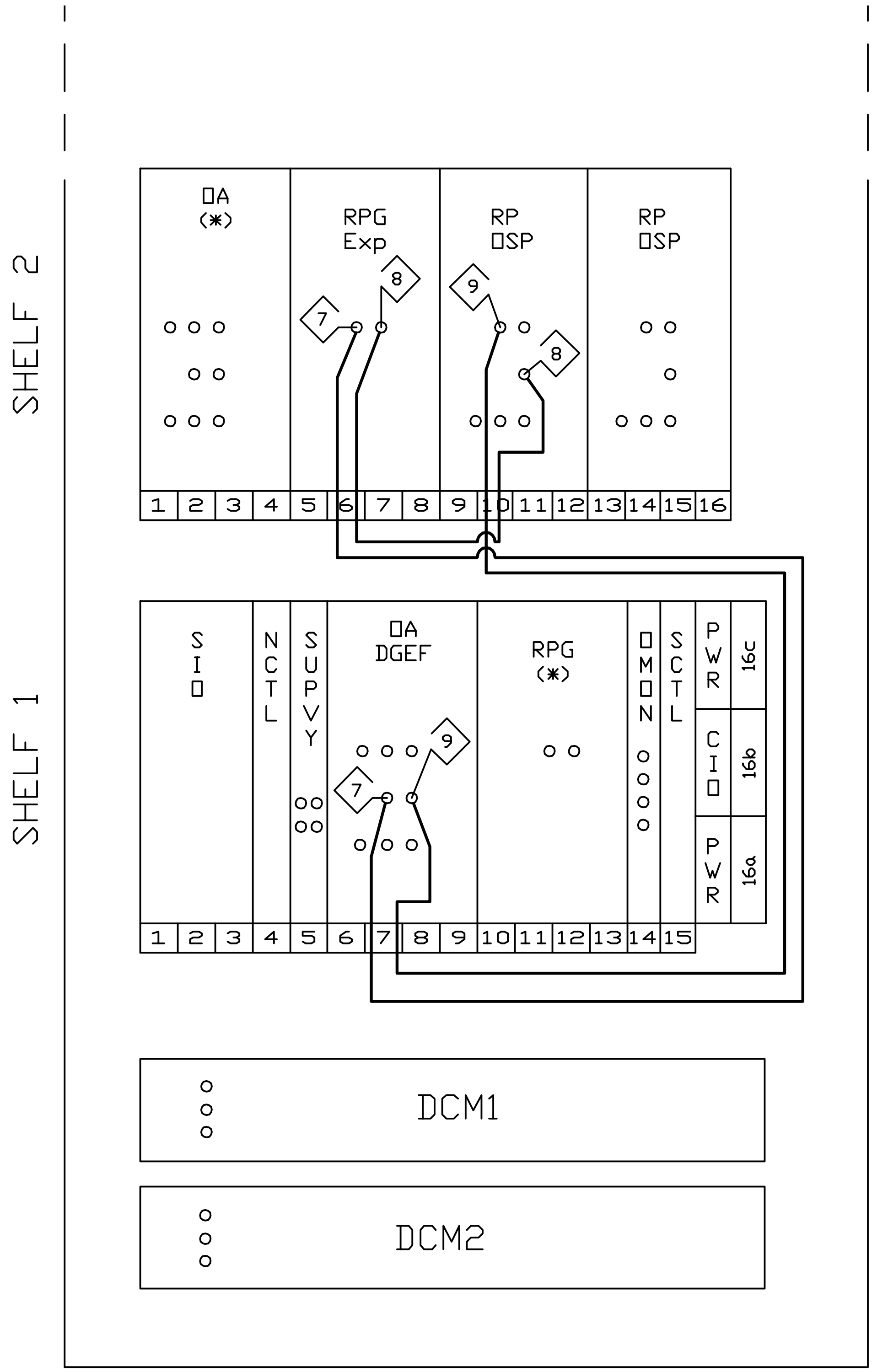
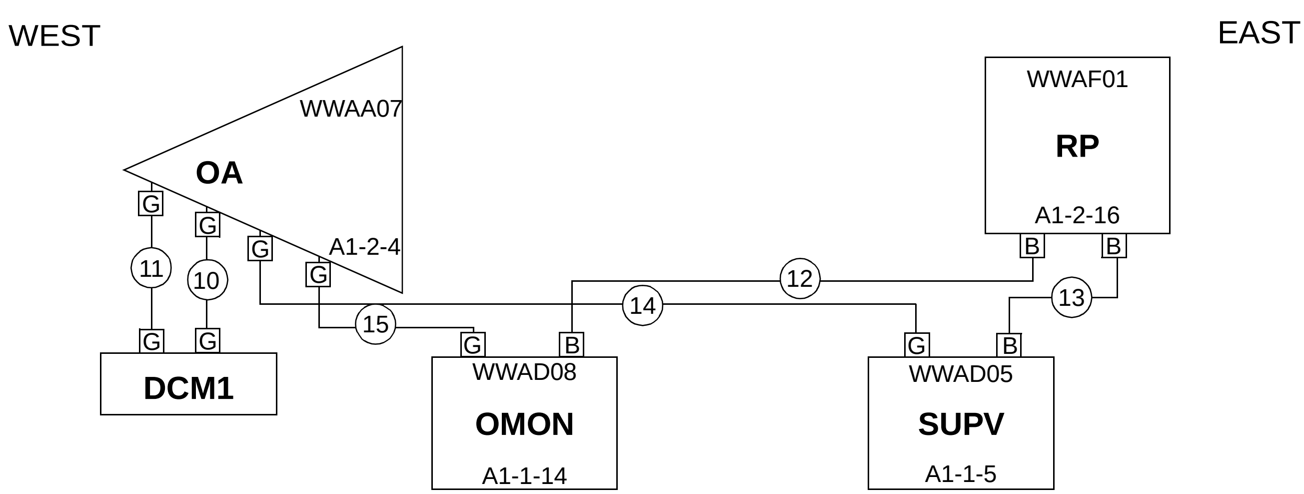


Table 5-12 1W Repeater OA (DGEF)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
10	OA	A1	2	4	OUT DCM	DCM1	A1	--	--	IN DCM	40.5 (G) XS3 80.0 (G) XS9
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF FIBER DUCT, RIGHT TO DCM 1										OA-OUT DCM / DCM1-IN DCM-1W
11	OA	A1	2	4	IN DCM	DCM1	A1	--	--	OUT DCM	40.5 (G) XS3 80.0 (G) XS9
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-IN DCM / DCM1-OUT DCM-1W
12	RP(OSP)	A1	2	16	OMON	OMON	A1	1	14	IN 2	65.0 (B) XS3
	DOWN THRU SLOT 14, LEFT TO FIBER DUCT, DOWN TO SHELF 1, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										RP-OMON / OMON-IN2-1E
13	SUPVY	A1	1	5	OUT 1	RP(OSP)	A1	2	16	IN SUP	48.O (B) XS3
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										SUPVY-OUT1 / RP-IN SUP-1E
14	SUPVY	A1	1	5	IN 2	OA	A1	2	4	OUT SUP	36.0 (G) XS3
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 2 AND UP										SUPVY-IN2 / OA-OUT SUP-1W
15	OA	A1	2	4	OMON	OMON	A1	1	14	IN3	49.0 (G) XS3
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, DOWN TO SHELF 1, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										OA-OMON / OMON-IN3-1W

Figure 5-19 Block Diagram w/Pack Codes 1W DGEF#1



Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 5-20 1W Repeater OA (DGEF) #1

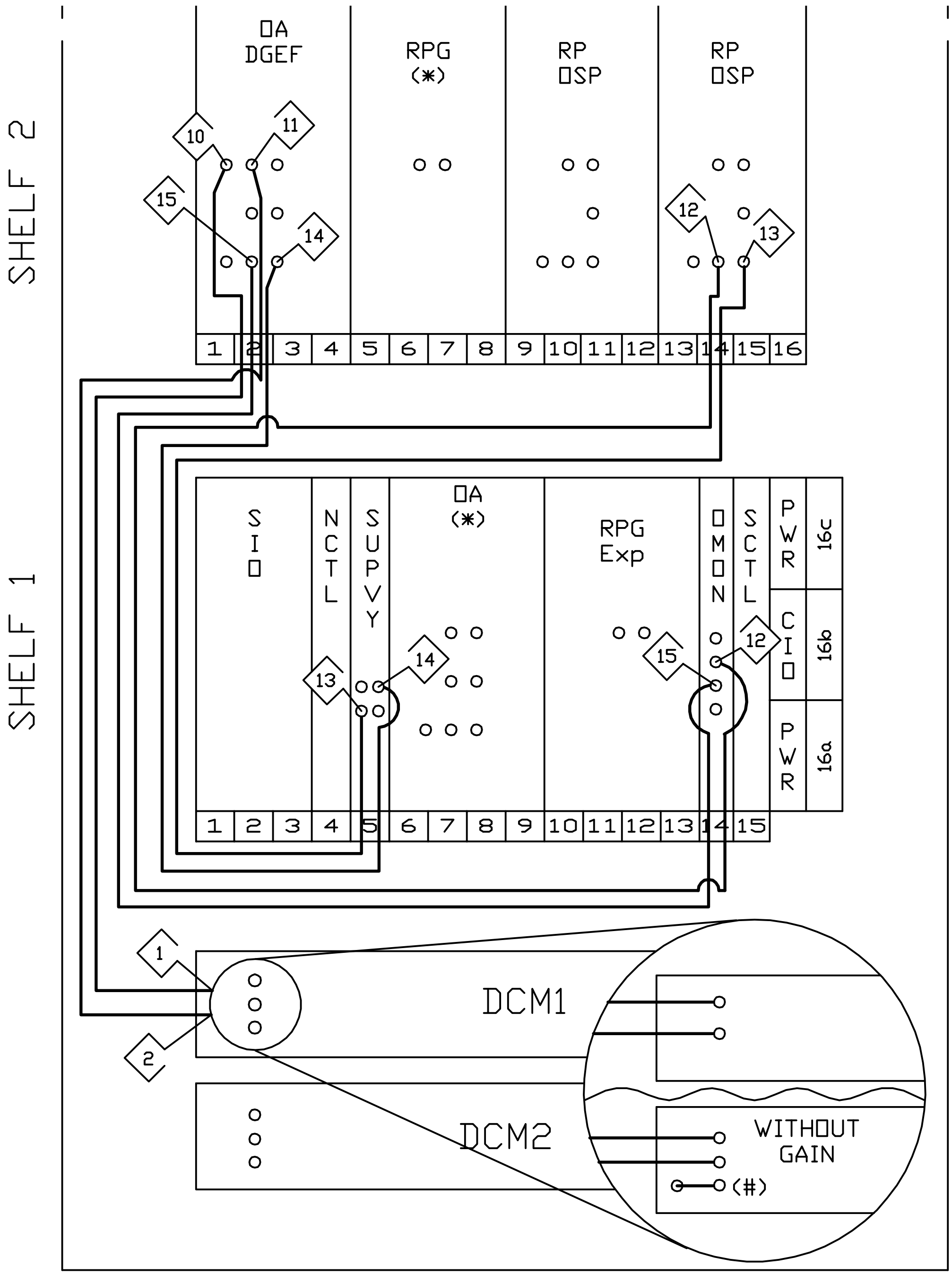
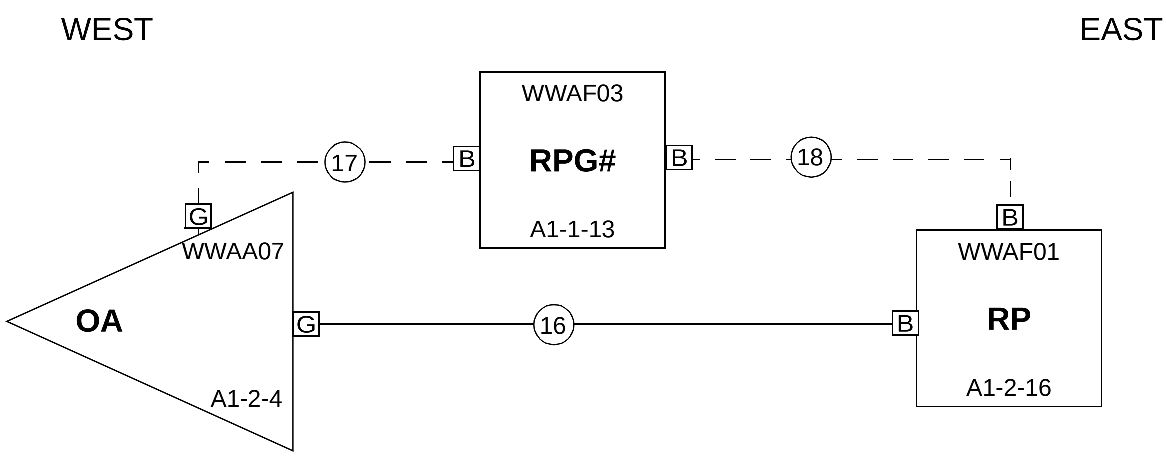


Table 5-13 1W Repeater OA (DGEF) #2

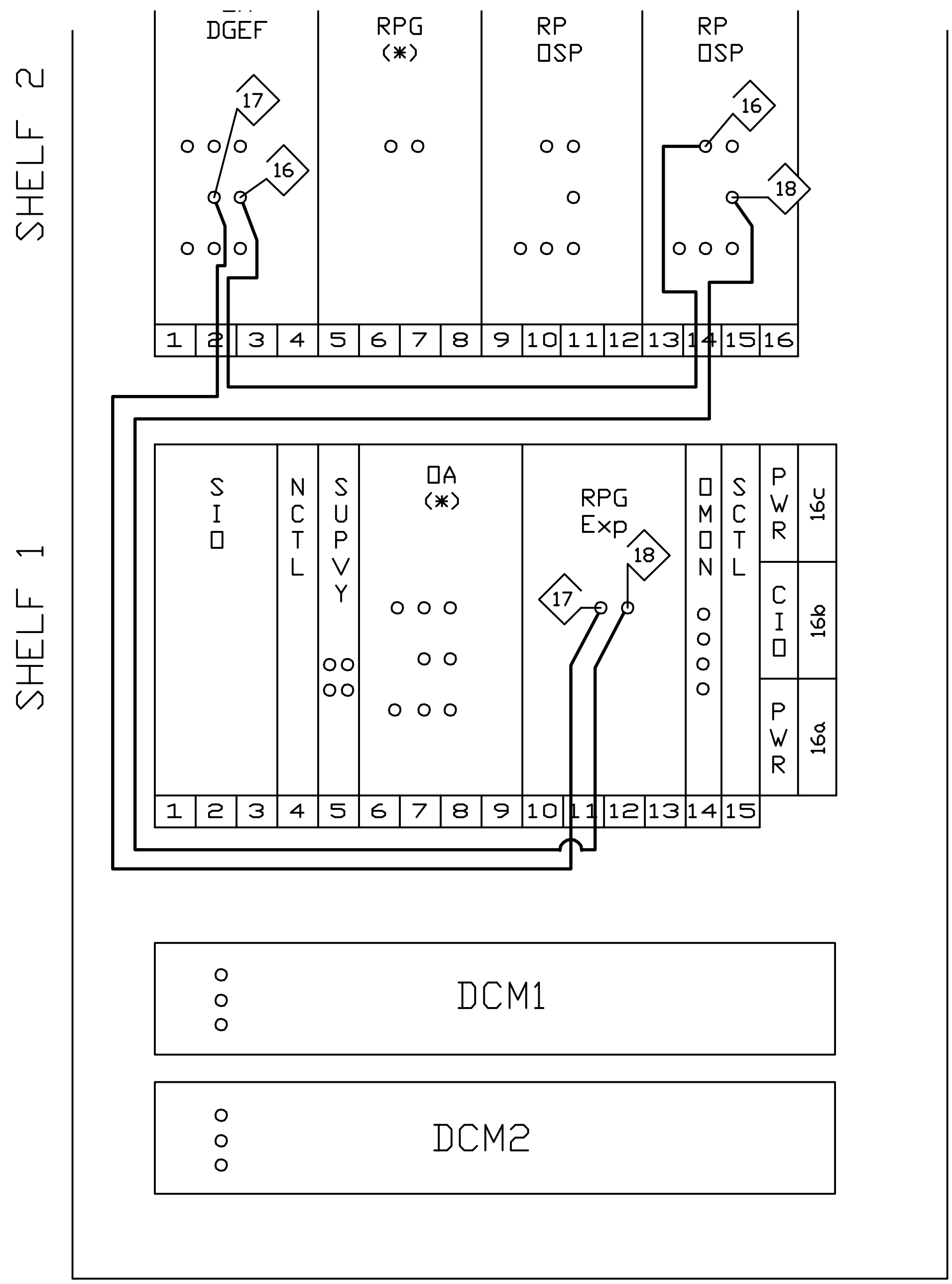
Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
16	OA	A1	2	4	IN SIG	RP (OSP)	A1	2	16	OUT SIG	36.0 (GB) XS3
	DOWN THRU SLOT 2, RIGHT, AND UP THRU SLOT 14										OA-IN SIG-1W / RP-OUT SIG-1E
17*	RPG#	A1	1	13	OUT CORP	OA	A1	2	4	IN CORP	52.5 (BG) XS6
	DOWN THRU SLOT 11, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 2 AND UP										RPG-OUT CORP-1E / OA-IN CORP-1W
18*	RPG#	A1	1	13	OUT RPG	RP (OSP)	A1	2	16	IN RPG	67.0 (B) XS6
	DOWN THRU SLOT 11, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 14 AND UP										RPG-OUT RPG / RP-IN RPG-1E

Figure 5-21 Block Diagram w/Pack Codes (1W DGEF #2)



Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 5-22 1W Repeater OA (DGEF)



6 Non-OT Circuit Pack and Fiber Installation for End Terminals

Overview

Introduction

This chapter provides the information necessary to install all the ordered circuit packs and fibers into the appropriate positions in either the System or Line bays.

Reason for revision

This is the first issue.

Contents

This chapter contains the following

Precautions	6-2
Circuit Pack Placement	6-3
DCM and Storage Tray Placement	6-9
CIO Configuration	6-11
Fiber Information	6-13
Fiber & Label Kits	6-14
Fiber Tables/Figures	6-16
Fibering Procedures	6-17

Precautions

ESD

CAUTION

Many of these circuit packs are sensitive to ESD. Always used and ESD wrist strap when handling circuit packs

Handling

CAUTION

Care should be used while handling Circuit Packs to prevent damage to the internal fibers on the circuit packs or causing them to come loose.

Switch Protection Port Cases

If a contaminated (dirty) fiber is disconnected with high levels of power present permanent damage to the fiber can occur. Switch protection is designed to protect the fiber by insuring that the power has been turned down prior to disconnecting the fiber. The switch protection mechanism combines a movable hinged cover, located over the fiber connection on the circuit pack faceplate, with a switch. With the cover in the down position the fiber connection cannot be physically accessed. With the cover in the down position high power light can flow through the fiber. Unlatching the cover and raising it to the up position causes the system to turn down the necessary pumps to make it safe to remove the fiber connection. The time interval between moving the hood to the up position and removing the fiber connection is sufficient for the pumps to be turned down.

□

Circuit Pack Placement

Bay Layout

The LambdaXtreme™ Transport End Terminal can be installed with one to six bays, depending on the configuration type (10G or 40G), and customer request. The System Bay (A1) is installed first. A Line bay A2 is commonly used for 10G applications, but is skipped for 40G applications. Extension Bays A3-A5, B1-H1, J1-M1 can be added as required, depending on the configuration rules and customer needs.

Precautions

CAUTION

Care should be used while handling circuit packs as fibers on the boards may come loose with improper handling.

Circuit Pack Layout

A Customer Specification sheet, generated by a customer ordering tool such as SITE, will instruct the installer where to place non-common packs such as OTs. Placement for those packs will be covered in a later chapter. This section covers the placement and fibering of all common packs in addition to a few non-OT packs that may be customer specific (such as RPG expansion packs, and growth OM and ODs [50Ghz, 100-GHz & 150-GHz offsets). Make note of the non-common non-OT packs now.

Circuit Pack Placement

Proceed as follows:

1 Remove packing material from all Non-OT circuit packs

2 Place and seat Non-OT circuit packs in their designated slots.

For 10G End Terminals (both LHX and ULH) refer to Table 6-1 on page 6-4 and reference Figure 6-1 on page 6-5 as a visual guide.
For 40G End Terminals, refer to Table 6-2 on page 6-6 and reference Figure 6-2 on page 6-7 as a visual guide.

END OF STEPS

Table 6-1 LambdaXtreme™ Transport 10G End Terminal Circuit Pack Placement

Pack Code	Pack Name	Bay	Shelf	Slot(s)
WWAD01	CIO	ALL	1	16B
WWAD01	CIO	ALL	3	16B
WWAD04	SIO	A1	3	1 - 3
WWAD02	NCTL	A1	3	4
WWAD03	SCTL	A1&A2	1	15
WWAD03	SCTL	A1&A2	3	15
WWAD03#	SCTL	Ext. Bays	2	16
WWAD03#	SCTL	Ext. Bays	2	16
WWAD05	SUPVY	A1	3	5
WWAD06	OMON	A1	1	2
WWAA01	OA (VOA)	A1	1	3 - 6
WWAA03	OA (Pre Amp, Hi Gain)	A1	2	4 - 7
WWAA03#	OA (Pre Amp, Hi Gain)	A2	2	4 - 7
WWAF02	RP	A1	1	11 - 14
WWAF03#	RPG (EXP)	A1	1	7 - 10
WWAC01	OM (0G offset)	A1	2	14 - 16
WWAC02#	OM (50G offset)	A2	2	14 - 16
WWAC03#	OM (100G offset)	A1	4	14 - 16
WWAC04#	OM (150G offset)	A2	4	14 - 16
WWAB01	OD (0G offset)	A1	2	1 - 3
WWAB02#	OD (50G offset)	A2	2	1 - 3
WWAB03#	OD (100G offset)	A1	4	1 - 3
WWAB04#	OD (150G offset)	A2	4	1 - 3

NOTE: Circuits packs marked with a (#) are optional packs and may not be present in all customer orders.

Figure 6-1 LambdaXtreme™ Transport 10G (LHX & ULH) End Terminal

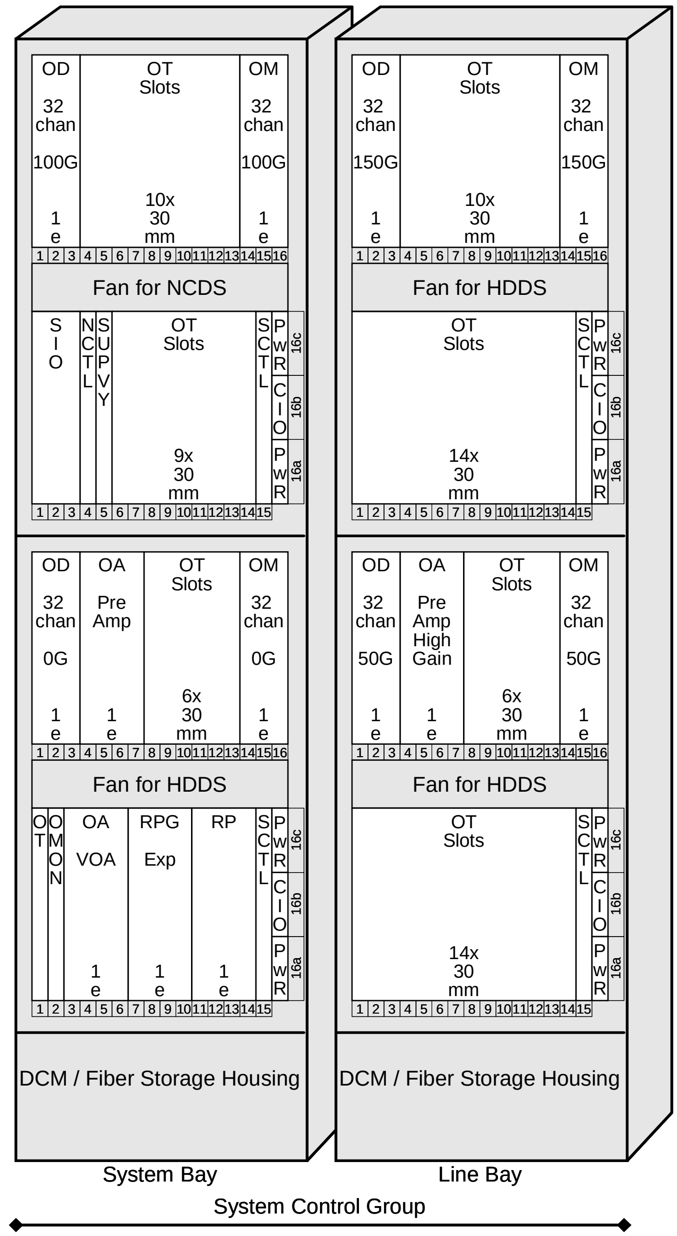
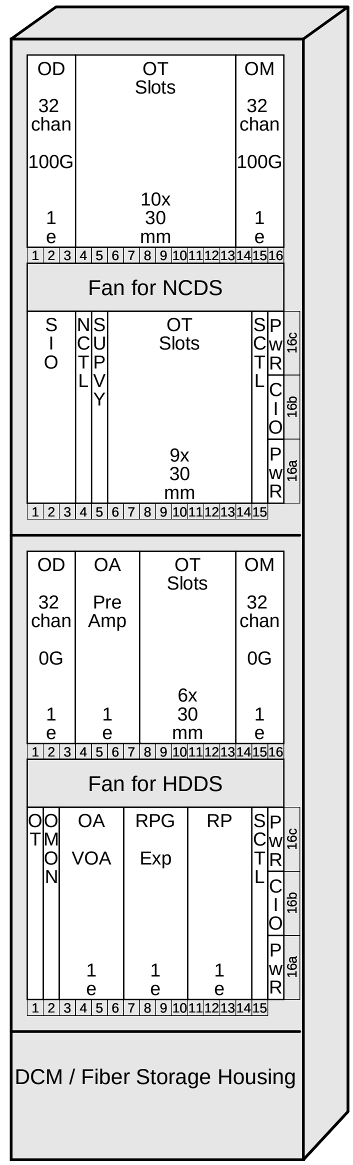


Table 6-2 LambdaXtreme™ Transport 40G End Terminal Circuit Pack Placement

Pack Code	Pack Name	Bay	Shelf	Slot(s)
WWAD01	CIO	ALL	1	16B
WWAD01	CIO	ALL	3	16B
WWAD04	SIO	A1	3	1 - 3
WWAD02	NCTL	A1	3	4
WWAD03	SCTL	A1	1	15
WWAD03	SCTL	A1	3	15
WWAD03#	SCTL	Ext. Bays	2	16
WWAD03#	SCTL	Ext. Bays	4	16
WWAD05	SUPVY	A1	3	5
WWAD06	OMON	A1	1	2
WWAA01	OA(VOA)	A1	1	3 - 6
WWAA02	OA (Pre Amp, Lo Gain)	A1	2	4 - 7
WWAF01	RP	A1	1	11 - 14
WWAF03#	RPG (EXP)	A1	1	7 - 10
WWAC11	OM (0G offset)	A1	2	14 - 16
WWAC03#	OM (100G offset)	A1	4	14 - 16
WWAB11	OD (0G offset)	A1	2	1 - 3
WWAB03#	OD (100G offset)	A1	4	1 - 3

NOTE: Circuits packs marked with a (#) are optional packs and may not be present in all customer orders.

Figure 6-2 LambdaXtreme™ Transport 40G (UHC) End Terminal



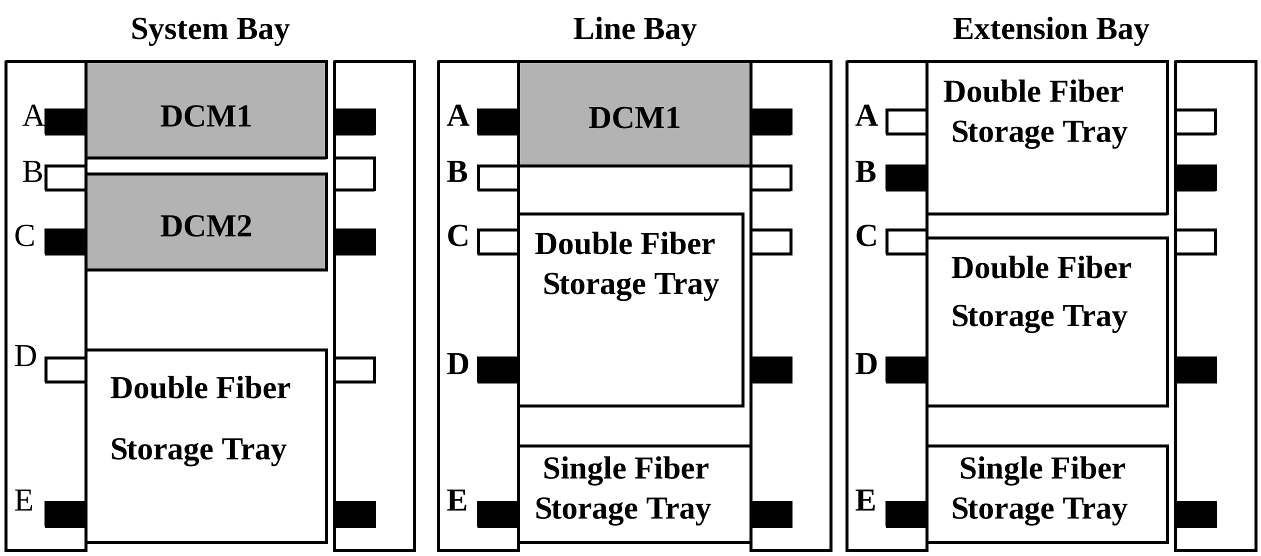
System Bay

DCM and Storage Tray Placement

DCM / Storage Tray Overview

At the bottom of every LambdaXtreme™ Transport bay is a DCM and Fiber Storage Tray Assembly. The DCMs and fiber storage trays are modules which slide into the bay and are retained by two thumbs screws. There are five slot positions in which to slide in units. These positions are identified as A, B, C, D and E, from top to bottom. The letters are adjacent to the slots into which units can slide. The following figure shows the placement of DCMs and storage trays based on bay types. It is essential that placement be exactly as shown in Figure 6-3.

Figure 6-3 DCM/Storage Tray Placement for End Terminals



DCM/Storage Tray Placement

DCM placement is designated on the customer specification order for each site.

1 Unpack DCM units.

2 Place all applicable DCM units in their designated locations as indicated on the customer order at this time.

3 Unpack storage tray units.

4 Place all storage tray units in their designated locations as indicated in Figure 6-3 on page 6-9.

END OF STEPS

DCM Gain Fiber

DCMs units come equipped with either three jacks and one plug on each unit, or with just two jacks on a unit. For the units with a plug, attaching the loose plug into a specific jack allows the user to either serially connect a gain fiber or bypass it. The gain fiber is only utilized when the DCM connected to a Raman pump. The gain fiber selection must be made prior to fibering the Terminal. As the following table shows, the gain fiber is never utilized in an End Terminal configuration.

Table 6-3 DCM Fiber Selection

Bay A1	DCM1	Gain Fiber Not Used
	DCM2	Gain Fiber Not Used
Bay A2	DCM1	Gain Fiber Not Used

1 Determine if DCM unit is a 2 or three input unit.

2 For 3 input units, determine fiber configuration from Table 6-3.

3 Make fiber applicable fibering changes to DCM unit.

END OF STEPS

CIO Configuration

Background

The CIO circuit pack has three switches that are utilized to identify the Group (S3), Bay within a Group (S2) and shelf location of the applicable Shelf Controller (S1). It must be set correctly prior to software installation.

Procedures

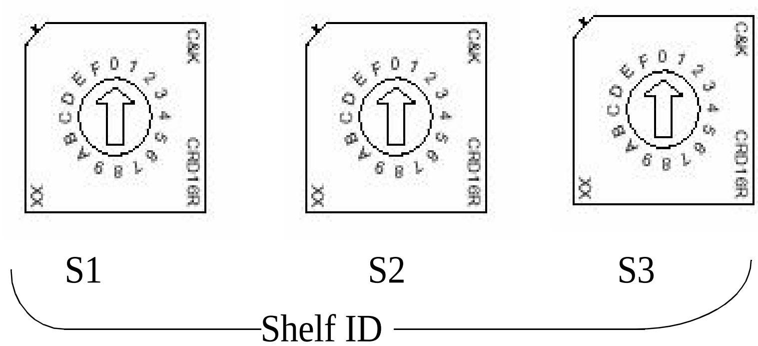
Use the following procedures to properly set the switches on the CIO circuit pack to the appropriate value. There are multiple locations for the CIO card and this procedure must be done for every card to ensure proper control communications within the system.

> **Important!** Observe ESD precautions when handling circuit packs

1 Remove the CIO circuit pack.

2 Locate the Shelf ID switches: S1, S2 and S3 on the CIO card.

Figure 6-4 CIO Switch Settings



3 Set the switches on the CIO circuit pack according to the table.

Important! There are two CIO circuit packs per bay.

Table 6-4 CIO Switch Settings

	Shelf 1			Shelf 3		
Bay	**SW1**	**SW2**	**SW3**	**SW1**	**SW2**	**SW3**
A1	1	1	A	3	1	A
A2	1	2	A	3	2	A
A3	2	3	A	4	3	A
A4	2	4	A	4	4	A
A5	2	5	A	4	5	A
B1	2	1	B	4	1	B
C1	2	1	C	4	1	C
D1	2	1	D	4	1	D
E1	2	1	E	4	1	E
F1	2	1	F	4	1	F
G1	2	1	0	4	1	0
H1	2	1	1	4	1	1
J1	2	1	2	4	1	2
K1	2	1	3	4	1	3
L1	2	1	4	4	1	4
M1	2	1	5	4	1	5

4 After setting the switches, replace the CIO circuit pack.

5 Repeat Steps 1-4 for all CIO circuit packs in the system.

END OF STEPS

☐

Fiber Information

Fiber Description

This section provides procedures to fiber the System and Line Bays in the LambdaXtreme™ Transport End Terminals. Descriptions of the various types of fibers, fiber kit components, fiber routing, fiber labels and dressing, running and storing fiber are included.

Fiber Kits

Refer to *Chapter 104, Fiber Kit Descriptions* for descriptions of the fiber kits.

Fiber Cleaning

Refer to *Chapter 105, Fiber Cleaning* for correct fiber cleaning procedures.

Precautions

CAUTION

Fiber is constructed of glass and should be treated with care. It should not be pulled or stretched. This could cause damage to the fiber or the fiber connector.

CAUTION

Fiber should not be bent in a radius of less than 1-1/2” (38 mm).

Fiber & Label Kits

Description

Each fiber kit contains red fiber to interconnect common circuit packs. Kits need to be selected based on the type of bays being used and how they are equipped.

LambdaXtreme™ Transport 10G End Terminal (ULH & LHX)

The LambdaXtreme™ Transport End Terminal consists of one to six bays; one System Bay, one optional Line Bay and up to four Extension Bays. The applicable red fiber kits and label kits are listed in the table below and contain fibers for inter- and intra-bay connections between the System and Line bays.

Kit	Description	System Name
109105734	LambdaXtreme™ Transport Kit XS1 (Provides all common circuit pack fibers for the system bay of a 10G End Terminal)	2FET-10G System Bay fibers
109180539	LambdaXtreme™ Transport Kit XS8 (Provides additional fibers needed if a line bay used)	2FET-10G Line Bay Fibers
109105981	LambdaXtreme™ Transport Kit XS5 (Provides additional fibers needed if RPG packs are used)	RPG Fibers for 2FET-10G/40G
848835898	End Terminal Fiber Jumper Designation Labels	
848835922	RPG Fiber Jumper Designation Labels	

Important! Yellow fiber kits for interconnections between the OM, OD and OT circuit packs are in Chapter 9.

LambdaXtreme™ Transport 40G End Terminal

The LambdaXtreme™ Transport 40G UHC End Terminal consists of one to seven bays; one System Bay and up to six Extension Bays. The applicable red fiber kits and label kits are listed in the table below and contain fibers for intra-bay connections within the System bay.

Kit	Description	System Name
109105742	LambdaXtreme™ Transport Kit XS2 (Provides all common circuit pack fibers for the system bay of a 40G End Terminal)	2FET-40G System fibers
109105981	LambdaXtreme™ Transport Kit XS5 (Provides additional fibers needed if RPG packs are used)	RPG Fibers for 2FET-10G/40G
848835898	End Terminal Fiber Jumper Designation Labels	
848835922	RPG Fiber Jumper Designation Labels	

Important! Yellow fiber kits for interconnections between the OM, OD and OT circuit packs are in Chapter 9.

□

Fiber Tables/Figures

Introduction

Fiber tables are required because of the complexity of the LambdaXtreme™ Transport System. The fibers for the System Bay have to be connected according to the tables that follow.

Tables

The tables give the name and location of each circuit pack by Bay, Shelf, Slot, and Port where the fiber connection will take place. They designate the fiber length, the route to take with the fiber out of the packs, and the label name to be used on each end of the fiber.

Below is an explanation of the headers of the tables:

- **Done** - Place a check here when the fiber is complete
- **Fiber Number**- Number used to designate fiber in Fiber Diagram. (NOTE: Fibers marked with an asterisk (*) are optional and are connected to an optional pack)
- **Circuit Pack**- Name of the pack and its label (NOTE: CPs marked with a (#) are optional packs. Information contained in parentheses following circuit pack name in the fiber table is not listed on circuit pack label).
- **Bay** - Bay number
- **Shelf -** Shelf number starting with the bottom shelf as shelf 1
- **Slot** - Slot number found below the pack (some packs span multiple slots)
- **Port** - Name of the Port on the pack where the fiber will be connected
- **Routing Information -** The route the fibers are run
- **Fiber Length -** Length of the fiber in inches
- **Fiber Label (Color)** - Indicates which labels are to be placed on the ends of each fiber. The fibers in the East Side will always be Blue.

Figures

Each table on the left side of an opposing pages is supported by a figure on the right visually depicting the fiber routes.

☐

Fibering Procedures

Bay Growth

The LambdaXtreme™ Transport supports bay growth in either direction, left or right. For that reason, the first two interbay fiber tables are listed to cover inter-bay fibering for left growth or right growth.

Procedures

1 Determine from customer specification sheet whether End terminal is 10G or 40G.

2 Obtain the proper fiber and label kits (See Fiber & Label Kits on page 6-14).

3 Determine the applicable tables/figures to use from the Master Fibering Table Guide.(* indicates optional based on installed circuit packs/bays)

Table 6-5 Master Fibering Table Guide

Applicable Fiber Tables/Figures			
10G (LHX & ULH)		**40G (UHC)**	
10G System Bay Table #1		40G System Bay Intra-bay #1	
Table 6-6	Figure 6-7	Table 6-12	Figure 6-13
10G System Bay Table #2		40G System Bay Intra-bay #2	
Table 6-7	Figure 6-8	Table 6-13	Figure 6-14
*10G System Bay Table #3			
Table 6-8	Figure 6-9		
*10G Line Bay #1			
Table 6-9	Figure 6-10		
*10G System/Line Inter-Bay (R)			
Table 6-10	Figure 6-11		
*10G System/Line Inter-Bay (L)			
Table 6-11	Figure 6-12		

4 On the applicable tables, circle all optional fibers that will be used.

5 Starting with first fiber connection in fibering table, locate proper fiber jumper from kit and install label to both ends of the jumper.

6 Remove dust cap from the connector at one end of the fiber jumper. **INSPECT** fiber end and **CLEAN** if required.

7 Using fibering table and fibering diagram locate circuit pack connection. Remove protective cap from circuit pack and complete connection. If protective cap has already been removed, the circuit pack connector will have to be inspected using a probe and cleaned if required.

8 Route fiber to the other circuit pack according to routing information.

9 Repeat Steps 6 and 7 for other end of fiber jumper.

10 Put a check mark in the applicable "Done" column.

11 Continue until all the fiber connections, including circled optional fibers, have been completed.

Important! For 10G End terminals, determine bay growth direction from customer specification sheet. This will determine which System/Line interbay fibering table to use.

Important! Route Inter-bay fibers using applicable Inter-bay tables and Figures

Important! Inter-bay fibers come pre-run in protective tubing. The fiber tubing should be secured to the bay frame with cable ties. (See Figure 6-5 and Figure 6-6 on page 6-19)

E N D O F S T E P S

Figure 6-5 Inter-Bay Fiber Tubing for Seismic Bay

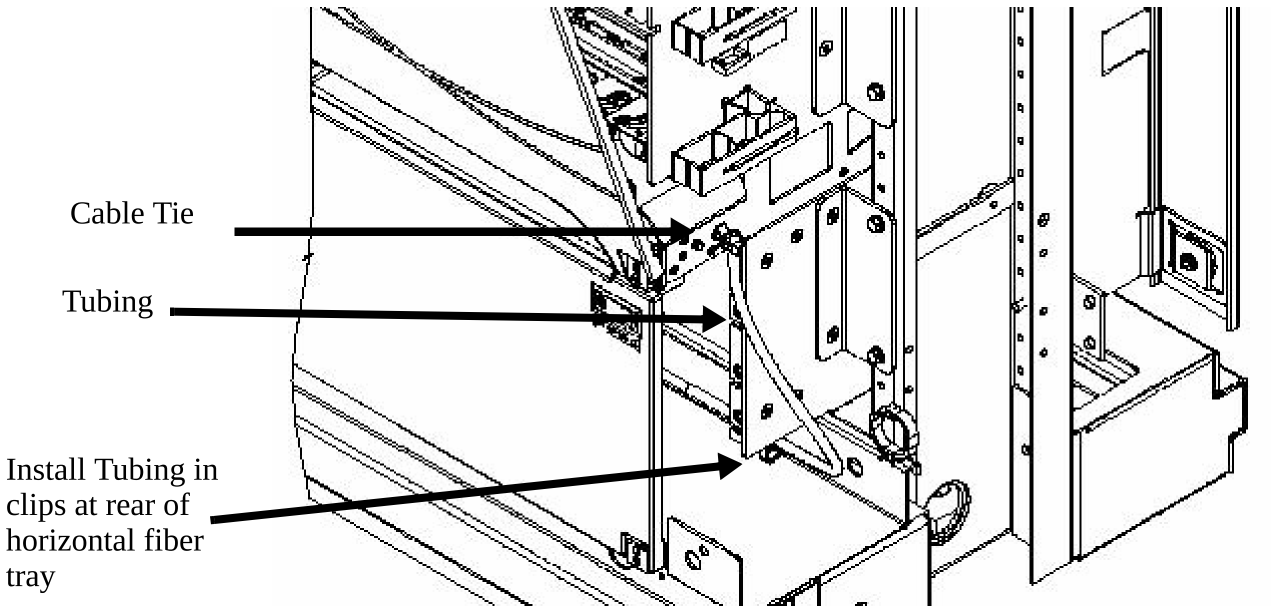


Figure 6-6 Interbay Fiber Tubing for ETSI Bay

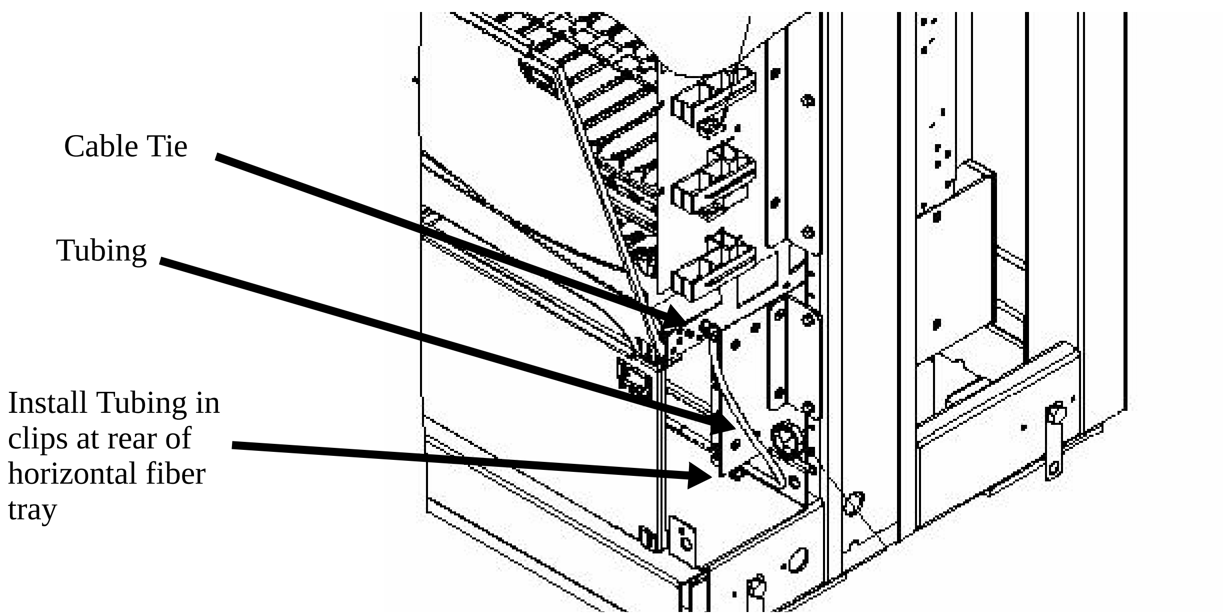


Table 6-6 10G System Bay Table #1

<table>
<tr><th rowspan="3">Fiber number/Done</th><th colspan="5">FROM</th><th colspan="5">TO</th><th rowspan="2">Total Fiber Lgth(In) Label Color Label Kit</th></tr>
<tr><th>Circuit Pack</th><th>Bay</th><th>Shelf</th><th>Slot</th><th>Port ID</th><th>Circuit Pack</th><th>Bay</th><th>Shelf</th><th>Slot</th><th>Port ID</th></tr>
<tr><th colspan="5">Routing Information</th><th colspan="5">Routing Information</th><th>Fiber Label BLUE=(B)=East GREEN=(G)=West</th></tr>
<tr><td>1</td><td>OD(200/100G 0G)</td><td>A1</td><td>2</td><td>3</td><td>IN 0/100G</td><td>OA(PREAMP)</td><td>A1</td><td>2</td><td>7</td><td>OUT SIG</td><td>28.0 (B) XS1</td></tr>
<tr><td></td><td colspan="10">DOWN THRU SLOT 3, RIGHT TO SLOT 5 AND UP</td><td>OD-IN 0/100G / OA-OUT SIG-1E</td></tr>
<tr><td>2</td><td>OMON</td><td>A1</td><td>1</td><td>2</td><td>IN 4</td><td>OA(PREAMP)</td><td>A1</td><td>2</td><td>7</td><td>OMON</td><td>39.0 (B) XS1</td></tr>
<tr><td></td><td colspan="10">DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGH IN FIBER TRAY TO SLOT 5 AND UP</td><td>OMON-IN4 /OA-OMON-1E</td></tr>
<tr><td>3</td><td>RP (OSP, 50G/ 100G)</td><td>A1</td><td>1</td><td>14</td><td>OUT 0/100G</td><td>OA(PREAMP)</td><td>A1</td><td>2</td><td>7</td><td>IN SIG</td><td>57.0 (B) XS1</td></tr>
<tr><td></td><td colspan="10">DOWN THRU SLOT 12, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGH IN FIBER TRAY TO SLOT 5 AND UP</td><td>RP-OUT 0/100G /OA-IN SIG -1E</td></tr>
<tr><td>4</td><td>OA(VOA)</td><td>A1</td><td>1</td><td>6</td><td>IN SIG</td><td>OM(OG)</td><td>A1</td><td>2</td><td>16</td><td>OUT SIG</td><td>53.5 (B) XS1</td></tr>
<tr><td></td><td colspan="10">DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 14 AND UP</td><td>OA-IN SIG /OM-OUT SIG-1E</td></tr>
<tr><td>5</td><td>OMON</td><td>A1</td><td>1</td><td>2</td><td>IN 3</td><td>OM(OG)</td><td>A1</td><td>2</td><td>16</td><td>OMON</td><td>50.0 (B) XS1</td></tr>
<tr><td></td><td colspan="10">DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 14 AND UP</td><td>OMON-IN3 /OM-OMON-1E</td></tr>
<tr><td>6</td><td>OMON</td><td>A1</td><td>1</td><td>2</td><td>IN 1</td><td>OA(VOA)</td><td>A1</td><td>1</td><td>6</td><td>OMON</td><td>18.0 (B) XS1</td></tr>
<tr><td></td><td colspan="10">DOWN THRU SLOT 2, RIGHT TO SLOT 4 AND UP</td><td>OMON-IN1/OA-OMON-1E</td></tr>
<tr><td>7</td><td>OMON</td><td>A1</td><td>1</td><td>2</td><td>IN 2</td><td>RP(OSP,50G/ 100G</td><td>A1</td><td>1</td><td>14</td><td>OMON</td><td>28.0 (B) XS1</td></tr>
<tr><td></td><td colspan="10">DOWN THRU SLOT 2, RIGHT TO SLOT 12 AND UP</td><td>OMON-IN2/RP-OMON-1E</td></tr>
</table>

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 6-7 10G System Bay Figure #1

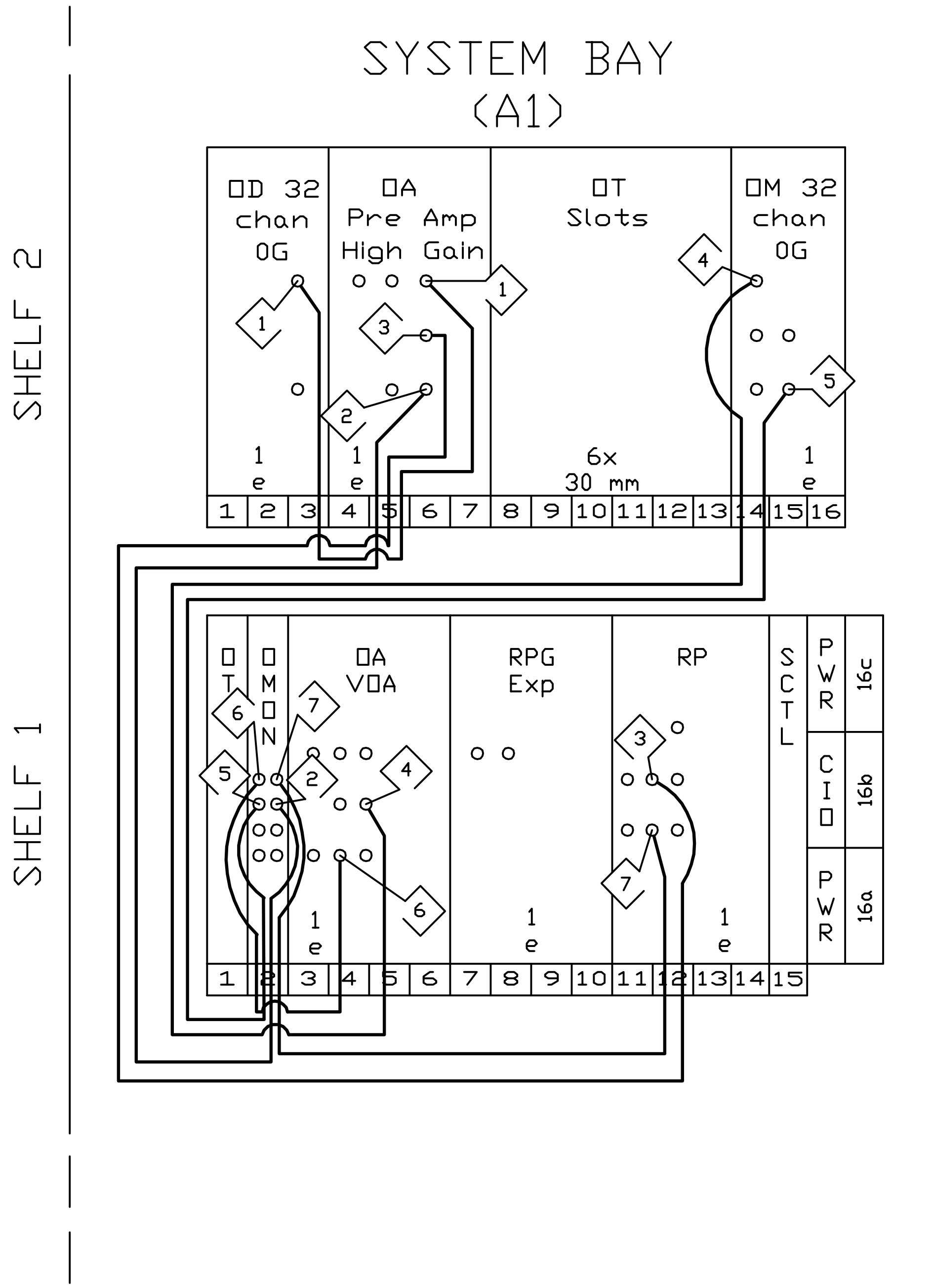


Table 6-7 10G System Bay Table #2

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) Label Color Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
8	OA(VOA)	A1	1	6	OUT SUP	SUPVY	A1	3	5	IN1	57.0 (B) XS1
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGHT IN FIBER TRAY TO SLOT 5 AND UP										OA-OUT SUP/ SUPVY-IN1-1E
9	RP (OSP, 50G/ 100G)	A1	1	14	IN SUP	SUPVY	A1	3	5	OUT1	65.0 (B) XS1
	DOWN THRU SLOT 12, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGHT IN FIBER TRAY TO SLOT 5 AND UP										RP-IN SUP / SUPVY-OUT1-1E
10	OA (PREAMP)	A1	2	7	OUT DCM	DCM1	A1	-	-	IN DCM	44.0 (B) XS1
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-OUT DCM / DCM1-IN DCM-1E
11	OA (PREAMP)	A1	2	7	IN DCM	DCM1	A1	-	-	OUT DCM	44.0 (B) XS1
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-IN DCM / DCM1-OUT DCM-1E
12	OA (VOA)	A1	1	6	OUT DCM	DCM2	A1	-	-	IN DCM	26.0 (B) XS1
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM2										OA-OUT DCM/ DCM2-IN DCM-1E
13	OA (VOA)	A1	1	6	IN DCM	DCM2	A1	-	-	OUT DCM	26.0 (B) XS1
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM2										OA-IN DCM/DCM2-OUT DCM-1E

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 6-8 10G System Bay Figure #2

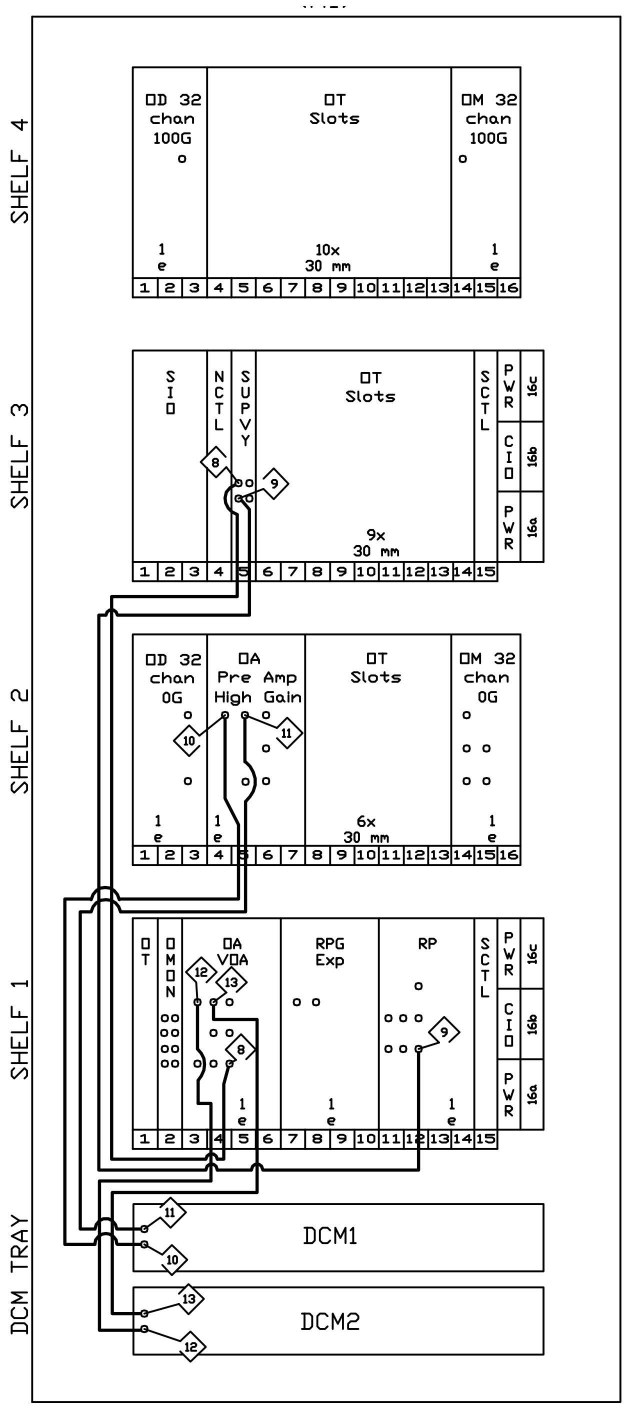


Table 6-8 10G System Bay Table #3

Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) / Label Color / Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
14*	OD(200/1000G)	A1	2	3	OUT 100G	OD (100G) #	A1	4	3	IN 100G	59.0 (B) XS1
	DOWN THRU SLOT 3, LEFT TO FIBER DUCT, UP TO SHELF 4, RIGHT IN FIBER TRAY TO SLOT 3 AND UP										OD-OUT 100G / OD-IN 100G-1E
15*	OM (OG)	A1	2	16	IN 100G	OM (100G)#	A1	4	16	OUT 100G	61.5 (B) XS1
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 4, LEFT IN FIBER TRAY TO SLOT 14 AND UP										OM-IN 100G / OM-OUT 100G-1E
16*	RPG(EXP)#	A1	1	10	OUT CORP	OA (VOA)	A1	1	6	IN CORP	27.0 (B) XS5
	DOWN THRU SLOT 8, LEFT TO SLOT 4 AND UP										RPG-OUT CORP/ OA-IN CORP-1E
17*	RPG(EXP)#	A1	1	10	OUT RPG	RP	A1	1	14	IN RPG	27.0 (B) XS5
	DOWN THRU SLOT 8, RIGHT TO SLOT 12 AND UP										RPG-OUT RPG/RP-IN PRG-1E

# Indicates optional growth circuit pack.

* Fiber numbers marked with an asterisk indicate one or both ends of fiber terminate in a circuit pack that is optional. Circuit pack placement is performed in a previous procedure. Verify presence of both circuit packs and/or customer order

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 6-9 10G System Bay Figure #3

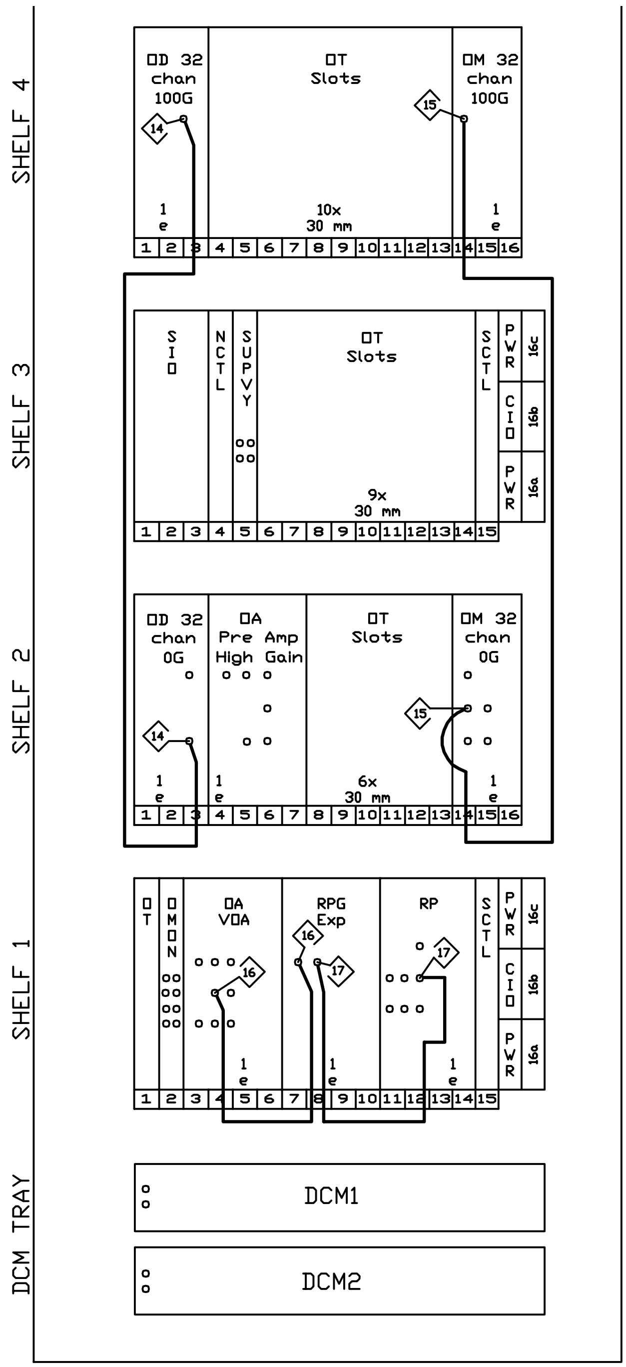


Table 6-9 10G Line Bay #1

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
18*	OD (200/100 50G)#	A2	2	3	OUT 150G	OD (150G)#	A2	4	3	IN 150G	59.0 (B) XS8
	DOWN THRU SLOT 3, LEFT TO FIBER DUCT, UP TO SHELF 4, RIGHT IN FIBER TRAY TO SLOT 3 AND UP										OD-OUT 150G / OD-IN 150G-1E
19*	OM (200/100 50G)#	A2	2	16	IN 150G	OM (150G)#	A2	4	16	OUT 150G	61.5 (B) XS8
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 4, LEFT IN FIBER TRAY TO SLOT 14 AND UP										OM-IN 150G / OM-OUT 150G -1E
20*	OD (200/100 50G)#	A2	2	3	IN 50/150G)	OA (PRE AMP)#	A2	2	7	OUT SIG	28.0 (B) XS8
	DOWN THRU SLOT 3, RIGHT TO SLOT 5 AND UP										OD-IN50/150G / OA-OUT SIG-1E
21*	OA (PREAMP)#	A2	2	7	OUT DCM	DCM1#	A2	-	-	IN DCM	44.O (B) XS8
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 4, LEFT IN FIBER TRAY TO SLOT 14 AND UP										OA-OUT DCM / DCM1-IN DCM-IE
22*	OA (PREAMP)#	A2	2	7	IN DCMS	DCM1#	A2	-	-	OUT DCM	44.0 (B) XS8
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 4, LEFT IN FIBER TRAY TO SLOT 14 AND UP										OA-IN DCM / DCM1-OUT DCM-1E

# Indicates optional circuit pack.

* Fiber numbers marked with an asterik indicate one or both ends of fiber terminate in a circuit pack that is optional. Circuit pack placement is performed in a previous procedure. Verify presence of both circuit packs and/or customer order

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 6-10 10G Line Bay #1

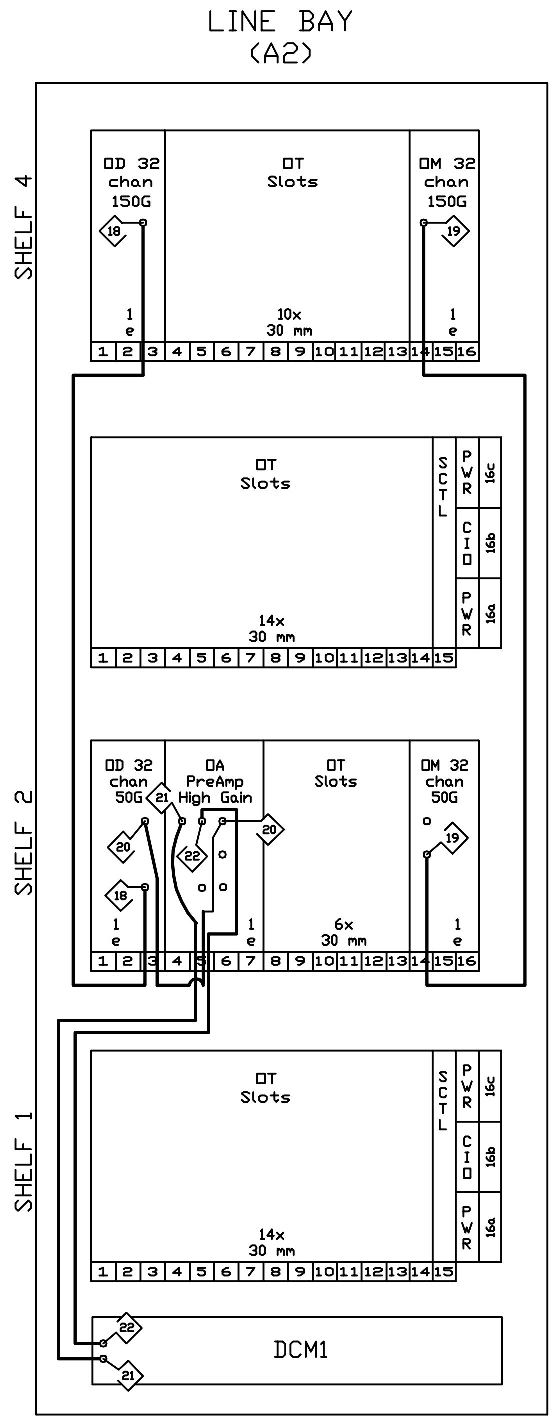


Table 6-10 10G System/Line Inter-Bay (R)

Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
23R *	OM (0G)	A1	2	16	IN 50/150G	OM(200/100 50G)#	A2	2	16	OUT 50/150G	106.0 (B) XS8
	Down Thru Slot 14, Right To Fiber Duct, Down To Horizontal Tray At Bottom Of Bay, Right To Right Vertical Duct Of Bay A2, Up To Shelf 2, Left In Fiber Tray To Slot 14 And Up										OM-IN 50/150G/ OM-OUT 50/150G-1E
24R *	OMON	A1	1	2	IN 5	OA (PREAMP)#	A2	2	7	OMON	81.5 (B) XS8
	DOwn Thru Slot 2, Left To Fiber Duct, Down To Horizontal Tray At Bottom Of Bay, Right To Left Vertical Duct Of Bay A2, Up To Shelf 2, Right In Fiber Tray To Slot 5 And Up										OMON-IN5 / OA-OMON-1E
25R *	RP(OSP 50/ 100G)	A1	1	14	OUT 50/ 150G	OA (PREAMP)#	A2	2	7	IN SIG	100.5 (B) XS8
	DOWN THRU SLOT 12, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, RIGHT TO RIGHT VERTICAL DUCT OF BAY A2, UP TO SHELF 2, LEFT IN FIBER TRAY TO SLOT 5 AND UP										RP-OUT 50/150G / OA-IN SIG-1E

# Indicates optional circuit pack.

* Fiber numbers marked with an asterik indicate one or both ends of fiber terminate in a circuit pack that is optional. Circuit pack placement is performed in a previous procedure. Verify presence of both circuit packs and/or customer order.

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 6-11 10G System/Line Inter-Bay (R)

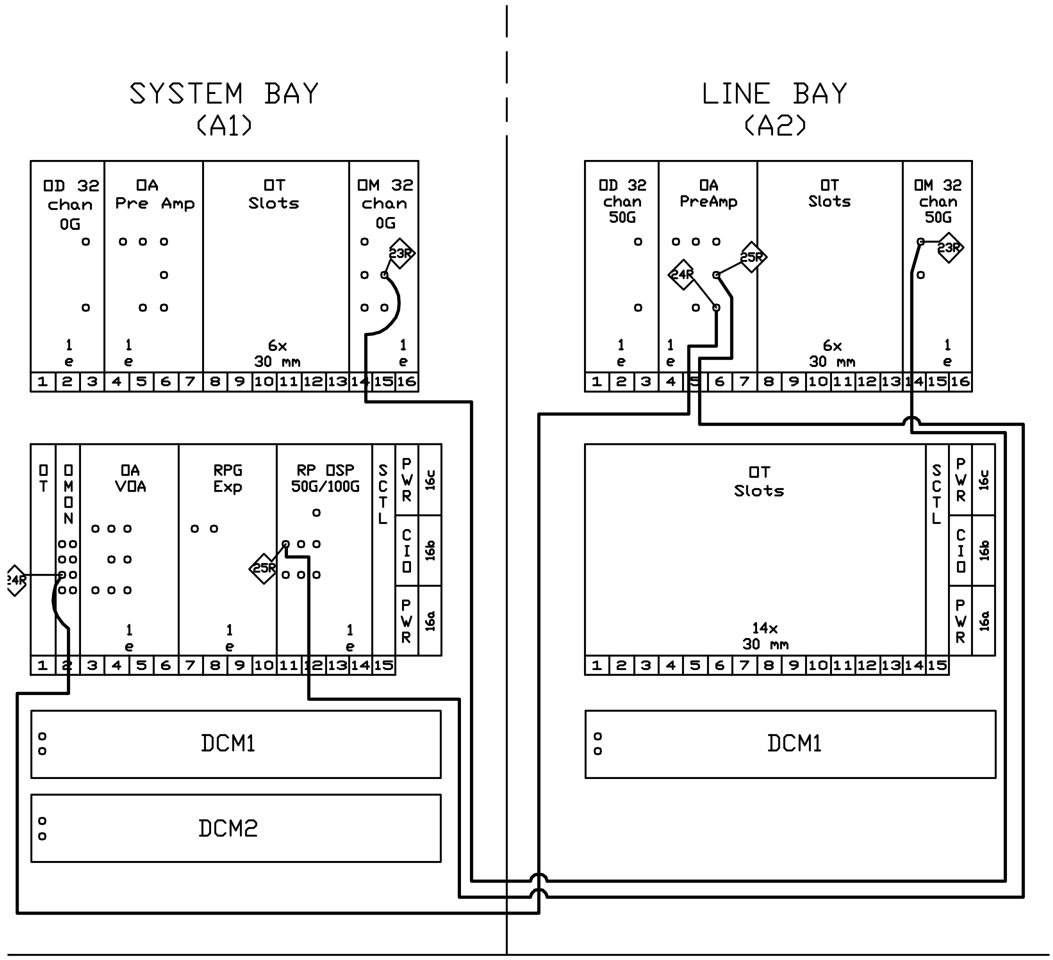


Table 6-11 10G System/Line Inter-Bay (L)

Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
23L *	OM (0G)	A1	2	16	IN 50/150G	OM(200/100 50G)#	A2	2	16	OUT 50/150G	106.0 (B) XS8
	Own Thru Slot 14, Right To Fiber Duct, Down To Horizontal Tray At Bottom Of Bay, Left To Right Vertical Duct Of Bay A2, Up To Shelf 2, Left In Fiber Tray To Slot 14 And Up										OM-IN 50/150G/ OM-OUT 50/150G-1E
24L *	OMON	A1	1	2	IN 5	OA (PRE AMP)#	A2	2	7	OMON	81.5 (B) XS8
	Down Thru Slot 2, Left To Fiber Duct, Down To Horizontal Tray At Bottom Of Bay, Left To Left Vertical Duct Of Bay A2, Up To Shelf 2, Right In Fiber Tray To Slot 5 And Up										OMON-IN5 / OA-OMON-1E
25L *	RP(OSP 50/ 100G)	A1	1	14	OUT 50/ 150G	OA (PRE AMP)#	A2	2	7	IN SIG	100.5 (B) XS8
	Down Thru Slot 12, Right To Fiber Duct, Down To Horizontal Tray At Bottom Of Bay, Left To Right Vertical Duct Of Bay A2, Up To Shelf 2, Left In Fiber Tray To Slot 5 And Up										RP-OUT 50/150G / OA-IN SIG-1E

# Indicates optional circuit pack.

* Fiber numbers marked with an asterik indicate one or both ends of fiber terminate in a circuit pack that is optional. Circuit pack placement is performed in a previous procedure. Verify presence of both circuit packs and/or customer order.

Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 6-12 10G System/Line Inter-Bay (L)

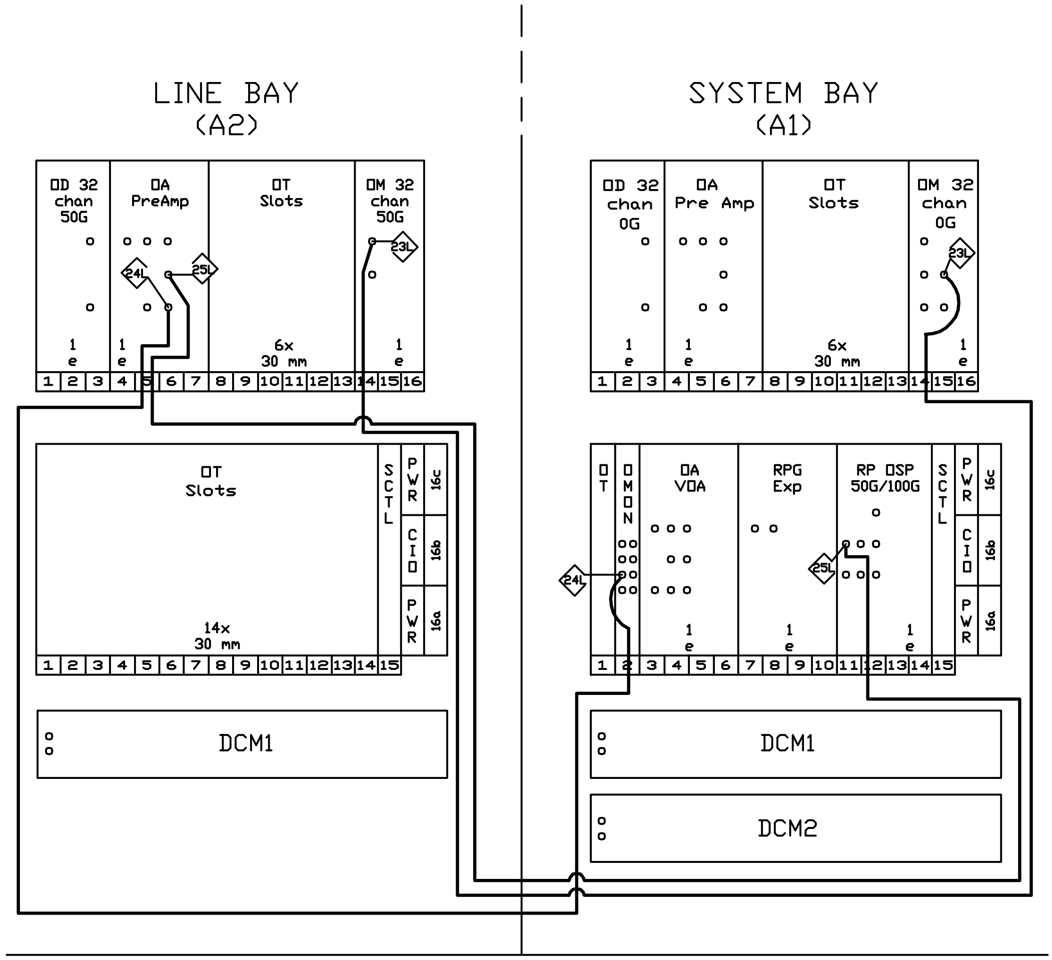


Table 6-12 40G System Bay Intra-Bay #1

Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) / Label Color / Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
1	OD(200/100G 0G)	A1	2	3	IN 0/100G	OA(PREAMP)	A1	2	7	OUT SIG	28.0 (B) XS2
	DOWN THRU SLOT 3, RIGHT TO SLOT 5 AND UP										OD-IN 0/100G / OA-OUT SIG-1E
2	OMON	A1	1	2	IN 1	OA (VOA)	A1	1	6	OMON	18.0 (B) XS2
	DOWN THRU SLOT 2, RIGHT TO SLOT 4 AND UP										OMON-IN1 / OA-OMON-IE
3	OMON	A1	1	2	IN 2	RP(OSP)	A1	1	14	OMON	28.0 (B) XS2
	DOWN THRU SLOT 2, RIGHT TO SLOT 12 AND UP										OMON-IN2 / RP-OMON-IE
4	OMON	A1	1	2	IN 3	OM (0G)	A1	2	16	OMON	50.0 (B) XS2
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										OMON-IN3 / OM-OMON-1E
5	OMON	A1	1	2	IN 4	OA(PREAMP)	A1	2	7	OMON	39.0 (B) XS2
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 5 AND UP										OMON-1N4 / OA-OMON-1E
6	OA (VOA)	A1	1	6	IN SIG	OM (OG)	A1	2	16	OUT SIG	57.0 (B) XS2
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										OA-IN SIG / OM-OUT SIG-1E
7	RPG(EXP)	A1	1	10	OUT CORP	OA (VOA)	A1	1	6	IN CORP	27.0 (B) XS5
	DOWN THRU SLOT 8, LEFT TO SLOT 4 AND UP										RPG-OUT CORP/ OA-IN CORP-1E
8	RPG(EXP)	A1	1	10	OUT RPG	RP	A1	1	14	IN RPG	27.0 (B) XS5
	DOWN THRU SLOT 8, RIGHT TO SLOT 12 AND UP										RPG-OUT RPG/RP-IN PRG-1E
9	RP(OSP)	A1	1	14	OUT SIG	OA(PREAMP)	A1	2	7	IN SIG	58.0 (B) XS2
	DOWN THRU SLOT 12, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 5 AND UP										RP-OUT SIG / OA-IN SIG-1E

Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 6-13 40G System Bay Intra-Bay #1

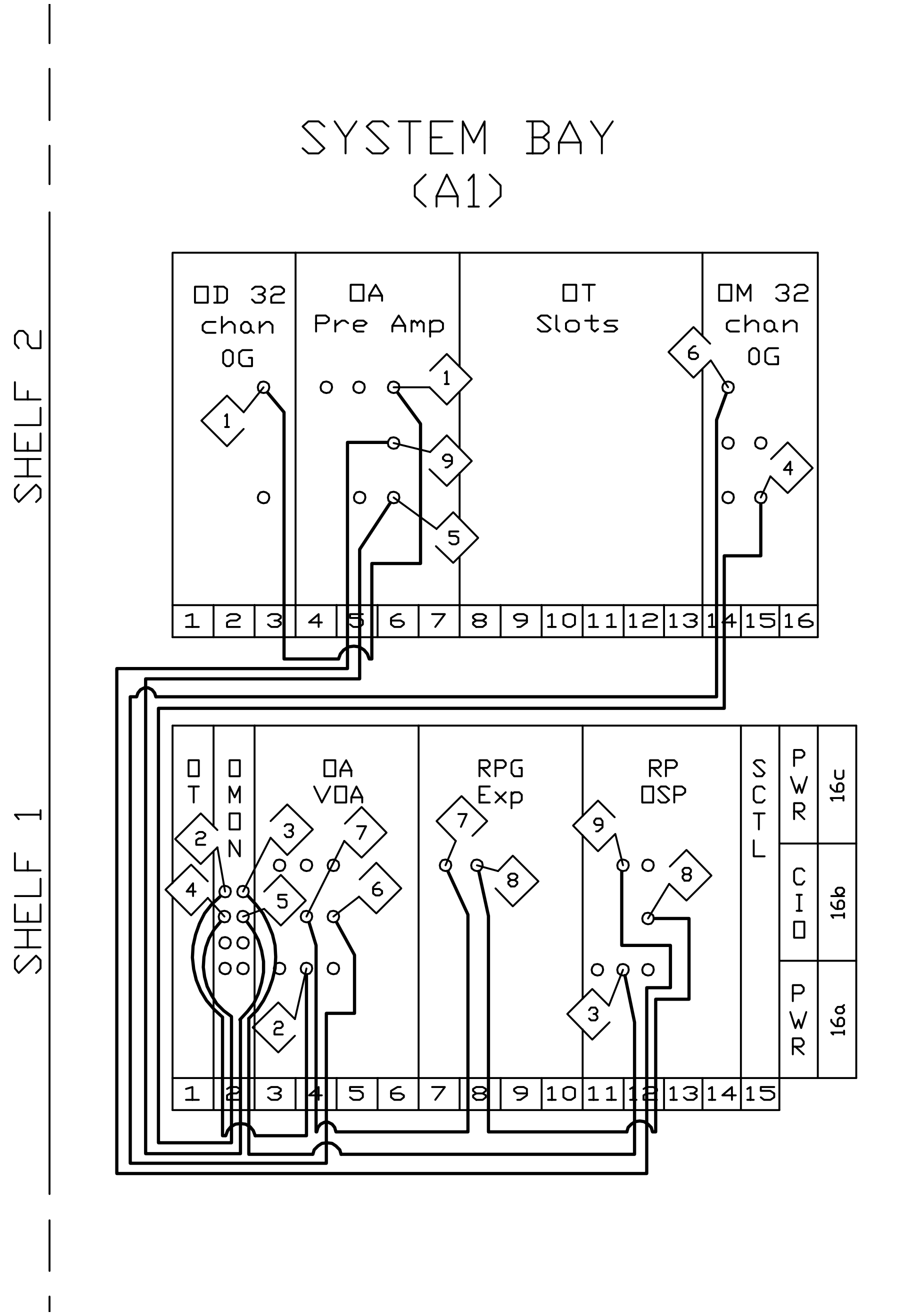


Table 6-13 40G System Bay Intra-bay #2

Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) / Label Color / Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
10	OD (200/100G)	A1	2	3	OUT 100G	OD (100G)	A1	4	3	IN 100G	59.0 (B) XS2
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT IN FIBER TRAY TO SLOT 14 AND UP										OD-OUT 100G / OD-IN 100G-1E
11	OA (PREAMP)	A1	2	7	IN DCM	DCM1	A1	-	-	OUT DCM	44.0 (B) XS2
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-IN DCM/DCM1-OUT DCM-1E
12	OA (PREAMP)	A1	2	7	OUT DCM	DCM1	A1	-	-	IN DCM	44.0 (B) XS2
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-OUT DCM / DCM1-IN DCM-1E
13	OM (OG)	A1	2	16	IN 100G	OM (100G)	A1	4	16	OUT 100G	61.5 (B) XS2
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 4, LEFT IN FIBER TRAY TO SLOT 14 AND UP										OM-IN 100G / 0M-OUT 100G-1E
14	OA (VOA)	A1	1	6	OUT DCM	DCM2	A1	-	-	IN DCM	26.0 (B) XS2
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-OUT DCM / DCM2-IN DCM-1E
15	OA (VOA)	A1	1	6	IN DCM	DCM2	A1	-	-	OUT DCM	26.0 (B) XS2
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-IN DCM / DCM2-OUT DCM-1E
16	OA (VOA)	A1	1	6	OUT SUP	SUPVY	A1	3	5	IN 1	57.0 (B) XS2
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGHT IN FIBER TRAY TO SLOT 5 AND UP										OA-OUT SUP / SUPVY-IN1-1E
17	RP (OSP)	A1	1	14	IN SUP	SUPVY	A1	3	5	OUT 1	65.0 (B) XS2
	DOWN THRU SLOT 12, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGHT IN FIBER TRAY TO SLOT 5 AND UP										RP-IN SUP / SUPVY-OUT1-1E

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 6-14 40G System Bay Intra-Bay #2

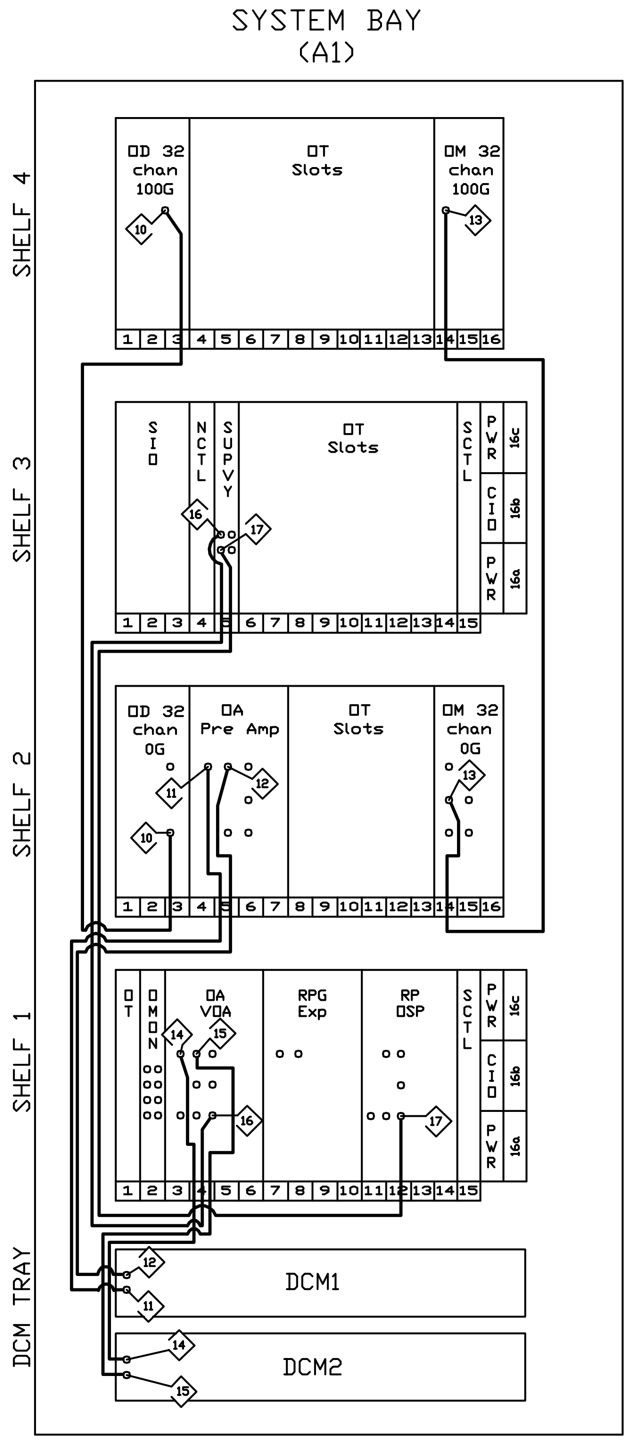


Figure 6-15 10G Block Diagram With Pack Codes

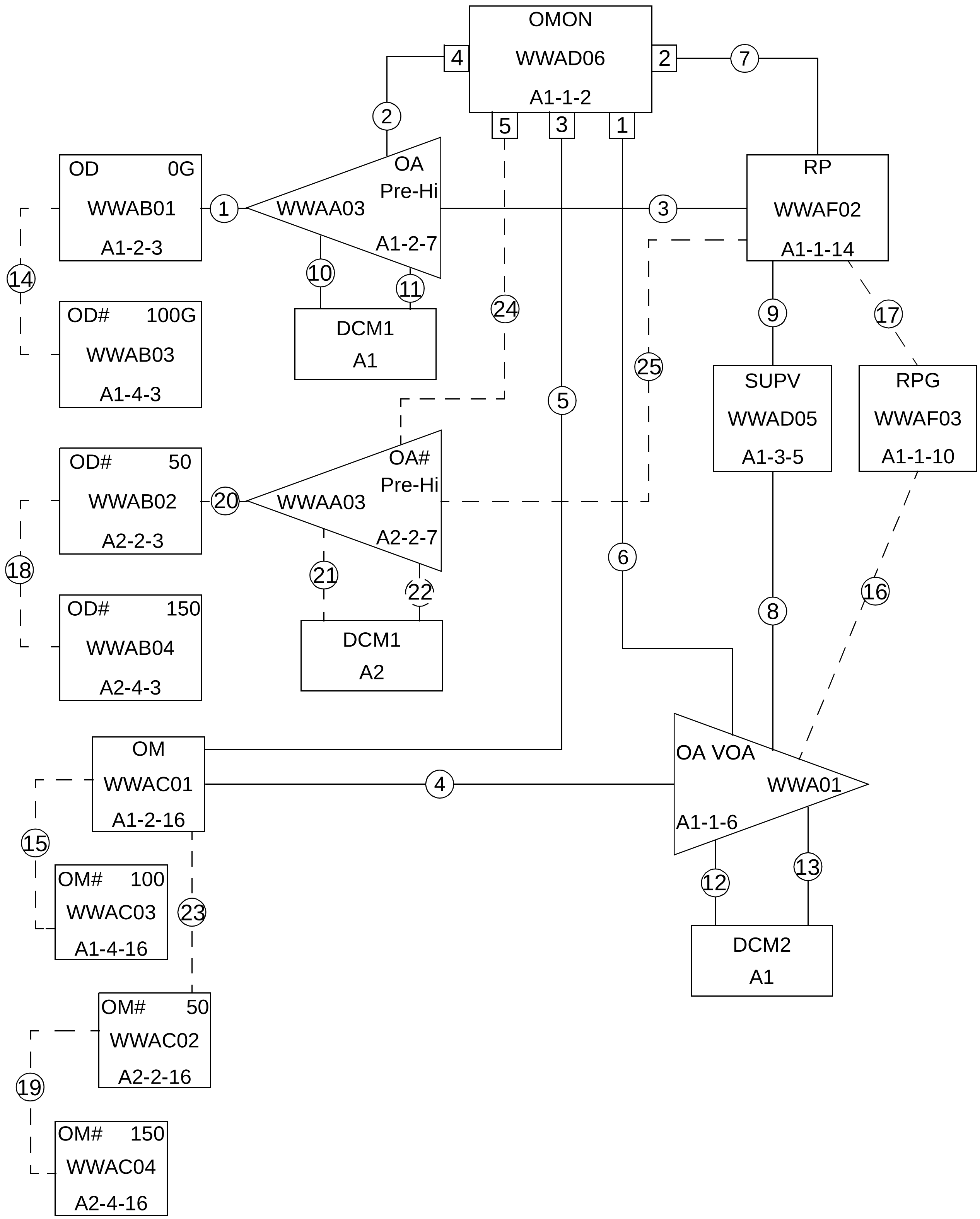
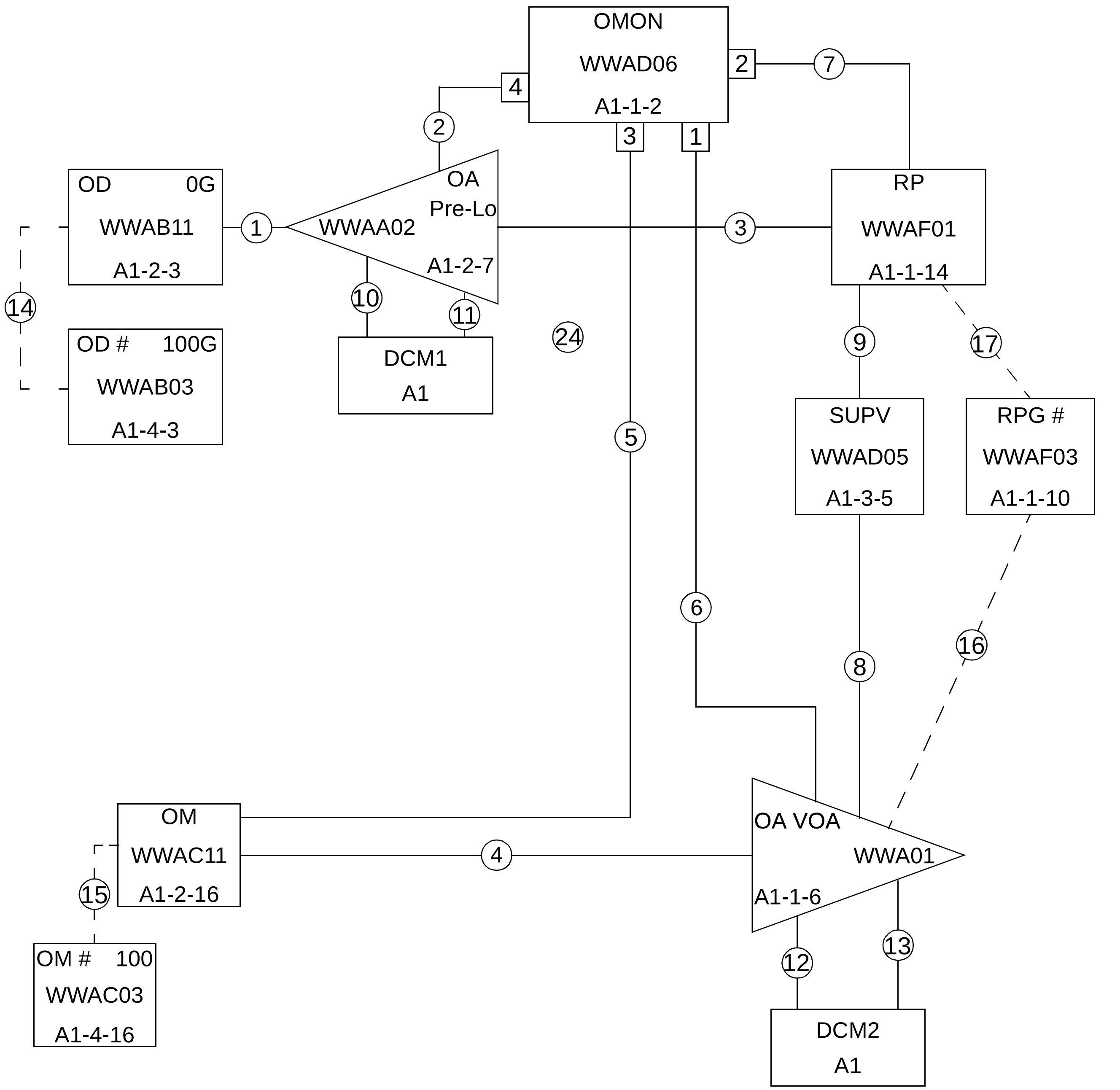


Figure 6-16 40G Block Diagram With Pack Codes



7 Non-OT Circuit Pack and Fiber Installation for OADM Terminals

Overview

Introduction

This chapter provides the information to install all the ordered circuit packs and fibers into the appropriate positions in either the System or Line bays.

Reason for revision

This is the first issue.

Contents

This chapter contains the following.

Precautions	7-2
Circuit Pack Placement	7-3
DCM and Storage Tray Placement	7-7
CIO Configuration	7-9
Fiber Information	7-11
Fiber Tables/Figures	7-13
Fibering Procedures	7-14

Precautions

ESD

CAUTION

Many of these circuit packs are sensitive to ESD. Always used and ESD wrist strap when handling circuit packs

Handling

CAUTION

Care should be used while handling Circuit Packs to prevent damage to the internal fibers on the circuit packs or causing them to come loose.

Switch Protection Port Cases

If a contaminated (dirty) fiber is disconnected with high levels of power present permanent damage to the fiber can occur. Switch protection is designed to protect the fiber by insuring that the power has been turned down prior to disconnecting the fiber. The switch protection mechanism combines a movable hinged cover, located over the fiber connection on the circuit pack faceplate, with a switch. With the cover in the down position the fiber connection cannot be physically accessed. With the cover in the down position high power light can flow through the fiber. Unlatching the cover and raising it to the up position causes the system to turn down the necessary pumps to make it safe to remove the fiber connection. The time interval between moving the hood to the up position and removing the fiber connection is sufficient for the pumps to be turned down.

□

Circuit Pack Placement

Bay Layout

The LambdaXtreme™ Transport OADM Terminal can be installed with one to six bays. The System Bay (A1) and Line Bay (A2) must be installed. Extension Bays (Bays B-H1, J-M1) can be added as required, dependent on configuration rules and customer needs. (Note: Bays A3-A5 are reserved for future configurations).

Precautions

CAUTION

Care should be used while handling Circuit Packs as fibers on the boards may come loose with improper handling.

Circuit Pack Layout

A Customer Specification sheet, generated by a customer ordering tool such as SITE, will instruct the installer where to place non-common packs such as OTs. Placement for those packs will be covered in a later chapter. This section covers the placement and fibering of all common packs in addition to a few non-OT packs that may be customer specific (such as RPG expansion packs and growth OM and ODs). Make note of the non-common non-OT packs now

Circuit Pack Placement

Proceed as follows:

1 Remove Non-OT Circuit packs from shipping material

2 Place and seat Non-OT Circuit Packs in the slots designated in Table 7-1 in conjunction with the customer order. Use Figure 7-1 on page 7-5 as a visual guide.

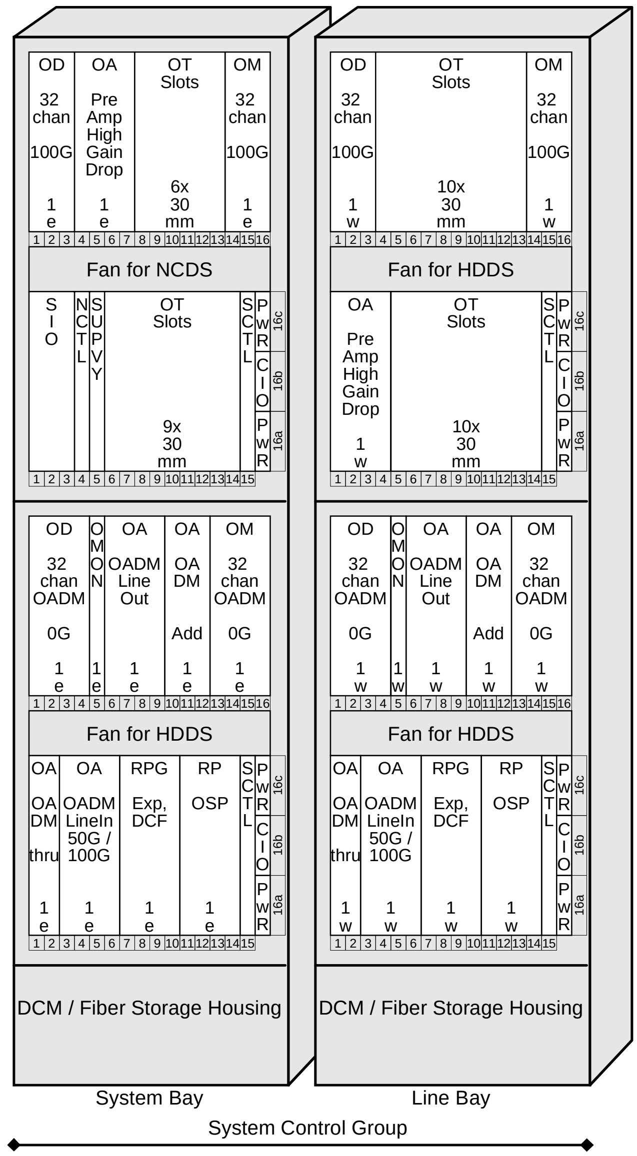
E N D O F S T E P S

Table 7-1 LambdaXtreme™ Transport OADM Circuit Pack Placement

Pack Code	Pack Name	Bay	Shelf	Slot(s)
WWAD01	CIO	ALL	1	16B
WWAD01	CIO	ALL	3	16B
WWAD04	SIO	A1	3	1 - 3
WWAD02	NCTL	A1	3	4
WWAD03	SCTL	ALL	1	15
WWAD03	SCTL	ALL	3	15
WWAD05	SUPVY	A1	3	5
WWAD06	OMON	A1 & A2	2	5
WWAA03	OA (Pre Amp, Hi Gain)	A1	4	4 - 7
WWAA03*	OA (Pre Amp, Hi Gain)	A2	3	1 - 4
WWAF01	RP (OSP)	A1 & A2	1	11 - 14
WWAF04*	RPG (Exp, DCF)	A1 & A2	1	7 - 10
WWAC21	OM OADM (0G)	A1 & A2	2	14 - 16
WWAC03*	OM OADM (100G)	A1 & A2	4	14 - 16
WWAB21	OD OADM (0G)	A1 & A2	2	1 - 3
WWAB03*	OD OADM (100G)	A1 & A2	4	1 - 3
WWAA24	OA (OADM, Add)	A1 & A2	2	10 - 12
WWAA04	OA (OADM, Line in))	A1 & A2	1	3 - 6
WWAA34	OA (OADM, Thru)	A1 & A2	1	1 - 2
WWAA14	OA (OADM, Line Out))	A1 & A2	2	6 - 9
WWAA03	OA (PreAmp Hi Gain)	A1 A2	4 3	4 - 7 1 - 4

* Indicates Circuit Pack, or second occurrence of circuit pack, is an optional pack that may not be on the customer order.

Figure 7-1 LambdaXtreme™ Transport OADM Terminal



Important! The above figure depicts Bay Growth to the right. Bay growth to the left would be the opposite.

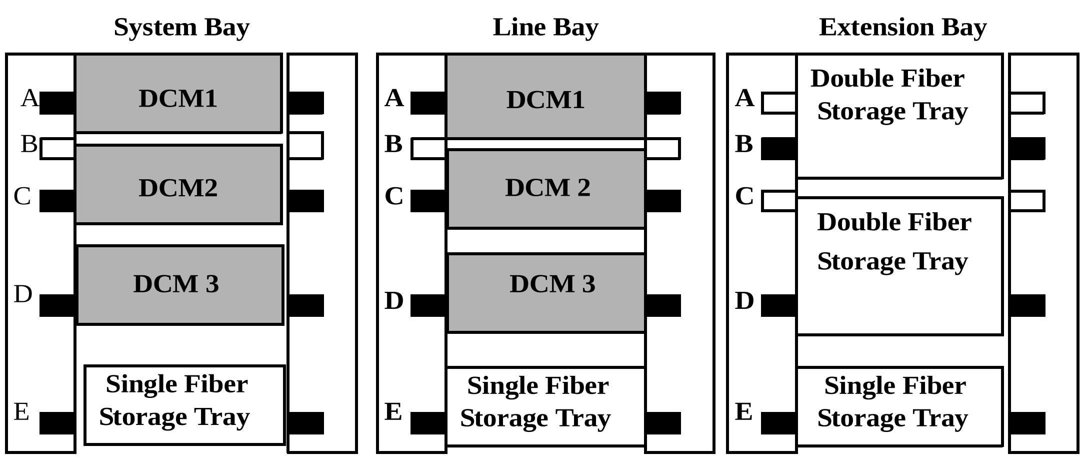
□

DCM and Storage Tray Placement

DCM / Storage Tray Overview

At the bottom of every LambdaXtreme™ Transport bay is a DCM and Fiber Storage Tray Assembly. The DCMs and fiber storage trays are modules which slide into the bay and are retained by two thumbs screws. There are five slot positions in which to slide in units. These positions are identified as A, B, C, D and E, from top to bottom. The letters are adjacent to the slots into which units can slide. The following figure shows the placement of DCMs and storage trays based on bay types. It is essential that placement be exactly as shown in Figure 7-2.

Figure 7-2 DCM/Storage Tray Placement for OADM



DCM/Storage Tray Placement

DCM placement is designated on the customer specification order for each site.

1 Unpack DCM units.

2 Place all applicable DCM units in their designated locations as indicated on the customer order at this time.

3 Unpack storage tray units.

4 Place all storage tray units in their designated locations as indicated in Figure 7-2 on page 7-7.

END OF STEPS

DCM Gain Fiber

DCMs units come equipped with either three jacks and one plug on each unit, or with just two jacks on a unit. For the units with a plug, attaching the loose plug into a specific jack allows the user to either serially connect a gain fiber or bypass it. The gain fiber is only utilized when the DCM connected to a Raman pump. The gain fiber selection must be made prior to fibering the Terminal.

Table 7-2 DCM Fiber Selection

Bay A1	DCM1	Gain Fiber Used
	DCM2	Gain Fiber Not Used
	DCM3	Gain Fiber Not Used
Bay A2	DCM1	Gain Fiber Used
	DCM2	Gain Fiber Not Used
	DCM3	Gain Fiber Not Used

1 Determine if DCM unit is a two or three input unit.

2 For three input units, determine fiber configuration from Table 7-2.

3 Make gain fibering changes to DCM unit if applicable.

END OF STEPS

□

CIO Configuration

Background

The CIO circuit pack has three switches that are utilized to identify the Group (S3), Bay within a group (S2) and shelf location of the applicable Shelf Controller (S1). They must be set properly prior to software installation

Procedures

Use the following procedures to properly set the switches on the CIO circuit pack to the appropriate value. There are multiple locations for the CIO card and this procedure must be done for every card to ensure proper communication control within the system

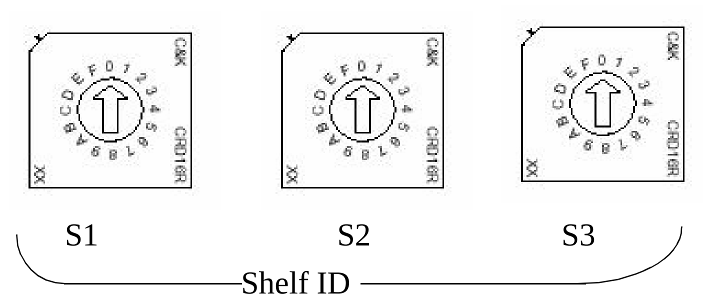
CAUTION

Observe ESD precautions when handling circuit packs.

1 Remove the CIO circuit pack.

2 Locate the Shelf ID switches (S1, S2, and S3) on the CIO circuit pack.

Figure 7-3 CIO Switch Locations



3 Set the switches on the CIO circuit packs in each bay according to the following table.

Important! There are two CIO circuit packs per bay

Table 7-3 CIO Switch Assignments

	Shelf 1			Shelf 3		
Bay	**SW1**	**SW2**	**SW3**	**SW1**	**SW2**	**SW3**
A1	1	1	A	3	1	A
A2	1	2	A	3	2	A
A3	Bays A3-A5 Reserved for future growth in OADM configurations					
A4						
A5						
B1	2	1	B	4	1	B
C1	2	1	C	4	1	C
D1	2	1	D	4	1	D
E1	2	1	E	4	1	E
F1	2	1	F	4	1	F
G1	2	1	0	4	1	0
H1	2	1	1	4	1	1
J1	2	1	2	4	1	2
K1	2	1	3	4	1	3
L1	2	1	4	4	1	4
M1	2	1	5	4	1	5

4 After setting the switches, replace the CIO circuit pack.

5 Repeat Steps 1-4 for all CIO circuit packs in the system.

END OF STEPS

☐

Fiber Information

Fiber Description

This section provides procedures to fiber the System and Line Bays in the LambdaXtreme™ Transport OADM terminal. Descriptions of the various types of fibers, fiber kit components, fiber routing, fiber labels, and dressing, running and storing fiber is included.

Fiber Kits

Refer to *Chapter 104, Fiber Kit Descriptions* for the descriptions of the fiber kits.

Fiber Cleaning

Refer to *Chapter 105, Fiber Cleaning* for the correct fiber cleaning procedures

Precautions

CAUTION

Fiber is constructed of glass and should be treated with care. It should not be pulled or stretched. This could cause damage to the fiber or the fiber connector.

CAUTION

Fiber should not be bent in a radius of less than 1-1/2” (38 mm).

OADM Terminal Fiber Kits

The LambdaXtreme™ Transport OADM Terminal consists of one - six bays; one System Bay, one Line Bay and up to four Extension Bays. The applicable red fiber kits are listed in the table below and contain fibers for inter- and intra-bay connections between the System and Line bays.

Kit	Description	System Name
109105973	LambdaXtreme™ Transport Kit XS4 (Provides all common circuit pack fibers for the system and line bays on an OADM terminal)	2FET-OADM fibers
109106005	LambdaXtreme™ Transport Kit XS7 (provides additional fibers needed if RPG packs are used)	RPG Fibers for 2F-OADM
848835906	OADM Fiber Jumper Designation Labels	
848835922	RPG Fiber Jumper Designation Labels	

Important! Yellow fiber kits for interconnections among the OM, OD and OT circuit packs are included in Chapter 9.

□

Fiber Tables/Figures

Introduction

Fiber tables are required because of the complexity of the LambdaXtreme™ Transport System. The fibers for the System Bay have to be connected according to the tables that follow.

Tables

The tables give the name and location of each circuit pack by Bay, Shelf, Slot, and Port where the fiber connection will take place. They designate the fiber length, the route to take with the fiber out of the packs, and the label name to be used on each end of the fiber.

Below is an explanation of the headers of the tables:

- **Done** - Place a check here when the fiber is complete
- **Fiber Number**- Number used to designate fiber in Fiber Diagram. (NOTE: Fibers marked with an asterik (*) are optional and are connected to an optional pack)
- **Circuit Pack**- Name of the pack and its label (NOTE: CPs marked with a (#) are optional packs. NOTE: Information contained in parentheses following circuit pack name in the fiber table is not listed on circuit pack label).
- **Bay** - Bay number
- **Shelf** - Shelf number starting with the bottom shelf as shelf 1
- **Slot** - Slot number found below the pack (some packs span multiple slots)
- **Port** - Name of the Port on the pack where the fiber will be connected
- **Routing Information** - The route the fibers are run
- **Fiber Length** - Length of the fiber in inches
- **Fiber Label (Color)** - Indicates which labels are to be placed on the ends of each fiber. The fibers in the East Side will always be Blue. Fibers in the West Side will be Green.

Figures

Each table on the left side of an opposing pages is supported by a figure on the right visually depicting the fiber routes.

□

Fibering Procedures

Bay Growth

The LambdaXtreme™ Transport supports bay growth in either direction, left or right. For that reason, the first two fiber tables are repeated to cover inter-bay fibering for left growth or right growth.

Procedures

Proceed as follows:

1 Determine from customer specification sheet whether the Line Bay will grow to the left or to the right.

2 Obtain the proper fiber and label kits (See Fiber Kits on page 7-11).

3 Determine the applicable fiber tables to use from the Master Fibering Table Guide: page 7-15.

4 On the applicable tables, circle all optional fibers that will be used.

Table 7-4 Master Fibering Table Guide

OADM Terminal			
Bay Growth Right		**Bay Growth Left**	
OADM Inter-Bay Growth Right (Table #1R)		OADM Inter-Bay Growth Left (Table #1L)	
Table 7-5	Figure 7-6	Table 7-7	Figure 7-8
OADM Inter-Bay Growth Right (Table #2R)		OADM Inter-Bay Growth Left (Table #2L)	
Table 7-6	Figure 7-7	Table 7-8	Figure 7-9
OADM System Intra-Bay (Table #3)			
Table 7-9		Figure 7-10	
OADM System Intra-Bay (Table #4)			
Table 7-10		Figure 7-11	
OADM System Intra-Bay (Table #5)			
Table 7-11		Figure 7-12	
OADM System Intra-Bay (Table #6)			
Table 7-12		Figure 7-13	
OADM Line Intra-Bay (Table #7)			
Table 7-13		Figure 7-14	
OADM Line Intra-Bay (Table #8)			
Table 7-14		Figure 7-15	
OADM Line Intra-Bay (Table #9)			
Table 7-15		Figure 7-16	

5 Starting with first fiber connection in fibering table, locate proper fiber jumper from kit and install label to both ends of the jumper.

6 Remove dust cap from the connector at one end of the fiber jumper. **INSPECT** fiber end and **CLEAN** if required.

7 Using fibering table and fibering diagram locate circuit pack connection. Remove protective cap from circuit pack and complete connection. If protective cap has already been removed, the circuit pack connector will have to be inspected using a probe and cleaned if required.

8 Route fiber to the other circuit pack according to routing information.

9 Repeat Steps 6 and 7 for other end of fiber jumper.

10 Put a check mark in the applicable “Done” column.

11 Continue until all the fiber connections, including circled optional fibers, have been completed.

> **Important!** Determine bay growth direction from customer specification sheet. This will determine which System/Line interbay fibering table to use.

> **Important!** Route Inter-bay fibers using applicable Inter-bay tables and Figures

> **Important!** Inter-bay fibers come pre-run in protective tubing. The fiber tubing should be secured to the bay frame with cable ties. (See Figure 7-4 and Figure 7-5 on page 7-17)

END OF STEPS

Figure 7-4 Inter-Bay Fiber Tubing for Seismic Bay

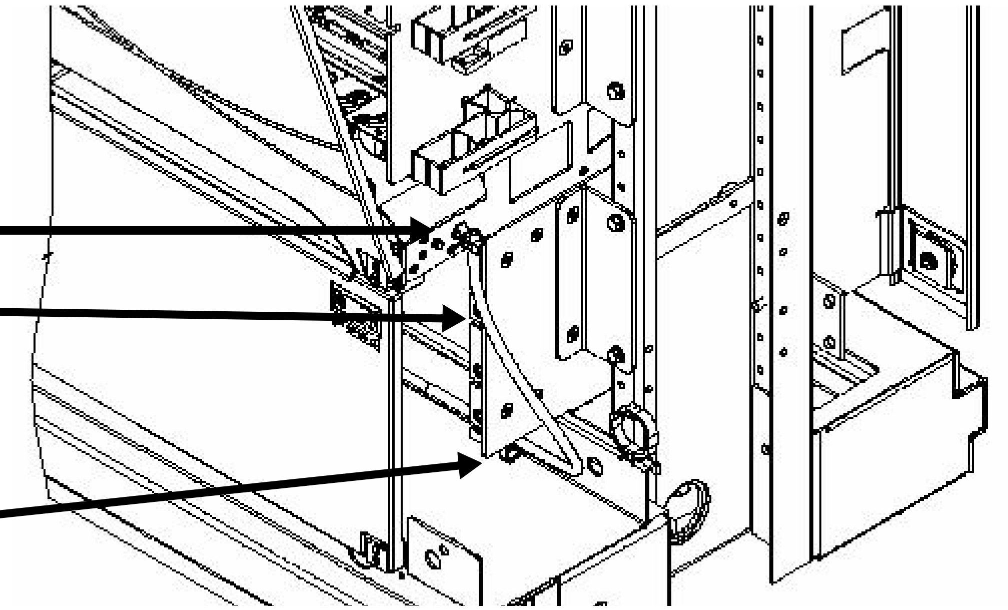


Figure 7-5 Interbay Fiber Tubing for ETSI Bay

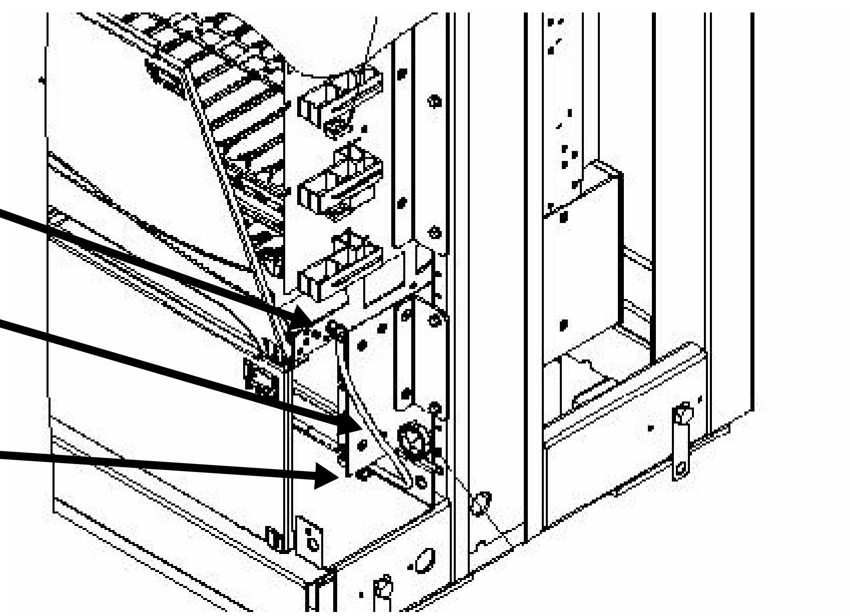


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Table 7-5 OADM Inter-Bay Growth Right (Table #1R)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) / Label Color / Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
1	OA (OADM LINE OUT)	A1	2	9	OUT SUP	SUPVY	A1	3	5	IN 1	43.0 (B) XS4
	DOWN THRU SLOT 7, LEFT TO VERTICAL DUCT, UP TO SHELF 3, RIGHT TO SLOT 5 AND UP										OA-OUT SUP / SUPVY-IN1-1E
2R	OD (OADM OG)	A2	2	4	OUT THRU	OM (OADM 0G)	A1	2	16	IN THRU	117.0 (GB) XS4
	DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, LEFT TO RIGHT VERTICAL DUCT OF BAY A1, UP TO SHELF 2 LEFT TO SLOT 13 AND UP										OD-OUT THRU-1W/ OM-IN THRU-1E
3R	OA (OADM LINE OUT)	A2	2	9	OUT SUP	SUPVY	A1	3	5	IN 2	122.5 (G) XS4
	DOWN THRU SLOT 7, LEFT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, LEFT TO LEFT VERTICAL DUCT OF BAY A1, UP TO SHELF 3, RIGHT TO SLOT 5 AND UP										OA-OUT SUP / SUPVY-IN2-1
4R	OA (OADM LINE-IN 50G/100G)	A2	1	6	OUT 50/ 150G	OM (OADM OG)	A1	2	16	IN EXPR	104.0 (GB) XS4
	DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, LEFT TO RIGHT VERTICAL DUCT OF BAY A1, UP TO SHELF 2 LEFT TO SLOT 13 AND UP										OA-OUT 50/150G-1W / OM-IN EXPR-1E
5R	RP (OSP)	A2	1	14	IN SUP	SUPVY	A1	3	5	OUT 2	109.0 (G) XS4
	DOWN THRU SLOT 12, LEFT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, LEFT TO LEFT VERTICAL DUCT OF BAY A1, UP TO SHELF 3, RIGHT TO SLOT 5 AND UP										RP-IN SUP / SUPVY-OUT2-IW

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 7-6 OADM Inter-Bay Growth Right (Figure #1R)

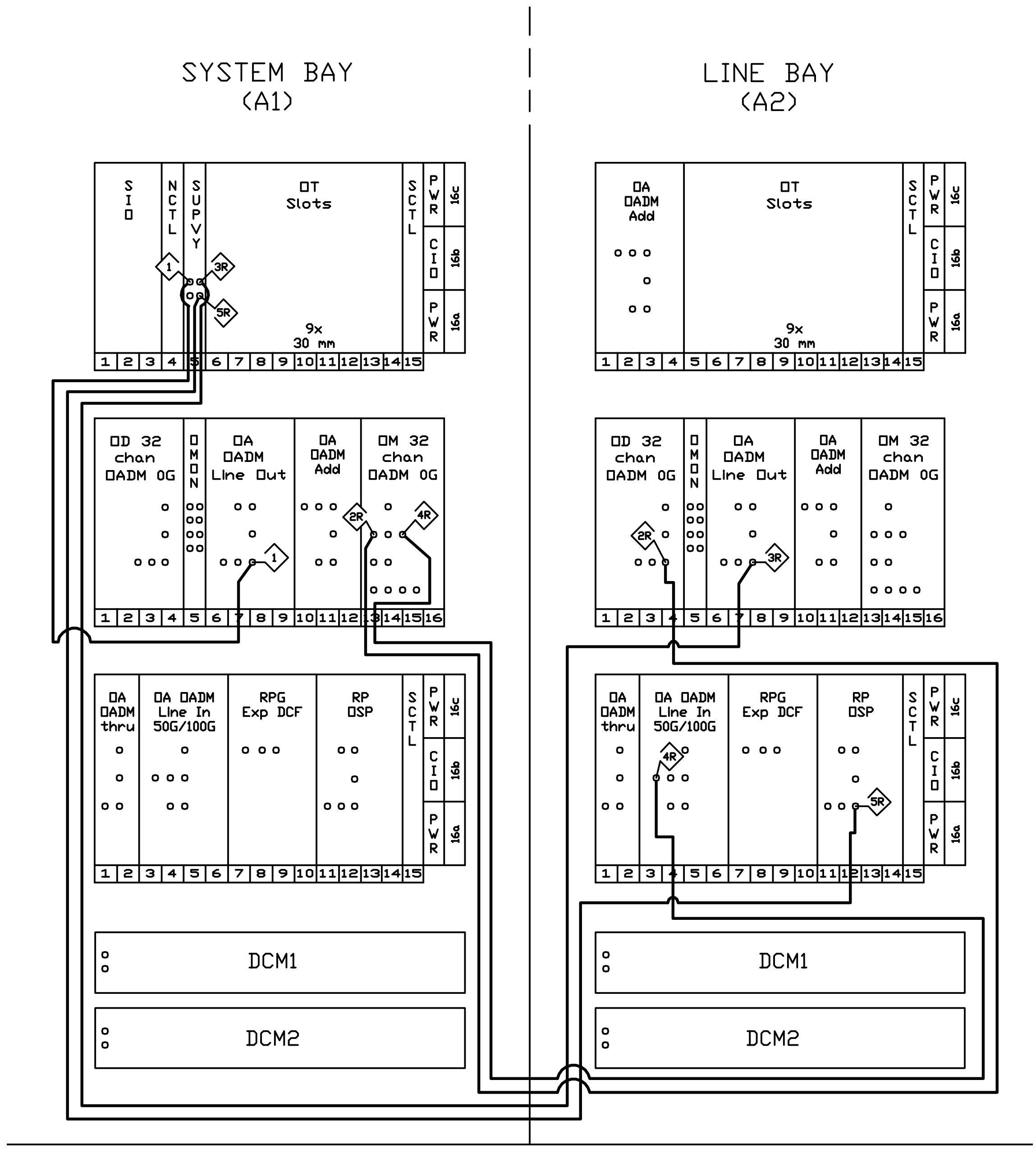


Table 7-6 OADM Inter-Bay Growth Right (Table #2R)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) / Label Color / Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
6R	OD (OADM OG)	A1	2	4	OUT THRU	OM (OADM 0G)	A2	2	16	IN THRU	117.0 (GB) XS4
	DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, RIGHT TO RIGHT VERTICAL DUCT OF BAY A2, UP TO SHELF 2 LEFT TO SLOT 13 AND UP										OD-OUT THRU-1E / OM-IN THRU-1W
7R	OA (OADM LINE-IN 50G/ 100G)	A1	1	6	OUT 50G/ 150G	OM (OADM OG)	A2	2	16	IN EXPR	104.0 (GB) XS4
	DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, RIGHT TO RIGHT VERTICAL DUCT OF BAY A2, UP TO SHELF 2 LEFT TO SLOT 13 AND UP										OA-OUT 50/150G-1E / OM-IN EXPR-1W
8*	RPG(EXP,DCF)	A1	1	10	OUT CORP	OA (OADM LINE OUT)	A1	2	9	IN CORP	55.5 (B) XS7
	DOWN THRU SLOT 8, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 7 AND UP										RPG-OUT CORP/ OA-IN CORP-1E
9*	RPG (EXP,DCF)#	A1	1	10	OUT RPG	RP (OSP)	A1	1	14	IN RPG	26.5 (B) XS7
	DOWN THRU SLOT 8, RIGHT TO SLOT 12 AND UP										RPG-OUT RPG / RP-IN RPG-1E
10 *	RPG (EXP,DCF)#	A1	1	10	OUT DCF	OA (OADM LINE-IN 50G/100G)	A1	1	6	IN DCF	26.5 (B) XS7
	DOWN THRU SLOT 8, LEFT TO SLOT 4 AND UP										RPG-OUT DCF / OA-IN DCF-IE
11 *	RPG (EXP,DCF)#	A2	1	10	OUT CORP	OA (OADM LINE OUT)	A2	2	9	IN CORP	55.5 (G) XS7
	DOWN THRU SLOT 8, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 7 AND UP										RPG-OUT CORP/ OA-IN CORP-1W
12 *	RPG (EXP,DCF)#	A2	1	10	OUT RPG	RP (OSP)	A2	1	14	IN RPG	26.5 (G) XS7
	DOWN THRU SLOT 8, RIGHT TO SLOT 12 AND UP										RPG-OUT RPG / RP-IN RPG-1W
13 *	RPG (EXP,DCF)#	A2	1	10	OUT DCF	OA(OADM LINE-IN 50G/100G)	A2	1	6	IN DCF	26.5 (G) XS7
	DOWN THRU SLOT 8, LEFT TO SLOT 4 AND UP										RPG-OUT DCF / OA-IN DCF-IW

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 7-7 OADM Inter-Bay Growth Right (Figure #2R)

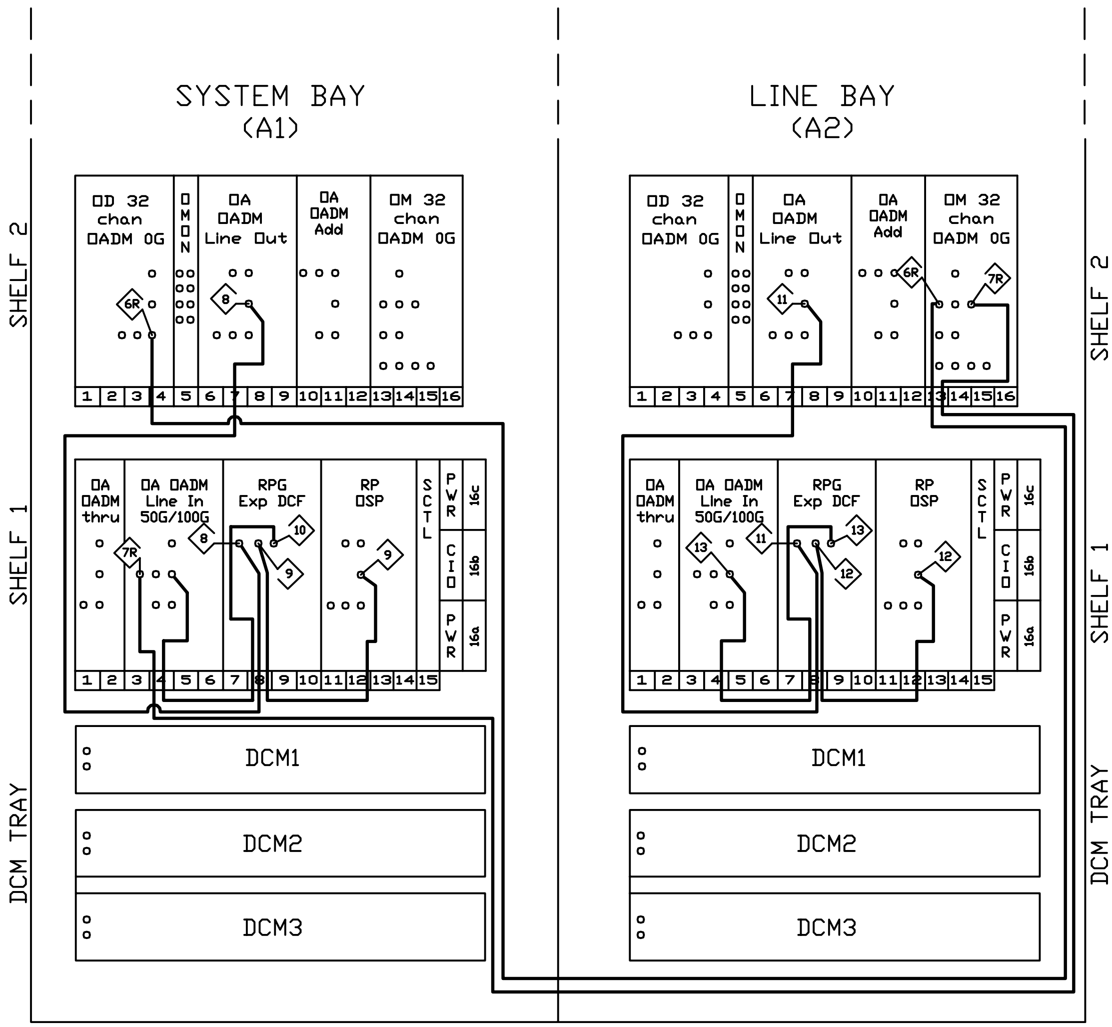


Table 7-7 OADM Inter-Bay Growth Left (Table #1L)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In)	Label Color	Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West		
1	OA (OADM LINE OUT)	A1	2	9	OUT SUP	SUPVY	A1	3	5	IN 1	43.0	(B)	XS4
	DOWN THRU SLOT 7, LEFT TO VERTICAL DUCT, UP TO SHELF 3, RIGHT TO SLOT 5 AND UP										OA-OUT SUP / SUPVY-IN1-1E		
2L	OD (OADM OG)	A2	2	4	OUT THRU	OM (OADM 0G)	A1	2	16	IN THRU	117.0	(GB)	XS4
	DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, RIGHT TO RIGHT VERTICAL DUCT OF BAY A1, UP TO SHELF 2, LEFT TO SLOT 13 AND UP										OD-OUT THRU-1W/ OM-IN THRU-1E		
3L	OA (OADM LINE OUT)	A2	2	9	OUT SUP	SUPVY	A1	3	5	IN 2	122.5	(GG)	XS4
	DOWN THRU SLOT 7, LEFT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, RIGHT TO LEFT VERTICAL DUCT OF BAY A1, UP TO SHELF 3, RIGHT TO SLOT 5 AND UP										OA-OUT SUP / SUPVY-IN2-1W		
4L	OA (OADM LINE-IN 50G/100G	A2	1	6	OUT 50/ 150G	OM (OADM 0G)	A1	2	16	IN EXPR	104.0	(GB)	XS4
	DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, RIGHT TO RIGHT VERTICAL DUCT OF BAY A1, UP TO SHELF 2, LEFT TO SLOT 13 AND UP										OA-OUT 50/150G-1W / OM-IN EXPR-1E		
5L	RP (OSP)	A2	1	14	IN SUP	SUPVY	A1	3	5	OUT 2	109.0	(G)	XS4
	DOWN THRU SLOT 12, LEFT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, RIGHT TO LEFT VERTICAL DUCT OF BAY A1, UP TO SHELF 3, RIGHT TO SLOT 5 AND UP										RP-IN SUP / SUPVY-OUT2-1W		

Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 7-8 OADM Inter-Bay Growth Left (Figure #1L)

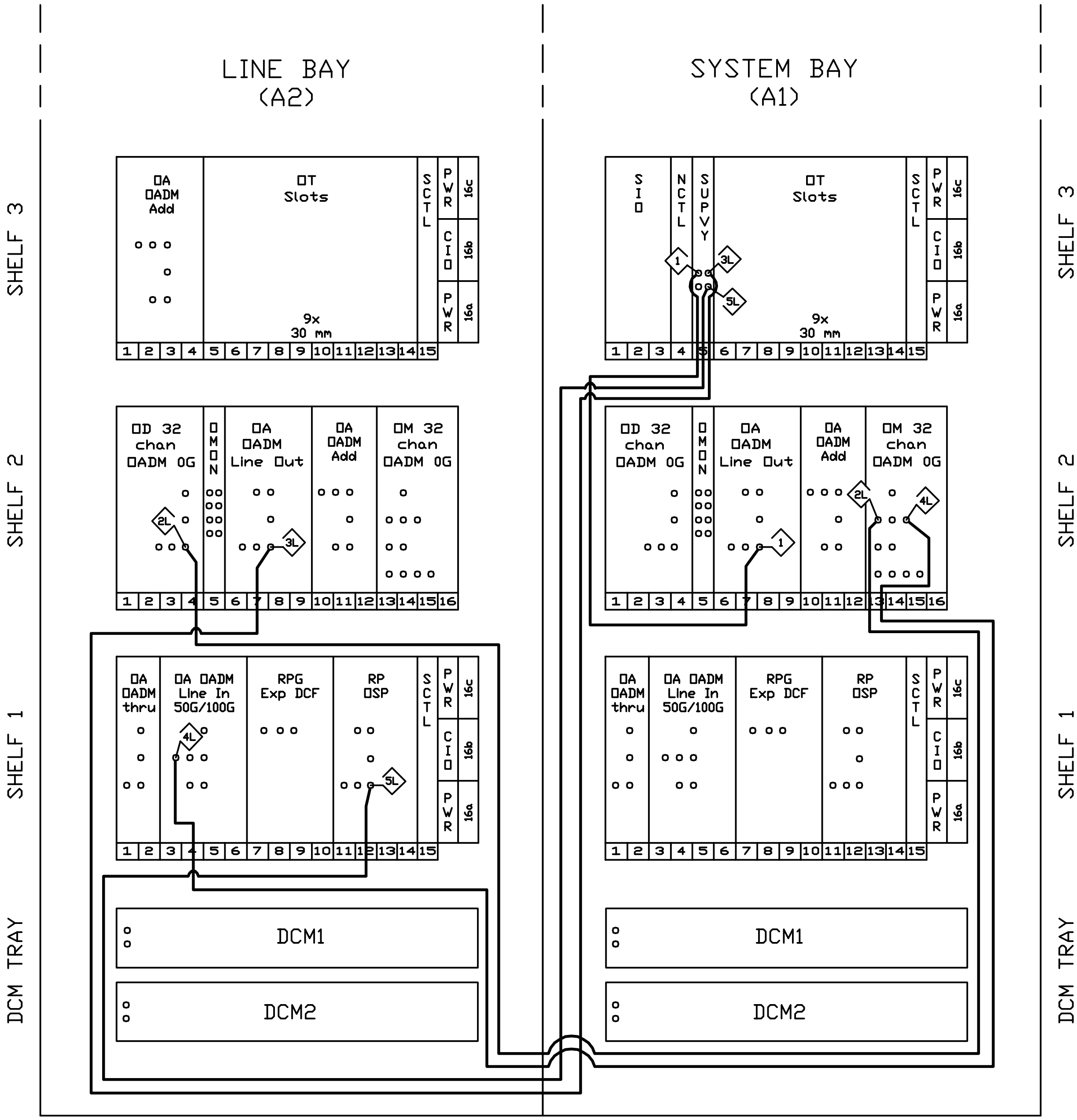


Table 7-8 OADM Inter-Bay Growth Left (Table #2L)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In)	Label Color	Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West		
6L	OD (OADM OG)	A1	2	4	OUT THRU	OM (OADM 0G)	A2	2	16	IN THRU	117.0	(GB)	XS4
	.DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, LEFT TO RIGHT VERTICAL DUCT OF BAY A2, UP TO SHELF 2, LEFT TO SLOT 13 AND UP										OD-OUT THRU-1E / OM-IN THRU-1W		
7L	OA(OADM LINE-IN 50G/ 100G)	A1	1	6	OUT 50/ 150G	OM(OADM 0G)	A2	2	16	IN EXPR	104.0	(BG)	XS4
	DOWN THRU SLOT 4, RIGHT TO FIBER DUCT, DOWN TO HORIZONTAL TRAY AT BOTTOM OF BAY, LEFT TO RIGHT VERTICAL DUCT OF BAY A2, UP TO SHELF 2, LEFT TO SLOT 13 AND UP										OA-OUT 50/150G-1E / OM-IN EXPR-1W		
8*	RPG (EXP,DCF)#	A1	1	10	OUT CORP	OA(OADM LINE OUT)	A1	2	9	IN CORP	55.5	(B)	XS7
DOWN THRU SLOT 8, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 7 AND UP											RPG-OUT CORP/ OA-IN CORP-1E		
9*	RPG (EXP,DCF)#	A1	1	10	OUT RPG	RP (OSP)	A1	1	14	IN RPG	26.5	(B)	XS7
	DOWN THRU SLOT 8, RIGHT TO SLOT 12 AND UP										RPG-OUT RPG / RP-IN RPG-1E		
10 *	RPG (EXP,DCF)#	A1	1	10	OUT DCF	OA(OADM LINE-IN 50G/100G)	A1	1	6	IN DCF	26.5	(B)	XS7
	DOWN THRU SLOT 8, LEFT TO SLOT 4 AND UP										RPG-OUT DCF / OA-IN DCF-IE		
11 *	RPG (EXP,DCF)#	A2	1	10	OUT CORP	OA(OADM LINE OUT)	A2	2	9	IN CORP	55.5	(G)	XS7
DOWN THRU SLOT 8, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 7 AND UP											RPG-OUT CORP/ OA-IN CORP-1W		
12 *	RPG (EXP,DCF)#	A2	1	10	OUT RPG	RP (OSP)	A2	1	14	IN RPG	26.5	(G)	XS7
	DOWN THRU SLOT 8, RIGHT TO SLOT 12 AND UP										RPG-OUT RPG / RP-IN RPG-1W		
13 *	RPG (EXP,DCF)#	A2	1	10	OUT DCF	OA (OADM LINE-IN 50G/100G)	A2	1	6	IN DCF	26.5	(G)	XS7
	DOWN THRU SLOT 8, LEFT TO SLOT 4 AND UP										RPG-OUT DCF / OA-IN DCF-IW		

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 7-9 OADM Inter-Bay Growth Left (Figure #2L)

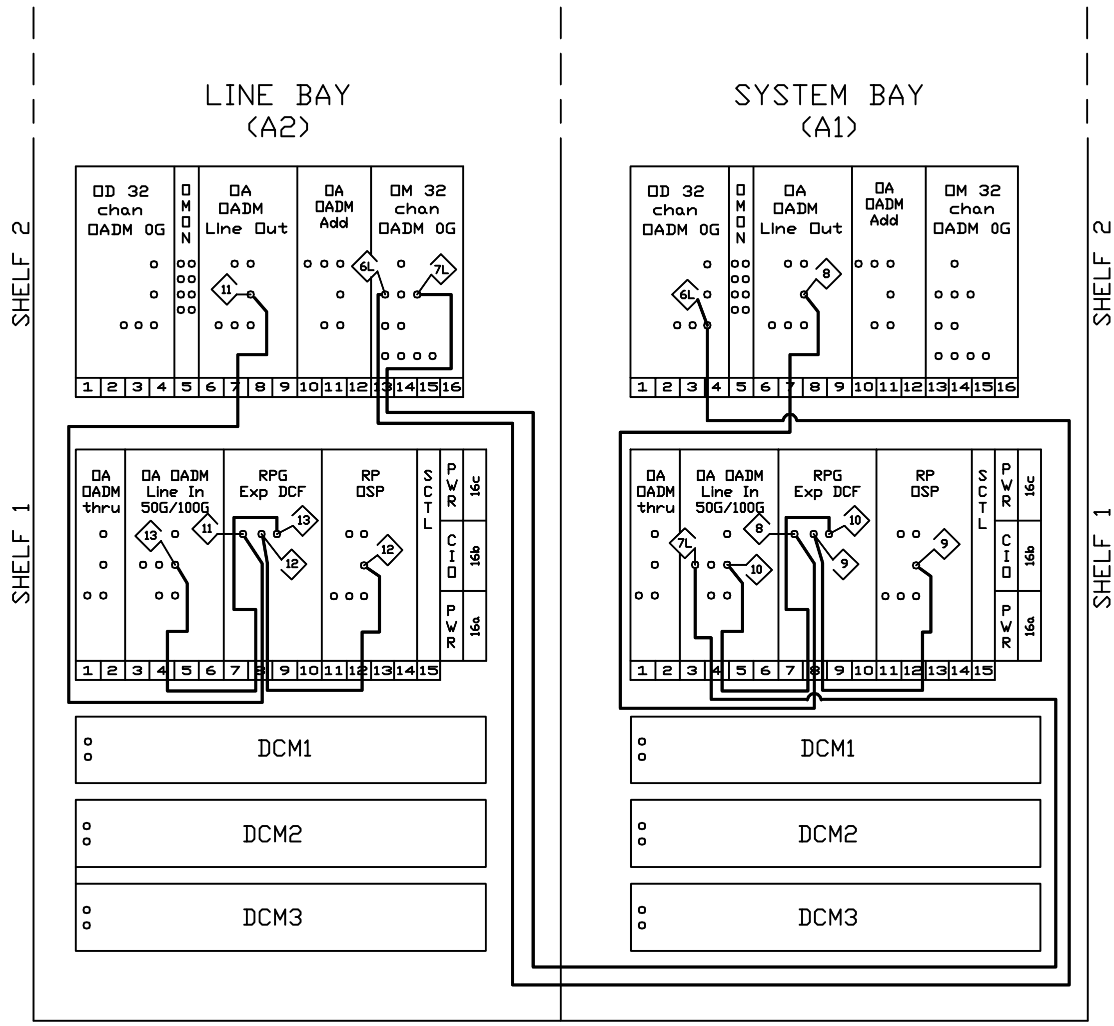


Table 7-9 OADM System Intra-Bay (Table #3)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) / Label Color / Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
14	OA (OADM THRU)	A1	1	2	OUT SIG	OD (OADM OG)	A1	2	4	IN OA-P	48.0 (B) XS4
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 4 AND UP										OA-OUT SIG / OD-IN OAP-1E
15	OA (OADM THRU)	A1	1	2	OMON	OMON	A1	2	5	IN 8	34.5 (B) XS4
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 5 AND UP										OA-OMON/OMON-IN8-1E
16	OA (OADM LINE-IN 50G/100G)	A1	1	6	OMON	OMON	A1	2	5	IN 4	40.0 (B) XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 5 AND UP										OA-OMON / OMON-IN4-1E
17	RP (OSP)	A1	1	14	OMON	OMON	A1	2	5	IN 2	53.0 (B) XS4
	DOWN THRU SLOT 12, RIGHT TO FIBER DUCT, UP TO SHELF 2, LEFT TO SLOT 5 AND UP										RP-OMON / OMON-IN2-1E

Visual Fiber Routing The following figure displays the routing information provided in table on the preceding page.

Figure 7-10 OADM System Intra-Bay (Figure #3)

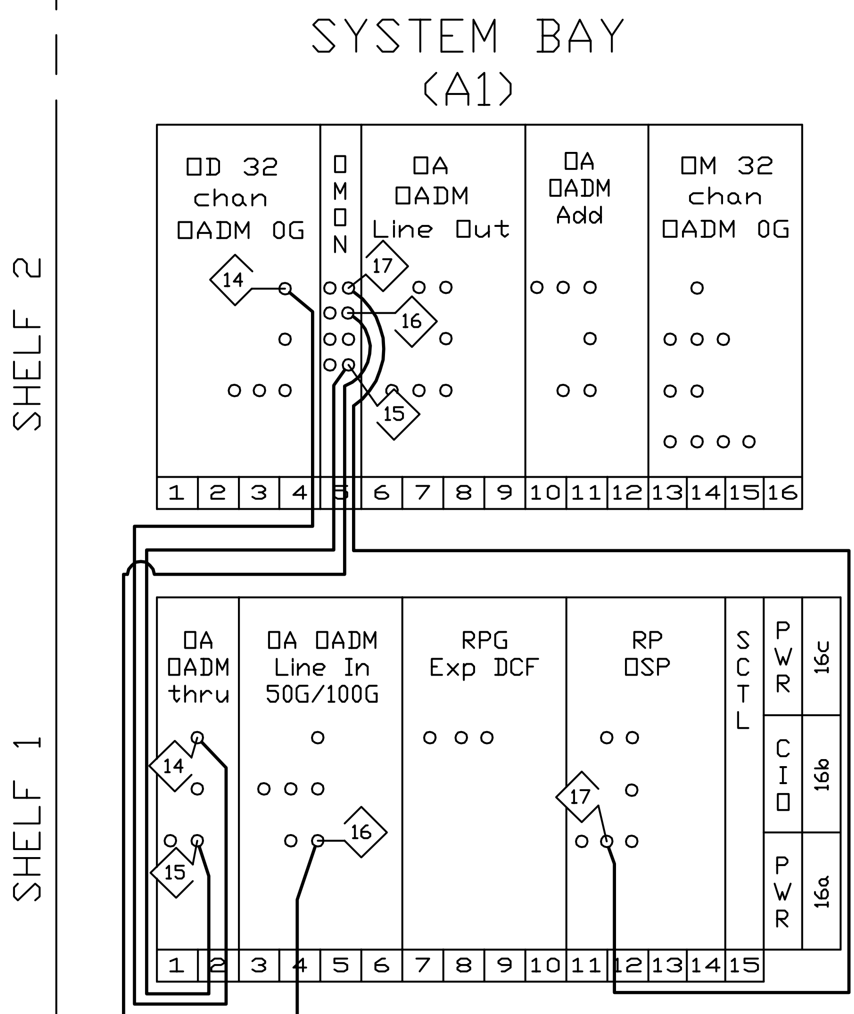


Table 7-10 OADM System Intra-Bay (Table #4)

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
18	OMON	A1	2	5	IN 1	OA (OADM LINE OUT)	A1	2	9	OMON	19.0 (B) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 7 AND UP										OMON-IN1 / OA-OMON-1E
19	OMON	A1	2	5	IN 3	OM (OADM 0G)	A1	2	16	OMON SIG	23.5 (B) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 13 AND UP										OMON-IN3 / OM-OMON SIG-1E
20	OMON	A1	2	5	IN 6	OA (OADM ADD)	A1	2	12	OMON	19.5 (B) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 11 AND UP										OMON-IN6 / OA-OMON-1E
21	OMON	A1	2	5	IN 7	OM (OADM 0G)	A1	2	16	OMON - A	19.0 (B) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 13 AND UP										OMON-1N7 / OM-OMONA-1E
22	OA (OADM LINE OUT)	A1	2	9	IN SIG	OM (OADM 0G)	A1	2	16	OUT SIG	27.5 (B) XS4
	DOWN THRU SLOT 7, RIGHT TO SLOT 13 AND UP										OA-IN SIG / OM-OUT SIG-1E
23	OA (OADM ADD)	A1	2	12	OUT SIG	OM (OADM 0G)	A1	2	16	IN OA-A	27.5 (B) XS4
	DOWN THRU SLOT 11, RIGHT TO SLOT 13 AND UP										OA-OUT SIG / OM-IN OAA-1E
24	OA (OADM ADD)	A1	2	12	IN SIG	OM (OADM 0G)	A1	2	16	OUT OA-A	19.0 (B) XS4
	DOWN THRU SLOT 11, RIGHT TO SLOT 13 AND UP										OA-IN SIG / OM-OUT OAA-1E
25	OA (OADM THRU)	A1	1	2	IN SIG	OA (OADM LINE IN 50G/100G)	A1	1	6	OUT 0/ 100G	22.0 (B) XS4
	DOWN THRU SLOT 2, RIGHT TO SLOT 4 AND UP										OA-IN SIG / OA-OUT 0/100G-1E

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page.

Figure 7-11 OADM System Intra-Bay (Figure #4)

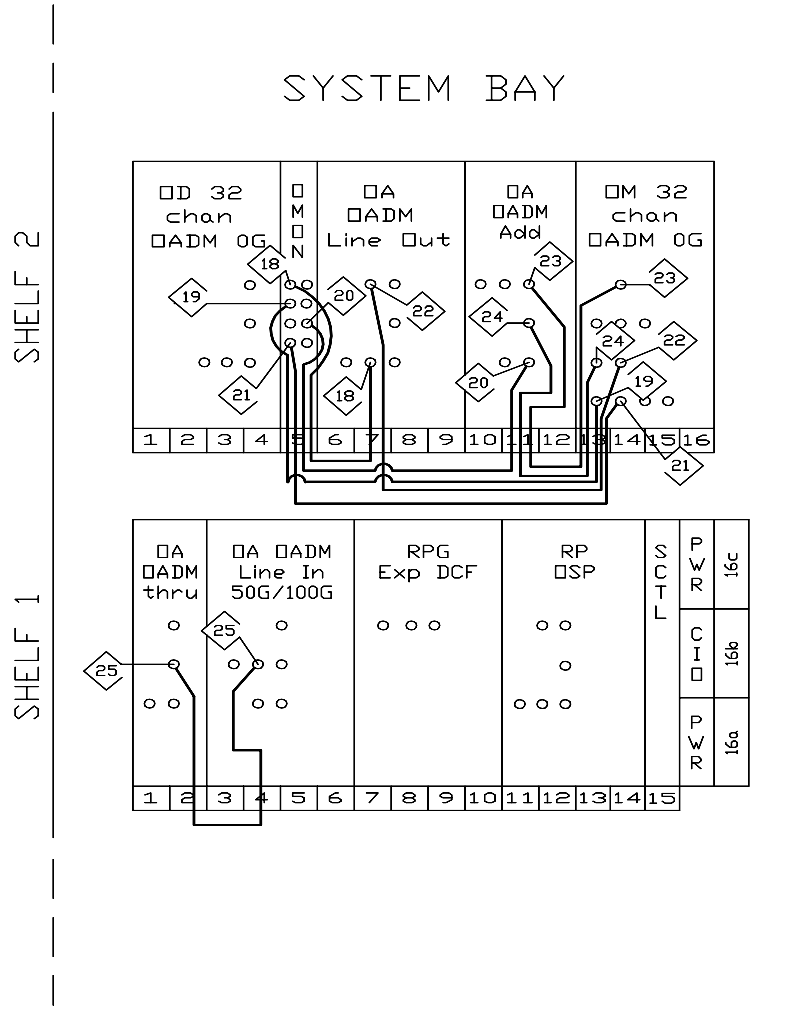


Table 7-11 OADM System Intra-Bay (Table #5)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) / Label Color / Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
26	OA (PREAMP HIGH GAIN)	A1	4	7	IN DCM	DCM3	A1	-	-	OUT DCM	83.0 (B) XS4
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 3										OA-IN DCM / DCM3-OUT DCM-1E
27	OA (PREAMP HIGH GAIN)	A1	4	7	OUT DCM	DCM3	A1	-	-	IN DCM	83.0 (B) XS4
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 3										OA-OUT DCM / DCM3-IN DCM-1E
28	OA (OADM ADD)	A1	2	12	OUT DCM	DCM2	A1	-	-	IN DCM	52.0 (B) XS4
	DOWN THRU SLOT 11, LEFT TO VERTICAL DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-OUT DCM / DCM2-IN DCM-1E
29	OA (OADM ADD)	A1	2	12	IN DCM	DCM2	A1	-	-	OUT DCM	52.0 (B) XS4
	DOWN THRU SLOT 11, LEFT TO VERTICAL DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-IN DCM / DCM2-OUT DCM-1E
30	OA (OADM LINE IN 50G/100G)	A1	1	6	IN DCM	DCM1	A1	-	-	OUT DCM	26.0 (B) XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-IN DCM / DCM1-OUT DCM-1E
31	RP (OSP)	A1	1	14	OUT SIG	DCM 1	A1	-	-	IN DCM	36.0 (B) XS4
	DOWN THRU SLOT 12, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										RP-OUT SIG / DCM1-IN DCM-1E
32	RP (OSP)	A1	1	14	IN SUP	SUPVY	A1	3	5	OUT 1	66.0 (B) XS4
	DOWN THRU SLOT 12, RIGHT TO FIBER DUCT, UP TO SHELF 3, LEFT TO SLOT 5 AND UP										RP-IN SUP / SUPVY-OUT1-1E

Visual Fiber Routing The following figure displays the routing information provided in the table on the preceding page.

Figure 7-12 OADM System Intra-Bay (Figure #5)

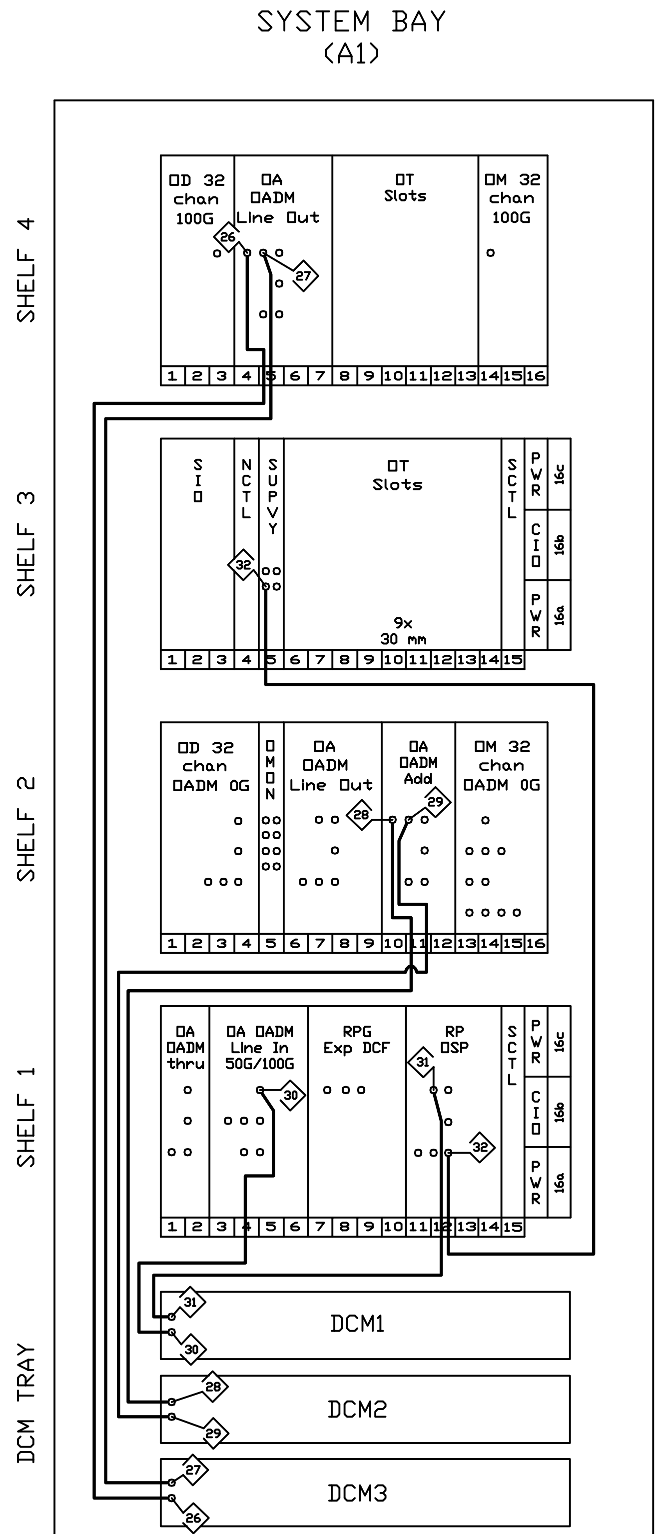


Table 7-12 OADM System Intra-Bay (Table #6)

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
33	OD (OADM 0G)	A1	2	4	IN OA-D	OA (PREAMP HIGH GAIN)	A1	4	7	OUT SIG	66.0 (B) XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 4, RIGHT TO SLOT 5 AND UP										OD-IN OAD / OA-OUT SIG-1E
34	OD (OADM 0G)	A1	2	4	OUT 100G	OD (100G)	A1	4	3	IN 100G	60.0 (B) XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 4, RIGHT TO SLOT 3 AND UP										OD-OUT 100G / OD-IN 100G-1E
35	OD (OADM 0G)	A1	2	4	OUT OA -D	OA (PREAMP HIGH GAIN)	A1	4	7	IN SIG	60.0 (B) XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 4, RIGHT TO SLOT 5 AND UP										OD-OUT OAD / OA-IN SIG-1E
36	OMON	A1	2	5	IN 5	OA (PREAMP HIGH GAIN)	A1	4	7	OMON	58.0 (B) XS4
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, UP TO SHELF 4, RIGHT TO SLOT 5 AND UP										OMON-IN5 / OA-OMON-1E
37	OM (OADM 0G)	A1	2	16	IN 100G	OM (100G)	A1	4	16	OUT 100G	64.0 (B) XS4
	DOWN THRU SLOT 14, RIGHT TO FIBER DUCT, UP TO SHELF 4, LEFT TO SLOT 14 AND UP										OM-IN 100G / OM-OUT 100G-1E

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page

Figure 7-13 OADM System Intra-Bay (Figure #6)

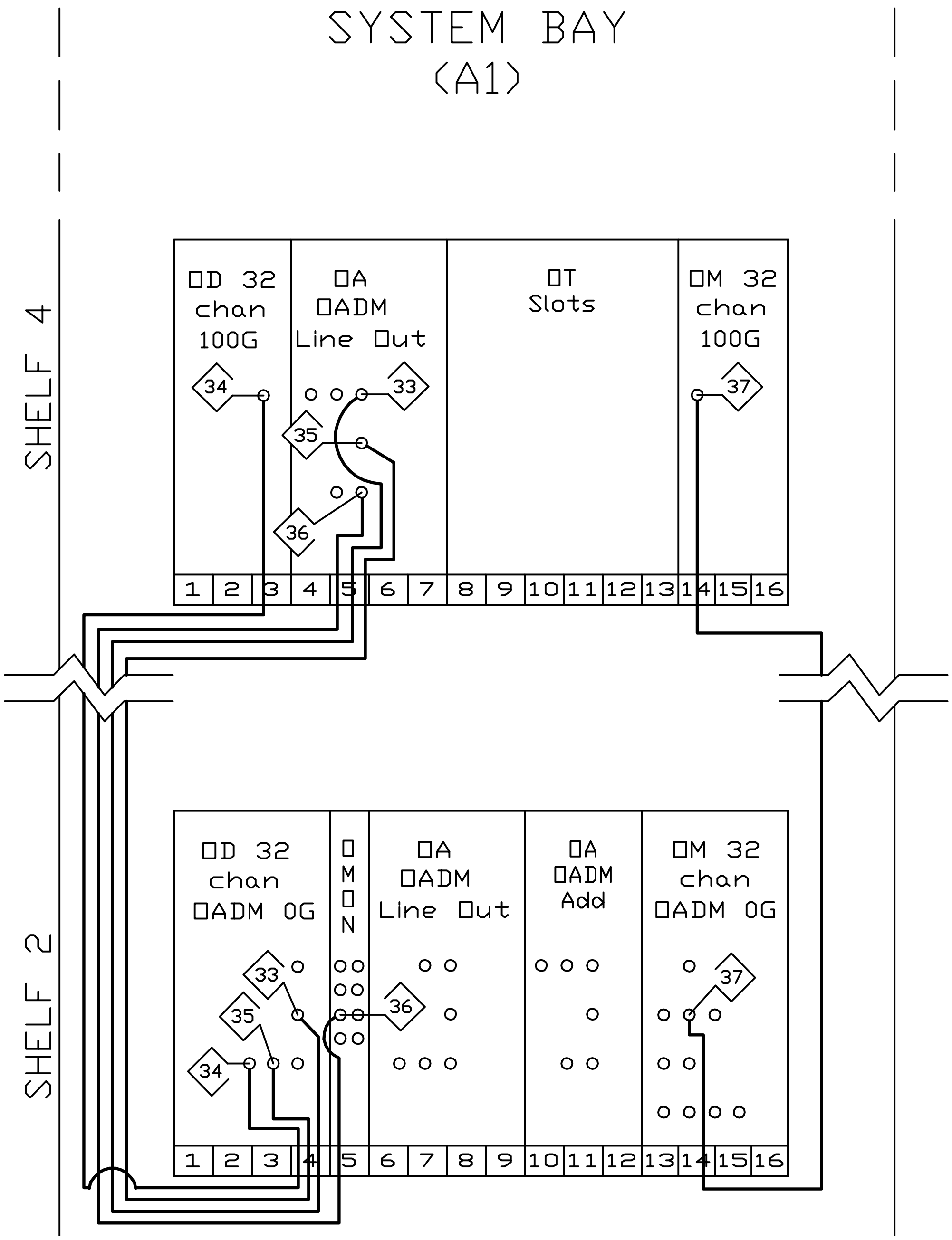


Table 7-13 OADM Line Intra-Bay (Table #7)

Fiber number/Done	FROM Circuit Pack	Bay	Shelf	Slot	Port ID	TO Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In)	Label Color	Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West		
38	OD (OADM 0G)	A2	2	4	IN OA-D	OA (PREAMP HIGH GAIN)	A2	3	4	OUT SIG	44.0	(G)	XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGHT TO SLOT 2 AND UP										OD-IN OAD / OA-OUT SIG-1W		
39	OD (OADM 0G)	A2	2	4	OUT OA-D	OA (PREAMP HIGH GAIN)	A2	3	4	IN SIG	39.0	(G)	XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGHT TO SLOT 2 AND UP										OD-OUT OAD / OA-IN SIG-1W		
40	OMON	A2	2	5	IN 5	OA (PREAMP HIGH GAIN)	A2	3	4	OMON	37.0	(G)	XS4
	DOWN THRU SLOT 5, LEFT TO FIBER DUCT, UP TO SHELF 3, RIGHT TO SLOT 2 AND UP										OMON-IN5 / OA-OMON-1W		
41	OA (OADM THRU)	A2	1	2	OUT SIG	OD (OADM 0G)	A2	2	4	IN OA-P	48.0	(G)	XS4
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 4 AND UP										OA-OUT SIG/ OD-IN OAP-1W		
42	OA (OADM THRU)	A2	1	2	OMON	OMON	A2	2	5	IN 8	34.5	(G)	XS4
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 5 AND UP										OA-OMON/OMON-IN8-1W		
43	OA (OADM LINE IN 50G/ 100G)	A2	1	6	OMON	OMON	A2	2	5	IN 4	40.0	(G)	XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 2, RIGHT TO SLOT 5 AND UP										OA-OMON/OMON-IN4-1W		
44	RP (OSP)	A2	1	14	OMON	OMON	A2	2	5	IN2	53.0	(G)	XS4
	DOWN THRU SLOT 12, RIGHT TO FIBER DUCT, UP TO SHELF 2, LEFT TO SLOT 5 AND UP										RP-OMON / OMON-IN2-1W		

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page

Figure 7-14 OADM Line Intra-Bay (Figure #7)

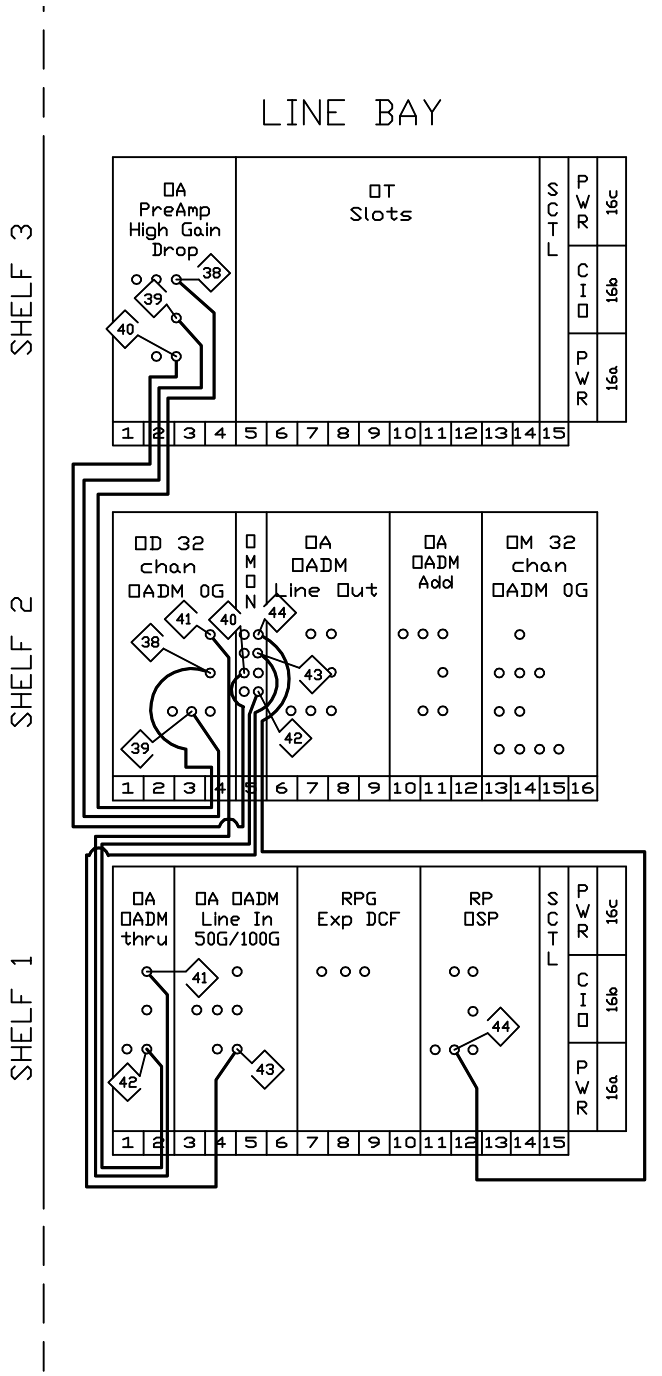


Table 7-14 OADM Line Intra-Bay (Table #8)

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
45	OMON	A2	2	5	IN 1	OA (OADM LINE OUT)	A2	2	9	OMON	19.0 (G) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 7 AND UP										OMON-IN1 / OA-OMON-1W
46	OMON	A2	2	5	IN 3	OM (OADM 0G)	A2	2	16	OMON SIG	23.5 (G) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 13 AND UP										OMON-IN3 / OM-OMON SIG-1W
47	OMON	A2	2	5	IN 6	OA (OADM ADD)	A2	2	12	OMON	19.5 (G) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 11 AND UP										OMON-1N6 / OA-OMON-1W
48	OMON	A2	2	5	IN 7	OM (OADM 0G)	A2	2	16	OMON -A	19.0 (G) XS4
	DOWN THRU SLOT 5, RIGHT TO SLOT 14 AND UP										OMON-IN7 / OM-OMONA-1W
49	OA (OADM LINE OUT)	A2	2	9	IN SIG	OM (OADM 0G)	A2	2	16	OUT SIG	27.5 (G) XS4
	DOWN THRU SLOT 7, RIGHT TO SLOT 14 AND UP										OA-IN SIG / OM-OUT SIG-1W
50	OA (OADM ADD)	A2	2	12	OUT SIG	OM (OADM 0G)	A2	2	16	IN OA-A	27.5 (G) XS4
	DOWN THRU SLOT 11, RIGHT TO SLOT 13 AND UP										OA-OUT SIG / OM-IN OA-A-1W
51	OA (OADM ADD)	A2	2	12	IN SIG	OM (OADM 0G)	A2	2	16	OUT OA-A	19.0 (G) XS4
	DOWN THRU SLOT 11, RIGHT TO SLOT 13 AND UP										OA-IN SIG / OM-OUT OAA-1W
52	OA (OADM THRU)	A2	1	2	IN SIG	OA (OADM LINE-IN 50/ 100G)	A2	1	6	OUT 0/100G	22.O (G) XS4
	DOWN THRU SLOT 2, RIGHT TO SLOT 4 AND UP										OA-IN SIG / OA-OUT 0/100G-1W

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page

Figure 7-15 OADM Line Intra-Bay (Figure #8)

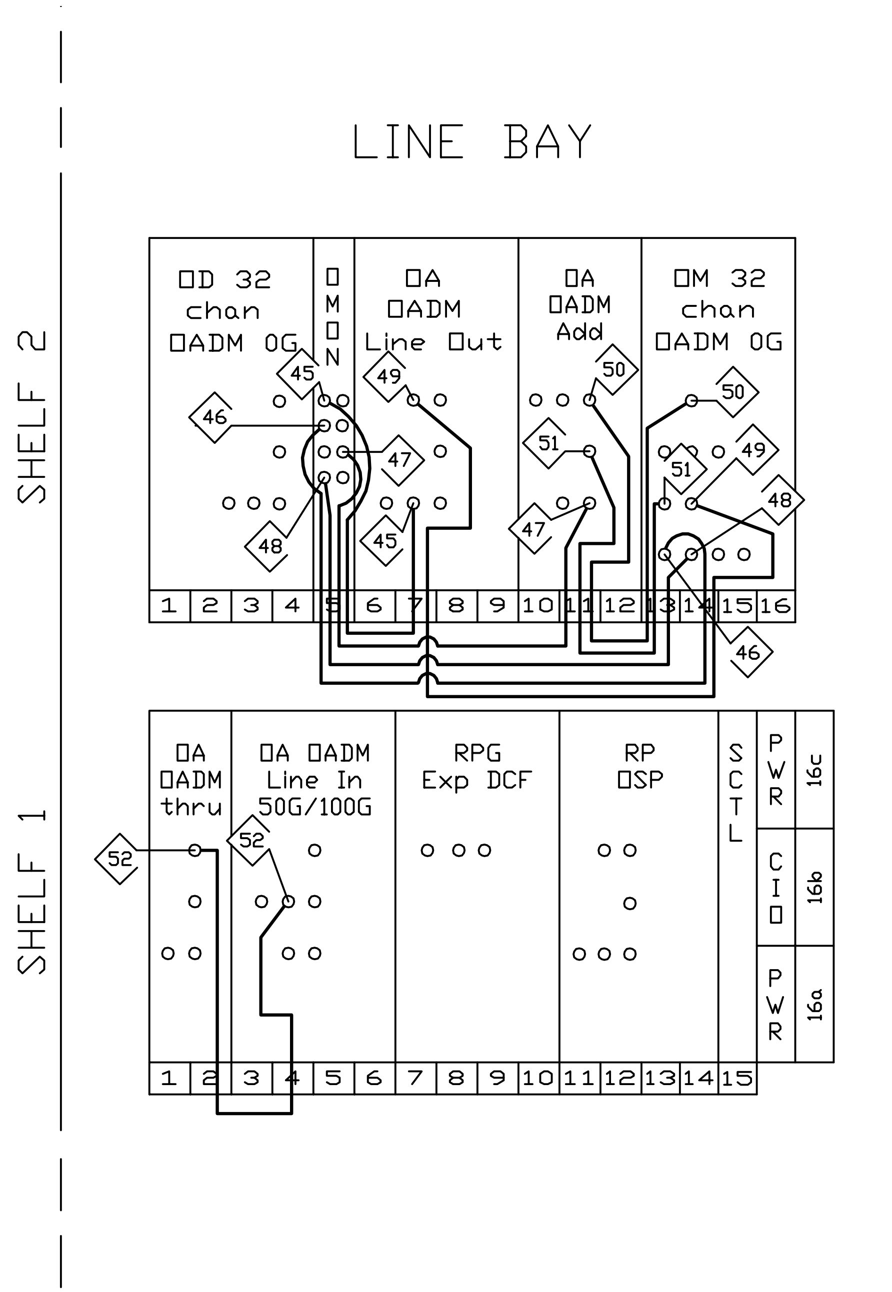


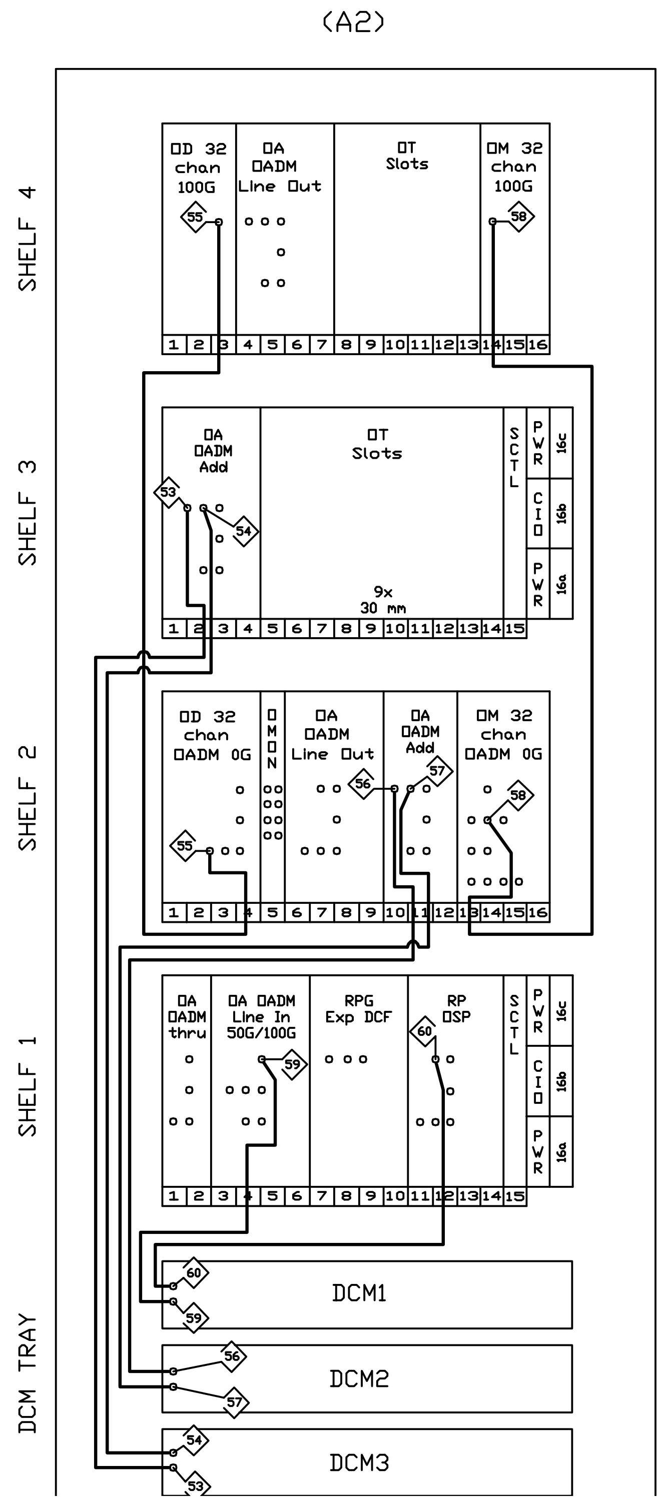
Table 7-15 OADM Line Intra-Bay (Table #9)

Fiber number/Done	FROM					TO					Total Fiber Lgth(In) / Label Color / Label Kit
	Circuit Pack	Bay	Shelf	Slot	Port ID	Circuit Pack	Bay	Shelf	Slot	Port ID	Total Fiber Lgth(In) Label Color Label Kit
	Routing Information					Routing Information					Fiber Label BLUE=(B)=East GREEN=(G)=West
53	OA (PREAMP HIGH GAIN)	A2	3	4	IN DCM	DCM 3	A2	-	-	OUT DCM	62.0 (G) XS4
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 3										OA-IN DCM / DCM3-OUT DCM-1W
54	OA (PREAMP HIGH GAIN)	A2	3	4	OUT DCM	DCM 3	A2	-	-	IN DCM	62.0 (G) XS4
	DOWN THRU SLOT 2, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 3										OA-OUT DCM / DCM3-IN DCM-1W
55	OD (OADM 0G)	A2	2	4	OUT 100G	OD (100G)	A2	4	3	IN 100G	60.0 (G) XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, UP TO SHELF 4, RIGHT TO SLOT 3 AND UP										OD-OUT 100G / OD-IN 100G-1W
56	OA (OADM ADD)	A2	2	12	OUT DCM	DCM 2	A2	-	-	IN DCM	52.0 (G) XS4
	DOWN THRU SLOT 11, LEFT TO VERTICAL DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-OUT DCM / DCM2-IN DCM-1W
57	OA (OADM ADD)	A2	2	12	IN DCM	DCM 2	A2	-	-	OUT DCM	52.0 (G) XS4
	DOWN THRU SLOT 11, LEFT TO VERTICAL DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 2										OA-IN DCM / DCM2-OUT DCM-1W
58	OM (OADM 0G)	A2	2	16	IN 100G	OM (100G)	A2	4	16	OUT 100G	64.0 (G) XS4
	DOWN THRU SLOT 13, RIGHT TO FIBER DUCT, UP TO SHELF 4, LEFT TO SLOT 14 AND UP										OM-IN 100G / OM-OUT 100G-1W
59	OA (OADM LINE-IN 50G/ 100G)	A2	1	6	IN DCM	DCM1	A2	-	-	OUT DCM	26.0 (G) XS4
	DOWN THRU SLOT 4, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										OA-IN DCM/DCM1-OUT DCM-1W
60	RP (OSP)	A2	1	14	OUT SIG	DCM 1	A2	-	-	IN DCM	36.0 (G) XS4
	DOWN THRU SLOT 12, LEFT TO FIBER DUCT, DOWN TO BOTTOM OF DUCT, RIGHT TO DCM 1										RP-OUT SIG/ DCM1-IN DCM-1W

Visual Fiber Routing

The following figure displays the routing information provided in the table on the preceding page

Figure 7-16 OADM Line Intra-Bay (Figure #9)



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8 Control and External Connections for End/OADM Terminals

Overview

Purpose

This chapter provides information for cabling of the LambdaXtreme™ Transport System.

Reason for revision

This is the first issue.

Contents

This chapter contains the following.

System Configuration and Verification	8-2
Interconnecting Cables	8-3
External Cabling	8-9
Outside Plant Fiber Connections	8-13

□

System Configuration and Verification

Overview

This section covers the installation of the Control, Telemetry and Alarm cabling for a LambdaXtreme™ Transport System, as well as connections to outside plant fiber. Refer to Lucent drawings ED-8C861-20 for additional detail on the cabling of the LambdaXtreme™ Transport equipment bays.

A LambdaXtreme™ Transport system is ordered and installed as individual equipment bays. Interprocessor Control cabling is required to provide control and status communications between the Network Controller (NCTL) in the System bay and Shelf Controllers (SCTL) which exist in each double shelf (2 SCTLs per bay) of all other bays.

Additional Control, Telemetry and Alarm cabling can support a wide range of services provided by the NCTL and Supervisory circuit pack through the System Input/Output (SIO) circuit pack.

Telemetry and Alarm cables may be needed to connect the LambdaXtreme™ Transport equipment to the local office and to the remote monitoring systems at both terminal and repeater locations.

□

Interconnecting Cables

Interconnecting Cable Routing

Interconnecting Cabling will be routed between bays for the System and Line bays. Additional Extension Bays may be situated up to 100 meters from the system bay. Interconnecting Cables on these bays may be done through overhead or subfloor ductwork. Refer to customer specific SITE engineering diagrams or work orders for detailed information.

An interconnection cable is used to provide communications between the NCTL and group SCTLs, and between group SCTLs and individual SCTLs within a control group. There are five bays in control group A. (Note: Bays A3 through A5 are not available in OADM configurations, but are available for End Terminal configurations).Current configurations of the LambdaXtreme™ Transport require a maximum of seven bays. A seven bay configuration could employ three control groups: Control Group A (Bays A1- A5), Control Group B (Bay B1), and Control Group C (C1).   If all the bays were remotely located, there would be 7 control groups (Bays A1, B1,C1,D1,E1,F1,G1). The system has built in capacity expansion up to Control Group M (skipping "I"), for a future maximum of 16 control groups.

A group SCTL, one per control group (first bay, first shelf), provides interconnections between individual SCTLs within the control group and to the NCTL. Interconnections between the NCTL and group SCTLs are provided by a cable between a designated SIO port and J10 port of the CIO port associated with the Control group SCTL. This cable may not exceed 100 meters. Interconnections between the Group SCTL and SCTLs within the group are provided by connections between ports J1-J9 of the Control Group SCTL and J10 port of the individual SCTLs.

Interconnect Cabling Procedures

1 Determine the number of bays to be connected as specified on the customer specification sheet.

2 Run the interconnect cables for the applicable bays according to Table 8-2 on page 8-7. Figure 8-4 and Figure 8-5 on page 8-8 provide visual references to connection points on the CIO and SIO circuit pack

Important! Interconnect cables are fed into the CIO and SIO packs through the cable feed channels located just above the packs.

Important! The 7 foot Interconnect cable in Bay A1 remains internal to bay A1. All other interconnect cables are routed external to the bay, either through the overhead or subfloor duct work.

3 In larger system installations, multiple cables attaching to the SIO board will require that the cable channel guard be temporarily removed. The fan unit must be also be removed to facilitate the channel guard removal.

Figure 8-1 Channel guard pictured in place

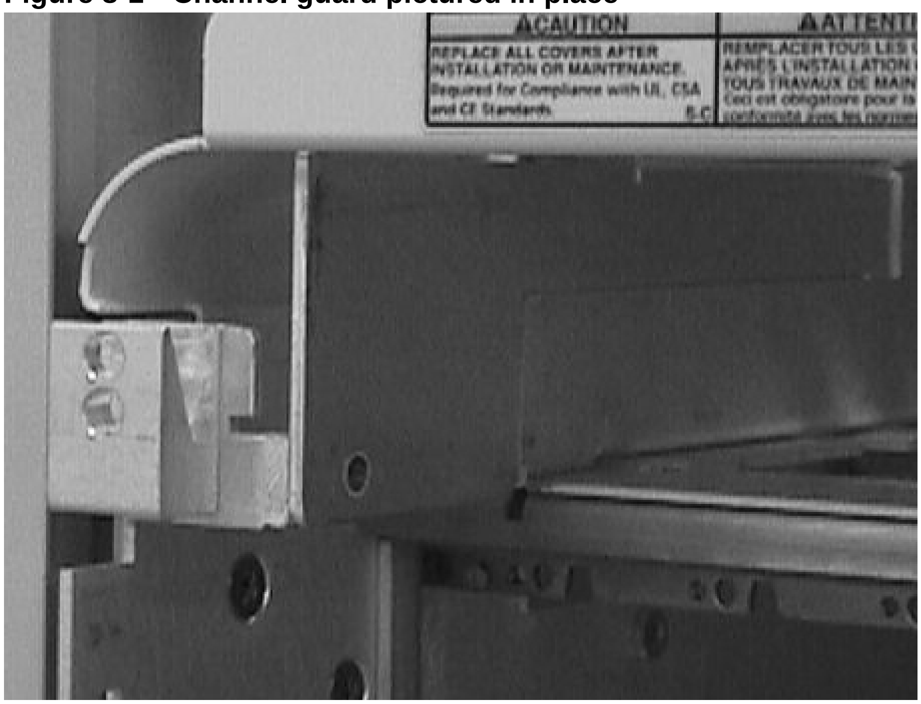


Figure 8-2 Cable Channel guard removed

4 If Telemetry and Alarm cables are also to be routed through to the cable channel, leave the guard removed until those operations are completed (See External Cabling: page 8-9), other wise reinstall the cable channel guard and reinstall the fan unit.

5 Secure the cables in the customer specified manner (cable ties, string, etc.) to the tie bar on the left or right side of the bay frame.

Figure 8-3 Interconnect cable routing

Table 8-1 Interconnect Codes by Length

Length	Product Code	Comcode
7 ft	LCCADSA-A-BB-BB-007	109251678
20	LCCADSA-A-BB-BB-020	109251686
25	LCCADSA-A-BB-BB-025	109251694
30	LCCADSA-A-BB-BB-030	109251702
50	LCCADSA-A-BB-BB-050	109251710
100	LCCADSA-A-BB-BB-100	109251728
150	LCCADSA-A-BB-BB-150	109251736
200	LCCADSA-A-BB-BB-200	109251744
300	LCCADSA-A-BB-BB-300	109251751

Table 8-2 Interconnect Cabling

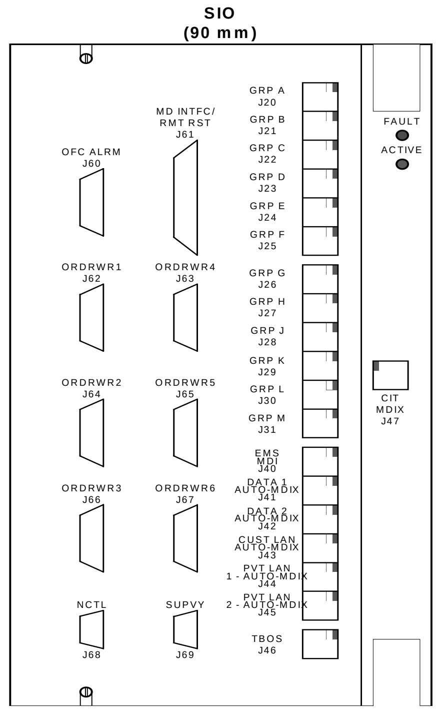
Bay	SIO Port	Control Group CIO Port	Length (ft)	Individual Shelf CIO Port
A1	A1-3-3 GRP A J20	A1-1-16B J10	20	
		A1-1-16B J1	7	A1-3-16B J10
A2		A1-1-16B J2	20	A2-1-16B J10
		A1-1-16B J3	20	A2-3-16B J10
A3		A1-1-16B J4	25	A3-1-16B J10
		A1-1-16B J5	25	A3-3-16B J10
A4		A1-1-16B J6	25	A4-1-16B J10
		A1-1-16B J7	25	A4-3-16B J10
A5		A1-1-16B J8	30	A5-1-16B J10
		A1-1-16B J9	30	A5-3-16B J10
B1	A1-3-3 GRP B J21	B1-1-16B J10	See Order	
		B1-1-16B J1	20	B1-3-16B J10
C1	A1-3-3 GRP C J22	C1-1-16B J10	See Order	
		C1-1-16B J1	20	C1-3-16B J10
D1	A1-3-3 GRP D J23	D1-1-16B J10	See Order	
		D1-1-16B J1	20	D1-3-16B J10
E1	A1-3-3 GRP E J24	E1-1-16B J10	See Order	
		E1-1-16B J1	20	E1-3-16B J10
F1	A1-3-3 GRP F J25	F1-1-16B J10	See Order	
		F1-1-16B J1	20	F1-3-16B J10
G1	A1-3-3 GRP G J26	G1-1-16B J10	See Order	
		G1-1-16B J1	20	G1-3-16B J10

NOTE: Future expansion bays H1, J1-M1 are not shown in this table.

SIO and CIO Faceplates

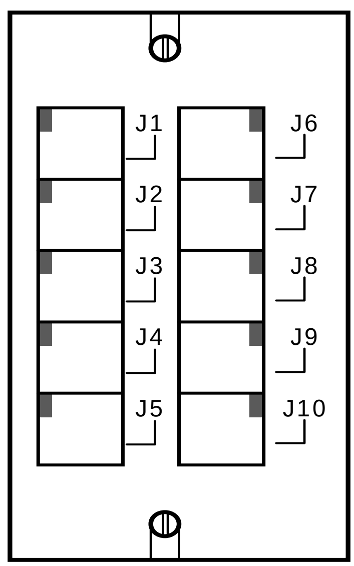
The SIO circuit pack provides connection points between the NCTL and SCTL

Figure 8-4 System Input/Output (SIO)



The CIO circuit packs located on each double shelf pair provide an interface point to individual SCTLs.

Figure 8-5 Controller Input/Output (CIO) Faceplate



External Cabling

Cables in the System Bay

1 Verify the external telemetry, control and alarm cabling information on the customer order, including the cable routing paths from the LambdaXtreme™ Transport System Bay to the specified terminations on the local office interface equipment.

> **Important!** External telemetry, control and alarm cabling encompasses connections to element management systems (EMS), TBOS ports, Orderwire, Miscellaneous Discretes, Office Alarms, and various customer LAN networks.

2 Connect the external and alarm cables as specified on the customer order to the corresponding jacks on the SIO circuit pack (A1-3-3). See Table 8-3 on page 8-11 for the cable and corresponding jack information.

3 If necessary, remove the cable channel guard located above the SIO card. This may already have been removed during interconnect cable routing (Interconnecting Cables: page 8-3). Refer to that section and *Figure 8-2, Cable Channel guard removed (8-5)* for visual guidance.

4 Route all telemetry and alarm cables out above the upper left side of the SIO card. (see Figure 8-6 on page 8-10).

5 Route the telemetry and alarm cables up into the bay frame space and out of the System Bay. (For raised floor applications, the telemetry and alarm cables would be run down the bay frame space, and then the under the floor space.)

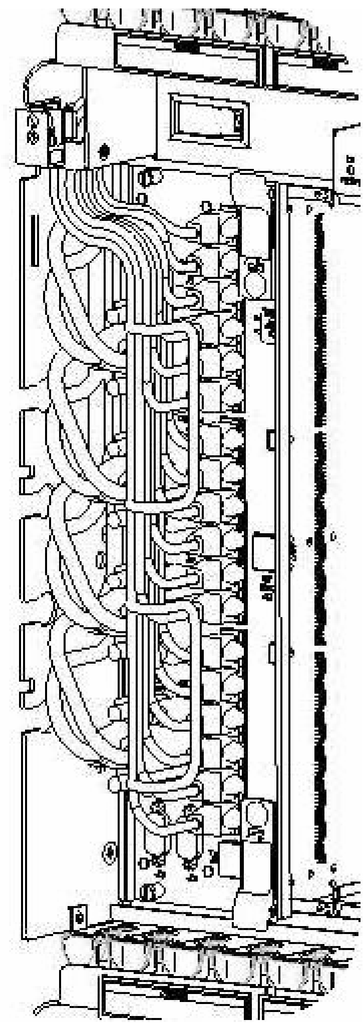
6 Run the telemetry and alarm cables in the office per the customer's order, and terminate at the local office interface equipment.

7 Secure all cables on the side of the bay as depicted in *Figure 8-3, Interconnect cable routing (8-6)*, utilizing the customer prescribed method (i.e. velcro, cable ties, string, etc.).

8 If necessary, reinstall the cable channel guard, and reinstall the fan unit.

9 Secure all cables to the guide bars on the SIO Circuit pack.

Figure 8-6 SIO Cable Routing



END OF STEPS

Table 8-3 Telemetry and Alarm Cables — System Input/Output (SIO) Circuit Pack

Telemetry or Alarm Application	Comcodes (note could be several)	Length Feet	System Shelf Marking	SIO Label
Order Wire - OW1	109068361 109068379 109068387 109068395 109068403	50 100 150 200 300	ORDRWR1	J62
Order Wire - OW2			ORDRWR2	J64
Order Wire - OW3			ORDRWR3	J66
Order Wire - OW4			ORDRWR4	J63
Order Wire - OW5			ORDRWR5	J65
Order Wire - OW6			ORDRWR6	J67
Office Alarm			OFC ALRM	J60
Miscellaneous Discretes/ Remote Restart	109068411	50	MD INTFC/ RMT RST	J61
	109068429	100		
	109068437	150		
	109068445	200		
	109068452	300		
EMS	109251710 109251728 109251736 109251744 109251751	50 100 150 200 300	EMS MDI	J40
TBOS			TBOS	J46
Supervisory			SUPVY	J69

Important! For additional information on connecting orderwire refer to *Chapter 101*, *Orderwire Installation*.

Important! For additional information on connecting miscellaneous discretes, refer to *Chapter 102, Miscellaneous Discretes/Remote Restart.*

Office Alarm Connections

Office Alarm Cable connections and designations

Table 8-4 Office Alarms Connections

Name	Designation	Pin	Wire Color
Major Visual Alarm	MJVIS	1	W-BL
Major Audible Alarm	MJAUD	2	W-O
Minor Visual Alarm	MNVIS	3	W-G
Minor Audible Alarm	MNAUD	4	W-BR
Critical Visual Alarm	CRVIS	5	W-S
Critical Audio Alarm	CRAUD	6	R-BL
Power Telemetry Alarm	PWRTLM	7	R-O
No Connection	None	8	R-G
Major Visual Alarm - Return	MJVISR	9	BL-W
Major Audible Alarm - Return	MJAUDR	10	O-W
Minor Visual Alarm - Return	MJVISR	11	G-W
Minor Audible Alarm - Return	MJAUDR	12	BR-W
Critical Visual Alarm - Return	CRVISR	13	S-W
Critical Audio Alarm - Return	CRAUDR	14	BL-R
Power Telemetry Alarm - Return	PWRTLMR	15	O-R

Next Operation

Refer to the appropriate checklist in Chapter 1 to determine the next procedure.

□

Outside Plant Fiber Connections

Equipment needed Obtain ladder, tile puller or other equipment needed as necessary.

Fiber Precautions

CAUTION

Fiber is constructed of glass and should be treated with care. It should not be pulled or stretched. This could cause damage to the fiber or the fiber connector.

CAUTION

Fiber should not be bent in a radius of less than 1-1/2".

Procedure

1 Arrange to, and obtain, access to the areas that contain both the NE and the Optical Distribution Frame (ODF) that connects to the outside plant fiber.

Important! Advance arrangements may have to be made to obtain access to other vendor co-locate areas.

Contact ______________________________________

Phone/Pager __________________________________

2 Verify path between NE and ODF as specified on customer order.

3 Verify connector types on both ends of the fiber match what is expected at the NE and ODF.

4 Verify through visual approximation that the length of fiber is sufficient.

5 Pre-label both ends of the fiber(s) with information as specified on the customer order.

Important! Do not remove protective caps on fiber.

Important! Labeling information should always be present on fibers.

6 Remove applicable floor tiles or fiber duct covers to facilitate running fiber.

7 Run fiber between NE and ODF.

Important! Do not connect fiber to ODF unless directed to do so by the customer. If directed to connect fiber to ODF, observe fiber cleaning procedures as specified in *Chapter 105, Fiber Cleaning*

Important! Do not connect fiber to the NE.

Important! Run all East fibers to shelf A1-1. For OADM terminals West fibers connect to shelf A2-1.

8 Replace removed fiber duct covers and/or floor tiles as applicable.

END OF STEPS

9 OT Circuit Pack and Fiber Installation for End and OADM Terminals

Overview

Purpose This chapter describes OT circuit pack placement and fibering.'

Reason for revision This is the first issue.

Contents This chapter contains the following.

Configuration Overview	9-2
OT Circuit Pack Overview	9-4
OM/OD Circuit Pack Overview	9-6
OM/OD Frequency Locations	9-7
OT Circuit Pack Placement	9-8
Alternate Circuit Pack Placement Guidelines	9-9
OT to OM/OD Fibering Information	9-13

Configuration Overview

Configuration Types There are two configuration types related to OT fibering issues

- End Terminals (10G or 40G)
- OADM Terminals

Bay Layout Each configuration will support various bay types as seen in the following two Figures.

- System Bay
- Line Bay (10G End terminal or OADM only)
- Extension Bay

Figure 9-1 LambdaXtreme™ Transport End Terminals

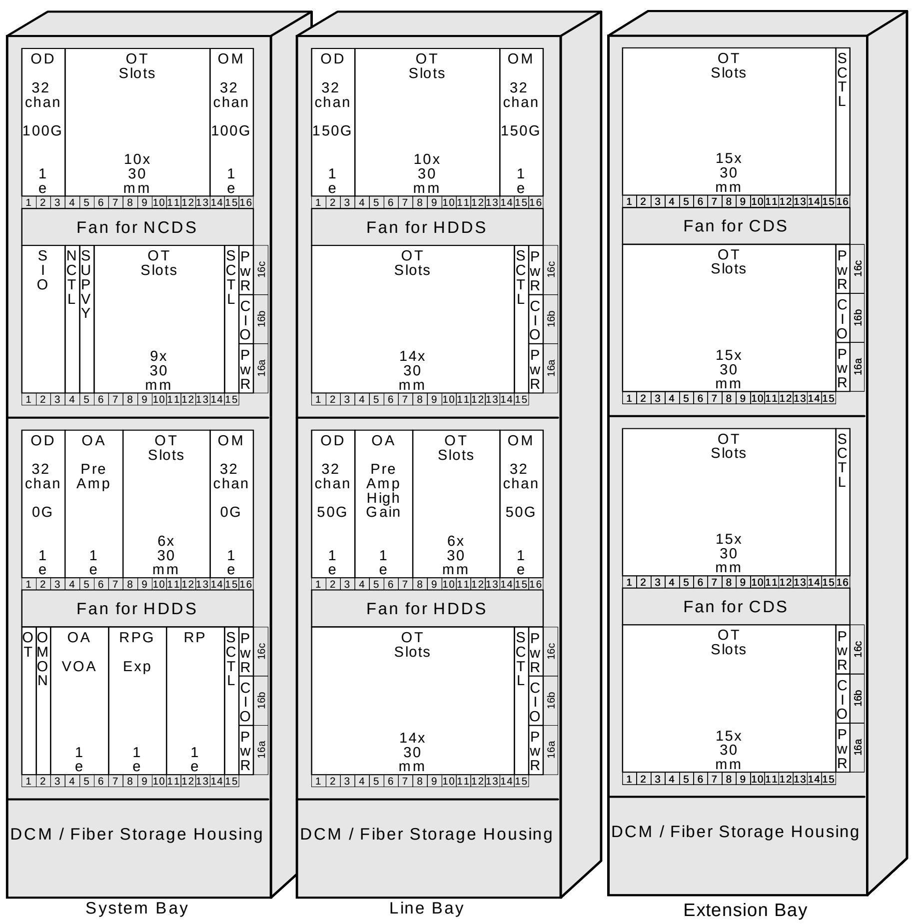
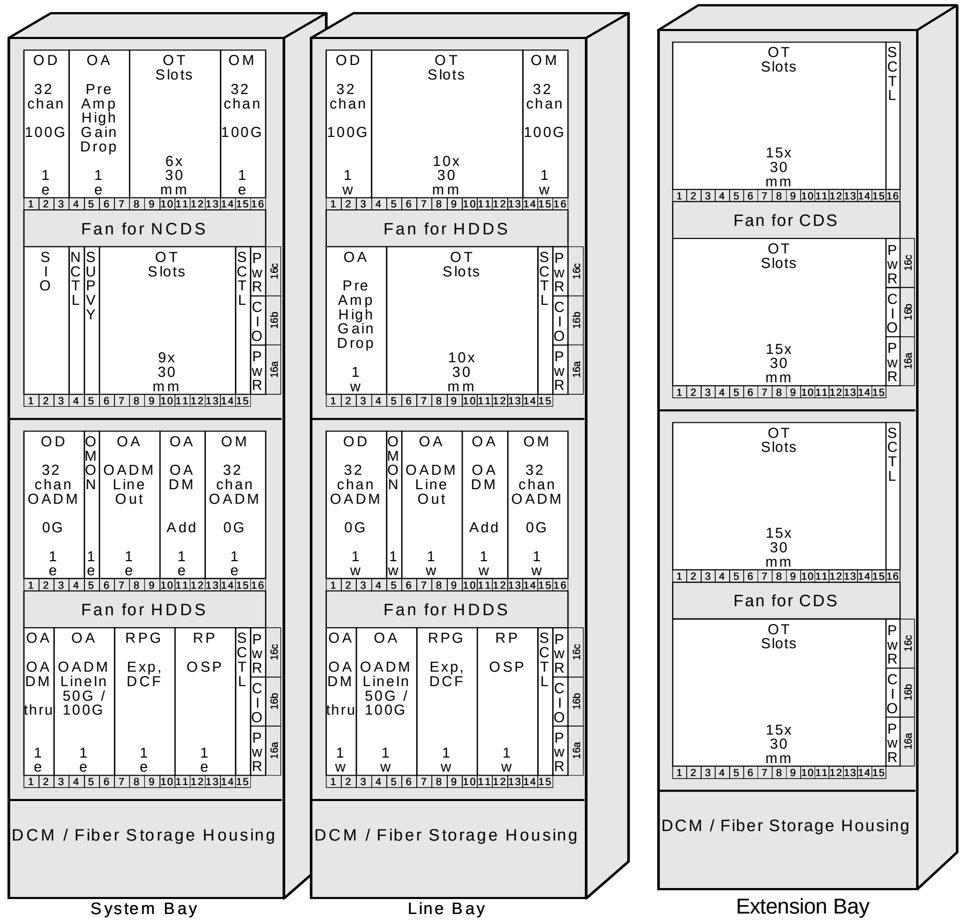


Figure 9-2 LambdaXtreme™ Transport OADM Terminals



OT Circuit Pack Overview

OT circuit pack Types

Available LambdaXtreme™ Transport OT circuit packs are listed below:

- 10G Add/Drop
- 10G Mux packs (4 x 2.5)
- 10G Soliton Add/Drop
- 40G Add/Drop
- 40G Thru
- 40G Mux Packs (4 x 10)

Figure 9-3 10G Circuit Packs

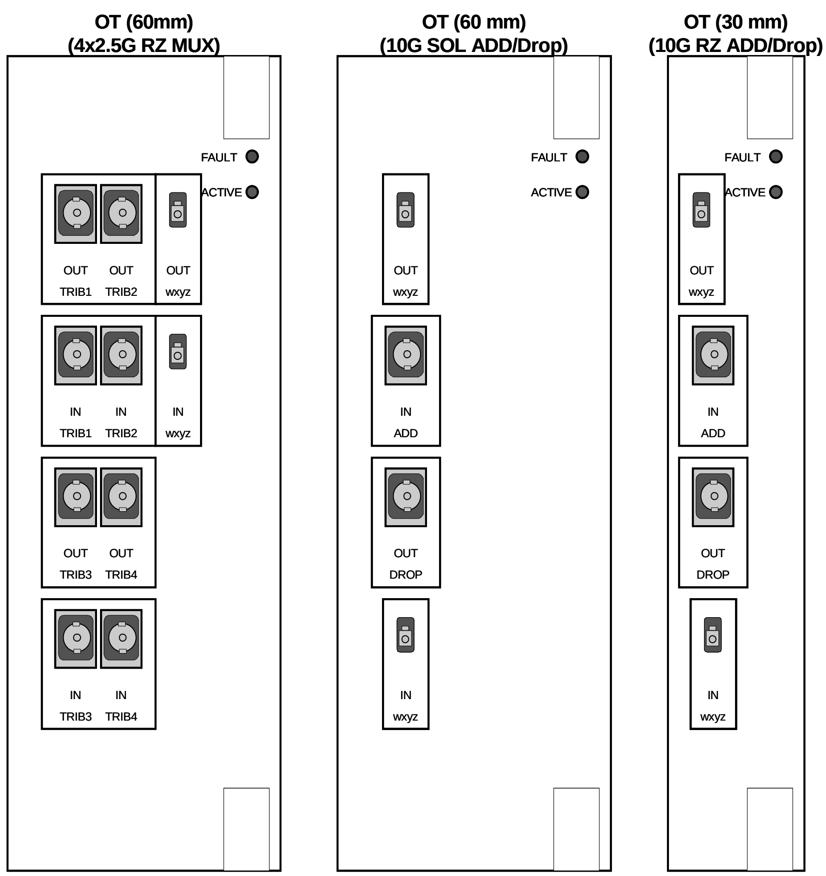
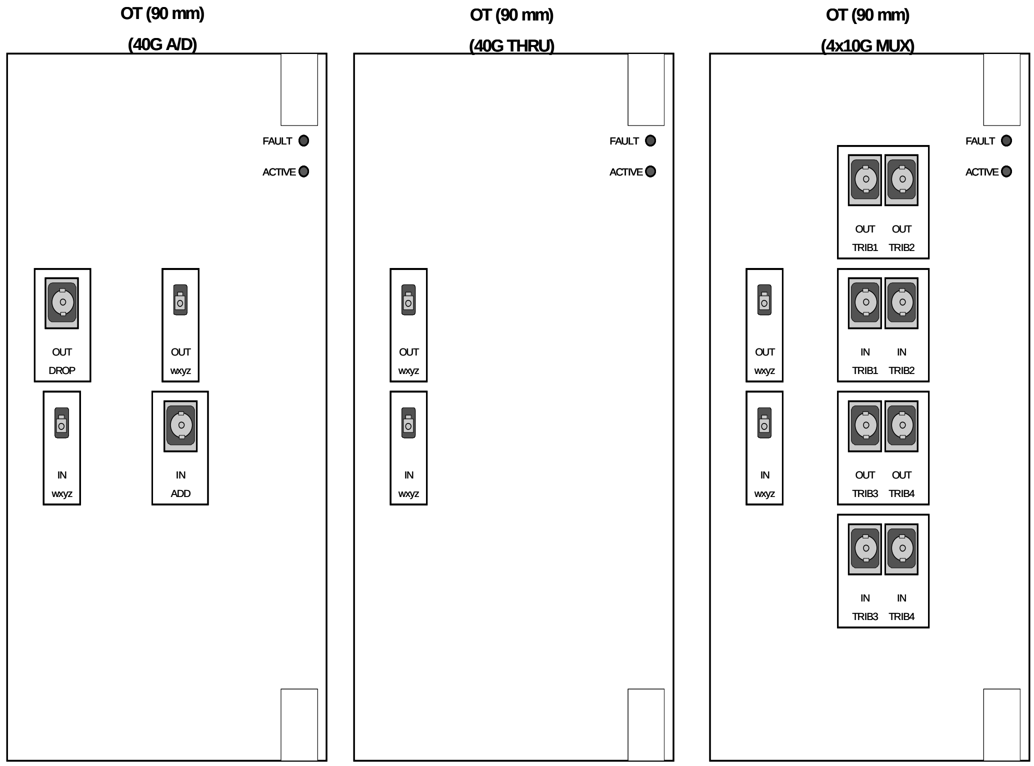


Figure 9-4 40G Circuit Packs



OM/OD Circuit Pack Overview

Circuit Pack Types

OM and OD circuit packs come in several types which support 10G and 40G pack types in both End Terminal and OADM Terminal configurations.

- OM 200/100 0-GHz Offset (40G End Terminal only)
- OM 200/100/50 0-GHZ Offset (10G End Terminals only)
- OM 100-GHz Offset (End and OADM Terminal)
- OM 200/100 Mux 50-GHz Offset (10G End Terminal only)
- OM 150-GHz Offset (10G End Terminal only)
- OM OADM 200/100/50 0-GHz Offset (OADM only)
- OD OADM 200/100 0-GHz Offset (OADM only)
- OD 200/100 0-GHz Offset (10G End Terminals only)
- OD 40G 200/100 0-GHz Offset (40G End Terminals only)
- OD 100-GHz Offset (End terminal and OADM terminal)
- OD 200/100 DMux 50-GHz Offset (10G End Terminals only)
- OD 200/100 Dmux 150-GHz Offset (10G End Terminals only)

OM/OD Frequency Locations

Table 9-1 OM/OD Frequency List

End Terminal							
OM				OD			
A1-2-16	A1-4-16	A2-2-16	A2-4-16	A1-2-3	A1-4-3	A2-2-3	A2-4-3
8650/8670	8660/8680	8655/8675	8665/8685	8650/8670	8660/8680	8655/8675	8665/8685
8690/8710	8700/8720	8695/8715	8705/8725	8690/8710	8700/8720	8695/8715	8705/8725
8730/8750	8740/8760	8735/8755	8745/8765	8730/8750	8740/8760	8735/8755	8745/8765
8770/8790	8780/8800	8775/8795	8785/8805	8770/8790	8780/8800	8775/8795	8785/8805
8810/8830	8820/8840	8815/8835	8825/8845	8810/8830	8820/8840	8815/8835	8825/8845
8850/8870	8860/8880	8855/8875	8865/8885	8850/8870	8860/8880	8855/8875	8865/8885
8890/8910	8900/8920	8895/8915	8905/8925	8890/8910	8900/8920	8895/8915	8905/8925
8930/8950	8940/8960	8935/8955	8945/8965	8930/8950	8940/8960	8935/8955	8945/8965
8970/8990	8980/9000	8975/8995	8985/9005	8970/8990	8980/9000	8975/8995	8985/9005
9010/9030	9020/9040	9015/9035	9025/9045	9010/9030	9020/9040	9015/9035	9025/9045
9050/9070	9060/9080	9055/9075	9065/9085	9050/9070	9060/9080	9055/9075	9065/9085
9090/9110	9100/9120	9095/9115	9105/9125	9090/9110	9100/9120	9095/9115	9105/9125
9130/9150	9140/9160	9135/9155	9145/9165	9130/9150	9140/9160	9135/9155	9145/9165
9170/9190	9180/9200	9175/9195	9185/9205	9170/9190	9180/9200	9175/9195	9185/9205
9210/9230	9220/9240	9215/9235	9225/9245	9210/9230	9220/9240	9215/9235	9225/9245
9250/9270	9260/9280	9255/9275	9265/9285	9250/9270	9260/9280	9255/9275	9265/9285

OT Circuit Pack Placement

Precautions

CAUTION

Care should be used while handling Circuit Packs as fibers on the boards may come loose with improper handling.

Circuit Pack Layout

Please refer to your Customer Specification (SITE) plans for the placement location of OT circuit pack. In lieu of customer specific plans refer to Alternate Circuit Pack Placement Guidelines on page 9-9.

Important! Generic and relative references to the LambdaXtreme™ Transport Bays refer to bay A1, A2, and so forth. Circuit pack placement will be referenced by the Customer specified Rack number on the customer order.

Important! Verify the customer's order before proceeding.

10G, 10G Soliton, 40G and 4x Mux Circuit Packs

OTs come in several variations: 10G LH Add/Drop, 10G ULH Add/Drop, 4 x 2.5 Mux, 40G Add/Drop, and 4 x 10G Mux. The 10G LH packs are 30 mm wide. The 10G ULH Add/Drop and 4 x 2.5G Mux packs are 60 mm wide. All 40G packs are 90 mm wide. All circuit packs may be placed in any slot designated for OT as long as it can accommodate the width requirements. Pack locations are designated by the rightmost occupied slot.

1 Unpack the OT circuit packs.

2 Place OT circuit packs in designated locations as listed on the order.

3 Place a dummy circuit pack blank in circuit pack slots with no circuit packs assigned.

END OF STEPS

Alternate Circuit Pack Placement Guidelines

Circuit Pack Layout

In lieu of specific OT Circuit Pack placement information, the following section details guidelines that may be used an alternate plan.

Wavelength Growth Plan

Wavelength growth plans are included in the Applications Planning Guide. There are two main plans: One starting with no RPG packs that progresses to full a compliment of OM & ODs (0, 50, 100 & 150-GHz offsets) before adding RPG packs. Another that adds RPG packs before adding the additional OM & ODs. The plan described below describes growth under the first scenario.

Wavelength Sequence

Table 9-2 on page 9-12 describes the sequence for wavelength growth as prescribed by the 32 available wavelength growth kits. The kits are available in 10G LH, 10G ULH, and 40G that include various supported Client side interfaces (VSR, IR, & MUX). These packs vary in size and this will also dictate their placement, as slots that are skipped because of width restrictions can be backfilled when width permits.

Placement Sequence

The following three figures show the placement sequence for 10G End Terminals, 40G End Terminals, and OADM Terminals. These guides are only to be used in the absence of specific pack placement information provide by on a customer order.

Figure 9-5 10G End Terminal

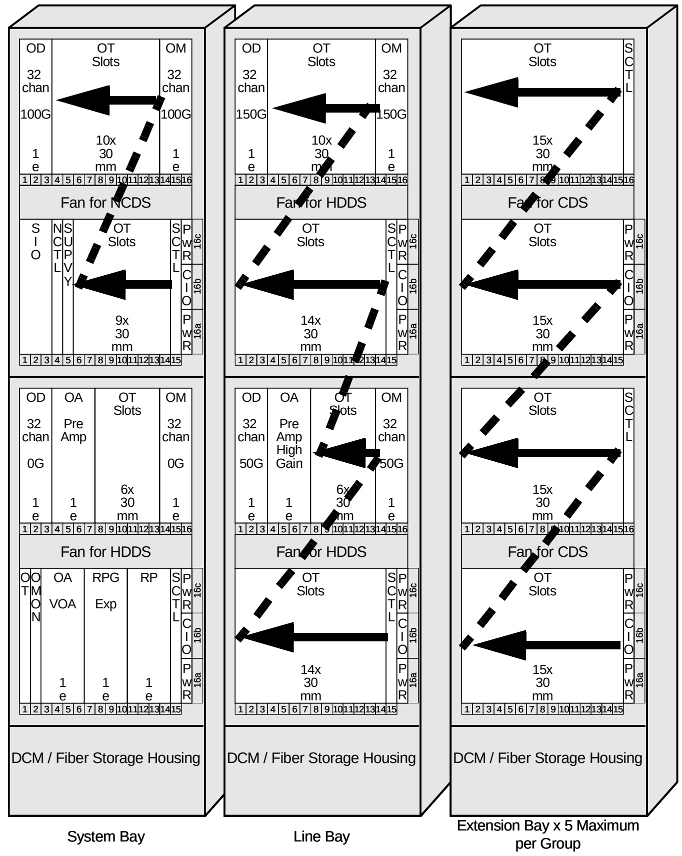


Figure 9-6 40G End Terminal

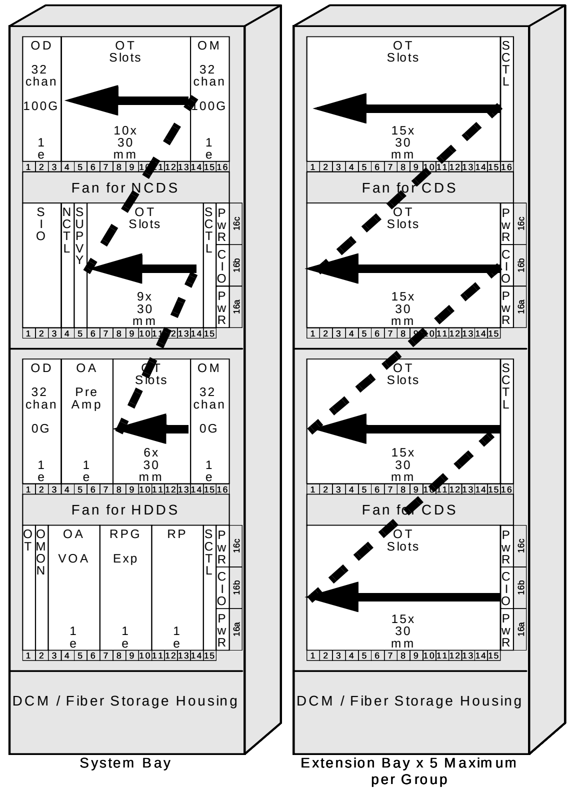


Figure 9-7 OADM Terminal

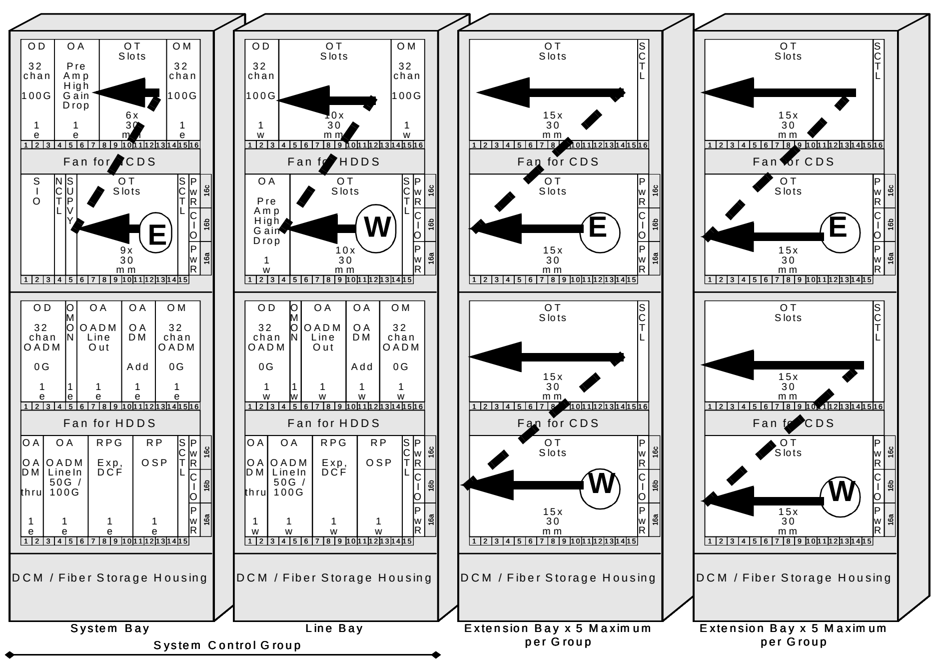


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Table 9-2 Placement Sequence vs Frequency Code

1	8650	**2**	8670	**3**	8690	**4**	8710
5	8730	**6**	8750	**7**	8770	**8**	8790
9	8810	**10**	8830	**11**	8660	**12**	8680
13	8700	**14**	8720	**15**	8740	**16**	8760
17	8780	**18**	8800	**19**	8820	**20**	8840
21	8655	**22**	8675	**23**	8695	**24**	8715
25	8735	**26**	8755	**27**	8775	**28**	8795
29	8815	**30**	8835	**31**	8665	**32**	8685
33	8705	**34**	8725	**35**	8745	**36**	8765
37	8785	**38**	8805	**39**	8825	**40**	8845
41	8850	**42**	8870	**43**	8890	**44**	8910
45	8930	**46**	8950	**47**	8970	**48**	8990
49	9010	**50**	9030	**51**	9050	**52**	9070
53	9090	**54**	9110	**55**	9130	**56**	9150
57	9170	**58**	9190	**59**	9210	**60**	9230
61	9250	**62**	9270	**63**	8860	**64**	8880
65	8900	**66**	8920	**67**	8940	**68**	8960
69	8980	**70**	9000	**71**	9020	**72**	9040
73	9060	**74**	9080	**75**	9100	**76**	9120
77	9140	**78**	9160	**79**	9180	**80**	9200
81	9220	**82**	9240	**83**	9260	**84**	9280
85	8855	**86**	8875	**87**	8895	**88**	8915
89	8935	**90**	8955	**91**	8975	**92**	8995
93	9015	**94**	9035	**95**	9055	**96**	9075
97	9095	**98**	9115	**99**	9135	**100**	9155
101	9175	**102**	9195	**103**	9215	**104**	9235
105	9255	**106**	9275	**107**	8865	**108**	8885
109	8905	**110**	8925	**111**	8945	**112**	8965
113	8985	**114**	9005	**115**	9025	**116**	9045
117	9065	**118**	9085	**119**	9105	**120**	9125
121	9145	**122**	9165	**123**	9185	**124**	9205
125	9225	**126**	9245	**127**	9265	**128**	9285

OT to OM/OD Fibering Information

Fiber Description

This section provides procedures for fibering the OTs to the OMs and ODs in the LambdaXtreme™ Transport.

Fiber Management

Refer to *Chapter 103, Fiber Management* for care, handling and routing of fibers.

Fiber Kits

Refer to *Chapter 104, Fiber Kit Descriptions* for descriptions of the fiber kits.

Fiber Cleaning

Refer to *Chapter 105, Fiber Cleaning* for the correct fiber cleaning procedures.

Precautions

CAUTION

Fiber is constructed of glass and should be treated with care. It should not be pulled or stretched. This could cause damage to the fiber or the fiber connector.

CAUTION

Fiber should not be bent in a radius of less than 1-1/2"(38 mm).

OT Simplex Fibers

The LambdaXtreme™ Transport End Terminal can contain one to six bays. The System Bay and a Line Bay (if used) are always adjacent to each other. Extension bays have no placement requirements other than that they must be less than 100 cable meters away from the System Bay. OT fiber lengths may be determined per each customer order using the SITE engineering tool. The following table may also be used as a guide, Table 9-3 on page 9-14.

Table 9-3 OT Fiber Length Guidelines (End/OADM Terminals)

	LOCATION OF OT CIRCUIT PACK				
	BAY NUMBER				
SHELF NO.	**A1**	**A2**	**A3**	**A4**	**A5**
4	20 Feet	20 Feet	20 Feet	25 Feet	25 Feet
3	15 Feet	15 Feet	20 Feet	20 Feet	25 Feet
2	15 Feet	15 Feet	20 Feet	20 Feet	25 Feet
1	-	15 Feet	15 Feet	20 Feet	20 Feet

Figure 9-8 OT Simplex Fibers

OT to OM/OD Fibers	
Comcode	**Description**
108918897	15 Feet, Simplex LC-LC Yellow Fiber (40 degree boot)
108918913	20 Feet, Simplex LC-LC Yellow Fiber (40 degree boot)
108918921	25 Feet, Simplex LC-LC Yellow Fiber (40 degree boot)
108918939	30 Feet, Simplex LC-LC Yellow Fiber (40 degree boot)
108918947	35 Feet, Simplex LC-LC Yellow Fiber (40 degree boot)
108918970	50 Feet, Simplex LC-LC Yellow Fiber (40 degree boot)
108918988	X Feet, Simplex LC-LC Yellow Fiber (40 degree boot), made with Cordage Comcode 108833963
Note: Angled boot end of fiber must be attached to the OM/OD circuit pack for proper fiber routing	

Fibering Procedures

Proceed as follows:

1 Select the fiber with the designated length for the specified ADD or Drop wavelength.

2 Attach the appropriate fiber labels to each end of the fiber.

> **Important!** Labels are different on each end. For example on an ADD 8805 OT signal to OM, the OT output would be 8805 OUT and the OM input would be 8805 IN.
>
> - End Terminal Label Kit 848835898
> - OADM Terminal Label Kit 848835914

3 Remove dust cover from one end of the fiber and inspect it. Clean the fiber, if necessary.

4 Place the straight end of yellow simplex fiber into designated port on the OT circuit pack

5 Route the fiber from the OT port to designated OM/OD (refer to Table 9-1 on page 9-7 for OM/OD to wavelength correlation).

> **Important!** Refer to *Chapter 103, Fiber Management* for guidance on routing fiber.

> **Important!** Fiber routing for OADMs is wavelength and direction specific. Be sure to route the specified wavelength to the correct OM.

> **Important!** Routing to OM and ODs should be through the closest of the 4 holes in the sideplate of the shelf (not down through the slots like the other fibers)

6 Uncover the dust cover and inspect the fiber. Clean the fiber if necessary.

7 Place the 40 degree booted end of yellow simplex fiber into the designated port of the OM or OD circuit pack.

8 Repeat the preceding Steps (1-7) for all OT packs on the customer order for both the add and drop wavelengths.

END OF STEPS

Lucent Technologies
Bell Labs Innovations

10 Stand-Alone Node Start-Up

Overview

Purpose This chapter provides the instructions to initially configure the Network Element (NE). It is expected that all warnings and cautions will be strictly observed. See Safety Instructions: page 1-16.

Reason for revision This is the first issue.

Contents This chapter contains the following.

PC Setup and Provisioning	10-2
Software Installation	10-3
Windows 98 setup	10-4
NE Login Procedures	10-6
NE Logoff Procedures	10-10
Configuration Provisioning	10-11
Circuit Pack and Cabling Verification	10-16
EMS Port Monitoring	10-18

PC Setup and Provisioning

Verify PC Capabilities

It is anticipated that most customers will have a dedicated a lap-top personal computer (PC) for the LambdaXtreme™ Transport applications software. However, a properly configured PC will also suffice. The following table shows the PC requirements for LambdaXtreme™ Transport.

Table 10-1 PC and Software Requirements

	Minimum	Recommended
Processor	350-MHz	500-MHz Pentium III
RAM	128 Mbyte	256 Mbyte
Disk space	120 Mbyte	120 Mbyte
Video	1024 X 768- 256 Color	1024 X 768 - 256 color
Network Interface	10BaseT LAN NIC with RJ45 interface	10BaseT LAN NIC with RJ45 interface
CDROM	Required	Required
Operating System	Windows 98/2000/ NT4.0.1	Windows 2000/NT4.0.1
PC Card Slot available (FMM)	Required	Required

Installed Software

Have the PC ready before proceeding. LambdaXtreme™ Transport CIT software and associated NE software should be loaded onto the PC in accordance with the procedures set forth in theLambdaXtreme™ Transport Software Release Description (SRD) for the Release of Software to be installed.

□

Software Installation

Procedures for NE Software Installation

Initial Software Installation is covered in the Software Release Description for this product

Comcode of SRD for R1.1: C109266585

Initial software is always downloaded locally. Software is loaded onto a PC and then into the network element. Remote downloads for first time installations are not possible.

> **Important!** Technicians should read the entire Software Release Description, including the Known Problems list.

> **Important!** A Network Element Controller (NCTL) circuit pack or a Flash Memory Module (FMM) should never be removed without first pressing the FMM LED button and waiting for it to flash. If an NCTL or FMM is removed without following this procedure, there is a risk of FMM file corruption.

☐

Windows 98 setup

Procedure The following procedure setup Windows 98 for direct connection to LambdaXtreme™ Transport network element.

1 Click on “Start” > Settings > Control Panel.

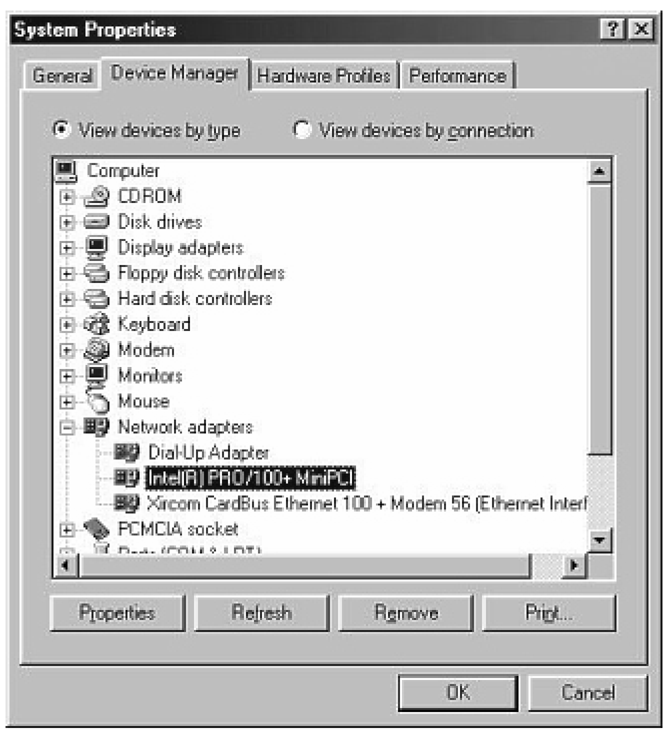
2 Double click on “System” icon. System Properties window will open.

3 In “System Properties” window, select “Device Manager.”

4 Expand the node for “Network Adapters.”

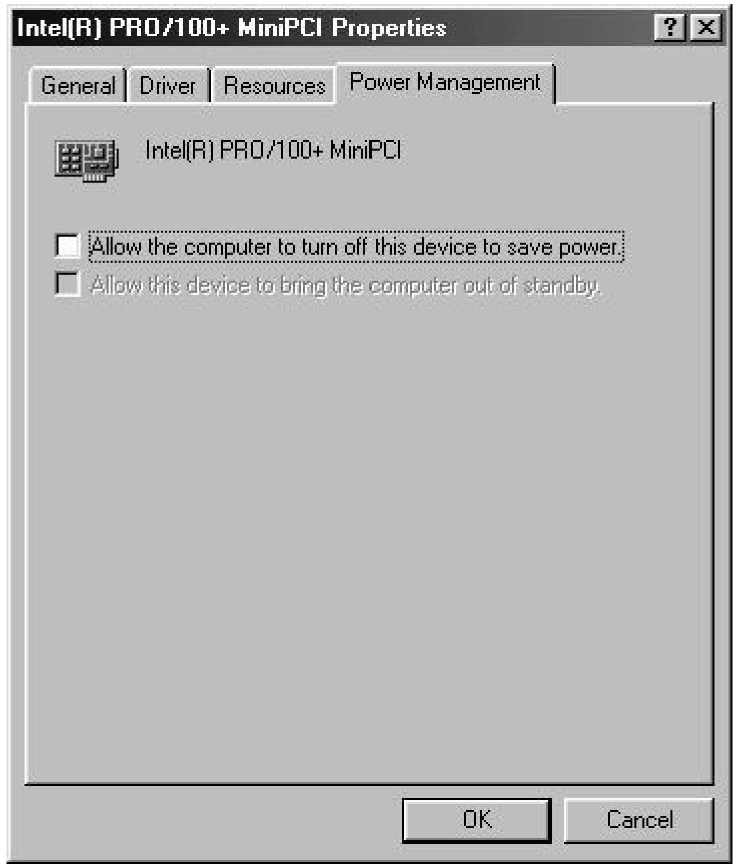
5 Right click on the network adapter item you use for the “Direct Connection” and select “Properties.”

Figure 10-1 Network Adapter Properties



6 In the Properties selection window, select the "Power Management" tab.

Figure 10-2 Network Adapter Power Management



7 Uncheck "Allow the computer to turn off this device to save power."

8 Click on "OK" to close the Network Adapter Properties window.

9 Click on "OK" to close System Properties Window. Proceed to NE Login Procedures: page 10-6.

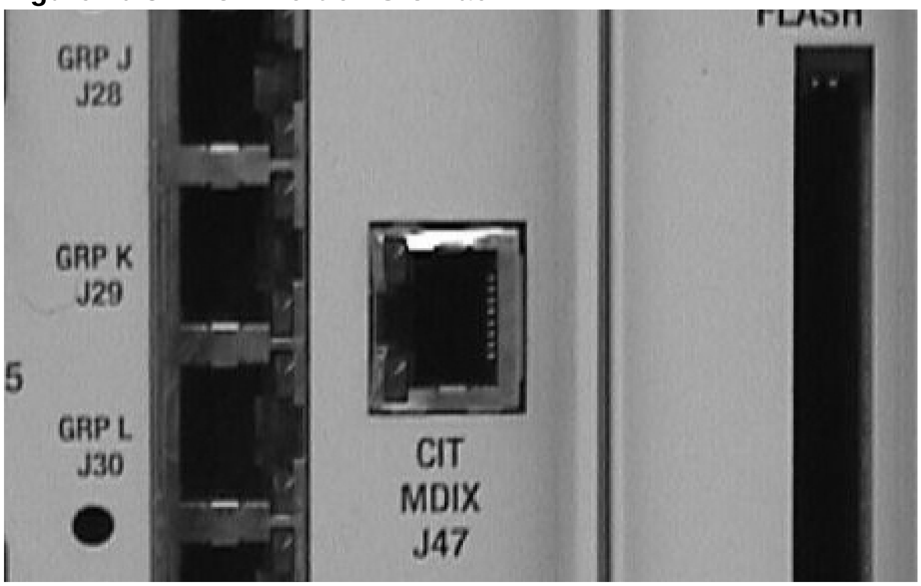
END OF STEPS

NE Login Procedures

Procedure This task describes how to log in to the LambdaXtreme™ Transport network element utilizing CIT Node Manager.

1 Connect the RJ45 straight through cable to the LAN card in the PC and to the LambdaXtreme™ Transport CIT port on the SIO pack.

Figure 10-3 CIT Port on SIO Pack



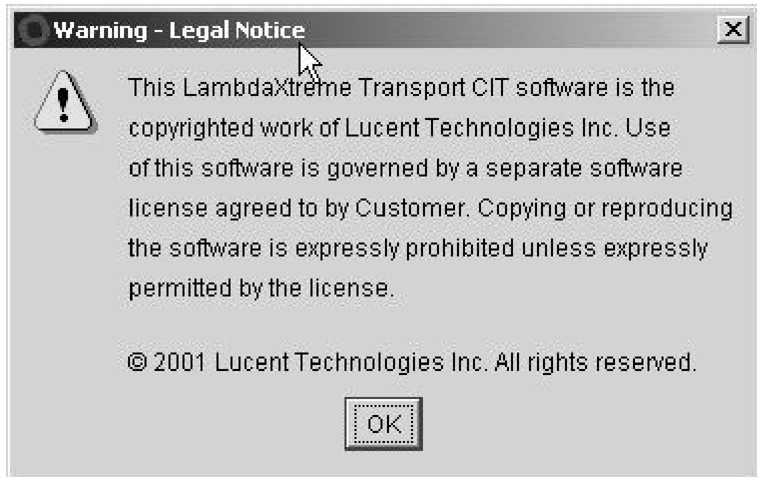
Important! Verify the Green LED is illuminated on the SIO, NCTL, and SCTL. If a proper LAN connection has been made the LED under CIT port should illuminate.

2 If the green LED on the CIT port does not illuminate after 30 seconds, check the RJ45 cable.

3 Start the LambdaXtreme™ Transport CIT by double clicking on the LambdaXtreme™ Transport CIT Release 1.0 on the desktop or by clicking "Start" > Programs > Lucent Technologies > LambdaXtreme™ Transport Release 1.0 > LambdaXtreme™ Transport.

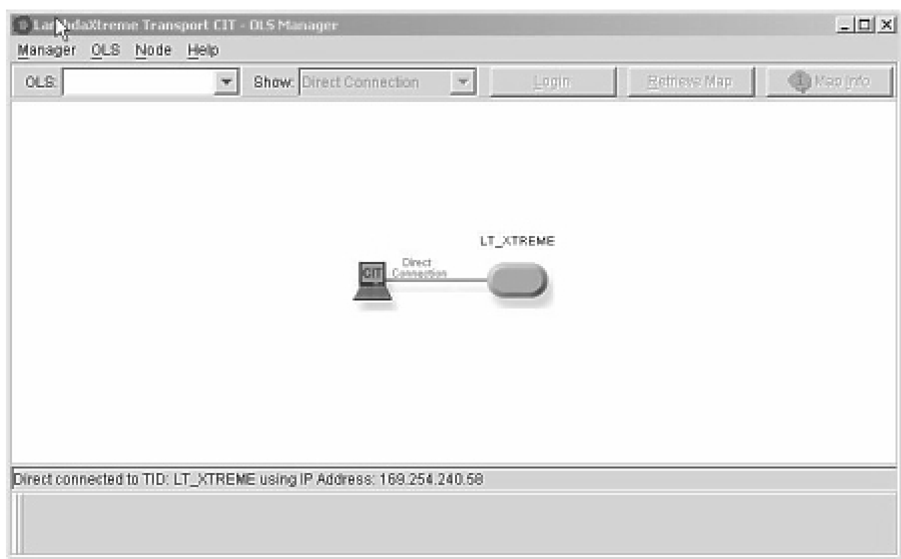
4 Read the "Legal Notice" and click on "OK" to proceed.

Figure 10-4 Warning Message Window



5 Once the CIT OLS Manager is open, a network element icon will automatically appear in the main window area.

Figure 10-5 CIT OLS Manager View



Important! IP addresses will be assigned to network element and to PC's LAN card if it does not have one. This process will take up to 30 seconds. Once IP addresses have assigned, you will see in the OLS window a graphical icon showing a CIT connected to LambdaXtreme™ Transport network element.

6 Right click on the icon for the network element and select Login.

7 A Login window will appear.

Figure 10-6 Login Window

8 Enter the initial default value:

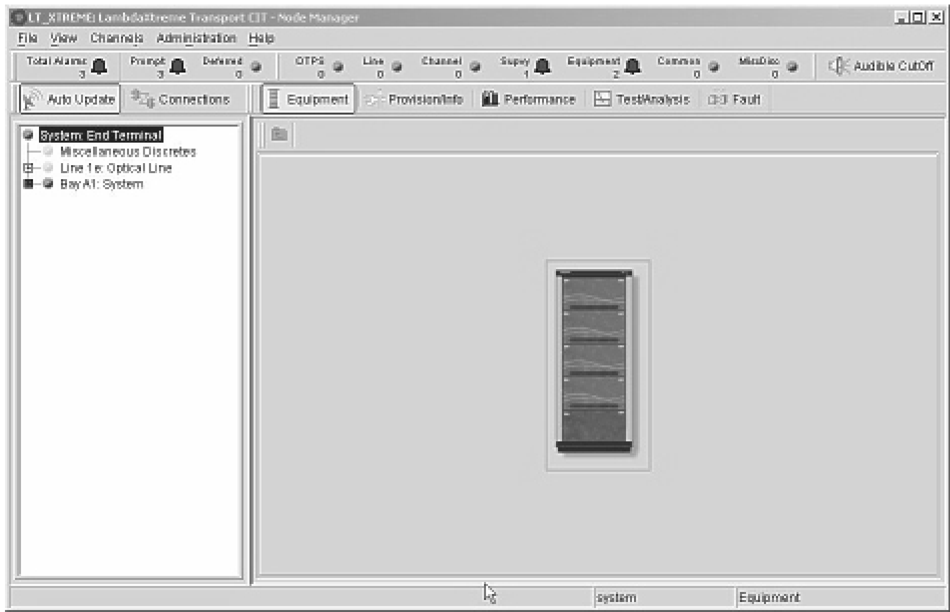
User ID: LUC01 or LUC02 or LUC03

Password: LUONG+01 or LUONG+02 or LUONG+03

Click on “OK.”

9 Once login is successful, the Node Manager view of the LambdaXtreme™ Transport CIT will be opened.

Figure 10-7 CIT Node Manager View



Important! *When using the Node Manager View feature of the LambdaXtreme™ Transport CIT, the graphical interface will only display the LambdaXtreme™ Transport bays in a Left to Right sequence. The CIT will display the System bay on the left side of the display with subsequent bays (Line, and Extension bays) to the right. This may differ from how the bays are physically installed. The graphical interfaces in CIT will not reflect the fact that the system could be built Right to Left.*

END OF STEPS

NE Logoff Procedures

Procedures The following procedure list steps to log off the Network Element (NE) and to exit the LambdaXtreme™ Transport CIT Node Manager.

1 From the “LambdaXtreme™ Transport CIT Node Manager” window menu bar, select File > Disconnect.

2 A Warning window will open stating “This will disconnect you from the network element.”

3 Click on “OK” and Node Manager session will end.

4 To exit OLS Manager, at menu bar of OLS Manager, click on Manager > Exit.

5 A Warning window will opening asking “Are you sure you want to exit?”

6 Click on “Yes” and OLS manager session will end.

END OF STEPS

Configuration Provisioning

Background

Effective communications between the LambdaXtreme™ Transport NE and the CIT begin after the node is properly identified and configured

Objective

To initially configure the LambdaXtreme™ Transport NE

Prerequisite Information

Prior to configuring the LambdaXtreme™ Transport, obtain the proper provisioning information. This information should come from the Customer order. It should include the following information:

- TID
- NE type
- Standard (SONET or SDH)
- Channel Rate
- NE Number
- Transmission options on pump failure
- EMS port information

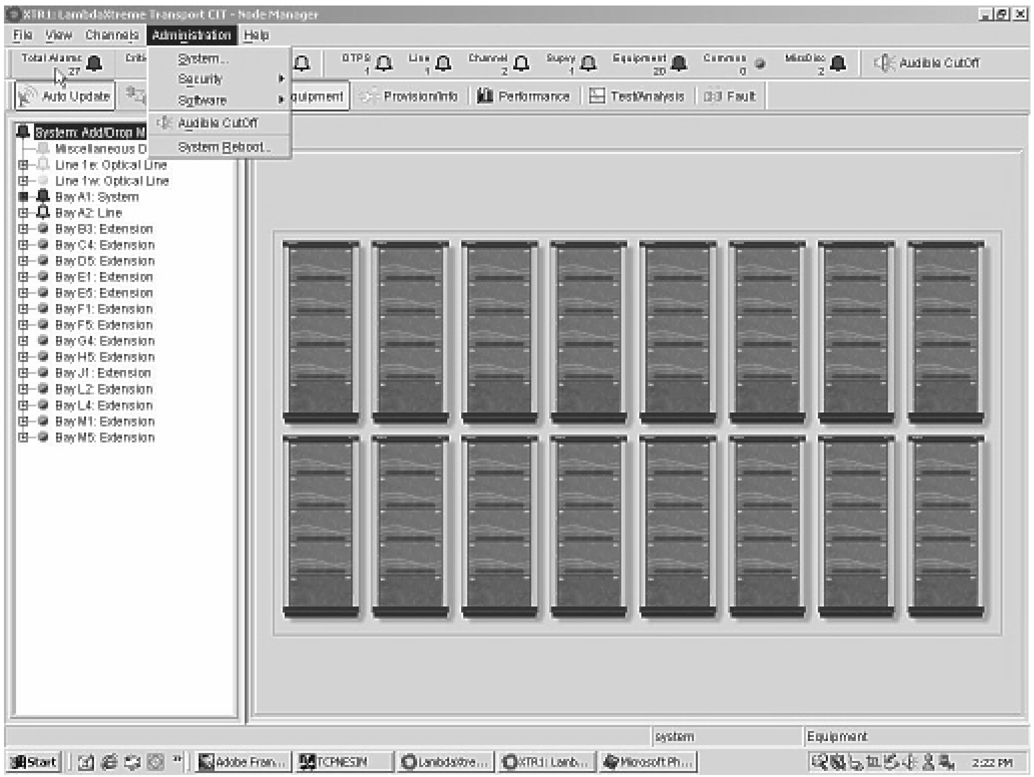
Procedure

These are the procedures to configure the LambdaXtreme™ Transport Node.

1 Log in to the LambdaXtreme™ Transport node. See NE Login Procedures: page 10-6.

2 A screen similar to the following will appear (NOTE: Variations in configuration type and equipment will result in different views).

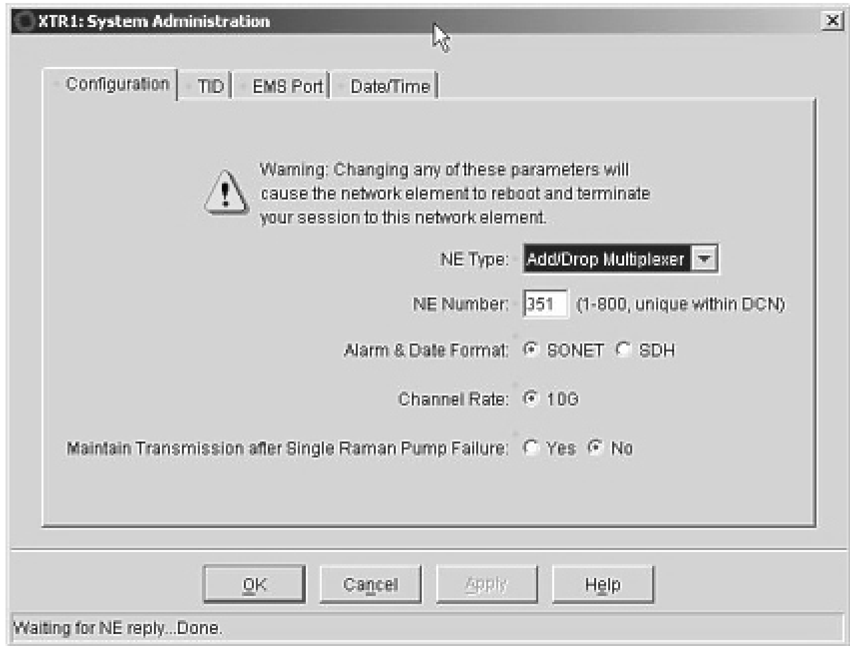
Figure 10-8 Node Manager Screen



3 On the upper toolbar select: Administration > System

4 A pop up window entitled TID name: System Administration appears.

Figure 10-9 System Administration Screen



Important! Do not select the OK button until you enter the appropriate information under each of the five tabs in this window

5 Click the Configuration tab.

6 Enter the applicable NE Type, NE number, Interface standard, Channel Rate and Pump Failure options.

Important! Selecting an NE type of Repeater makes another folder tab Repeater Type available.

7 Click on the “TID” tab.

8 Enter the proper TID.

9 Click on the "EMS port" tab.

10 Enter the proper EMS port IP Address, EMS Subnet Mask, and EMS Default Router IP Address.

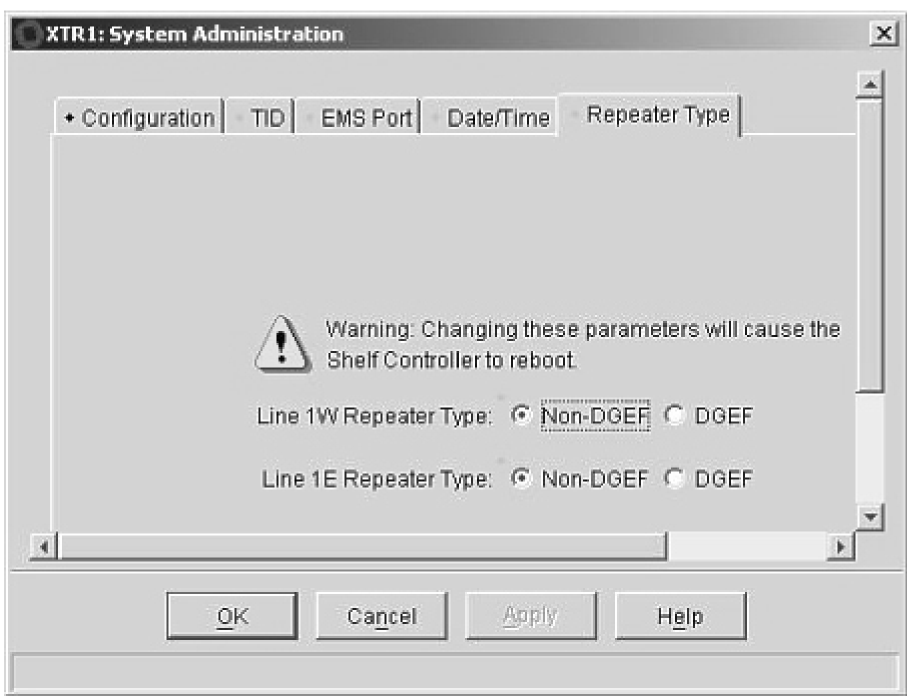
11 Click on the "Date/Time" tab.

12 Enter the proper Date and time.

Important! Date/Time is purposely the last System Configuration tab. Clicking the "OK" button at the bottom of the window in a timely fashion after entering this information will ensure a proper time setting.

13 If an NE type of Repeater was selected, set the repeater type for each direction.

Figure 10-10 Repeater Configuration Screen



14 Click “OK.”

END OF STEPS

Circuit Pack and Cabling Verification

Background When the LambdaXtreme™ Transport is cabled and configured properly, all circuit packs are visible on the Node Manager window.

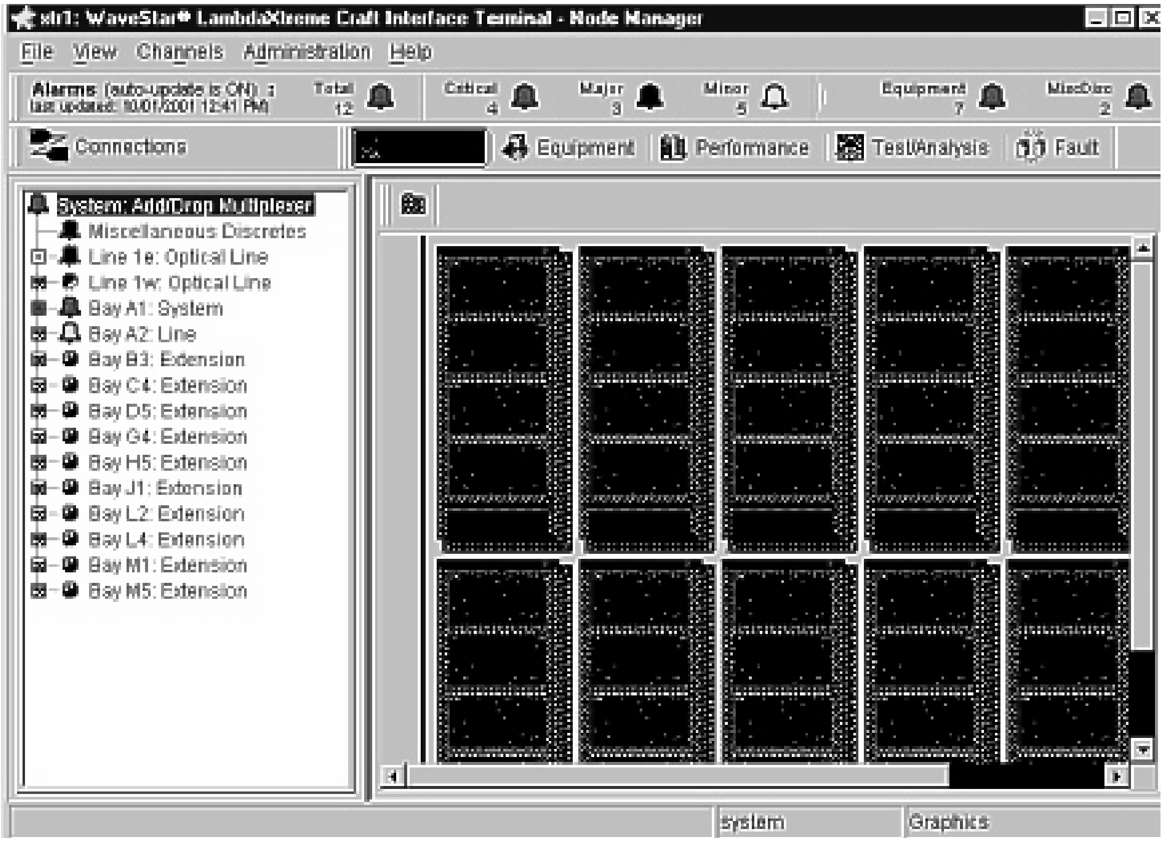
Objective Verify all installed circuit packs show up on the Node Manager window. Verify circuit pack operation, cabling and proper CIO switch provisioning.

Procedure The following procedure is used to verify circuit pack operation, cabling and proper CIO switch settings.

1 Log in to the LambdaXtreme™ Transport node. See NE Login Procedures on page10-4.

2 On the upper left side of the Explorer Bar is an entry titled “System,” followed by a terminal type. Double Click on the System entry. (See Figure 10-11 on page 10-17).

Figure 10-11 Sample Node Manager Screen



3 Verify that the system displayed on Node Manager window display is identical to the planned system (see customer order).

END OF STEPS

EMS Port Monitoring

Background The EMS Port information is provisioned under the System Administration function. The EMS port monitoring function must be administered separately under the System Input Output Circuit Pack provisioning.

Objective To properly select EMS port monitoring.

Prerequisite information The EMS port should be on the customer job order.

Procedure The below steps describe how to provision the EMS Port Monitoring feature.

---

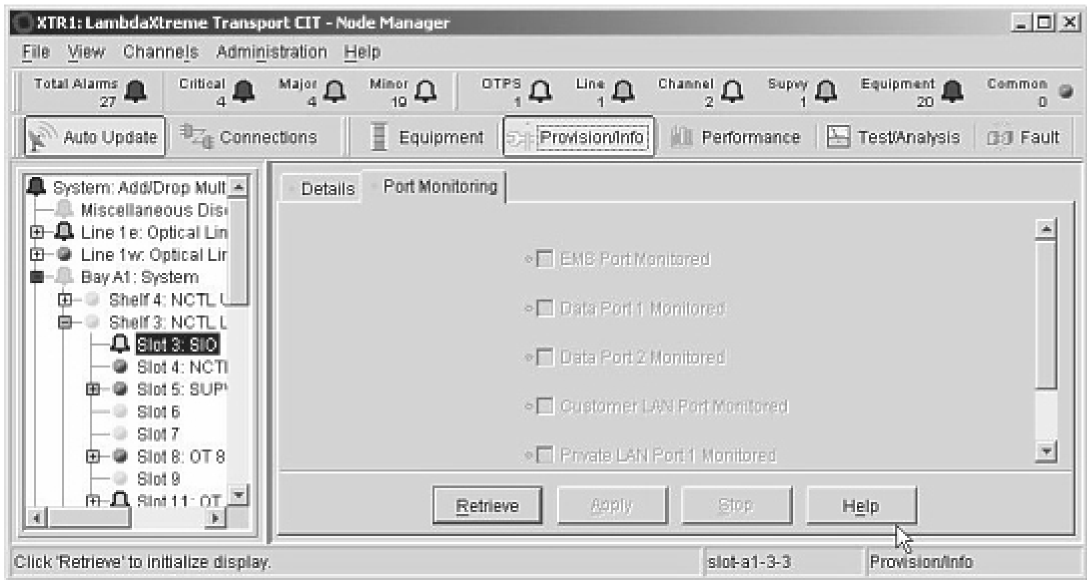
1 If not already logged in to the LambdaXtreme™ Transport, do so now. Procedure to login are covered in NE Login Procedures: page 10-6.

---

2 Under the Explorer tree on the left window, select the SIO card.

> **Important!** For End Terminals, the SIO card is located in Bay A1, Shelf 3, Slot 3. For Repeater Terminals, the SIO card is located in Bay A1, Shelf 1, Slot 3. Use the “Equipment View.”

Figure 10-12 SIO Selection



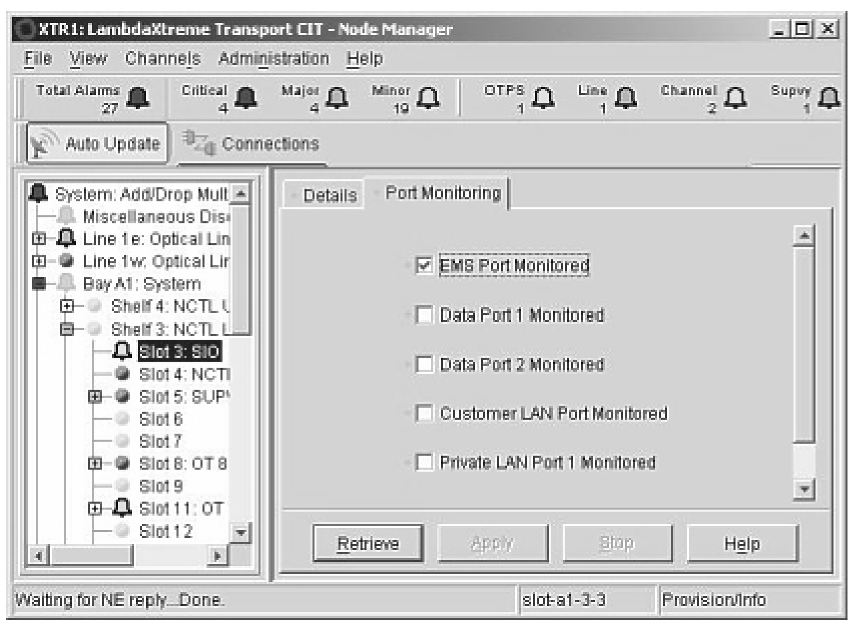
---

3 The main window will show two tabs: Details and Port Monitoring.

---

4 Select the “Port Monitoring” tab.

Figure 10-13 EMS Port Monitoring Screen



5 Click on the “Retrieve” button.

6 Click the “EMS Port Monitored” to change the setting (as needed). Default entry is unchecked (not monitored).

7 Click “Apply” if you changed the settings.

END OF STEPS

11 Local Installation Testing

Overview

Purpose This chapter describes how to perform the Installation Self-Test on an individual network element.

Reason for revision This is the first issue.

Contents This chapter contains the following.

General Considerations	11-2
LED Testing	11-4
Internal Path Testing Procedures	11-6

General Considerations

Objectives

The Installation Self Test will help verify that the LambdaXtreme™ Transport Network Element (NE) is correctly assembled by performing continuity tests on each optical channel passing through its circuit packs and internal connections. A technician will initiate testing and obtain results through a Craft Interface Terminal (CIT). For each continuity test, the results reported will indicate if the test passed, failed, or was not performed.

Important! Note the following before starting these procedures:

- Disconnect the office alarm cable (if attached) before performing any test. Reconnect the office alarm cable after completing all tests.
- These procedures require that the NE has LambdaXtreme™ Transport software installed. Additionally, all circuit packs must be installed with their ACTIVE LED (green) lit and their FAULT LEDs (Red) extinguished and with no unexpected alarms. (NOTE: OTs may have a RED flashing LED indicating LOS on their inputs.)

Precautions

CAUTION

The tests in this section should be performed on an out of service NE only. If these tests are performed in service, service may be interrupted.

CAUTION

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.

Tools, Test Sets, and Accessories

The following equipment is required to perform the installation tests in this chapter:

- Wrist Strap connected to wrist strap ground jack on user panel or equivalent
- PC for use as CIT with software loaded
- Cat 5 Straight 4-pair Cable w/ RJ-45 connectors
- Optical connector cleaning accessories
- LC to LC, ST, SC or FC Fiber jumpers depending on the type of connector (Universal Build Out or LC) that customer ordered, (6 for 2-fiber application).

□

LED Testing

Procedure Proceed as follows:

1 Log in to the NE.

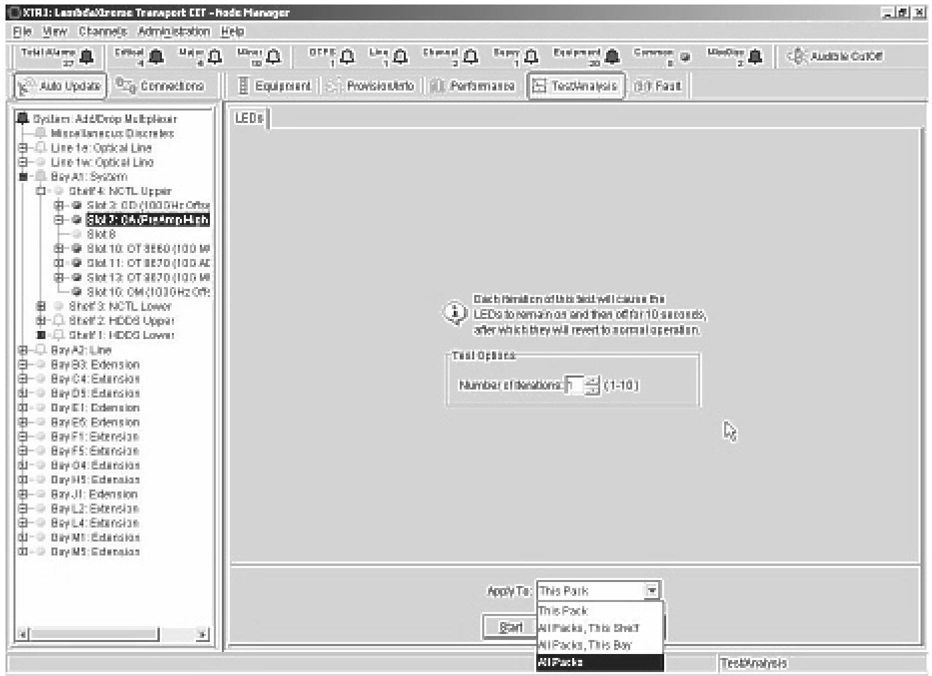
2 Open the Explorer bar on the right side of the Node Manager, and click on any individual circuit pack.

3 Click on the “Test/Analysis” option on the sub tool bar (or while on the circuit pack in the explorer tree, right click and select “Test/Analysis”).

4 Select the LED tab.

5 Determine the number of iterations and which packs will be tested.

Figure 11-1 LED Test Screen



6 Click on the start button.

7 Observe the LEDs on the selected circuit packs respond as desired.

END OF STEPS

☐

Internal Path Testing Procedures

Description This procedure will be available in Release 1.1.

Part III: System Turn-up and Testing

Overview

Introduction

This part of the Installation Guide includes the necessary chapters to connect the LambdaXtreme Transport NEs together between adjacent sites to build a complete system ring map. These chapters are written assuming working knowledge of the LambdaXtreme Transport and its operations. Additional information is included in Part IV if needed.

Reason for revision

This is the first issue.

Contents

This part of the document contains the following chapters.

Overall Integration Planning	12
Connecting Adjacent Network Elements	13
Port/WaveLength Servicing	14
Performance Verification Testing	15

12 Overall Integration Planning

Overview

Purpose The purpose of this chapter is to provide the information needed to plan the integration of a LambdaXtreme™ Transport system.

Reason for revision This is the first issue.

Contents This chapter contains the following:

Integration Planning	12-2
Checklists	12-4
Integration Checklist for Repeaters	12-5
Integration Checklist for End Terminals	12-6
Integration Checklist for OADM Terminals	12-7
Tools and Test Equipment	12-8
Safety Instructions	12-11
Technical Support Functions	12-15

Integration Planning

Scope of Job

Installation and Integration of the LambdaXtreme™ Transport equipment is similar to other lightwave telecommunications equipment. The general phases of the installation job are:

1. Prepare central office for new equipment.
2. Physically install LambdaXtreme™ Transport equipment.
3. Power up the LambdaXtreme™ Transport equipment.
4. Install circuit packs and associated fibers.
5. Cable (copper) the LambdaXtreme™ Transport equipment.
6. Install the software.
7. Provision and perform any local tests in the central office.
8. Connect LambdaXtreme™ Transport NEs and establish network.
9. Perform system tests and connect traffic to LambdaXtreme™ Transport.
10. Turn over system to local operations and maintenance personnel.

Items 2 through 7 are covered in the Installation part of this manual. Items 8 and 9 are covered in the System Turn up part of the manual. Items 1 and 10 are beyond the scope of this document.

> **Important!** Please check with your Customer Team to determine which of the above items are included in your contract with Lucent. Contracts can vary widely.

Equipment Installation

Use Part I, Chapters 2 through 4 of this document to perform the physical and power installation of the LambdaXtreme™ Transport equipment. Use Part II, Chapters 5 through 11 of this document to perform the stand-alone installation and testing. Use Part III, Chapters 12 through and 15 of this document to perform System Turn-Up. Part IV, chapters 100 through 105 provide additional detail or reference information.

Installation Documents

Besides the Installation Guide, the Technician should also have:

- Installation Specification sheets (generated by SITE tool)
- Fiber Characterization specification
- Floor Plan Information

Important! Network Element type determines Chapter sequence via downward flow beneath NE type name

Table 12-1 Job Planning Flowchart for LambdaXtreme™ Transport

<table>
<tr><th></th><th>Repeater</th><th>End Terminal</th><th>OADM Terminal</th></tr>
<tr><td rowspan="3">PART I</td><td colspan="3">Chapter 1, Overall Installation Planning</td></tr>
<tr><td rowspan="2">Chapter 2, Repeater Shelf - Physical and Power Installation</td><td colspan="2">Chapter 3, Terminal Frame - Physical Installation</td></tr>
<tr><td colspan="2">Chapter 4, Bay Powering</td></tr>
<tr><td rowspan="5">PART II</td><td rowspan="3">Chapter 5, Circuit Pack and Fiber Installation for Repeater</td><td>Chapter 6, Non-OT Circuit Pack and Fiber Installation for End Terminals</td><td>Chapter 7, Non-OT Circuit Pack and Fiber Installation for OADM Terminals</td></tr>
<tr><td colspan="2">Chapter 8, Control and External Connections for End/OADM Terminals</td></tr>
<tr><td colspan="2">Chapter 9, OT Circuit Pack and Fiber Installation for End and OADM Terminals</td></tr>
<tr><td colspan="3">Chapter 10, Stand-Alone Node Start-Up</td></tr>
<tr><td colspan="3">Chapter 11, Local Installation Testing</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td rowspan="4">PART III</td><td colspan="3">Chapter 12, Overall Integration Planning</td></tr>
<tr><td colspan="3">Chapter 13, Connecting Adjacent Network Elements</td></tr>
<tr><td></td><td colspan="2">Chapter 14, Port/WaveLength Servicing</td></tr>
<tr><td colspan="3">Chapter 15, Performance Verification Testing</td></tr>
<tr><td rowspan="6">PART IV</td><td colspan="3">Chapter 100, Backplane Pin Repair/Replacement</td></tr>
<tr><td colspan="3">Chapter 101, Orderwire Installation</td></tr>
<tr><td colspan="3">Chapter 102, Miscellaneous Discretes/Remote Restart</td></tr>
<tr><td colspan="3">Chapter 103, Fiber Management</td></tr>
<tr><td colspan="3">Chapter 104, Fiber Kit Descriptions</td></tr>
<tr><td colspan="3">Chapter 105, Fiber Cleaning</td></tr>
</table>

Checklists

Description The following tables provide Installation Checklists for each network element type to aid in the installation process. The associated NE is the value provisioned into the software to define the equipment capabilities.

LambdaXtreme™ Transport Configuration	NE Type	Installation Checklist
LambdaXtreme™ Transport Repeater	2 Fiber Repeater [2F_RPT]	Integration Checklist for Repeaters on page 12-5
LambdaXtreme™ Transport End Terminal	2 Fiber End Terminal [2F_ET]	Integration Checklist for End Terminals on page 12-6
LambdaXtreme™ Transport OADM	2 Fiber OADM [2F_OADM]	Integration Checklist for OADM Terminals on page 12-7

☐

Integration Checklist for Repeaters

Office Location ____________________

System Turn Up

Check that the following LambdaXtreme™ Transport items are completed between offices.

Check When Done	Item to Check	Location in IG
	Connecting Adjacent NEs	*Chapter 13, Connecting Adjacent Network Elements*
	Good Transmission	*Chapter 15, Performance Verification Testing*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

☐

Integration Checklist for End Terminals

Office Location ____

System Turn Up Check that the following items are completed between offices.

Check When Done	Item to Check	Location in IG
	All NEs Connected Ring Map Built___________ Remote Logins___________	*Chapter 13, Connecting Adjacent Network Elements*
	Port Services	*Chapter 14, Port/ WaveLength Servicing*
	Performance Verification	*Chapter 15, Performance Verification Testing*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

☐

Integration Checklist for OADM Terminals

Office Location ____

System Turn Up Check that the following items are completed between offices.

Check When Done	Item to Check	Location in IG
	Ring Map Built__________ Remote Logins__________	*Chapter 13, Connecting Adjacent Network Elements*
	Port Services	*Chapter 14, Port/WaveLength Servicing*
	Performance Verification	*Chapter 15, Performance Verification Testing*

Completed/Verified by:

Name			
Phone/Pager		Date Complete	

☐

Tools and Test Equipment

General

Included in this section are the tools and test equipment needed for installing and testing LambdaXtreme™ Transport equipment.

Lucent Installers can refer to the following website for tool and test set information: http://tooltest.ih.lucent.com

Tools

Listed below are the tools needed for installing and testing.

Description	Commercial or Comcode	Chapter Used	Notes
ESD wrist strap	(R TOOL #4987C)		For ESD protection.
Metral Pin Repair Kit (optional, as required)	BERG MT370-01 Kit 106423859 ***OR*** IMDARC R-6004 407959881		For replacing any damaged METRAL pins Refer to Appendix A for more details
#2 Phillips Screwdriver	406693432 (R-5770 D4)		For use with Power Connectors
Jewelers Screwdriver			For setting switches on CIO circuit pack

Test Equipment

Listed below is the test equipment needed while installing and testing.

Description	Commercial or Comcode	Notes
Optical power meter with appropriate connectors	ITE #7116 Noyes -Model with SC, ST and LC adapter. or ITE#71992D2 Acterna/WG with universal adapter of 2.5-FC, SC, ST and LC. or equivalent	For optical power measurements
Optical Time Domain Reflectomer (OTDR)		For verifying span losses and reflectance parameters
Laptop Computer	(ITE # 6938G)	For use as Craft Interface Terminal

Description	Commercial or Comcode	Notes
LAN Card	Comes with (ITE # 6938G) computer, Xircom RealPort Combo Card (ITE_6727 List 8) or ITE #6927 3Com Lan Adapter card	For use with Laptop Computer (see the PC Hardware Requirements section of the Software Release Description (SRD) document for PC specifications)

Test Accessories Listed below are the test accessories needed for turn-up and/or testing.

Description	Commercial or Comcodes	Notes
ESD Wrist Strap	(R TOOL #4987C)	For ESD protection
Single-Mode Fiber Jumpers with appropriate connectors		For optical local tests (minimum 2 ft. length)
RJ45 Cat 5 straight Cable		For connection from the PC to the Network Element

Fiber Cleaning Tools The following tools are used to clean and inspect all fibers before making a fiber connection:

Important! For cleaning and inspection procedures see *Chapter 105, Fiber Cleaning*.

Description	Commercial or Comcode	Installation Order Number
Fiber cleaning Kit	TK-0621 Kit includes the following ITE #6408A D6 Case ITE #7051 Coupler, Fiber (ST-ST) ITE #7093 Coupling Duplex SC ITE #7125 Coupler LC-LC fiber ITE #7134 Luminex Stick Port cleaner 1.25 mm ITE #7135 Luminex Stick Port cleaner 2.5 mm 33713500 ITE #7136 Wipes, Alcohol 33713600 ITE #7137 CLETOP cleaning cassette Type B. 33713700 ITE #7137A D1 CLETOP cleaning cassette refills. 3371370 ITE #7177 Optical fiber Microscope, Westover R-6033 Cloth, Lumionex. 23603300	Each item can be ordered separately

Description	Commercial or Comcode	Installation Order Number
Fiber Microscope	ITE #7177	
Video Fiber Scope (VFS-1)	408356830 (ITE #7146)	41714600
1.25mm Adapter for VFS-1	408356848 (ITE #7146D1)	33714601
2.5mm Adapter for VFS-1	408356855 (ITE #7146D2)	33714602
FC Adapter for VFS-1	408356863 (ITE #7146D3)	33714603
LC Adapter for VFS-1	408356889 (ITE #7146D4)	33714604
SC Adapter for VFS-1	408356954 (ITE #7146D5)	33714605
ST Adapter for VFS-1	408356962 (ITE #7146D6)	33714606
Noyes OFS 300-200X Optical Fiber Scope	408463636 (ITE #7129)	33712900
2.5mm Adapter for Noyes OFS	408197044 (ITE #7129D1)	33712901
1.25mm Adapter for Noyes OFS	408197069 (ITE #7129D2)	33712902

Safety Instructions

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 front, side and top are provided for ventilation. To protect the product 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 four -48V/-60V DC input power feeders per bay. (two feeds for single repeaters). Disconnecting one power feeder will not deenergize the product. To reduce the risk of injury, disconnect the two power supply cables to remove 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, any replacement fuse MUST be of the same type and rating as the original 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. Viewing optics tends to focus the energy from an optical connector increasing 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 LambdaXtreme™ Transport uses a Class I, Class IIIb and Class IV lasers as transmitters. 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 Administration (FDA) as a Class I system (exempt lasers and laser systems). All sections of the LambdaXtreme™ Transport 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. The compliance label is located on the rear of the equipment bays. 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.

Fiber Cleaning Considerations

Observe the following precautions when handling fibers to prevent contaminates from adhering to the fibers and creating potential errors and unnecessary losses:

- Assume that all fibers are dirty and must be inspected and cleaned before connection to equipment.
- Always inspect fibers for contaminants and clean where required.
- Do not remove the protective end caps on fibers or fiber ports until ready to connect.
- If a fiber or port is suspected to been contaminated during test or turn up procedures, reinspect and clean as necessary.

Important! See *Chapter 105, Fiber Cleaning,* for further information on cleaning and inspecting fibers.

Electrostatic Discharge (ESD) Considerations

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

CAUTION

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.

- Assume all circuit packs and units contain solid state electronic components that can be damaged by ESD.
- Always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat when handling circuit packs (storing, inserting, removing, and so forth) 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 all circuit packs at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats.

- Always store and transport 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.

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

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Technical Support Functions

Technical Assistance

Many of our customers have established their own support procedures. These procedures usually involve escalation within their own companies. However, some issues may require additional assistance from Lucent Technologies.

Lucent Technologies has been and continues to be committed to providing excellence in technical customer support for its products and services. Therefore, we provide a hierarchical support structure ready and available to solve any LambdaXtreme™ Transport technical issue.

When additional technical assistance is needed, the Lucent Technologies **C**ustomer **T**echnical **A**ssistant **M**anagement (**CTAM**) center is your first point of contact. A **CTAM** operator can direct your call to engineers that are highly trained and skilled at resolving issues involving Lucent Technologies products. Technical assistance is available 24 hours a day, 7 days a week.

Lucent Technologies Customer Technical Assistance Management (CTAM) center

1-866-LUCENT8 (1-866-582-3688) (continental U.S.)

(24 hours a day, 7 days a week)

By using **CTAM** as the entry point for Lucent Technologies support, you will be assured of timely and effective technical support services.

Outside the continental US, call **+1-630-224-4672**

Customer Assistance Request Entry System (TSS Cares)

TSS CARES (Customer Assistance Request Entry System) is an internal Customer Technical Support tool that allows Lucent engineers to record customer requests for a variety of products. TSS CARES has replaced all legacy systems within Lucent Technologies, Inc. such as CAROD, QUES/DIAS, CTSS, and GTSIP (www.lucentsupport.com).

The Customer Web Access tools provide customers an easy method to access data about Lucent Products using the World Wide Web. Customers can choose to search for data in three different applications:

- Assistance Request

  The Assistance Request Tool allows external customers to search their Assistance Requests and to submit new Assistance Requests. In addition, customers can send e-mail notifications to the Lucent Assignee and Owner of the Assistance Request. Customers using the web access can search the Assistance Request database using a number of fields such as, AR Number, product or priority.
- Solutions

  The Solutions access tool allows customers to view and search known problems and solutions for products. Entries are created within CARES by a Lucent engineer. Customers using the web access can search for solutions using a number of fields such as product, subproduct, created date or description. Only solutions with a state of active will be returned.
- Product Notifications

  The Product Notification access tool allows customers to view and search for information regarding Lucent products that have an issue which needs to be communicated immediately to their customers. A detailed text description of the issue and the urgency of the issue is the kind of information available in the Product Notification database. Customers using the web access can search the Product Notification database using a number of fields such as Product Notification ID, product or created date.

To inquire about obtaining a login, contact Customer Technical Assistance Management (CTAM)/ Virtual Call Center (VCC) at 1-866-LUCENT8 or WECARE/VCC at 1-800-932-2273 or Non-US at 1-630-224-4672. Please make sure you ask for a CARES Customer Web Access Login. An agent will create an Assistance request in TSS CARES and forward your request to the appropriate login administrator.

□

13 Connecting Adjacent Network Elements

Overview

Purpose This chapter includes the procedures to connect adjacent LambdaXtreme™ Transport NEs to each other.

Reason for revision This is the first issue.

Contents This chapter contains the following:

Background	13-2
Identify and Label Outside Plant Fiber	13-3
Test for Fiber Parameter Compliance	13-4
Enter Optical Line Provisioning Parameters	13-10
Enter Supervisory Provisioning Parameters	13-13
Connect Adjacent Nodes	13-15
Verify Neighbor Connectivity	13-16
Warranty Registration	13-18

Background

Objectives

This chapter explains the procedures for connecting the outside plant fiber between adjacent NEs. Connectivity between adjacent NEs will be repeated for all NEs in the system until an End to End system has been completed and verified.

The procedures are:

- Testing for compliance with reflectance parameters
- Testing for compliance with connector loss parameters
- Determining span loss between NEs
- Provisioning the NEs with applicable parameters
- Connecting adjacent NE fibers
- Verifying supervisory connectivity between NEs through CIT

Node Verification

Before beginning to connect the nodes to create a complete system, verify that all individual NEs have no unexpected alarms.

Sequence Algorithm

The sequence for system connection is based on two users, each working on a NE. The users will work together to make all the measurements and connections between the two NEs, then move on to the next two sequential NEs.

DCC connectivity between NEs is verified by viewing the neighbor map or logging in to all NEs.

Precautions

For a complete listing see “Safety Instructions: page 1-16.”

WARNING

This equipment generates and uses laser radiation at extremely high power levels which can cause serious bodily injury. Do not look into any of the fibers or ports on this equipment during the integration procedures.

CAUTION

All ESD precautions MUST be strictly observed. Failure to do so can result in equipment damage.

Identify and Label Outside Plant Fiber

Background

Connectivity specifications between the LambdaXtreme™ Transport NE and the outside plant fiber panels should be designated on the customer order as specified by SITE installation drawings

Objective

Identify, label, and record all label markings for outside plant connections.

Outside Plant Fiber Labeling

Use the table below to determine the appropriate label for the outside plant fiber:

Table 13-1 Outside Plant Fiber Labels

EAST		WEST	
RX	**TX**	**RX**	**TX**
REPEATER			
RP 1-2-16 IN LINE	OA 1-1-9 OUT LINE	RP 1-2-12 IN LINE	OA 1-2-4 OUT LINE
OADM			
RP 1-1-14 IN LINR	OA 1-1-6 OUT LINE	RP 2-1-14 IN LINE	OA 2-1-6 OUT LINE
END			
RP 1-1-14 IN LINE	OA 1-1-6 OUT LINE		

☐

Test for Fiber Parameter Compliance

Background In order to ensure optimal performance of the system, comply to the engineering rules.

Objective Verify reflectance and connector loss are within specifications.

Equipment Required Optical Time Domain Reflectometer (ODTR)
Optical Power Meter
Optical Light Source

Personnel Requirements Two engineers/technicians at adjacent sites are required to perform the necessary connections and measurements.

Procedures Proceed as follows:

1 Attach the ODTR to the outside plant fiber that is to be connected to the East transmit OA.

> **Important!** See specific Figure for applicable Configurations.
> For OADM terminals, refer to *Figure 13-1, OADM Terminal Measurement Diagram (13-7)*.
> For Repeater terminals., refer to *Figure 13-2, Repeater Terminal Measurement Diagram (13-7)*.
> For End terminals connected to the East side of other terminals, refer to *Figure 13-3, End Terminal (Connected to East NEs) Measurement Diagram (13-8)*.
> For End terminals, refer to *Figure 13-4, End Terminal Measurement Diagram (13-9)*.

2 At the far end NE, verify that the outside plant is not connected to the NE. Refer to the same figure used above for far end NE connection points.

3 Using the brand-specific procedures associated with the ODTR, take a span measurement.

4 Record the span distance and span loss.

5 Verify the span measurement is consistent with the measurements provided from previously Fiber characterization.

6 If the span loss is less than 14 dB or greater than 25 dB, contact your next level of support.

7 Record the maximum reflectance point values (Reflector) and verify against the permissible values in the following tables.

Table 13-2 10G System Reflectance Parameters.

Number of Spans	One Reflector can be as Large as	Two Additional Reflectors can be as Large as
40	-35 dB	-38 dB
32	-34 dB	-37dB
25	-33 dB	-36 dB
20	-32 dB	-35 dB
16	-31 dB	-34 dB
12	-30 dB	-33 dB
< 10	-29 dB	-32 dB

Table 13-3 40G System Reflectance Parameters

Number of Spans	One Reflector can be as Large as	Two Additional Reflectors can be as Large as
13	-37 dB	-40 dB
10	-36 dB	-39 dB
8	-35 dB	-38 dB
6	-34 dB	-37 dB
5	-33 dB	-36 dB

Number of Spans	One Reflector can be as Large as	Two Additional Reflectors can be as Large as
4	-32 dB	-35 dB
3 or < 3	-31 dB	-34 dB

8 Contact your next level of support if the reflectance values are out of range.

9 Record connector losses on the span and verify they are within the ranges of the following table.

Table 13-4 Connection Loss Parameters

Maximum office connector loss	0.5 dB
Maximum splice loss within 20km of NE	0.5 dB
Maximum splice >20km of NE	2.0 dB

10 Contact your next level of support if connector losses are out of range.

11 If this is an OADM or a Repeater NE, repeat Steps 1-10 for the outside plant fiber that is to be attached to the West Transmit OA.

END OF STEPS

Figure 13-1 OADM Terminal Measurement Diagram

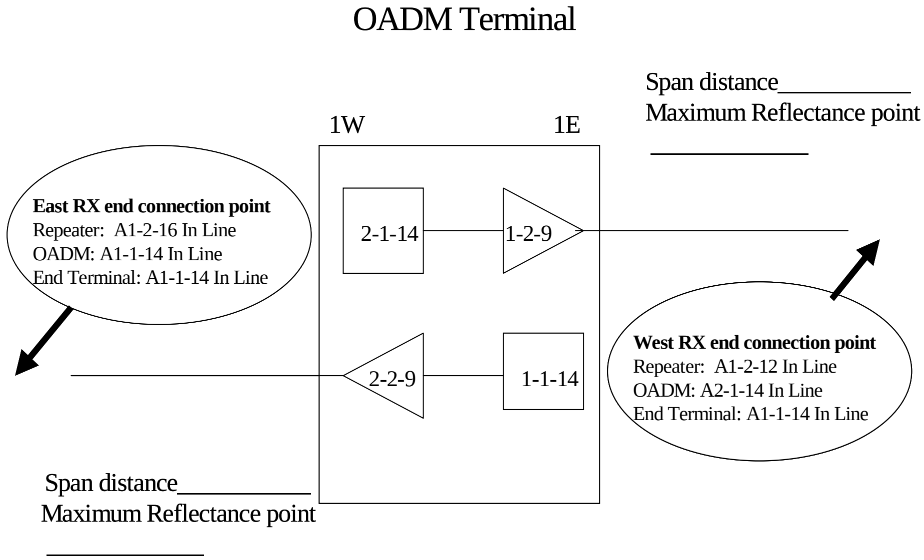


Figure 13-2 Repeater Terminal Measurement Diagram

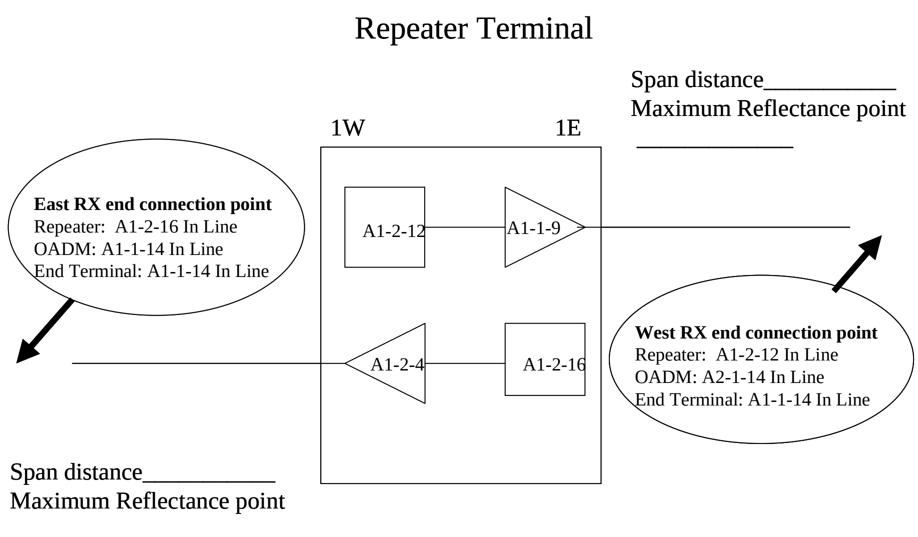


Figure 13-3 End Terminal (Connected to East NEs) Measurement Diagram

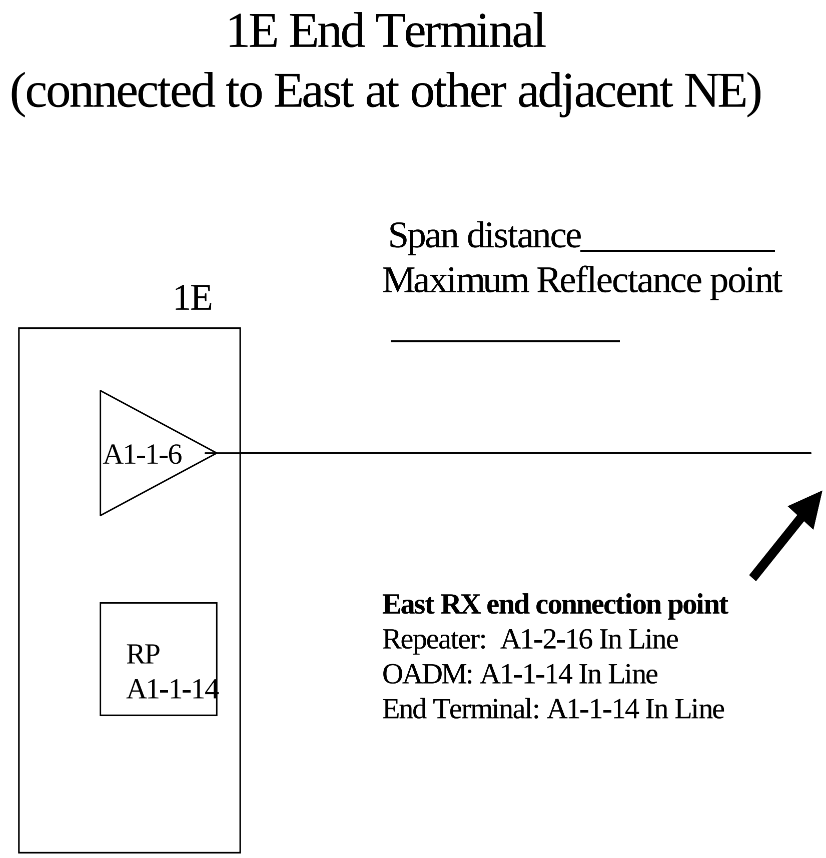
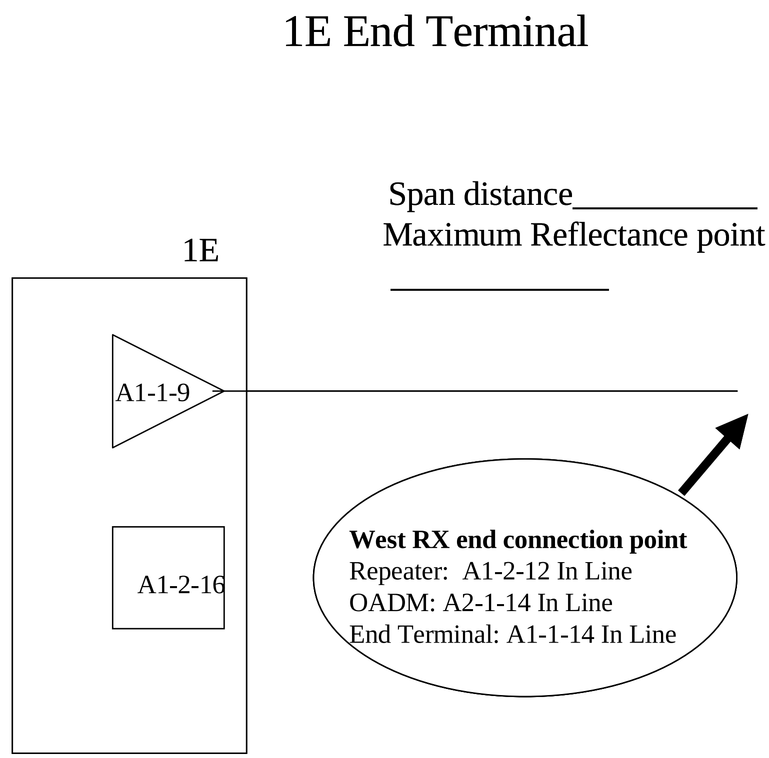


Figure 13-4 End Terminal Measurement Diagram



Enter Optical Line Provisioning Parameters

Purpose The purpose of provisioning optical line parameters prior to connecting adjacent NEs is to define and optimize the operational characteristics of the OAs and RPs.

Information Prerequisites The following information must be known for each line (1E and possibly 1W) in advance to properly provision the optical line parameters:

- Optical line fiber type
- Outside plant span loss
- Outside plant connector Type
- DCM type
- Pulse width vector (10G only)

The above information should be provided by the Integration planner.

Process The following steps define the process for provisioning the optical line.

1 Log in to the LambdaXtreme™ Transport NE.

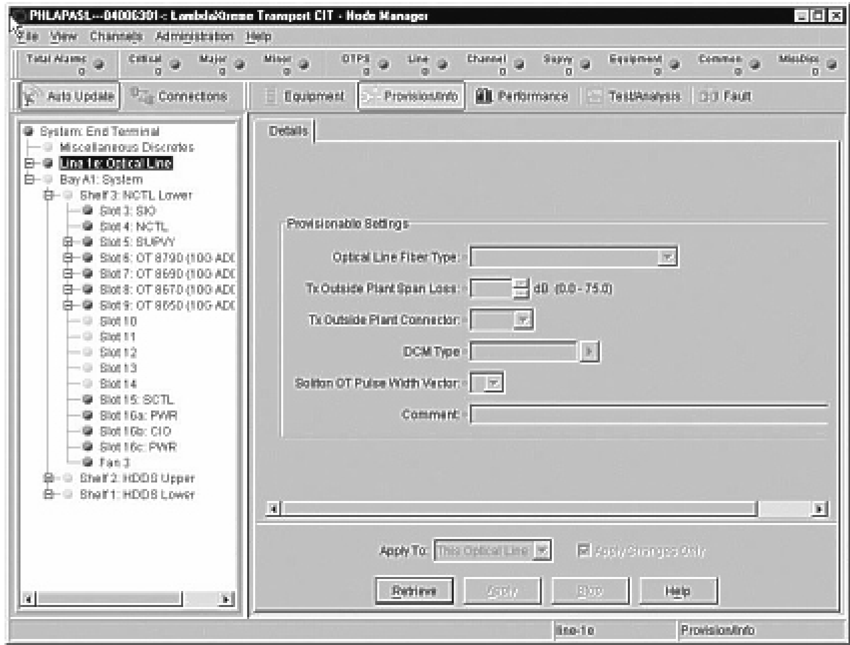
2 Select the applicable optical line by clicking on the “Line XX:Optical Line” selection on the left side window. (where XX refers to 1E or 1W).

> **Important!** OADMs and Repeaters have two optical lines, 1E and 1W, and each needs to be provisioned. End terminals have only one optical line 1E which needs to be provisioned.

3 A detail window pops up on the right side of the window.

4 Click “Retrieve” to bring up the specifications of the Optical line (see Figure 13-5 on page 13-11).

Figure 13-5 Optical Line Detail



---

5 Enter the optical line fiber type by clicking on the pull-down and selecting one the applicable fiber types (per customer order).

---

6 Enter the Tx side outside plant span loss (determined in the previous step) by either direct entry or utilizing the up/down selector.

---

7 Enter the type of outside plant connector used.

> **Important!** This selection is either “ST” or “non ST” (SC, LC, etc., are all considered non ST).

---

8 Enter the DCM fiber type.

9 Enter the DCM type.

- For End Terminals, this is the value of DCM2
- For Repeaters: Line 1W the value of DCM1, 1E the value of DCM2

10 For 10G applications only, select the Soliton OT Pulse Width Vector.

11 Enter comments into the comments field at customer request.

12 Click “Apply.”

13 Retrieve the values a second time to verify if the information was properly entered.

14 For Repeaters and OADM terminals, repeat Steps 2 through 13 for line 1W.

END OF STEPS

□

Enter Supervisory Provisioning Parameters

Purpose The purpose of provisioning supervisory parameters prior to connecting adjacent NEs is to define Orderwire and timing specifications.

Information Prerequisites The following information must be known for each line (1E and possibly 1W) in advance to properly provision the optical line parameters:

- Timing source
- Orderwire information (if any)

The above information should be provided by the Integration planner.

Process The following steps define the process for provisioning the optical line.

1 Log in to the LambdaXtreme™ Transport NE.

2 From Node Manager select “Provision” mode.

3 From the Explorer tree, select the pack by double clicking on the Supervisory pack, or right clicking on the pack and selecting provision again.

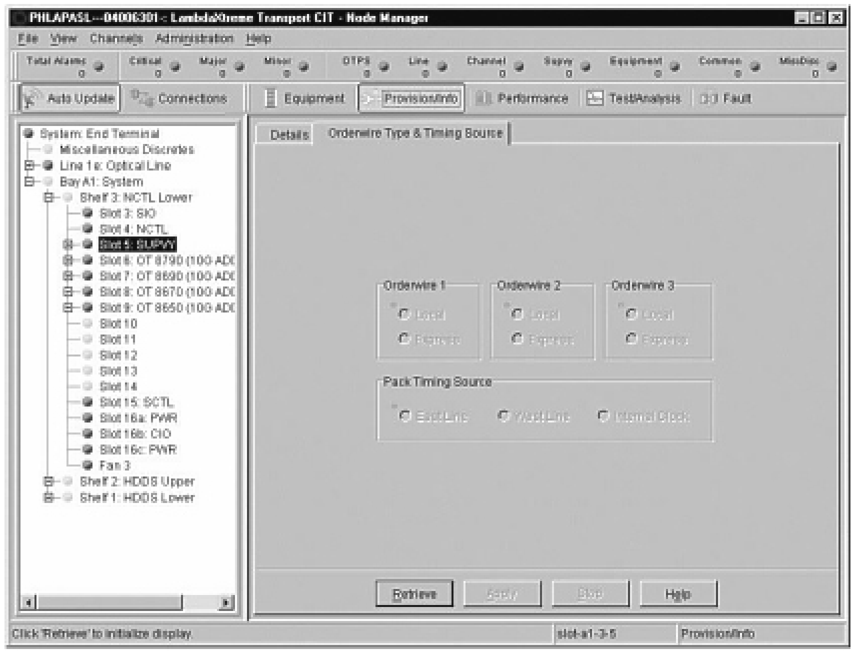
- End & OADM Terminals A1-3-5
- Repeater Terminals A1-1-5

4 Select the “Orderwire Type and Timing Source” tab.

5 Click the “Retrieve” button.

6 Make applicable changes to the orderwire and timing source tabs per the integration plan.

Figure 13-6 Supervisory Pack Provisioning Screen



7 Click Apply.

8 Log off the NE.

END OF STEPS

Connect Adjacent Nodes

Objective The objective of the procedure is to connect the transmit and receive fibers between adjacent NEs.

Prerequisites Correctly label outside plant fibers run to LambdaXtreme™ Transport NEs.

Process Using the following table, connect the applicable fibers to their respective RPs or OAs as indicated on the customer order.

Table 13-5 Outside Plant to NE Connection Points

EAST		WEST	
RX	**TX**	**RX**	**TX**
REPEATER			
RP 1-2-16 IN LINE	OA 1-1-9 OUT LINE	RP 1-2-12 IN LINE	OA 1-2-4 OUT LINE
OADM			
RP 1-1-14 IN LINR	OA 1-1-6 OUT LINE	RP 2-1-14 IN LINE	OA 2-1-6 OUT LINE
END			
RP 1-1-14 IN LINE	OA 1-1-6 OUT LINE		

Verify Neighbor Connectivity

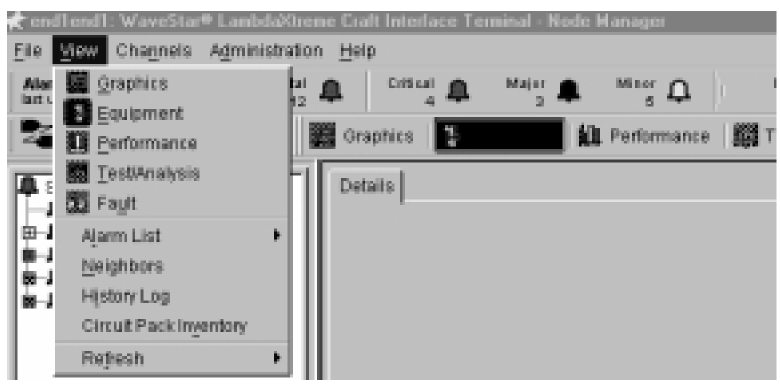
Objective After physically connecting adjacent LambdaXtreme™ Transport NEs verify connectivity through the Craft Interface terminal (CIT).

Process The following procedure to verifies neighbor connectivity using the CIT. This process must be repeated by system integrators at the NE sites.

1 Log in to the NE.

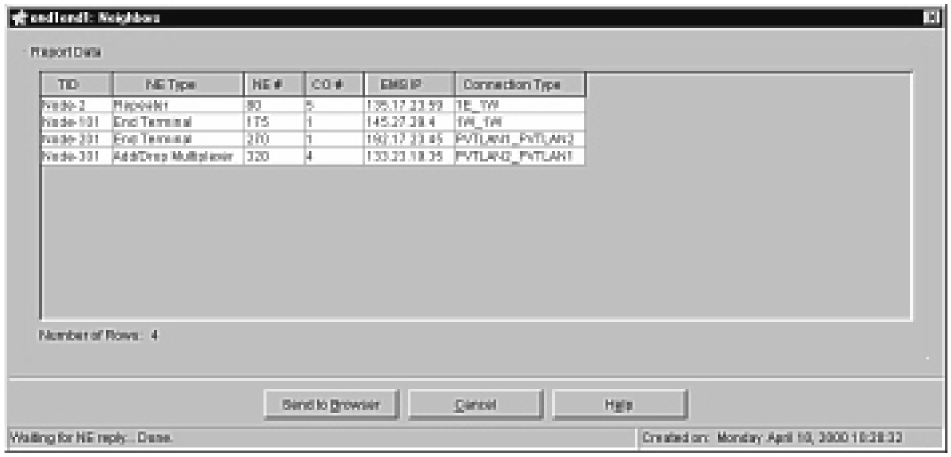
2 Located in the upper left side of the CIT, click View > Neighbors.

Figure 13-7 CIT View Neighbor Selection



3 A pop-up window showing neighbors appears.

Figure 13-8 Neighbor View



4 Verify that the applicable adjacent neighbor shows up on the CIT.

5 Repeat this process for all remaining NEs.

6 At the last set of adjacent NEs, connectivity should indicate that the full system has now been connected.

E N D O F S T E P S

Warranty Registration

Purpose Complete the warranty registration and upload the information to Lucent Warranty Eligibility System (WES).

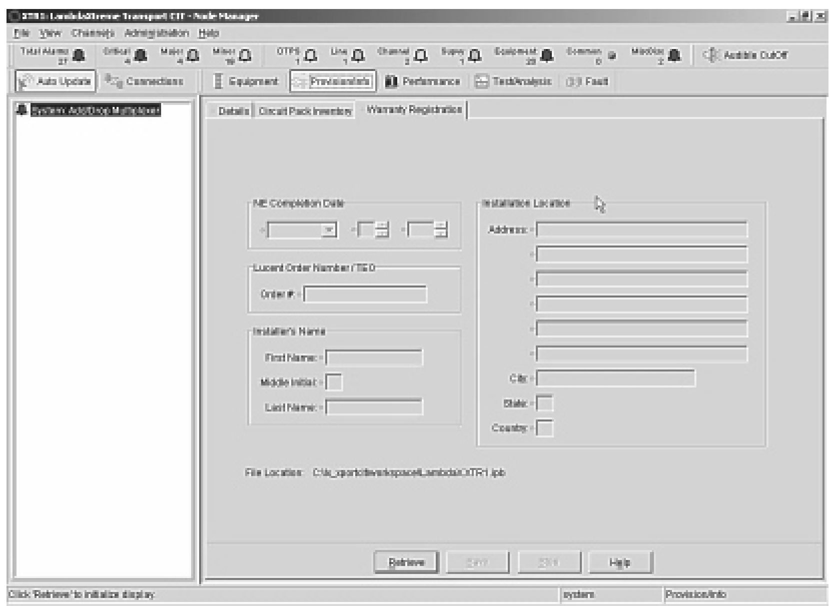
Procedure Proceed as follows:

1 Access the Provision/Info View in Node Manager.

2 Select the System Level (the highest level) in the NE Equipment Tree. Click on the Warranty Registration tab in the display panel.

Result:

The following window is displayed:



3 Click the Retrieve button.

4 Enter appropriate information in all categories. The below categories must be filled in as follows:

- Lucent Order Number/TEO - As obtained from installation.

- Address fields 1 through 3: As appropriate.
- Address field 4: Product - Release -Customer.
  - Product (ONG product code for LambdaXtreme™ Transport is: LX).
  - Release (in XXX format: Release, point release, maintenance release). Example R1.0.0 would be entered 100.
  - Customer name.
  - Full entry would resemble: LX-100-JohnDoeTelecom.
- Address field 5: TID of Eastmost NE in the system.
- Address field 6: TID of Westmost NE in the system.

---

5 Click the Save button to save the information to file. (Note the file name at the bottom of the screen.)

---

6 Connect to the Lucent corporate LAN (i.e., dial-up or via local office LAN). Start the FTP application on the CIT-PC.

Important! First time FTP users can install the application as follows:

a. Using the windows explorer locate the "SmartFTP" software included as a part of LambdaXtreme™ Transport CIT installation. (The software is located in the directory where the CIT software has been installed under sub-directory "extras\ftpclient” (e.g. C:\Program Files\Lucent Technologies\Lx_xportCITR1.0\extras\ftpclient\SmartFTP_install.exe). If different than default location search for file labeled SmartFTP_install.exe.)

b. Click on SmartFTP_install.exe application to initiate the installation of the FTP client software on your PC.

c. Answer the installation menu choices by accepting the software and selecting typical installation at respective prompts.

d. Smart install completes the installation and the FTP client application is available to be selected under the start/programs/smartFTP menu.

7 Connect to the ftp.lucent.com site and copy the warranty file over via drag and drop.

- Default User name is “wes”, default password is “wes1234”

8 Upon successful up-loading of the files, exit the FTP application.

END OF STEPS

14 Port/WaveLength Servicing

Overview

Purpose This chapter describes the procedures used to fiber and verify port signals to and from the LambdaXtreme™ Transport.

Reason for revision This is the first issue.

Contents This chapter contains the following.

Background	14-2
ADD Circuit Connections	14-3
Drop Circuit Connection Procedures	14-6

Background

Overview

This chapter covers the procedures used to create and verify ADD and DROP circuit connections to the LambdaXtreme™ Transport NE.

These connections can be made easily with minimal circuit administration processes.

Precautions

CAUTION

The procedures in this section should be performed on out of service wavelengths only.

CAUTION

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments. Avoid direct exposure to the beam.

Important! Disconnect the office alarm cable (if attached) before performing any test. Reconnect the office alarm cable after completing this procedure.

Tools, Test Sets, and Accessories

The following equipment is required for performing the installation tests in this Chapter:

- Wrist Strap connected to wrist strap ground jack on user panel (or equivalent)
- Single-mode optical fiber cables with LC, ST, SC, or FC connectors on one end and connector to match power meter on the other
- Optical Power Meter
- PC for use as CIT with software loaded
- RJ45 straight 4-pair cable
- Optical connector cleaning accessories

□

ADD Circuit Connections

Adding a Port Signal

The following procedures should be used to prepare the node and fibers for adding a wavelength. All Adds to OT, use the autodiscovery function. Adds via compatible optics require circuit provision (Refer to UOG)

1 Remove the equipment cover over the OT.

2 Route the fiber from the customer specified equipment to the appropriate OT (or for compatible optics, to the desired OM).

3 Log in to the NE.

4 Clean and connect the fiber from the customer specified equipment (or drop OT) to the Optical power meter.Verify the power level:

Table 14-1 Client Side Input Ranges

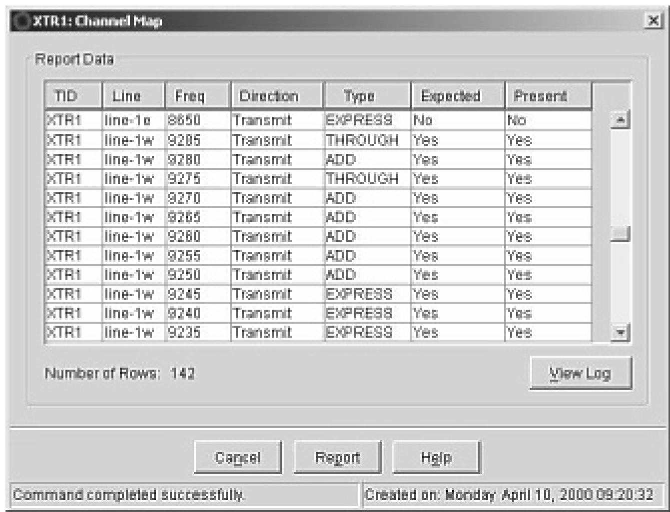
Pack Type	Code Prefix	Range	Target Value
10G LH VSR	WWBA	-11 to -1dBm	-6 dBm
10G LH IR	WWBB	-14 to -1 dBm	-7.5 dBm
10G MUX SR	WWBD	-18 to -3 dBm	-10.5 dBm
10G ULH VSR	WWBE	-11 to -1dBm	-6 dBm
10G ULH IR	WWBF	-14 to -1 dBm	-7.5 dBm
40G A/D	WWBG	-11 to -1dBm	-6 dBm
40G THRU	WWBH	-11 to -1dBm	-6 dBm
40G MUX IR	WWBJ	-14 to -1 dBm	-7.5 dBm
40G MUX VSR	WWBN	-11 to -1dBm	-6 dBm
Compatible Optics to OM			-4 dBm

5 If the power level is within the required range, proceed to the next step, otherwise contact your next level of support.

6 Clean and connect the fiber from the customer specified equipment.

7 At the Node Manager select View > Channel Map > This NE.

Figure 14-1 Channel Map



8 Verify the OT wavelength of Type “ADD” is expected and present.

Important! The system enforces an interval of a few minutes per channel during addition of subsequent channels via autodiscovery. Users can connect valid client side signals to multiple OTs as fast as they want, but LambdaXtreme™ Transport will provision them sequentially.

9 Repeat the “Add Circuit Connection” Procedure for all wavelengths.

10 Log off the NE.

11 Replace the shelf cover.

END OF STEPS

□

Drop Circuit Connection Procedures

Verifying Drop Wavelength Presence and Optical Power

The following procedures should be used to fiber and verify a dropped port signal. All Dropped wavelengths to OTs, use the autodiscovery function. A valid signal must be added to the client side OT IN port to inititiate the Auto-Discovery function. Drops via compatible optics require circuit provisioning (Refer to UOG).

1 Remove the equipment cover over the OT.

2 Route the fiber from the customer specified equipment to the NE.

3 Clean and connect a fiber jumper between the OT DROP out port (or for compatible optics, the OD out for the specific wavelength) and an Optical power meter.

4 Verify the power level:

Table 14-2 Client Side OT Output Levels

Pack Type	Code Prefix	Min Value
10G LH VSR	WWBA	-4dBm
10G LH IR	WWBB	-2dBm
10G MUX SR	WWBD	0 dBm
10G ULH VSR	WWBE	-4dBm
10G ULH IR	WWBF	-2dBm
40G A/D	WWBG	-4 dBm
40G THRU	WWBH	-4 dBm

Pack Type	Code Prefix	Min Value
40G MUX IR	WWBJ	-2dBm
40G MUX VSR	WWBN	-4dBm

5 Remove the fiber jumper.

6 Record the drop power level.

7 Route the fiber from the client equipment to the LambdaXtreme™ Transport according to the customer order.

8 Inform the client of the receive power level so the client input can be padded as necessary.

9 Clean and connect the fiber to the client equipment.

10 Clean and connect the fiber at the specified drop OT out port.

11 Repeat the Drop Circuit Procedures for all clients signals.

12 Replace covers.

END OF STEPS

□

15 Performance Verification Testing

Overview

Purpose This chapter describes several tests used to verify various performance features of the LambdaXtreme™ Transport.

Reason for revision This is the first issue.

Contents The chapter contains the following:

Background	15-2
Local OT Port Performance	15-3
End to End OT Port Performance	15-5
Network Analysis	15-7

Background

Introduction

The following test are designated to verify equipment performance and system readiness for client signals.

Reason for Reissue

This is the first issue.

Test Equipment Required

The following is a list test equipment required to verify various performance features

- BERT set
- Optical power meters
- Various fiber jumpers
- Various size and types of LBOs

> **Important!** OT circuit packs come equipped with Universal Build Out (UBO) connectors on their inputs. The UBO connector can accept ST, SC or FC LBOs.

Performance Verification Tests

The following is a list verification tests that are performed

- Local OT Performance
- End to End Port Signal performance
- Network Analysis

□

Local OT Port Performance

Background The following procedure is performed to verify that an individual OT will recognize a valid input signal and pass the input signal error free.

> **Important!** Due to the use of FEC, all test signals presented to an Add OT input will be looped back to the OT drop side.

1 Remove the equipment cover over the OT if necessary.

2 Login to the NE.

3 Verify test signal from the BERT set is within the acceptable dynamic input range for an ADD OT signal (10G: -1 dBm - 11 dBm, 2.5G: -3 to -18 dBm). If the signal is too strong, pad it down with an appropriate in line LBO.

4 Insert the an appropriate test signal (2.5 or 10G) into the ADD OT port.

5 Verify through the CIT that the ADD OT signal is recognized.

6 Remove the ADD OT out fiber that connects to the OM.

7 Remove the corresponding DROP OT in fiber that connects to the OD.

8 Measure the Optical Power of the ADD OT out. It should be approximately -4 dBm.

9 Pad the ADD OT out signal with a 5-7 dB LBO so that it is approximately -10 dBm

10 Insert a fiber loop between the ADD OT out to the DROP OT in port.

11 Connect a fiber between the DROP OT out port and the BERT set (pad according to input specifications of the test set).

12 Verify error-free transmission.

13 Remove fiber loops and any LBOs between ADD and DROP side of the OT under test.

14 Inspect and clean all fiber before returning to original setup.

15 Repeat this procedure for all OT packs.

16 Replace shelf covers and return equipment to normal when these tests are complete.

END OF STEPS

□

End to End OT Port Performance

Background The following procedure is performed to verify that an individual OT will recognize a valid input signal and pass the input signal error-free to the far end NE. Due to the use of FEC, all test signals presented to an Add OT input will be looped back to the OT drop side.

Test Equipment required

- BERT set
- Optical power meter
- Fiber jumpers
- LBO

Personnel Requirements This procedure requires personnel to be situated at NEs on both ends of the system.

---

1 Remove the equipment cover over the OT if necessary.

---

2 Log in to each of the NEs.

---

3 Verify test signal from the BERT set is within the acceptable dynamic input range for an ADD OT signal (-2 dBm to -15 dBm). If the signal is too strong, pad it down with an appropriate in-line LBO.

---

4 Insert the an appropriate test signal (2.5 or 10G) into the ADD OT port signal to be tested.

---

5 Verify through the CIT that the ADD OT signal is recognized.

---

6 At the far end Network Element, connect a fiber between the DROP OT out port and the BERT set.

> **Important!** An alternate method would be to loop the signal back to the sending NE on the identical wavelength, to verify.

7 Verify error-free transmission.

8 Clear all PM registers for the appropriate Port signal.

9 From the BERT set, insert 1-5 errors into the test signal.

10 Verify that the errors were recorded in the PM registers.

11 Clear the PM register.

12 Run this performance verification test for approximately 1 hour (or longer as dictated by customer agreement).

13 Verify error-free transmission.

14 Repeat this procedure for all OT packs.

15 Replace shelf covers and return equipment to normal when these tests are complete.

END OF STEPS

☐

Network Analysis

Background The following procedure verifies network communication is functioning correctly.

1 Log in into the NE.

2 Verify through neighbor map, that all NE in the network are visible.

3 Remotely login in to a different NE.

4 Once logged into a remote NE, verify functionality by executed a few commands (retrieve equipment, ring map, etc.).

5 Log out of the NE.

6 Remotely log into a different NE.

7 Repeat Steps 4-6 for all remaining NEs in the system.

8 Log out of the NE.

END OF STEPS

Part IV: Miscellaneous Detailed Installation Procedures and Reference Material

Overview

Introduction

This part of the Installation Guide includes the detailed installation procedures for miscellaneous items and reference material to complete installation, turn up, and testing of the LambdaXtreme Transport system. These chapters are written assuming working knowledge of the LambdaXtreme Transport system and its operations.

Reason for revision

This is the first issue.

Contents

This part of the document contains the following chapters.

Backplane Pin Repair/Replacement	100
Orderwire Installation	101
Miscellaneous Discretes/Remote Restart	102
Fiber Management	103
Fiber Kit Descriptions	104
Fiber Cleaning	105

100 Backplane Pin Repair/Replacement

Overview

Purpose

This chapter is used when a pin or blade on the backplane has been bent or broken.

> **Important!** The Backplane Shelf Repair/Replacement is located in the Alarms, Messages, and Trouble Clearing Guide in the section titled “Backplane Pin and Shelf Repair/Replacement.”

Reason for revision

This is the first issue.

Contents

This chapter contains the following

General Information	100-2
Repair Kits and Tools	100-3
Simple Repair Methods	100-4
Replacement Methods	100-6

General Information

Pin and Blade Background

This section describes the procedures for the repair/replacement of press-fit connector pins used on the backplanes of LambdaXtreme™ Transport shelves. Trouble clearing procedures may lead you to inspect the backplane for damaged connectors.

Circuit packs are plugged into METRAL™ signal pin connectors which have been press-fit into the backplane. The shelf power filters plug into these connectors which use power blade press-fit terminals. A plastic shroud is included with the connectors to protect the pins or blades. The signal pin and power blade press-fit terminals in these connectors may be replaced individually if they have been damaged beyond simple repair methods.

Shelves and Backplanes

There are four types of shelves used with the LambdaXtreme™ Transport, each with a different backplane assembly. All four backplanes have their connector and terminal identifiers stenciled on both the front and back surfaces for identification of location or position.

Pins and blades are identified by a column and row position on the backplane.

The table below show the location and type of METRAL pins and blades on each of the four backplanes.

Table 100-1 Backplane Locations of METRAL Pins and Blades

Column-Row	Type	Mating Length (mm)
Any Column & Rows 001-150	Signal Pin	5.75
Any Column & Rows 151-162	Signal Pin	8.00
46-192 Rows 007-012 15-508 Rows 007-018 and 031-036 38-508 Rows 007-018 and 031-036	Power Blade	6.50

□

Repair Kits and Tools

Repair Kits

For the repair or replacement of METRAL signal pins and power blades use one of the following repair kits:

- Berg Electronic MT370-01 Shelf Level Press-Fit Repair Kit
- IMDARC R-6004 METRAL Pin Repair Kit - Comcode 407959881

This kit include the tools, parts and instructions for repair and replacement of signal pins and power blades.

Replacement Pins and Blades

Pins and blades are also available. These are defined by the mating length extending beyond the inside of the plastic shroud and by their tail length for press-fitting into the backplane. The tail length includes a compliant press-fit section needed to achieve a gas-tight connection in four contact areas. All the METRAL pins and blades used on the LambdaXtreme™ Transport shelves have the same tail length of 4.30 mm (0.169 in.).

Additional replacement signal pins and power blades may be ordered in packages of 100 by the part number shown in the table below:

Table 100-2 METRAL Pins and Blades

Type	Mating Length mm	Berg Part #	Comcode
Signal Pin	5.75	88929-102	106816077
Signal Pin	8.00	88929-119	107473811
Power Blade	6.50	88930-101	106817182

□

Simple Repair Methods

Precautions

CAUTION

These procedures should be done with the shelf out of service and powered down to insure no further damage to the equipment or to the person doing the repair. If service cannot be removed or rerouted, contact your next level of support before proceeding.

CAUTION

Proper ESD precautions must be followed.

Make sure that you have adequate space to access the backplane area and that you have good light sources so that you can see what you are doing.

Visual Examination

Visually examine the connector pins to determine which pins or blades may have been damaged and the degree of the damage. Pins or blades that have been slightly bent may be carefully restored to their initial straight position. Examine both sides of the backplane to determine if the press-fit termination has been disturbed. These pins and blades depend on an undisturbed interference fit between the terminal body and the plated-through hole in the backplane to create a reliable connection.

If the visual examination suggests that the connector pins are loose or are damaged beyond repair, replace the connector pin.

METRAL Backplane Pins and Blades

CAUTION

This is a delicate procedure. Take your time to gently straighten the pin or blade in several small steps. Large movements may damage adjacent pins or blades.

Follow the instructions and use the tools provided in the MT370-01 Shelf Level Press-Fit Repair Kit to straighten METRAL pins and blades which may have been bent out of position.

Guide Pins and Keying Pins

If a stainless steel guide pin or keying pin has been bent out of alignment, attempts to straighten it may damage the backplane. The recommended alternative is to replace the bent pin.

Replacement Methods

Background

Connector pins are designed to withstand a considerable removal force. An impact-type tool is used to generate a controlled removal force. Similarly, proper insertion of a press-fit connector pin is done with an impact-type tool to control the insertion forces and not damage adjacent pins.

Precautions and Notes

Read the following Notes before proceeding:

Important! Any press-fit connector pin may be removed and replaced **one time** in the LambdaXtreme™ Transport backplane. A second removal and replacement in the same plated-through hole may not meet the long-term reliability objectives. If a replacement is needed for a previously replaced connector pin, contact your next level of support before proceeding.

Important! Protect the surrounding area from any debris which may be generated during the pin removal and replacement.

Procedures for METRAL Pins and Blades

Use the steps below to replace pins or blades when required:

1 Verify that the problem cannot be fixed using a simple repair procedure.

2 Secure the proper tool kit.

3 Read the tool kit instructions before beginning.

4 Plan and write out a “Method of Procedure” specific to your location.

5 Follow the instructions provided to remove the damaged pin or blade.

6 Install the replacement pin or blade.

7 Verify that the new pin or blade is securely in the backplane.

8 If the replacement is not successful, contact your next level of support.

END OF STEPS

Guide and Keying Pin Procedures

If it becomes necessary to replace Guide or Keying Pins, contact your next level of support for tooling, replacement parts and detailed replacement procedures. The replacements will need to installed with screws and washers.

□

101 Orderwire Installation

Overview

Purpose This chapter gives detailed information for connecting Dantel orderwire units to the LambdaXtreme™ Transport.

Reason for revision This is the first issue.

Contents This chapter contains the following.

Orderwire Details	101-2
Provisioning the LambdaXtreme™ Transport	101-4
Cabling to the LambdaXtreme™ Transport	101-6
Dantel Options Settings for Voice	101-10
Dantel Options Settings for Voice and Data	101-16
Reference Materials	101-24

Orderwire Details

Overview

In Orderwire communication, connections are established across NEs using external Orderwire equipment. The Orderwire channels which are used to establish voice and data communication between LambdaXtreme™ Transport nodes, are derived from the supervisory signal traversing between the LambdaXtreme™ Transport nodes.

The user is able to provision up to three Orderwire links at each SUPVY interface of the LambdaXtreme™ Transport node.

The orderwire interface has the following characteristics:

- Each Orderwire interface consists of clock, sync, and data signals in the transmit direction and in the receive direction. The clock and sync signals are outputs of the SUPVY for both transmit and receive. The transmit data signal is an input and the receive data signal is an output of the SUPVY.
- Orderwire signals are RS-485. The drivers, receivers, and terminations are on the SUPVY pack.
- One DB15S connector is used per each orderwire interface. The connectors are on the SIO panel.
- The transmit clock is derived from the local SUPVY common clock. The receive clock automatically tracks the local SUPVY common clock of the transmitting NE.

Orderwire Implementation

There are six DB15S connectors located on the SIO panel for Orderwire interfaces (two 64 Kbps channels and one 192 Kbps channel for East and West directions). The drivers, receivers, and terminations are on the SUPVY pack. The SUPVY supports three orderwire circuits from each direction. Three orderwire channels are carried in the East OSC and three in the West OSC. The three channels can be independently provisioned by the user as either local (dropped to the orderwire connectors on the SIO) or express. The default is local.

Recommended Orderwire System

The recommended Orderwire systems are listed below:

- Voice Only - J68974L-1 L300 (Dantel part # A18-04588-02)
- Voice and Data - J68974L-1 L301 (Dantel part # A18-05547-01)

Shelf Mounting and Powering

Consult Dantel documentation for powering and mechanical mounting information.

□

Provisioning the LambdaXtreme™ Transport

Overview The following section describes the provisioning of the LambdaXtreme™ Transport supervisory circuit pack.

Purpose The purpose of provisioning supervisory parameters prior to connecting adjacent NEs is to define Orderwire and timing specifications.

Information Prerequisites The following information must be known in advance to properly provision the supervisory parameters:

- Timing source
- Orderwire information

The above information should be provided by the Integration planner.

Process The following steps define the process for provisioning the supervisory channel.

1 Log in to the LambdaXtreme™ Transport NE.

2 From Node Manager select “Provision” mode.

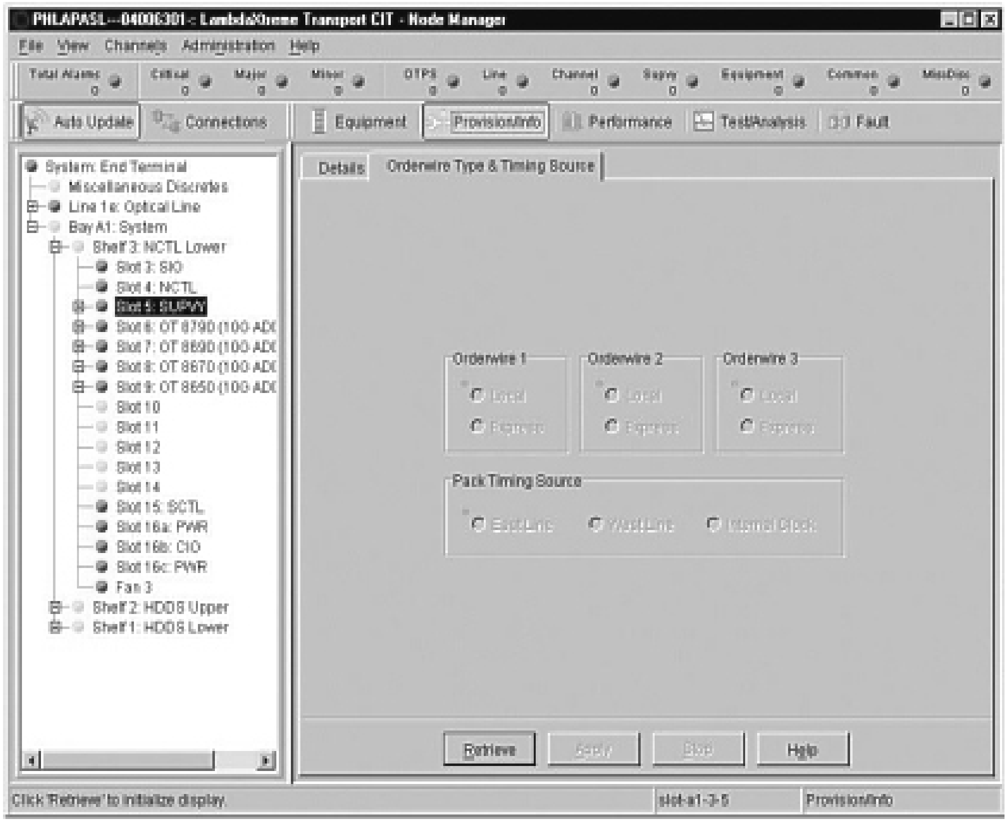
3 From the Explorer tree, select the pack by double clicking on the Supervisory pack, or right clicking on the pack and selecting provision again.

- End & OADM Terminals A1-3-5
- Repeater Terminals A1-1-5

4 Select the “Orderwire Type and Timing Source” tab.

5 Click the “Retrieve” button.

6 Make applicable changes to the orderwire and timing source tabs per the integration plan



e. Orderwire interface for circuit 1, 2 or 3 can be provisioned as Local (orderwire signal is bridged) or Express (orderwire signal is passed through).

f. Timing mode does not need to be provisioned for basic orderwire to work.

7 Click Apply.

8 Log off the NE.

END OF STEPS

Cabling to the LambdaXtreme™ Transport

Overview

The following section describes the cables and their installation for LambdaXtreme™ Transport equipment.

Orderwire Cable Connection

Table 101-1 lists orderwire cable connections and designations. The information is the same for both the OW-1, OW-2 and OW-3, East and West interconnection jacks:

Table 101-1 Orderwire Circuits 1, 2, and 3 Cable Connections.

Name	Pin Number	Wire Color
Rx Clock P	14	R-BL
Rx Clock N	6	BL-R
Rx Data P	12	W-BR
Rx Data N	4	BR-W
Rx Sign P	13	W-S
Rx Sign N	5	S-W
Tx Clock P	9	W-BL
Tx Clock N	1	BL-W
Tx Data P	11	W-G
Tx Data N	3	G-W
Tx Sign P	10	W-O
Tx Sign N	2	O-W
Not used	7	O-R
Not used	8	G-R
Not used	15	R-O

Available Cables

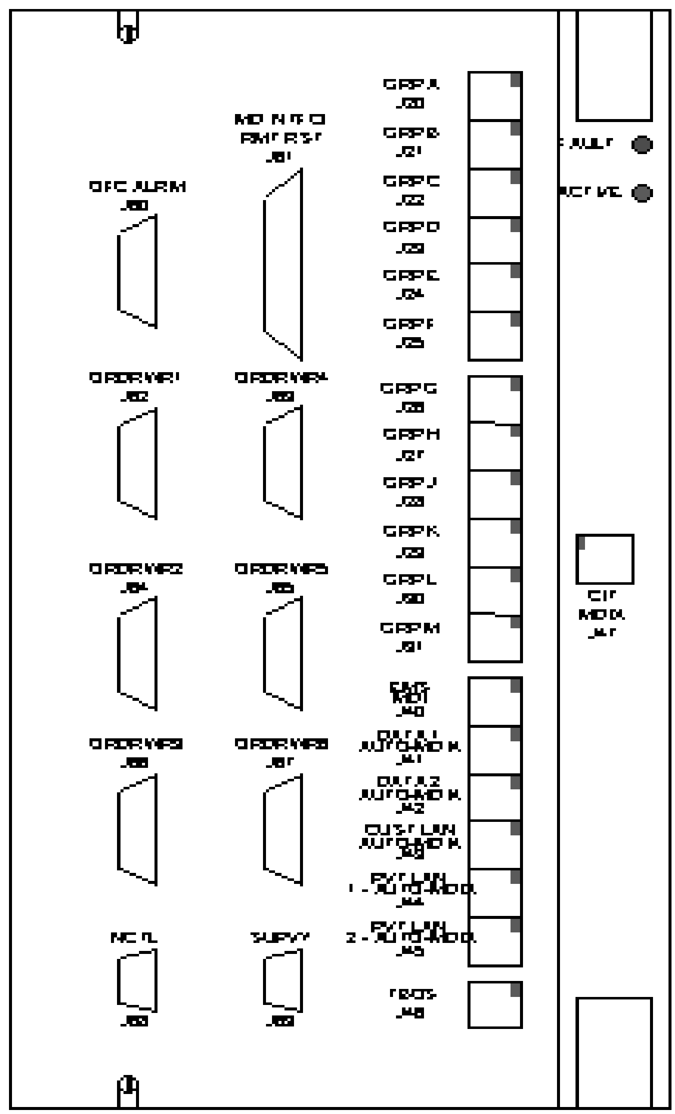
The table below lists the cables that are available for Orderwire.

Comcode	Cable Length (ft.)	Cable Type
109068361	50	1400016A
109068379	100	
109068387	150	
109068395	200	
109068403	300	

Connection to the SIO Interconnecting Panel

The table below lists orderwire cable connections to the SIO circuit pack interconnection panel.

	EOW Circuit 1		EOW Circuit 2		EOW Circuit 3	
Cable Application	**OW1 EAST**	**OW1 WEST**	**OW2 EAST**	**OW2 WEST**	**OW3 EAST**	**OW3 WEST**
SIO DB15S connectors	ORDRWR4 J63	ORDRWR1 J62	ORDRWR5 J65	ORDRWR2 J64	ORDRWR3 J67	ORDRWR6 J66



Orderwire Cable Installation Procedures

Listed below are the steps for installing the orderwire cables for Orderwire Channel 1:

1 Route the cable through the left side of the LambdaXtreme™ Transport equipment and connect to the orderwire connectors on the SIO panel.

- For End Terminal (East Side) connect the orderwire cable to ORDRWR4 (J63) 15DBS connector. Note: No West side connection is required for End Terminals.
- For Repeaters and OADM (East Side) connect the orderwire cable to ORDRWR4 (J63) 15DBS connector.
- For Repeaters and OADM (West Side) connect the orderwire cable to ORDRWR1 (J62) 15DBS connector.

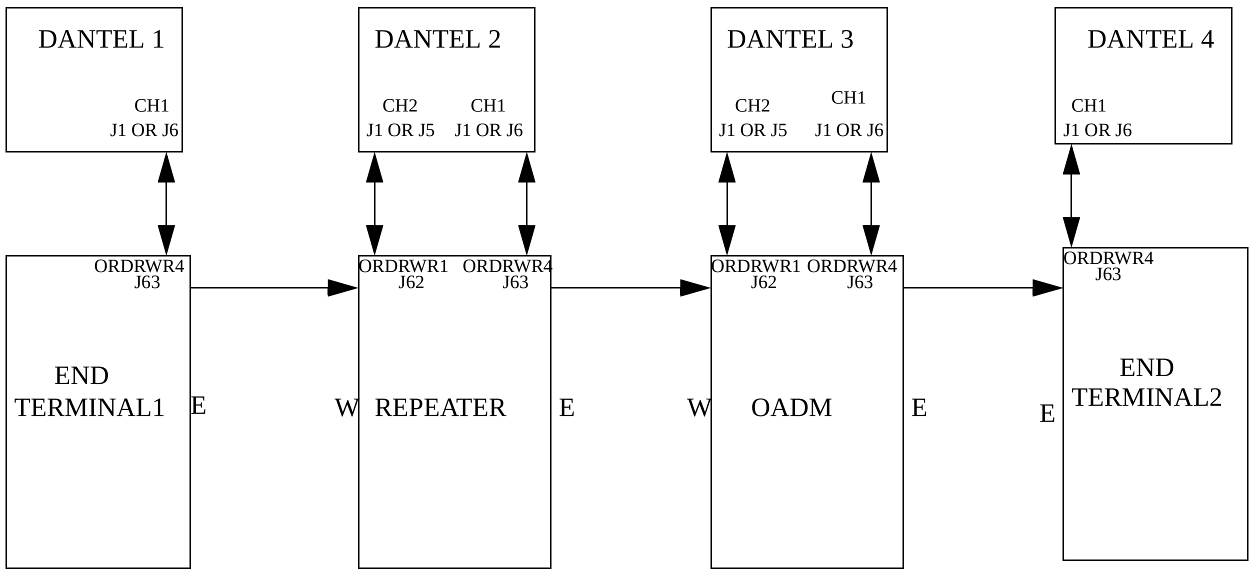
2 Connect the orderwire cable to the Dantel's orderwire equipment by cutting the cable to length and wire-wrapping the loose ends onto the unit (J1) or connecting the wires to a DB15 female connector (recommended). See Table 101-4 on page 101-24 and Table 101-5 on page 101-24 for wire connections.

- For End Terminal (East Side) connect the orderwire cable to channel 1 of the Dantel's orderwire equipment. J6 for DB15 connector or J1 for wire-wrapping.
- For Repeaters and OADM (East Side) connect the orderwire cable to channel 1 of the Dantel's orderwire equipment. J6 for DB15 connector or J1 for wire-wrapping.
- For Repeaters and OADM (West Side) connect the orderwire cable to channel 2 of the Dantel's orderwire equipment. J5 for DB15 connector or J1 for wire-wrapping.

3 Label the connections that are wire-wrapped.

4 Dress and tie the cable

Figure 101-1 LambdaXtreme™ Transport Orderwire Connection for Orderwire Channel 1



.

	End Terminal 1		Repeater		OADM		End Terminal 2	
	WEST	**EAST**	**WEST**	**EAST**	**WEST**	**EAST**	**WEST**	**EAST**
SIO Orderwire Connection	No Connect	ORDRWR4 J63	ORDRWR1 J62	ORDRWR4 J63	ORDRWR1 J62	ORDRWR4 J63	No Connect	ORDRWR4 J63
Dantel Connections	No Connect	Channel 1 J1 or J6	Channel 2 J1 or J5	Channel 1 J1 or J6	Channel 2 J1 or J5	Channel 1 J1 or J6	No Connect	Channel 1 J1 or J6

END OF STEPS

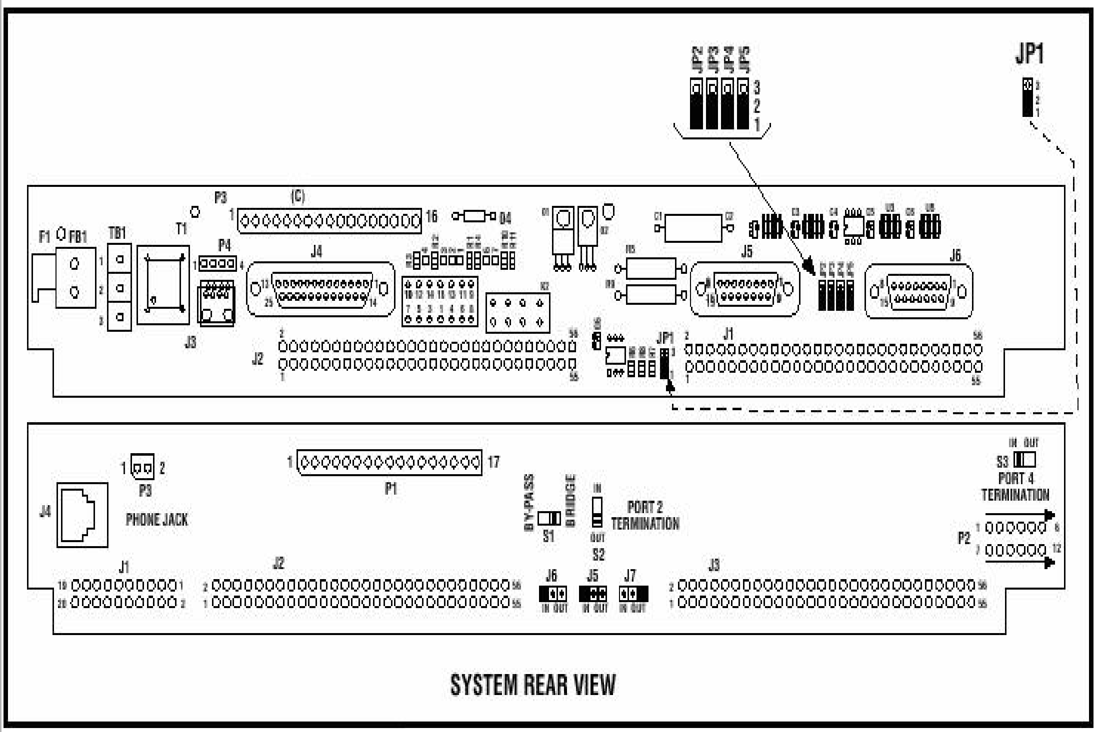
Dantel Options Settings for Voice

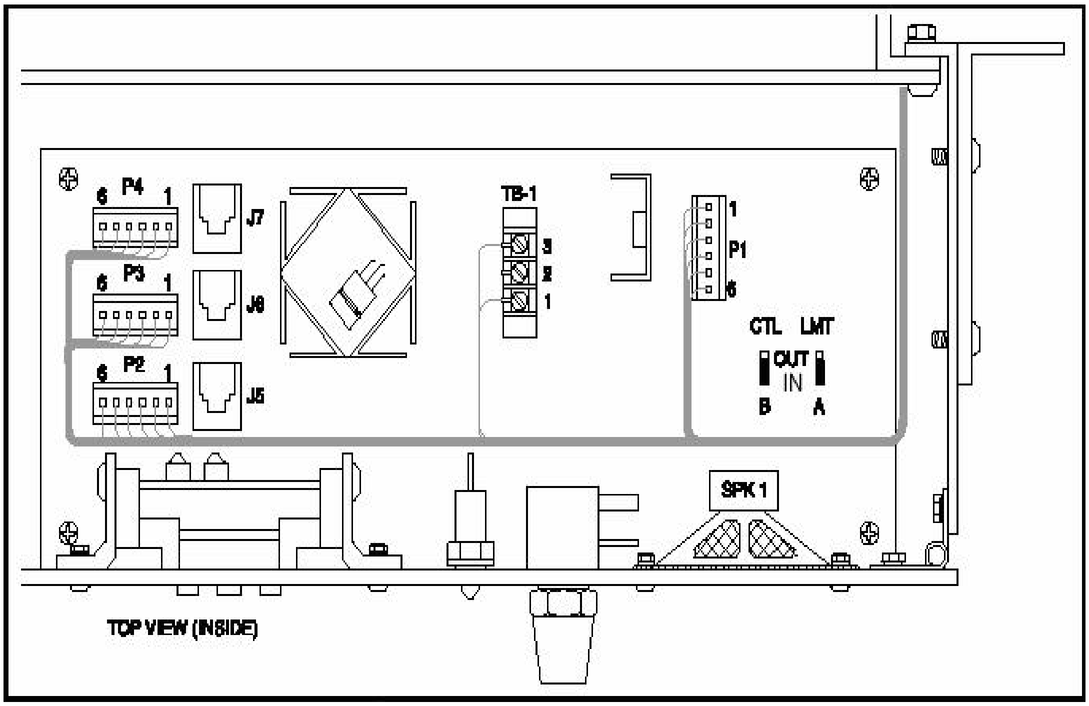
Voice Applications

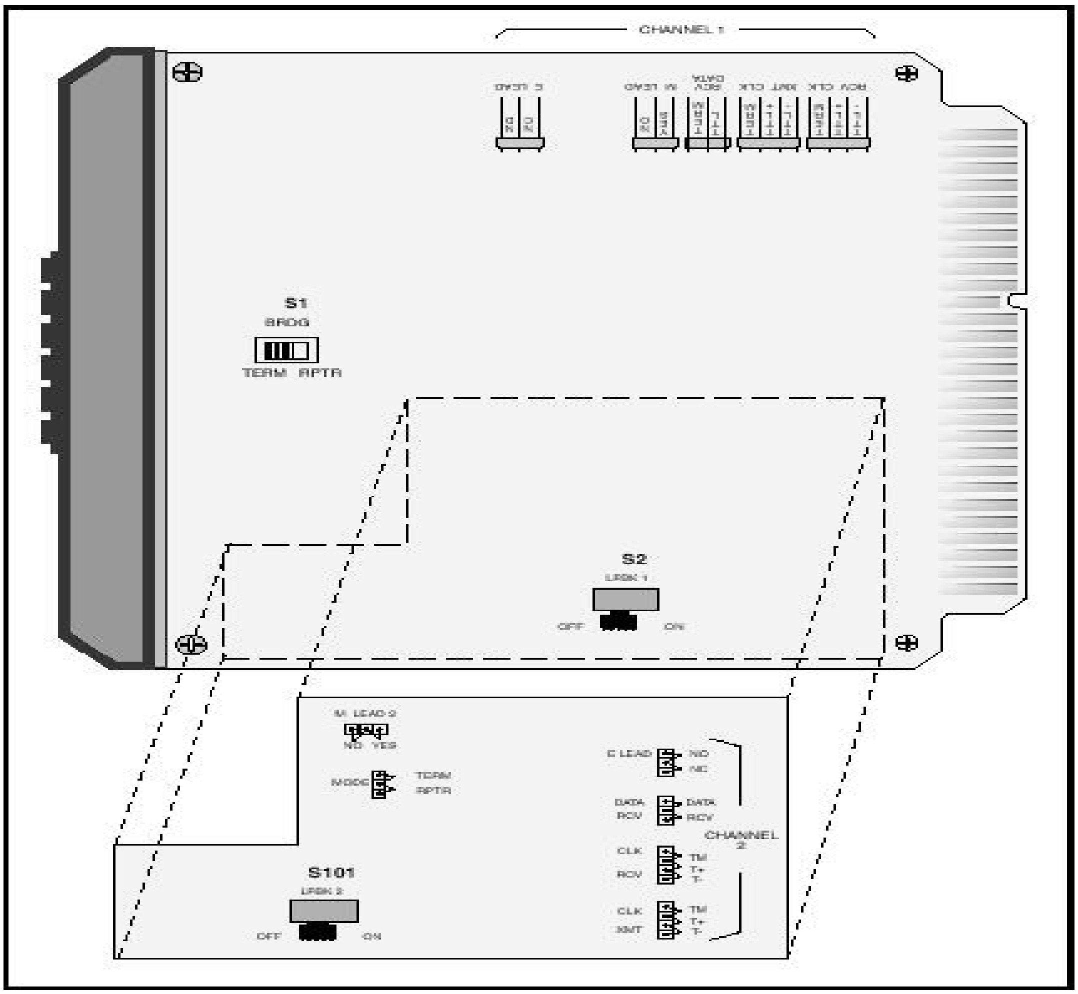
The system operates as a standard orderwire when the handset on the front of the orderwire panel is picked up and someone at a remote terminal (station1 code) is called. The voice circuit uses Dantel Channel 1.

The switch and strap setting used in the tables below are compatible with LambdaXtreme™ Transport.

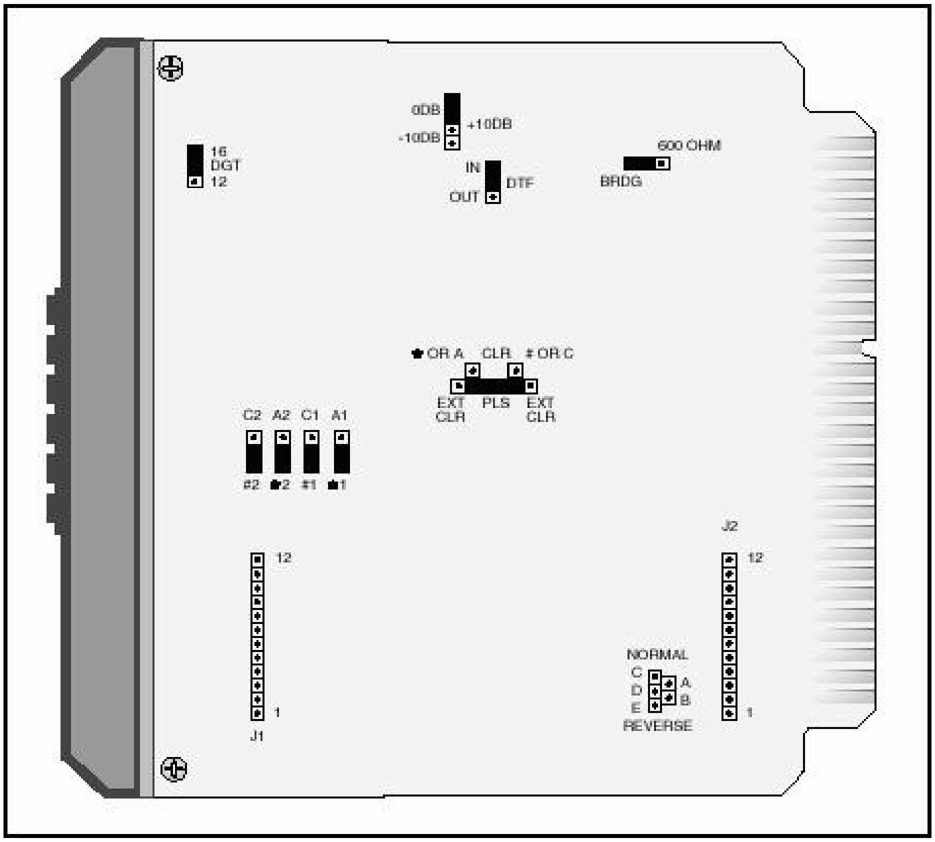
Table 101-2 Dantel Orderwire Options Settings for Voice

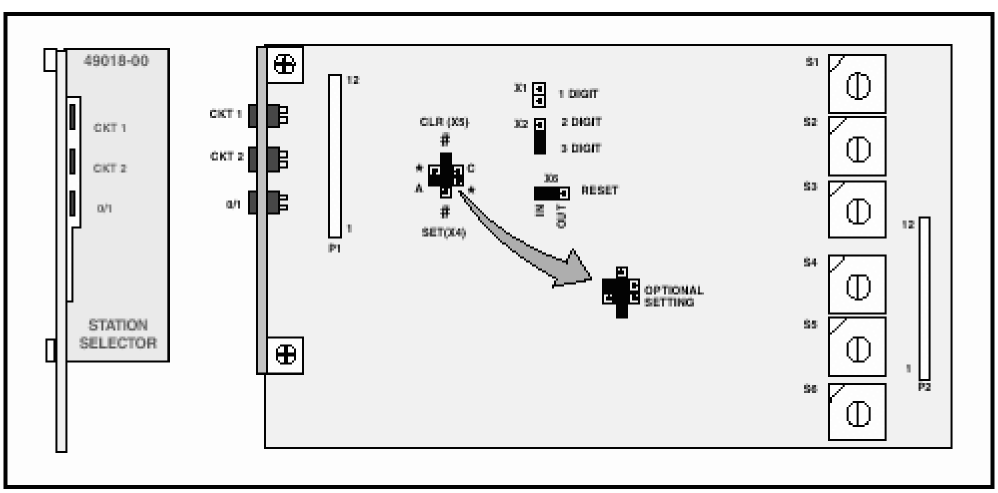
Module	Settings
Backplane	• Set S1 to BRIDGE. Set S2 to IN. Set S3 to IN. 

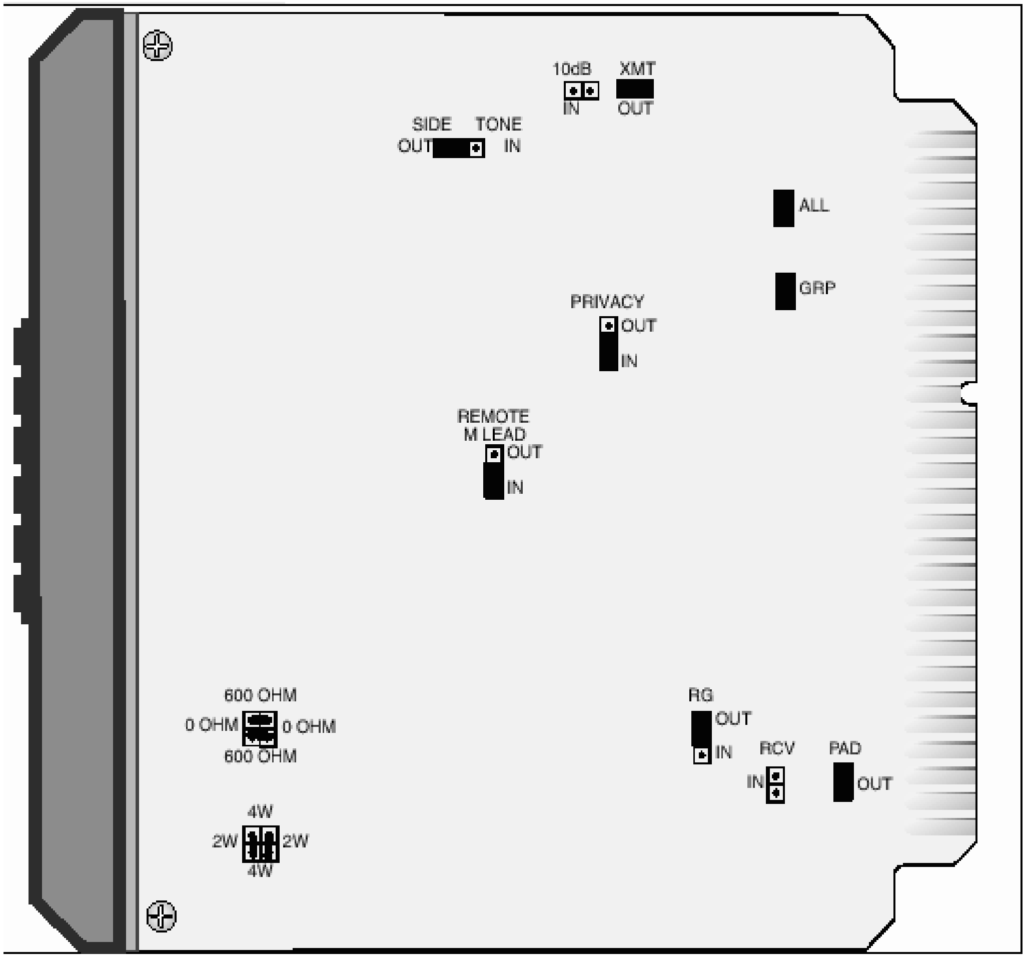
Module	Settings
41096	• Set CTL LMT A strap, to IN position to prevent the ALL CHAN volume control knob from turning off the speaker. • Set CTL LMT A strap, to OUT position to allow the ALL CHAN volume control knob to turn off the speaker. • Set CTL LMT B strap, to IN position to prevent the CHAN SELECT 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. 

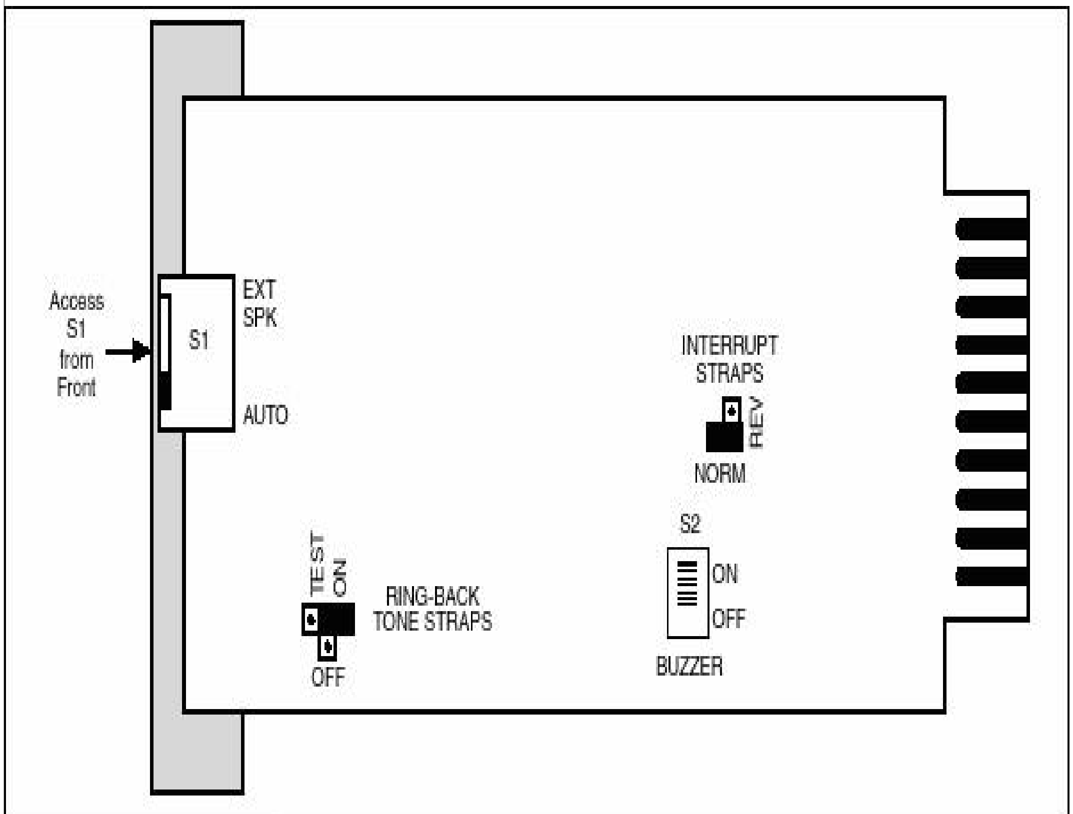
Module	Settings
46105	• Set S1 (BRDG) switch, to TERM at the breakpoint (DSNE Office 0) Terminal site. • Set S1 (BRDG) switch, to RPTR at all repeater and all other Terminal sites. • Set S2 (LPBK 1) in OFF. • Set S101 (LPBL 2) in OFF. • Set the XMT CLK 1 and XMT CLK 2 straps in TERM. • Set the RCV CLK 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.
	

Module	Settings
44020	• 49018 child board, set the station 1 code with S1, S2, and S3 = 3-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 = 3-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.





Module	Settings
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. 

Module	Settings
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. 

Dantel Options Settings for Voice and Data

Voice and Data Communications

For data circuit applications, dial a different number (station 2 code) to call the same remote terminal to set up a data communications path. Remote 1200 baud access is also possible from any site to any other site over the orderwire by using the internal and external 1200 baud modems. Orderwire cannot be used for voice and data access simultaneously.

The data circuit works as listed below:

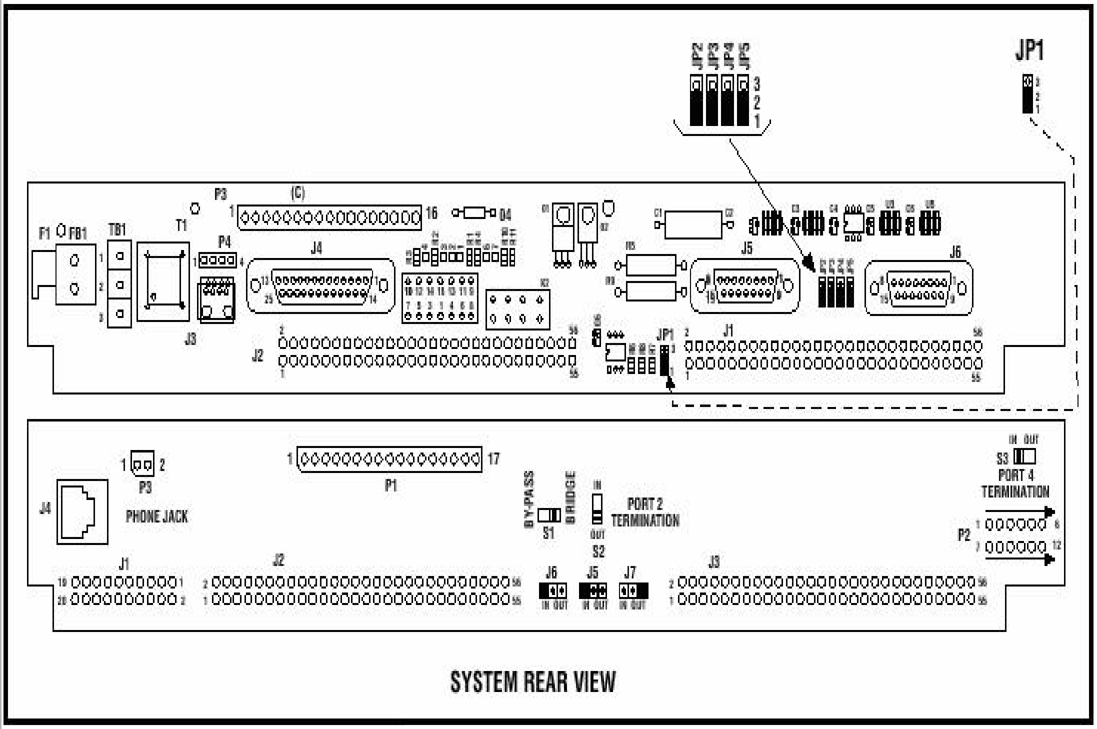
1. Select Channel 1 on the 41096 orderwire panel, then pick up the handset and call the remote terminal (station2 code.)

   At the remote end, the 00330 orderwire 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 circuit disables the side tone in the 00330 Orderwire 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 used for both voice and data.

The switch and strap setting used in the tables below are compatible with LambdaXtreme™ Transport.

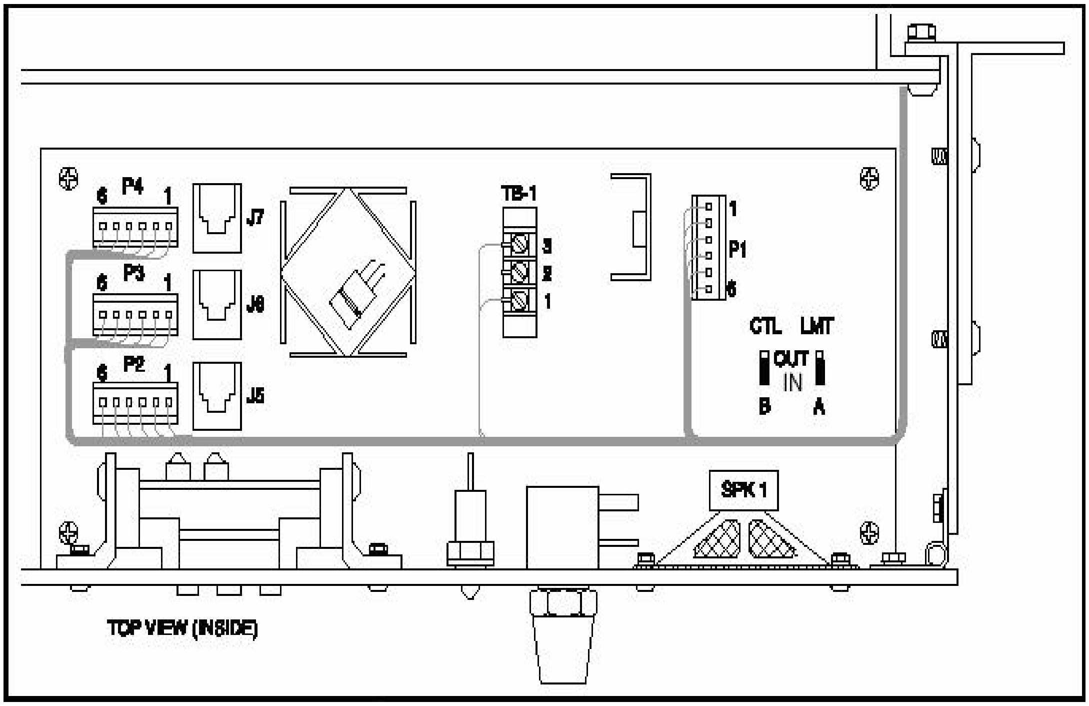
Table 101-3 Dantel Orderwire Options Settings for Voice and Data

Module	Settings
Backplane	• Set S1 to BRIDGE. • Set S2 to OUT. • Set S3 to IN.



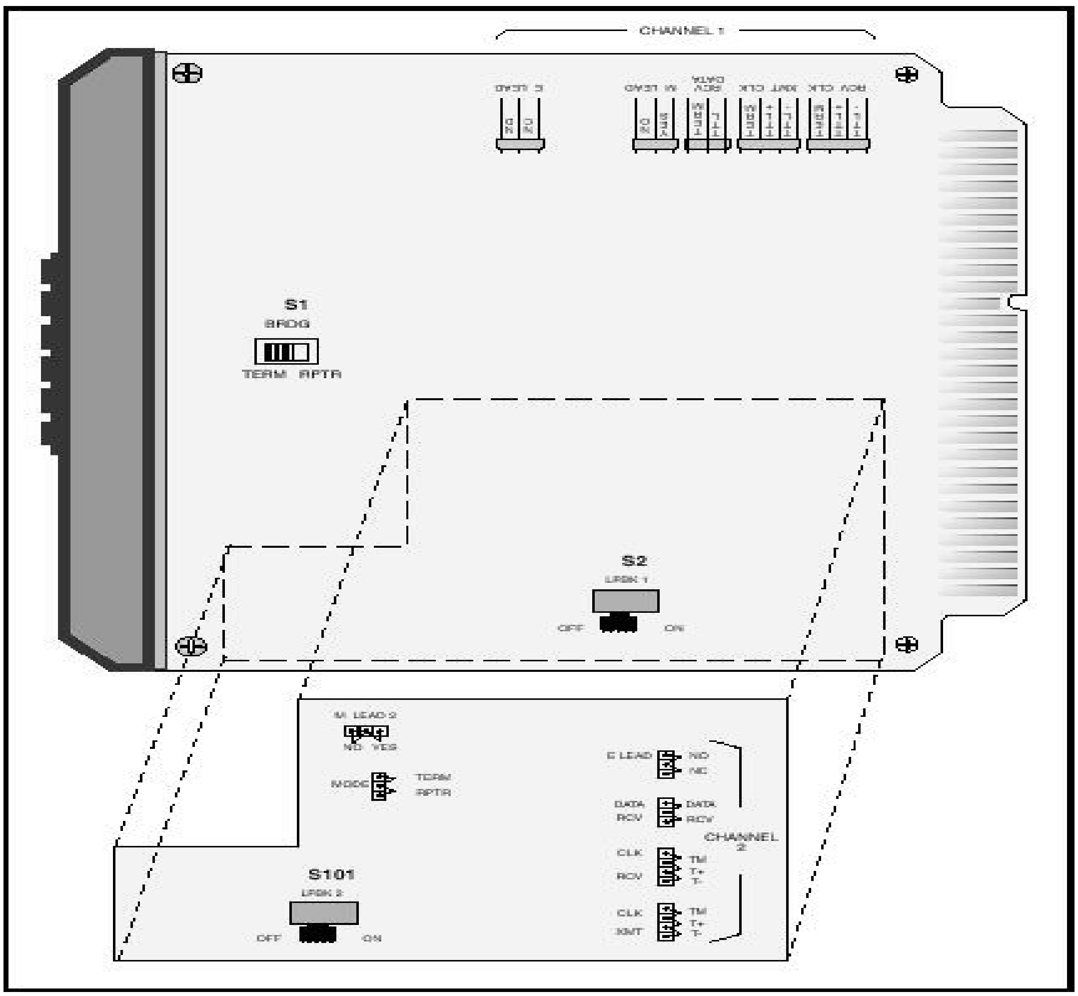
<table>
<tr><th>Module</th><th>Settings</th></tr>
<tr><td>41096</td><td>

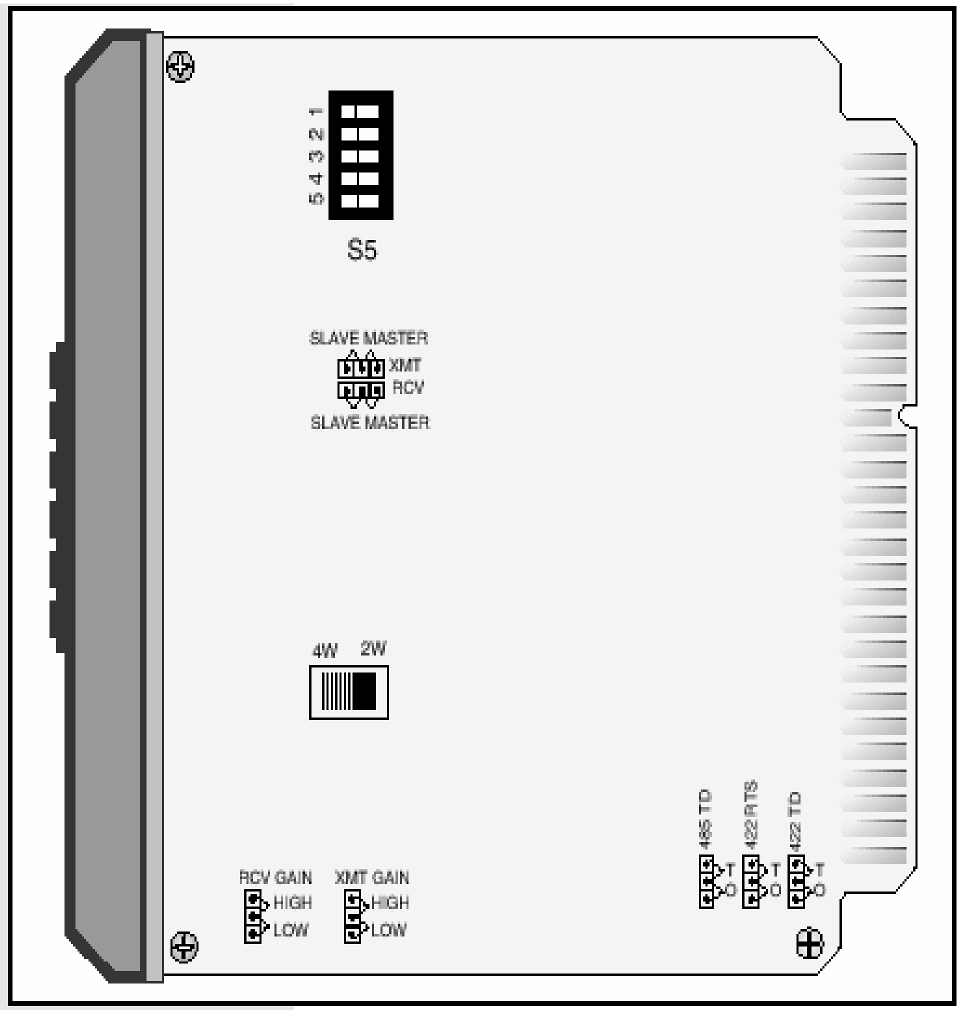
Set CTL LMT A strap, to IN position to prevent the ALL CHAN volume control knob from turning off the speaker.
Set CTL LMT A strap, to OUT position to allow the ALL CHAN volume control knob to turn off the speaker.
Set CTL LMT B strap, to IN position to prevent the CHAN SELECT volume control knob from 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.



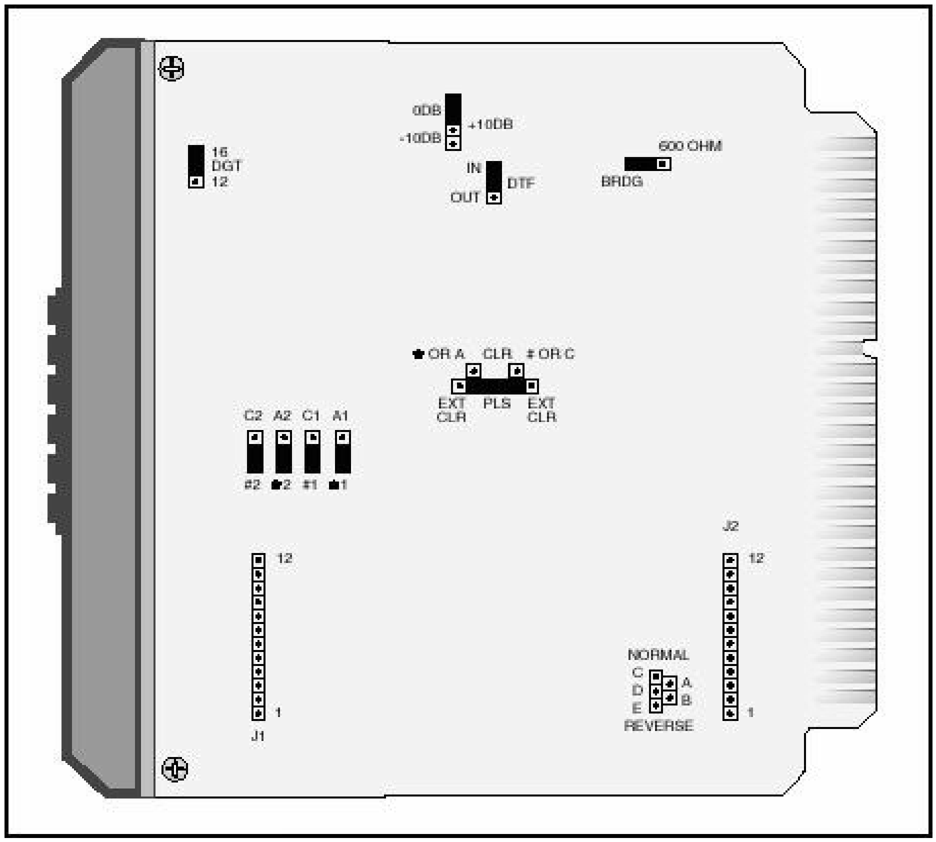
</td></tr>
</table>

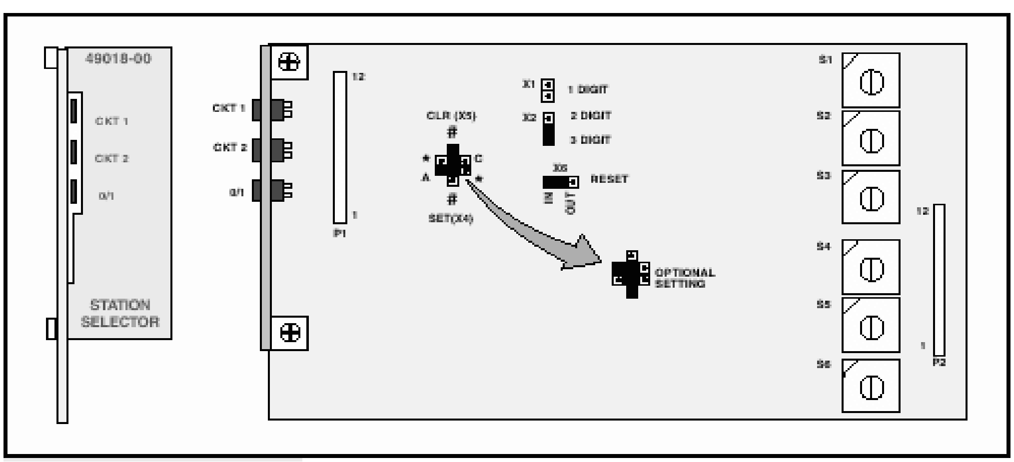
Module	Settings
46105	• Set S1 (BRDG) switch, to TERM at the breakpoint (DSNE Office 0) Terminal site. • Set S1 (BRDG) switch, to RPTR at all Repeater and all other Terminal sites. • Set S2 (LPBK 1) in OFF. • Set S101 (LPBL 2) in OFF. • Set the XMT CLK 1 and XMT CLK 2 straps in TERM. • Set the RCV CLK 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.

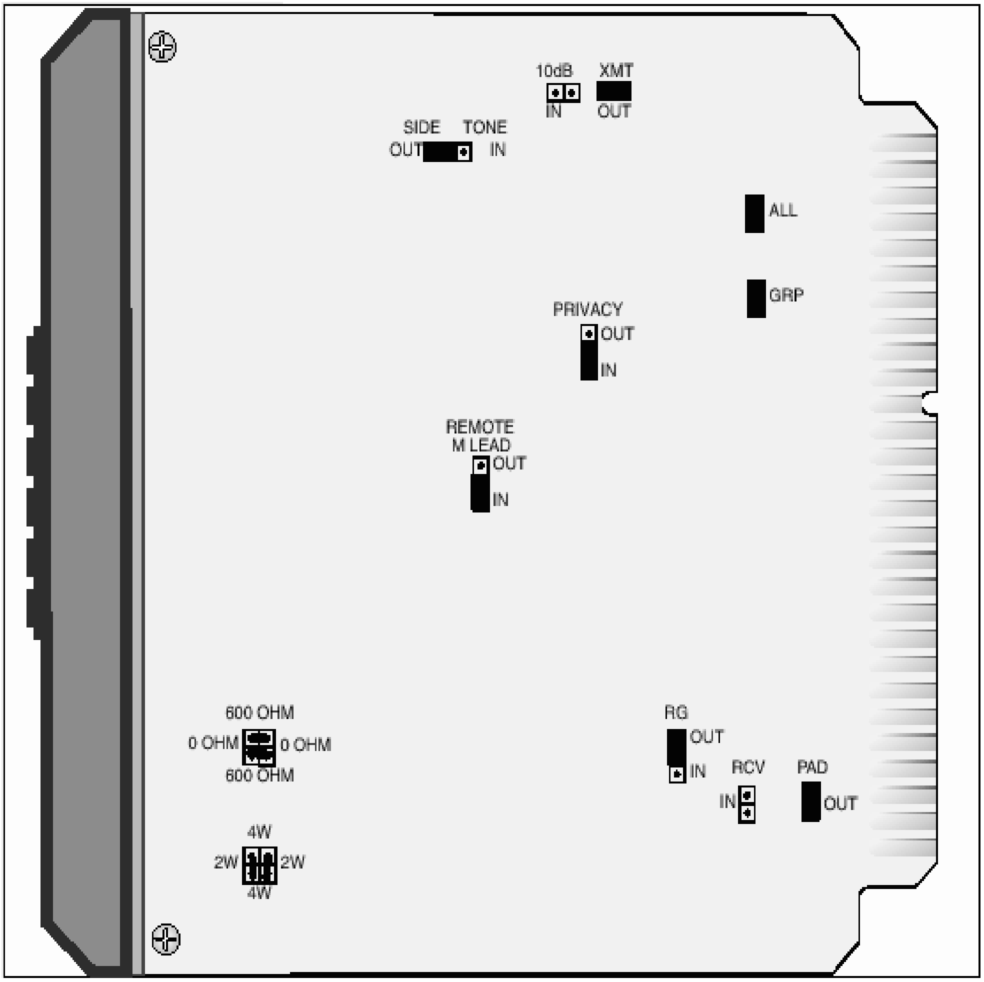


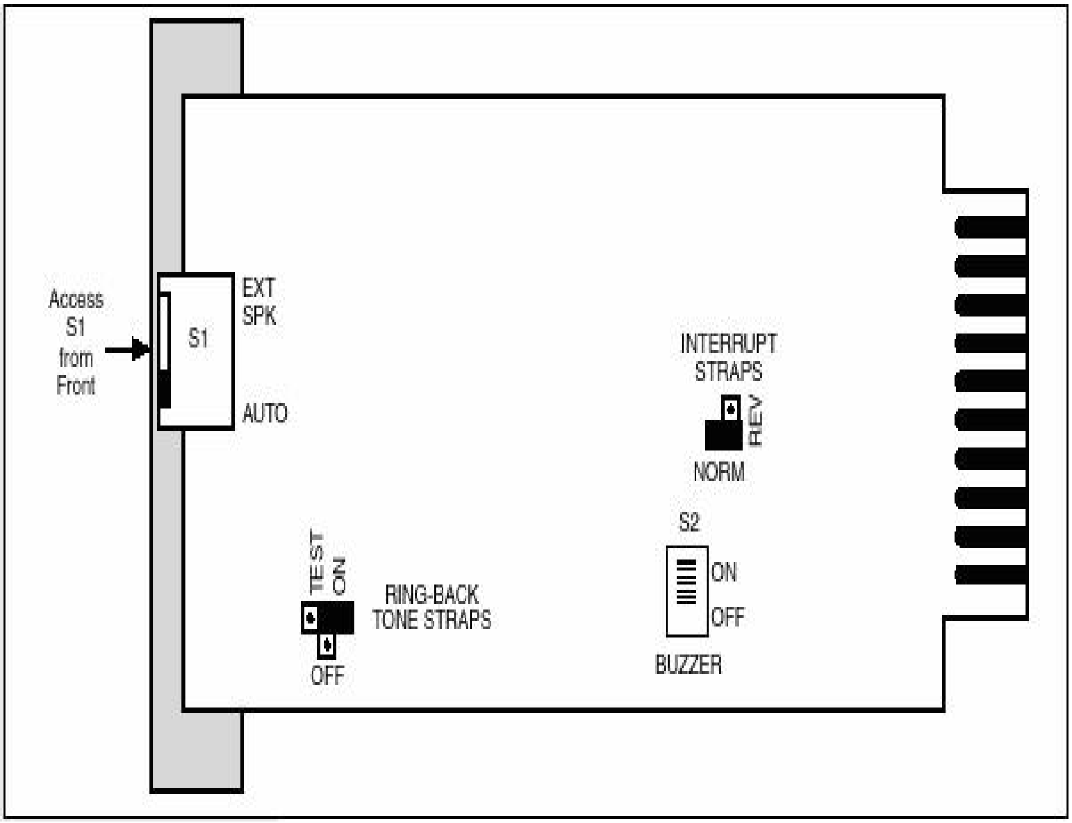
Module	Settings
44202 202	• Set the TEST, ALB, and DLB switches in the DOWN positions on faceplate. • Set the 2W/4W switch to 4w. • Set the S5 dip switch as follows: • S5-1, S5-3, and S5-4 ON • S5-2 and S5-5 OFF • Set the RCV GAIN strap to HIGH. • Set the XMT GAIN strap to LOW. • Set XMT and RCV straps to MASTER. • Set 485TD, 422RTS, and 422TD straps to O (OUT). • Reinstall the module in the middle slot in the top equipment shelf. 

Module	Settings
44020	• 49018 child board, set the station 1 code with S1, S2, and S3 = unique 3-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 3- 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.





Module	Settings
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. 

Module	Settings
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. 

Reference Materials

Dantel Channel 1 Orderwire Connections

Table 101-4 gives the Dantel Channel 1 to LambdaXtreme™ Transport orderwire circuit 1 connection information:

Table 101-4 Dantel Channel 1 Orderwire Connections

Wire Color	R-BL	BL-R	O-BR	BR-O	W-G	G-W	W-O	O-W
LambdaExtreme DB15S SIO Orderwire connector	14	6	12	4	11	3	10	2
Dantel 46105 DB15S Connector (J6)	14	6	12	4	11	3	10	2
Dantel 46105 Connector End (J1)	46	45	44	43	52	51	48	47
Designation	RxCP	RxCN	RxDP	RxDN	TxCP	TxCN	TxDP	TxDN

Dantel Channel 2 Orderwire Connections

Table 101-5 gives the Dantel Channel 2 to LambdaXtreme™ Transport orderwire circuit 1 connection information:

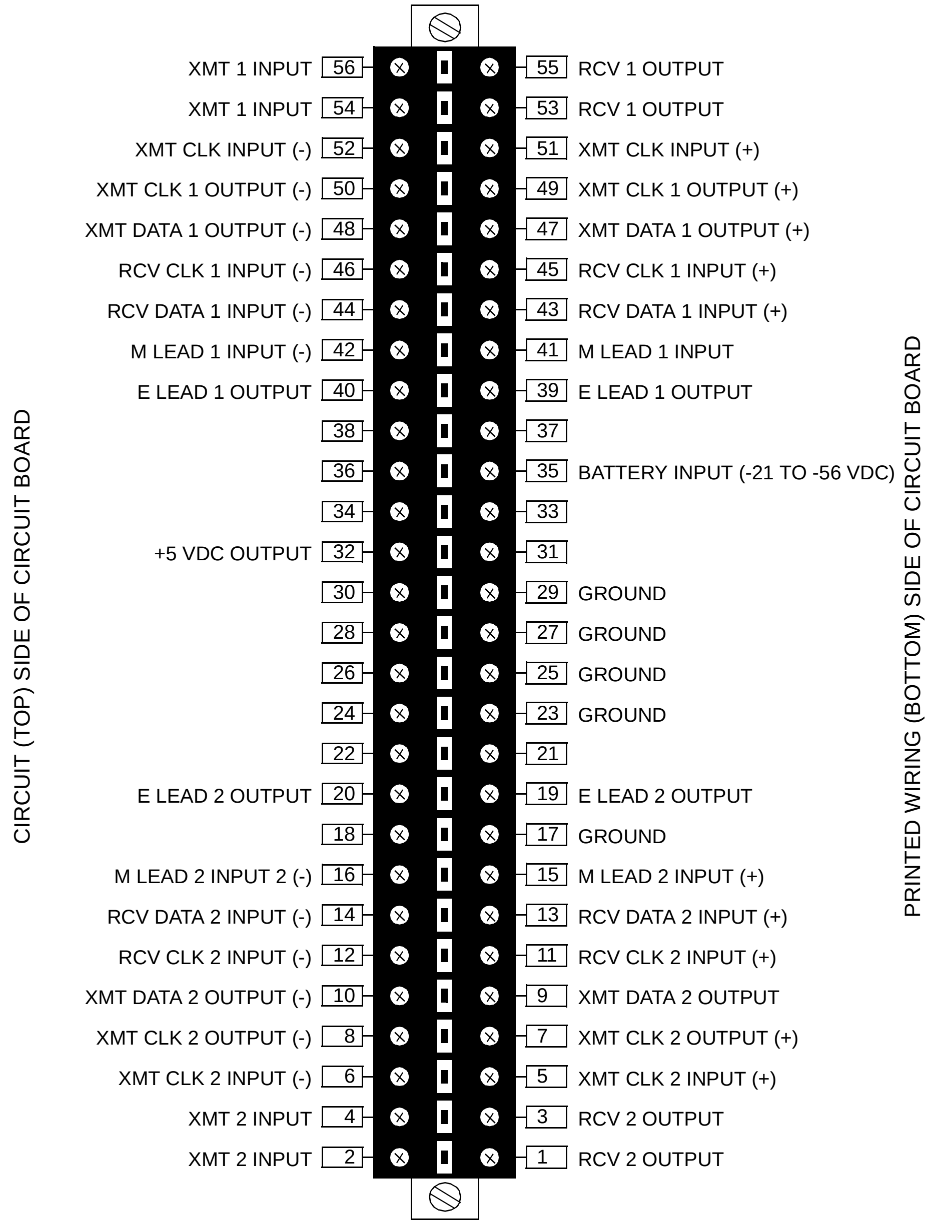
Table 101-5 Dantel Channel 2 Orderwire Connections

Wire Color	R-BL	BL-R	O-BR	BR-O	W-G	G-W	W-O	O-W
LambdaXtreme DB15S SIO Orderwire connector	14	6	12	4	11	3	10	2
Dantel 46105 DB15S Connector (J5)	14	6	12	4	11	3	10	2
Dantel 46105 Connector End (J1)	12	11	14	13	6	5	10	9
Designation	RxCP	RxCN	RxDP	RxDN	TxCP	TxCN	TxDP	TxDN

46105 Edge Connector (J1)

Figure 101-2 shows the pinout information for the Dantel J1 connector.

Figure 101-2 View of 46105 Edge Connector From Backplane



102 Miscellaneous Discretes/Remote Restart

Overview

Purpose This chapter gives detailed information for connecting miscellaneous discretes and remote restart capablilties to the LambdaXtreme™ Transport.

Reason for revision This is the first issue.

Contents This chapter contains the following.

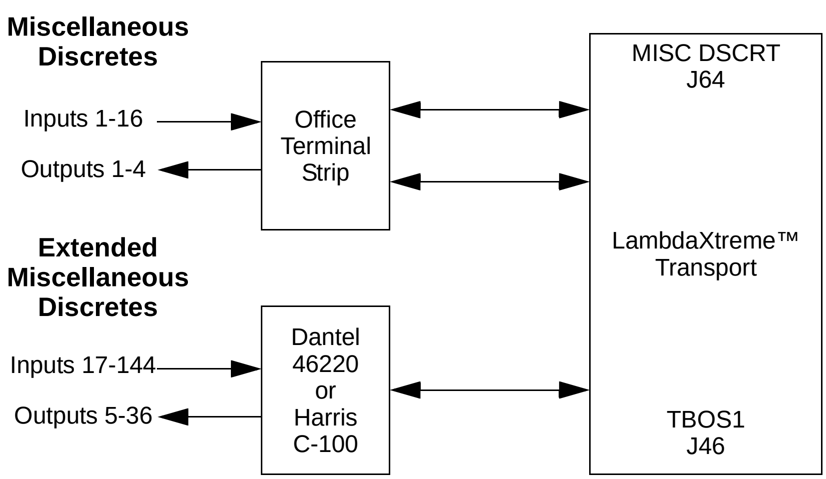
Miscellaneous Discretes Overview	102-2
Miscellaneous Discretes Connection Details	102-4
Miscellaneous Discretes Cable Installation	102-7
Extended Miscellaneous Discretes - Dantel-46220 Installation	102-8
Extended Miscellaneous Discretes - Harris C-1000 Installation	102-14

Miscellaneous Discretes Overview

Description

- Each LambdaXtreme™ Transport Network Element provides 16 internal miscellaneous discrete environmental input points (User Settable Discrete In - USDI), four internal control output points (User Settable Discrete Out - USDO), and a reset pair capable of restarting the NE when activated remotely.
- The miscellaneous customer equipment to be monitored must provide the electrical equivalent of a contact closure across the corresponding USDI pairs. The closure must be capable of passing at least 10 ma of drive current, which is derived from an internal -48 V supply. See drawing ED8C861-20 for more detailed information.
- The voltage used to control miscellaneous customer equipment may be between 3 and 72 volts. The LambdaXtreme™ Transport provides a unidirectional opto-isolator across each corresponding USDO pair. The load current shall be limited by customer equipment and shall not exceed 35 ma.
- The NE is able to sense current flow on any individual input point and notify the OS/CIT with the appropriate message.
- The OS/CIT is able to activate/release any control message.
- Refer to Figure 102-2 and Figure 102-3 for a typical miscellaneous discrete connection. See the LambdaXtreme™ Transport User Operations Guide for more detailed information.

Figure 102-1 Miscellaneous Discretes Applications



General Considerations

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 drawing ED8C861-20.
- For ordering information, refer to the LambdaXtreme™ Transport Application Planning Guide (APG) and drawing ED8C861-10.
- 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 or bent pins that cannot be straightened on the D-sub connectors cannot be replaced. See *Chapter 100, Backplane Pin Repair/Replacement*, for further information.

Precautions

CAUTION

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

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.

Miscellaneous Discretes Connection Details

Available Miscellaneous Discretes Cables

Table 102-1 lists available cable for miscellaneous discretes applications.

Table 102-1 Miscellaneous Discretes Cables

Comcode	Cable Length (ft.)
109068411	50
109068429	100
109068437	150
109068445	200
109068452	300

Miscellaneous Discretes Cable Connection Interconnection Panel

Table 102-2 lists the miscellaneous discretes cable connection to the interconnection panel:

Table 102-2 Cable Connections to Interconnection Panel

Cable Application	Interconnection Panel Location
Miscellaneous Discretes/ Reset	J61

Miscellaneous Discretes 1 Connections

Table 102-3 lists miscellaneous discretes Cable 1 connections and designations.

Table 102-3 Miscellaneous Discretes/Remote Restart

Name	Designation	Pin	Wire Color
Remote Restart Return	RESTARTR	25	BK-O
Remote Restart	RESTART	12	O-BK
User Settable Discrete **Out** 04	MD04	24	BK-BL
User Settable Discrete **Out** 03	MD03	11	BL-BK
User Settable Discrete **Out** 02	MD02	23	R-S
User Settable Discrete **Out** 01	MD01	10	S-R
User Settable Discrete In 16	MDI16	22	R-BR
User Settable Discrete In 15	MDI15	9	BR-R
User Settable Discrete In 14	MDI14	21	R-G
User Settable Discrete In 13	MDI13	8	G-R
User Settable Discrete In 12	MDI12	20	R-O
User Settable Discrete In 11	MDI11	7	O-R
User Settable Discrete In 10	MDI10	19	R-BL
User Settable Discrete In 09	MDI9	6	BL-R
User Settable Discrete In 08	MDI8	18	W-S
User Settable Discrete In 07	MDI7	5	S-W
User Settable Discrete In 06	MDI6	17	W-BR
User Settable Discrete In 05	MDI5	4	BR-W
User Settable Discrete In 04	MDI4	16	W-G
User Settable Discrete In 03	MDI3	3	G-W
User Settable Discrete In 02	MDI2	15	W-O
User Settable Discrete In 01	MDI1	2	O-W
User Settable Discrete **Out** Common	MDOCOM	14	W-BL
User Settable Discrete **In** Common	MDICOM	1	BL-W
No Connection		13	

Figure 102-2 Typical Miscellaneous Discrete In Circuit

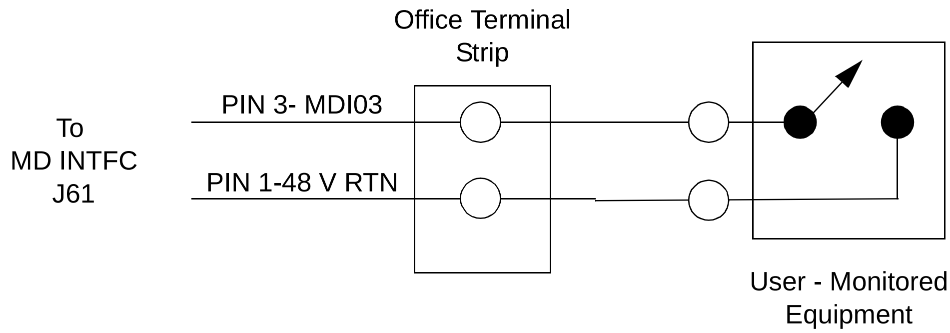
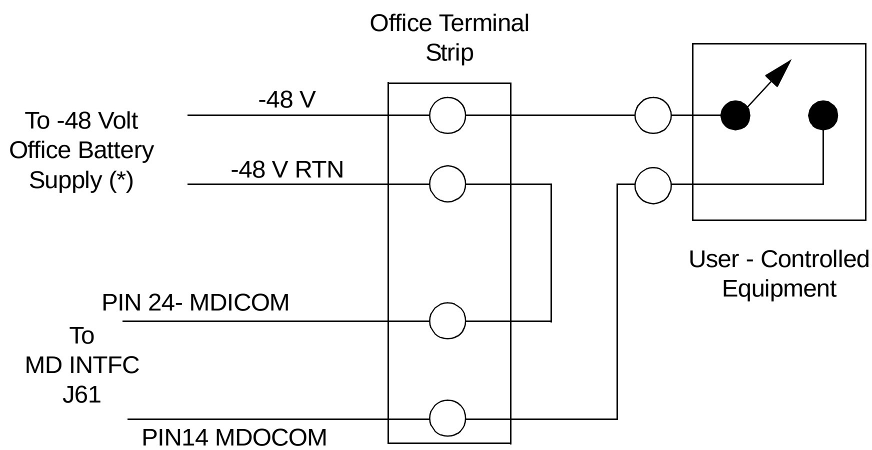


Figure 102-3 Typical Miscellaneous Discrete Out Circuit



Miscellaneous Discretes Cable Installation

Cable Installation Procedure

Use the following steps to install the miscellaneous discretes cables:

1. Route the Miscellaneous Discrete/Remote Restart cable out the left side of the LambdaXtreme™ Transport Network Controller shelf (shelf A1-3).

2. Connect the cable to J61 of the SIO board.

3. Using the connector identification labels included in the envelope attached to the cable, select and attach the appropriate label to each plug.

4. Route the cables from the LambdaXtreme™ Transport along the cable rack to the office terminal strip for miscellaneous discrete input points and control output points.

   Important! The office terminal strip is not part of the LambdaXtreme™ Transport equipment. It needs to provided elsewhere in the office.

5. Connect the cables to the office terminal strip for miscellaneous discrete input points and control output points by cutting the cables to length and wire-wrapping the loose ends onto the terminal strip.

6. Label the connections that are wire-wrapped.

7. Dress and tie the cables.

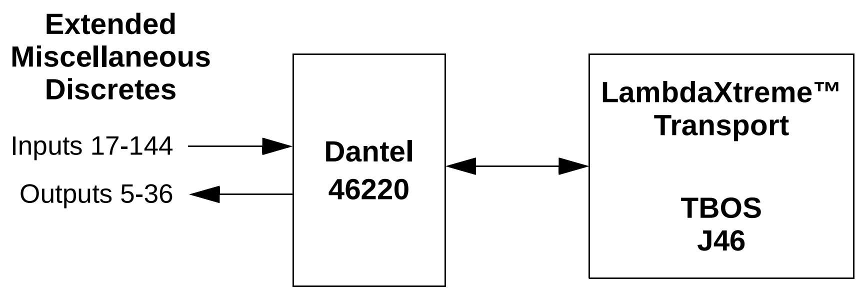
END OF STEPS

Extended Miscellaneous Discretes - Dantel-46220 Installation

Description

The Extended Miscellaneous Discretes feature for the LambdaXtreme™ Transport 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 an additional 32 control output points, bringing the total number of miscellaneous discrete inputs for the network element to 144 inputs and 36 outputs.

Figure 102-4 Miscellaneous Discretes Applications



Ordering Information

Table 102-4 Ordering Information

Description	Order Number	Comcode Number
Dantel Alarm and Control Block	Model No. 46220-00	407567924
Mounting Bar	A25-00508-01	406863621
TBOS Cable	50 ft	109251710
	100 ft	109251728
	150 ft	109251736
	200 ft	109251744
	300 ft	109251751

Tools and Equipment Required

The following tools are required:

- Phillips Screwdriver
- Small Standard Screwdriver
- 11/32-Inch Wrench

The following equipment is required:

- Alarm Control Box
- 23” Mounting Bar
- Standard Distribution Frame
- Applicable TBOS 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 LambdaXtreme™ Transport.

1 Attach the Dantel 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 TBOS cable from the TBOS port of the LambdaXtreme™ Transport (J46) to the Dantel Alarm and Control Block.

4 The TBOS Cable needs to be wired to the Dantel Alarm and Control Block.

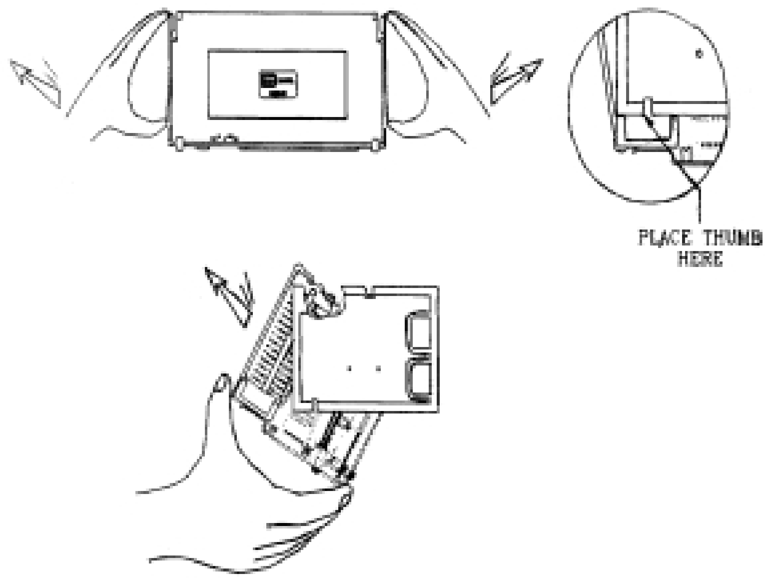
END OF STEPS

Wiring

Proceed as follows:

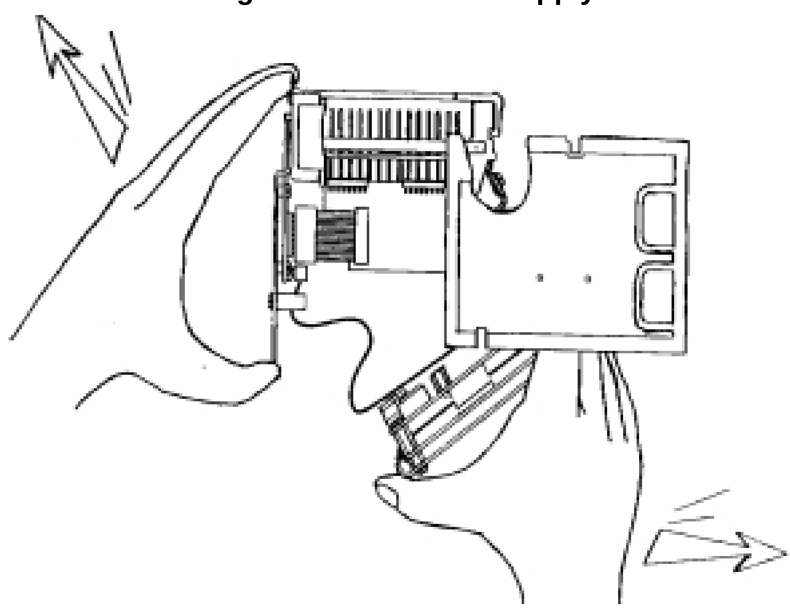
1 In order to access the power supply board of the Dantel Alarm and Control Block, the unit must be opened by placing your thumbs under the sides of the unit and gently pushing outwards as in Figure 102-6.

Figure 102-5 Opening the Dantel Alarm Block



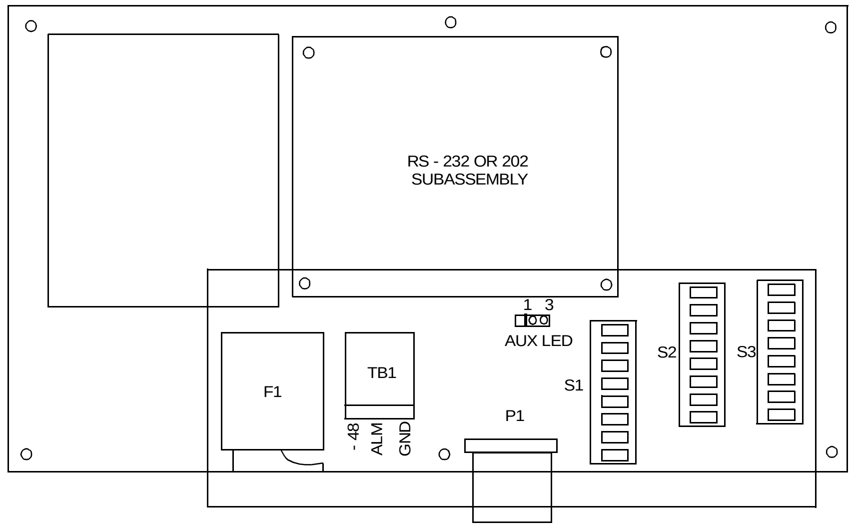
2 Pull the Power Supply board and CPU board down. Refer to Figure 102-6.

Figure 102-6 Pulling Down the Power Supply and CPU.



3 On the power supply board, wire negative battery (-21 to -56 VDC) to terminal (-48) on connector TB1 (Refer to Figure 102-7).

Figure 102-7 Power Supply Board Component Location



4 Wire the alarm inputs (refer to Figure 102-8). 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 102-7). Pin 1 will begin with Input Point 17 (See Figure 102-8). Table 102-5 lists the TBOS1 cable connections and designations and the Dantel Pin designations.

5 The TBOS Transmit and Receive Positive and Negative (see Table 102-5) need to be wire-wrapped to pins 32 E-H on the Alarm and Control Block (See Figure 102-8).

Cable 1	Cable 2
1. TBOS1TXP (W) to 32-E	3. TBOS1RXP (W) to 32-G
2. TBOS1TXN (BL) to 32-F	4. TBOS1RXN (O) to 32-H

END OF STEPS

Figure 102-8 Dantel Wire Wrap Pin Designations

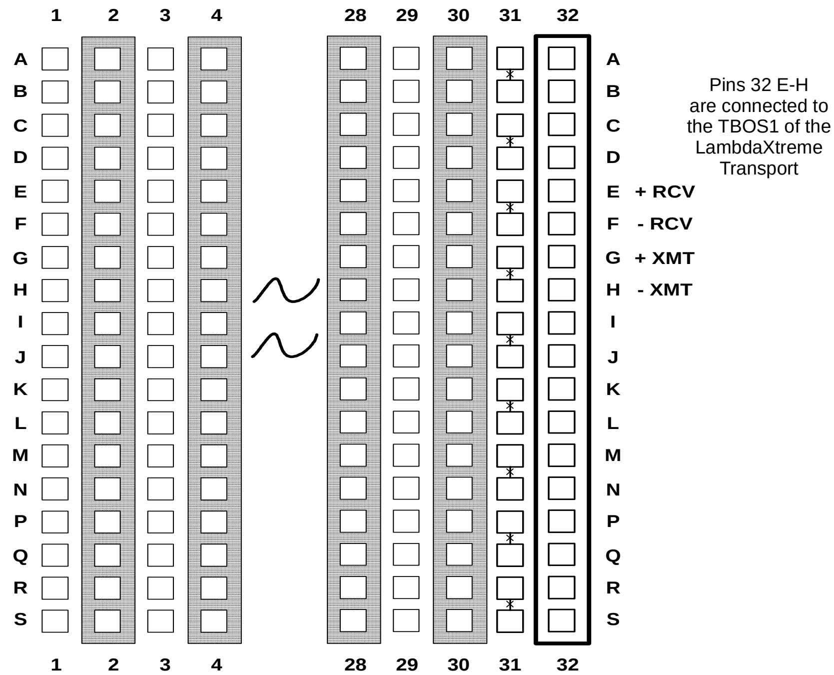


Table 102-5 SER TLM 1 Cable Connections and Designations

Name	Designation	Pin	Wire Color	Dantel Pin Designation*
TBOS1 Transmit N	TBOS1TXN	1	BL (CA1)	32-F (-RCV)
No Connection	None	2	None	
TBOS1 Receive N	TBOS1RXN	3	O (CA2)	32-H (-XMT)
No Connection	None	4	None	
No Connection	None	5	None	
TBOS1 Transmit P	TBOS1TXP	6	W (CA1)	32-E (+RCV)
No Connection	None	7	none	
TBOS1 Receive P	TBOS1RXP	8	W (CA2)	32-G (+XMT)
No Connection	None	9	None	

* See Figure 102-8 for location.

Switch and Strap Settings

On the Dantel Alarm and Control Block there are three (3) switches (S1-S3) located on the Power Supply Board (Figure 102-7). For functionality with Lucent's LambdaXtreme™ Transport, the following switch settings must be made.

Table 102-6 Dantel Switch Settings

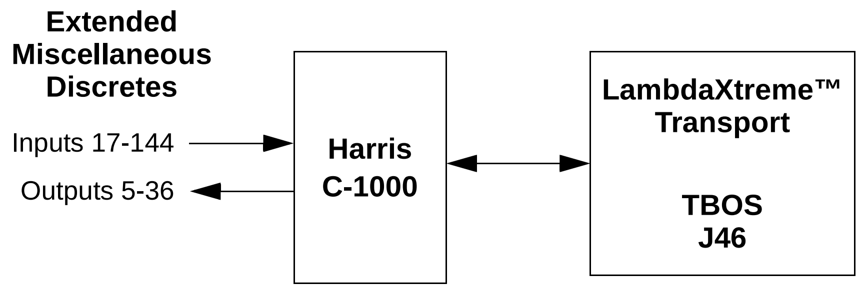
	S1 Switch Settings	S2 Switch Settings	S3 Switch Settings
1	OFF	OFF	OFF
2	OFF	ON	ON
3	OFF	OFF	OFF
4	ON	OFF	ON
5	OFF	OFF	ON
6	OFF	OFF	OFF
7	OFF	OFF	OFF
8	OFF	ON	OFF

Extended Miscellaneous Discretes - Harris C-1000 Installation

Description

The Extended Miscellaneous Discretes feature for the LambdaXtreme™ Transport 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 an additional 32 control output points, bringing the total number of miscellaneous discrete inputs for the network element to 144 inputs and 36 outputs.

Figure 102-9 Miscellaneous Discrete Applications



Ordering Information

Table 102-7 Ordering Information

Description	Order Number	Comcode Number
C-1000 Centurion	594-T043	407567932
Rear Access Wire Wrap Connector	620-T030	407532217
TBOS Cable	50 ft	109080630
	100 ft	109080721
	150 ft	109080739
	200 ft	109080747
	300 ft	109080754

Tools and Equipment Required

The following tools are required:

- Phillips Screwdriver
- Small Standard Screwdriver
- 11/32-Inch Wrench

The following equipment is required:

- C-1000 Centurion
- Mounting Brackets
- Standard Distribution Frame
- Interconnect Cable from LambdaXtreme™ Transport

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 LambdaXtreme™ Transport.

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 applicable cable (see Chapter 8 for lengths and comcodes) from the TBOS port of the LambdaXtreme™ Transport 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).

END OF STEPS

Powering the Unit

When powering the unit, proceed as follows:

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).

END OF STEPS

Switch Settings

Configure the C1000 unit by using the two Configuration DIP switches on the front of the unit (See Figure 1-1 in the C-1000 Centurion User Guide). The settings should be as follows:

- S1-1 to S1-8 OFF (down)
- S1-9 to S1-10 ON (up)
- S2-1 to S1-10 OFF (down)

□

103 Fiber Management

Overview

Purpose This chapter describes management of the fiber.

Reason for revision This is the first issue.

Contents This chapter contains the following.

Fiber Description	103-2
Fiber Labels	103-4
Fiber Routing Hardware	103-6
Running, Dressing, and Storing Fiber	103-10

Fiber Description

Fibers All fibers to be used are single-mode fibers. There are three different types of fiber used with the LambdaXtreme™ Transport system, simplex red fiber, simplex yellow fiber, and the customer's fiber coming in to or going out of the OTs, or in the case of compatible optics, the OMs or ODs.

Red Fiber Red fiber is made up of a single red colored fiber equipped with LC connectors at both ends. It is referred to as **Simplex LC Red Fiber**. The Red Fibers are custom cut to length for their application. The length is given on the protection boot of the LC connector.

Figure 103-1 Simplex Fiber With LC Connector

Fiber Length

The length is in inches and the Fiber Tables state which length to use for which connection. These fibers are used to make common circuit pack connections within the system bay and line bay. Installation is covered in chapters 5, 6 and 7.

Yellow Fiber Simplex fibers are Yellow in color and come in six different lengths (15, 20, 25, 30, 35 and 50 feet), as well as custom lengths.

The installation of these fibers will be covered in *Chapter 9, OT Circuit Pack and Fiber Installation for End and OADM Terminals*.

Outside Fiber Outside fiber is the fiber connecting the Customer equipment to the LambdaXtreme™ Transport. Depending on the customers specifications, these fibers may be any combination of SC, FC, or ST connectors. The length of these fibers depends on the system interface setup. This fiber is usually referred to as the ***Outside Bay or Plant Fiber***.

Outside Bay Fiber management should be specified by the customer. It is beyond the scope of this document to specify the route or dressings that the fiber should take once it leaves the equipment bays.

Precautions

CAUTION

Fiber is constructed of glass and should be treated with care. It should not be pulled or stretched. This could cause damage to the fiber or the fiber connector.

CAUTION

Fiber should not be bent in a radius of less than 1-1/2".

Fiber Testing Requirements

All fibers shall be tested after they are installed as follows:

- All fibers shall be tested after installation, but prior to turn-up
- Before fibers are tested, they shall be labeled properly and all cable tags shall be removed.
- A 1550nm test source (any available 1550nm test source) and an ITE# 7116 (or equivalent) optical power meter shall be used to perform all tests.
- The light source shall first be measured for a reference point/ baseline.
- No fiber jumper may have a measured loss of more than 2 dB.

Fiber Labels

Introduction

The labels come packaged in several different sets. Refer to the applicable chapter for End Terminal, OADM or Repeater label kit comcodes.

Labels come in two different colors: Blue and Green. The BLUE labels are used on the EAST End Terminal (All End Terminals are defined to face East), EAST side of the OADM, and EAST side of Repeater Terminals. The GREEN labels are used on the WEST side of the OADM and WEST side of Repeater Terminals. See the appropriate Fiber Table to confirm your choice of labels for your application.

Labels for red fibers have the same information for each end of the fiber, however the label column may be different. Each red fiber label contains the circuit pack and port designation for both ends of the fiber.

Labels for OT fibers are unique for each end of the fiber.

If specific pre-printed Blue or Green labels are unavailable, use Blue or Green blank labels and print the appropriate designation before affixing the label to the end of the fiber.

> **Important!** Label all fibers in the System whether in use or not. Once in place, it is easier to add or remove a circuit pack with less chance of error.

Labeling the Fibers

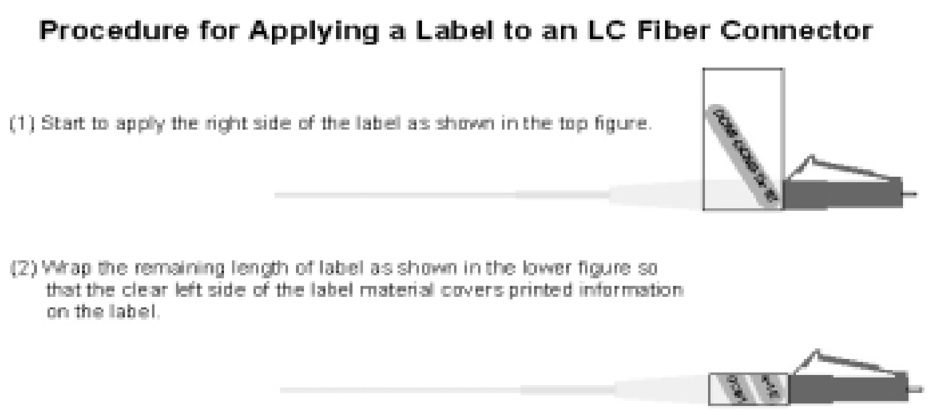
To apply the labels to the connectors, use the procedure in the table below:

1 Apply the right side of the label close to the boot of the connector. Refer to Figure 103-2.

2 Wrap the remaining length of the label so that the clear left side of the label covers the printed information on the label.

END OF STEPS

Figure 103-2 Applying Connector Labels



Fiber Routing Hardware

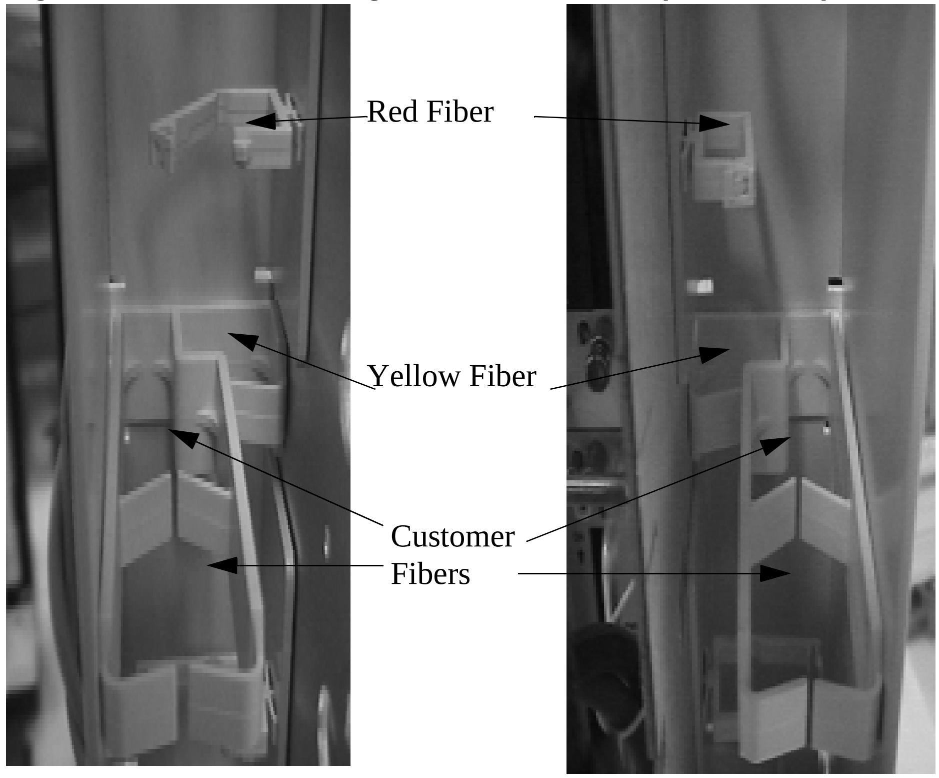
Introduction

In the LambdaXtreme™ Transport, there is a tremendous amount of fiber to be installed. This section introduces the location of the components associated with inter and intra shelf fibering as well as where to run and store fiber slack.

Fiber Ducts

Each bay is equipped with two vertical fiber ducts. The fiber ducts are located on the left side (left duct) and on the right side (right duct).Each fiber duct addresses the separation needed by the three different applications of fiber. (see Figure 103-3) The Red fibers utilize the fiber guides on the interior of the duct the path closest to the bay. This path has plastic clips to retain the fiber. Yellow fibers, used to interconnect OD/OM ports to OT ports, utilize the rear interior pathway of the tri-guide molding. The two forwardmost and outermost pathways of the tri-guide molding are used to facilitate fiber coming into or going out of the OTs or OAs from client equipment or outside plant.

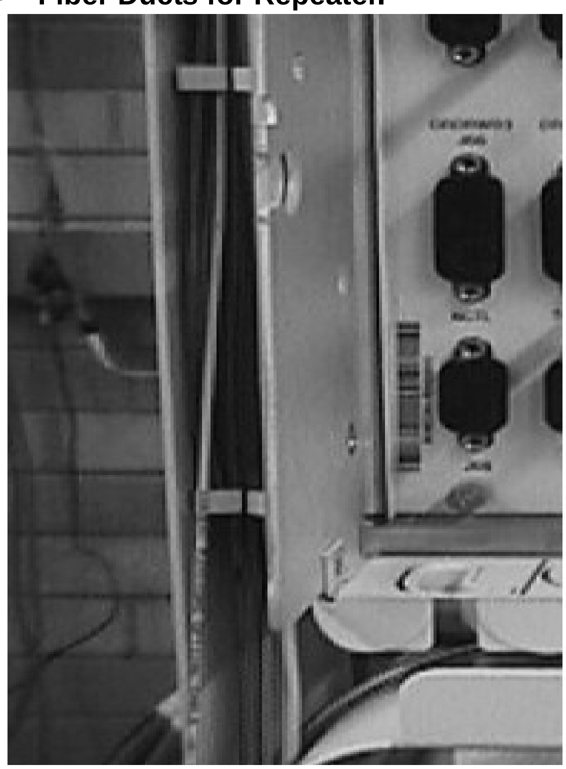
Figure 103-3 Left and Right Side Fiber Ducts (End/OADM)



Left Side Duct

Right Side Duct

Figure 103-4 Fiber Ducts for Repeater.



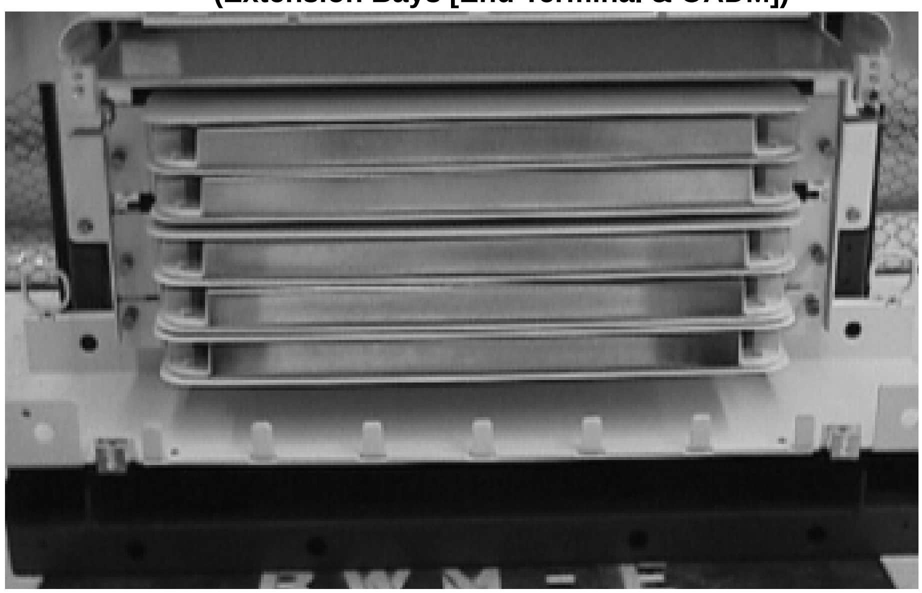
Fiber Trays Fiber storage trays, one to five per bay, are located at the bottom of the bay. The fiber trays can be either single tray or double tray, and there can be a combination of both types. The number of trays is dependent on the number of DCMs used in the bay. These trays store excess yellow simplex fiber associated with OT packs within that particular bay. The following figures depict the various combinations

Figure 103-5 Three DCMs One Single Tray (OADM)

Figure 103-6 Two DCMs, One Double Tray (System Bay [End Terminal])

Figure 103-7 One DCM, One Single, One Double Tray (Line Bay [End Terminal])

Figure 103-8 Two Double Trays, One Single Tray (Extension Bays [End Terminal & OADM])



Running, Dressing, and Storing Fiber

Yellow Fiber Running

Follow the steps in the table below for running the simplex fibers used for the LambdaXtreme™ Transport equipment.

1 Use the OT circuit pack placement guidelines in *Chapter 9, OT Circuit Pack and Fiber Installation for End and OADM Terminals* in conjunction with the customer order to determine to which OD/OM and OT the fiber will be connected.

> **Important!** Cleaning and connections are also covered in *Chapter 9, OT Circuit Pack and Fiber Installation for End and OADM Terminals*.

2 At the OM/OD end of the fiber, position the fiber in the appropriate slot in the sideplate of the shelf.

3 Route the fiber to the OT end destination in accordance with the customer order.

> **Important!** For OTs on the left side of the bay (slots 1-8), feed the fiber into the shelf from the left. For OTs on the right side of the bay (slot 9 -15), feed the fiber into the shelf from the right.

> **Important!** For OADM terminal System Bays, all OT fibers should feed into the shelf from the right, as there is only one single storage tray that takes fiber from the right.

See Figure 103-3 on page 103-7 duct work description.

4 At the OT end of the fiber, position the fiber in the associated OT slot.

5 Any associated slack should be made ready for storage at the base of the bay containing the OT.

END OF STEPS

Yellow Fiber Dressing

After running the fibers between the OMs/ODs and the OTs, dress them following the steps below.

1 Dress the fibers into the yellow fiber portion of the molded tri-channel of the applicable side duct down to the base of each bay.

2 Dress the fiber across the width of the bay (or bays) in the horizontal fiber tray.

3 All slack for this fiber needs to be placed as follows:

a. In a tray that is in the same bay as the OT pack

b. In a tray that pivots on the same side of the bay as the vertical fiber duct that contains the fiber

4 Near the bottom of the bay, below the vertical fiber duct containing the OT end of the fiber are 2 holes. These holes are in the horizontal fiber tray. Insert a long screwdriver or pencil into the two holes (See Figure 103-9 on page 103-12). Use of the screwdrivers insures that there is sufficient fiber slack to permit the opening and closing of the fiber trays.

5 The screwdriver is only used temporarily and should be removed before a tray containing fiber slack is closed.

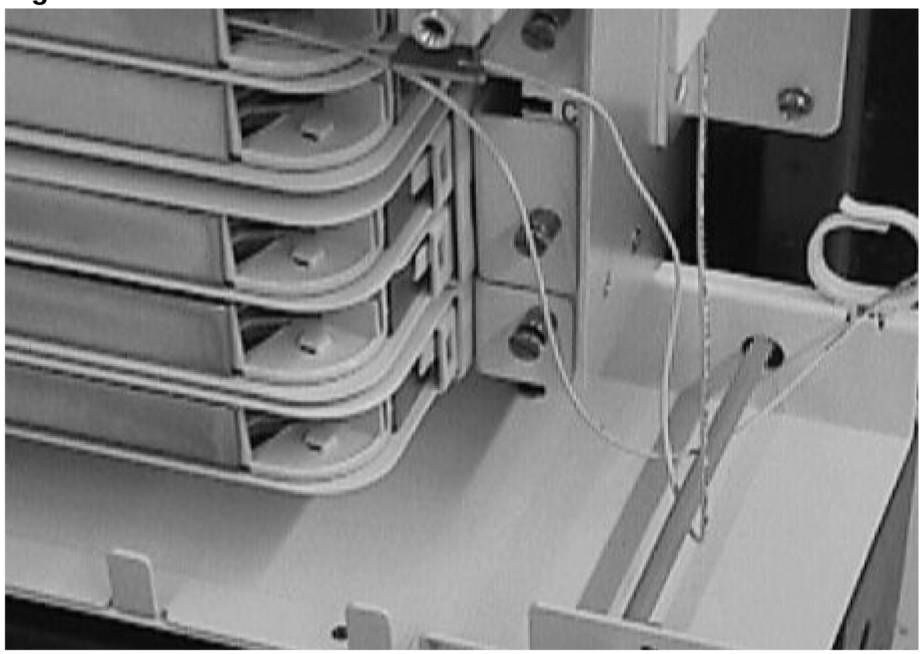
6 The fiber coming down the right vertical fiber duct above the screwdriver must follow a path around the right side of the screwdriver, under the screwdriver, and up and into the appropriate fiber tray.

7 If the fiber is coming down the left vertical duct it follows a path around the left side of the screwdriver, under the screwdriver, and up and into the appropriate fiber tray.

8 All fiber slack needs to be gathered between the screwdriver and the fiber tray before it is prepared for placement in the tray.

9 If a bay has more than one fiber tray that pivots on the proper side for the OT fiber slack, the upper most tray should be used and completely filled first. Once this upper most tray is full of fiber, then the next lower tray can be used.

Figure 103-9 Fiber Slack Procedures



END OF STEPS

Yellow Fiber Storage

A specialized technique is used to store the excess yellow simplex fiber in the storage trays. The steps for this technique are listed below:

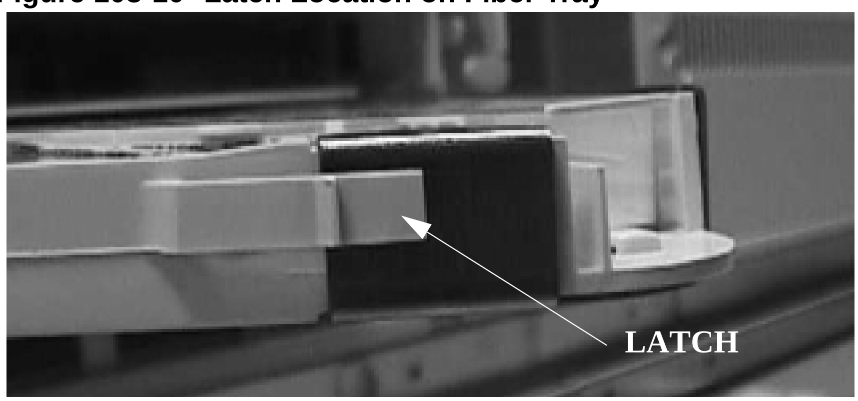
> **Important!** Slack should be stored in the fiber tray in the bay housing the OT. If there is no more room in the tray beneath the OT, the trays in the System or Line bays may be used.

> **Important!** Fiber from the left side of the bay should be stored in a fiber tray which takes fiber from the left side. Likewise, fiber from the right side of the bay should be stored in a fiber tray which takes fiber from the right.

---

1 Open the fiber tray by depressing the latch on the opposite side from the pivot.

Figure 103-10 Latch Location on Fiber Tray



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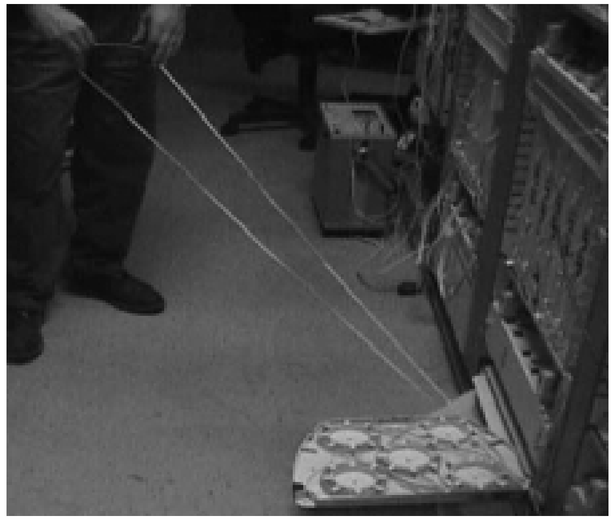
2 Take the midpoint of the fiber loop created in the last procedure and gently extend it until the slack fiber is in two parallel lines ending in a large loop. Refer to Figure 103-11.

---

3 Take the right-hand side of the fiber loop and move it to the left and cross the left-hand side fiber to the right. At the same time, twist the resulting loop away from your body back into the same place as before. Refer to Figure 103-12.

Figure 103-11 Large Fiber Loop



4 Adjust the size of this loop to be approximately the diameter of the circular reels in the storage tray.

Important! If the motion of creating the loop causes the two long sections of fiber to cross, turn the loop over to remove this twist so that the long sections are again parallel.

5 Repeat the forming and untwisting motions to create more loops until the slack has been taken up. Refer to Figure 103-13.

6 Position the small loops over the furthest available storage reel.

7 Gently place the small loops, one at a time, onto the reel. Refer to Figure 103-14.

Figure 103-12 Looping the Fiber

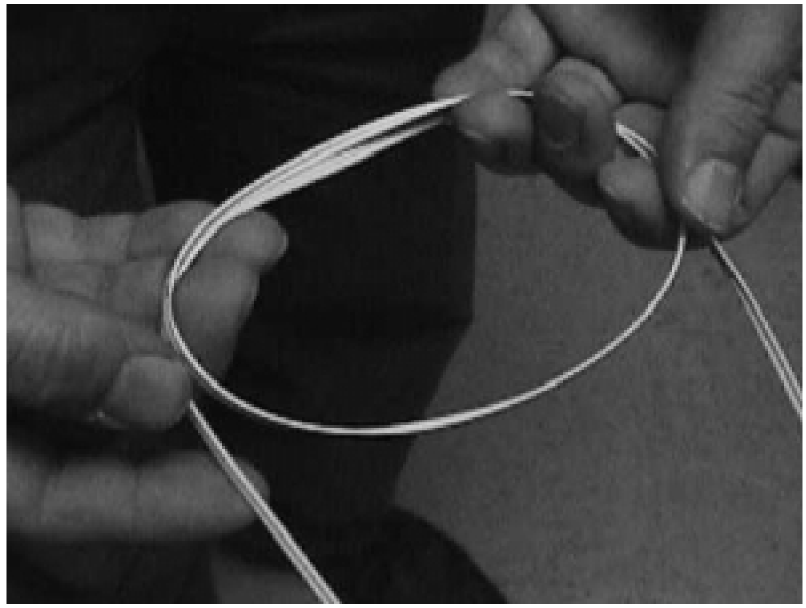


Figure 103-13 Positioning Fiber Loops on Storage Wheel

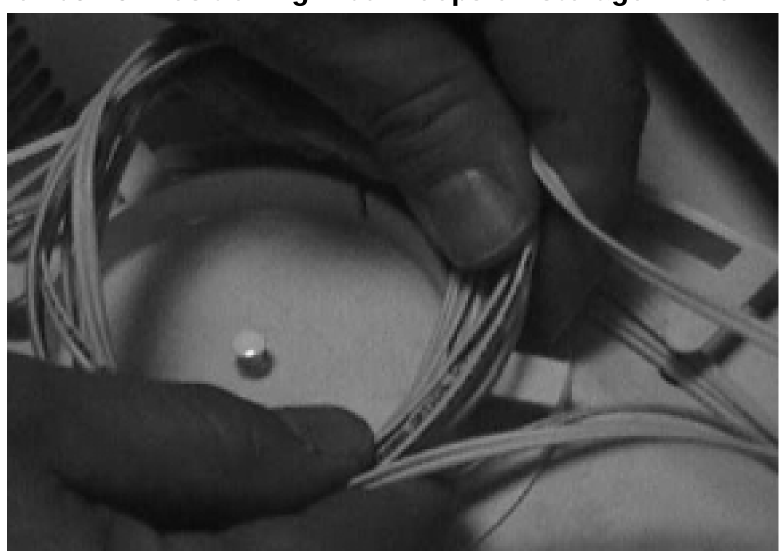
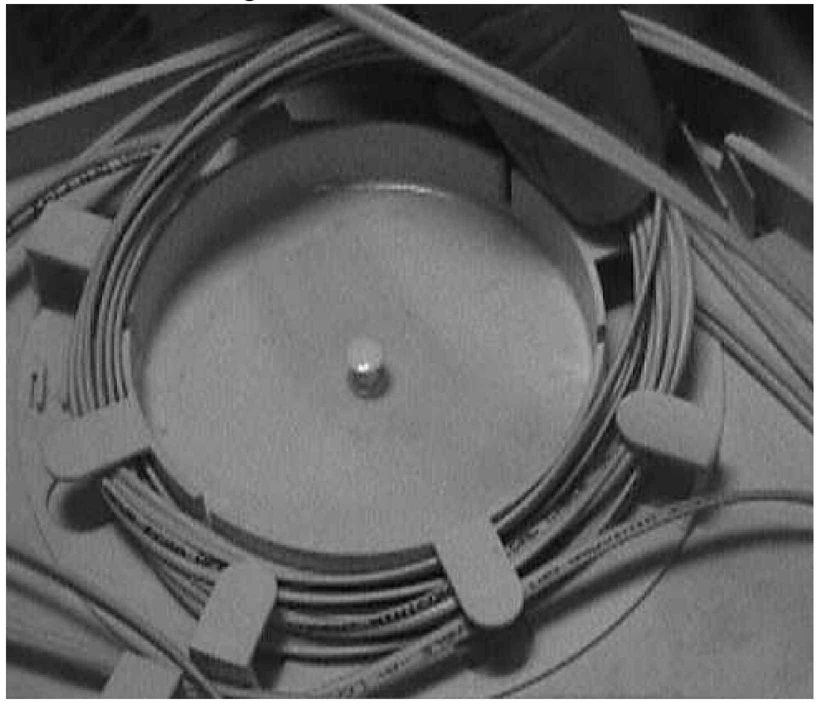


Figure 103-14 Placing the Fibers on the Wheel

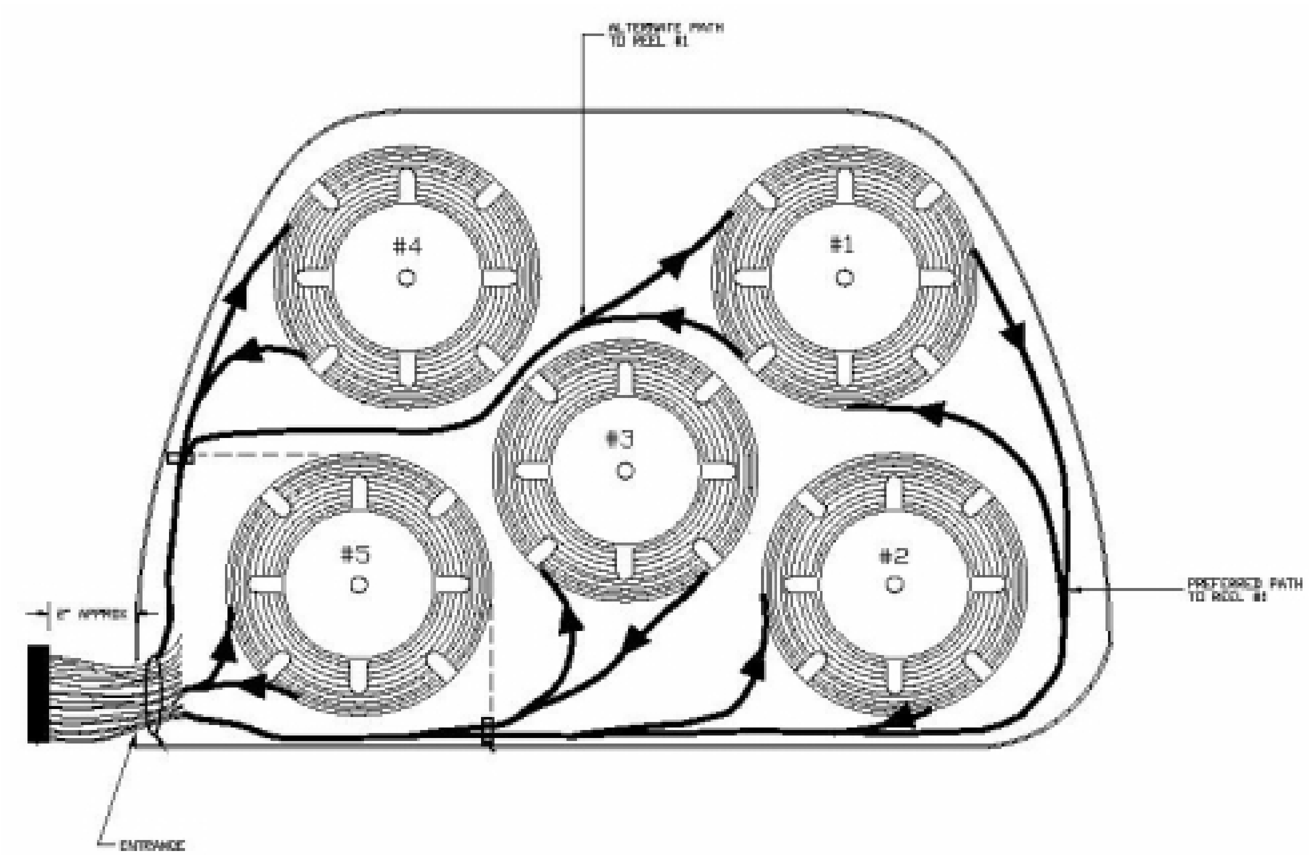


8 Dress the remaining slack within the storage tray. Refer to Figure 103-15

9 Replace the plastic fiber tray cover, **remove the pencil/slack control object,** and close the tray.

E N D O F S T E P S

Figure 103-15 Fiber Storage on the Wheel



104 Fiber Kit Descriptions

Overview

Purpose This chapter describes the contents of the LambdaXtreme™ Transport fiber kits.

Reason for revision This is the first issue.

Contents The following fiber kits are described in this chapter:

Fiber Kit Usage Matrix	104-2
XS1 LambdaXtreme™ Transport Jumper Kit	104-4
XS2 LambdaXtreme™ Transport Jumper Kit	104-5
XS3 LambdaXtreme™ Transport Jumper Kit	104-6
XS4 LambdaXtreme™ Transport Jumper Kit	104-7
XS5 LambdaXtreme™ Transport Jumper Kit	104-8
XS6 LambdaXtreme™ Transport Jumper Kit	104-9
XS7 LambdaXtreme™ Transport Jumper Kit	104-10
XS8 LambdaXtreme™ Transport Jumper Kit	104-11
XS9 LambdaXtreme™ Transport Jumper Kit	104-12

Fiber Kit Usage Matrix

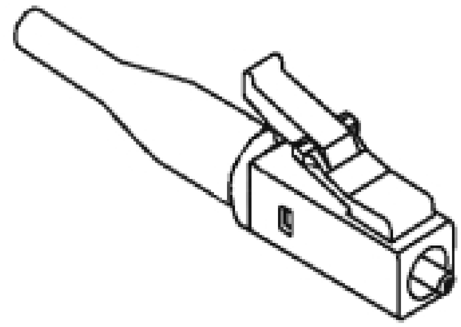
Purpose The following tables describe the fiber kits.

2-Fiber Kits The following table describes which fiber kits are used on 2-Fiber LambdaXtreme™ Transport Systems.

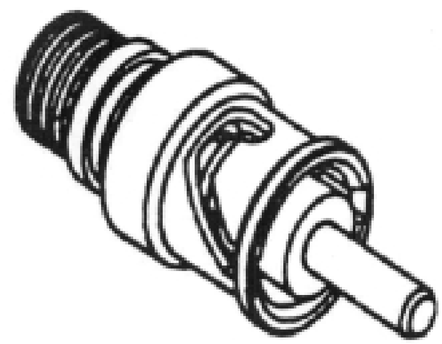
Kit Comcode	Description	System Name	No. of Jumpers
109105734	LambdaXtreme™ Transport Kit XS1	2FET-10G System Bay Fibers	15
109105742	LambdaXtreme™ Transport Kit XS2	2FET-40G Fibers	15
109105965	LambdaXtreme™ Transport Kit XS3	2F-Repeater Fibers	16
109105973	LambdaXtreme™ Transport Kit XS4	2F-OADM Fibers	54
109105981	LambdaXtreme™ Transport Kit XS5	RPG Fibers for 2FET-10G/40G	2
109105999	LambdaXtreme™ Transport Kit XS6	RPG Fibers for 2F-Repeater	6
109106005	LambdaXtreme™ Transport Kit XS7	RPG Fibers for 2F-OADM	6
109105539	LambdaXtreme™ Transport Kit XS8	2FET-10G Line Bay Fibers	8
109180547	LambdaXtreme™ Transport Kit XS9	DCM Fibers for 2nd Repeater in a Bay	6

Connector Types The following illustrates the different connector types.

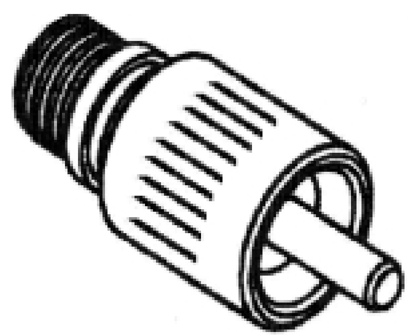
LC



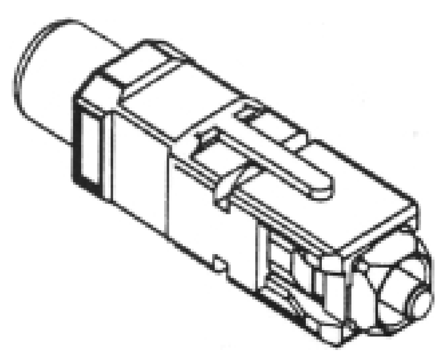
ST



FC



SC



XS1 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-18.0, Red Fiber	109178541	1
MSR1LC-LC-26.0, Red Fiber	108627910	2
MSR1LC-LC-28.0, Red Fiber	109178624	2
MSR1LC-LC-39.0, Red Fiber	109106047	1
MSR1LC-LC-44.0, Red Fiber	109106062	2
MSR1LC-LC-50.0, Red Fiber	108627944	1
MSR1LC-LC-53.5, Red Fiber	108463910	1
MSR1LC-LC-57.0, Red Fiber	108627969	2
MSR1LC-LC-60.0, Red Fiber	108463969	1
MSR1LC-LC-62.5, Red Fiber	109178640	1
MSR1LC-LC-65.0, Red Fiber	108607532	1

XS2 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-18.0, Red Fiber	109178541	1
MSR1LC-LC-26.0, Red Fiber	108627910	2
MSR1LC-LC-28.0, Red Fiber	109178624	2
MSR1LC-LC-39.0, Red Fiber	109106047	1
MSR1LC-LC-44.0, Red Fiber	109106062	2
MSR1LC-LC-50.0, Red Fiber	108627944	1
MSR1LC-LC-57.0, Red Fiber	108627969	2
MSR1LC-LC-58.0, Red Fiber	108463936	1
MSR1LC-LC-59.0, Red Fiber	108627977	1
MSR1LC-LC-60.0, Red Fiber	108463969	1
MSR1LC-LC-61.5, Red Fiber	108463977	1
MSR1LC-LC-65.0, Red Fiber	108607532	1

XS3 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-14.5, Red Fiber	109178681	1
MSR1LC-LC-24.0, Red Fiber	109106013	1
MSR1LC-LC-31.5, Red Fiber	300388428	2
MSR1LC-LC-36.0, Red Fiber	109178798	2
MSR1LC-LC-40.5, Red Fiber	109178707	2
MSR1LC-LC-42.0, Red Fiber	108463837	1
MSR1LC-LC-48.0, Red Fiber	108627936	1
MSR1LC-LC-49.0, Red Fiber	109178715	2
MSR1LC-LC-53.0, Red Fiber	109178855	1
MSR1LC-LC-55.0, Red Fiber	108463928	1
MSR1LC-LC-58.0, Red Fiber	108463936	1
MSR1LC-LC-65.0, Red Fiber	108607532	1

XS4 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-19.0, Red Fiber	109178723	6
MSR1LC-LC-19.5, Red Fiber	109178749	2
MSR1LC-LC-22.0, Red Fiber	108463555	2
MSR1LC-LC-23.5, Red Fiber	109178756	2
MSR1LC-LC-26.0, Red Fiber	108627910	2
MSR1LC-LC-27.5, Red Fiber	108463621	4
MSR1LC-LC-34.5, Red Fiber	109178772	2
MSR1LC-LC-36.0, Red Fiber	109178798	2
MSR1LC-LC-37.0, Red Fiber	109106039	1
MSR1LC-LC-39.0, Red Fiber	109106047	1
MSR1LC-LC-40.0, Red Fiber	108463829	2
MSR1LC-LC-43.0, Red Fiber	109178814	1
MSR1LC-LC-44.0, Red Fiber	109106062	1
MSR1LC-LC-48.0, Red Fiber	108627936	2
MSR1LC-LC-52.0, Red Fiber	109178848	4
MSR1LC-LC-53.0, Red Fiber	109178855	2
MSR1LC-LC-58.0, Red Fiber	108463936	1
MSR1LC-LC-60.0, Red Fiber	108463969	3
MSR1LC-LC-62.0, Red Fiber	109106070	2
MSR1LC-LC-64.0, Red Fiber	109178673	2
MSR1LC-LC-66.0, Red Fiber	109106088	2
MSR1LC-LC-83.0, Red Fiber	109178863	2
Red Jumper Assembly D (104 & 117)	109178954	2
Red Jumper Assembly C (109 & 122.5)	109178947	1

☐

XS5 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-27.0, Red Fiber	109178616	2

□

XS6 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-26.0, Red Fiber	108627910	1
MSR1LC-LC-52.5, Red Fiber	109158089	2
MSR1LC-LC-63.0, Red Fiber	108627993	2
MSR1LC-LC-67.0, Red Fiber	300388451	1

XS7 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-26.5, Red Fiber	108463605	4
MSR1LC-LC-55.5, Red Fiber	108627951	2

XS8 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-28.0, Red Fiber	109178624	1
MSR1LC-LC-44.0, Red Fiber	109106062	2
MSR1LC-LC-59.0, Red Fiber	108627977	1
MSR1LC-LC-61.5, Red Fiber	108463977	1
RED JUMPER ASSY A (81.5)	109178921	1
RED JUMPER ASSY B (100.5 & 106)	109178939	1

☐

XS9 LambdaXtreme™ Transport Jumper Kit

Overview The following table describes the contents of the fiber kit.

Item Description	Single Item Comcode	# of Fibers/ Kit
MSR1LC-LC-70.0, Red Fiber	300388469	2
MSR1LC-LC-80.0, Red Fiber	109106096	2
MSR1LC-LC-92.0, Red Fiber	109178582	1
MSR1LC-LC-94.5, Red Fiber	300388477	1

Lucent Technologies
Bell Labs Innovations

105 Fiber Cleaning

Overview

Introduction

This chapter describes the Lucent recommended method for the cleaning and inspection of optical connectors using specific tools and materials that have been proven to be effective in the assembly and testing of optical transmission equipment. It is critical that the connector endfaces are clean and free from particular contamination to assure proper performance and reliability of lightwave systems. With the modern high speed, high power, and wider bandwidth optical transmission systems, clean connectors along the optical path are absolutely essential for successful operation.

Reason for revision

This is the first issue.

Contents

This chapter contains the following.

Materials and Tools	105-3
Safety Instructions	105-5
Cleaning Optical Connectors	105-6
Inspecting Optical Connectors	105-9
Cleaning Other Optical Components	105-11

Related Information

A course on connector cleaning and the connector inspection process is now offered through Lucent Technologies Learning and Performance Center, Course Code: LMC200H “Understanding Fiber Optic Cleaning, Inspection, and Testing.” To learn more about this course, consult your local Lucent Account Representative.

Materials and Tools

Equipment Required For proper cleaning, the following equipment and materials are recommended:

Product	Model	Comcode	ITE #	Installation Order #
Optical Fiber Scope	Noyes OFS 300-200X	408463636	ITE-7129	33712900
2.5-mm Universal Adapter Cap	For use with the Noyes OFS 300-200X	408197044	ITE-7129D1	33712901
1.25-mm Universal Adapter Cap	For use with the Noyes OFS 300-200X	408197069	ITE-7129D2	33712902
Video Fiber Scope*	Noyes VFS-1	408356830	ITE-7146	4171600
1.25-mm Adapter	For VFS-1	408356848	ITE-7146D1	33714601
2.5-mm Adapter	For VFS-1	408356855	ITE-7146D2	33714602
FC Adapter	For VFS-1	408356863	ITE-7146D3	33714603
LC Adapter	For VFS-1	408356889	ITE-7146D4	33714604
SC Adapter	For VFS-1	408356954	ITE-7146D5	33714605
ST Adapter	For VFS-1	408356962	ITE-7146D6	33714606
Individual Pre-Saturated Alcohol Wipes	99% Pure Isopropyl Alcohol	901375147	ITE-7136	33713600
CLETOP Cleaning Cassette	Type A Reel	901375154	ITE-7137	33713700
CLETOP Cleaning Cassette Replacement Reel	Type A Reel	901375014	ITE-7137 D1	33713701
Luminex Stick Port Cleaners	1.25 mm	901375030	ITE-7134	33713400
Luminex Stick Port Cleaners	2.5 mm	901375022	ITE-7135	33713500
Luminex Cloth	5.5” x 5.5”	408201226	R6033	23603300

* This equipment may not be necessary at all locations. It is to be used when the ports need to be verified for cleanliness. If care is exercised when cleaning fibers, the video scope may not be needed.

Important! The equipment and material previously listed has been tested and is proven effective when used in conjunction with this procedure. Substitution of equipment or materials is at the discretion of the user and is not recommended by Lucent.

□

Safety Instructions

Important Safety Instructions

WARNING

Never view an energized optical cable with the naked eye or with an optical magnifying instrument. Disconnected or separated optical connectors may emit invisible laser radiation and direct exposure can severely injure the eye. If inspecting the endface of a connector with a fiberscope, be absolutely certain that the system is deactivated.

WARNING

Alcohol is flammable and is harmful if swallowed, inhaled or absorbed through the skin. Keep alcohol away from heat, sparks, or flame. Avoid contact with eyes, skin and clothing.

□

Cleaning Optical Connectors

Introduction

The procedure that follows utilizes the "Wet/Dry" method for connector cleaning. This method first applies a "wet" solvent such as high purity alcohol to the connector endface to dissolve/remove any organic particulate or oily films, followed by a "dry" double clean wipe using the CLETOP cleaning cassette.

This procedure is recommended for connector ferrules 2.5 mm and 1.25 mm in diameter associated with ST, SC, FC, and LC connectors. The ferrule of a fiber optic connector consists of a ceramic or stainless steel cylinder with a hole located longitudinally down the center of its axis, allowing enough tolerance for a fiber to pass through.

All optical connectors should be cleaned prior to connectorization. Keep the protective ferrule dust cap in place on the connector until initiating the cleaning process.

Cleaning Process

The following cleaning procedure is acceptable for field service/ installation activities:

1 Remove the dust cap from the connector ferrule exposing the connector endface.

2 Open an individual foil packet of a pre-saturated isopropyl alcohol (99% pure) wipe.

Grasp the connector housing and place the connector ferrule endface perpendicular to the alcohol wipe.

Drag it against the wipe three (3) times in a figure eight pattern. This action applies the alcohol solvent to the endface and initially loosens and scrubs away organic/solid contaminates. Refer to Figure 105-1.

3 If a CLETOP cassette cleaner is not available, proceed with Step 7. Otherwise, hold the CLETOP cassette cleaner in the palm of your hand with the cassette shutter door facing up. Refer to Figure 2-2.

Rotate the cassette lever all the way down with your thumb. Do not release the lever. The lever advances the “dry” Luminex cleaning cloth inside the case and simultaneously opens the shutter. The CLETOP cassette shutter door is now open and ready for cleaning the connector.

Figure 105-1 Cleaning the Ferrule Endface

Figure 105-2 CLETOP Cleaner

4 Insert and press the connector ferrule endface perpendicular against the cleaning cloth in the first of two slots of the cleaner. Refer to Figure 105-2.

Drag it down in the direction indicated by the arrows on the cleaner. Do not release the lever of the cassette.

5 Lift the connector from the first slot and rotate it 90 degrees and repeat the wiping procedure using the second slot. Be sure the ferrule is pressed snug against the cleaning cloth while dragging the ferrule to assure the proper cleaning action.

6 Release the cassette lever allowing the shutter door to close to its initial position. Continue with Step 8.

7 Wrap a Luminex cleaning cloth around the ferrule and rotate the connector housing, cleaning the outside periphery of ferrule.

Follow this by folding an unused portion of the cloth over the end of the ferrule endface and then with light pressure from the thumb, slightly drag the cloth from the center of the ferrule to the edge while rotating the connector 360 degrees. If the Luminex cleaning cloth is not available, a lint-free cleanroom optic wipe can be used. The Luminex cleaning cloth is washable and can be used multiple times. The optic wipes are single use and disposable.

8 Inspect the connector for cleanliness. If necessary, repeat the cleaning process. See Connector Inspection on page 105-9.

END OF STEPS

☐

Inspecting Optical Connectors

Connector Inspection

After cleaning the connector, inspect the ferrule endface to ensure that it is free from any particulate contamination using an optical fiber inspection scope of at least 200X magnification. When using an optical fiber scope (for example, the Noyes OFS 300-200X), exercise extreme caution to assure fiber being examined is de-energized.

WARNING

Use an optical power meter to verify the connector and fiber to be cleaned has been de-energized/deactivated before viewing.

1 Follow the instructions in the manual provided with the Optical Fiber Scope to view the ferrule endface of the fiber under inspection.

2 The visual area of the ferrule endface (ferrule and fiber) as observed by the inspection system/scope should be free of any contaminates. Repeat the Cleaning Procedure if the fiber endface does not meet the following requirements: Refer to Figure 105-3.

Requirement: No fixed type of contamination (contaminates that remain at the same location after three wet-dry cleaning cycles), regardless of size, is allowed in the restricted area of the glass fiber endface.

> **Important!** The restricted area is defined as ~66 micron (um) diameter for both singlemode and multimode fibers.

Requirement: No chips, cracks or scratches are allowed near the core of the glass fiber endface.

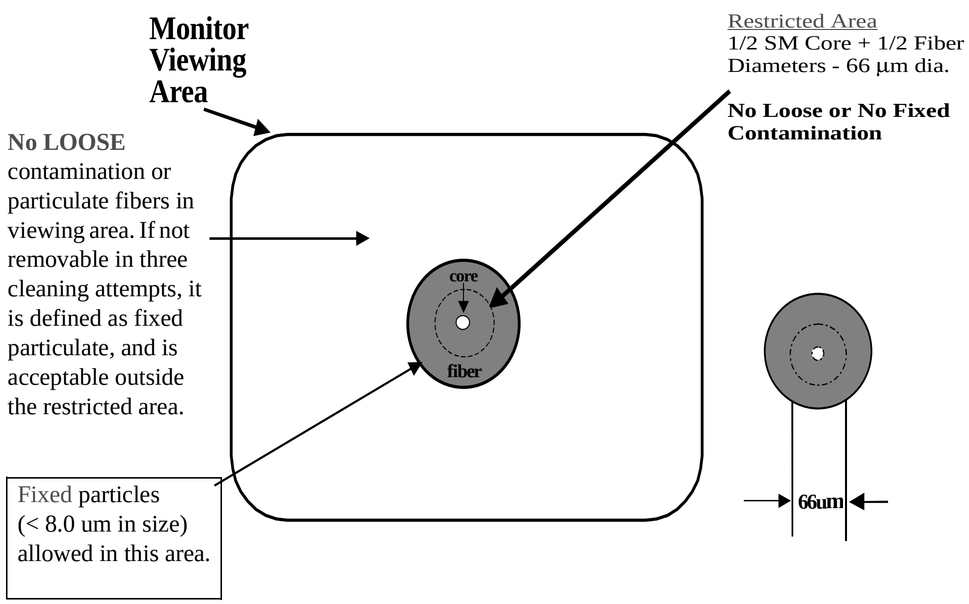
Requirement: No large floating (loose) contaminates are allowed on the glass fiber and ceramic ferrule endface.

3 After the connector has been verified to be cleaned, it should be immediately inserted into the adapter buildout of the optical component. This will assure maximum cleanliness and effectiveness of the connector.

4 If the cleaned connector can not be “connectorized” with a corresponding adapter, the connector ferrule must be protected with a connector dust cap. Before placing the cap on the ferrule, make sure the cap is clean. This can be accomplished by inserting a CLETOP stick cleaner (swab) of the same inside diameter as the cap (either 2.5 or 1.25 mm) and rotate the stick 360 degrees three (3) times. Following this procedure, carefully place the cap over the ferrule. When the cleaned connector is ready for assembly, it should be re-inspected for cleanliness prior to connectorization.

END OF STEPS

Figure 105-3 Acceptability Criteria for Fiber Cleaning



Cleaning Other Optical Components

Fiber Adapters or Circuit Pack Connectors

During testing and/or troubleshooting activities, it may be necessary to clean the optical buildout adapter or the circuit pack connector. The following procedure is recommended.

CAUTION

Do not attempt to clean ports equipped with yellow Lightguide BuildOut (LBO) attenuators. Attenuators contain a thin glass lens that is extremely fragile. The LBO will be damaged if cleaned using this method.

1 Using the appropriate CLETOP stick cleaner (2.5 mm for SC, ST, and FC connectors, 1.25 mm for LC connectors) dampen the stick cleaner with Ethyl alcohol using the alcohol wipe. Insert the stick cleaner into the adapter rotating the stick 360 degrees while inserting. Push/rotate the stick until the stick cleaner makes contact with the connector. Apply slight pressure upon contact and rotate the stick 360 degrees at least three (3) times.

2 Remove the stick cleaner, rotating it upon removal.

3 Using a dry CLETOP stick cleaner of appropriate diameter, repeat the above cleaning procedure. This procedure will clean the side walls of the adapter and the endface of the circuit pack connector.

4 Gently insert the Video Fiber Scope probe into the port until the fiber ferrule comes into view.

5 Verify that the fiber ferrule is clean. Repeat the process in Steps 1 - 3 if the fiber does not meet the requirements specified on pages 105-9 through.

END OF STEPS

Glossary

10/100 BASE-T
A twisted-pair cable version of an IEEE 802.3 network.

100 BASE-TX
A A 100-Mbps Ethernet implementation over Category 5 twisted-pair cabling.

A

ACO (Acknowledge Button)
A push-button switch on the indicator strip that can be used to retire an audible office alarm.

AID (Access Identifier)
AIDs identify an entity or a range of entities within a NE in a TL1 message (for example, a port or list of ports). See also TL1. This field is optional.

AIM (Alarm Indication Message)
A message sent from a one NE to another NE to indicate that it has received a signal so degraded that it raised an alarm.

AIS (Alarm Indication Signal)
A signal sent downstream by a NE to indicate that its incoming signal has failed.

Alarm
External notification or display of a failure condition. The indication of a failure towards an external system interface or via audible or visible indicators.

Alarm List
A status report that lists active alarms on the NE.

Alarm Log
A history of the setting and clearing of system alarms on the NE.

Alarm Severity
An attribute defining the priority of the alarm message. The way alarms are processed depends on the severity.

Alarm Suppression
Selective removal of alarm messages from being forwarded to the GUI or to network management layer OSs.

Angular Misalignment
Loss at a connector due to misaligned fiber end face angles.

Anomaly
Any deviation from normal behavior. Anomalies do not result in any consequent actions, but are contributors to defects and performance monitoring counts. See also Defect.

ANSI (American National Standards Institute)
A United States standards body that accredits standards for programmming languages, conmmunications and networking; it is the U.S. representative in the International Organization for Standardization (ISO).

APC (Angle Polished Connector)
An 5'-15' angle on the connector tip for the minimum possible back reflection.

Apparatus Code
ASCII name assigned by the manufacturer to identify a particular circuit pack by pack type and number.

APR (Automatic Power Reduction)
The lowering of the laser power to a limit that fits into class 1 category for handling fiber cables. APR replaces the full power off feature known as ALS (automatic laser shutdown) or APSD (automatic power shutdown).

AR (Antireflection Coating)
A thin, dielectric or metallic film applied to an optical surface to reduce its reflection and thereby, increase its transmission.

ASE (Amplified Spontaneous Emission)
ASE is optical noise generated in an erbium-doped fiber amplifier (EDFA) with and without signal input power.

ASTM (American Society for Testing and Materials)
A non-profit industry wide organization that publishes standards, methods of test, recommended practices, definitions and other related material.

Asynchronous
Data that is transmitted without an associated clock signal.

ATAG (Autonomously generated correlation TAG)
An autonomous TL1 message (event) counter used to detect lost events.

ATM (Asynchronous Transfer Mode)
A digital transmission switching format, with c containing 5 bytes of header information followed by 48 data bytes. Part of the B-ISDN standard.

Attenuation
The decrease in signal strength along a fiber optic waveguide caused by absorption and scattering. Attenuation is usually expressed in dB/km.

Attenuator
In optical systems, a passive device that reduces the amplitude of a signal without distorting the waveform.

Automatic Protection
A protection switch that occurs automatically in response to an automatically detected fault condition.

Auto-Provisioning
Configuration of system parts without pre-provisioning. When a part is plugged into the system it is accepted with its default configuration.

B **Backscattering**
The return of a portion of scattered light to the input end of a fiber; the scattering of light in the direction opposite to its original propagation.

Bay
A mechanical facility to mount shelves and other equipment for system configurations. Bays can be accessed from the front side or front and rear side. It is made of aluminum or steel and is attached to the wall or ceiling. Equipment cabling is laid in or attached to the Bay. Also known as rack.

BCM (Board Controller Module)
A small module (printed wiring board plus components) that plugs into almost every circuit pack (other than the NCTL, SCTL, and SUPVY) to supply the processor, memory and intra-NE communications capabilities needed to operate the pack in the system.

Beamsplitter
An optical device, such as a partially reflecting mirror, that splits a beam of light into two or more beams. Used in fiber optics for directional couplers.

Bend Radius

The smallest radius an optical fiber or fiber cable can bend before increased attenuation or breakage occurs.

Bending Loss

Attenuation caused by high-order modes radiating from the outside of a fiber optic waveguide, which occur when the fiber is bent around a small radius. See also macrobending, microbending.

BER (Bit Error Rate)

BER measures how accurately a bit stream is transmitted through a system. It measures how many bits are received in error compared to how many are sent.

Birefringent

When the refractive index differs in light of different polarizations.

C **Cable Assembly**

A cable that is connector terminated and ready for installation.

Cable Plant

The cable plant consists of all the optical elements including fiber connectors, splices, and so forth, between a transmitter and a receiver.

CCITT (Consultative Committee for the International Telephone and Telegraph)

An international advisory committee under United Nations' sponsorship that has composed and recommended for adoption worldwide standards for international communications. Recently changed to the International Telecommunications Union Telecommunications Standards Sector (ITU-TSS).

CDS (Complementary Double Shelf)

The double shelf used in an Extension Bay; two per bay.

CE (Conformite Europeenne)

The CE Mark is a European proof of conformity and is also described as "passport" that allows manufacturers and exporters to circulate products freely within the EU. The letters "CE" indicate that the manufacturer has satisfied all assessment procedures specified by law for its product.

Center Wavelength

In a laser, the nominal value central operating wavelength. It is the wavelength defined by a peak mode measurement where the effective optical power resides. In a LED, the average of the two wavelengths measured at the half amplitude points of the power spectrum.

Channel

A communications path or the signal sent over that path.

Chirp

In laser diodes, the shift of the laser's central wavelength during single pulse duration due to laser instability.

Chromatic Dispersion

The speed at which an optical pulse travels depends on the fiber wavelength. This is caused by several factors including material dispersion, waveguide dispersion and profile dispersion. The net effect is that if an optical pulse contains multiple wavelengths (colors), then the different colors travel at different speeds and arrive at different times, smearing the received optical signal.

CIO (Controller Input/Output) Circuit Pack

CIO indicates Ethernet port status.

CIT (Craft Interface Terminal)

The terminal used as the local interface between humans and a NE. It is used to issue commands to the local system or, by way of a remote login, to another system on the same fiber as the local system.

CL (Coupling Ratio/Loss)

The ratio/loss of optical power from one output port to the total output power, expressed as a percent.

Cladding

The material that surrounds the core of an optical fiber which has a lower index of refraction compared to that of the core. The lower index of refraction causes the transmitted light to travel down the core.

CLEI (Common Language Equipment Identifier)

For circuit packs in domestic markets, this is assigned by Telecordia and is 10 bytes (characters) long. The CLEI is mapped to the ECI (Equipment Code Identifier) in the customer database. For international market, the CLEI is assigned by CClib and is 9 characters long.

Connector

A mechanical or optical device that provides a demountable connection between two fibers or a fiber and a source or detector.

Connector Plug
A device used to terminate an optical conductor cable.

Connector Receptacle
The fixed or stationary half of a connection that is mounted on a panel/bulkhead. Receptacles mate with plugs.

Connector Variation
The maximum value in dB of the difference in insertion loss between mating optical connectors (for example, with remating, temperature cycling, and so forth). Also called optical connector variation.

Core
The central portion of the fiber that transmits light. It is composed of material with a higher index of refraction than the cladding.

Coupler
An optical device that combines or splits power from optical fibers.

CR (Coupling Ratio/Loss)
The ratio/loss of optical power from one output port to the total output power, expressed as a percent.

CRC (Cyclic Redundancy Check)
A method to detect skipped bits in a byte stream.

CSA (Canadian Standards Association)
A non-profit independent organization which operates a listing services for electrical and electronic materials and equipment. It is the body that establishes telephone equipment (and other) standards of use in Canada. At least in part, CSA is the Canadian counterpart of the Underwirters Laboratories. CSA also is heavily involved in the development of the ISO standards on quality and Environmental Management.

CSMA/CD (Carrier Sense Multiple Access with Collision Detection)
A control technique for getting onto and off a LAN. All devices attached to the network listen for transmissions in progress (that is, carrier sense) before starting to transmit (multiple access). If two or more begin transmitting at the same time and their transmissions crash into each other, each backs off (collision detection) for a different amount of time (determined by an algorithm) before again attempting to transmit.

CTAG (Correlation Tag)

The CTAG of a TL1 command is repeated in the associated response and allows an operator to find matches.

CW (Continuous Wave)

The constant optical output from an optical source when it is turned on, but not modulated with a signal.

D

DAR (Deutscher AkkreditierungsRat)

The German Accreditation Council (DAR) is a working group established by the Federal Government, the Ministries of the Federal German States and the German industry. DAR coordinates the activities in the area of accreditation and recognition of testing and calibration laboratories, certification and inspection bodies in Germany; runs a central registration of German accreditations and recognitions granted; and represents German interests in national, European and international organizations dealing with general questions of accreditation and recognition.

Dark Current

The flow of electricity through the diode in a photodiode when no light is present.

DCC (Data Communication Channel)

A portion of the SDH/SONET signal that contains alarm, surveillance, and performance information.

DCF (Dispersion Compensating Fiber)

DCF is a special fiber with a negative chromatic dispersion coefficient used to compensate the positive chromatic disperion of the transmission fiber in the third optical window.

DCM (Dispersion Compensation Module)

Spooled fiber used to control excess dispersion found in certain fiber types at pre- and post-amplification.

DCN (Data Communication Network)

DCN supports communications between NEs and the NMS.

DCS (Digital Cross-Connect System)

A system that has multiple input and output streams, and can interconnect a signal from any input to any output.

DEMUX or DMX (Demultiplexer)

A module that separates two or more signals previously combined by compatible multiplexing equipment.

Detector

An opto-electric transducer used in fiber optics to convert optical power to electrical current. Usually referred to as a photodiode.

DGEF (Dynamic Gain Equalization Filter)

A filter that equalizes the gain of an optical signal

DHCP (Dynamic Host Control Protocol)

DHCP enables PCs and workstations to get temporary or permanent IP addresses from the server.

DIN (Deutsche Industrie Norm)

DIN is the German Institute for Standardization in Berlin. Since 1975 it has been recognized by the German government as the national standards body and represents German interests at international and European level.

Directional Coupler

A coupling device for separately sampling (through a known coupling loss) either the forward (incident) or the backward (reflected) wave in a transmission line.

Dispersion

The temporal spreading of a light signal in an optical waveguide caused by light signals traveling at different speeds through a fiber either due to modal or chromatic effects.

Distortion

The difference in value between two measurements of a signal (transmitted and received.)

DL (Data Link)

The communication links used for data transmission from a source to a destination.

DSA (Directory System Agents)

A DSA is an operating system application process that provides the Directory functionality.

DSF (Dispersion-Shifted Fiber)

Standard single-mode fibers exhibit optimum attenuation performance at 1550 nm and optimum bandwidth at 1300 nm.

DTE (Data Terminal Equipment)

DTE is a part of a broader grouping of equipment known as customer premises equipment which includes voice, as well as, data, and terminals.

Duplex Cable
A two-fiber cable suitable for duplex transmission.

Duplex Transmission
Transmission in both directions, either one direction at a time (halfduplex) or both directions simultaneously (full-duplex).

DWDM (Dense Wavelength Division Multiplexing)
Transmitting two or more signals of different wavelengths simultaneously over a single fiber.

E

E-LEAF (Enhanced -Large Effective Area Fiber)
A fiber type manufactured by Corning.

EDC (Error Detection Code)
EDC is designed to permit the detection of errors. When an error is detected, the receiver asks for a re-transmission of the erroneous bits, or inform the recipient that the transmission was corrupted.

EDCV (Error Detection Code Violation)
An EDCV occurs when the calculated checksum over a signal does not match the received checksum.

EDFA (Erbium-Doped Fiber Amplifier)
Optical fibers doped with the rare earth element erbium which can amplify light in the 1550 nm region when pumped by an external fight source.

EEPROM (Electrical Erasable and Programmable Read-Only Memory)
Kind of non-volatile memory. Often used to store inventory data.

EMI (Electromagnetic Interference)
High-energy, electrically induced magnetic fields that cause data corruption in cables passing through the fields.

EML (Externally Modulated Laser)
When laser is modulated using a Mach-Zehnder modulator.

EMR (Electromagnetic Radiation)
Radiation made up of oscillating electric and magnetic fields and propagated with the speed of light. Includes gamma radiation, X-rays, ultraviolet, visible and infrared radiation, and radar and radio waves.

EMS (Element Management System)
Element management systems, for example, CIT or SNMS, which are either directly attached to a NE or remotely by using the DCN.

Engineering Rules
A set of rules that determine the system configuration possibilities based on fiber type, OA, rate and number of wavelengths. These rules determine the maximum loss per span that can be tolerated, the maximum distance between spans allowed and the maximum number of spans that can be supported.

EOL (End-Of-Life)
EOL defines the status or values at the end of the guaranteed lifetime. EOL is reached when the wear-out failure rate dominates the component failure rate.

Error Recovery
The intent to recover from a detected error, such as inconsistent state or configuration information. See also Operational Recovery.

ES-IS (End System to Intermediate System Protocol)
An ISO OSI network layer protocol (ISO 9542) for End Systems (alias hosts) communicating to Intermediate Systems (alias routers) that dynamically builds the relevant network routing databases (administrative protocol).

ESD (Electro-Static Discharge)
Static electrical energy potentially harmful to circuit packs and humans.

ET (End Terminal)
Optical equipment that terminates optical line signals.

ETSI (European Telecommunications Standards Institute)
Located in Sophia-Antipolis in France, ETSI is the European counterpart to ANSI. Its task is to pave the way for telecommunications integration in the European community as part of the single European market program. It establishes telecommunication standards for the European community.

External Modulation
Modulation of a light source by an external device that acts like an eIectronic shutter.

Extinction Ratio
The ratio of the low, or OFF optical power level (Pl) to the high, or ON optical power level (Ph).

Eye Pattern

Also called eye diagram. The proper function of a digital system can be quantitatively described by its BER, or qualitatively by its eye pattern. The "openness" of the eye relates to the BER that can be achieved.

F

Fabric

The part of an optical system that is responsible for switching voice, data or video from one place to another

Failure

A failure is declared when a fault cause persists for a certain period of time.

Failure Rate

The number of failures of a device per unit of time.

Fall Time

The time required for the trailing edge of a pulse to fall from 90% to 10% of its amplitude; the time required for a component to produce such a result. Typically measured between the 80% and 20% points or alternately the 90% and 10% points. Also called turn-off time.

Far-End Crosstalk

Crosstalk which travels along a circuit in the same direction as the signals in the circuit.

FAS (Frame Alignment Signal)

A sequence at the beginning of an SDH/SONET frame that detects the frame start.

FC (Fiber Optic Connector)

A threaded optical connector (originated in Japan), good for single-mode or multimode fiber and applications requiring low back reflection.

FC/PC

A special curved polish on the connector for very low back reflection.

FCC (Federal Communications Commission)

The U.S. federal regulatory agency responsible for the regulation of interstate and international communications by radio, television,wire, satellite and cable.

FDDI (Fiber Distributed Data Interface)

A 100 Mbps fiber optic LAN.

FE (Far End)

Any other network element in a maintenance subnetwork other than the one the user is at or working on. Also called remote.

FEBE (Far End Block Error)

A maintenance signal transmitted in the physical overhead indicating that a bit error has been detected at the physical layer at the far end of the link.

FEC (Forward Error Correction)

A method to correct bit errors in a transmission signal. Additional information is put into the data signal to allow the correction of bit errors. There is no acknowledge information in the back direction.

Ferrule

A rigid tube that confines or holds a fiber as part of a connector assembly.

Fiber Optic Attenuator

A component installed in a fiber optic transmission system that reduces the power in the optical signal. It is often used to limit the optical power received by the photodetector to within the limits of the optical receiver.

Fiber Optic Cable

A cable containing one or more optical fibers.

Fiber Optic Link

A transmitter, receiver, and cable assembly that can transmit information between two points.

Fiber Optic Span

An optical fiber/cable terminated at both ends which may include devices that add, subtract, or attenuate optical signals.

FIT (Failure In Time)

A unit of failure rate in reliability analysis. One FIT is equivalent to one failure per 10 operating hours

FIT Rate

The number of device failures in one billion device hours.

FMM (Flash Memory Module)

A nonvolatile memory device used to store the installation software generic or the NE database.

Fresnel Reflection

A reflection of light that occurs at the air-glass interface at the ends of an optical fiber.

Fused Fiber

A bundle of fibers fused together so they maintain a fixed alignment with respect to each other in a rigid rod.

Fusion Splicer

An instrument that permanently bonds two fibers together by heating and fusing them.

G **GNE (Gateway Network Element)**

A system node that has a physical attachment to the managment system to support the access of the remote NE. The number of remote NEs a GNE can serve is specified in terms of the number of OSI stack associations the GNE can support without running out of local resources.

GPIO (General Purpose Input/Output)

GPIO provides a flexible way of interfacing a wide range of peripheral devices with a computer. Among the interface methods GPIO uses are the configurable data sense and handshaking (signals used between a computer and a peripheral to inform each other when either is ready to receive or transmit data.)

Ground Loop Noise

Noise that results when equipment is grounded at points having different potentials thereby creating an unintended current path. The dielectric properties of optical fiber provide electrical isolation that eliminates ground loops.

H **HDDS (High Density Double Shelf)**

The double shelf used in Line Bays; two per bay.

I **ICEA (Insulated Cable Engineers Association)**

ICEA (previously IPCEA) is a professional organization dedicated to developing cable standards for the electric power, control, and telecommunications industries.

IDI (Initial Domain Identifier)

Part of the NSAP, the IDI defines the country code of the registration authority responsible for the allocation and assignment of the NSAP address.

IEC (International Electrotechnical Commission)

The international standards and conformity assessment body for all fields of electrotechnology, including electricty and electronics.

IEEE (Institute of Electrical and Electronic Engineers)

The IEEE helps advance global prosperity by promoting the engineering process of creating, developing, integrating, sharing, and applying knowledge about electrical and information technologies and sciences for the benefit of humanity and the profession.

IMF (Infant Mortality Factor)

The ratio of the first year failure rate to the steady-state failure rate.

Index of Refraction

Also refractive index. The ratio of the velocity of light in free space to the velocity of light in a fiber material. Symbolized by n. Always greater than or equal to one.

Index-Matching Gel

A gel whose index of refraction nearly equals that of the fiber's core. Used to reduce Fresnel reflection at fiber ends. See also index-matching fluid.

Insertion Loss

The loss of power that results from inserting a component, such as a connector or splice, into a previously continuous path.

Interchannel Isolation

The ability to prevent undesired optical energy from appearing in one signal path as a result of coupling from another signal path.

Intrinsic Losses

Splice losses arising from differences in the fibers being spliced.

IR (Intermediate Reach)

Optical sections from a few kilometers (km) to approximately 15 km.

Irradiance

The amount of power per unit area.

ISO (International Standards Organization)

A United Nations agency concerned with international standardization in a broad range of industrial and technical field.

ITU (International Telecommunication Union)

A United Nations telecommunications established to provide standardized communications procedures and practices including frequency allocation and radio regulations on a worldwide basis.

J

Jacket

The outer, protective covering of the cable.

Jitter

Small and rapid variations in the timing of a waveform due to noise, changes in component characteristics, supply voltages, imperfect synchronizing circuits, and so forth.

Jumper

A short fiber optic cable with connectors on both ends.

L

L-Band (Long Band)

A dispersion-shifted fiber range of 1570 to 1610 nm, where a wide range of wavelengths are possible with low loss. L-Band doubles the number of wavelengths best suited in DWDM applications, and uses newer, more expensive optical amplifiers. In LambdaXtreme, the L-Band is widened and referred to as an Extended L-Band.

LAN (Local Area Network)

1. A communication link between two or more points within a small geographic area, such as between buildings.2. A data network which has a size of normaly up to 10km. Important LANs are Ethernet, Token Ring, Token Bus and FDDI.

LAPD (Link Access Protocol on D-channel)

A special protocol of the OSI Data Link Layer, which provides the functional and procedural means to establish, maintain, and release data link connections for NEs. For NE-NE communications over the DCC, Layer 2 services are provided by LAPD.

Launch Fiber

An optical fiber used to couple and condition light from an optical source into an optical fiber Often the launch fiber is used to create an equilibrium mode distribution in multimode fiber. Also called launching fiber.

LBC (Laser Bias Current)
Current that runs through the laser to make it work. LBC is monitored by performance monitoring. If the current goes beyond a certain threshold, it means that the circuit pack must be replaced.

LBO (Line Build Out)
Attenuation used to simulate a load

LD (Laser Diode)
A semiconductor that emits coherent light when forward biased.

LEAF (Large Effective Area Fiber)
A type of fiber manufactured by Corning.

LED (Light-emitting diode)
Diodes which translate electrical current into light. Made out of semiconductor material like Gallium-Arsenid; A semiconductor that emits incoherent light when forward biased.

LH (Long Haul)
A 10 Gbps application for transmission of 128 channels, giving a capacity of 1.28 Tbps and a reach of up to 2000 km. Payload (per channel) can be one OC192/STM-64 or four OC48/STM-16 signals.

LID (Link ID Protocol)
A Lucent proprietary protocol for exchange of neighbour information over a DCC link. LID makes use of LAPD (OSI) or PPP (IP).

LOF (Loss of Frame)
Loss of frame is detected when the OOF anomaly persists for a certain time.

Loose-Tube
A type of fiber optic cable construction where the fiber is contained within a loose tube in the cable jacket.

LOS (Loss of Signal)
When the optical input power falls below a certain threshold.

Loss
The amount of a signal's power, expressed in dB, that is lost in connectors, splices, or fiber defects.

LR

A standard for optics, concerning transmitters and receivers in a system and ensuring that transmission can be maintained for long distances (tens of kilometers). This standard constrains the output power of the transmitter and the sensitivity of the receiver for long-haul applications (up to 80 km) without the need for regeneration.

M

Macrobending

In a fiber, all macroscopic deviations of the fiber's axis from a straight line.

MAN (Metropolitan Area Network)

A network covering an area larger than a local area network. A wide area network that covers a metropolitan area. Usually, an interconnection of two or more local area networks.

Margin

The allowance for attenuation in addition to that explicitly accounted for in system design.

MAS (Multiplex Alignment Signal)

A byte in the 40G overhead which allows to check if the four bitmultplexed 10G data streams are demultiplexed in the right way. It has the value 10100101 in the first 10G data stream and the value 01011010 in the other 10G data stream.

Microbending

Minute but severe bends in fiber that result in light displacement and increased loss.

MDI (Miscellaneous Discrete Inputs)

System input ports used to supervise external equipment in the office (for example doors, fire alarm and so forth).

MDO (Miscellaneous Discrete Outputs)

System binary output ports used to control external equipment in the office (for example, light and so forth).

Mechanical Splice

An optical fiber splice accomplished by fixtures or materials, rather than by thermal fusion.

Modulation

The process by which the characteristic of one wave (the carrier) is modified by another wave (the signal). Examples include amplitude modulation (AM), frequency modulation (FM), and pulse-coded modulation (PCM).

MS (Multiplex Section)

A multiplex section is a maintenance entity between two MS TT functions.

MTBF (Mean Time Between Failures)

The expected time between failures. Usually expressed in hours.

MTTR (Mean Time To Repair)

The average time that it takes until a failure is repaired. MTTR is usually expressed in hours.

Multimode Fiber

An optical fiber that has a core large enough to propagate more than one mode of light The typical diameter is 62.5 micrometers.

Multiplexing

The process by which two or more signals are transmitted over a single communications channel. Examples include time-division multiplexing and wavelength-division multiplexing.

MUX (Multiplexer)

A device that combines two or more signals into a single output.

N

Navis™ Optical Element Management System (OEMS)

Navis OEMS is an element management system that provides networks with operational functions such as configuration management, fault management, performance management, and security management.

NCDS (Network Controller Double Shelf)

The double shelf used in System Bays; two per bay.

NCTL (Network Element Controller)

The NCTL provides control and user interfaces at the NE level.

NDF (New Data Flag)

Allows to set an arbitrary chnage of the pointer value if the change is due to a change of the payload.

NDF (Nonzero dispersion fiber)

A type of fiber that has a chromatic dispersion between 1 and 6 ps/(nm*km) or between -1 and -6 ps/(nm*km) in the 1550 wavelength window. Examples are the TrueWave fiber from Lucent and the LS fiber from Corning.

NE (Network Element)
Processor controlled entities of a telecommunications network that primarily provide switching and transport network functions and contain network operations functions.

Near Infrared
The part of the infrared near the visible spectrum, typically 700 nm to 1500 nm or 2000 nm.

Near-End Crosstalk
The optical power reflected from one or more input ports, back to another input port. Also known as isolation directivity.

NEBS (Network Equipment-Building System Requirements)
Developed by Telcordia, these are standards that vendors must adhere to if they want to sell equipment to the Regional Bell Operating Companies (RBOCs) and the Competitive Local Exchange Carriers (CLECs).

NEC (National Electric Code)
A standard governing the use of electrical wire, cable and fixtures installed in buildings; developed by the NEC Committee of the American National Standards Institute (ANSI), sponsored by the National Fire Protection Association (NFPA).

NEMA (National Electrical Manufacturers Association)
NEMA, created in the fall of 1926 by the merger of the Electric Power Club and the Associated Manufacturers of Electrical Supplies, provides a forum for the standardization of electrical equipment, enabling consumers to select from a range of safe, effective, and compatible electrical products.

NFPA (National Fire Protection Association)
A not-for-profit organization which works with U.S. Congress and federal agencies to promote the adoption and use of fire protection codes and standards, and to promote a uniform national approach to fighting the problem of fires.

NIM (Non-intrusive Monitor)
A kind of sink termination point function which does not touch SDH/SONET signals but monitors quality of service.

NSAP (Network Service Access Point)
The access point where the Network Layer Services are available to network service users.

NVM (Non Volatile Memory)

NVM denotes memory which survives a shut down or power down of the system such as a hard disk, floppy or tape. Xtreme uses a PCMCIA card for NVM.

O

OA (Optical Amplifier)

A device that amplifies an input optical signal without converting it into electrical form.

OADM (Optical Add Drop Multiplexer)

A terminal capable of adding and dropping lower-rate signals from a higher-rate multiplexed signal without completely demultiplexing the signal.

OBA (Optical Booster Amplifier)

An optical amplifier with high output power.

OC-n (Optical Carrier-level n)

A carrier rate specified in the SONET standard.

OCWR (Optical Continuous Wave Reflectometer)

An instrument used to characterize a fiber optic link wherein an unmodulated signal is transmitted through the link, and the resulting light scattered and reflected back to the input is measured.

OD (Optical Demultiplexer)

ODs extract individual wavelengths from the DWDM optical that is generated using an Optical Multiplexer (OM).

OGC (Optic Gate Controller)

The controller of an OpticGate module. Its tasks are to control the components of the module and connect it to a circuit pack.

OLS (Optical Line System)

A lightwave transmission system that can multiplex up 8, 16, 80 or more wavelengths, transmit the resulting multiplexed signal, and then demultiplex the signal at the other end.

OM (Optical Multiplexer)

The process by which two or more wavelengths are combined onto a single fiber.

OMON (Optical MONitor)

The OMON circuit pack scans the entire DWDM spectrum to provide Optical Spectrum Analysis (OSA) for up to 4 or 8 selected locations in an NE.

OMS (Optical Multiplex Section)
A layer in the Xtreme transmission hierarchy.

OOF (Out of frame state)
State in which the frame alignment sequence of an SDH/SONET frame has not been found for several consecutive frames.

Optical Channel
An optical wavelength band for WDM optical communications.

Optical Channel Spacing
The wavelength separation between adjacent WDM channels.

Optical Channel Width
The optical wavelength range of a channel.

Optical Isolator
A component used to block out reflected and unwanted light.

Optical Link Loss Budget
The range of optical loss over which a fiber optic link will operate and meet all specifications. The loss is relative to the transmitter output power.

Optical Path Power Penalty
The additional loss budget required to account for degradations due to reflections, and the combined effects of dispersion resulting from intersymbol interference, mode-partition noise, and laser chirp.

Optical Power Meter
An instrument that measures the amount of optical power present at the end of a fiber or cable.

Orderwire
A section of the supervisory signal that is used for communication between sites.

ORL (Optical Return Loss)
The ratio (expressed in units of dB) of optical power reflected by a component or an assembly to the optical power incident on a component port when that component or assembly is introduced into a link or system.

OSA (Optical Spectrum Analyser)
Optoelectronic device that resolves the incident light into individual wavelengths and display power vs wavelength. Usually these are based on diffraction-grating.

OSC (Optical Supervisory Channel)
See SUPVY/SU (Supervisory Channel).

OSI (Open Systems Interconnection)
The internationally accepted grouping of standards for communication between different systems made by different vendors.

OSNR (Optical Signal Noise Ratio)
The ratio between the optical power of the data signal and the power of the optical noise signal.

OT (Optical Translators)
OTs do frequency adaptation between LambdaXtreme equipment and external equipment that are not optically compatible with LambdaXtreme. OTs also provide 3R functionality (retiming, reshaping, reamplification); and, perform fault management and performance monitoring (Non-intrusive Monitoring) on the SONET/SDH and WaveWrapper signal.

OTDR (Optical Time Domain Reflectometer)
An instrument that locates faults in optical fibers or infers attenuation by backscattered light measurements

OOS (Out-of-Service)
The circuit pack is not providing its normal service function (removed from either the working or protection state) either because of a system problem or because the pack has been removed from service.

OXC (Optical Cross-connect)
Devices that can switch optical signals between different optical fibers, without the need for conversion to electrical signals.

P

Passive Branching Device
A device which divides an optical input into two or more optical outputs.

PCMCIA (Personal Computer Miniature Communications Interface Adapter)
Slot on the system controller where the flash disk PCS

PD (Photodetector)
An optoelectronic transducer such as a PIN photodiode or avalanche

photodiode.

PDU (Protocol Data Unit)
PDUs are used for the information exchange between equal protocol layers.

Peak (Power (Output)
The output power averaged over that cycle of an electromagnetic wave having the maximum peak value that can occur under any combination of signals transmitted.

Photodiode
A device that converts optical energy to electrical energy.

Pigtail
A short optical fiber permanently attached to a source, detector or other fiber optic device.

Plastic Clad Silica
A step-index fiber with a glass core and plastic or polymer cladding. This fiber is also called hard clad silica (HCS).

Plenum
The air handling space between walls, under structural floors, and above drop ceilings, which can be used to route intrabuilding cabling.

Plenum Cable
A cable whose flammability and smoke characteristics allow it to be routed in a plenum area without being enclosed in a conduit.

PLL (Phase Locked Loop)
An electronic circuit that controls an oscillator so that it maintains a constant phase angle relative to a reference signal.

PM (Performance Monitoring)
Measures the quality of service and identifies any degrading or marginally operating systems (before an alarm would be generated).

PMD (Polarization Mode Dispersion)
PMD is an inherent property of all optical media. It is caused by the difference in the propagation velocities of light in the orthogonal principal polarization states of the transmission medium. The net effect is that if an optical pulse contains both polarization components, then the different polarization components will travel at different speeds and arrive at different times, smearing the received optical signal.

pN_EBC (Near-end Errored Block Count)
Every second the number of near-end errored blocks (N_Bs) within that second is counted as the Near-end Errored Block Count (pN_EBC). This counter is used to determine the DEGRADED defect and as an input for the performance monitoring process.

Point-to-Point Transmission)
The transmission between two designated stations.

Polarization
The direction of the electric field in the lightwave.

Pre-Provisioning
The capability to provision a slot before installing a circuit pack.

Previous SW Generic (Previous Software Generic)
The previous SW generic is the software and data on the alternate partition to the currently executed SW/data of the PCMCIA card. It might be installed and activated per user command. After installation previous and current SW generic are exchanged.

Pulse Spreading
The dispersion of an optical signal as it propagates through an optical fiber.

Pump laser
A laser used in an optical fiber amplifier.

Q **QOS (Quality of Service)**
A set of performance parameters that characterize the transmission quality over a given virtual connection.

R **Raman Amplification**
A technique in which high-power laser light is sent into the outside plant fiber (OSP) transforming part of the fiber itself into an amplifier.

Rayleigh Scattering
The scattering of light that results from small inhomogeneities of material density or composition.

RBOC (Regional Bell Operating Company)
One of the seven companies formed by the AT&T divestiture.

RDI (Remote Defect Indication)
RDI signals convey the defect status of the trail signal at the trail destination (that is, at trail termination sink function) back to the trail origin (that is, trail termination source function). This mechanism allows alignment of the near-end and far-end performance monitoring processes.

Receiver
A terminal device that includes a detector and signal processing electronics. It functions as an optical-to-electrical converter.

Receiver Overload
The maximum acceptable value of average received power for an acceptable BER or performance.

Receiver Sensitivity
The minimum acceptable value of received power needed to achieve an acceptable BER or performance. It takes into account power penalties caused by use of a transmitter with worst-case values of extinction ratio, jitter, pulse rise and fall times, optical return loss, receiver connector degradations, and measurement tolerances.

Refractive Index
A property of optical materials that relates to the speed of light in the material.

Refractive Index Gradient
The change in refractive index with distance from the axis of an optical fiber.

Refractive Index Profile
The description of the value of the refractive index as a function of distance from the optical axis along an optical fiber diameter.

Regenerator
A repeater, designed for digital transmission, in which digital signals are amplified, reshaped, retimed, and retransmitted. For optical transmission, a device that receives an optical signal, converts it to electrical, regenerates the signal, converts it to optical, then transmits it.

REI (Remote Error Indication)
REI signals contain either the exact or truncated (see note) number of error detection code violations detected in the trail signal at the trail termination sink. This information is conveyed to the trail termination source. This mechanism allows alignment of the near-end and far-end performance monitoring processes.

Repeater
A receiver and transmitter set designed to amplify attenuated signals. Repeaters are used to extend operating range.

Responsivity
The ratio of a photodetectors electrical output to its optical input in Amperes/ Watt.

Ribbon Cables
Cables in which many fibers are embedded in a plastic material in parallel, forming a flat ribbon-like structure.

Rise Time
The time taken to make a transition from one state to another, usually measured between the 10% and 90% completion points of the transition. Alternatively the rise time may be specified at the 20% and 80% amplitudes. Shorter or faster rise times require more bandwidth in a transmission channel.

RJ (Random Jitter)
Random jitter is due to thermal noise and may be modeled as a Gaussian process. The peak-to-peak value of Rj is of a probabilistic nature, and thus any specific value requires an associated probability.

RM (Registration Manager)
The Registration Manager is an application process that initiates the Registration Request Protocol, and communicates the DSA address and Name-prefix information to the Registration Agent.

RP (Raman Pump)
RPs provide amplification/gain in the outside plant fiber to a specific range of signal wavelengths. The amplification is provided by “pumping” high intensity, lower wavelength (that is, lower than the signal wavelength) laser light into fiber that carries optical signals.

RPG (Raman Pump Growth)
These pumps have the same function as RPs, but are used for the wavelengths that transport channels above 188.50 THz.

S

SC (Subscription Channel Connector)
A push-pull type of optical connector that originated in Japan. Features high packing density, low loss, low backreflection, and low cost.

SCTL (Shelf Controller)
SCTL provides control at the double shelf backplane level (half of a bay).

Scattering
The change of direction of light rays or photons after striking small particles. It may also be regarded as the diffusion of a light beam caused by the inhomogeneity of the transmitting material.

SDH (Synchronous Digital Hierarchy)
SDH is a worldwide ITU standard for digital, optical transmission systems.

SEC (SDH Equipment Clock)
A timing device (equipment) used to synchronize network equipment that operates according to the principles governed by SDH.

Shelf
A shelf is a mechanical facility that is in general a housing for circuit packs. Shelves are housed in Bays.

Simplex
A single element (for example, a simplex connector is a single-fiber connector).

Simplex Cable
An other name for a single-fiber cable.

Simplex Transmission
Transmission in one direction only.

SIO (System Input/Output) Circuit Pack
SIO CP connects the NCTL to the SCTLs, provides the main interface to the system, provides LAN interfaces, provides orderwire interfaces, and provides performance monitoring interfaces.

SNMS (Sub-Network Management System)
See Navis OEMS.

Soliton Pulse
An optical pulse having a shape and power level designed to take advantage of nonlinear effects in an optical fiber waveguide, for the purpose of essentially negating dispersion over long distances. The result is that the pulse retains its original shape as it travels.

SONET (Synchronous Optical Network)
A north-american standard developed by Bell-Labs for the optical long distance networks.

Span
Fiber link between NEs that may be unidirectional or bidirectional, depending upon network design.

Span Loss

Loss (in dB) of optical power due to the span transmission medium (includes fiber loss and splice losses).

Spectral Width

A measure of the extent of a spectrum. For a source, the width of wavelengths contained in the output at one half of the wavelength of peak power. Typical spectral widths are 50 to 160 nm for an LED and 0.1-5 nm for a laser diode.

Splice

A permanent connection of two optical fibers through fusion or mechanical means.

Splitting Ratio

The ratio of power emerging from two output ports of a couplet

SPOT (Synchronous Partial Overhead Transparency)

Overhead bytes of SDH/SONET transmission signals which are sent together with payload although they are mapped into higher rate signals. The transparency feature is often used in combination with fibre shortage solutions.

SR (Short Reach)

Optical sections of two km or less.

SRS (Simulated Raman Scattering)

A broadband effect where power is transferred from a low wavelength channel to a higher-wavelength channel. The short wavelength source acts like a "pump".

SSMF (Standard Single Mode Fiber)

This is the most common type of fiber deployed. This fiber was designed to provide zero chromatic dispersion at 1310 nm, to support the early long-haul transmission systems operating at this wavelength. It has a chromatic dispersion of at most 20 ps/(nm*km) in the 1550 nm wavelength range and usually around 17 ps/(nm*km).

ST (Straight Tip Connector)

Popular fiber optic connector originally developed by AT&T.

Step-Index Fiber

Fiber that has a uniform index of refraction throughout the core.

STM (Synchronous Transfer Mode)

Transport and switching method that depends on information occurring in regular and fixed patterns.

Strength Member

The part of a fiber optic cable composed of aramid yarn, steel strands, or fiberglass filaments that increase the tensile strength of the cable.

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.

SUPVY/SUP (Supervisory Channels)

SUPVY/SUP supports the following communications: node-to-node, interworking, client LAN, and orderwire communication.

SUPVY Pack (Supervisory Pack)

SUPVY circuit pack is a low-speed transmission pack that facilitates communication between LambdaXtreme NEs.

SW Generic (Software Generic)

The whole software and (static) data associated with a particular NE release. See also current and previous SW generic.

Synchronous

A data signal that is sent along with a clock signal.

T

T-Carrier

Generic designator for any of several digitally multiplexed telecommunications carrier systems.

Tap

The entry point into a system module

Tap Loss

In a fiber optic coupler, the ratio of power at the tap port to the power at the input port.

Tap Port

In a coupler where the splitting ratio between output ports is not equal, the output port containing the lesser power

TBOS (Telemetry Byte Oriented Serial) Protocol

A protocol used for transmitting alarms, status, and control points between a NE and the operating system.

TC (Tandem Connection)
An arbitrary series of contiguous link connections and/or subnetwork connections.

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.

TC (Tandem Connection)
An arbitrary series of contiguous link connections and/or subnetwork connections.

TCP/IP (Transmission Control Protocol/Internet Protocol)
A suite of several networking protocols developed for the Internet that provides communication across interconnected ntworks, between computers with idverse hardware architectures and various operating systems. Some examples are FTP, SMTP, SNMP, and so forth.

TDC (Tunable Dispersion Compensator)
A device which has negative chromatic dispersion where the amoung of dispersion can be adjusted. It is used for compensation of the chromatic dispersion of the transmission fibers.

Thermal Noise
Noise resulting from thermally induced random fluctuation in the receiver's load resistance current.

Throughput Loss
In a fiber optic coupler, the ratio of power at the throughput port to the power at the input port.

TID (Targer Identifier)
A provisionable parameter used to identify an NE within a TL1 command.

TL1 (Transaction Language 1)
TL1 is an OS/NE machine-to-machine language. TL1 messages are expressed as ASCII strings. TL1 messages and syntax are defined by Telecordia requirements.

TrueWave® Fiber
Non-zero dispersion-shifted fiber manufactured by Lucent Technologies.

TSD (Trail Signal Degrade)
The TSD signal (generated by a trail termination sink function) informs the next function(s) of the "signal degrade" condition of the associated data signal.

TSF (Trail Signal Fail)
The TSF signal (generated by a trail termination sink function) informs the next downstream function(s) of the "signal fail" condition of the associated data signal (which contains, due to that "signal fail" condition, the all-ONEs (AIS) pattern).

TT (Trail Termination)
An atomic function within a layer that generates, adds, and monitors information concerning the integrity and supervision of adapted information.

U

UART (Universal Asynchronous Receiver and Transmitter)
A receiver/transmitter that converts incoming serial data from a port into parallel form.

UFEC (Ultra Forward Error Correction)
An improved method to correct biterrors in a transmission signal. Additional information is put into the data signal to allow the correction of bit errors. There is no acknowledge information in the backdirection.

UHC (Ultra High Capacity)
A 40G application for transmission of 64 channels for a capacity of 2.56 Tbps and a reach of up to 1000 km. Payload (per channel) can be one OC768/STM-256 or four OC192/STM-64 signals.

ULH (Ultra Long Haul)
A 10 Gbps application for transmission of 128 channels giving a capacity of 1.28 Tbps and a reach of 2000–4000 km. Payload (per channel) can be one OC192/STM-64 or four OC48/STM-16 signals.

UNITE (UNIversal high speed TDM Equipment for multi-services)
A 10G/40G platform.

V

VOA (Variable Optical Attenuator)
VOA correct the signal strength differences that occur a the transmission line.

VSR (Very Short Reach)

VSR is a SONET/SDH interface that provides a low-cost solution interconnections of less than 300 meters between routers, switches and DWDM systems.

W

WAN (Wide Area Network)
A network whose elements are separated by long distances.

Waveguide
A material medium that confines and guides a propagating electromagnetic wave.

Waveguide Couplers
A coupler in which light is transferred between planar waveguides.

Waveguide Dispersion
The part of chromatic dispersion arising from the different speeds light travels in the core and cladding of a single-mode fiber (that is, from the fiber's waveguide structure).

Wavelength
The distance between points of corresponding phase of two consecutive cycles of a wave. The wavelength, is related to the propagation velocity, and the frequency.

Wavelength Growth
A type of growth in which all eight wavelengths are added to a single line before more lines are added.

WaveWrapper
WaveWrapper provides network management functions such as optical-layer performance monitoring, error correction and ring protection on a per-wavelength basis.

WDM (Wavelength-Division Multiplexing)
Sending several signals through one fiber with different wavelengths of light.

WGR (Waveguide Grating Router)
A device used to take a mix of wavelengths and separate into the component wavelengths.

WTR time (Wait To Restore time)
The WTR time ensures that a previous failed synchronization source is only again considered as available by the selection process if it is fault free for a certain time.

X

XT Crosstalk X-talk
The undesired coupling from one circuit, part of a circuit, or channel to another.

Y

Y Coupler XT
A variation on the tee coupler in which input light is split between two channels (typically planar waveguide) that branch out like a Y from the input.

Z **Zero-Dispersion Wavelength XT Crosstalk**

DSF where the zero dispersion point is shifted from 1310nm to 1550 nm. It is best suited for applications involving single channel transmission at 1550 nm, providing the benefits of zero dispersion as well as taking advantage of the lower attentuation wavelength.