Lucent Technologies
Bell Labs Innovations

LambdaXtreme™ Transport
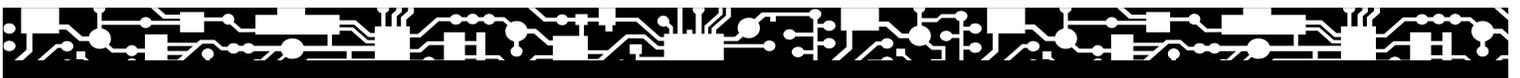
Alarms, Messages, and Trouble Clearing Guide

Release 1.1

Product Development Manager   1-888-Lucent8 (continental U.S.)
                                1-317-322-6848 (international)

Notice

Every effort was made to insure that this information product was complete and accurate at the time of printing. However, information is subject to change.

Mandatory customer information

Interference Information: Part 15 of FCC Rules

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

Security statement

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

Trademarks

LambdaXtreme Transport is a trademark of Lucent Technologies.

Limited Warranty

For terms and conditions of sale, contact your Lucent Technologies Account Team.

Ordering information

The ordering number for this information product is 365-575-783R1.1. For ordering information, refer to the "About this information product" chapter.

Support

Technical support

The Lucent Technologies Customer Technical Assistance Management (CTAM) provides a technical assistance telephone number that is monitored 24 hours a day. For technical assistance in the continental U.S., call 1-866-LUCENT8 (1-866-582-3688) and select the appropriate prompt. Outside the continental U.S., please call 1-630-224-4672.

Information product support

Lucent Technologies provides a referral telephone number for support. Use this number to report errors or to ask questions about the information product. This is a non-technical number. The telephone number is 1-888-LUCENT8.

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About this information product

Purpose   This Alarms, Messages, and Trouble Clearing Guide provides detailed descriptions of the operation and maintenance, and task oriented practices supporting operation, and trouble clearing tasks necessary for *LambdaXtreme*™ Transport.

This document supports maintenance of the *LambdaXtreme* Transport product using Task-Oriented Procedures (TOPs). Use of these procedures should be preceded by a general knowledge and understanding of the LambdaXtreme Transport Craft Interface Terminal (CIT).

Reason for reissue   This document addresses the R1.1 release of *LambdaXtreme* Transport. Alarm condition names have been updated to reflect the changes in the R1.1 *LambdaXtreme* Transport software.

Safety labels   The following safety labels are used in this document:

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x v i i

 DANGER

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

 WARNING

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

 CAUTION

This admonishment 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 manual is intended primarily for individuals in the field of telecommunications and for communications network providers.

Descriptive material in this document may be used by anyone desiring specific information or knowledge on the operational functions and features of *LambdaXtreme* Transport.

Procedural tasks in this document are written primarily for personnel responsible for the operation and maintenance of LambdaXtreme Transport.

How to use this information product   The sections in this document provide the following information:

Chapter 1, "Alarms and Indicators" provides a description of the *LambdaXtreme* Transport alarm types and their indicators.

Chapter 2, "Maintenance" provides guidelines to the user for taking appropriate corrective or preventive actions when the LambdaXtreme Transport system detects a problem.

Chapter 3, "Automatic Power Reduction (APR)" describes scenarios when the LambdaXtreme Transport system will automatically reduce power to certain circuit packs to prevent injury from high-power lasers.

Chapter 4, "Performance Monitoring" summarizes the parameters that are monitored in order to provide proactive maintenance of the system and aid in trouble-clearing procedures.

Chapter 6, "Trouble Clearing Tasks" covers procedures on clearing the alarm conditions reported by *LambdaXtreme* Transport.

Chapter 7, "Detail Level Procedures" contains detailed "how to" instructions.

The Glossary provides a list of common terms and acronyms.

The Index provides page numbers for key words and subject names.

Conventions used

The following typographical conventions are used throughout this document:

- **Bold face** type is used to identify CIT menu selections and button selections.

- `monospaced` type is used to identify alarm names.

Related documentation

The *WaveStar™ LambdaXtreme Transport Alarms, Messages, and Trouble Clearing Guide, Release 1.1,* (365-575-783R1.1) is part of a set of documents that support the *LambdaXtreme* Transport System. The following items are included in the set:

Document Number	Document Title
365–575–780R1.1	*LambdaXtreme* Transport Applications and Planning Guide, Release 1.1
365–575–781R1.1	*LambdaXtreme* Transport User Operations Guide, Release 1.1
365–575–783R1.1	*LambdaXtreme* Transport Alarms, Messages, and Trouble Clearing Guide, Release 1.1

Document Number	Document Title
365-575-782R1.1	*LambdaXtreme* Transport Installation Manual and System Turn-up Services, Release 1.1
Comcode 109163642	*LambdaXtreme* Transport Software Release Description, Release 1.1
365–575–797	*LambdaXtreme* Transport Software Ordering Guide

Related training   The Lucent Learning (LL) Organization provides management courses for system planning, engineering, and ordering, as well as courses to train telecommunications technicians in installation, operations, and maintenance. To enroll in training classes, call the Lucent Learning Organization at 1-888-LUCENT8 (1-888-582-3688) Prompt 2 – Prompt 2, or fax to 1-407-767-2677. The International registration number is 1-407-767-2798. Suitcasing of these courses is also available. To arrange suitcase sessions (within USA), call the Product Training Manager at 1-888-582-3688, Prompt 2 – Prompt 1.

The available *LambdaXtreme* Transport courses are listed in the following table.

Course Number	Course Title
LW2471	*LambdaXtreme* Transport Installation & Testing
LW2271	*LambdaXtreme* Transport Applications and Planning
LW2671	*LambdaXtreme* Transport Operations and Maintenance

Schedule and Registration

For more information or to register for any of these courses, call:

1-888-LUCENT8 and select option 2

Fax: 1-407-767-2677

Or write to:

Lucent Technologies

Lucent Learning

240 E. Central Parkway

Altamonte Springs, FL 32701

Technical Support Telephone Number

The Lucent Technologies Global TSS Contact Center provides a technical assistance telephone number that is monitored 24 hours a day. For technical assistance, call 1-866-LUCENT8 (1-866-582-3688) and select the appropriate prompt. Outside the continental United States, call 1-630-224-4672.

Lightwave Safety Guidelines

The following precautions should be observed.

General Laser Information

The *LambdaXtreme* Transport and associated optical test sets use semiconductor laser transmitters that emit light at wavelengths between approximately 800 nanometers (nm) and 1600 nm. The emitted light is above the red end of the visible spectrum, which is normally not visible to the human eye. Although radiant energy at near-infrared wavelengths is officially designated invisible, some people can see the shorter wavelength energy even at power levels several orders of magnitude below any that have been shown to cause injury to the eye.

Conventional lasers can produce an intense beam of monochromatic light. Monochromatic light is a single wavelength output of pure color that may be visible or invisible to the eye. A conventional laser produces a small-size beam of light, and because the beam size is small the power density (also called irradiance) is very high. Consequently, lasers and laser products are subject to federal and applicable state regulations as well as international standards for their safe operation.

A conventional laser beam expands very little over distance or is said to be very well collimated. Thus, conventional laser irradiance remains relatively constant over distance. However, lasers used in lightwave systems have a large beam divergence, typically 10 to 20 degrees. Here, irradiance obeys the inverse square law (doubling the distance reduces the irradiance by a factor of 4 and rapidly decreases over distance.

Lasers and Eye Damage

Light energy emitted by laser and high-radiance light-emitting diodes (LEDs) in the 400 to 1400 nm range may cause eye damage if absorbed by the retina. When a beam of light enters the eye, the eye magnifies and focuses the energy, magnifying the irradiance. The irradiance of the energy that reaches the retina is approximately 10^5 or 100,000 times that at the cornea, and if sufficiently intense, may cause a retinal burn.

The damage mechanism at the wavelengths used in telecommunications is thermal in origin, for example, damage caused by heating. Therefore, a specific amount of energy is required for a definite time to heat an area of retinal tissue. Damage is not instantaneous. It occurs only when one looks at the light sufficiently long enough that the product of the retinal irradiance and the viewing time exceeds the damage threshold. Light energies above 1400 nm would cause surface and skin burns and do not affect the retina. The thresholds for injury at wavelengths greater than 1400 nm are significantly higher than for wavelengths in the retinal hazard region.

Classification of Lasers

Manufacturers of lasers and laser products in the United States are regulated by the Food and Drug Administration's Center for Devices and Radiological Health (FDA/CDRH) under 21 CFR 1040. These regulations require manufacturers to certify each laser or laser product as belonging to one of seven major Classes 1, 1M, 2, 2M, 3R, 3B, and 4. The International Electro-technical Commission (IEC) is an international standards body that writes laser safety standards under IEC-60825. Classification schemes are similar with Classes divided into Classes 1, 1M, 3R, 3B, and 4. Lasers are classified according to the accessible emission limits and their potential for causing injury. Lightwave systems are generally classified as Class 1, because, under normal operating conditions, all energized laser transmitting circuit packs are terminated on optical fibers which enclose the laser energy with the fiber sheath forming a protective housing. Also, covers are in place over the circuit pack shelves. The circuit packs themselves, however, may be FDA/CDRH Class 1 or 3B, or IEC Class 1, 3R, or 3B.

Lightwave Safety Precautions

Under normal operating conditions, the *LambdaXtreme* Transport System is totally enclosed and presents no risk of eye injury. It is a Class 1M system under the FDA/CDRH scheme.

The lightguide cables that interconnect various components of a lightwave system can disconnect or break and may expose people to lightwave emission. Also, certain measures and maintenance procedures may expose the technician to emission from the semiconductor laser during installation and servicing. Unlike more familiar laser devices, such as solid-state and gas lasers, the emission pattern of a semiconductor laser results in a highly divergent beam. In a divergent beam, the irradiance (power density) decreases rapidly with distance. The greater the distance, the less energy will enter the eye and the less potential risk for eye injury.

Inadvertently viewing an unterminated fiber or damaged fiber with the unaided eye at distances greater than 5 to 6 inches normally will not cause eye injury provided the power in the fiber is less than a few milliwatts at the shorter wavelengths and higher at the longer wavelengths. However, damage may occur if an optical instrument such as a microscope, magnifying glass, or eye loupe is used to stare at the energized fiber end.

⚠ **WARNING**

> *Use of controls, or adjustments, or performance of procedures other than those specified herein may result in hazardous laser radiation exposure.*

Safety Precautions for Enclosed Systems

Under normal operating conditions, the *LambdaXtreme* Transport System is completely enclosed; nonetheless, the following precautions should be observed:

- Because of the potential for eye damage, technicians should neither disconnect any lightwave cable nor splice or stare into the optical connectors terminating the cables.

- Under no circumstance should lightwave/lightguide operations be performed by a technician before satisfactorily completing an approved training course.

- Since viewing lightwave emission directly with an optical instrument such as an eye loupe greatly increases the risk of eye damage, an appropriate label must appear in plain view on the front of the main frame or lightguide termination/interconnection equipment.

Safety Precautions for Unenclosed Systems

The Automatic Power Reduction (APR) feature brings the optical amplifier output power and Raman pump output power to safe levels in the event of a fiber cut, removed connector or equipment failure. The main concerns with respect to time to reduce power are human safety and prevention of optical surges. Once the system has been repaired or links have been re-established, the feature also ensures restoration to normal operation.

⚠ DANGER

> *Automatic Power Reduction (APR) is not available during maintenance or other applicable scenarios. This includes system or circuit pack resets. For example, when the SCTL fails, certain APR capabilities are unavailable until the pack is replaced and the system rebooted. For details, see* <u>*"Situations when APR is not available" (3-19)*</u>*.*

In cases when APR is not available, *LambdaXtreme* Transport is considered unenclosed. During these conditions, observe the following precautions:

- Only authorized, trained personnel should be permitted to perform maintenance on the system. Avoid exposing the eye to emissions from unterminated, energized optical connectors at close distances. Laser modules associated with the optical ports of laser circuit packs are typically recessed, which limits the exposure distance. Optical port shutters and APR are engineering controls that are also used to limit the emissions. However, technicians removing or replacing fiber jumpers should not look directly into disconnected connectors on circuit packs or jumpers, with or without optical instruments or magnifying lenses. (Normal eyewear or indirect viewing instruments, such as Find-R-Scope's infrared optical viewers, are not considered magnifying lenses or optical instruments.)

- Only authorized, trained personnel should use the lightwave test equipment during installation or servicing, since this equipment contains semiconductor lasers. [Some examples of lightguide test equipment are Optical Time Domain Reflectometers (OTDRs), Hand-Held Loss Test Sets, and Feature Finders.]

- Under no circumstances should any personnel scan a fiber with an optical test set without verifying that all lightwave sources on the fiber are turned off.

- All unauthorized personnel should be excluded from the immediate area of lightwave transmission systems during installation and service.

Consult *ANSI Z136.1, American National Standard for Safe Use of Lasers* in the U.S., or outside the U.S., *IEC-60825, Part 2*, for guidance on the safe use of optical fiber optic communication systems in the workplace.

Laser Safety and Lucent Products

Lucent is committed to designing optical fiber transmission equipment that minimizes operator and service personnel exposure to potentially hazardous levels of optical energy during service and operation. However, the continued safe use of optical transmission, optical cables and passive optical connection equipment requires partnership with customers to assure that these systems are deployed and maintained in a safe manner. While automatic laser power reduction systems in Lucent's higher power transmission equipment respond quickly to reduce laser emissions to safe levels in the event of fiber disconnection or break, network operators must take proper action in the event of an alarm.

In a typical network, our optical cables and passive optical connection equipment can carry signals from various vendor sources that may have different degrees of safety controls. We urge our customers to properly assess the power of these sources to ensure that their safety controls are adequate.

To strengthen our partnership and to assure the continued safe deployment and use of optical networks, we urge you to use the following standards as your guides for laser safety for your customers and employees:

1. In the U.S.:

1 1 ANSI Z136.1 – American National Standard for Safe Use of Lasers, and

1 2 ANSI Z136.2 – American National Standard for Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources.

2. Elsewhere:

2 1 IEC 60825 Safety of Laser Products Part 1: Equipment classification, requirements and user's guide, and

2 1 IEC 60825 Safety of Laser Products Part 2: Safety of optical fibre communication systems

It should be noted that recent studies in Europe[1] have suggested that power as low as 50 mW can ignite certain hazardous (classified) gaseous/vapor/mist/dust environments under worst case, dusty conditions. Standards are being written, both in the US and the International Electrotechnical Commission (IEC), to address optical installations in hazardous (classified) environments. If you must

deploy high power systems in such environments, you should assess the impact.

[1] Carleton, F.B., Bothe, H., Proust, Ch., Hawksworth, S., Prenormative research on the use of optics in potentially explosive atmospheres – PROPEX - EUR 19617 EN. European Commission, 2000 (Brussels, Belgium), November 1999.

Warning and Compliance Labels

Warning Label

A warning label is provided on the inside front cover of each shelf assembly. The warning label shows the word "DANGER" in white lettering on a safety red background, and the text of the warning label in black lettering on a white background. See the figure below.

The label states:

DANGER

INVISIBLE LASER RADIATION WHEN OPEN

AND FIBER DISCONNECTED

Avoid direct exposure to beam.

Do not view beam with optical instruments.

IEC Caution Label

An IEC "CAUTION" label is provided on the inside front cover of each shelf assembly. See the figure below.
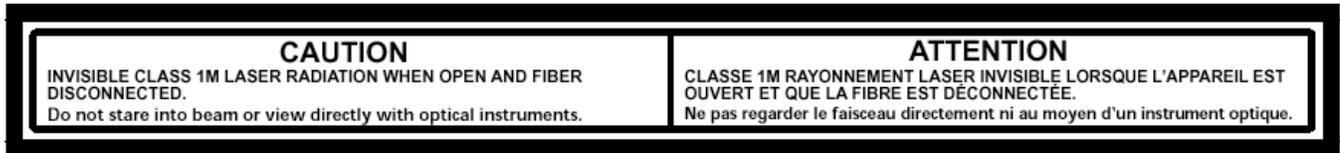
This label uses black lettering on a safety yellow background, and states in both English and French:

CAUTION

INVISIBLE CLASS 1M LASER RADIATION WHEN

OPEN AND FIBER DISCONNECTED

Do not stare into beam or view

directly with optical instruments.

IEC Hazard Level Label

An IEC "HAZARD LEVEL" label is provided on the faceplate of all circuit packs with optical connectors which could permit access to IEC 1M emissions. This includes all OA, RP, RPG, and OD Circuit Packs. See the figure below.

For additional information on laser output power, see the *LambdaXtreme Transport Applications and Planning Guide, Release 1.1, (365-575-780R1.1).*

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Rear Cover Warning Label

A warning label is provided on the rear cover of each equipment bay, cabinet, and miscellaneously mounted shelf that states:

NOTICE: UNTERMINATED OPTICAL CONNECTORS MAY EMIT LASER RADIATION. AVOID DIRECT EXPOSURE TO THE BEAM. DO NOT VIEW BEAM WITH OPTICAL INSTRUMENTS.

System Compliance Label

A compliance label stating that the system has been certified, along with the manufacturer's name and place of manufacture, is attached to the rear of each equipment bay (at eye level), cabinet, and

miscellaneously mounted shelf. The following figure shows an example of a compliance label.

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Laser Diode Compliance Label

A Laser Diode Compliance Label is attached to the non-component side of each circuit pack containing a laser diode. This includes all OA, OT, RP, RPG, and SUPVY circuit packs. See the figure below.

Lucent Technologies
North Andover, MA U.S.A.
Complies with 21 CFR
1040.10 and 1040.11

Electrostatic Discharge (ESD)

Introduction

The following information must be considered whenever working on the *LambdaXtreme* Transport System, or one of its components.

⚠ **CAUTION**

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

Precautions

The following precautions must be observed when handling circuit packs/units to prevent damage by electrostatic discharge:

- Assume all circuit packs contain solid-state electronic components that can be damaged by electrostatic discharge (ESD).

- When handling circuit packs/units (storing, installing, removing, etc.) or when working on the backplane, always wear a grounded wrist strap or wear a heel strap and stand on a grounded, static-dissipating floor mat.

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

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

- If possible, open all circuit packs/units at a static-safe work position, using properly grounded wrist straps and static-dissipating table mats.

- Always store and transport circuit packs/units in static-safe packaging. Shielding is not required unless specified.

- Keep all static-generating materials such as food wrappers, plastics, and styrofoam containers away from all circuit packs/units. When removing circuit packs/units from a cabinet, immediately place the circuit packs/units in static-safe packages.

- Whenever possible, maintain relative humidity above 20 percent.

- Always keep the front covers on the shelves except during an upgrade or maintenance procedure. Be sure to put blanks in slots that are not used. Once a circuit pack/unit is replaced in the shelf, immediately close the front cover.

Grounding Wrist Straps

Any connectors on the shelf interconnection panel that are not cabled should be fitted with a plastic dust cap to provide ESD protection. To reduce the possibility of ESD damage, shelves are equipped with grounding jacks to enable personnel to ground themselves using wrist straps while handling circuit packs/units or working on a shelf. See

the figure below. The wrist straps should be checked periodically with a wrist strap tester to ensure that they are working properly.
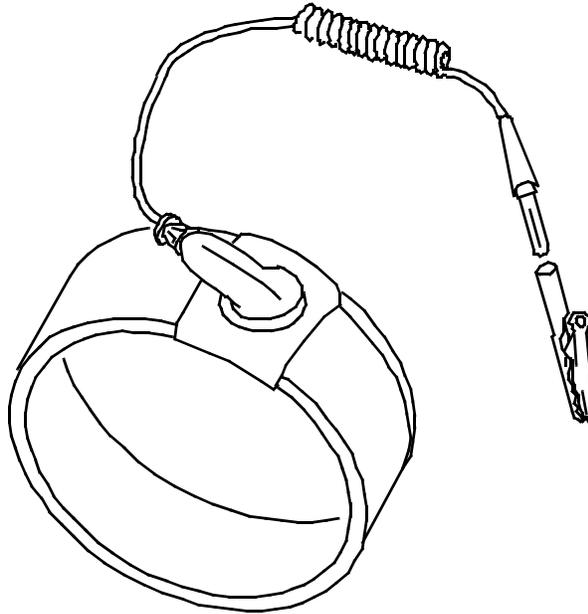
Important! The grounding jacks for connection of wrist straps are located at the front of the bay on the right side, just below the hinge for each shelf cover.

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:

- Follow all warnings and instructions marked on the product.

- Slots and openings in this product at the front and top are provided for ventilation. To protect it from overheating, these openings must not be blocked or covered.

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

- 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.

- Refer servicing to qualified service personnel.

- Use caution when installing and modifying telecommunications lines.

- Never install telecommunication wiring during a lightning storm.

- Never install telecommunication jacks in wet locations unless the jack is specifically designed for wet locations.

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

- 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.

- This product has four -48Vdc (-60Vdc for ETSI and similar applications) input power feeders per bay. Disconnecting one power feeder will not de-energize the product. To reduce the risk of injury, disconnect the four power supply cables when removing power from the system.

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

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

- Use only Lucent Technologies manufactured, recognized circuit packs/units/modules. Refer to the *LambdaXtreme Transport Applications and Planning Guide, Release 1.1,* (365-575-780R1.1).

- This equipment is intended for installation in Restricted Access Locations where access is controlled or where access can only be gained by service personnel with a key or tool. Access to this equipment is restricted to qualified service personnel only.

- Power the unit only from -48Vdc (-60Vdc for ETSI and similar applications) sources providing Safety Extra Low Voltage (SELV) outputs.

- This equipment must be provided with a readily accessible input power disconnect device as part of the building installation (such as a main power disconnect switch or external circuit breaker). *SAVE THESE INSTRUCTIONS.*

How to comment   To comment on this information product online, go to *http://www.lucent-info.com/comments* or email your comments to ctiphotline@lucent.com (mailto:ctiphotline@lucent.com).

How to order   The *LambdaXtreme* Transport customer documents can be ordered as individual paper copies or as a set on a CD-ROM (Comcode #109163683). One-time orders include a binder (if applicable) and the document contents for the current issue in effect at the time of the order. Also, placement on the standing order list for all later reissues of the document may be requested. The standing order list for each document provides automatic distribution of all reissues of the document.

Note: For commercial customers, a credit card is required for orders totaling $1000 or less. Visa, Mastercard, and American Express are accepted. Prepayment by check is also acceptable. Orders totaling over $1000 may be paid for using credit card, check, or invoice upon receipt of a purchase order. Orders placed by Lucent Associates are billed using the cost center.

To order additional copies of this document and/or request placement on the standing order list, send or call in the request as follows:

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Lucent Technologies

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Phone: 1-317-322-6416

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or

http://www.lucent8.com

Internet for Lucent Associates:

http://www.cic.lucent.com

1 Alarms and Indicators

Overview

Purpose This chapter provides a description of the *LambdaXtreme*™ Transport alarm conditions and their indicators, and the Office Alarms Interface. The alarm visual indicators are indicated on the Office Alarms panel and individual circuit packs.

Contents

☐

Alarms

Overview

....

Purpose   *LambdaXtreme*™ Transport supports SONET and SDH alarm severity levels. Users can select either a SONET or SDH severity classification scheme for the available alarm conditions. The complete list of reported alarm conditions is provided in Appendix A, "Alarm/Condition List", and detailed trouble-clearing procedures are provided in Chapter 6, "Trouble Clearing Tasks".

This section provides information on alarm mappings and severity levels.

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Alarm Mappings

SONET Alarm Definitions   Refer to Table 1-1, "SONET Alarm Definitions" (1-3) for definitions for the alarm severity and control criteria in the SONET environment.[1]

Table 1-1   SONET Alarm Definitions

Alarm Severity	Control Criteria
Critical	Critical alarms are used to indicate that a severe, service-affecting condition has occurred, and that immediate corrective action is imperative, regardless of the time of day or day of week.
Major	Major alarms are used for hardware or software conditions that indicate a serious disruption of service or the malfunctioning or failure of important circuits. These troubles require the immediate attention and response of a craftsperson to restore or maintain system capability. The urgency is less than in critical situations because of a lesser immediate or impending effect on service or system performance.
Minor	Minor alarms are used for troubles that do not have a serious effect on service to customers or for troubles in circuits that are not essential to NE operation.

Notes:

1.   From Telcordia TR-NWT-000474 Network Maintenance: Alarm & Control Criteria Common to Switching and Transport Network Elements.

SDH Alarm Definitions   Refer to Table 1-2, "SDH Alarm Definitions" (1-4) for definitions for the alarm severity in the SDH environment.[1]

Table 1-2   SDH Alarm Definitions

Alarm Severity	Definitions
Prompt Maintenance Alarm (PMA)	A PMA is generated in order to initiate maintenance activities (normally, immediately) by maintenance personnel to remove defective equipment from service for the purpose of restoring good service and effecting repair of the failed equipment.
Deferred Maintenance Alarm (DMA)	A DMA is generated when immediate action is not required by maintenance personnel. For example: • When performance falls below a set threshold but the effect does not warrant removal from service. • When automatic changeover to standby equipment has been used to restore service.

Notes:

1.   From ITU M.20 Maintenance: Introduction and General Principles.

Supported Alarm Attributes   A single, user-provisioned parameter, whose value may be SONET or SDH, determines the set of supported attributes.

• When this parameter is set to SONET,

   - supported alarm indicators are:
     CRITICAL
     MAJOR
     MINOR
     NOT ALARMED
     NOT REPORTED

   - Supported status indicators are:
     ABNORMAL
     ALARM CUT OFF
     NEAR-END ACTIVITY

• When this parameter is set to SDH,

   - supported alarm indicators are:
     PROMPT
     DEFERRED
     NO ALARM

NO REPORT

- Supported status indicators are:
  ABNORMAL
  SUPPRESS
  INFORMATION

□

LambdaXtreme™ Transport Alarm Groups

Overview   Alarm conditions are categorized into groups, and each alarm has a default severity level. Users can retrieve and display alarm characteristics, and can override default severity assignments.

The Alarm Groups   The alarm groups are:

- Slot (Slot, Circuit Pack, and Equipment Alarms)
- PortOT (Signal alarms detected at OT ports)
- PortOther (Signal alarms detected at SUPVY or OMON circuit pack ports)
- OCHAN (Optical Channel)
- PortOA_RP (Signal alarms detected at OA or Raman Pump circuit pack ports)
- PortOM_OD (Signal alarms detected at OM or OD circuit pack ports)
- Line (Optical Line)
- Shelf
- Fan (Fan assembly alarms)
- System

□

Office Alarms Panel

Overview

Purpose
This section provides information on the Office Alarms Panel that provides visual alarm indicators of the overall operating status of the *LambdaXtreme*™ Transport network element.

Office Alarms Panel Location

The Office Alarms panel is located on the Fan Assembly and Office Alarm Display Assembly circuit pack, which is visible from the front of the network element. In a System Bay, it is located between shelves 3 and 4. In a Repeater, it is located between shelves 1 and 2.

Display

Figure 1-1, "*LambdaXtreme* Transport User Panel" (1-7) shows the Office Alarms panel, located in the System Bay, between each pair of shelves, on the 'Fan Assembly & Office Alarms Assembly' circuit pack.

Figure 1-1   *LambdaXtreme* Transport User Panel

FAN ASSEMBLY & OFFICE ALARM DISPLAY ASSEMBLY
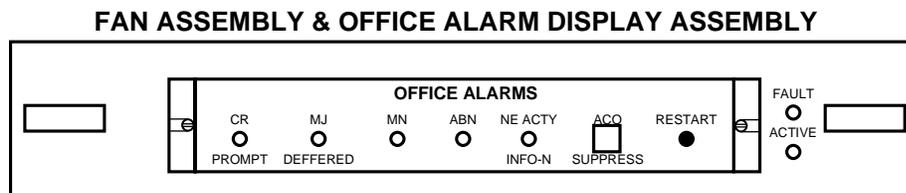
The Office Alarms panel features from left to right, three alarm indicator LEDs, two status indicator LEDs, and two control buttons/switches. Each LED is labeled with the SONET-based name above the light, and the SDH-based name below. In case of suspected trouble, the LEDs can be tested using the procedure detailed in "TAP-612: Address 'Test alarm in progress' and 'Test LED in progress'" (6-177).

☐

Alarm Indicators

Overview The alarm indicators indicate the overall operating status of the *LambdaXtreme*™ Transport NE. The three LEDs indicate the severity of the alarms present on the NE in both the SONET and SDH schemes. LED indicators designate that the Critical Alarm, Major Alarm, or Minor Alarm is active (including alarm testing) in the SONET environment. These LEDs are also used to indicate that the Prompt Alarm or Deferred Alarm is active (including alarm testing) in the SDH environment. The office audible and visual alarms is activated when any one of these indicators is activated.

When multiple conditions with two or more different alarm attributes are active, only the highest level alarm with be active (both audible and visual). When the highest severity alarm has been cleared, the next highest alarm, if any, will be activated (both audible and visual).

CR/Prompt LED In the SONET environment, Critical Alarms indicate that a severe, service-affecting condition has occurred and immediate corrective action is imperative regardless of the time of day or day of week.

In the SDH environment, Prompt Maintenance Alarm (PMA) is generated to initiate activities (normally immediately) by maintenance personnel to remove defective equipment in order to restore good service and repair the failed equipment. This LED is red and is labeled *CR/Prompt*.

MJ/Deferred LED In the SONET environment, Major alarms are used for hardware or software conditions that indicate a serious disruption of service or the malfunctioning or failure of important circuits. These troubles require the immediate attention and response of maintenance personnel to restore or maintain system capability. The urgency is less than in critical situations because of a less immediate or impending effect on service or system performance.

In the SDH environment, Deferred Maintenance Alarm (DMA) is generated when immediate action is not required by maintenance personnel. For example,

- when performance falls below a set threshold but the effect does not warrant removal from service

- when automatic changeover to standby equipment has been used to restore service

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This LED is red, and is labeled ***MJ/Deferred***.

MN LED   Minor alarms are defined only in the SONET environment and are used for troubles that do not have a serious effect on service to customers or for troubles in circuits that are not essential to network element operation. This LED is yellow and is labeled ***MN***.

□

Status Indicators

ABN LED   This LED is not utilized in *LambdaXtreme*™ Transport R1.0.

In future *LambdaXtreme* Transport releases, when lit, this yellow LED will indicate an abnormal condition within the system. These conditions include maintenance activity on any network element within the system which could potentially cause service affecting failures if additional craft activity is performed within the system. The LED is labeled *ABN*.

NE ACTY/Info-N LED   When lit, this yellow LED indicates that there is an alarm or status condition active on the local network element. This includes any condition identified, regardless of the alarm level. An alarm condition is one with a severity attribute of Critical (CR), Major (MJ), Minor (MN), Prompt, or Deferred. A status condition is one with an alarm attribute of NA, NR, NO, No_Alarm, or No_Report. The NE-ACTY LED is lit for both types of conditions.

Alarm Cut Off/Suppress LED   When lit, the green Alarm Cut Off/Suppress LED indicates that an alarm condition exists, but the audible alert associated with the condition has been turned off. The LED is labeled *ACO (Suppress)*.

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Controls

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Alarm Cut Off (ACO)/Suppress
    The Alarm Cut Off (ACO)/Suppress button turns off any audible alarm indicators. After the ACO/Suppress button has been pressed, any subsequent alarm conditions reactivate the audible alarm.

Restart Switch
    The Restart Switch restarts system software using the provisioned parameter values that were defined prior to the restart. A restart causes the local network element to reset. This switch is recessed to avoid accidental activation.

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LambdaXtreme™ Transport LEDs

Overview

Purpose   This section describes the functioning of the Power-On LED and individual Circuit Pack LEDs.

□

Power-On LED

Location A green Light Emitting Diode (LED), labeled ***PWR OUTPUT***, is located on each power filter. There are two power filters located on each double-shelf within a network element. When lit, an LED indicates that its corresponding filter is powered on.

Operation The Power-On LED is extinguished when:

- Power is not supplied through the filter to the shelf, OR
- The low-voltage shutdown feature located on the power filter is activated, which then turns off power to the shelf

Monitor points on the power filters allow the incoming voltage to the filter to be measured.

□

Circuit Pack LEDs

Overview   Each *LambdaXtreme*™ Transport circuit pack features two LEDs; a red (FAULT) LED, and a green (ACTIVE) LED. Only the DCM and CIO packs are not equiped with LEDs.

LambdaXtreme Transport provides the capability to test these LEDs, using the procedure detailed in "TAP-612: Address 'Test alarm in progress' and 'Test LED in progress'" (6-177).

Fault LED (FAULT)   When continuously lit, this red LED indicates either a failure of its associated circuit pack or an on-board power failure.

When flashing at a rate of one second on/one second off, this indicates a failure of an expected input to the associated circuit pack. The LED is labeled ***FAULT***.

Circuit Pack Active LED (ACTIVE)   When lit, this green LED indicates that the circuit pack is powered and is in the active state. If the circuit pack is stateless in a particular slot and for a particular generic, this LED will be unlit. The LED is labeled ***ACTIVE***.

ACTIVE LED as Not-in-Service Indicator

The *LambdaXtreme* Transport Software allows the Active LED (Green LED) on any circuit pack to be extinguished by issuing the appropriate command from the EMS or the *LambdaXtreme* Transport CIT. When issued, the corresponding slot declares a ***cp not-in-service indicated*** condition. The state of this LED remains independent of any other state of the Network Element until such time as the appropriate command is issued to indicate that the circuit pack has returned to service, and a ***cp not-in-service indicated — cleared*** event is declared and the LED comes on.

A separate command is issued to determine all circuit packs indicating a ***not-in-service*** condition at the time the command is issued.

This allows a user to indicate the removal of service from a circuit pack, which then allows the circuit pack to be removed and/or replaced without affecting service.

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Flashing LEDs   When circuit packs are inserted into a running system, there will be an automatic upgrade of the firmware on the circuit packs to the latest version. Flashing green LEDs on the circuit pack faceplates will indicate that the upgrade is occurring (typically less than 30 seconds). Please DO NOT remove the circuit pack during this upgrade because it may cause damage to the affected pack. After the pack LEDs stop flashing it is then safe to remove the packs or power down the system as needed.

□

Office Alarm Interface

Overview

Purpose   This section provides information on the Office Alarm interface and its operational capabilities.

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Interfaces

Overview *LambdaXtreme*™ Transport provides the capability to export Office Alarm indicators to a central office location. This interface is located on the SIO circuit pack.

CR/Prompt, MJ/Prompt, MN/Deferred Alarms There is a set of contact closures for CR/Prompt, MJ/Deferred, and MN alarms, for both audible and visual alarms. When multiple conditions with two or more different alarm attributes are active, only the highest level alarm with be active (both audible and visual). When the highest severity alarm has been cleared, the next highest alarm, if any, will be activated (both audible and visual).

Contact Closures Alarm relays are in a closed state when the corresponding alarms are activated, and are open when the alarm is cleared.

CR/Prompt, MJ/Prompt, and MN/Deferred Fail Safe The CR/Prompt and MN/Deferred alarm relays have normally closed contacts so that in the event of a total power failure to the controller shelf, the relays will open and result in dual local office alarms.

The MN alarm relay has normally open contacts.

□

Operational Capabilities

Clearing Alarms   If all previous alarms have been silenced via Alarm Cut Off (ACO) (audible indication only) and if a new alarm condition begins, the ACO will be cleared and the highest level of alarm activated.

Alarm Suppression   Alarm relay contact closures may be isolated from the Office Alarm Grid/Station to permit maintenance activities on the Network Element without activating new alarms. Suppression of alarm indications to the EMS interfaces is also supported. The NE ACTY/INFO-N LED will light when the office alarms are suppressed.

Functional Testing   The *LambdaXtreme*™ Transport terminals provide the ability to exercise the functioning of audible and visual alarms. When the test is initiated, the LED alarm indications on the NE light, and the alarm relays on the NE operate, causing local office audible and visual alarms to activate. Any single alarm, or all alarms, may be exercised. The number of times the alarms can be exercised is selectable from between one and ten times. For details, see "DLP-602: Test LEDs on Circuit Packs" (7-5).

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2   Maintenance

Overview

Purpose   This chapter introduces the maintenance features of *LambdaXtreme*™ Transport. These features continuously monitor the overall health of all the equipment and the signals passing through the system. When the system detects a problem and reports it, the user is able to take appropriate corrective or preventive actions.

Contents

Maintenance Signals

Overview

Purpose   *LambdaXtreme*™ Transport uses maintenance signals and messages to identify and isolate faulty equipment within the system. *LambdaXtreme* Transport is an optically amplified line system which monitors optical power levels, digital wrapper overhead as well as client SONET/SDH overhead data.

Types of Signals   The following maintenance signals are used by the *LambdaXtreme* Transport:

- Optical Line Maintenance Signal
- Supervisory Signal
- Optical Channel Trace
- JØ Section Trace Identifier for SONET/SDH

Refer to the following sections for information about each of these signals.

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Optical Maintenance Signals

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Optical Channel Alarm Indication Message (OCAIM)

An Optical Channel Alarm Indication Message (OCAIM) notifies the downstream (in the direction of transmission) equipment when an incoming optical channel Loss of Signal defect is declared at an OA circuit pack. This message is sent downstream via the SUPVY Data Link to suppress or unsuppress the downstream alarms when an incoming optical channel LOS is declared or cleared at a *LambdaXtreme*™ Transport NE.

OCAIM Yellow

An OCAIM yellow indicator notifies the upstream NE that an incoming optical channel loss of signal defect is detected at the current NE. Also, OCAIM yellow is sent upstream when LOS is detected at the input of a drop side of OT or Through OT. The OCAIM yellow is an indication for the nodes to make OMON measurement, to determine if they have a new OCh LOS or OCh LOS cleared condition. This message is sent in the supervisory channel and for internal use only.

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Supervisory Signal

Overview   The Supervisory Signal travels in the opposite direction of the transmitted DWDM signal, and provides the following capabilities:

- Node-to-node communication: SUPV communicates with the SUPV controller core in other network elements via the OSC. An example use of this flow is a CIT connection to a remote node for sending TL1 commands and receiving responses. All such inter-node communication flows through the SUPV controller core before transmission on the OSC or private LAN. Node-to-node communication is at 100Mbps–priority 2.

- Orderwire communication: used to establish orderwire connections between network elements. Orderwire communication is at 5 Mbps–priority 1 (to minimize variable delay).

The Supervisory Channel is not amplified and can run with the OA/RP lasers off.

Signal Specifications   The Supervisory (SUPVY) Signal data rate is 149.76 Mb/s OC-3. Of this bandwidth, 145 Mb/s payload capacity is available for the Supervisory Data Link.

Signal Composition   There is one SUPVY Signal for each Dense Wavelength Division Multiplexing (DWDM) line. There are four ports per circuit pack and two SUPVY Signals per optical line in a *LambdaXtreme*™ Transport.

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Optical Channel Trace

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Definitions   **WW10G, WW40G** The transport of SONET/SDH signals with Strong Forward Error Correction (FEC) is achieved by adding digital overhead that contains the FEC check bytes and the Optical Channel Overhead (OCh-OH). This signal format is referred to as WaveWrapper.

There are two formats of WaveWrapper:

- WW10G (Optical Channel at 10 GB/s)
- WW40G (Optical Channel at 40 GB/s)

OCh-S The Optical Channel Section (OCh-S) is defined as a portion of a network between adjacent OTs with FEC processing turned on, where FEC processing, performance monitoring, and maintenance functions are performed.

OCh-P The Optical Channel Path (OCh-P) is defined as spanning the distance from that point where a client signal is converted to a WW signal (add mode) to that point where a WW signal is converted to a client signal (drop mode).

Description   All *LambdaXtreme*™ Transport OTs have access to the WW Optical Channel Path Trace overhead byte. This enables the system to determine if the received trace string matches the expected string at the WW level. The path trace can be used to verify connectivity between path terminating network elements, and supports path maintenance.

Provisioning   The TL1 command `ENT-OCHTRC` is used to enter the transmitted OCh Path Trace and the expected received OCh Path Trace. If the expected received OCh Path trace is not the default value `RESET-OCH-TRACE`, the expected received OCh Path Trace is compared with the received OCh Path Trace, and if a mismatch is detected, an alarmed condition 'WaveWrapper path trace identifier mismatch" will be raised. If the expected received OCh Path trace is the default value `RESET-OCH-TRACE`, then no comparison is made and the status is "unspecified".

You can provision two values, *Transmitted Trace Identifier* and *Expected Trace Identifier* in the `ENT-OCHTRC` command. The *Transmitted Trace Identifier* is utilized by the Add direction of an OT. The expected received optical channel path trace is utilized

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only at the Drop direction of an OT. The TL1 command has more
details about these parameters.

For more information about Provisioning, see *LambdaXtreme
Transport User Operations Guide, Release 1.1,* (365-575-781R1.1).

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JØ Section Trace Identifier (STI)

Overview   The *LambdaXtreme*™ Transport System is able to read the JØ Section Trace Identifier (STI) for OC-48/STM-16, OC-192/STM-64 FEC signals. The JØ STI byte allows the tracing, reading, and comparing of the received signal with the expected OC-48/STM-16, OC-192/STM-64 FEC signal at the OTs.

Description of JØ STI   *LambdaXtreme* Transport supports a 1-byte, 16-byte, and 64-byte section trace. This string is transmitted in the JØ byte position of the section overhead of the first STS-1 of each of the OC-48/STM-16, OC-192/STM-64 frames and is retrievable on demand.

$C_1 C_2 C_3 C_4 C_5 C_6 C_7$ is the first byte of the string. It is a frame start marker that includes the result of the CRC-7 calculation over the previous frame. C_1 is the Most Significant Bit (MSB.)

OXXXXXXX represents a T.50 character where the other 15 bytes is of this format are used to transport 15 T.50 characters. The first bit of every byte is a header bit. The only non-zero bit is found in the first byte of the 16 bytes.

□

Alarm Reporting

Overview

Purpose This section provides information on alarm and status indicators, and equipment failures.

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Alarms and Status Indicators

Autonomous Indications Autonomous indications of conditions or events are generated when they occur. No user action is required to produce autonomous indications. Autonomous indications appear at the following alarm and status interfaces:

- Alarm Contact Closures to the Office Alarm Grid
- Craft Interface Terminal (CIT)
- LEDs on the equipment
- EMS Interfaces

On-Demand Indicators On-demand indications of conditions or events are generated when requested by the user. On-demand indications appear at the following alarm and status interfaces:

- Craft Interface Terminal (CIT)
- EMS Interfaces

Reported Items Items reported by the Alarm and Status Indicators are as follows:

- Conditions
- Events

Conditions Conditions persist in time and indicate there is something non-nominal about the system.

Events Events occur at particular times. The four types of events are as follows:

- A condition starting
- A condition clearing
- An autonomous action by the system
- A user action

Incoming Signal Alarm Delay When a condition related to an incoming signal is detected, an individual timer is started for that condition. This timer runs until a provisioned interval, called the Incoming Signal Alarm Delay, expires or until it is determined that the condition no longer exists.

If, at the end of the Incoming Signal Alarm Delay interval, it is determined that the condition still exists, autonomous indications of

the condition are generated and on-demand reports will indicate that the condition is active. If the condition is determined to have been cleared, no indications of the condition are generated.

Alarm Clear Delay The Alarm Clear Delay applies individually to conditions related to incoming signal failures. As soon as the system determines that a condition has been cleared, an Alarm Clear Delay timer begins for that condition. The timer runs until a provisioned interval, called the Alarm Clear Delay, expires or until the condition is detected again

If, at the end of the Alarm Clear Delay interval, the condition remains cleared, all indications of the condition are cleared. If the same condition appears during the Alarm Clear Delay interval, all indications remain active.

□

Equipment Failure

Description   Equipment failures are reported as soon as the defect is determined to exist. There is no Incoming Alarm Delay and there is no Alarm Clear Delay associated with equipment failures. The alarm for an equipment failure will be reported at the location of the failure to assist the user in troubleshooting any failures. Refer to Chapter 6, "Trouble Clearing Tasks" for details on specific alarms.

Incoming Alarm Delay   There is no Incoming Alarm Delay associated with equipment failures.

Alarm Clear Delay   There is no Alarm Clear Delay associated with equipment failures.

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Fault Identification

Overview

Purpose   This section provides information on fault detection and isolation. For details on performance monitoring, see Chapter 4, "Performance Monitoring".

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Fault Detection

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Description   Maintenance activities are affected by Network Element Type (NETYPE) provisioning and connection provisioning as follows:

- Common slots are made known to the software by provisioning the NETYPE

- Per Channel slots are made known to the software by provisioning connections.

Monitored Signal Conditions   Refer to Table 2-1, "Monitored Incoming Signal" (2-13) for a list of incoming signals and the associated monitored conditions.

Table 2-1   Monitored Incoming Signal

Incoming Signal Level	Conditions
Client Signal SONET/SDH	LOS
	LOF
	JØ Mismatch
Optical Channel (WaveWrapper)	LOS
	LOF
	WW path trace mismatch
	WW payload-type mismatch
Optical Multiplex Section (OMS)	LOS
Optical Transport Section (OTS)	LOS
Supervisory Signal	LOS
	LOF

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Automatic Fault Isolation and Diagnostics

Overview   When a trouble condition is detected, *LambdaXtreme*™ Transport isolates the failed circuit pack or signal.

Failure Reporting   Failures are reported to a local technician and operations system for repair.

Failure Alarming   The control system examines the indications it receives and determines the most probable cause for the failure (that is, circuit pack or control link). Control failures are automatically alarmed through equipment and office alarm relays. This alarming is fail safe to ensure that the CIT is notified regardless of the effect of the failure on other control functions.

Cleared Conditions   When a trouble condition is cleared, automatic diagnostics reevaluate the related defects in order to isolate another possibly failed circuit pack or signal.

□

Loss of Signal (LOS)

Overview

Purpose   This section provides information on OTS LOS, OMS LOS, optical channel LOS, SUPV LOS, and the functions of the alarm indicators during an LOS.

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Detecting Incoming OTS LOS

Description   Each NE that terminates an Optical Transmission Section (OTS) monitors the incoming optical line signals for a LOS.

The Optical Transmission Section is the lowest layer in the optical transport network and provides functionality for transmission of optical signals on optical media of various types. All NEs terminate the OTS. Its source is considered to be where the L band and the supervisory signal (traveling in the opposite direction) are combined in the RP pack. Its sink is located in OA where the L band and supervisory signal (counter-propagating) get separated. The incoming OTS LOS alarm condition is detected at the RP circuit pack.

□

Detecting OMS LOS

The Optical Multiplex Section is the next layer above OTS, which is terminated at End Terminals, or OADM terminals. The OMS originates at the OM circuit pack of the Add Terminal, and terminates at the OD circuit pack in the Drop terminal.

LambdaXtreme™ Transport reports a variety of OMS LOS alarm conditions, depending on the type of OM or OD circuit pack detecting the LOS.

□

Optical Channel LOS

LOS at a Local Network Element An incoming Optical Channel LOS is detected at the Optical Spectrum Analyzer (OSA) on the OMON circuit pack. This LOS defect is then integrated before generating an OCHAN LOS Alarm.

The system software makes spectrum measurements of all OMON input ports with associated OA/OM/RP taps. Spectral measurements are made at least once every 8 minutes. Spectral measurements driven by failure events supersede the minimum measurement schedule.

Declaring and Clearing an Optical Channel LOS The OMON is used to scan all the channels in use at every NE. These scans are used to localize the signal failure of the channel. The optical channel LOS will be correlated with OMON scans within the line system. OCAIM and OCAIM Yellow are used for signaling purposes to correlate and clear the optical channel LOS.

OCAIM The Optical Channel Alarm Indication Message (OCAIM) notifies downstream equipment when an incoming optical channel Loss of Signal (LOS) defect is declared at a transmitting OA circuit pack. The message contains information on all channels. This message is sent downstream via the Supervisory (SUPVY) Data Link (DL) to suppress or unsuppress the downstream alarms when an incoming optical channel Loss of Signal (LOS) is declared or cleared at a *LambdaXtreme*™ Transport Network Element (NE).

OCAIM Yellow The OCAIM Yellow indicator notifies the upstream equipment that an incoming optical channel LOS has been detected. This message requests that the OMON scan at an OA.

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SUPVY Link Failures

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Conditions Generated

LambdaXtreme™ Transport provides the following alarms to isolate failures of the SUPVY link between adjacent NEs.

- OSC LOS (opposite direction to optical channels)

- SUPVY transmitting LOS

- Incoming SUPVY channel LOS

- Incoming SUPVY channel LOF

- SUPVY Data Link Failure

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Figure 2-1, "SUPVY Link Failures" (2-20) shows the SUPVY transmit path between two adjacent NEs, indicating failure detection points and associated alarm conditions.

Figure 2-1 SUPVY Link Failures
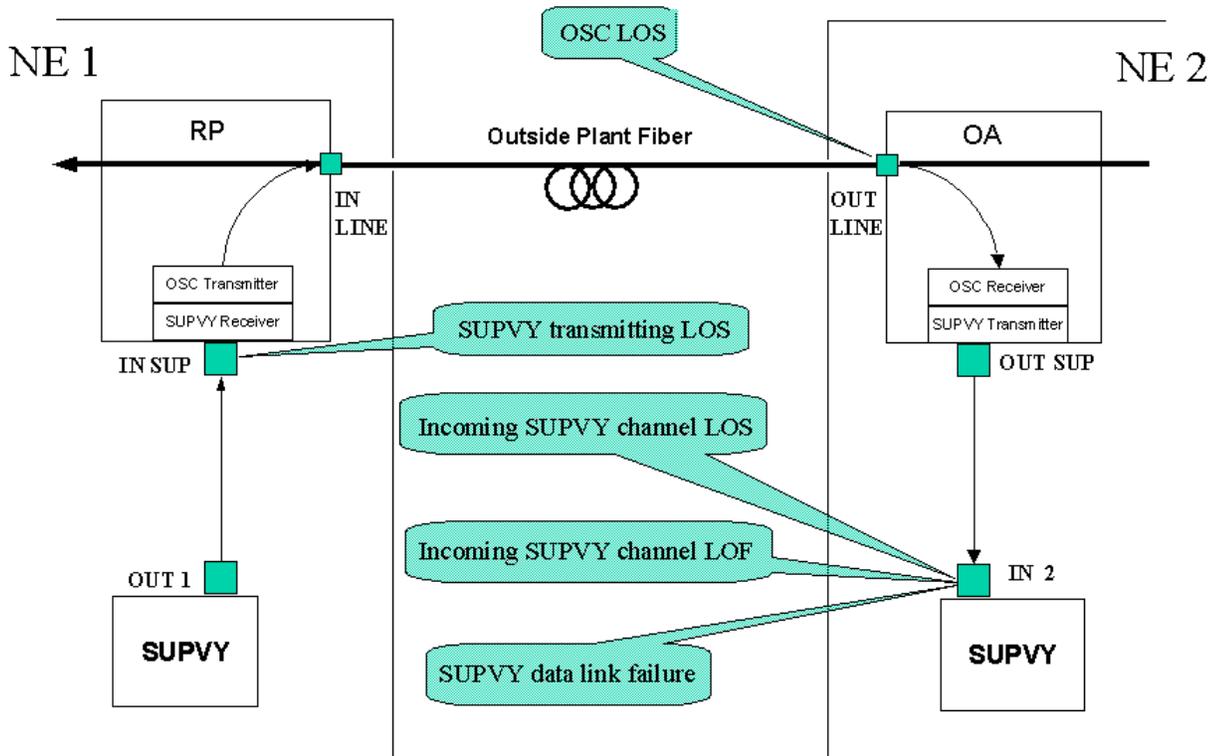

```
OSC LOS (opposite direction to optical channels)
```

This alarm condition indicates a problem with the connectivity between two NEs. The alarm is raised when signal loss is detected by the OSC receiver in the OA circuit pack.

`OSC LOS (opposite direction to optical channels)` is a clear indication that there is a fiber cut between the NEs. It will not be caused by the detection of `SUPVY transmitting LOS`, or by the removal of the SUPVY circuit pack from the transmitting node.

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Detection of the `OSC LOS (opposite direction to optical channels)` will trigger `APR active: line`. See Chapter 3, "Automatic Power Reduction (APR)" for more information.

`SUPVY transmitting LOS`

This alarm condition indicates a problem with the connectivity between an OUT port on the SUPVY circuit pack and the IN_SUP port of the corresponding RP circuit pack. The alarm is raised when signal loss is detected at the IN_SUP port of the RP circuit pack. This alarm is suppressed if either an RP or SUPVY circuit pack failure is detected.

If `SUPVY transmitting LOS` is detected at NE1, `Incoming SUPVY channel LOF` will be raised at the SUPVY circuit pack in NE2, as illustrated in Figure 2-1, "SUPVY Link Failures" (2-20).

`Incoming SUPVY channel LOS`

This alarm condition indicates a problem with the connectivity between an OUT_SUP port of the OA circuit pack and the IN port of the SUPVY circuit pack. The alarm is raised when signal loss is detected at the IN port of the SUPVY circuit pack. This alarm is supressed if OSC LOS is detected or if an OA circuit pack fails

`Incoming SUPVY channel LOF`

This alarm condition is caused by any of the following scenarios:

- SUPVY circuit pack failure at the transmitting NE (NE1 in Figure 2-1, "SUPVY Link Failures" (2-20))
- Presence of `SUPVY transmitting LOS` at the transmitting NE
- Degradation of the OSC transmission in the outside plant or degradation of SUVY signal between OA and SUPVY circuit packs

This alarm condition is supressed if `OSC LOS (opposite direction to optical channels)` is detected at the corresponding OA circuit pack.

The following three conditions can trigger this alarm:

- Poor transmission between the OUT_SUP port of the OA circuit pack and the alarmed IN port of the SUPVY circuit pack..
- Detection of `SUPVY transmitting LOS` at the transmitting NE.
- Failure of the SUPVY circuit pack at the transmitting NE.

SUPVY Data Link Failure

During normal operation, adjacent SUPVY circuit packs exchange messages to check for data link integrity. If a SUPVY circuit pack doesn't detect these messages, it will raise the SUPVY Data Link Failure alarm condition. This alarm will be supporesed if an OA circuit pack has failed or been removed, if OSC LOS is detected, or if Incoming SUPVY Channel LOS or LOF is detected.

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Control System

Overview

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Purpose This section provides information on the various system controllers and their functionality to assist during trouble clearing procedures.

Types of Controllers The *LambdaXtreme*™ Transport System includes the following controllers:

- NCTL
- SCTL
- BCM

System software monitors the health of each controller, including:

- effect of control failures on the system
- detection, isolation, and reporting of control failures
- recovery from control failures

Control System Maintenance Philosophy The Control System Maintenance philosophy includes:

- ***Automatic Fault Recovery*** — The control system automatically recovers from power surges or interruptions with no *LambdaXtreme* Transport CIT action required. The system is automatically restored to its state prior to the failure.

- ***Non-Service Affecting Control Faults and Processor Resets*** — Control faults and processor restarts do not affect service. The system continues to operate in the state in which it was operating before the control failure or reset (autonomous or manual) occurred. This includes maintaining existing transmission and protection switching states.

The removal and insertion of a control pack (e.g., NCTL, SCTL) in a quiescent system is non-service affecting.

Version Recognition The *LambdaXtreme* Transport System provides the following version recognition features:

- Automatic identification of the type of circuit pack installed in each slot

- Hardware and software version recognition

- Common Language Equipment Identifier (CLEI) Code version identification for each circuit pack

- Equipment Catalog Item (ECI) version identification for each circuit pack

- An apparatus code for each circuit pack, which does not change throughout the life cycle of the pack

- Firmware version recognition using the Series Number. The Series Number is used to indicate inter-changeability among the circuit packs with the same circuit pack type and apparatus code, but different manufacturing versions.

- Manufacturing serial number recognition

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CIT/Operating System Interface
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Description   The CIT and EMS connections run over TCP/IP protocol. The *LambdaXtreme*™ Transport System includes two 100BaseT connections on the SIO pack: the CIT port and the EMS port.

PING Support   The CIT connection supports the PING command, and executes this upon startup.

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3   Automatic Power Reduction (APR)

Overview

Purpose   The Automatic Power Reduction (APR) feature brings the optical amplifier output power and Raman pump output power to safe levels in the event of a fiber cut, removed connector or equipment failure. The main concerns are human safety and prevention of optical surges. Once the system has been repaired or links have been re-established, the feature also ensures restoration to normal operation. The feature is shipped enabled all the time.

APR is required by both the US and international markets in order to meet customer requirements for a safer working environment under the guidelines for laser products.

Theory of Operation   The purpose of APR is to comply with IEC Hazard Level 1M requirements and create a safe environment for the transmission facility maintenance team to perform repairs to damaged fibers that are transmitting high power. The APR feature brings the optical amplifier output power and pump output power to safe levels in the event of a fiber cut, removed connector, or equipment failure. After the system has been repaired or links have been re-established, APR also ensures restoration of optical power to normal operating levels.

The following scenarios can cause APR:

*   Optical Line cut (in the outside plant)

*   Fiber disconnect (within the NE)

- Circuit pack failure
- Circuit pack removal
- Circuit pack warmup
- Port switch protection

Important! Once an APR condition has been cleared, there is no longer a risk of exposure to dangerous levels of laser radiation. However, this does not imply that the system has returned to full operating power.

Contents

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APR for a Single-Fiber Cut

Overview
When a fiber connecting two network elements is cut, it causes the loss of the DWDM signal and the supervisory signal on that fiber.

The LOS detection of the Supervisory and DWDM signals at the respective nodes will trigger the following activity at the NEs:

- Power is reduced at either the OA or RP circuit pack and the RPG circuit pack, if present.

- Associated alarm conditions are raised

- The upstream node is notified of the problem

An automatic restart will be triggered when the damaged fiber has been repaired.

APR activation
Figure 3-1, "APR for a single fiber cut" (3-3) shows APR for a single fiber cut case. The fiber cut affects all the channels in the Extended L band transmitted from NE1 to NE2 and the supervisory channel transmitted from NE2 to NE1.

Figure 3-1 APR for a single fiber cut
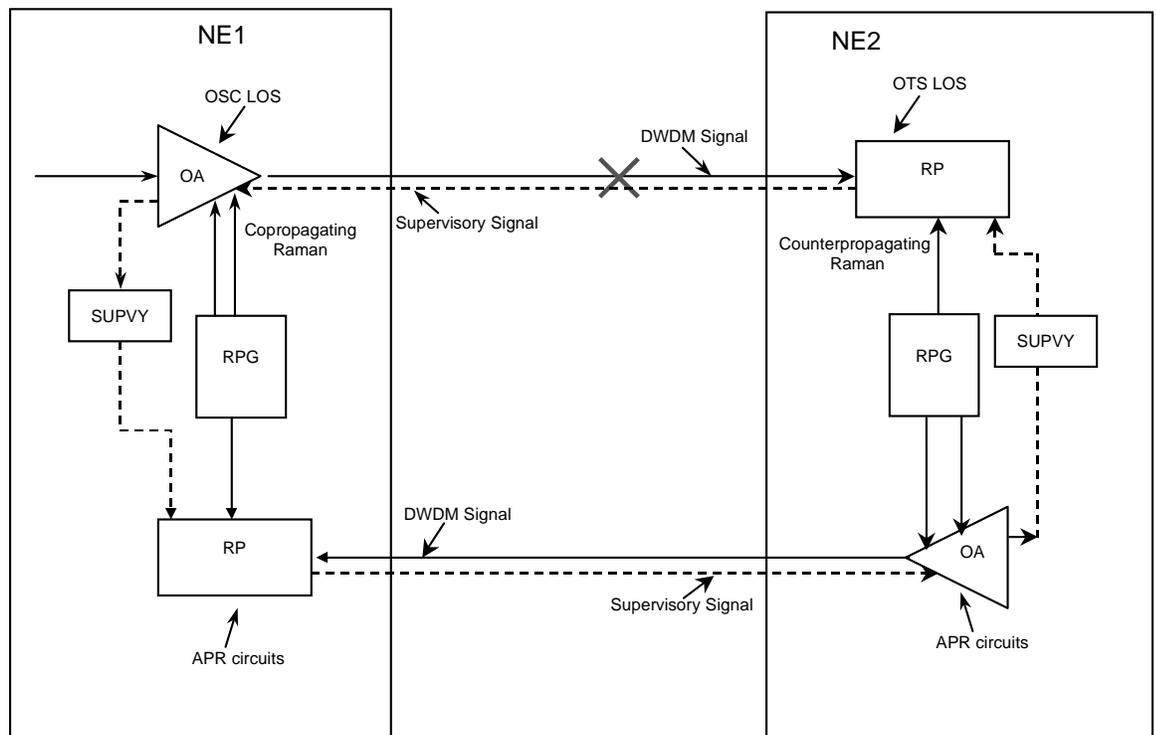
Activity at NE1

NE1 detects the loss of the Supervisory channel and initiates the APR procedure, power is reduced in the following components:

- Gain elements in the OA:
    - EDFA pumps for OA(VOA) in an End Terminal, OA(Raman), OA(Raman EDFA) , OA(DGEF) in a Repeater, and OA(OADM LineOut) in an OADM Terminal
    - Raman startup copropagating pumps
    - Raman startup DCF counterpropagating pumps in OA(Raman), OA(Raman EDFA) in a Repeater
- Raman growth copropagating and counterpropagating pumps if the RPG circuit pack is installed. If an RPG(DCF) is used, then the DCM Growth Pumps and are also turned down.

When supervisory LOS is detected and APR is activated, the following alarm conditions are raised:

- `OSC LOS` with AID of the associated OA circuit pack
- `APR active-Line` with AID of the associated OA circuit pack

After detecting Supervisory LOS, NE1 sends:

- OSC Defect indication to NE2 (the downstream NE)
- APR Active indication to the upstream NE

The upstream NE receives the APR Active indication and triggers APR analogous to NE1.

Activity at NE2

NE2 detects the loss of DWDM signal and initiates the APR procedure to lower the counterpropagating power associated with that fiber. The power is reduced in the following components:

- Raman Startup counterpropagating pumps
- Raman Growth counterpropagating pumps if the RPG circuit pack is installed.
- Raman startup copropagating pumps if NE2 is a Repeater
- Raman startup DCF counterpropagating pumps in OA(Raman), OA(Raman EDFA) if NE2 is a Repeater

When DWDM signal LOS is detected and APR is activated, the following alarm conditions are raised:

- OTS LOS with AID of the In port of the associated RP circuit pack
- APR active: line with AID of the associated RP circuit pack

After detecting DWDM signal LOS, NE2 sends indication of Transmission defect to NE3 via the RP circuit pack over the Supervisory channel.

Important! The Supervisory signal from NE2 to NE1 remains on to enable automatic restart after the fiber is repaired.

Active Zone for Single-Fiber Cut

Figure 3-2, "APR Active Zone for single-fiber cut" (3-5) shows the APR active zone for a single fiber cut. The APR condition is expected in NE2 through NE5. NE2 will have APR active- line non-alarmed condition indicating the turn down of OA and the copropagating pumps. NE3 and NE4 will have the APR active-line non-alarmed condition for copropagating,, counterpropagating, and DCM pumps for the impacted transmission direction only. NE5 will have the APR active-line non-alarmed condition for counterpropagating pumps in RP and RPG for the impacted transmission direction only.

Figure 3-2 APR Active Zone for single-fiber cut
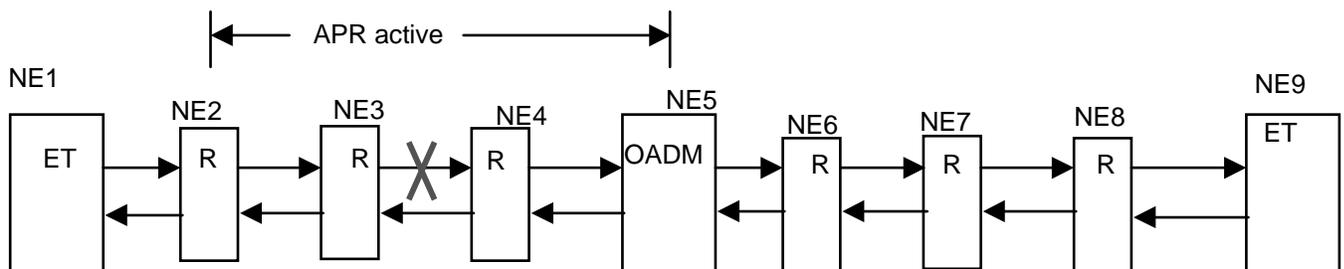
Automatic Restart Following a Single-Fiber Cut

The system performs automatic restart as soon as the damaged fiber is repaired. The automatic restart at NE1 is triggered by the successful detection of the Supervisory signal sent by NE2 to NE1. After detecting the supervisory signal, NE1 notifies NE2 that the Supervisory defect has been cleared. This notification causes NE2 to initiate the restart process. See Figure 3-1, "APR for a single fiber cut" (3-3).

Activity at NE1

NE1 detects the Supervisory channel and initiates the APR procedure to restore the copropagating Raman power associated with that fiber to normal levels. The power is restored to the following components:

- Gain elements in the OA circuit pack:

  - EDFA pumps for OA(VOA) in an End Terminal, OA(Raman), OA(Raman EDFA) , OA(DGEF) in a Repeater, and OA(OADM LineOut) in an OADM Terminal

  - Raman startup copropagating pumps

  - Raman startup DCF counterpropagating pumps in OA(Raman), OA(Raman EDFA) in a Repeater, and OA(OADM LineIn) in an OADM Terminal

- Raman growth copropagating pumps and counterpropagating pumps if the RPG circuit pack is installed.

After detecting the supervisory channel, NE1 will clear the standing OSC LOS (opposite direction to optical channels) alarm condition. As the associated pumps reach nominal levels, NE1 clears the standing APR active: line condition. The associated pumps are expected to reach their nominal levels within 5 minutes of initiation of the automatic restart process. If the pumps do not reach nominal levels within 5 minutes, then the associated circuit pack failure alarms are raised.

After detecting Supervisory signal, NE1 sends:

- ***OSC Defect Clear*** indication to NE2 (the downstream NE)

- ***APR Active Clear*** indication to the upstream NE

The upstream NE receives the ***APR Active Clear*** indication and triggers the APR Restart procedure analogous to NE1.

Activity at NE2

NE2 receives ***No OSC Defect*** indication from NE1 and initiates the APR Restart procedure to restore the power in the following components:

- Raman Startup counterpropagating pumps

- Raman Growth counterpropagating pumps if the RPG circuit pack is installed.

- Raman startup copropagating pumps if NE2 is a Repeater
- Raman startup DCF counterpropagating pumps in OA(Raman), OA(Raman EDFA) if NE2 is a Repeater

When power is restored and DWDM signal is detected, the following alarm conditions are cleared:

- `OTS LOS` with AID of the In port of the associated RP circuit pack
- `APR active: line` with AID of the associated RP circuit pack

After detecting the DWDM signal, NE2 sends indication of ***No Transmission Defect*** to NE3.

□

APR for a Two-Fiber Cut

APR Activation   Figure 3-3, "APR for two-fiber cuts" (3-8) shows a two-fiber cut.

Figure 3-3 APR for two-fiber cuts
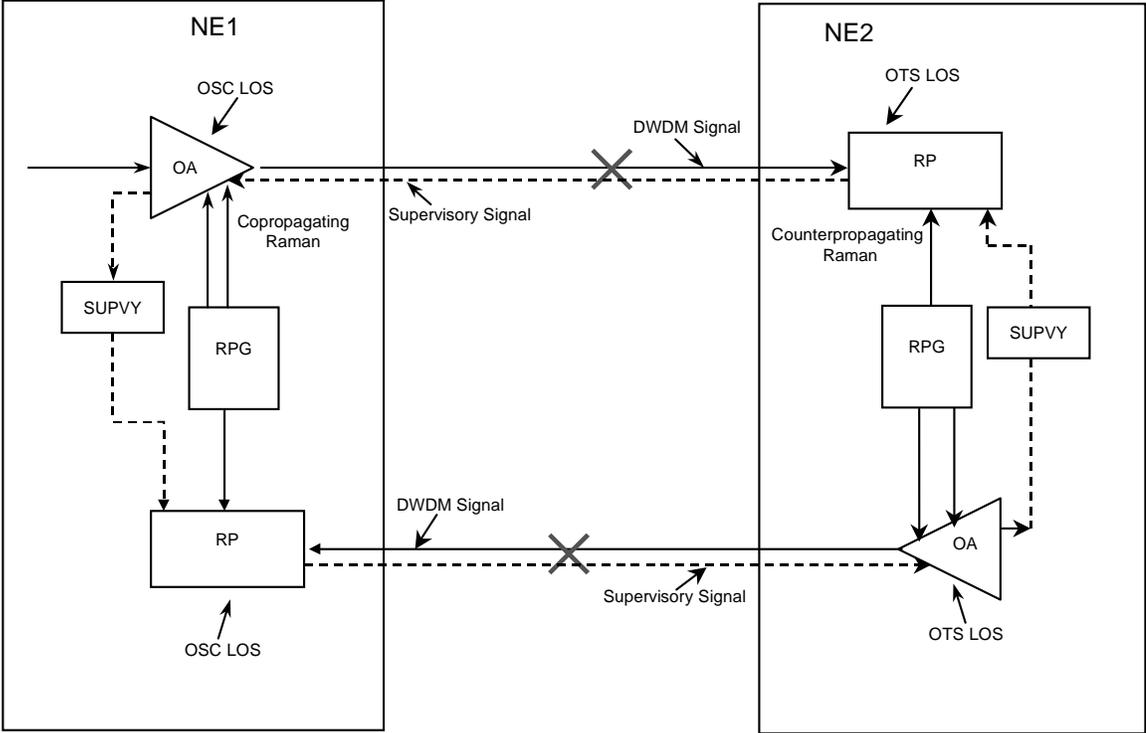
When both fibers between two adjacent NEs are cut simultaneously, the two NEs react identically because both NEs detect a loss of Supervisory signal and loss of DWDM signal. Each NE detects the loss of the supervisory channel and initiates the APR procedure to lower the copropagating and counterpropagating Raman power associated with the two fibers.

The power is reduced to the following components:

- Gain elements in the OA circuit pack:

    - EDFA pumps for OA(VOA) in an End Terminal, OA(Raman), OA(Raman EDFA) , OA(DGEF) in a Repeater, and OA(OADM LineOut) in an OADM Terminal

    - Raman startup copropagating pumps

    - Raman startup DCF counterpropagating pumps in OA(Raman), OA(Raman EDFA) in a Repeater, and OA(OADM LineIn) in an OADM Terminal

- Raman counterpropagating pumps in the RP Circuit Pack

- Raman Growth copropagating pumps and counterpropagating pumps if the RPG Circuit Pack in installed. If the RPG is an RPG(DCF), then the DCM Growth Pumps are also turned down.

When a loss of Supervisory and DWDM signals is detected, and APR has been activated, the following alarm conditions are raised:

- `OSC LOS (opposite direction to optical channels)` with the AID of the associated OA Circuit Pack

- `OTS LOS` with the AID of the In port of the associated RP Circuit Pack

- `APR active: line` with the AID of the associated OA Circuit Pack

After detecting `OSC LOS (opposite direction to optical channels)` and `OTS LOS`, each NE sends:

- ***OSC Defect*** indication to the neighboring NE

- ***APR Active*** indication to the neighboring NE

The upstream NE receives the ***APR Active Clear*** indication and triggers the APR Restart procedure analogous to NE1/NE2.

Active Zone for Two-Fiber Cut

Figure 3-4, "APR Active Zone for two-fiber cut" (3-10) shows an example of the APR Zone for a 2–fiber cut. An APR condition is present in NE2 through NE5 for transmission in the direction of NE9. APR condition is present in NE1 through NE5 for transmission in the direction of NE1. NE2 has APR active for the OA and the copropagating pumps in the RPG for the transmission direction travelling from NE1 to NE5. In the other direction, NE2 will have APR active for copropagating, counterpropagating, and DCM pumps. NE3 and NE4 have APR active for copropagating, counterpropagating

and DCM pumps for both transmission directions. If the OADM has only 1 to 3 channels, then the APR active condition may extend to nodes further downstream.

Figure 3-4 APR Active Zone for two-fiber cut
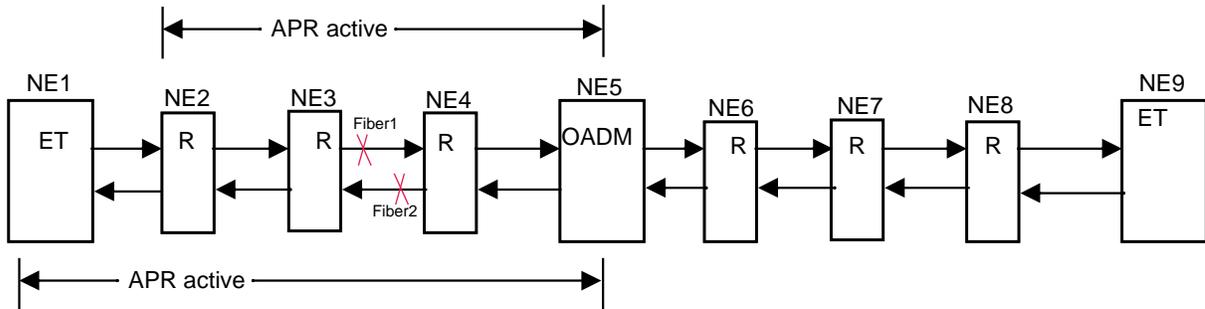
Automatic Restart Following a Two-Fiber Cut

The system performs automatic restart when the damaged fibers have been repaired. The automatic restart at each NE is triggered by the successful detection of the Supervisory signal coming from the other NE. If both fibers are repaired simultaneously, then the two NEs initiate an identical restart process.

Each NE detects the supervisory channel and initiates the automatic restart process to restore the copropagating Raman power associated with that fiber to nominal levels.

The power is restored to the following components:

- Gain elements in the OA circuit pack:

  - EDFA pumps for OA(VOA) in an End Terminal, OA(Raman), OA(Raman EDFA) , OA(DGEF) in a Repeater, and OA(OADM LineOut) in an OADM Terminal

  - Raman startup copropagating pumps

  - Raman startup DCF counterpropagating pumps in OA(Raman), OA(Raman EDFA) in a Repeater

- Raman Counterpropagating pumps in the RP Circuit Pack

- Raman Growth Copropagating and Counterpropagating Pumps if the RPG Circuit Pack is installed. If the RPG is an RPG(DCF), then the DCM Growth Pumps are also turned down.

Once the Supervisory Channel is detected, each NE clears the standing OSC LOS alarm condition. Once the DWDM signal is detected, each NE clears the standing OTS LOS alarm condition. As the

associated pumps reach nominal levels the NEs clear the standing `APR Active - Line` condition. The associated pumps are expected to reach their nominal levels within 5 minutes of the automatic restart procedure initiation. If this does not occur, then the associated circuit pack failure alarms are raised.

After detecting Supervisory signal, NE1/NE2 sends:

- *OSC Defect Clear* indication to NE2 (the downstream NE)

- *APR Active Clear* indication to the upstream NE

After detecting the DWDM Signal, each NE sends `No Transmission defect` to adjacent NEs via the RP circuit pack over the Supervisory Channel.

The upstream NE receives the *APR Active Clear* indication and triggers the APR Restart procedure analogous to NE1/NE2.

When only one fiber is repaired in a two-fiber cut

In a two fiber-cut, when Fiber 1 has been repaired, and Fiber 2 is still awaiting repair, the following occurs (see Figure 3-3, "APR for two-fiber cuts" (3-8)):

- NE1 detects the Supervisory Channel at the OA. Because Fiber 2 is still cut, NE2 will not start the counterpropagating Raman pumps. APR is still enforced and the alarms continue.

- In fiber 2, the Supervisory Channel has not yet been detected by NE2, and the clearing of RDI-L value has not yet been detected by NE1. APR is still enforced and the alarms will be continued.

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APR for Fiber Disconnect within an NE

Overview   Some fiber jumpers within a network element carry high optical power. Removal or damage to these fiber jumpers will trigger APR conditions.

This table lists high-power fiber jumpers and associated APR conditions.

Table 3-1   APR for High-Powered Fiber Connections within Network Elements

NE Type	Fiber Jumper Connection Points	Associated Alarms	Components Reduced in Power
End Terminal	• port OUTCORP on RPG Circuit Pack • port INCORP on OA(VOA)	`APR active: fiber disconnect RPG to OA for Raman co-pumps`	Raman co-pumps in RPG
Repeater	• port OUT DCF on RPG(DCF) Circuit Pack • port IN DCF on OA(Raman) or OA(Raman EDFA) Circuit Pack	`APR active: fiber disconnect RPG to OA for Raman DCF pumps`	Raman DCF pumps in RPG(DCF)
	• port OUT RPG on RPG or RPG(DCF) Circuit Pack • port IN RPG on RP Circuit Pack	`APR active: fiber disconnect RPG to RP for Raman counter-pumps`	Raman growth counter-pumps in RPG or RPG(DCF)
	• port OUT SIG on RP Circuit Pack • port IN DCM on OA(Raman) or OA(Raman EDFA) Circuit Pack Note that these ports are connected via the DCM Circuit Pack	`DCM LOS: OA` with aid = IN DCM of OA (alarmed) `APR active: OA DCF Raman startup pumps` (non-alarmed). `APR active: RPG Raman DCF pumps` (non-alarmed)	Raman DCF startup counter-pumps in OA(Raman) or OA(Raman EDFA) and RPG Raman growth DCF counter-pumps in RPG if installed

Table 3-1   APR for High-Powered Fiber Connections within Network Elements   (continued)

NE Type	Fiber Jumper Connection Points	Associated Alarms	Components Reduced in Power
OADM	- port OUT DCF on RPG Circuit Pack - port IN DCF on OA(OADM LineIn) Circuit Pack	`APR active: fiber disconnect RPG to OA for Raman DCF pumps`	Raman DCF counter-pumps in RPG(DCF)
	- port OUT SIG on RP Circuit Pack - port IN DCM on OA(OADM LineIn) Circuit Pack Note that these ports are connected via the DCM Circuit Pack	`DCM LOS: OA` with aid = IN DCM of OA (alarmed) `APR active: OA DCF Raman startup pumps`(non-alarmed). `APR active: RPG Raman DCF pumps` (non-alarmed)	Raman startup DCF counter-pumps in OA(OADM, line in) and Raman DCF counter pumps in RPG(DCF) Circuit Pack, if installed
	- port OUT RPG on RPG or RPG(DCF) Circuit Pack - port IN RPG on RP Circuit Pack	`APR active: fiber disconnect RPG to RP for Raman counter-pumps`	Raman growth counter-pumps in RPG or RPG(DCF) Circuit Pack
	- port OUTCORP on RPG or RPG(DCF) Circuit Pack - port INCORP on OA(OADM LineOut)	`APR active: fiber disconnect RPG to OA for Raman co-pumps`	Raman co-pumps in RPG or RPG(DCF) Circuit Pack

APR for Circuit Pack Warmup, Removal/Latch Protection, and Failure

Circuit pack warmup in progress

The waveguides in the OD, RP, and OA require a stable temperature. If the temperature of one of these packs drifts out of range, the traffic from one channel may be routed to another channel, resulting in crossed traffic. APR for circuit pack failure and APR for circuit pack removal are not cleared until the packs have warmed up to the required temperature range.

Circuit pack removal/latch protection

There is a mechanical cover over the fiber connector, prohibiting removal of a fiber jumper until the circuit pack latch has extracted the CP from the backplane, removing power.

This latch is present on the following circuit packs

- OA
- RP, RP(50G/100G)
- OD(0GHz offset), OD(40G 0GHz offset), OD(50GHz offset), OD(OADM 0GHz offset)
- RPG, RPG(DCF)

Circuit pack failure

Once *LambdaXtreme*™ Transport detects a circuit pack failure, it will stop monitoring the pack for faults, because the pack will need to be replaced. Any subsequent APR condition, such as fiber disconnects or switch openings, would not be detected thereby exposing the customer to high power levels. Hence as a protective measure, APR is invoked.

APR conditions for circuit pack warmup, removal, and failure

Cause of Failure	Alarm Conditions	Components involved in power reduction
SCTL detects removal or failure of: • OA(Raman) • OA(Raman, EDFA)	• OA removed or OA failure • APR active-line	• RPG Raman Growth Copropagating Pumps • RPG Raman growth DCF Counterpropagating Pumps • RP Raman Startup Counterpropagating Pumps • RPG Raman Growth Counterpropagating Pumps
SCTL detects removal or failure of: • OA(VOA) • OA(DGEF)	• OA removed or OA failure • APR active-line	• RPG Raman Growth Copropagating Pumps
SCTL detects removal or failure of OA (OADM LineOut)	• OA removed or OA failure • APR active: line	RPG Raman Growth Copropagating Pumps
SCTL detects warmup, removal or failure of OA(OADM LineIn)	• OA warmup in progress, OA removed, or OA failure • APR active: line	• RP Raman Startup Counterpropagating Pumps • RPG Raman Growth Counterpropagating Pumps • RPG Raman growth DCF Counterpropagating Pumps • OA(OADM Thru) • OA(Preamp High Gain)

Cause of Failure	Alarm Conditions	Components involved in power reduction
SCTL detects removal or failure of OA(OADM Thru) in OADM	• `OA removed` or `OA failure` • `APR active: line`	• RP Raman Startup Counterpropagating Pumps • RPG Raman Growth Counterpropagating Pumps • RPG Raman growth DCF Counterpropagating Pumps • OA(OADM LineIn) Raman DCF Counterpropagating Pumps • OA(OADM LineIn) • OA(Preamp High Gain)
SCTL detects removal or failure of: • OA(OADM LineIn) • OA(OADM Thru) in OADM	• `OA removed` or `OA failure` • `APR active: line`	• RP Raman Startup Counterpropagating Pumps • RPG Raman Growth Counterpropagating Pumps • RPG Raman growth DCF Counterpropagating Pumps • OA(OADM LineIn) Raman DCF Counterpropagating Pumps • OA(OADM Thru) • OA(OADM LineIn) • OA(Preamp High Gain)
SCTL detects removal or failure of RP at 40G End Terminal	• `RP removed` or `RP failure` • `APR active: line`	RPG Raman growth Counterpropagating Pumps
SCTL detects warmup, removal or failure of RP at 10G End Terminal	• `RP warmup in progress, RP removed,` or `RP failure` • `APR active: line`	• RPG Raman Growth Counterpropagating Pumps • OA(Preamp High Gain)
SCTL detects removal or failure of RP at OADM	• `RP removed` or `RP failure` • `APR active: line`	• RPG Raman Growth Counterpropagating Pumps • RPG Raman growth DCF Counterpropagating Pumps • OA(OADM LineIn) Raman DCF Counterpropagating Pumps

Cause of Failure	Alarm Conditions	Components involved in power reduction
SCTL detects removal or failure of RP at Repeater	• `RP removed` or `RP failure` • `APR active: line`	• RPG Raman Growth Counterpropagating Pumps • RPG Raman Growth DCF Counterpropagating Pumps • OA(Raman), OA(Raman EDFA) DCF Counterpropagating Pumps
SCTL detects OD warmup, removal, or failure	• `OD warmup in progress,` `OD removed,` or `OD failure` • `APR active: OA (preamp)`	OA(Preamp)
SCTL detects in OADM the warmup, removal, or failure of: • OD(OADM 0 GHz offset) • OD(100 GHz offset)	• `OD warmup in progress,` `OD removed,` or `OD failure` • `APR active: OA (preamp)`	• RP Raman Startup Counterpropagating Pumps • RPG Raman Growth Counterpropagating Pumps • RPG Raman growth DCF Counterpropagating Pumps • OA(OADM LineIn) Raman DCF Counterpropagating Pumps • OA(OADM Thru) • OA(Preamp High Gain)
SCTL detects removal or failure of OM(OADM 0 GHz offset)	• `OM removed` or `OM failure` • `APR active: OA (OADM-add)`	OA(OADM Add)
SCTL detects failure of RPG in OADM	• `RPG failure` • `APR active: line`	• RP Raman Startup Counterpropagating Pumps • OA(OADM LineIn) Raman DCF Counterpropagating Pumps • OA(OADM Thru) or OA(OADM LineIn) • OA(Preamp High Gain)

APR for Port Switch Protection Cases

Description   If a contaminated (dirty) fiber is disconnected with high levels of power present, permanent damage to the fiber can occur. The ***Switch protection*** feature is designed to protect the fiber by ensuring 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, making 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.

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Situations when APR is not available

Overview

The capability to trigger APR is unavailable when certain high-powered cicuit packs are in the process of booting, or when certain SCTL circuit packs have been removed, have failed, or are in the process of booting.

When APR is unavailable a message is displayed at the CIT as soon as the action that causes APR to be unavailable occurs: APR—NOT AVAILABLE—CLASS 4 LASER POWER CAN BE ACCESSIBLE IN THE EVENT OF A DISCONNECT OR FIBER BREAK.

The following user-initiated events will cause a system reboot, causing APR to be temporarily unavailable:

- Issuing the ENT-SYS and INIT-SYS TLI commands
- Pushing the restart button on the Office Alarms Display Assembly

APR unavailable at End Terminal

APR is unavailable in an End Terminal under the following conditions:

- Boot, failure, or removal of the SCTL in A1–1–15
- Boot, failure, or removal of the SCTL in A2–1–15 if growth packs are installed

APR unavailable at OADM Terminal

APR is unavailable in an OADM Terminal during the boot process of the following packs:

- Boot, failure, or removal of the SCTL in A1–1–15
- Boot, failure, or removal of the SCTL in A2–1–15
- Boot, failure, or removal of the SCTL in A1–3–15
- Boot, failure, or removal of the SCTL in A2–3–15

APR unavailable at Repeater

APR is unavailable in a Repeater under the following condition:

- Boot, failure, or removal of the SCTL

□

4   Performance Monitoring

Overview

Purpose   Performance Monitoring (PM) refers to the in-service, non-intrusive monitoring of transmission and equipment quality. *LambdaXtreme*™ Transport systematically tracks the signal quality and equipment health through continuous collection and analysis of data obtained by observing its performance. Performance parameters may be either analog or digital for each entity that is measured and are monitored for both proactive and reactive maintenance. Many performance parameters in this section have thresholds that may be set. Crossing of a performance parameter threshold indicates a potential network quality or performance degradation while the services being transported have not failed. If a condition continues to deteriorate, then alarms are raised and immediate attention may be required to resolve or repair the problem. Parameters are measured, monitored and reported to CIT and EMS users (via TL/1) and have user-provisionable thresholds. Performance Monitoring exists for optical lines, channels (both data traffic and supervisory) and for monitoring equipment health.

Features   The *LambdaXtreme* Transport System provides the following performance monitoring features:

- Full support of SONET and SDH parameters based on digital parity checking of the given client SONET/SDH signal, Supervisory signal or Wavewrapped signal

- Support of analog parameters based on optical power measurements for Optical Line, Optical Channels, and Supervisory channel

- Support for current 15-minute and 32 previous 15-min bins, as well as current-day and 6 previous day registers for tracking and reporting each analog and digital PM parameter

- Initialization of current 15-minute and/or current day registers for digital parameters at any time

- User settable start time of day registers

- Parameter baselining (automatic or user-initiated) for provisionable analog PM parameters

- User settable TCA/QOS thresholds for provisionable PM parameters

- User notification of TCA/QOS autonomous event warning messages

- Clearing of TCA/QOS events for analog parameters

- Retrieval of TCA/QOS alarm messages via CIT and message based EMS interfaces

- Retrieval of PM data and threshold data per accumulation time interval through the CIT or message-based OS interface

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Performance Parameters

Overview

Purpose   This section provides information on the various performance parameters that the system supports. Knowledge of these parameters can be of assistance during trouble-clearing procedures.

Contents

Optical Line Analog Performance Parameters

Total Optical Power Received (TOPR-OL)

This is the total amount of optical power that is being received from the optical line. The TOPR-OL parameter has an associated baseline value and user-provisionable performance thresholds. Performance parameter thresholds are set to show degraded performance by generating a defined notification from changes in parameter values. The thresholds are set relative to the baseline value. The baseline value can be established automatically or manually with an externally initiated user command. The baseline value is displayed in the PM report, next to the currently measured value, in dBm.

Re-baselining

Important! Baselining is done automatically when a channel is added or removed. Re-baselining can be initiated manually by an external user command.

⚠️ **CAUTION**

When TOPR-OL is re-baselined, any optical line that is in a defect state (LOS or AIM) is not re-baselined. If LOS occurs in one or more channels, baselining the TOPR-OL may result in an incorrect baseline value. Do not re-baseline if a LOS condition occurs for a channel.

Total Optical Power Transmitted (TOPT-OL)

This is the total amount of optical power that is being transmitted on the optical line. The TOPT-OL parameter has an associated baseline value and user-provisionable performance thresholds. Performance parameter thresholds are set to show degraded performance by generating a defined notification from changes in parameter values. The thresholds are set relative to the baseline value. The baseline value can be established automatically or manually with an externally initiated user command. The baseline value is displayed in the PM report, next to the currently measured value, in

Important! Baselining is done automatically when a channel is added or removed. Re-baselining can be initiated manually by an external user command.

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Optical Channel Analog Performance Parameters

Signal Power Transmitted Per Channel (SPT-C)

This is the signal power transmitted for the specified optical channel. This parameter is measured by the OMON at the outside plant-facing OA at every NE in the OLS. The SPT-C parameter has an associated baseline value and user-provisionable performance thresholds. Performance parameter thresholds are set to show degraded performance by generating a defined notification from changes in parameter values. The thresholds are set relative to the baseline value. The baseline value can be established automatically or manually with an externally initiated user command. The baseline value is displayed in the PM report, next to the currently measured value, in dBm.

Re-baselining

If thre are fewer than eight channels present on a line, then all the channels on a line are automatically re-baselined when a new channel is added. If a ninth channel is added, then only the new channel is re-baselined.

Upon deletion of an optical channel, if there are fewer than eight channels remaining, then all the optical channels are automatically baselined. Re-baselining can be initiated manually by an external user command.

⚠️ **CAUTION**

When an attempt to update the baseline SPT-C value is made, any optical channel that is in a defect (LOS) state will not be baselined.

Signal Power Received Per Channel (SPR-C)

This is the amount of per-channel optical power that is being received, as measured by the OMON at the RP circuit pack in every NE of the OLS. The SPR-C parameter has an associated baseline value and user-provisionable performance thresholds. Performance parameter thresholds are set to show degraded performance by generating a defined notification from changes in parameter values. The thresholds are set relative to the baseline value. The baseline value can be established automatically or manually via externally initiated user command. The baseline value is displayed in the PM report, next to the currently measured value, in dBm.

Re-baselining

Baselining is done automatically when a channel is added. Upon deletion of an optical channel, if there are fewer than eight channels remaining, then all the optical channels are automatically baselined. Re-baselining can be initiated manually by an external user command.

⚠ CAUTION

When an attempt to update the baseline SPR-C value is made, any optical channel that is in a defect (LOS) state will not be baselined.

Report Inhibiting   Autonomous reporting of the SPR-C Threshold Crossing Alerts (TCA)/Quality of Signal (QOS) is inhibited during periods of defect conditions that directly impact the measure, such as:

- OTS LOS

- Incoming optical channel LOS

- WW LOS

In addition, any outstanding TCA/QOS is cleared.

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OT Analog Parameters

Optical Power Received (OPR)

This is the amount of optical power being observed by the circuit pack (OT) optical receiver. OPR is an internally monitored parameter with factory -calibrated (non-provisionable) thresholds. During normal operations, the parameter is measured regularly and reported as being *IN-RANGE* or *OUT-OF-RANGE*. If the measured value is not within the factory-specified operational range, then a TCA is raised. Subsequently, if the value falls within the operational range, then the TCA is cleared.

Optical Power Transmitted (OPT)

This is the amount of optical power being sent by the circuit pack (OT) optical transmitter. OPT is an internally monitored parameter with factory- calibrated (non-provisionable) thresholds. During normal operations, the parameter is measured regularly and reported as being *IN-RANGE* or *OUT-OF-RANGE*. If the measured value is not within the factory-specified operational range, then a TCA is raised. Subsequently, if the value falls within the operational range, then the TCA is cleared.

□

OT Digital Performance Parameters

Overview   The OT digital parameters are based upon digital parity checking of the given client SONET/SDH signal or line WaveWrapped signal.

Monitored Parameters   Refer to Table 4-1, "Monitored WaveWrapper Performance Parameters" (4-8) for a list of WaveWrapper performance parameters that are monitored by the *LambdaXtreme*™ Transport System.

Table 4-1   Monitored WaveWrapper Performance Parameters

Sonet	SDH
CV	BBE
ES	ES
SES	SES
SEFS	SEFS
LOSS	LOSS
	UAS

CV/BBE

Code Violation counters are incremented for each BIP error detected at the layer.

Background Block Error counters are incremented by 1 if the received BIP does not match the BIP calculated from the previous block.

ES

An *Errored Second* is a count of one-second intervals containing errors.

SES

A *Severely Errored Second* is a count of one-second intervals containing errors above a threshold.

SEFS

A *Severely Errored Frame Second* is a count of one-second intervals containing one or more SEF defects.

LOSS

A ***Loss Of Signal Second*** is a count of one-second intervals containing one or more LOS defects.

UAS

Unavailable Seconds begin at the onset of 10 consecutive SES events. For SDH only.

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Supervisory Performance Parameters

Supervisory Analog Performance Parameters

Signal Power Transmitted (SPT-SU) is the total amount of optical power that is being transmitted on the supervisory channel. The SPT-SU parameter has an associated baseline value and user-provisionable performance thresholds. Performance parameter thresholds are set to show degraded performance by generating a defined notification from changes in parameter values. The thresholds are set relative to the baseline value. The baseline value can be established automatically or manually with an externally initiated user command. The baseline value is displayed in the PM report, next to the currently measured value, in dBm.

Important! Baselining is done automatically during initial system installation. Re-baselining can be initiated manually by an external user command.

Supervisory Digital Performance Parameters

The Supervisory circuit pack monitors a series of parity errors for the health of the Supervisory Channel. The SUPVY signal operates at a data rate of 140 Mbps and is formatted according to the standards for an OC-3 signal format, with respect to framing, CRC error monitoring, and channel numbering. The first time slot (Channel 0) is used for framing (FRM) and parity error checking (CRC Checksum Errors.)

Refer to Table 4-1, "Monitored WaveWrapper Performance Parameters" (4-8) for a list of SONET physical layer performance parameters that are monitored by the *LambdaXtreme*™ Transport System.

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Performance Data Processing

Overview

Purpose   This section describes the way in which performance monitoring data is collected and processed. It also includes information about default values for digital parameter registers and analog parameter baselining.

Performance Data Collection

Circuit Pack Removal

When a circuit pack is removed, only the current performance data associated with the circuit pack is discarded.

Performance Monitoring Registers

Registers are used to track and report performance data. Performance Mangement registers exist for both 15-minute and 24-hour data bins for each of the analog and digital parameters.

Initialization of Performance Monitoring Registers

PM registers may be initialized (set to zero) individually or as an associated group. Initialization can be performed through the CIT or through EMS.

Time Aspects of Performance Monitoring Registers

All parameters of the same duration begin and end at the same time. The 15-minute bins start on the hour, the quarter of the hour, the half-hour, and at three-quarters past the hour.

The 24-hour bin start time is user-provisionable, but the 15-minute bin start time is not user-provisionable.

The 15-minute and 24-hour intervals are accurate to within +/-10 seconds. The start of the 15-minute and 24-hour counts are accurate to within +/-30 seconds with respect to the *LambdaXtreme*™ Transport clock (for example, a 15-minute register may begin its 2:00 count between 1:59:30 and 2:00:30).

As each register records a new value, the previous value is moved to the previous register. The earliest value is discarded as each new value is recorded.

Whenever a storage register is exceeded for a digital parameter, the register does not roll over, but stays at the maximum value, and is re-initialized at the end of the time period.

If the time of day setting in *LambdaXtreme* Transport is changed, then the current digital register may contain overflow or partial error counts. For example, if date/time is reset before the end of a quarter hour, the current register will continue to be incremented until the duration for the 15 minute has been completed. This may cause register overflow since the time accumulated is over 900 seconds.

Invalid Data Indicator

Each parameter register (current 15 minute, 32 previous 15 minutes, current day, and 6 previous day) has an associated status indicator for the monitored value. This indicates the validity of the PM data (invalid data flag) or the PM data is out of the threshold range. The status indicator is displayed in addition to the value in the PM Report.

This indicator will set to invalid for any of the following reasons:

- The register contains data for a period greater or less than the nominal accumulation range/period. The status indicator indicates OVFL (overflow) or PRTL (partial). This occurs when:

    - *LambdaXtreme* Transport is restarted

    - The current register is reset

    - The *LambdaXtreme* Transport system's time is changed, causing the current accumulation period to be lengthened or shortened by more than 10 seconds

    - the counter overflow is reached

□

Analog Parameter Baselining

Overview   Baselining is defined as measuring the current power level and saving it as the expected nominal operational value for that parameter. The purpose of a baseline value is to provide a basis from which to measure deviation from nominal in the parameter value.

Baselining optical power levels is done automatically or through a user command (Manual Baselining or Re-Baselining), and applies to provisionable parameters.

Automatic Baselining   Automatic Baselining establishes a reference power level for optical analog parameters at the time of baselining. If necessary, these parameters can be re-baselined manually using TL/1 commands

Manual Baselining   All provisionable analog parameters can be manually baselined through the CIT, or with user-initiated TL/1 commands using the CIT or the EMS interface.

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Automatic Baselining

When Automatic Baselining Occurs

LambdaXtreme™ Transport performs automatic baseline in the following situations:

- Initial system installation
- The addition of a single, bidirectional optical channel from an optical line
- The deletion of a single, bidirectional optical channel from an optical line

Important! Automatic baselining is not performed after the replacement of an OA, RP, OD, OM, OT, or Supervisory circuit pack.

Initial System Installation

Following an initial system installation, automatic baselining is performed on the *SPT-SU* parameter.

Important! *LambdaXtreme* Transport does not automatically rebaseline a parameter upon system initialization once it has been baselined.

Add A Single Optical Channel

Automatic baselining is performed when a new optical channel is added.

If there are eight (8) or more channels present in the line before the addition of the new channel, the following parameters are automatically baselined:

- SPT-C for the newly added optical channel
- SPR-C for the newly added optical channel

If there are fewer than eight (8) channels present in the line before the addition of the new channel, the following parameters are automatically baselined:

- SPT-C for all optical channels with no active LOS condition
- SPR-C for all optical channels with no active LOS condition

The following parameters are automatically baselined:

- TOPR-OL for the optical line
- TOPT-OL for the optical line

Important! Any channel with an active LOS or AIM condition is not automatically baselined.

Delete a Single Optical Channel   Automatic baselining will be performed when an optical channel has been deleted.

If there are eight or fewer channels present in the optical line after the deletion of the channel, the following parameters are automatically baselined:

- SPT-C for all optical channels with no active LOS condition, and
- SPR-C for all optical channels with no active LOS condition

The following parameters are automatically baselined:

- TOPR-OL for the optical line
- TOPT-OL for the optical line

□

Manual Baselining

Baselining Commands   The TL/1 threshold provisioning commands are:

- SET-BASELINE-OCHAN for baselining analog parameters, SPR-C and SPT-C

- SET-BASELINE-OLINE for baselining analog parameters, TOPT-OL and TOPR-OL

- SET-BASELINE-SUPR for baselining analog parameter SPT-SU

The TL/1 retrieve commands used for retrieving the baseline values are:

- RTRV-BASELINE-OCHAN

- RTRV-BASELINE-OLINE

- RTRV-BASELINE-SUPR

Important! During initial installation, the baseline value for at least one of the parameters SPR-C, SPT-C, TOPR-OL, TOPT-OL must be established with an externally initiated user command. Once the baseline value is established for at least one of the parameters, then the other parameters will be automatically baselined for all existing signal(s). Baselining is independent of external equipment, such as when an Optical Spectrum Analyzer (OSA) is added or installed.

Thresholds

Overview

Purpose   This section provides information on analog and digital performance parameter thresholds, provides background information on each type, and categorizes those which can and cannot be user-provisioned.

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Performance Parameter Thresholds

Overview

Performance parameter thresholds are set to show degraded performance. Two types of thresholds are:

- Counter-Threshold, which is associated with digital parameters and can be user-provisioned.

- Gauge-threshold, which is associated with analog parameters, and can be user-provisioned.

Gauge-Thresholds

LambdaXtreme™ Transport uses gauge-thresholds for all analog parameters. Unlike counter parameters, which can only increase in value until reset, the value of a gauge parameter can increase or decrease over time.

Thresholds are set and reported using relative dB values. By using relative values, new high and low thresholds are automatically adjusted after re-baselining.

Each provisioned analog parameter has four associated thresholds:

- notifyHigh, user provisionable

- clearHigh, non-user provisionable

- notifyLow, user provisionable

- clearLow, non-user provisionable

High Threshold

Defines the value that the gauge must reach or exceed in order to optionally generate a QOS notification. The notifyHigh value, when combined with the notification switch state, controls the generation of the QOS notification. Initially, if the switch is on and the gauge value becomes equal to or greater than the notifyHigh value (in a positive going direction,) then the defined event notification is triggered. Subsequent crossings of the high threshold's gauge value do not generate additional event reports unless the gauge value becomes equal to or less than the clearHigh value.

Low Threshold

Defines the value that the gauge must fall below in order to optionally generate a QOS notification. The notifyLow value, when combined with the notification switch state, controls the generation of the QOS notification. Initially, if the switch is on and the gauge value becomes equal to or less than the notifyLow value (in a negative direction,)

then the defined event notification is triggered. Subsequent crossings of the low threshold's gauge value do not generate additional event reports unless the gauge value becomes equal to or greater than the clearLow value.

Counter Thresholds

Counter thresholds are accumulative in nature and are used for reporting digital Performance Measurement parameters, such as Coding Violations (CVs.) A counter threshold has only one threshold value. Users are able to provision thresholds for both the 15-minute bin and the 24-hour bin registers.

Non-provisionable thresholds

Some parameters that check laser aging or equipment failures are monitored internally. These parameters have a high threshold and a low threshold, neither of which are user provisionable or retrievable. The threshold values are factory calibrated. During normal operation, each parameter is measured and compared with the high and low thresholds associated with that parameter and circuit pack failure declared if the thresholds are exceeded. These parameters are referred to as internal non-provisionable parameters.

However, two non-provisionable parameters, namely OPR and OPT, are monitored as analog performance parameters. Each parameter has an associated factory-set high and low threshold for generating the performance monitoring related QOS notification.

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Parameter Threshold Provisioning

Threshold provisioning using the CIT

For information about how to use the CIT to provision thresholds, see the Appendix of the *LambdaXtreme™ Transport User Operations Guide, Release 1.1,* (365-575-781R1.1).

Threshold provisioning commands

The TL/1 threshold provisioning commands are:

- SET-TH-OTPS for provisioning thresholds of OT related digital PM parameters
- SET-TH-OCHAN for provisioning thresholds for SPR-C and SPT-C analog parameters
- SET-TH-OLINE for provisioning thresholds for TOPT-OL, TOPR-OL analog parameters
- SET-TH-OLINE for provisioning thresholds for TOPT-OL, TOPR-OL analog parameters

The TL/1 threshold retrieval commands are:

- RTRV-TH-OTPS
- RTRV-TH-OCHAN
- RTRV-TH-OLINE
- RTRV-TH-SUPR

□

QOS Alarm Events

Introduction   The Quality of Service (QOS) notification message is reported to the EMS and interfaces where threshold crossings associated with a particular path can be correlated and the most probable source of the degradation can be identified.

Important! To activate TCAs, you must turn on QOS for the required PM parameter(s) from the CIT GUI or TL/1 command

Reporting   The *LambdaXtreme*™ Transport System reports threshold crossings as Quality of Service (QOS) alarm messages/event notifications on the individual parameters monitors. A QOS alarm message is triggered whenever a monitored performance parameter crosses the high or low threshold associated with the parameter.

Message Characteristics   The QOS event/notification autonomous messages have the following characteristics:

- The messages are reported as autonomous alarm messages to the EMS and user interface

- QOS does not raise any visual or audible alarms

- Alarm messages can be retrieved in the CIT TL/1 RTRV-ALM-ALL report

- A QOS entry is logged in the history report which may then be retrieved by the user

QOS Alarm Levels   The QOS Alarm Indicator is "NA" (Not Alarmed) for SONET, and "No Alarm" for SDH.

Clearing QOS Alarms

clearHigh   The clearHigh alarm-clearing threshold defines the value that the gauge must reach in order to clear the QOS notification. This value, when combined with the switch state, controls the clearing of the notification. If notifyHigh's on/off switch is on and the gauge value becomes equal to or less than the clearHigh's gauge value (in the negative going direction) then the defined event notification is cleared.

Important! ClearHigh is non-provisionable and is fixed to be 10% lower than the value of notifyHigh.

clearLow   The clearLow alarm-clearing threshold defines the value that the gauge must reach or exceed in order to clear the QOS notification. This value, when combined with the switch state, controls the clearing of the notification. If notifyLow's on/off switch is on, and the gauge value becomes equal to or higher than notifyLow's gauge value (in a positive going direction), then the defined event clearing is triggered.

Important! ClearLow is non-provisionable and is fixed to be 10% higher than the value of notifyLow.

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5 Fault Management with Navis™ Optical EMS

Overview

Purpose   This chapter provides general information about monitoring alarms and conditions in a subnetwork of network elements managed by the Navis™ Optical EMS. It also provides general information about the Log Management features provided by the Navis™ Optical EMS for displaying and viewing alarm/event data, NE commands/responses, and other messages generated by the Navis™ Optical EMS and managed network elements.

Reference

For detailed information about Fault Management using Navis™ Optical EMS, see *Navis™ Optical Element Management System (EMS) Maintenance Guide, Release 8.0,* 190-224-157R8.0.

Contents

Fault Management

Overview   Fault Management monitors alarms and conditions in the subnetwork. Users can access Fault Management functions from the Main Menu, or by accessing the pop-up menu on an NE or Aggregate icon in the Map window, or on the items listed in tables or other screens. Some important Fault Management features include the alarm summary and alarm list, viewing autonomous alarms as they are received, alarm throttling, and visible alarm indicators.

The Navis™ Optical EMS receives autonomous alarm messages from NEs when alarm states are set or cleared. These alarm messages are processed and made available to the user through the GUI. Following is a complete list of Fault Management features, all of which are available to the user through the GUI.

In addition to the above alarm windows and reports, the Map window indicates which NEs and aggregates have alarms and their severity level by different colors. Also, the EMS host icon indicates the alarm status of the host. Furthermore, the Map window indicates which NEs have unacknowledged alarms (by flashing those nodes), and which NEs have exceeded the alarm throttling threshold (with a gray square in the center of the icon).

Alarm notification   One of the ways the Navis™ Optical EMS keeps you informed about current alarms and standing condition (SC)events is via the Alarm Notification window. This window contains information on the type and number of current alarms and events in the subnetwork. It remains open on your screen, and comes to the front each time another alarm is received by the Navis™ Optical EMS.

Figure 5-1, "Alarm Notification Window" (5-2) shows an example of the Alarm Notification window.

Figure 5-1   Alarm Notification Window

The Alarm Notification window consists of two rows of alarm/event data.

The first row shows a current tally of the total outstanding alarms/events, broken down by alarm/event category. Depending on the setting of the Alarm Display option done via the Preferences window, the Alarm Notification window shows the current number of Critical, Major, Minor alarms, Not Alarmed (which represents Standing Condition events that require clearing), and Communication alarms or the current number of Prompt, Deferred alarms, No Alarms (which represents Standing Condition events that require clearing), and Communication alarms.

The second row shows a current tally of unacknowledged alarms/events, broken down by alarm/event category, as explained above.

The total number of alarms or events for a category is automatically updated whenever a new alarm or event of that alarm category is received. The count of unacknowledged alarms/events in a category decreased by one whenever an alarm or event of that category is acknowledged. Alarms/events are acknowledged either by using one of the Alarm Acknowledgement functions in the Fault GUI or by selecting an alarm or event on the Alarm List and acknowledging it.

The color of each alarm category box is the default color for each alarm category (unless you change the color used for an alarm category through the Preferences option via the View Preferences menu selection on the Map window main menu).

The following table shows the default system colors used to indicate each alarm severity level or communication status.

Table 5-1   Default System Colors for Alarm Severity Levels

Alarm Color (default)	Alarm Severity Level (SONET)	Alarm Severity Level (SDH)
Red	Critical	Prompt
Yellow	Major	Prompt
Cyan	Minor	Deferred
Gray	Throttled	
Green	No Active Alarms	

**Table 5-1   Default System Colors for Alarm Severity Levels
(continued)**

Alarm Color (default)	Alarm Severity Level (SONET)	Alarm Severity Level (SDH)
Magenta	Loss of Communications	
White	Not Alarmed state	Not Alarmed state

For additional instructions on how to modify user preferences, see the *Navis™ Optical EMS Provisioning Guide*.

When the color of an NE is white on the Map window (the default color), this indicates that the NE is in a "Not Alarmed" state, or has received one or more Standing Condition (SC) events which require clearing by the NE. When the SC event has been cleared by the NE, the color of the NE returns to green, indicating that there are no active alarms present and the NE is communicating.

You can click on any of the alarm category boxes in the Total Alarms row to display the Alarm List window and obtain a list of the currently active alarms for that category. If you click on the Communications alarms box, a list of NEs that are currently not communicating with the system is displayed. The Alarm List window is only displayed if there is one or more active alarms or standing condition events for the selected alarm category.

Below the two rows of alarm/event data is the Click Here to Retrieve Alarm List button. When you click this button, the Alarm List window is displayed with a complete list of all current alarms for all NEs (if no alarm filtering has been enabled) in the user's Target Group.

If the Alarm Tally Popup option is enabled on the Fault panel of the Preferences window, when a new alarm is received by the Navis™ Optical EMS, the Alarm Notification window is brought to the forefront of the GUI display to signal the arrival of the new alarm. Also, the text on the Click Here to Retrieve Alarm List button changes, displaying a message that shows the Navis™ Optical EMS host, affected NE, alarm severity (such as Critical, Major, or Minor), affected NE component, and alarm message text, time the alarm occurred, and, if there was an alarm resync, the time the resync occurred. The totals in the Total Alarms row on the window are automatically updated to account for the new alarm.

Once displayed, the Alarm Notification window remains open during the GUI session.

NE alarm summary

The Alarm Summary feature provides a single-line overview of alarm information for each node in an aggregate. This information is provided via the NE Alarm Summary window on the GUI. This window lists the NEs in your Target Group and displays the number of Critical, Major, Minor and Not Alarmed (standing condition) alarms/events (for SONET) or Prompt, Deferred, and Informational (standing condition) alarms/events (for SDH) for each NE. The alarms can be listed by severity or TID.

Trail alarm summary

The Trail Alarm Summary feature provides a single-line overview of alarm information for each trail in the subnetwork. This information is provided via the Trail Alarm Summary window on the GUI. This window lists the trails in your Target Group and displays the number of Critical, Major, Minor and Not Alarmed (standing condition) alarms/events (for SONET) or Prompt, Deferred, and Informational (standing condition) alarms/events (for SDH) for each NE. The alarms can be listed by severity or trail.

Alarm list

The Alarm List contains a line of various information about each active alarm in an NE. You can sort the list using various critieria, such as alarm severity and age, age alone, condition, date/time logged, and acknowledged vs. unacknowledged. You can also acknowledge or unacknowledge the alarms listed here.

Alarm indication and acknowledgement

The Alarm Indicator feature graphically indicates the arrival of new alarms by flashing the impacted nodes and aggregates. If there are one or more alarms against an NE and alarm indication is enabled, that node will flash (in the color of the highest severity alarm). Likewise, if there are one of more alarms against one or more NEs in an aggregate and alarm indication is enabled, that aggregate will flash. (When all the alarms against an NE or aggregate are acknowledged it no longer flashes.) Users should acknowledge alarms for which they are responsible. (The system tags the acknowledgment so that other users will not attempt to troubleshoot the same problem.)

Double acknowledgement of alarms

The Navis™ Optical EMS has a "Double Acknowledgement" capability for alarms that can be enabled at system installation time. It

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is disabled, by default. When set, Double Acknowledgement assures that a cleared alarm is acknowledged before the alarm is removed from the Alarm List for an NE.

Alarm details

Alarm Details are available to the user via the Alarm List window. This window contains a line of information about each active alarm in an NE or aggregate. Before acknowledging an alarm, it is a good practice to display it on the Alarm List window to check the details and make sure you want to acknowledge it. You can then perform the acknowledgement right from the Alarm List window.

Trail alarms

Trails are physical links between NEs. The system monitors all existing trails for alarm conditions.

NEs can only automatically discover and report to Navis™ Optical EMS trails over which there is an active Data Communications Channel (DCC). Users can, however, add trails between any pair of termination points on NEs.

The following Information about trail alarms that have occurred can either be displayed on the Alarm Summary window or by selecting the trail:

• Trail Alarm Summary Window—this lists a count of critical, major, and minor alarms for the AIDs that terminate the trail between two NEs.

• Trail Alarm List—this contains a line of information about each active alarm for the trails between two NEs. This information includes alarm severity, occurrence date/time, condition, and date/time logged.

Alarm resynchronization

Alarm Resynchronization provides the ability for the system to update its alarm list, autonomous message log, and command/response log from network elements in the subnetwork whenever any outage of NE communications occurs. The system automatically resynchronizes alarms whenever the communications status with an NE changes from "down" to "up."

Before resynchronizing alarms for an NE, the user should disable the automatic/manual alarm throttling control for the NE. Alarm resynchronization does not work unless the NE is in an unthrottled state.

The alarm resynchronization process does not clear the existing GUI display and alarm notification/list displays during the resynchronization process, but rather retains the existing alarms until the resynchronization is completed. The system can distinguish between:

- standing alarms that already exist in the GUI and alarm/notification list displays

- new alarms

- alarms that are cleared by the NE between resynchronizations.

This allows the system to incrementally update the GUI display and alarm notification/list displays to accurately indicate the subnetwork status to the user.

Alarm throttling   The Alarm Throttling feature enables you to limit the amount of autonomous messages and Critical autonomous messages that should be monitored for an NE.

Alarm throttling can be done on demand for an NE through the Alarm Throttling option on the NE's pop-up menu or be set up to occur automatically when the number of alarms exceed a specified threshold. An alarm throttle level between zero and 3,600 per hour can be specified in the Automatic Alarm Throttling window. The recommended initial level is 100 messages per hour (and this is the default). If an NE has been enabled for alarm throttling and the number of alarms in the NE exceeds the set level, the NE is automatically put on throttled, or partial, alarm monitoring.

The Alarm Throttling feature is useful during events, such as an initial network turn-up (or maintenance activity), where large numbers of messages are generated by an NE. Throttling alarm only allows alarms of a Critical priority to be displayed on the GUI, sent upstream to an OS, or retrieved via alarm queries. (Non-maintenance-related messages are not affected by alarm throttling and continue to be logged in the normal manner.)

Audible alarms/events   The Audible Alarm feature provides an alternative way to alert the user to existing alarms or standing condition (SC) events. The following list provides an overview of audible alarm specifications:

- Audible alarms are generated at each system interface screen.

- To eliminate possible confusion, the characteristics of the audible alarm (that is, sound, duration, and interval between sounds) is common to all users of the host.

- Individual user interface users can enable or disable the audible alarm feature for their respective system user interface screens.

- The Map window contains the audible alarm symbol near the upper middle of the screen. The symbol is a speaker if the audible alarm is enabled, or a speaker with a slash through it if disabled.

- When the audible alarm is enabled, an audible alarm is initiated at the onset of each new alarm or Standing Condition (SC) event, with sound characteristics that correspond to the severity level of the most severe alarm/SC event. When there are multiple concurrent alarms or SC events of different severity levels, the sound emitted corresponds to the most severe unacknowledged prevailing alarm or SC event.

- Audible alarms last for a short duration and are repeated after a set time interval, until quieted by the user.

When you log off Navis™ Optical EMS and then log in again, the Audible Alarm feature is enabled. You can disable it The audible alarm sounds are initially loaded with system default settings. These settings can be adjusted by the system administrator.

Alarm browser   The Alarm Browser lets you view alarms and clear messages for the NEs in your Target Group as they occur. Specifically, it captures `alarm` and `clear` messages that are received from NEs in your Target Group and displays them in the Browsing Alarm Audit Log window on your workstation screen.

Alarm filtering   Alarm filtering is the selective removal of alarm messages from being forwarded to the GUI. Alarm filtering can be applied to reduce the number of alarms forwarded to the GUI caused by intermittent failure, or to filter symptomatic alarms associated with a reported signal failure, such as those that occur during a fiber cut. All alarms that are filtered out are logged in the Navis™ Optical EMS and can be viewed through the Alarm Browser.

Types of Alarm Filtering

The Navis™ Optical EMS uses three basic methods to reduce the number of alarms to be displayed:

- Aging—waiting for a pre-set time period to eliminate alarms that are caused by temporary failures (and are cleared within a time period shorter than the aging interval)

- Event-per-Time (EPT) Filtering—EPT, which is primarily an alarm reduction technique, filters transient condition (TC) events such as PM Threshold Crossing Alerts (TCAs). To forward all TC events, set the EPT count to zero. Both the time and number of TEs can be adjusted to only log TCs that exceed the expected normal level.

- Symptomatic Alarm Filtering—Symptomatic Alarm Filtering (SAF) filters out a set of pre-defined symptomatic NE alarms and standing condition (SC) events. The filtering is based on the Probable Cause (Condition Type) of the alarms and SC events received from all NEs, including the EMS-based alarms. The list of Probable Causes for SAF filtering is specified in the SAF filter parameter file, which is a UNIX flat file that can be edited using standard UNIX editing tools such as `vi`. Any alarm (including NE and EMS alarms) that match a Probable Cause specified in the SAF filter parameter file is filtered out. Alarms and events that are filtered out are not shown in the Map window or alarm lists. The SAF filter does not differentiate between NE types for the source of the alarms/events.
  The Navis™ Optical EMS provides a default set of pre-defined Probable Causes for alarms only in the SAF filter parameter file as follows:
  SONET

  - AIS-P (SONET Path Alarm Indication Signal Detected)

  - AIS-L (SONET Line Alarm Indication Signal Detected)

  - AIS (SONET Alarm Indication Signal Detected)

- RFI-P (SONET Remote Failure Indication-STS path)

- RFI-L (SONET Remote Failure Indication-line)

- PDI-P (SONET Remote Failure Indication-VT path)

SDH

- MSAIS (SDH MSect Alarm Indication Signal Detected)

- AUAIS (SDH AU Alarm Indication Signal Detected)

- MSRDI (SDH MSect Remote Failure Indication)

- HPRDI (SDH HP Remote Failure Indication)

- TRIBSDH (SDH Communications Failure)

The set of Probable Causes in the SAF filter parameter file can be modified by editing the file using standard UNIX editing tools.

The SAF filter is enabled by default and cannot be turned off by the user via the GUI. The Navis™ Optical EMS administrator enables or disables SAF filtering by changing the value of the `SNC_FM_SAF_FLAG` parameter in the */snc/etc/FM_rc* file. The Navis™ Optical EMS updates its SAF filtering based on the current Probable Causes specified in the SAF filter parameters file after the system administrator executes the `alarm_filter_update` command.

The Map window displays an "unfiltered view" of alarms, including symptomatic alarms filtered out by the SAF filter, by default. You can choose a "filtered view" of alarms, where the symptomatic alarms listed above in the explanation of the SAF feature are not displayed or counted in the alarm tallies, Map window view, and Alarm List.

Transient event condition browser

The Navis™ Optical EMS provides a GUI-based browser that allows you to display a list of transient condition (TC) events that occur in the host's NE network. Transient events do not require a clear message by the NE because they do not change the NE's condition over an extended period of time.

Administering fault management functions

The Navis™ Optical EMS allows you to set up or modify several aspects of alarm reporting for the NEs in your network at the same time, using a single GUI window that can be accessed from the Fault

menu option on the Map window toolbar. This GUI window allows you to:

- provision facility and equipment alarm delays

- provision facility and equipment alarm clearing delays

- enable or disable audio/visual alarm indicators

- allow or inhibit the receipt of autonomous messages

- enable or disable alarm latching. When alarm latching is enabled for an NE, an alarm is removed from the Alarm List only when the following conditions are met: 1) the alarm is cleared 2) the alarm is acknowledged. Alarm acknowledgement may be done before or after the alarm is cleared. For Alarm Latching to be enabled for an NE, Alarm Latching Readiness must be enabled during installation of the *LambdaXtreme*™ Transport. Alarm Latching Readiness is disabled, by default.

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The Navis™ Optical EMS Logs

Overview   The Navis™ Optical EMS keeps track of certain information regarding system performance and actions. This information is stored in logs, and may be filtered and viewed by the user. The process of collecting, storing, and displaying this information is called Log Management.

Log Management provides the following four functions:

- *Logging*—logs messages and data into the Navis™ Optical EMS database or a flat file.

- *Browsing*—provides GUI functionality for the user to browse the messages and data.

- *Filtering*—filters log data to provide only desired data.

- *Purging*—purges old log messages from the Navis™ Optical EMS database or temporal log files generated by system modules.

Types of logs   There are two main categories of logs available through the Navis™ Optical EMS:

- Log data from the EMS (Navis™ Optical EMS)

- Log data obtained directly from the NE

The following EMS logs are maintained:

- *Alarm/Event Log*—This log stores a history of all the alarms and events received from the network elements as a result of unexpected behaviors by an NE.

- *Network Element Notifications Log*—This log stores notifications from NEs on database changes, protection switching, and other NE-related activities.

- *Network Element Command/Response Log*—This log stores all commands and responses, except retrieval commands and responses (for example, RTRV-rr) that are originated from and received by SNMS. The user ID information and user interface information (GUI, cut-through, TCP/IP, or dial-up) are also logged.

- *EMS Alarm/Event Log*—This log stores alarms originated by system on all system hardware and/or software-related unexpected behaviors detected by the Navis™ Optical EMS itself.

- *EMS Activity Log*—This log displays information on selected Navis™ Optical EMS activities for one or more users.

The Navis™ Optical EMSalso provides access to data logs obtained directly from a specific NE.

Important! The Navis™ Optical EMS currently only supports access to the alarm data log from an NE.

Alarm/event log   Use the Alarm/Event Log to view, save, and print important alarm and event information. The Navis™ Optical EMS logs and stores various alarms and non-alarm events as listed in the appropriate NE documentation.

The user can filter the Network Alarm/Event Log on certain parameters, including start date/time, end date/time, TID, aggregate, EPT, alarm/event type, and severity. The maximum number of days for which alarm/event data can be displayed is 45.

Alarm/event log format   The following table shows the system failure information logged by the Navis™ Optical EMS to the Alarm/Event Log.

Table 5-2   System Failure Information in the Navis™ Optical EMSAlarm/Event Log

Parameter	Values	Description
Alarm/Event Type	Alarm	for alarms only
Alarm ID	1 - 999999	the Navis™ Optical EMS assigned alarm identification number
Date of Occurrence	YYYY-MM-DD (month-day)	
Time of Occurrence	HH:MM:SS (hours:minutes:seconds)	
Category	Equipment/ Processing Error	
Alarm Issue Point	<=20 characters	LAN/Disk IO/File System/Database
Effect on Service	NSA	
Severity	CR/MJ/CL	

Table 5-2   System Failure Information in the Navis™ Optical EMSAlarm/Event Log (continued)

Parameter	Values	Description
Probable Cause	Text String (see the Navis™ Optical EMS alarm list)	condition type
Description	Text String (see the Navis™ Optical EMS alarm list)	description of the failure conditions

The user can filter the Navis™ Optical EMS Alarm/Event Log on the start date/time and end date/time parameters. The maximum number of days for which alarm log data can be displayed is 45.

NE notifications log   The Navis™ Optical EMS logs the following notifications/events in the NE Notifications Log:

- The completion (or noncompletion) of an automatic database backup (from primary NVM to secondary)

- Any change in the Navis™ Optical EMS database

- The autonomous removal from service of an administrative or data link

- Automatic and manual (user-initiated) equipment protection switches, synchronization mode switches, and system timing reference switches.

The user can filter the NE Notification Log on certain parameters, including start date/time, end date/time, TID, aggregate, and notification type. The maximum number of days for which network notification data can be displayed is 45.

NE command/response log   All commands that are formulated by internal subsystems as a result of a user operation from the GUI are logged to the NE Command/Response Log. (The one exception is retrieval commands, which are left out for performance reasons.) The Navis™ Optical EMS provides a user interface parameter for each logged command from all interface types. The possible values for the parameter are GUI, cut-through, TCP/IP, and dial-up.

The system administrator is allowed access to all commands/responses, while users are able to view self-originated commands and responses. The commands are displayed in the order they were received by the Navis™ Optical EMS, each command

followed by its response. (If a command did not receive a response, the display indicates this with the entry "time out.")

The user can filter the NE Command/Response Log on certain parameters, including start date/time, end date/time, TID, and aggregate. The system administrator can filter on these same parameters, plus two more - command interface and user login ID. The maximum number of days for which network command/response data can be displayed is 7.

EMS activity log   All user activities that are executed through the GUI as well as system activities are stored in the Navis™ Optical EMS database and logged in the EMS Activity Log. By using the Log Management feature, the Activity Log can be browsed by the user and the information saved and printed.

The user can filter the Activity Log on certain parameters including start date/time, user, activity type, and selected activity. The maximum number of days for which activity can be displayed is seven.

The activities are listed in the order they were received by the Navis™ Optical EMS with the requested information.

The onset and termination of system overload conditions are also logged in the Activity Log.

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6 Trouble Clearing Tasks

Overview

Purpose This chapter covers procedures for fixing the conditions that cause alarm conditions to be reported.

Successful technical assistance relies on gathering system information. A local visual inspection of the equipment may be made, but most internal hardware problems are detected and corrected using the *LambdaXtreme*™ Transport CIT. The *LambdaXtreme* Transport CIT is used to obtain detailed information about the system. The *LambdaXtreme* Transport CIT retrieves detailed reports about performance monitoring, alarms and status, and configurations for the local and remote OLS network elements.

Trouble Analysis Procedures (TAPs) The Trouble Analysis Procedures (TAPs) found in this document provide detailed instructions on how-to:

- Replace faulty circuit packs

- Obtain performance reports

- Retrieve alarm and status reports

This information is analyzed to determine the status of the system. If a condition cannot be corrected, the technician is then directed to contact the local maintenance engineering group for technical assistance.

Clear alarm conditions in the following order: controllers(s), transmission, other.

Technical assistance   The technician makes decisions regarding trouble analysis, corrective action, and obtaining assistance. The technician and the local technical support staff may choose to continue trouble analysis based on knowledge or experience with *LambdaXtreme* Transport, or they may elect to obtain assistance by calling Customer Technical Assistance Management (CTAM) 1-800 225 4672 (United States) and 1-630 224-4672 (International), in accordance with local procedures.

Circuit pack failures   Circuit pack failures are identified by constantly lit LEDs and reported by network alarms and reports.

Circuit packs are replaced in a specified sequence, but only one circuit pack is replaced at a time. If a trouble is not cleared after replacing a circuit pack, the original circuit pack should be reinstalled. This reduces the chances of returning nondefective circuit packs for repair.

ESD considerations   Any integrated circuit on a circuit pack can be damaged by static electricity that builds up within a work area, particularly in areas with low relative humidity. This static buildup on work surfaces and on personnel and their clothing is produced by the various charging effects of even simple movements and by contact between various objects.

As a rule, the greatest potential for electrostatic damage occurs in areas with the lowest relative humidity. But, because such damage can occur anywhere, all personnel handling circuit packs must adhere to the following precautions:

1.   Keep all food wrappers, plastics, and Styrofoam containers away from all circuit packs.

2.   Read all warning labels on bags and cartons containing electronic components before opening.

3.   If possible, open all circuit packs at a static-safe work position using properly grounded wrist straps and table mats that dissipate static electricity.

4.   Whenever possible, wait to remove circuit packs from their protective antistatic packaging until time to insert them into a shelf.

5.   Never touch a circuit pack's components, conductors, or connector pins. Handle all circuit packs only by the faceplate or latch, or by the top and bottom outermost edges.

6. 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, installing, or removing) or when working on backplanes.

7. Always store and transport circuit packs in static-safe packages. (Shielding is not required unless specified.)

8. When removing a circuit pack from the shelf, immediately put it into a static-safe package.

9. Try to keep relative humidity above 20 percent.

10. OLS network elements are equipped with grounding jacks for connecting the static ground wrist strap. The jacks are located on the user panel and on the filter panel.

11. Keep the electromagnetic interference (EMI)/ESD protective front shelf covers closed at all times. Close the cover immediately after a maintenance procedure such as replacing a circuit pack.

Contents

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TAPs for the SLOT, SHELF, and FAN Alarm Groups

Overview

Purpose   The TAPs in this section describe the alarm-clearing procedures that apply to alarm conditions associated with circuit pack and equipment failures, slot, and power-related alarm conditions.

                                □

TAP-101: Clear 'Circuit Pack Failure'

Overview   This procedure is used to replace a circuit pack with a lit FAULT
LED in response to one of these indicated failures:

- OT failure
- OM failure
- OD failure
- OA failure
- RP failure
- RPG failure
- OMON failure
- OA pump failure
- RP pump failure
- RPG pump failure
- SUPVY failure

CAUTION

*During initial software installation and when circuit packs
are inserted into a running system, there will be an
automatic upgrade of the firmware on the circuit packs to
the latest version. Flashing green LEDs on the circuit pack
faceplates will indicate that the upgrade is occurring
(typically less than 30 seconds). Please DO NOT remove the
circuit pack during this upgrade because it may cause
damage to the affected pack. After the pack LEDs stop
flashing it is then safe to remove the packs or power down
the system as needed.*

Important! ***While the OMON pack is failed, no channels should be
added or deleted.*** A failed OMON circuit pack can be replaced while
the node is in service, with no transmission impact. Replacement of a
failed pack should be scheduled as soon as practical, because with the
OMON failed, *LambdaXtreme*™ Transport will not be able to perform
adjustments to the transmission.

Procedure

1   Using the **AID** column from the **NE Alarm List**, identify the appropriate shelf associated with the "Circuit Pack Failure" alarm condition.

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

3   Is the red FAULT LED lit on the circuit pack identified in the **AID** column?

IF…	THEN…
YES	Continue with Step 4.
NO	Test the LEDs. For details, see "DLP-602: Test LEDs on Circuit Packs" (7-5).

> ⚠ **CAUTION**
>
> *The replacement of any circuit packs other than OMON or SUPVY, will cause service interruption.*

4   Unseat the failed circuit pack without disconnecting any optical fibers. After unseating the pack, remove all connected fibers.

5   Insert a replacement circuit pack without seating it (do not push it all the way in).

Important! A series number *S1:2* is the same series number as *S1:4*. The 2 and 4 refer to minor changes within series 1.

6   Reconnect all the optical fibers to the new circuit pack.

7   Reseat the circuit pack.

....

8   Wait for the time indicated in Table 6-1, "Circuit Pack Warmup Times" (6-7). These are the worst-case times; the alarm may clear sooner.

....

9   Is the FAULT LED lit on the replacement circuit pack?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 10.

....

10   Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

STOP! YOU HAVE COMPLETED THIS PROCEDURE.

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Circuit pack boot times

Table Table 6-1, "Circuit Pack Warmup Times" (6-7) lists the maximum wait times for circuit packs to reboot.

Table 6-1   Circuit Pack Warmup Times

CP Inserted	Warm Boot	Cold Boot
OA	less than 7 minutes	10–15 minutes
OD	less than 7 minutes	5–15 minutes
OMON	less than 5 minutes	5–10 minutes
OM	3 minutes	3–5 minutes
OT	less than 5 minutes	less than 5 minutes
SUPVY	less than 5 minutes	less than 5 minutes
SCTL	10–15 minutes	15–25 minutes
NCTL	10–15 minutes	15–25 minutes
RP	less than 5 minutes	7–10 minutes
RPG	less than 5 minutes	7–10 minutes

....

TAP-102: Clear 'SIO Failure'

Overview   This procedure is used to clear the `SIO failure` alarm condition.

Procedure

1   Using the **AID** column from the **NE Alarm List**, identify the appropriate shelf associated with the alarm condition.

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

3   Is the red FAULT LED lit on the circuit pack identified in the **AID** column?

IF…	THEN…
YES	Continue with Step 4.
NO	Test the LEDs. For details, see "DLP-602: Test LEDs on Circuit Packs" (7-5).

4   Unseat the failed circuit pack without disconnecting any cables. After unseating the pack, remove all connected cables.

5   Insert a replacement circuit pack without seating it (do not push it all the way in).

6   Reconnect all cables to the new circuit pack.

7   Reseat the circuit pack.

8   Is `SIO failure` still listed in the CIT **NE Alarm List**?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 9.

....

9   Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-103: Clear 'CIO failure'

Overview   This procedure is used to clear the `CIO failure` alarm condition.

Procedure

1   Using the **AID** column from the **NE Alarm List**, identify the appropriate shelf associated with the alarm condition.

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

3   Unseat the failed circuit pack without disconnecting any cables. After unseating the pack, remove all connected cables.

4   Insert a replacement circuit pack without seating it (do not push it all the way in).

5   Reconnect all cables to the new circuit pack.

6   Reseat the circuit pack.

7   Is `CIO failure` still listed in the CIT **NE Alarm List**?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 8.

8   Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-104: Clear 'Network controller failure'

Overview This procedure explains how to clear the `Network controller failure` condition.

Procedure **Important!** The installation of a replacement FlashDisk in the FlashDisk slot of the NCTL circuit pack may generate certain unexpected alarm conditions until the new software loads. Ignore these indications until the software loads.

1 Examine the **NE Alarm List**.

2 Using the **AID** column, identify the appropriate shelf associated with the NCTL failure.

The NCTL circuit pack is located in slot A1–3–4 in and End Terminal, and slot A1–1–4 in a Repeater.

3 Remove the appropriate shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

The provisioning data for the Network Element is on the FlashDisk. Ensure that the same FlashDisk from the NCTL is inserted in the new NCTL.

⚠ **CAUTION**

SERVICE AFFECTING - If this procedure is not performed properly, you can affect service.

4 Press the green Remove Flash button next to the FlashDisk. Wait for several seconds until the green LED begins to blink steadily.

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-104: Clear 'Network controller failure'

Trouble Clearing Tasks

....

5   Remove the FlashDisk from the slot in the NCTL circuit pack.

....

6   Using both hands, remove the NCTL circuit pack.

....

7   Obtain a replacement circuit pack with the same or higher series number and, *reinstall the FlashDisk* removed in Step 5, into the replacement NCTL circuit pack.

Important! A series number *S1:2* is the same series number as *S1:4*. The 2 and 4 refer to minor changes within series 1.

....

 WARNING

Never install an NCTL circuit pack without a FlashDisk present in the NCTL.

8   Install the replacement circuit pack (from Step 7) in place of the circuit pack with the lit FAULT LED. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

9   Wait approximately 15-20 minutes, depending on system size, or until the MJ LED is off on the Office Alarms circuit pack (User Panel), whichever comes first.

....

10   Examine the **NE Alarm List**.

....

11   Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for technical assistance before with other trouble clearing procedures.

....

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TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-104: Clear 'Network controller failure'

Trouble Clearing Tasks

IF…	THEN…
NO	Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover " (7-17).

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TAP-105: Clear 'Shelf controller failure'

Overview   This procedure is used to replace an SCTL circuit pack with a lit FAULT LED in response to a `Shelf controller failure` **alarm** condition.

Procedure

1   Examine the **NE Alarm List**. Identify the appropriate shelf and slot associated with the `Shelf controller failure` **alarm** condition.

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

3   Remove the SCTL circuit pack. For details, see "DLP-608: Remove and/or Install Circuit Pack" (7-20).

4   Obtain a replacement SCTL circuit pack with the same or higher series number.

Important! A series number *S1:2* is the same series number as *S1:4*. The 2 and 4 refer to minor changes within series 1.

5   Install the replacement SCTL circuit pack, and wait for 20 minutes for the circuit pack to finish booting.

6   Examine the **NE Alarm List**. Is the alarm still listed?

IF…	THEN…
YES	Go to Step 7.
NO	Go to Step 9.

7   Remove the replacement SCTL circuit pack installed in Step 5, and reinstall the original circuit pack.

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-105: Clear 'Shelf controller failure'

Trouble Clearing Tasks

....

8 Consult the appropriate maintenance support organization for further technical assistance.

STOP! YOU HAVE COMPLETED THIS PROCEDURE.

....

9 Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-106: Clear 'Fan failure'

Overview   One or more of the fans have failed or the dust filter is clogged.

Procedure

1   Refer to the **AID** column of the **NE Alarm List** and determine the bay location of for the failed fan.

2   Replace all dust filters in the bay with the alarm conditions. For details, go to "DLP-611: Inspect/Replace Air Filter" (7-34).

Important! Ensure that there is an available supply of replacement fan assemblies.

3   Replace the fan assembly with a new one. For details, go to "DLP-612: Replace Fan Assembly" (7-37).

4   Examine the **NE Alarm List**.

5   Referring to the report obtained in Step 4, is the Fan Failure still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

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TAP-107: Clear 'FLASH memory module code mismatch'

Overview The version of software code stored in the active partition on the FlashDisk is different from the software version in the circuit pack. The system network element is currently functioning from the code running in the NCTL circuit pack.

In LambdaXtreme Transport a `FLASH code mismatch` condition may arise from either of the following two conditions:

- The version of the software executing in memory on the NCTL circuit pack is different from the version of the software stored on the active partition of the FlashDisk. This condition can only arise when the FlashDisk is removed and another FlashDisk with a different version of the software stored on its active partition is inserted into the NCTL circuit pack.

- The active partition of the FlashDisk is corrupted.

The `FLASH code mismatch` condition is cleared by ensuring that the versions of the software on the active partition of the FlashDisk and software executing in memory on the NCTL match. The following actions may be required:

- Select **Administration** ⇒ **System Reboot** ⇒ **OK**. This will cause the FlashDisk to download code from the active FlashDisk partition to the NCTL circuit pack. Use this option only if the version of the software on the active FlashDisk partition is what you intend on Upgrading/Change to next. Ensure the software on the active FlashDisk partition is not in a corrupted state

- Perform a remote download of the required version of software from a remote network element (NE). This will copy software from another network element to the inactive FlashDisk partition of the target NE. Then from the CIT, select **Administration** ⇒ **System Reboot** ⇒ **OK**. Use this option only if it has been determined that the software version on the active FlashDisk partition and the software version executing in memory on the

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-107: Clear 'FLASH memory module
code mismatch'

Trouble Clearing Tasks

NCTL circuit pack are the same. This suggests that the software on the active partition of the FlashDisk and the NCTL in Slot 10 has been corrupted in which case you want to replace it with a fresh copy. Typically, this means downloading a fresh copy from a remote NE or CIT-PC.

- Download the code from the CD through the CIT to the FlashDisk inactive partition and then click on **Administration ⇒ System Reboot ⇒ OK**. Use this option as an alternative to downloading software code from a remote NE.

Procedure

....

1 At the CIT, select **Administration ⇒ Software ⇒ Download**.

....

2 Record the software release information from the line entry `inactive release`.

....

3 Are the software releases different?

IF…	THEN…
YES	A software version mismatch may be the cause. Continue with Step 4 to determine the correct software version.
NO	The software on the Active FlashDisk Partition or in the NCTL in slot 4 is in a corrupted state. Continue with Step 10 to install a fresh copy of the software.

....

4 Contact technical support to determine which of the two software releases is supposed to be running in the system network element.

....

5 Is the correct software release stored in Step 2?

IF…	THEN…
YES	Use this as the source for a fresh copy to be installed. Continue with Step 6 for installation instructions.

....

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-107: Clear 'FLASH memory module
code mismatch'

Trouble Clearing Tasks

IF…	THEN…
NO	A fresh copy of the software may have to be downloaded from a remote NE or CIT-PC. Continue with <u>Step 10</u>.

....

Important! The CIT will disconnect from the network element when the FAULT-Reset command is executed. During the reset time, the miscellaneous discrete control points are deactivated.

6   At the CIT, select **Admin** ⇒ **System reboot** ⇒**OK**.

....

7   Wait 15-30 minutes or until the MJ LED stops flashing. Time to wait will vary depending on system size.

....

8   At the CIT, view the **NE Alarm List**.

....

9   Is the FLASH Code Mismatch condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for technical assistance before proceeding with other trouble clearing procedures. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

....

10   Is the correct software release running in a remote network element and is the SUPVY data link good to that network element?

IF…	THEN…
YES	See the section in the *LambdaXtreme*™ *Transport User Operations Guide, Release 1.1,* (365-575-781R1.1) describing how to copy software from one NE to another.

....

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-107: Clear 'FLASH memory module
code mismatch'

Trouble Clearing Tasks

IF…	THEN…
NO	See the section in the *LambdaXtreme Transport Software Release Description, Release 1.1,* describing how to install software into the CIT.

11 At the CIT, view the **NE Alarm List**.

12 Is the FLASH Code Mismatch condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for technical assistance before proceeding with other trouble clearing procedures.
NO	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

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TAP-108: Clear 'Flash memory module removed'

Overview   This procedure explains how to replace a FlashDisk that has been removed from the NCTL.

Important! When a FlashDisk is not present, the red FAULT LED blinks on the NCTL.

Procedure

1   Is the red LED on the NCTL circuit pack blinking?

IF…	THEN…
YES	Continue with Step 2.
NO	Consult the appropriate maintenance support organization for technical assistance before proceeding with other trouble clearing procedures.

2   Is the same FlashDisk that was removed from this Network Element (NE) or a FlashDisk with the same software version currently active on this NE available?

IF…	THEN…
YES	Continue with Step 3.
NO	Consult the appropriate maintenance support organization for technical assistance before proceeding with other trouble clearing procedures.

3   Install the replacement FlashDisk obtained in Step 2 into the NCTL SYSMEM slot. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

4   Wait approximately 5 - 15 minutes.

5   Is the red LED on the NCTL circuit pack blinking ON and OFF?

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-108: Clear 'Flash memory module
removed'

Trouble Clearing Tasks

IF…	THEN…
YES	Continue with Step 6.
NO	Consult the appropriate maintenance support organization for technical assistance before proceeding with other trouble clearing procedures.

....

6 At the CIT, click on the NE Alarm List icon to obtain another report.

....

7 Is the same alarm condition still listed under the DESCRIPTION column of the report?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for technical assistance before proceeding with other trouble clearing procedures.
NO	Continue with Step 8.

....

8 At the CIT, click on **Configuration-Provision**.

....

9 Click on the bay where the NCTL is located.

....

10 Click on the shelf where the NCTL is located.

....

11 Click on the NCTL circuit pack.

....

12 Click on the **Provision** button.

....

13 Select **Disable** for the FlashDisk Removal.

....

14 Click on the **Apply** button.

....

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-108: Clear 'Flash memory module
removed'

Trouble Clearing Tasks

....

15   Is the red LED on the NCTL circuit pack OFF?

IF…	THEN…
YES	Continue with Step 16.
NO	Consult the appropriate maintenance support organization for technical assistance before proceeding with other trouble clearing procedures.

....

16   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-109: Clear 'Circuit Pack Removed'

Overview   Use this procedure to clear one of these conditions by either installing the missing circuit pack or by updating the network element data base to reflect the current equipage.

- `OA removed`
- `OD removed`
- `OM removed`
- `OT removed`
- `Power removed`
- `RP removed`
- `RPG removed`

Procedure

1   Examine the **NE Alarm List**. You may wish to click on **Report** to obtain a snapshot.

2   Using the **AID** column from the report, identify the appropriate shelf associated with the removed circuit pack.

3   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17)).

4   Is the indicated slot empty or circuit pack unseated?

IF…	THEN…
YES	Continue with Step 5.
NO	Consult the appropriate maintenance support organization for further technical assistance.

5   Do the office records show that the slot should contain a circuit pack?

IF…	THEN…
YES	Continue with Step 9.
NO	Continue with Step 6.

....

6   From the CIT **Node Manager**, select all the channels, and remove the associations related to the removed circuit pack.

....

7   Select all the channels and delete the channels associated with the removed circuit pack.

....

8   Has the alarm cleared?

IF…	THEN…
YES	Continue with Step 14.
NO	From the office records, verify that the channels and the corresponding OTs are present. Consult the appropriate maintenance support organization for further technical assistance. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

....

 CAUTION

SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.

9   Notify the person that is responsible for the optical line associated with the service to restore service on a different Optical Line System or route, if available.

....

10   Reseat the circuit pack or obtain a replacement circuit pack with the same or a higher series number and install it in the empty slot. For details, see "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

Important! A series number *S1:2* is the same series number as *S1:4*. The 2 and 4 refer to minor changes within series 1.

....

11   Wait for the time indicated in Table 6-1, "Circuit Pack Warmup Times" (6-7), and examine the **NE Alarm List**.

....

12   Is the alarm still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 13.

....

13   Notify the person that is responsible for all affected service that this Optical Line can now be returned to service.

....

14   Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

Important! If an OA or RP circuit pack is removed, you may need to baseline TOPT-OLINE for the OA(VOA) circuit pack, or TOPR-OLINE for RP(OSP) circuit pack. For details, see "Baseline TOPT-OLINE, TOPR-OLINE" (6-27). ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

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**Baseline TOPT-OLINE,
TOPR-OLINE**

....

1   From the CIT **Node Manager**, select Optical Line 1E or 1W.

....

2   Click the **Performance** button.

....

3   Click the **Analog Baseline** tab.

....

4   Click a checkbox for either **Total Power Transmitted** or **Total Power Received**.

....

5   Select a reason from the **Reason** drop-down menu.

....

6   Select **This Optical Line** from the **Select** drop-down menu.

....

7   Click the **Apply** button.

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TAP-110: Clear 'OMON Removed', 'SUPVY Removed'

Overview   Use this procedure to clear one of these conditions by installing the missing circuit pack.

- OMON removed

- SUPVY removed

Procedure

1   Examine the **NE Alarm List**. You may wish to click on **Report** to obtain a snapshot.

2   Using the **AID** column from the report, identify the appropriate shelf associated with the removed circuit pack.

3   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17)).

4   Is the indicated slot empty or circuit pack unseated?

IF…	THEN…
YES	Continue with Step 5.
NO	Consult the appropriate maintenance support organization for further technical assistance.

5   Reseat an unseated pack, or install a replacement circuit pack, after first making the proper fiber connections.

   Important! Do not insert a circuit pack before making the proper fiber connections.

6   Examine the **NE Alarm List**. Has the alarm cleared?

IF…	THEN…
YES	Continue with Step 7.
NO	Consult the appropriate maintenance support organization for further technical assistance.

....

7   Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

....

8   If you just replaced the SUPVY circuit pack, you must baseline the SPT-SU. For details, see "Baseline the SUPVY (SUPT-SU)" (6-76).

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TAP-111: Clear 'No circuit pack expected in slot'

Overview   This alarm condition is raised when a circuit pack is inserted in a slot not meant for that type of circuit pack. For example, an OT in one of the three slots assigned to an OA will cause this alarm condition.

Procedure

1   Examine the **NE Alarm List**.

2   Using the **AID** column, identify the appropriate shelf associated with the `No CP expected in Slot` alarm condition.

3   Remove the shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

4   Do office records or the *LambdaXtreme™ Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1) show that the slot(s) should contain a circuit pack of this type?

IF…	THEN…
YES	Check office records to determine correct circuit pack or consult the appropriate maintenance support organization for technical assistance. If a different circuit pack will be inserted, continue with Step 7.
NO	Remove the circuit pack, then continue with Step 5.

5   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

6   *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-111: Clear 'No circuit pack expected in
slot'

Trouble Clearing Tasks

....

7   Obtain the desired circuit pack and install it. For details, go to
"DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

8   Wait the time indicated in Table 6-1, "Circuit Pack Warmup Times"
(6-7). These times are worst-case times; alarm may clear sooner.

....

9   Is the FAULT LED lit on the replacement circuit pack?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Then continue with Step 10.

....

10   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install
Front Cover" (7-17).

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TAP-112: Clear 'Unexpected circuit pack type'

Overview   The `Unexpected CP Type` condition is issued whenever the system software detects a difference between what it expects in a circuit pack (CP) slot and which CP is actually in the slot. This condition is normally cleared by correcting the difference (wrong CP type or incomplete records).

Procedure   **Important!** Do not remove any additional circuit packs from the shelf until the `Unexpected CP Type` **condition has been cleared.**

1   Using the **AID** column from the **NE Alarm List**, identify the appropriate shelf associated with the `Unexpected CP Type` condition.

2   From the **Equipment View** select the appropriate shelf, and see which CP should be in the slot.

3   If required, remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

4   Obtain the correct circuit pack type and install it in place of the circuit pack generating the `Unexpected CP Type Failure`. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

5   Wait the time indicated in Table 6-1, "Circuit Pack Warmup Times" (6-7). These times are worst-case times; alarm may clear sooner.

6   Is the FAULT LED lit on the replacement circuit pack?

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-112: Clear 'Unexpected circuit pack
type'

Trouble Clearing Tasks

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Continue with Step 7.

7 Reinstall the shelf cover. For details, see "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-113: Address 'Circuit Pack Booting'

Overview This procedure explains how to address the following "Circuit Pack Booting" conditions.

- RP booting in progress
- RPG booting in progress
- OA booting in progress
- OD booting in progress
- OMON booting in progress
- OM booting in progress
- OT booting in progress
- Supervisory booting in progress
- SCTL booting in progress

When a circuit pack reboots, after several minutes, the circuit pack LEDs react as follows:

- The red FAULT LED is lit continuously.
- The green ACTIVE LED is flashing continuously.
- After the boot cycle has completed and the circuit pack has been determined to be functional, the green ACTIVE LED remains lit and the red FAULT LED goes off.

Procedure

1 Examine the **NE Alarm List**.

2 Using the **AID** column, identify the appropriate shelf/slot associated with the "Circuit Pack Booting" condition.

3 Remove the appropriate shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

4 Using the **AID** column, identify the correct circuit pack with the "Circuit Pack Booting" condition.

....

5   Wait 2–5 minutes or until the green LED on the circuit pack starts
flashing.

....

6   Is the green ACTIVE LED flashing continuously and the red FAULT
LED on continuously?

IF…	THEN…
YES	Continue with Step 8.
NO	Continue with Step 7.

....

7   Examine the **NE Alarm List**. Is the 'Circuit Pack Booting' condition
still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 9.

....

8   Wait 5–30 minutes, depending on system size, or until the red LED
goes out.

....

9   Reinstall the shelf cover. For details, see "DLP-607: Remove/Install
Front Cover" (7-17).

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TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'

Overview This condition indicates that the optical filters in the OM, OD, OA, RP, or RPG are below their correct operating temperature and the heater is in the process of correcting the filter temperature. The OM/ODs have their own board controllers that control the heater function.

Procedure

1 Using the **AID** column from the **NE Alarm List**, identify the appropriate shelf and slot location of the circuit pack with the alarm condition.

2 Remove the shelf cover. All connections can be accessed from the front. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.

3 Notify the person responsible for the optical line or channel associated with the service assigned to this circuit pack to manually switch the service to a different channel if this will take too long to fix.

4 Reseat the circuit pack, and wait the appropriate amount of time for the circuit pack to warm up. See Table 6-1, "Circuit Pack Warmup Times" (6-7). Is the Alarm still reported in the CIT **Alarm List**?

IF…	THEN…
YES	Continue with Step 5.

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-114: Clear 'OM/OD/OA/RP/RPG
warm-up in progress'

Trouble Clearing Tasks

IF…	THEN…
NO	Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover " (7-17). Notify the person responsible for the optical line or channel associated with the service assigned to this circuit pack to restore the service to the original line. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

5 Reseat the SCTL in that double-shelf, and wait the appropriate amount of time for the circuit pack to warm up. This causes everything to reboot except the NCTL and the SUPVY circuit packs.. Is the Alarm still reported in the CIT **Alarm List**?

IF…	THEN…
YES	Continue with Step 6.
NO	Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover " (7-17). Notify the person responsible for the optical line or channel associated with the service assigned to this circuit pack to restore the service to the original line. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

6 Reseat the Group Shelf Controller, and wait the appropriate amount of time for the circuit pack to warm up. Is the Alarm still reported in the CIT **Alarm List**?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-114: Clear 'OM/OD/OA/RP/RPG
warm-up in progress'

Trouble Clearing Tasks

IF…	THEN…
NO	Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover " (7-17). Notify the person responsible for the optical line or channel associated with the service assigned to this circuit pack to restore the service to the original line. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

END OF STEPS

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TAP-115: Clear 'Power Monitor for N48V_A' and 'Power Monitor for N48V_B'

Overview   This procedure is used to clear a power failure by resetting the circuit breaker on the power line filter(s) associated with the unlit ***PWR OUTPUT*** LED.

Important! Contact the maintenance support organization before proceeding if a failure of both circuit breakers (A and B) or both feeders (A and B) to a bay exists.

Procedure

1   Are these alarm conditions reported by one circuit pack or by multiple circuit packs?

IF…	THEN…
Only one circuit pack	Replace the circuit pack. For details, go to Appendix A, "Alarm/Condition List", and locate the appropriate TAP for clearing that type of circuit pack failure.
More than one circuit pack	Go to "TAP-116: Clear 'Circuit Breaker/Power Failure "A or B" or "A and B"' " (6-40).

2   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

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TAP-116: Clear 'Circuit Breaker/Power Failure "A or B" or "A and B"'

Overview   This procedure is used to clear a power failure by resetting the circuit breaker on the power line filter(s) associated with the unlit ***PWR OUTPUT*** LED. This procedure is performed for a selected shelf by clearing the voltage supply problem at the battery distribution and fuse bay (BDFB) or by replacing a failed power filter on a shelf.

Important! Contact the maintenance support organization before proceeding if a failure of both circuit breakers (A and B) or both feeders (A and B) to a bay exists.

Procedure

1   Are any circuit breaker ***PWR OUTPUT*** LEDs not lit on the shelf associated with the alarm condition?

IF…	THEN…
YES	Continue with Step 2.
NO	Continue with Step 4.

2   Reset the circuit breaker by operating the breaker to the ON position.

3   Did the circuit breaker remain in the ON position and the ***PWR OUTPUT*** LED for the circuit breaker remain on?

IF…	THEN…
YES	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Go to Step 2 of the section "One Power Feeder Cable is NOT Supplying Voltage to a Bay" (6-42).

4   Are all ***PWR OUTPUT*** LEDs extinguished for all shelves in the bay?

IF…	THEN…
YES	Go to Step 5.

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-116: Clear 'Circuit Breaker/Power
Failure "A or B" or "A and B"'

Trouble Clearing Tasks

IF…	THEN…
NO	Continue with Step 5. **Important!** If the User Panel on the Office Alarms circuit pack has any defective LEDs, you may not see a MJ LED. "DLP-603: Test Alarm LEDs on Office Alarm Panel" (7-7) can be used to test the LEDs if you suspect problems with the LEDs on the Office Alarms circuit pack.

 CAUTION

Consult with the Technical Support personnel if you have any questions regarding the power cables.

5 Both power feeder cables are NOT supplying voltage to the bay that have their PWR OUTPUT LEDs off. Check at the Battery Distribution Fuse Board (BDFB) or equivalent, visually check within the bay for loose connections, power cable problems between the BDFB and the shelf with the failure and correct the voltage supply problem.

6 Was a problem found and corrected?

IF…	THEN…
YES	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*
NO	Go to Step 10 of the section, "One Power Feeder Cable is NOT Supplying Voltage to a Bay" (6-42).

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TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-116: Clear 'Circuit Breaker/Power
Failure "A or B" or "A and B"'

Trouble Clearing Tasks

One Power Feeder Cable is NOT Supplying Voltage to a Bay

1   At the CIT, look at the **Condition List** to determine which slot is reporting the alarm.

⚠️ **CAUTION**

> *Step 2 through Step 4 requires an input voltage measurement at the power filter jacks of the appropriate power feeder.*

2   Remove the appropriate shelf cover(s) to access the power line filter. For details, see"DLP-607: Remove/Install Front Cover" (7-17).
Voltage input measuring jacks (white and red) are on the front of each filter. Each shelf has two power line filters. The 48V power line filter associated with the *A* feeder is located on the left and the *B* feeder power line filter is on the right.

3   Measure the input voltage at the measuring jacks of the appropriate power line filter.

4   Does the input voltage measure between -42.75 and -60 volts?

IF…	THEN…
YES	Go to Step 7.
NO	Continue with Step 5.

⚠️ **CAUTION**

> *Consult the Technical Support personnel if you have any questions when checking the power cables.*

5   Check at the Battery Distribution Fuse Board (BDFB) or equivalent, visually check within the bay for loose connections, power cable problems between the BDFB and the shelf with the failure and correct the voltage supply problem.

TAPs for the SLOT, SHELF, and FAN
Alarm Groups
TAP-116: Clear 'Circuit Breaker/Power
Failure "A or B" or "A and B"'

Trouble Clearing Tasks

6 Was a problem found and corrected?

IF…	THEN…
YES	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Go to Step 10.

⚠️ **CAUTION**

> *Step 7 through Step 9 requires replacement of a power filter. Replacing the wrong power filter will interrupt power to the shelf providing service. The 48V power line filter associated with the A feeder is located on the left; and the B feeder power line filter is on the right. Verify the proper filter is being used by checking the rear panel designations next to the filters plug-in socket.*

7 Contact Technical Support personnel to notify them you are about to start replacing a power filter on a shelf.

8 Replace the appropriate shelf power line filter. For details, go to "DLP-610: Replace Power Line Filter" (7-32).

9 Did the Circuit Breaker/Power "A or B" alarm condition clear?

IF…	THEN…
YES	Continue with Step 11.
NO	Continue with Step 10.

10 Consult the appropriate Technical Support organization for further technical assistance.

11 Reinstall the appropriate shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

E N D   O F   S T E P S

TAPs for PortOA_RP and LINE Alarm Groups

Overview

Purpose   The TAPs in this section describe the alarm-clearing procedures that apply to alarm conditions associated with the optical transmission section (OTS), also called LINE-level alarms.

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TAP-201: Clear 'OTS LOS' and/or 'OSC LOS (opposite direction to optical channels)'

Overview   This procedure is used to clear the following conditions:

- `OTS LOS`

- `OSC LOS (opposite direction to optical channels)`

`OTS LOS` is raised at the InLine port of the RP or RP(50G/100G) circuit pack when a loss of the incoming DWDM signal is detected.

`OSC LOS (opposite direction to optical channels)` is raised at the OutLine port of the OA(Raman), OA(Raman EDFA), OA(DGEF), OA(VOA), or OA(OADM LineOut) circuit pack when a loss of the incoming Supervisory signal is detected.

The incoming signal loss is caused by a fiber cut between adjacent NEs, a disconnected fiber, or failure of the transmitting circuit pack at the adjacent NE. In the case of a single-fiber cut, the upstream NE will raise OSC LOS and the downstream NE will raise OTS LOS. For details see "APR for a Single-Fiber Cut" (3-3). If **both** of the fibers connecting two NEs are cut, then both NEs will raise both OTS LOS **and** OSC LOS. For details, see "APR for a Two-Fiber Cut" (3-8).

LambdaXtreme™ Transport initiates APR when an NE detects OTS LOS and/or OSC LOS. When the incoming signal loss is repaired, the system will resume normal operation and the OTS LOS and/or OSC LOS conditions will clear.

Procedure   **Important!** This condition is caused by an upstream facility failure or a failure on the receive side of the NE.

1   If the alarm is detected at a Repeater or OADM terminal, look at the source address ID displayed in the alarm report to determine whether it's an east or a west circuit pack that has raised the alarm. This also determines whether the alarm affects the east or the west side of the NE.

2   Log into the adjacent NE in the direction identified in Step 1.

Examine the **NE Alarm List**.

TAPs for PortOA_RP and LINE Alarm
Groups
TAP-201: Clear 'OTS LOS' and/or 'OSC
LOS (opposite direction to optical
channels)'

Trouble Clearing Tasks

3 Look for an `OA failure`, `OA removed` or `OSC LOS (opposite direction to optical channels)` alarm condition.

IF…	THEN…
`OA Failure`	Continue with Step 4.
`OSC LOS`	Continue with Step 10.

4 Verify that the `OA Failure` corresponds to the OA associated with the same line as the `OTS LOS` previously identified at the adjacent NE. For example, an OTS LOS detected at a west RP would be caused by a failure of the east OA. Go to Step 10

5 Look for `RP Failure` or `OTS LOS` conditions.

IF…	THEN…
`RP Failure`	Continue with Step 6.
`OTS LOS`	Go to Step 10.

6 Verify that the `RP Failure` corresponds to the RP associated with the same line as the `OSC LOS` previously identified at the adjacent NE. For example, an OSC LOS detected at a west OA would be caused by a failure of the east RP.

7 Replace the failed circuit pack at the identified NE. For details, see "DLP-608: Remove and/or Install Circuit Pack" (7-20).

8 Log into the NE where the alarm was identified.

Examine the **NE Alarm List**.

9 Has the alarm condition been cleared?

IF…	THEN…
YES	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

TAPs for PortOA_RP and LINE Alarm
Groups
TAP-201: Clear 'OTS LOS' and/or 'OSC
LOS (opposite direction to optical
channels)'

Trouble Clearing Tasks

IF…	THEN…
NO	Continue with Step 10.

....

10 Examine the intra-office fiber jumper connectivity between the OA/RP circuit pack and the corresponding OSP office temination. Is there a disconnected fiber?

IF…	THEN…
YES	Continue with Step 11.
NO	Consult the appropriate maintenance support organization for further technical assistance.

....

11 Reconnect the disconnected fiber jumper(s). Verify that the `OTS LOS` and `OMS LOS` have cleared at corresponding NEs.

IF…	THEN…
YES	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Consult the appropriate maintenance support organization for further technical assistance.

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TAP-202: Clear 'DCM LOS'

Overview Use this procedure to clear the following alarm conditions:

- `DCM LOS: OA`

- `DCM LOS: OA (preamp)`

- `DCM LOS: RP to OA`

Defective DCM or faulty connectivity to the associated OA will cause Loss of Signal (LOS) on the line.

The `DCM LOS: OA` alarm condition is raised at the

- OA(DGEF) circuit pack in a Repeater

- OA(VOA) circuit pack in an End Terminal

- OA(OADM Add)circuit pack in an OADM

The `DCM LOS: OA (preamp)` alarm condition is raised at the

- OA(Preamp) circuit pack in an End Terminal

- OA(Preamp) circuit pack in an OADM

The `DCM LOS: RP to OA` alarm condition is raised at the

- OA circuit pack in a Repeater

The DCM circuit pack has no LED. If the cause of this alarm condition is a bad DCM fiber jumper, or a bad connector at the IN_DCM port or OUT_DCM port of an OA circuit pack, then the fault LED of the OA will flash. The **AID** column of the **NE Alarm List** will identify the OA and the IN_DCM port.

Procedure

1 Examine the **NE Alarm List**. Using the **AID** column, identify the location of the OA associtated with this alarm condition.

2 Remove the appropriate shelf covers over the OA and corresponding DCM. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

3 Visually inspect the fiber jumper between the identified DCM, OA, and RP circuit packs. Correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

4   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 22.

....

⚠️ **CAUTION**

Failure to do this step will result in connector damage.

5   Unseat the identified OA circuit pack.

....

6   In the case of `DCM LOS: OA` or `DCM LOS: OA (preamp)`, disconnect the fibers from the IN_DCM port and OUT_DCM port of the OA circuit pack.

In the case of `DCM LOS: RP to OA`, disconnect the fibers from the IN_DCM port of the OA circuit pack, and the the OUT_SIG port of the RP circuit pack.

....

7   Measure the loss across the DCM and it's two connecting fiber jumpers.

....

8   Is the measured loss within the expected range?

IF…	THEN…
YES	Continue with Step 9.
NO	Go to Step 17.

....

9   Using a videoscope, inspect the IN_DCM and OUT_DCM ports of the OA for dirt and/or damage to the connectors. Clean the connectors if necessary. For details, see "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

....

10 Reconnect the DCM.

....

11 Reseat the OA circuit pack, and wait for it to boot. See Table 6-1, "Circuit Pack Warmup Times" (6-7).

....

12 Examine the **NE Alarm List**. Has the alarm condition cleared?

IF…	THEN…
YES	Go to Step 22.
NO	Continue with Step 13.

....

13 Replace the OA with a circuit pack of the same or higher series number. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

14 Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 15.
NO	Go to Step 22.

....

15 Remove the replacement circuit pack (installed in Step 13) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

16 Consult the appropriate maintenance support organization for further technical assistance.

Go to Step 22.

....

17 Disconnect the fiber jumpers from the DCM, and measure the loss of DCM.

....

....

18   Is the measured loss within the expected range?

IF…	THEN…
YES	Continue with Step 19.
NO	Go to Step 20.

....

19   Replace fibers to the DCM circuit pack until the combined loss of the DCM and connected fiber jumpers is within the expected range. Go to Step 21.

....

20   Replace the DCM. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

21   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Continue with Step 22.

....

22   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-203: Clear 'APR active: line'

Overview   This procedure is used to clear the `APR active: line` condition.

LambdaXtreme™ Transport reduces the circuit pack output power to safe levels if an incoming loss of signal is detected. The `APR active: line` condition is generated when the Raman co- and/or counter-pump powers have been reduced to safe levels as a result of SUPV and/or DWDM loss of signal detection in OA and RP circuit packs. This condition will be present as long as OTS LOS and/or OSC LOS (opposite direction to optical channels) are present. The loss of DWDM and SUPV signals is caused by a fiber cut in the outside plant.

It is necessary to look at the upstream nodes to determine whether the reported APR condition is caused by a problem in the local node or if it has propagated to to this node from a problem further upstream. Once you have identified the node furthest upstream that is reporting an `APR active: line` alarm condition, you can expect to find the source of the problem located between the second and third downstream nodes. See Figure 3-2, "APR Active Zone for single-fiber cut" (3-5).

When the incoming loss of signal is repaired, *LambdaXtreme* Transport will resume normal operation and the APR active condition will clear.

Procedure   ....

1   Examine the **NE Alarm List**. Are either the `OTS LOS` or `OSC LOS` (opposite direction to optical channels) alarm conditions present in the NE at the **Source Address ID**?

IF…	THEN…
YES	Continue with Step 2.
NO	Go to Step 4.

....

2   Proceed to "TAP-201: Clear 'OTS LOS' and/or 'OSC LOS (opposite direction to optical channels)'" (6-45).

....

3   Is the `APR active: line` condition still listed?

TAPs for PortOA_RP and LINE Alarm
Groups
TAP-203: Clear 'APR active: line'

Trouble Clearing Tasks

IF…	THEN…
YES	Continue with Step 4.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

....

4 Determine which circuit pack is reporting the `APR active: line` alarm condition.

....

5 Is the `APR active: line` alarm condition reported by the RP(OSP) circuit pack?

IF…	THEN…
RP(OSP)	Continue with Step 6.
OA(VOA)	Go to Step 9.

....

6 At the CIT, examine each upstream node to determine whether `APR active: line` is reported upstream.

If the alarm is present in an End Terminal, it will be reported by the OA(VOA) and the RP(OSP) circuit packs.

If the alarm is present in a Repeater Terminal, it will be reported by the OA(Raman) and the RP(OSP) circuit packs.

....

7 Go to node furthest upstream which has declared `APR active: line`. Clear all alarms reported in this node. For example, verify that channels are being transmitted from the OM to the OA circuit packs by monitoring the MON port of each circuit pack.

....

8 Is `APR active: line` still reported in the upstream node?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.

....

TAPs for PortOA_RP and LINE Alarm
Groups
TAP-203: Clear 'APR active: line'

Trouble Clearing Tasks

IF…	THEN…
NO	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

....

9   The problem lies in the present node. Clear all alarms reported in this node. For example, verify that channels are being transmitted from the OM to the OA circuit packs by monitoring the MON port of each circuit pack.

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TAP-204 Clear 'APR active: OA (preamp)'

Overview This procedure is used to clear the `APR active: OA (preamp)` condition.

When an OD circuit pack is removed, *LambdaXtreme*™ Transport turns off the OA(PreAmp) circuit pack output power in order to prevent cross-traffic interference.*LambdaXtreme* Transport will resume normal operation and the APR active condition will clear.

The OD circuit pack can be one of the following:

- OD(0 GHz offset)
- OD(40G 0 GHz offset)
- OD(50 GHz offset)
- OD(100 GHz offset) on an End Terminal or an OADM
- OD(150 GHz offset)

`APR active: OA (preamp)` is a secondary condition which is raised as a result of the detection of one of the following alarms:

- `OD removed` (see "TAP-109: Clear 'Circuit Pack Removed'" (6-24).)
- `OD warmup in progress` (see "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).)
  When these alarms are cleared, the `APR active: OA (preamp)` condition will also clear.
- `OD failure`

Procedure

1 Examine the **NE Alarm List**. Is `OD warmup in progress` listed?

IF…	THEN…
YES	Go to "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).
NO	Continue with Step 2.

2 Examine the **NE Alarm List**. Is `OD removed` listed?

TAPs for PortOA_RP and LINE Alarm
Groups
TAP-204 Clear 'APR active: OA (preamp)'

Trouble Clearing Tasks

IF…	THEN…
YES	Go to "TAP-109: Clear 'Circuit Pack Removed'" (6-24).
NO	Continue with Step 3.

....

3   Examine the **NE Alarm List**. Is `OD failure` listed?

IF…	THEN…
YES	Go to "TAP-101: Clear 'Circuit Pack Failure'" (6-5).
NO	Continue with Step 4.

....

4   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-205 Clear 'APR active: OA (OADM-add)'

Overview   This procedure is used to clear the `APR active: OA (OADM-add)` condition. This is a secondary condition which is raised as a result of lowering of the power of the OA(OADM Add). The power is lowered as a result of the detection of one of the following alarms associated with the OM(OADM 0 GHz offset) circuit pack.:

- `OM failure`
- `OM removed`
- `OM warmup in progress`

When these alarms are cleared, the `APR active: OA (OADM-add)` condition will also clear.

Procedure

1   Examine the **NE Alarm List**. Is `OM failure` listed?

IF…	THEN…
YES	Go to "TAP-101: Clear 'Circuit Pack Failure'" (6-5).
NO	Continue with Step 2.

2   Examine the **NE Alarm List**. Is `OM removed` listed?

IF…	THEN…
YES	Go to "TAP-109: Clear 'Circuit Pack Removed'" (6-24).
NO	Continue with Step 3.

3   Examine the **NE Alarm List**. Is `OM warmup in progress` listed?

IF…	THEN…
YES	Go to "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).

IF…	THEN…
NO	Consult the appropriate maintenance support organization for further technical assistance.

E ND   OF   S TEPS

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TAP-206 Clear 'APR active: OA DCF Raman startup pumps'

Overview   This procedure is used to clear the `APR active: OA DCF Raman startup pumps` condition. This is a secondary condition which is raised as a result of lowering of the power of the counterpropagating DCM pumps in OA(Raman), OA(Raman EDFA), or OA(OADM LineIn). The power is lowered as a result of the detection of one of the following alarms:

- `DCM LOS: OA`

- `RP warmup in progress`

- `RP removed`

When these alarms are cleared, the `APR active: OA DCF Raman startup pumps` condition will also clear.

Procedure

1   Examine the **NE Alarm List**. Is `DCM LOS: OA` listed?

IF…	THEN…
YES	Go to "TAP-202: Clear 'DCM LOS'" (6-48).
NO	Continue with Step 2.

2   Examine the **NE Alarm List**. Is `RP warmup in progress` listed?

IF…	THEN…
YES	Go to "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).
NO	Continue with Step 3.

3   Examine the **NE Alarm List**. Is `RP removed` listed?

IF…	THEN…
YES	Go to "TAP-109: Clear 'Circuit Pack Removed'" (6-24).

TAPs for PortOA_RP and LINE Alarm
Groups
TAP-206 Clear 'APR active: OA DCF
Raman startup pumps'

Trouble Clearing Tasks

IF...	THEN...
NO	Consult the appropriate maintenance support organization for further technical assistance.

E ND   OF   S TEPS

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TAP-207 Clear 'APR active: RPG Raman co-pumps'

Overview   This procedure is used to clear the `APR active: RPG Raman co-pumps` condition. This is a secondary condition which is raised as a result of lowering of the power of the copropagating Raman pumps in RPG due to warmup or removal of the corresponding OA(VOA), OA(Raman), OA(Raman EDFA), or OA(OADM LineOut). The power is lowered as a result of the detection of one of the following alarms:

- `OA warmup in progress`
- `OA removed`

When these alarms are cleared, the `APR active: RPG Raman co-pumps` condition will also clear.

Procedure

1   Examine the **NE Alarm List**. Is `OA warmup in progress` listed?

IF…	THEN…
YES	Go to "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).
NO	Continue with Step 2.

2   Examine the **NE Alarm List**. Is `OA removed` listed?

IF…	THEN…
YES	Go to "TAP-109: Clear 'Circuit Pack Removed'" (6-24).
NO	Consult the appropriate maintenance support organization for further technical assistance.

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TAP-208 Clear 'APR active: RPG Raman counter-pumps'

Overview   This procedure is used to clear the `APR active: RPG Raman counter-pumps` condition. This is a secondary condition which is raised as a result of lowering of the power of the copropagating Raman pumps in RPG due to warmup or removal of the corresponding RP. The power is lowered as a result of the detection of one of the following alarms:

- `RP warmup in progress`
- `RP removed`

When these alarms are cleared, the `APR active: RPG Raman counter-pumps` condition will also clear.

Procedure

1   Examine the **NE Alarm List**. Is `RP warmup in progress` listed?

IF…	THEN…
YES	Go to "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).
NO	Continue with Step 2.

2   Examine the **NE Alarm List**. Is `RP removed` listed?

IF…	THEN…
YES	Go to "TAP-109: Clear 'Circuit Pack Removed'" (6-24).
NO	Consult the appropriate maintenance support organization for further technical assistance.

E N D   O F   S T E P S

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TAP-209 Clear 'APR active: RPG Raman co-pumps'

Overview This procedure is used to clear the `APR active: RPG Raman DCF pumps` condition. This is a secondary condition which is raised as a result of lowering of the power of the DCF Raman pumps in the RPG circuit pack due to warmup or removal of the corresponding OA(Raman), OA(Raman EDFA), or OA(OADM LineIn) circuit packs. The power is lowered as a result of the detection of one of the following alarms:

- `OA warmup in progress`
- `OA removed`
- `DCM LOS: RP to OA`

When these alarms are cleared, the `APR active: RPG Raman co-pumps` condition will also clear.

Procedure

1 Examine the **NE Alarm List**. Is `OA warmup in progress` listed?

IF…	THEN…
YES	Go to "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).
NO	Continue with Step 2.

2 Examine the **NE Alarm List**. Is `OA warmup in progress` listed?

IF…	THEN…
YES	Go to "TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36).
NO	Continue with Step 3.

3 Examine the **NE Alarm List**. Is `DCM LOS: RP to OA` listed?

IF…	THEN…
YES	Go to "TAP-506: Clear 'TCA optics: OT OC-192/STM-64 (OPR)'" (6-146).
NO	Consult the appropriate maintenance support organization for further technical assistance.

E ND OF S TEPS

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TAP-210: Clear APR Active Conditions for Fiber Disconnects

Overview   This procedure is used to clear the following "APR active" conditions:

- `APR active: fiber disconnect RPG to OA for Raman co-pumps`
  This condition is raised when there is a disconnected or broken fiber between RPG OUT_CORP port and IN_CORP port of the corresponding OA. The corresponding OAs may be one of the following:
  - OA(VOA)
  - OA(Raman)
  - OA(Raman EDFA)
  - OA(OADM LineOut)

- `APR active: fiber disconnect RPG to OA for Raman DCF pumps`
  This condition is raised when there is a disconnected or broken fiber between RPG OUT_DCF port and IN_DCF port of the corresponding OA. The corresponding OAs may be one of the following:
  - OA(Raman)
  - OA(Raman EDFA)
  - OA(OADM LineIn)

- `APR active: fiber disconnect RPG to RP for Raman counter-pumps`
  This condition is raised when there is a disconnected or broken fiber between RPG OUT_RPG port and IN_RPG port of the corresponding RP. The corresponding RP circuit packs may be one of the following:
  - RP
  - RP (50G/100G)

  LambdaXtreme™ Transport reduces the circuit pack output power to safe levels if an incoming loss of power is detected. These condtions are raised when the loss of power is caused by a disconnected or broken fiber jumper between associated OA, RP, and RPG circuit packs. When the incoming loss of power is

repaired, *LambdaXtreme* Transport will resume normal operation and the APR active condition will clear.

Procedure

....

1   Examine the **NE Alarm List**. Identify the appropriate shelf associated with the failure condition by looking at the alarm source address ID.

....

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

3   Examine the the entire length of the optical fiber jumper between the RPG port identified in Step 1 and the corresponding port on the OA or RP circuit pack for damage. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

4   Examine the **NE Alarm List**. Is the condition still listed?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 11.

....

5   Remove the identified fiber jumper, and inspect the associated ports on the circuit packs for dirt or damage. For details see "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

6   Replace the removed fiber jumper with an appropriate replacement. Inspect and clean the connectors on the new jumper before installing it. For details see "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

7   Examine the **NE Alarm List**. Is the condition still listed?

IF…	THEN…
YES	Continue with Step 8.

IF…	THEN…
NO	Go to Step 11.

....

8 Replace the RPG circuit pack. For Details, see "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

9 Examine the **NE Alarm List**. Is the condition still listed?

IF…	THEN…
YES	Go to Step 10
NO	Continue with Step 11.

....

10 Consult the appropriate maintenance support organization for further technical assistance.

....

11 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-211 Clear APR Switch Protection Conditions

Overview This procedure is used to clear the following conditions:

- APR active: switch protection OA (preamp)

- APR active: switch protection OA (OADM-add)

- APR active: switch protection RPG port DCF

- APR active: switch protection RPG Raman co-pumps

- APR active: switch protection RPG Raman counter-pumps

This type of alarm condition occurs when a fiber jumper is disconnected from the switch-protected connector on a circuit pack. This alarm condition automatically clears when the fiber jumper is reconnected and the loss of signal is cleared.

Procedure

1 Which alarm condition is reported? For the identified alarm condition, determine the associated switch port from the following table.

Alarm Condition	Associated Switch Port
APR active: switch protection OA (preamp)	OD(OADM 0 GHz offset), IN_OA-D port
APR active: switch protection OA (OADM-add)	OD(OADM 0 GHz offset), IN_OA-A port
APR active: switch protection RPG port DCF	In a basic Repeater: OA(Raman), IN_DCF port In an extra-gain Repeater: OA(Raman EDFA), IN_DCF port In an OADM: OA(OADM Line In), IN_DCF port
APR active: RPG Raman counter-pumps	RP, IN_RPG port

Alarm Condition	Associated Switch Port
APR active: RPG Raman co-pumps	In a basic Repeater: OA(Raman), IN_CORP port In an extra-gain Repeater: OA(Raman EDFA), IN_CORP port In a DGEF Repeater: OA(DGEF), IN_CORP port In an End Terminal: OA(VOA), IN_CORP port In an OADM: OA(OADM Line Out), IN_CORP port

....

2 Examine the **NE Alarm List**. Identify the appropriate shelf associated with the failure condition by looking at the alarm source address ID.

....

3 Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

4 Examine the identified port. Reconnect the disconnected fiber.

....

5 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP 212: Clear 'TCA optics: OLINE (TOPR-OL)'

Overview The total optical receive power at the RP has either exceeded the high threshold or has dropped below the low threshold.

Make sure there are *no* standing alarms that can attribute to the TCA(s), for example, if there is an OCHAN TCA make sure that the corresponding upstream add OT is not in alarm.

Make sure all TCAs have a default threshold value. With the exception of OPR and OPT, all TCAs can be user-provisioned.

If the TCA is occurring on more than one node associated with the same channel/wavelength, start the following trouble-clearing process at the first upstream node that is reporting the TCA. Fixing this node first may clear the TCA at the other downstream nodes.

Display the Default Threshold The following is the procedure for displaying the default threshold:

1 From the **Equipment Tree**, choose the optical line associated with this condition (1E or 1W).

2 Click the **performance** button, and then the **Analog Threshold** tab. Click the **Select** button.

Important! It can take as much as 10 minutes for a TCA to activate or clear.

3 Before taking the recommended action that follows, please check the sensitivity of the current user-provisioned thresholds which can cause inadvertent activation of TCAs, and, as a result, may only require adjusting the current threshold value.

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Recommended Action Follow these steps to clear the condition `TCA Optics: OLINE`
`(TOPR-OL)`.

....

⚠ **CAUTION**

*SERVICE AFFECTING - Failure to follow instructions in
this step could result in service interruption.*

1 Notify the person responsible for services supported by this optical
line to ensure that this line is not utilized until the problem has been
resolved.

....

2 If the TCA is occurring on all nodes, were channels added or deleted?

IF…	THEN…
YES	Manually re-baseline each node. Refer to "DLP-613: Baseline Optical Parameters " (7-38). If problem persists, contact the appropriate maintenance support organization for technical assistance.
NO	Continue with Step 3.

....

3 Measure span loss between the node that has the TCA and the
upstream node. If span loss has changed per office records:

- Determine the reason

- Rectify the problem

- Manually re-baseline this node, if necessary. Refer to "DLP-613: Baseline Optical Parameters" (7-38).

- If condition persists contact the appropriate maintenance support organization for technical assistance.

....

4 Replace the RP(OSP) circuit pack, and view the **Alarm List** in the
CIT. Does the condition still exist?

....

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IF…	THEN…
YES	Remove the new RP(OSP) circuit pack, and return the original pack to that slot. Continue with Step 5.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

5 Replace the fiber adapter at the IN_LINE port of the RP(OSP) circuit pack, and view the **Alarm List** in the CIT. Does the condition still exist?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

END OF STEPS

☐

TAP 213: Clear 'TCA optics: OLINE (TOPT-OL)'

Overview The total optical transmit power at the OA(VOA) has either exceeded the high threshold or has dropped below the low threshold.

Ensure the following:

Make sure there are *no* standing alarms that can attribute to the TCA(s), for example, if there is an OCHAN TCA make sure that the corresponding upstream add OT is not in alarm.

All TCAs have a default threshold value that was carefully chosen. With the exception of OPR and OPT, all TCAs can be user-provisioned.

If the TCA is occurring on more than one node associated with the same channel/wavelength, start the following trouble-clearing process at the first upstream node that is reporting the TCA. Fixing this node first may very well clear the TCA at the other downstream nodes.

Display the Default Threshold The following is the procedure for displaying the default threshold:

1 From the CIT **Node Manager**, select the **Equipment** tab, and select either **Line 1E** or **Line 1W**.

2 Click the **Performance** button and select the **Analog Threshold** tab.

3 Click on **Select**.

Important! It can take as much as 10 minutes for a TCA to activate or clear.

4 Before taking the recommended action, check the sensitivity of the current user-provisioned thresholds that can cause inadvertent activation of TCAs, and, may only require adjusting the current threshold value.

E N D   O F   S T E P S

Recommended Action   Follow these steps to clear the condition `TCA Optics: OLINE`
`(TOPT-OL):`

⚠ **CAUTION**

> *SERVICE AFFECTING - Failure to follow instructions in*
> *this step could result in service interruption.*

1   Notify the person responsible for services supported by this optical
line to ensure that this line is not utilized until the problem has been
resolved.

2   If power per channel is less than 1dBm from the OM cicuit pack, then

1.   Manually re-baseline this node, and

2.   If problem persists, replace the fiber jumper on the IN port of the
OA circuit pack and view the **NE Alarm List**.
STOP! YOU HAVE COMPLETED THIS PROCEDURE.

3   If power is per channel is ***not*** less than 1dBm from the OM cicuit
pack, then

1.   Replace OMON and then the OA.

2.   If problem persists contact the appropriate maintenance support
organization for technical assistance.

E N D   O F   S T E P S

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TAP-214: Clear 'TCA optics: SUPVY (SPT-SU)'

Overview The power of the transmit supervisory signal has either exceeded the high threshold or has dropped below the low threshold.

Clear TCA optics: SUPVY (SPT-SU)

1   Measure the power level to the IN_SUP port of the RP(OSP) circuit pack.

2   Is the power level between –12 dBm and –15 dBm?

IF…	THEN…
YES	Continue with Step 3.
NO	Go to Step 4.

3   Baseline the SUPVY. See "Baseline the SUPVY (SUPT-SU)" (6-76).

STOP! YOU HAVE COMPLETED THIS PROCEDURE.

4   Replace the connector on the RP(OSP).

5   Examine the **NE Alarm List**. Is `TCA optics: SUPVY (SPT-SU)` still listed?

IF…	THEN…
YES	Continue with Step 3.
NO	Consult the appropriate maintenance support organization for further technical assistance. *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

E ND OF S TEPS

**Baseline the SUPVY
(SUPT-SU)**

Follow these steps to baseline the SUPVY (SUPT-SU):

....

1 In the the CIT Equipment Tree, select the **SUPVY Channel**, under the appropriate optical line.

....

2 Click the **Analog Baseline** tab.

....

3 Click the **Signal Power Transmitted** checkbox.

....

4 Select **SUPVY_REPLACED** from the **Reason** drop-down menu.

....

5 Select **This Supervisory Channel** from the **Apply to** drop-down menu.

....

6 Click the **Apply** button.

STOP! YOU HAVE COMPLETED THIS PROCEDURE.

E ND OF S TEPS
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TAPs for PortOM_OD Alarm Group

Overview

Purpose   The TAPs in this section describe the alarm-clearing procedures that apply to alarm conditions associated with the optical multiplex section (OMS). The OMS alarm conditions are raised at the various *LambdaXtreme*™ Transport OM and OD circuit packs. These alarm conditions are supressed if the corresponding PortOA_RP and LINE alarm group conditions are raised.

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TAP-301: Clear 'OMS LOS: all at OA'

Overview   The Optical Multiplex Section (OMS) is the line between the Optical Multiplexer (OM 0GHz offset) OUT_SIG connector and IN_SIG connector of the OA(VOA). This condition indicated that the OA has detected a total loss of signal.

Procedure   **Important!** A minimum of two channels must be present on the system to prevent this alarm.

....

1   Examine the **NE Alarm List**.

....

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

⚠️ **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

3   Visually inspect the incoming signal cable between the OM(0GHz offset) OUT_SIG port and the OA IN_SIG port and correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

4   Did the visual inspection result in correcting any problems?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 6.

....

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....

5   Examine the **NE Alarm List**. Is the `OMS LOS: all at OA` condition still listed?

IF…	THEN…
YES	Continue with Step 6.
NO	Go to Step 17.

....

⚠️ **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

6   Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

....

7   Replace the fiber jumper between the OM(0GHz offset) OUT_SIG port and the OA IN_SIG port.

....

8   Examine the **NE Alarm List**. Is `OMS LOS: all at OA` still listed?

IF…	THEN…
YES	Continue with Step 9.
NO	Continue with Step 16.

....

9   Replace the OA associated with this optical multiplex section. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

10 Examine the **NE Alarm List**. Is `OMS LOS: all at OA` still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Continue with Step 16.

....

....

11 Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

12 Replace the OM associated with this optical multiplex section. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

13 Examine the **NE Alarm List**. Is OMS LOS: all at OA still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 16.

....

14 Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15 Examine the **NE Alarm List**. Is OMS LOS: all at OA still listed?

IF…	THEN…
YES	Contact the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

....

16 Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

....

17 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

18 Perform baseline on the OA if it was replaced. For details, refer to "DLP-613: Baseline Optical Parameters" (7-38).

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....

TAP-302: Clear 'OMS LOS: 0GHz and 100GHz offset at OA (preamp)' and 'OMS LOS: 50GHz and 150GHz offset at OA (preamp)'

Overview Use this procedure to clear the following alarm conditions:

- `OMS LOS: 0GHz and 100GHz offset at OA (preamp)`

- `OMS LOS: 50GHz and 150GHz offset at OA (preamp)`

These alarms are raised at the OA(Preamp) circuit pack when there is a total loss of signal at it's IN_SIG port. This indicates an Optical Multiplex Section (OMS) loss of signal (LOS) between the OUT ports of the RP circuit pack and the IN_SIG port of the associated OA(Preamp).

`OMS LOS: 0GHz and 100GHz offset at OA (preamp)` is raised when a LOS is detected at the IN_SIG port of the OA(Preamp) associated with the 0/100 GHz channels at 10G and 40G End Terminals.

`OMS LOS: 50GHz and 150GHz offset at OA (preamp)` is raised when a LOS is detected at the IN_SIG port of the OA(Preamp) associated with the 50/150 GHz channels in the 10G End Terminal.

Procedure

1   At The CIT, examine the **NE Alarm List**, and identify the AID of the OA(Preamp).

2   Remove the cover from the shelf identified in Step 1. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

SERVICE AFFECTING – this step could result in service interruption.

3   Visually inspect the incoming signal fiber between the OUT port of the RP and the IN_SIG port of the OA(Preamp). Correct any

TAPs for PortOM_OD Alarm Group
TAP-302: Clear 'OMS LOS: 0GHz and
100GHz offset at OA (preamp)' and 'OMS
LOS: 50GHz and 150GHz offset at OA
(preamp)'

Trouble Clearing Tasks

problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

4   Examine the **NE Alarm List**. Is the condition still listed?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 16.

....

⚠ **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

5   Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

....

6   Replace the fiber jumper between the RP OUT port and the OA(Preamp) IN_SIG port.

....

7   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 16.

....

8   Connect a power meter to the OUT port of the RP circuit pack. Is there any power output?

IF…	THEN…
YES	Continue with Step 9.
NO	Go to Step 12.

....

TAPs for PortOM_OD Alarm Group
TAP-302: Clear 'OMS LOS: 0GHz and
100GHz offset at OA (preamp)' and 'OMS
LOS: 50GHz and 150GHz offset at OA
(preamp)'

Trouble Clearing Tasks

9   Replace the OA(Preamp). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

10 Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 16.

11 Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

12 Replace the RP. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

13 Examine the**NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 16.

14 Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

15 Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

TAPs for PortOM_OD Alarm Group
TAP-302: Clear 'OMS LOS: 0GHz and
100GHz offset at OA (preamp)' and 'OMS
LOS: 50GHz and 150GHz offset at OA
(preamp)'

Trouble Clearing Tasks

....

16   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install
Front Cover" (7-17).

....

17   Notify the person responsible for the service assigned to this optical
multiplex section that the section can be returned to service.

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TAP-303: Clear 'OMS LOS: 100GHz offset at OM (0GHz offset)'

Overview Use this procedure to clear the `OMS LOS: 100GHz offset at OM (0GHz offset)` alarm condition.

There is an Optical Multiplex Section (OMS) loss of signal (LOS) between the OM(100GHz offset) OUT_100G connector and IN_100G connector of the OM(0GHz offset). This condition indicates that the OM(0GHz offset) circuit pack has detected a total loss of signal for all 100 GHz offset channels.

Procedure **Important!** A minimum of one channel must be present on the OM(100 GHz offset) circuit pack to prevent this alarm.

1 Examine the **NE Alarm List**.

2 Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to <u>"DLP-607: Remove/Install Front Cover" (7-17)</u>.

⚠ **CAUTION**

SERVICE AFFECTING – this step could result in service interruption.

3 Visually inspect the incoming signal fiber between following two circuit pack connections and correct any problems found. For details, see <u>"DLP-609: Inspect Optical Fiber(s)" (7-31)</u>.

- OUT_100G port of the OM(100 GHz offset) and the IN_100G port of the OM(0 GHz offset)

- OM(100 GHz offset) and associated 100 GHz offset OT circuit packs.

....

4   Examine the **NE Alarm List**. Is the `OMS LOS: 100GHz offset at OM` `(0GHz offset)` condition still listed?

IF…	THEN…
YES	Continue with <u>Step 5</u>.
NO	Go to <u>Step 16</u>.

....

⚠️ **CAUTION**

      SERVICE AFFECTING – this step could result in service interruption.

5   Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

....

6   Replace the fiber jumper between the OM(100 GHz) OUT_100G port and the OM(0 GHz offset) IN_100G port.

....

7   Examine the **NE Alarm List**. Is `OMS LOS: 100GHz offset at OM` `(0GHz offset)` still listed?

IF…	THEN…
YES	Continue with <u>Step 8</u>.
NO	Go to <u>Step 17</u>.

....

8   Connect a power meter to the OUT_100G port of the OM(100 GHz offset) circuit pack. Is the the power from the OM(100 GHz offset) < –16 dBm per channel?

IF…	THEN…
Power < –16 dBm per channel	Continue with <u>Step 9</u>.

IF…	THEN…
Power > –16 dBm per channel	Go to Step 12.

9   Replace the OM(100 GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

10   Examine the **NE Alarm List**. Is OMS LOS: 100GHz offset at OM (0GHz offset) still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 16.

11   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

12   Replace the OM(0 GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

13   Examine the **NE Alarm List**. Is OMS LOS: 100GHz offset at OM (0GHz offset) still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 16.

14   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

15   Examine the **NE Alarm List**. Is OMS LOS: 100GHz offset at OM (0GHz offset) still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

....

16 Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

....

17 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-304: Clear 'OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset)'

Overview   Use this procedure to clear the `OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset)` alarm condition.

There is an Optical Multiplex Section (OMS) loss of signal (LOS) between the OM OUT_50/150G connector and IN_50/150G connector of the OM(0GHz offset). This condition indicates that the OM(0GHz offset) circuit pack has detected a total loss of signal for all 50GHz offset and 150GHz offset channels.

Procedure   **Important!** A minimum of one channel must be present on the OM(50/150 GHz offset) circuit pack to prevent this alarm.

---

1   Examine the **NE Alarm List**.

---

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

SERVICE AFFECTING – this step could result in service interruption.

3   Visually inspect the incoming signal fiber between the following circuit pack connections and correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

- OUT_50/150G port of the OM(50GHz offset) and the IN_50/150G port of the OM(0GHz offset)

- OM(50GHz offset) and associated 50GHz offset OT circuit packs.

- OM(150GHz offset) and associated 150GHz offset OT circuit packs.

....

4 Examine the **NE Alarm List**. Is the `OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset)` condition still listed?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 16.

....

⚠ **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

5 Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

....

6 Replace the fiber jumper between the OM(150 GHz) OUT_50/150G port and the OM(0 GHz offset) IN_50/150G port.

....

7 Examine the **NE Alarm List**. Is `OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset)` still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 17.

....

8 Connect a power meter to the OUT_50/150G port of the OM(50 GHz offset) circuit pack. Is the the power < –16 dBm per channel?

IF…	THEN…
Power < –16 dBm per channel	Continue with Step 9.
Power > –16 dBm per channel	Go to Step 12.

....

....

9   Replace the OM(50 GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

10   Examine the **NE Alarm List**. Is OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset) still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 16.

....

11   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

12   Replace the OM(0 GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

13   Examine the**NE Alarm List**. Is OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset) still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 16.

....

14   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15   Examine the **NE Alarm List**. Is OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset) still listed?

....

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

16 Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

17 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-305: Clear 'OMS LOS: 150GHz offset at OM (50GHz offset)'

Overview Use this procedure to clear the `OMS LOS: 150GHz offset at OM (50GHz offset)` alarm condition.

There is an Optical Multiplex Section (OMS) loss of signal (LOS) between the OM OUT_150G connector and IN_150G connector of the OM(150GHz offset). This condition indicates that the OM(50GHz offset) has detected a total loss of signal for all 150GHz offset channels.

Procedure **Important!** A minimum of one channel must be present on the OM(150 GHz offset) circuit pack to prevent this alarm.

1   Examine the **NE Alarm List**.

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

3   Visually inspect the incoming signal fiber between the following circuit pack connections and correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

- OUT_150G port of the OM(150GHz offset) and the IN_150G port of the OM(50G offset)
- OM(150GHz offset) and associated 150GHz OT circuit packs.

....

4   Examine the **NE Alarm List**. Is the `OMS LOS: 150GHz offset at OM`
`(50GHz offset)` condition still listed?

IF…	THEN…
YES	Continue with <u>Step 5</u>.
NO	Go to <u>Step 16</u>.

....

![Caution triangle icon] **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

5   Notify the person responsible for services supported by this optical
multiplex section to ensure that it is not utilized until the problem has
been resolved.

....

6   Replace the fiber jumper between the OM(150 GHz) OUT_150G port
and the OM(50 GHz offset) IN_150G port.

....

7   Examine the **NE Alarm List**. Is `OMS LOS: 150GHz offset at OM`
`(50GHz offset)` still listed?

IF…	THEN…
YES	Continue with <u>Step 8</u>.
NO	Go to <u>Step 17</u>.

....

8   Connect a power meter to the OUT_150G port of the OM(150 GHz
offset) circuit pack. Is the the power < -16 dBm per channel?

IF…	THEN…
Power < –16 dBm per channel	Continue with <u>Step 9</u>.
Power > –16 dBm per channel	Go to <u>Step 12</u>.

....

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9 Replace the OM(150 GHz offset). For details, go to <u>"DLP-608:
Remove and/or Install Circuit Pack" (7-20)</u>.

10 Examine the **NE Alarm List**. Is OMS LOS: 150GHz offset at OM
(50GHz offset) still listed?

IF…	THEN…
YES	Continue with <u>Step 11</u>.
NO	Go to <u>Step 16</u>.

11 Remove the replacement circuit pack (installed in <u>Step 9</u>) and reinstall
the original circuit pack. For details, go to <u>"DLP-608: Remove and/or
Install Circuit Pack" (7-20)</u>.

12 Replace the OM(50 GHz offset). For details, go to <u>"DLP-608:
Remove and/or Install Circuit Pack" (7-20)</u>.

13 Examine the **NE Alarm List**. Is OMS LOS: 150GHz offset at OM
(50GHz offset) still listed?

IF…	THEN…
YES	Continue with <u>Step 14</u>.
NO	Go to <u>Step 16</u>.

14 Remove the replacement circuit pack (installed in <u>Step 9</u>) and reinstall
the original circuit pack. For details, go to <u>"DLP-608: Remove and/or
Install Circuit Pack" (7-20)</u>.

15 Examine the **NE Alarm List**. Is OMS LOS: 150GHz offset at OM
(50GHz offset) still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

16 Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

17 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-306: Clear 'OMS LOS: 0GHz and 100GHz offset at OD (0GHz offset)'

Overview   For the context of this alarm, the Optical Multiplex Section (OMS) is the line between the Optical Preamplifier (OA) OUT connector and IN 0/100 GHz connector of the Optical Demultiplexer Unit (OD 100). This condition indicates that the OD (0 GHz offset) has detected a total loss of input signal.

Procedure

1   Examine the **NE Alarm List**.

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

SERVICE AFFECTING - This step could result in service interruption.

3   Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

4   Visually inspect the incoming signal cable between the OA OUT_SIG port and the IN_0/100 port and correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

5   Did the visual inspection result in correcting any problems?

IF…	THEN…
YES	Go to Step 17.
NO	Continue with Step 6.

....

6   Replace the fiber adapters at the OA OUT port and the IN_0/100GHz port, and install a new fiber jumper between these two ports. For details see "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

7   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 16.

....

8   Using a power detector, check for power output from the OA(PreAmp) OUT_SIG port associated with the OD (0GHz Offset). Is there output power from the OA(PreAmp)?

IF…	THEN…
YES	Go to Step 12.
NO	Continue with Step 9.

....

9   Replace the OA associated with this optical multiplex section. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

10   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 16.

....

11   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

12   Replace the OD(0GHz Offset) associated with the OA(PreAmp). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

....

13   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Continue with Step 16.

....

14   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15   Obtain another NE Alarm List report (refer to Step 1). Is the same failure condition still listed?

IF…	THEN…
YES	Contact the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 17.

....

16   Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

....

17   Perform baseline on the OA if it was replaced. For details, refer to "DLP-613: Baseline Optical Parameters" (7-38).

....

18   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-307: Clear 'OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)'

Overview Use this procedure to clear the `OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)` alarm condition.

There is an Optical Multiplex Section (OMS) loss of signal (LOS) between the OA(Preamp) OUT_SIG connector and IN_50/150 connector of the OD(150 GHz offset) circuit pack. This condition indicates that the OD(50/150 GHz offset) circuit pack has detected a total loss of signal.

Procedure

1 Examine the **NE Alarm List**.

2 Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

SERVICE AFFECTING – this step could result in service interruption.

3 Visually inspect the incoming signal fiber between the OUT_SIG port of the OA(Preamp) and the IN_50/150G port of the OD(50 GHz offset). Correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

4 Examine the **NE Alarm List**. Is the `OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)` condition still listed?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 16.

....

⚠ **CAUTION**

SERVICE AFFECTING – this step could result in service interruption.

5 Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

....

6 Replace the fiber jumper between the OA(Preamp) OUT_SIG port and the OD(50 GHz offset) IN_50/150 port.

....

7 Examine the **NE Alarm List**. Is `OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)` still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 17.

....

8 Connect a power meter to the OUT_SIG port of the OA(Preamp) circuit pack. Is there any power output?

IF…	THEN…
YES	Continue with Step 9.
NO	Go to Step 12.

....

9 Replace the OD(50 GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

10 Examine the **NE Alarm List**. Is `OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)` still listed?

....

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 16.

....

11 Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

12 Replace the OA(Preamp). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

13 Examine the**NE Alarm List**. Is `OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)` still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 16.

....

14 Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15 Examine the **NE Alarm List**. Is `OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)` still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

....

16 Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

....

....

17 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-308: Clear 'OMS LOS: 100GHz offset at OD (100GHz offset)' or 'OMS LOS: 150GHz offset at OD (150GHz offset)'

Overview   Use this procedure to clear the following alarm conditions:

- `OMS LOS: 100GHz offset at OD (100GHz offset)`

- `OMS LOS: 150GHz offset at OD (150GHz offset)`

These alarms are raised at the identified OD circuit pack when there is a total loss of signal at it's IN port.

`OMS LOS: 100GHz offset at OD (100GHz offset)` is raised when a LOS is detected at the IN_100G port of the OD(100GHz offset) at 10G and 40G End Terminals and OADM Terminals. At End Terminals, this indicates that there is a problem with the connectivity between the OUT_100G port of the OD(0GHz offset)/OD(40G 0GHz offset) and the IN_100G port of the OD(100GHz offset) circuit pack. At OADM Terminals, this indicates that there is a problem with the connectivity between the OUT_100G port of the OD(OADM 0GHz offset) and the IN_100G port of the OD(100GHz offset) circuit pack.

`OMS LOS: 150GHz offset at OD (150GHz offset)` is raised when a LOS is detected at the IN_150G port of the OD(150GHz offset) at 10G End Terminals. This indicates that there is a problem with the connectivity between the OUT_150G port of the OD(50 GHz offset) and the IN_150G port of the OD(150GHz offset) circuit pack.

These alarm conditions are caused by a problem with the OMS 100G/150G path at the local terminal.

If an OMS LOS of the 100 GHz/150 GHz channels is detected at the upstream terminal, these alarms will be supressed.

Procedure

1   At the CIT, log into the upstream End Terminal or OADM, and check for presence of any OMS LOS alarm conditions associate with 100 GHz/150 GHz channels in the transmit direction.

2   Are there any OMS LOS alarm conditions associate with 100 GHz/150 GHz channels?

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TAPs for PortOM_OD Alarm Group
TAP-308: Clear 'OMS LOS: 100GHz offset
at OD (100GHz offset)' or 'OMS LOS:
150GHz offset at OD (150GHz offset)'

Trouble Clearing Tasks

IF…	THEN…
YES	Clear the upstream alarm conditions. For details, see Appendix A, "Alarm/Condition List" ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Continue with Step 3.

....

3 At The CIT, examine the **NE Alarm List**, and identify the AID of the OD.

....

4 Remove the cover from the shelf identified in Step 3. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

⚠ **CAUTION**

> *SERVICE AFFECTING - This step could result in service interruption.*

5 Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

....

6 Visually inspect the incoming signal cable into the IN port of the OD circuit pack, and correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

7 Did the visual inspection result in correcting any problems?

IF…	THEN…
YES	Go to Step 19.
NO	Continue with Step 8.

....

TAPs for PortOM_OD Alarm Group
TAP-308: Clear 'OMS LOS: 100GHz offset
at OD (100GHz offset)' or 'OMS LOS:
150GHz offset at OD (150GHz offset)'

Trouble Clearing Tasks

....

8   Replace the fiber adapters at the identified ports, and replace the fiber jumper between them.

....

9   At the CIT, examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 10.
NO	Go to Step 19.

....

10   Using a power detector, check for power output from the OA(PreAmp) OUT_SIG port associated with the OD (0GHz Offset). Is there output power from the OA(PreAmp)?

IF…	THEN…
YES	Go to Step 14.
NO	Continue with Step 11.

....

11   Replace the identified OD circuit pack associated with this optical multiplex section. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

12   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 13.
NO	Go to Step 19.

....

13   Remove the replacement circuit pack (installed in Step 11) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

14   For a 10G End Terminal, replace the OD(0GHz offset)/OD(50GHz offset).

....

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TAPs for PortOM_OD Alarm Group
TAP-308: Clear 'OMS LOS: 100GHz offset
at OD (100GHz offset)' or 'OMS LOS:
150GHz offset at OD (150GHz offset)'

Trouble Clearing Tasks

For a 40G End Terminal, replace the OD(40G 0GHz offset).

For an OADM Terminal, replace the OD(OADM 0GHz offset).

For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15 Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 16.
NO	Go to Step 19.

....

16 Remove the replacement circuit pack (installed in Step 14) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

17 Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 19.

....

18 Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

....

19 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-309: Clear 'OMS LOS: drop all at OA (preamp)'

Overview   Use this procedure to clear the `OMS LOS: drop all at OA (preamp)` alarm condition.

These alarms are raised at the OD(OADM 0GHz offset) circuit pack when there is a total loss of signal at it's OUT_OA-D port. This indicates an Optical Multiplex Section (OMS) loss of signal (LOS) between the OUT_OA-D ports of the OD(OADM 0GHz offset) circuit pack and the IN_SIG port of the associated OA(Preamp High Gain).

Procedure

1   Examine the **NE Alarm List**, and identify the AID of the OA(Preamp High Gain).

2   Remove the cover from the shelf identified in Step 1. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

> ⚠️ **CAUTION**
>
> *SERVICE AFFECTING – this step could result in service interruption.*

3   Visually inspect the incoming signal fiber between the OUT_OA-D port of the OA(OADM 0GHz offset) and the IN_SIG port of the OA(Preamp High Gain). Correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

4   Examine the **NE Alarm List**. Is the condition still listed?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 16.

....

⚠ **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

5   Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

....

6   Replace the fiber jumper between the OD(OADM 0GHz offset) OUT OA-D port and the OA(Preamp) IN_SIG port.

....

7   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 16.

....

8   Connect a power meter to the OUT port of the OM(OADM 0GHz offset) circuit pack. Is there any power output?

IF…	THEN…
YES	Continue with Step 9.
NO	Go to Step 12.

....

9   Replace the OA(Preamp High Gain). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

10   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 16.

....

....

11   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

12   Replace the OD(OADM 0GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

13   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 16.

....

14   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

....

16   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

17   Notify the person responsible for the service assigned to this optical multiplex section that the section can be returned to service.
E N D   O F   S T E P S
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....

TAP-310: Clear 'OMS LOS: add 100GHz at OM (OADM 0GHz offset)'

Overview   Use this procedure to clear the `OMS LOS: add 100GHz at OM (OADM 0GHz offset)` alarm condition.

There is an Optical Multiplex Section (OMS) loss of signal (LOS) between the OM(100GHz offset) OUT_100G connector and IN_100G connector of the OM(OADM 0GHz offset). This condition indicates that the OADM(0GHz offset) circuit pack has detected a total loss of signal for all 100 GHz offset channels.

Procedure

1   Examine the **NE Alarm List**.

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

SERVICE AFFECTING – this step could result in service interruption.

3   Visually inspect the incoming signal fiber between following two circuit pack connections and correct any problems found. For details, see "DLP-609: Inspect Optical Fiber(s)" (7-31).

- OUT_100G port of the OM(100 GHz offset) and the IN_100G port of the OM(OADM 0 GHz offset)

- OM(100 GHz offset) and associated 100 GHz offset OT circuit packs.

4   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 5.

IF…	THEN…
NO	Go to Step 16.

⚠ **CAUTION**

> *SERVICE AFFECTING – this step could result in service interruption.*

5 Notify the person responsible for services supported by this optical multiplex section to ensure that it is not utilized until the problem has been resolved.

6 Replace the fiber jumper between the OM(100 GHz) OUT_100G port and the OM(OADM 0GHz offset) IN_100G port.

7 Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 17.

8 Connect a power meter to the OUT_100G port of the OM(100 GHz offset) circuit pack. Is the the power from the OM(100 GHz offset) < –16 dBm per channel?

IF…	THEN…
Power < –16 dBm per channel	Continue with Step 9.
Power > –16 dBm per channel	Go to Step 12.

9 Replace the OM(100 GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

10   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 16.

....

11   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

12   Replace the OM(OADM 0GHz offset). For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

13   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 16.

....

14   Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 16.

....

16   Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can be returned to service.

....

....

17   Reinstall the shelf cover. For details, go to <u>"DLP-607: Remove/Install Front Cover" (7-17)</u>.

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TAPs for OCHAN Alarm Group

Overview

....

Purpose   The TAPs in this section describe the alarm-clearing procedures that apply to alarm conditions associated with the optical channel (OCHAN). The OCHAN alarm conditions are raised at the various *LambdaXtreme*™ Transport RP, OA, and OT circuit packs. These alarm conditions are supressed if the corresponding Equipment Failure, PortOA_RP, LINE, and PortOM_OD alarm group conditions are raised.

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TAP-401: Clear 'Transmitting optical channel LOS'

Overview This condition indicates that the OMON circuit pack has detected a loss of an optical channel incoming to the transmit OA circuit pack.

Procedure

1 Examine the **NE Alarm List**.

2 Are all optical channels indicating an optical channel transmit failure?

IF…	THEN…
YES	Proceed to "TAP-202: Clear 'DCM LOS'" (6-48).
NO	Continue with Step 3.

3 Using the **AID** column of the **NE Alarm List**, identify the port label number associated with the condition (for example, it is 9010 for OCHAN-1E-9010).

4 Using the port label number obtained in Step 3 (9010) and the information in the source port **AID** column of the **NE Alarm List** (for example, port-1-1-1-OUTA_9010 and port 1-3-5-9010), determine the slot and port location of the OT and the OM circuit pack.

5 Remove the appropriate shelf cover from the front. For details, see "DLP-607: Remove/Install Front Cover" (7-17).

Important! *SERVICE AFFECTING*—this step could result in service interruption

6 Visually inspect the incoming signal cable between the OT_OUT port connector and the OM_IN port connector and correct any problems found. For details, see "DLP-609: Inspect Optical Fiber(s)" (7-31).

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....

7   Examine the **NE Alarm List**. Is the optical channel transmit failure still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 20.

....

8   Using the information from Step 4 identify the OT and OT_OUT fiber connected to the OM_IN port associated with the alarm condition.

....

⚠ **CAUTION**

> *SERVICE AFFECTING—failure to follow the instructions in this step could result in service interruptions.*

9   Notify the person responsible for services supported by faulty circuit pack to ensure that it is not utilized until the problem has been resolved.

....

10   Remove and clean the fiber identified in Step 8 at the OM_IN port. For details, go to "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

11   Connect an optical power meter to the fiber cleaned in Step 10 and obtain power measurement.

RESULT: The power should be -5 dBm +/-0.5 dBm.

....

12   Was the optical power measurement within the limits?

IF…	THEN…
YES	Go to Step 17.
NO	Continue with Step 13.

....

....

13 Examine the **NE Alarm List**. Is the `Transmitting optical channel LOS` still listed?

IF…	THEN…
YES	Continue with Step 14.
NO	Go to Step 20.

....

14 Replace the OT circuit pack identified in Step 8. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15 Examine the **NE Alarm List**. Is the same alarm condition still listed?

IF…	THEN…
YES	Continue with Step 16.
NO	Go to Step 20.

....

16 Remove the replacement circuit pack (installed in Step 14) and reinstall the original circuit pack. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

Important! At this point, suspect the OM is defective.

....

⚠ **CAUTION**

> *Failure to follow instructions in this step could result in service interruptions. Contact the appropriate maintenance support organization for further technical assistance if required.*

17 Notify the person responsible for services supported by faulty circuit pack to ensure that it is not utilized until the problem has been resolved.

....

....

18 Replace the OM pack identified in Step 4. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

19 Examine the **NE Alarm List**. Is the same `Transmitting optical channel LOS` failure listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Continue with Step 20.

....

20 Notify the person responsible for the optical line or channel associated with the service assigned to this OM/OT that the optical channel or optical line can now be returned to service.

....

21 Baseline the replaced circuit pack. For details, refer to "DLP-613: Baseline Optical Parameters" (7-38).

....

22 Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

E ND OF S TEPS

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TAP-402: Clear 'Line side: WaveWrapper path trace identifier mismatch'

Overview   This procedure is used to clear the `Line side: WaveWrapper path trace identifier mismatch` condition. *LambdaXtreme*™ Transport reads the optical channel path trace byte (0J3) in the optical channel overhead. This condition indicates that the incoming optical channel path trace message trace does not match the expected incoming optical channel path trace message trace.

Procedure

1   Examine the **NE Alarm List**. Determine the AID of the OT reporting this alarm condition.

2   Determine from the local office records what is the correct expected received OCH path trace message for this signal.

3   Do the office records for the expected incoming optical channel path trace message match the data in the expected incoming optical channel path trace message listed in the report from Step 1?

IF…	THEN…
YES	Continue with Step 4.
NO	Go to Step 9.

4   At the CIT, click on the NE Alarm List icon to obtain an updated report.

Important! *SERVICE AFFECTING* - this step could result in service interruption.

5   Trace the fiber jumper connected to the IN_wxyz port of the OT identified in the **AID** column, back to the source.

6   Do the office records indicate that the fiber jumper is connected to the correct source?

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IF…	THEN…
YES	Go to Step 11.
NO	Continue with Step 7.

....

Important! *SERVICE AFFECTING*—this step could result in service interruption.

7 Using local procedures connect the fiber jumper to the correct source.

....

8 Examine the **NE Alarm List**. Is the `Line side: WaveWrapper path trace identifier mismatch` condition still present?

IF…	THEN…
YES	Continue with Step 9.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

....

9 At the CIT, enter the correct expected incoming optical channel path trace message.

....

10 Examine the **NE Alarm List**. Is the `WaveWrapper Path Trace Mismatch` condition still present?

IF…	THEN…
YES	Continue with Step 11.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

....

Important! At this point, it appears that the local network element is operating correctly.

11 Initiate a Trouble Report to the upstream network element of the line indicating the `WaveWrapper Path Trace Mismatch`.
E N D   O F   S T E P S
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TAP-403: Clear 'Unexpected channel'

Overview   This alarm condition is raised when an OMON scan discovers a new channel frequency on a line that has not been provisioned. This usually happens when a compatible optics signal is added to an End Terminal or an OADM without being provisioned.

Procedure

1   At the CIT, examine the **NE Alarm List** to determine the frequency of the unexpected channel.

2   Log into the upstream terminals, and identify the most upstream terminal which reports this alarm.

3   Consult the person responsible for services on the OLS, and verify whether this signal should be present.

4   Should this signal be present?

IF…	THEN…
YES	Continue with Step 5
NO	Go to Step 6

5   Provision the compatible optics connection. For details, see the *LambdaXtreme™ Transport User Operations Guide, Release 1.1,* (365-575-781R1.1).

6   Access the terminal identified in Step 2. Identify the AID of the OM circuit pack transmitting the unexpected channel.

7   Remove the fiber jumper of the unexpected channel from the OM circuit pack.
E N D   O F   S T E P S

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TAP-404: Clear 'TCA optics: OCHAN (SPR-C)'

Overview   The signal power received for a specific optical channel has either exceeded the high threshold or has dropped below the low threshold.

Before you begin   Ensure the following:

Make sure there are *no* standing alarms that can attribute to the TCA(s), for example, if there is an OCHAN TCA make sure that the corresponding upstream add OT is not in alarm.

All TCAs have a default threshold value that was carefully chosen. With the exception of OPR and OPT, all TCAs can be user-provisioned.

If the TCA is occurring on more than one node associated with the same channel/wavelength, start the following trouble-clearing process at the first upstream node that is reporting the TCA. Fixing this node first may very well clear the TCA at the other downstream nodes.

Display the default threshold   The following is the procedure for displaying the default threshold:

1   In the CIT, click on the **Performance** button, select an optical line from the **Node Explorer** tree, and select the appropriate channel.

2   Select the bay, shelf and slot/CP number.

3   Click on **Select**.

Important! It can take as much as 10 minutes for a TCA to activate or clear.

4   Before taking the recommended action, check the sensitivity of the current user-provisioned thresholds that can cause inadvertent activation of TCAs, and only require adjusting the current threshold value.

E N D   O F   S T E P S

For one or a few channels Using the CIT, read the receive (OCHAN) power of the specified channel wavelength at the OA.

....

1 Manually baseline the specific channel. Refer to <u>"DLP-613: Baseline Optical Parameters" (7-38)</u>.

    1. If TCA does not clear within approximately 10 minutes, contact the appropriate maintenance support organization for technical assistance.

    2. *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

....

 CAUTION

    SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.

2 Notify the person responsible for services supported by this optical line to ensure that this line is not utilized until the problem has been resolved.

....

3 If the current value is per measurements listed in *LambdaXtreme*™ *Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1), then

    1. Using a power meter, disconnect the fiber and measure the power at the corresponding output port of the upstream OT.

        a. If the power is *out of range* as indicated in the *Technical Specifications* chapter of the *LambdaXtreme Transport Applications and Planning Guide, Release 1.1,* (365-575-780R1.1), replace the OT circuit pack.

....

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> *NOTE:* If the OT circuit pack is replaced, manually baseline both ports. Refer to "DLP-613: Baseline Optical Parameters" (7-38).

    b.   If the power *is* within the expected range, continue with Step c.

    c.   Record the power of the OT output port.

2.   Disconnect the fiber from the input port associated with the OCHAN of OM, connect it to a power meter and measure the power.

    a.   If the result is not equal (may vary between 0.1 to 0.2 dB) to recorded value in Step 1c, replace the fiber.

    b.   If the result is equal to recorded value in Step 1c, reconnect the fiber.

3.   Connect a multi-wave meter to OUT port of the OM and measure the OCHAN power is within the expected range specified in *LambdaXtreme Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1).

    a.   If the result is *not* within range determine the source of the problem, or contact the appropriate maintenance support organization for technical assistance.

    b.   If the result *is* within range, continue.

4.   Using the CIT, read the power associated with the channel at next (Repeater) node in the downstream path up to the adjacent node that has the TCA

    a.   If the current value is *outside* expected range, determine the source of the problem, or contact the appropriate maintenance support organization for technical assistance.

    b.   If the current value *is* per *LambdaXtreme Transport Applications and Planning Guide, Release 1.1,* (365-575-780R1.1), Technical Specifications, go to the next node and repeat Step 4.

....

4   If after all the nodes are checked and problem persists, contact the appropriate maintenance support organization for technical assistance.

....

5   *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

E N D   O F   S T E P S
....

For many or all channels: **Important!** This indicates that a common circuit pack— the OMON circuit pack has failed.

....

⚠ **CAUTION**

> *SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.*

1 Notify the person responsible for services supported by this optical line to ensure that this line is not utilized until the problem has been resolved.

....

2 Replace the OMON circuit pack. An auto-baseline of all the channels at that node occurs because of the new init map when the circuit connection is made only.

....

3 Allow the circuit pack to reboot.

....

4 If problem persists, contact the appropriate maintenance support organization for technical assistance.

....

5 Notify the person that is responsible for all affected service assigned to this OA that this Optical Line can now be returned to service.

E N D   O F   S T E P S
....

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TAP-405: Clear 'TCA optics: OCHAN (SPT-C)'

Overview   The transmit signal power for a specific optical channel has either exceeded the high threshold or has dropped below the low threshold.

Ensure the following:

Make sure there are *no* standing alarms that can attribute to the TCA(s), for example, if there is an OCHAN TCA make sure that the corresponding upstream add OT is not in alarm. All TCAs have a default threshold value that was carefully chosen. With the exception of OPR and OPT, all TCAs can be user-provisioned.

If the TCA is occurring on more than one node associated with the same channel/wavelength, start the following trouble-clearing process at the first upstream node that is reporting the TCA. Fixing this node first may very well clear the TCA at the other downstream nodes.

Display the Default Threshold   The following is the procedure for displaying the default threshold:

1   Click on **Performance** ⇒ **Provision Threshold**.

2   Select the bay, shelf and slot/CP number.

3   Click on **OCHAN-( )e/w-( )**.

4   Click on **Select**.

        Important! It can take as much as 10 minutes for a TCA to activate or clear.

5   Before taking the recommended action, please check the sensitivity of the current user-provisioned thresholds which can cause inadvertent activation of TCAs, and, as a result, may only require adjusting the current threshold value.

        E ND OF S TEPS

Recommended Action

⚠️ **CAUTION**

SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.

1 Notify the person responsible for services supported by this optical channel to ensure that this optical channel is not utilized until the problem has been resolved.

2 If the power is per *LambdaXtreme Transport Applications and Planning Guide, Release 1.1,* (365-575-780R1.1), Technical Specifications, then

1. Manually re-baseline the OCHAN. Refer to "DLP-613: Baseline Optical Parameters" (7-38)

2. If problem persists, contact the appropriate maintenance support organization for technical assistance
   STOP! YOU HAVE COMPLETED THIS PROCEDURE.

3 If the power is not within the expected range as listed in *LambdaXtreme™ Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1).

1. Determine the problem, rectify and manually re-baseline, Refer to "DLP-613: Baseline Optical Parameters" (7-38).

2. If problem persists, contact the appropriate maintenance support organization for technical assistance.

4 Notify the person responsible for all affected service assigned to this OA that this Optical Line can now be returned to service.

E N D   O F   S T E P S

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TAPs for PortOT Alarm Group

Overview

Purpose The TAPs in this section describe the alarm-clearing procedures that apply to alarm conditions associated with the client SONET/SDH signals monitored at the OT circuit packs. These alarm conditions are supressed if the corresponding Equipment Failure, PortOA_RP, LINE, PortOM_OD, and OCHAN alarm group conditions are raised.

□

TAP-501: Address Incoming Line-Side Signal Failure

Overview This procedure is used when one of the following incoming signal failures is detected:

- `Incoming optical channel LOS`
- `Incoming SUPVY channel LOS`
- `Incoming SUPVY channel LOF`
- `Line side: WaveWrapper payload type mismatch`
- `Line side WaveWrapper LOS failure`
- `Line side WaveWrapper LOF failure`

The `Incoming optical channel LOS` alarm condition is raised when an OMON scan at the RP circuit pack detects loss of a particular provisioned channel.

The `Incoming SUPVY channel LOS` alarm condition is raised when there is a problem with a fiber jumper between the OUT_SUP port of an OA and the IN port of the SUPVY circuit pack.

The `Incoming SUPVY channel LOF` alarm condition is raised when a SUPVY circuit pack fails to detect an OC-3 frame. This occurs when there is a problem with the upstream SUPVY circuit pack.

The `Line side: WaveWrapper payload type mismatch` alarm condition is raised when the OT circuit packs at End Terminals do not match. For example, one OT might be carrying an OC-192 payload, when the other is carrying an OC-48 payload.

The `Line side WaveWrapper LOS failure` alarm condition is raised when there is a LOS detected at the IN_wxyz port of an OT. This could be caused by a problem with fiber connectivity between an OT and the corresponding OD circuit pack. If an OT failure is detected at the upstream node, this alarm will be suppressed.

The `Line side WaveWrapper LOF failure` alarm condition is raised when .

Procedure

   1   Refer to the **NE Alarm List** to determine the type of incoming signal failure.

....

2   Is the alarm condition caused by a problem at the NE reporting the alarm. See the descriptions above.

IF…	THEN…
YES	Continue with Step 3.
NO	Go to Step 7.

....

3   Determine the AID of the circuit pack reporting the alarm.

....

4   Remove the appropriate shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

....

⚠ **CAUTION**

SERVICE AFFECTING—this step could result in service interruption.

5   Visually inspect the incoming signal cable(s) and connection(s) and correct any problems found. For details, refer to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

6   Examine the **NE Alarm List**. Is the alarm condition still listed?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	Go to Step 8.

....

7   Log into the upstream node and address any reported alarms. See Appendix A, "Alarm/Condition List" for a list of alarm-clearing procedures.

....

8   Reinstall the shelf cover. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

E ND OF S TEPS

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TAP-502: Clear Incoming (LOF/LOS) Signal Failure

Overview This procedure explains how to address one of the following incoming signal failures:

- Add side OC-192/STM-64 LOS failure

- Add side OC-192/STM-64 LOF failure

- Add side OC-48/STM-16 LOS failure

- Add side OC-48/STM-16 LOF failure

Procedure **Important!** OC-192/STM-64 is associated with the 10G ADD DROP OT. OC-48/STM-16 is associated with the MUX OT.

---

1 Refer to the **AID** column of the **NE Alarm List** and determine the bay location of the OT with the incoming failure.

---

2 Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ **CAUTION**

SERVICE AFFECTING—this step could result in service interruption.

3 Visually inspect the fiber(s) connecting the client equipment and the OT circuit packs, and correct any problems found. For details, see "DLP-609: Inspect Optical Fiber(s)" (7-31).

---

4 Did a visual inspection reveal any problems?

IF…	THEN…
YES	Continue with Step 5.

IF…	THEN…
NO	Go to Step 6.

....

5   Examine the **NE Alarm List**. Has the failure condition cleared?

IF…	THEN…
YES	Go to Step 24.
NO	Continue with Step 6.

....

6   Is the failure condition an *LOS* or *LOF* failure?

IF…	THEN…
LOS	Continue with Step 7.
LOF	Go to Step 15.

....

7   Notify the person responsible for the service assigned to this circuit pack to ensure that it is not being used for service.

....

8   Make an optical power measurement on the incoming optical jumper to the OT IN_ADD port.

....

9   Was the optical power measurement within the limits for this client interface type?

IF…	THEN…
NO	Continue with Step 10.
YES	Go to Step 14.

....

10   Clean the incoming fiber jumper. For details, refer to "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

11   Connect the incoming fiber jumper to the correct OT IN port.

....

....

Important! At this point, it appears that the local OT is operating correctly. The trouble appears to be in the optical fiber jumper, optical line, or in the far-end network element.

12 Initiate a Trouble Report to the source of the failed incoming signal indicating the type of failure. If the source of the failed incoming signal returns a Trouble Report indicating ″no trouble found,″ then contact the appropriate maintenance support organization for further technical assistance before following the prescribed operating procedures to fault isolate the fiber jumper carrying the failed incoming signal. For details, go to "DLP-604: Identify Source of Incoming Signal" (7-9).

....

13 *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

....

14 Remove the OT indicating the incoming failure from the shelf. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

⚠ **CAUTION**

The replacement OT must have the same (or higher) circuit pack series number.

15 Obtain and install the replacement OT. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

16 Examine the **NE Alarm List**.

....

17 Did the incoming failure clear?

IF…	THEN…
YES	Go to Step 24.
NO	Continue with Step 18.

....

18   Remove the fiber jumper, clean it and reconnect it to the OT. For details, see "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

19   Did the incoming failure clear?

IF…	THEN…
YES	Go to Step 24.
NO	Continue with Step 20.

20   As required, check for a damaged jumper, or bent or broken pins.

21   Reinstall the original OT that was removed in Step 14. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

22   Connect the optical fibers to the original OT.

23   Initiate a trouble report to the source of the failed incoming signal indicating the type of failure. If the source of the failed incoming signal returns a trouble report indicating ″no trouble found,″ then contact the appropriate maintenance support organization for further technical assistance before following the prescribed operating procedures to fault isolate the fiber jumper carrying the failed incoming signal. For details, go to "DLP-604: Identify Source of Incoming Signal" (7-9).

Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

STOP! YOU HAVE COMPLETED THIS PROCEDURE.

24   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

25   Notify the person responsible for the service assigned to this circuit pack that they can be returned to service.

E N D   O F   S T E P S

TAP-503: Clear Drop Side Incoming LOF Failures

Overview This procedure explains how to address one of the following incoming signal failures:

- `Drop side OC-48/STM-16 LOF failure`

- `Drop side OC-192/STM-64 LOF failure`

These alarms are raised at the OUT_DROP port of the OT circuit pack when the OT fails to detect the expected SONET/SDH frame structure. This is an indication that there is problem with the upstream OT.

Procedure **Important!** OC-192/STM-64 is associated with the 10G ADD DROP OT. OC-48/STM-16 is associated with the MUX OT.

....

1 At the CIT **NE Alarm List**, examine the **AID** column and record the AID of the OT with the failure.

....

2 Determine the OT frequency associated with the identified AID.

....

3 Identify the NE of the corresponding upstream OT circuit pack.

....

4 Log into the identified NE.

....

5 Are any alarms reported in this NE, associated with the identified OT?

IF…	THEN…
YES	Continue with Step 6
NO	Go to Step 9.

....

6 Clear the alarms. Refer to Appendix A, "Alarm/Condition List".

....

....

7   Log back into the original NE.

....

8   Examine the **NE Alarm List**. Has the failure condition cleared?

IF…	THEN…
YES	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Continue with <u>Step 9</u>.

....

9   Initiate a trouble report to the source of the failed incoming signal indicating the type of failure. If the source of the failed incoming signal returns a trouble report indicating "no trouble found," then contact the appropriate maintenance support organization for further technical assistance before following the prescribed operating procedures to fault isolate the fiber jumper carrying the failed incoming signal. For details, go to <u>"DLP-604: Identify Source of Incoming Signal" (7-9)</u>.

Reinstall the shelf cover. For details, go to <u>"DLP-607: Remove/Install Front Cover" (7-17)</u>.

STOP! YOU HAVE COMPLETED THIS PROCEDURE.

E N D   O F   S T E P S

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TAP-504: Clear 'Add side OC-48/STM-16 client synchronization failure'

Overview   The "Client Synchronization Failure" alarm condition is issued when the system software detects an input signal from a client has a timing problem.

If more than one channel for the same 2.5G MUX indicates the same failure, then the user may suspect a defective 2.5G MUX circuit pack. The 2.5G MUX can have up to four inputs of OC-48 signals.

Procedure

1   At the CIT, examine the **NE Alarm List**, and identify the appropriate shelf and slot location of the OT and associated port reporting the alarm condition.

2   Remove the shelf cover. All connections can be accessed from the front. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

⚠ CAUTION

SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.

3   Make a visual inspection of the incoming signal cable(s) and connections and correct any problems found. For details, refer to "DLP-609: Inspect Optical Fiber(s)" (7-31).

4   Did the visual inspection reveal any problems?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 6.

....

5   Examine the **NE Alarm List**. Has the alarm condition cleared?

IF…	THEN…
YES	Go to Step 23.
NO	Continue with Step 6.

....

⚠ **CAUTION**

SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.

6   Notify the person responsible for the optical channel associated with the service assigned to this circuit pack to manually switch the service to a different channel if this will take too long to fix.

....

7   Make an optical power measurement on the incoming optical jumper at the OT.

....

8   Is the optical power measurement within limits?

IF…	THEN…
YES	Go to Step 11.
NO	Continue with Step 9.

....

9   Clean the incoming fiber jumper. For details, refer to "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

10   Connect the incoming fiber to the correct OT IN port.

Important! At this point, it appears that the local OT is operating correctly. The trouble appears to be in the optical fiber jumper, optical line, or the client signal coming into the OT.

....

....

11 Initiate a Trouble Report to the source of the failed incoming signal indicating the type of failure. If the source of the failed incoming signal returns a Trouble Report indicating "no trouble found," then continue with Step 13.

....

12 *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

....

⚠ **CAUTION**

> *SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.*

13 Remove the OT identified in the **AID** column in Step 1. For details, see "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

⚠ **CAUTION**

> *The replacement OT must have the same (or higher) circuit pack series number.*

14 Obtain and install the replacement OT. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

15 Did the "Client Synchronization Failure" alarm condition clear?

IF…	THEN…
YES	Go to Step 24
NO	Continue with Step 16.

....

16 Remove the optical input jumper, reclean and reconnect it to the OT. For details, refer to "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

....

17 Did the "Client Synchronization Failure" condition clear?

IF…	THEN…
YES	Go to Step 22.
NO	Continue with Step 18.

....

18 As required, check for a damaged jumper, or bent or broken pins.

....

19 Reinstall the original OT that was removed in Step 13. For details, refer to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

20 Connect the optical fibers to the original OT.

....

21 Initiate a Trouble Report to the source of the failed incoming signal indicating the type of failure. If the source of the failed incoming signal returns a Trouble Report indicating "no trouble found", then contact the appropriate maintenance support organization for further technical assistance.

....

22 Notify the person responsible for all service signals assigned to this circuit pack that the signals can be returned to service.

....

23 Reinstall the shelf cover. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-505: Clear 'JØ mismatch'

Overview This procedure is used to clear the JØ mismatch condition. *LambdaXtreme*™ Transport reads the section trace byte (JØ) in the section overhead as OC-48/OC-192 signal. The Optical Translator (OTs) are the only circuit packs capable of reading the section trace byte. This condition indicates that the incoming section trace does not match the expected incoming section trace.

Procedure

Important! An upstream transmission failure could cause multiple reports of JØ mismatch. Before attempting to clear this alarm, log in to the upstream network element to view the **NE Alarm List**, and clear any transmission alarms.

1 At the CIT, select **FAULT-Analysis-OT Section Trace** and select the appropriate bay shelf and OT port to obtain a report.

2 Determine from the local office records what is the correct expected incoming message for this OC-48/OC-192.

3 Do the office records for the expected incoming message match the data in the Expected Incoming Message listed in the report from Step 1?

IF…	THEN…
YES	Continue with Step 4.
NO	Go to Step 11.

4 At the CIT, click on the **NE Alarm List** icon to obtain an updated report.

5 Trace the fiber jumper connected to the IN port of the OT, identified in the **AID** column, back to the source.

....

6 Do the office records indicate that the fiber jumper is connected to the correct source?

IF…	THEN…
YES	Go to Step 14.
NO	Continue with Step 7.

....

⚠ **CAUTION**

SERVICE AFFECTING—this step could result in service interruption.

7 Using local procedures connect the fiber jumper to the correct source.

....

8 At the CIT, click on the **NE Alarm List** icon to obtain an updated report.

....

9 Is the JØ mismatch condition still present?

IF…	THEN…
YES	Go to Step 14.
NO	Continue with Step 10.

....

10 *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

....

11 At the CIT, select **FAULT-Analysis-OT Section Trace** and enter the correct expected incoming message and click **OK**.

....

12 At the CIT, click on the **NE Alarm List** icon to obtain an updated report.

....

13 Is the JØ mismatch condition still present?

....

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

....

Important! At this point, it appears that the local network element is operating correctly.

14 Initiate a trouble report to the upstream network element of the OT indicating the JØ mismatch.

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TAP-506: Clear 'TCA optics: OT OC-192/STM-64 (OPR)'

Overview   The amount of signal power received by the OT has dropped below the low threshold.

Ensure the following:

Make sure there are *no* standing alarms that can attribute to the TCA(s), for example, if there is an OCHAN TCA make sure that the corresponding upstream add OT is not in alarm.

All TCAs have a default threshold value that was carefully chosen. With the exception of OPR and OPT, all TCAs can be user-provisioned.

If the TCA is occurring on more than one node associated with the same channel/wavelength, start the following trouble-clearing process at the first upstream node that is reporting the TCA. Fixing this node first may very well clear the TCA at the other downstream nodes.

Recommended Action For   Follow these steps to clear this TCA:
Add OT

⚠ CAUTION

> *SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.*

1   Notify the person responsible for services supported by this optical channel to ensure that this channel is not utilized until the problem has been resolved.

---

2   Fix/replace the external connecting equipment that is connected to the OT, connecting fiber or connector(s).

---

3   If problem persists, contact the appropriate maintenance support organization for technical assistance.

....

4 Notify the person that is responsible for all affected service assigned to this OA that this Optical Line can now be returned to service.

....

5 *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

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Recommended Action For Drop OT

Follow these steps to clear this TCA:

....

1 Determine the frequency/wavelength of the optical channel received at the OTD port. If the TCA is present it should be listed in the NE Alarm List.

....

2 Using the CIT, check the receive OA in the same node as the OTD for an OCHAN TCA.

....

3 If there is an OCHAN TCA, clear this TCA.

....

 CAUTION

SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.

4 Notify the person responsible for services supported by this optical channel to ensure that this channel is not utilized until the problem has been resolved.

....

....

5   If there is no associated OCHAN TCA, using the CIT, select
Performance > Reports> to obtain a PM Report. Check the OCHAN
power at the output of the OA.

1.   Using a power meter, measure the power at the associated output
port of the OD.

2.   Subtract the OCHAN power level from the OD output port
power level.

- If the result is more than the expected loss per
*LambdaXtreme Transport Applications and Planning Guide,
Release 1.1,* (365-575-780R1.1), **Technical Specifications**,
the fiber(s) that connect the ODs and/or OD to the OTD
port may be dirty or defective.

- If the difference is within the expected value, contact the
appropriate maintenance support organization for technical
assistance.

....

6   Notify the person that is responsible for all affected service assigned
to this OA that this Optical Line can now be returned to service.

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TAP-507: Clear 'TCA optics: OT OC-192/STM-64 (OPT)'

Overview The amount of signal power transmitted by the OT has exceeded the high threshold or dropped below the low threshold.

Ensure the following:

Make sure there are *no* standing alarms that can attribute to the TCA(s), for example, if there is an OCHAN TCA make sure that the corresponding upstream add OT is not in alarm.

All TCAs have a default threshold value that was carefully chosen. With the exception of OPR and OPT, all TCAs can be user-provisioned.

If the TCA is occurring on more than one node associated with the same channel/wavelength, start the following trouble-clearing process at the first upstream node that is reporting the TCA. Fixing this node first may very well clear the TCA at the other downstream nodes.

Recommended Action Follow these steps to clear this TCA:

⚠️ **CAUTION**

> *SERVICE AFFECTING - Failure to follow instructions in this step could result in service interruption.*

1 Notify the person responsible for services supported by this optical channel to ensure that this channel is not utilized until the problem has been resolved.

2 Replace the OT circuit pack as per instruction in "DLP-608: Remove and/or Install Circuit Pack" (7-20).

3 If problem persists, contact the appropriate maintenance support organization for technical assistance.

....

4   Notify the person that is responsible for all affected service assigned
to this OA that this Optical Line can now be returned to service.

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TAPs for SYSTEM and PortOther Alarm Groups

Overview

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Purpose   The TAPs in this section describe the alarm-clearing procedures that apply to alarm conditions associated with management and control. These are control-level alarm groups, and are not supressed by other alarm groups.

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TAP-601: Clear 'Duplicate TIDs'

....

Overview This alarm appears when two network elements (NEs) in the same Data Communications Network (DCN) have the same target identifier (TID). No two NEs in the same DCN should have the same TID.

Procedure to find duplicate TIDs

....

1 From the CIT **Node Manager**, log into one of the nodes.

....

2 Select **View ⇒ OLS Configuration**, to display information about the NEs within the OLS.

....

3 Take note of which NEs share the same TID.

To change a TID, continue with "Procedure to change a TID" (6-152).

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Procedure to change a TID

....

1 Using the CIT, log in to the node you wish to change.

....

2 From the **Node Manager**, select **Administration ⇒ System**. The **System Administration** window appears.

....

3 From the **System Administration** window, select the **TID** tab.

....

4 Enter a new, unique value for the TID.

....

5 Click on the **Apply** button.

Notification of the new provisioning appears.

....

6 Check the **NE Alarm List**. Is the Duplicate TIDs alarm still listed?

....

IF…	THEN…
YES	Continue with Step 7.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

....

7   Search the entire DCN for nodes with duplicate TIDs, using the "Procedure to find duplicate TIDs" (6-152). Are there any duplicate TIDs?

IF…	THEN…
YES	Repeat this procedure from Step 1.
NO	Contact the appropriate technical support personnel.

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TAP-602: Clear 'Duplicate NENUM Provisioned'

Overview   This procedure indicates that the OLS has a duplicate Network Element Number (NENUM). Each Network Element (NE) in the OLS must be identified by a unique NENUM.

Check for duplicate NENUM

1   From the CIT **OLS Manager**, select the OLS containing the NE with the duplicate NENUM.

2   Establish a connection to one of the Network Elements by selecting an NE and clicking on the **Login** button.

3   Select **View** ⇒ **OLS Manager**.

4   From the **OLS Manager** window check to see whether any of the NEs have duplicate NENUMs.

5   Do any of the NEs have duplicate NENUMs?

IF…	THEN…
YES	Continue with "Change NENUM" (6-155).
NO	Consult the appropriate maintenance support organization for further technical assistance. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

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Change NENUM

1   From the CIT **Node Manager,** select **Administration ⇒ System**.

2   Select **TID: System Administration**.

3   Enter a new NENUM value for the NE you wish to change.

Changing a NENUM causes the system to reboot. Boot time is 15–20 minutes, depending on system size.

4   Wait 15 to 20 minutes for the system to reboot, then examine the **NE Alarm List**. Is the alarm still listed?

IF…	THEN…
YES	Go to "Check for duplicate NENUM" (6-154)
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

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TAP-603: Clear Condition When 'NE ACTY/INFO-N' LED is Lit

Overview   This procedure is used to clear one or more of the following conditions:

- Test alarm in progress

- Flash memory module ready for removal

- Inhibit alarms: office alarms

- Logins inhibited

- Provisioned control point

- Provisioned environmental point

Procedure   **Important!** The indicated condition was *initiated by a user command*. You must determine, by consulting with the appropriate maintenance personnel, whether the need for the user-initiated condition still exists before proceeding.

1   Does the need for the user-initiated condition still exist?

IF…	THEN…
YES	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*
NO	Continue with Step 2.

2   Use the CIT to clear the indicated condition by performing the function listed in Table 6-2, "Determine Command for Condition" (6-157).

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Table 6-2   Determine Command for Condition

Condition to be Cleared	Perform Function
`disable alarms-office alarms`	Configuration-Alarms-Alarm Configuration Select the appropriate data and click the **OK** button.
`Provisioned Control Point`	FAULT-Operate Output Miscellaneous Discretes 1. At the CIT, select Fault-Operate Output Miscellaneous Discretes 2. In the Operate Output Miscellaneous dialog box, click on the Miscellaneous Discrete control point indicated on the Condition Report description column of the TAP that sent you here. 3. Check the office record to verify if the control point should be *ON* or *OFF*. 4. Click the **OFF** or **ON** button to change the current setting. 5. Click **YES** when the system prompts you to confirm the change. 6. Observe that the `Output Miscellaneous Discretes` changed to the appropriate condition.
`Flash removal enabled`	Select **Configuration-Provision**, then click on **Bay->Shelf->NCTL circuit pack**. 1. Click on Provision Select the appropriate data and click the **Apply** button 2. Click **YES** in the confirmation box. Enable and Disable FlashDisk removal, allows for the replacement of the FlashDisk. This function allows the user to remove the FlashDisk from the NCTL circuit pack by pressing the FlashDisk eject button located on the NCTL circuit pack.
`test alarm in progress`	Wait for the test to complete.

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TAP-604: Clear 'EMS link failure'

Overview This procedure explains how to clear the `EMS link failure`alarm condition.

This alarm condition occurs when there is a loss of signal at the provisioned EMS port on the SIO circuit pack.

The failure can be caused by any of the following conditions:

- A disconnected cable at the EMS port
- A faulty cable between the EMS port and the nearby DCN device
- A faulty DCN device (for example, the nearby router)

Procedure

1 Consult the office records to determine whether the EMS port should be provisioned.

IF…	THEN…
YES	Go to Step 3.
NO	Continue with Step 2.

2 At the CIT, set the EMS port state to **Inactive**.

STOP! YOU HAVE COMPLETED THIS PROCEDURE.

3 Remove the cover of shelf A1–3. All connections can be accessed from the front. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

4 Inspect the connection to the EMS port on the SIO circuit pack, and fix any problems.

5 Is the `EMS link failure` alarm condition still listed?

IF…	THEN…
YES	Continue with Step 6.

TAPs for SYSTEM and PortOther Alarm
Groups
TAP-604: Clear 'EMS link failure'

Trouble Clearing Tasks

IF…	THEN…
NO	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

....

6   Initiate a Trouble Report to the source of the failed incoming signal indicating the type of failure.

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TAP-605: Clear 'EMS Port unavailable'

Overview This procedure explains how to clear the `EMS Port unavailable` alarm condition.

This alarm condition occurs when the NCTL processor serving the EMS port is busy. This occurs normally during the NCTL boot cycle. If this condition remains in effect for a prolonged period, there is a problem with the NCTL circuit pack.

Procedure

1 If the `EMS Port unavailable` alarm condition remains present for longer than the NCTL circuit pack boot time listed in Table 6-1, "Circuit Pack Warmup Times" (6-7), go to "TAP-105: Clear 'Shelf controller failure'" (6-14).

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TAP-606: Clear 'OMON LOS'

Overview This procedure is used to clear a loss of optical signal (LOS) condition detected by the OMON circuit pack.

Important! If a "DCM Failure" alarm condition is present in the alarm list report, you must clear the `DCM Failure` **alarm condition before attempting to clear the** `OMON LOS` **alarm condition. For details, see "TAP-202: Clear 'DCM LOS'" (6-48).**

Procedure **Important!** Wait eight minutes for the system to scan the OMON inputs after removing and installing cables between the OMON and OA or replacing the OMON or OA circuit pack.

1 Examine the **NE Alarm List**.

2 Identify and locate the OMON circuit pack (and Port IN_1) listed in the **AID** column of the **NE Alarm List**.

3 Remove the appropriate shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

4 Identify the circuit pack associated with the OMON port determined in Step 2. You may use the fiber label on the fiber that is assigned to the OMON IN port or refer to the *LambdaXtreme™ Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1), for information on fiber connection to identify the circuit pack and signal source.

5 Visually inspect the connections between the OMON port on the circuit pack and the IN port on the OMON and correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

6   Did the visual inspection result in correcting any problems?

IF…	THEN…
YES	Continue with Step 7.
NO	Go to Step 8.

....

7   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 8.
NO	Go to Step 28.

....

8   Remove the fiber from the OMON port of the circuit pack identified in Step 2.

....

9   Connect an optical power meter to the OMON port of the circuit pack and obtain an optical power measurement

....

10   Is the power level greater than -37 dBm?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 21.

....

11   Reconnect the fiber that was removed from the OMON port of the circuit pack.

....

12   Remove the fiber from the IN port of the OMON circuit pack that is connected to the OA.

....

13   Connect the optical power meter to the fiber just removed and obtain a power measurement.

....

....

14   Is the power level greater than -37 dBm?

IF…	THEN…
YES	Go to Step 17.
NO	Continue with Step 15.

....

Important! The *LambdaXtreme Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1) accessible thorough the CIT Help section provides assistance on routing the fiber jumper.

15   Clean both ends of the fiber and reconnect it.

....

16   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 17.
NO	Go to Step 28.

....

17   Replace the OMON circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

18   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 19.
NO	Go to Step 28.

....

19   Remove the replacement circuit pack (installed in Step 17) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

20   Examine the **NE Alarm List**. Is the same failure condition still listed?

....

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IF…	THEN…
YES	Continue with Step 21.
NO	Go to Step 28.

⚠️ **CAUTION**

> *SERVICE AFFECTING - This step could result in a service
> interruption.*

21   Notify the person responsible for services supported by the faulty
circuit pack to ensure that it is not utilized until the problem has been
resolved.

22   Replace the circuit pack which is reporting the OMON LOS. For details,
go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

23   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 24.
NO	Go to Step 26.

24   Remove the replacement circuit pack (installed in Step 22) and
reinstall the original circuit pack. For details, go to "DLP-608:
Remove and/or Install Circuit Pack" (7-20).

25   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Contact the appropriate maintenance support organization for further technical assistance. Then continue with Step 26 if advised to restore service to the regular facilities.

IF…	THEN…
NO	Continue with Step 26.

....

26 Notify the person responsible for the optical line or channel associated with the service assigned to this optical multiplex section that the section can now be returned to service.

....

27 Perform a baseline on the OA circuit pack if it was replaced. For details, refer to "DLP-613: Baseline Optical Parameters" (7-38).

....

28 Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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TAP-607: Clear 'SUPVY transmitting LOS'

Overview   This procedure is used to clear an alarm condition where an RP circuit pack detects loss of incoming SUPVY signal from SUPVY OUT port to the RP IN_SUP port.

The alarm is raised when signal loss is detected at the IN_SUP port of the RP circuit pack. This alarm is suppressed if there is a circuit pack failure reported for either the RP or SUPVY circuit pack.

This alarm condition is caused by either of the following scenarios:

- A problem with the connectivity between an OUT port on the SUPVY circuit pack and the IN_SUP port of the corresponding RP circuit pack.

- A faulty LOS detector on the IN_SUP port of the associated RP circuit pack

Procedure   **Important!** A `SUPVY transmitting LOS` **alarm condition will cause an** `Incoming SUPVY channel LOS` **alarm condtion to be reported at the downstream NE.**

....

1   Examine the **NE Alarm List**.

....

2   Remove the appropriate shelf cover. All connections can be accessed from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

⚠ **CAUTION**

SERVICE AFFECTING – This step could result in service interruption.

3   Visually inspect the incoming signal cable(s) and connection(s) between the SUPVY (OUT) and RP (SUP Rx) circuit packs and

correct any problems found. For details, go to "DLP-609: Inspect Optical Fiber(s)" (7-31).

....

4   Did the visual inspection result in correcting any problems?

IF…	THEN…
YES	Go to Step 15.
NO	Continue with Step 5.

....

⚠ **CAUTION**

> *SERVICE AFFECTING – This step could result in service interruption.*

5   Replace the SUPVY circuit pack that is connected to the RP (SUP Rx) indicated in the AID column of the report from Step 1. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

6   Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 7.
NO	Go to Step 15.

....

⚠ **CAUTION**

> *SERVICE AFFECTING – Failure to follow instructions in this step could result in service interruption.*

7   Remove the replacement circuit pack (installed in Step 5) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

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8   Notify the person responsible for the service assigned to this circuit pack to ensure that it is not being used for service.

....

9   Replace the RP circuit pack as indicated in the AID column of the report from Step 1. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

10 Obtain another report (as in Step 1). Is the same failure condition still listed?

IF…	THEN…
YES	Continue with Step 11.
NO	Go to Step 14.

....

11 Remove the replacement circuit pack (installed in Step 9) and reinstall the original circuit pack. For details, go to "DLP-608: Remove and/or Install Circuit Pack" (7-20).

....

⚠ **CAUTION**

> *SERVICE AFFECTING – This step could result in service interruption.*

12 Replace the fiber jumper between the SUPVY (OUT) and RP (SUP Rx) circuit pack.

....

13 Examine the **NE Alarm List**. Is the same failure condition still listed?

IF…	THEN…
YES	Contact the appropriate maintenance support organization for further technical assistance.
NO	Continue with Step 14.

....

....

14   Notify the person responsible for the optical line associated with the
service assigned to this RP that the Optical Line can now be returned
to service.

....

15   Reinstall the shelf cover. For details, go to <u>"DLP-607: Remove/Install
Front Cover" (7-17)</u>.

....

16   Baseline the replaced circuit pack. For details, refer to <u>"DLP-613:
Baseline Optical Parameters" (7-38)</u>.

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TAP-608: 'SUPVY Data Link Failure'

Overview   This alarm condition is triggered when an external ping failure occurs, indicating the loss of the SUPVY link between the local SUPVY entity and it's peer entity in an adjacent node.

Procedure

1   From the CIT **OLS Manager**, select any node and press the **Retrieve Map** button. If node-to-node connectivity has been interrupted, you will not see all the NEs that exist in this OLS.

2   Identify the node and the port which has declared SUPVY Data Link Failure.

3   Remove the appropriate shelf covers over the identified OA and the SUPVY circuit pack. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

4   Visually inspect the fiber jumper between the identified OUT_SUP port of the OA and the identified IN port of the SUPVY circuit pack. Correct any problems found. For details, see "DLP-609: Inspect Optical Fiber(s)" (7-31).

5   Examine the **NE Alarm List**. Is the alarm condition still present?

IF…	THEN…
YES	Continue with Step 6.
NO	Go to Step 8.

6   Measure the output of the SUPVY channel from the OUT_SUP port of the OA.

7   Is the ouput power greater than –12 dBm?

IF…	THEN…
YES	Consult the appropriate maintenance support organization for further technical assistance. ***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Go to Step 8.

8   Reinstall the shelf cover. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

E ND OF S TEPS

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TAP-609: Clear 'Topology Construction Incomplete'

Overview Use this procedure to clear a node-to-node communication failure.

Important! When the network is in this state, you will probably not be able to establish a login to one or more of the other nodes. If a remote login is possible, and you need additional help, refer to the section of the *LambdaXtreme™ Transport User Operations Guide, Release 1.1,* (365-575-781R1.1) detailing how to log in to a network element. Otherwise, you will need local CIT assistance at those nodes.

Procedure

1 At the local NE CIT, examine the **NE Alarm List**.

2 Does the **NE Alarm List** show a "controller" circuit pack condition (Network controller failure, SUPVY failure, or SUPVY removed) or an incoming alarm condition (OSC LOS (opposite direction to optical channels))?

IF…	THEN…
YES	Clear that alarm, using the TAP listed in Appendix A, "Alarm/Condition List".
NO	Continue with Step 3.

3 Using the office records for the network elements in the system, can you establish a login to a remote node?

IF…	THEN…
YES	Continue with Step 4.
NO	Go to Step 8.

4 Log in to any of the other network elements.

5 Examine the **NE Alarm List**.

....

6   Does a controller circuit pack condition or an incoming alarm
condition from a remote NE appear in the **NE Alarm List**?

IF…	THEN…
YES	Clear that alarm, using the TAP listed in Appendix A, "Alarm/Condition List".
NO	Continue with Step 7.

....

7   Repeat Step 4 through Step 6 for each of the remaining NEs listed in
the office records if possible.

....

8   Contact other nodes in the OLS for local CIT assistance at those
nodes or consult the appropriate technical maintenance support
organization for assistance.

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TAP-610: Address 'Topology Construction In Progress'

Overview   This is normally a transient condition, that appears while the OLS Map is rebuilding. Follow the procedure below to Address it.

Procedure

1   Wait up to 30 minutes, depending on system size, or until the CR/PROMPT, MJ/DEFERRED LEDs are extinguished.

2   From the CIT **OLS Manager**, select any node and click on **Retrieve Map**.

3   At the CIT, initiate a login session to each node in the OLS Map.

4   Examine the **NE Alarm List**.

5   Is the `Topology Construction In Progress` condition still present?

IF…	THEN…
YES	Clear that alarm, using the TAP listed in [Appendix A, "Alarm/Condition List"]().
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

E N D   O F   S T E P S

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TAP-611: Address 'CPYPGMIPDST', 'CPYPGMIPSRC', 'SWDIP', 'BKUPIP', 'RDTIP'

Overview   These alarm conditions are the result of software procedures selected by the user for backup, copy program, download, initiate and restore of software.

- CPYPGMIPDST (Copy Program:IP tid dest)
- CPYPGMIPSRC (Copy Program:IP tid src)
- SWDIP (Download-SW:IP)
- BKUPIP (Backup-Database:IP — dest. TID)
- RDTIP (RESTORE-Database:IP — dest. TID)

A brief description of each of the alarm conditions is listed below:

Important! This is not a clearing activity; wait for the condition to finish.

BKUPIP (Backup-Database:IP — dest. TID)

Database backup is in progress. This function causes a transfer of the current working values in the database to the backup FlashDisk database and to a specified location in a remote system.

Using the *LambdaXtreme™ Transport Software Release Description, Release 1.1,* , the user will setup the destination system with the appropriate file access permissions to write data to the destination pathname location in the responder virtual file store. The pathname is assumed to point to a directory on the responder. The Backup function indicates an error if the users setup destinations are not valid.

Disregard any alarm resync message during the database backup process, as the system is only reporting a transient condition which should clear upon completion of the backup process.

CPYPGMIPDST (Copy Program:IP tid dest), CPYPGMIPSRC (Copy Program:IP tid src)

Software is being copied from this *LambdaXtreme* Transport network element to the network element whose target identification (TID) appears in the message.

The software download is performed in the background. Once the background download is initiated, there is no mechanism to cancel the operation. To confirm that this operation completed, check the history log for the target network element.

TAPs for SYSTEM and PortOther Alarm
Groups
TAP-611: Address 'CPYPGMIPDST',
'CPYPGMIPSRC', 'SWDIP', 'BKUPIP',
'RDTIP'

Trouble Clearing Tasks

SWDIP (Download-SW:IP)

Software Download in Progress. This is part of a software reset that involves downloading software from the FlashDisk to the NCTL, and SCTL board controllers on all circuit packs. During this time, the miscellaneous discrete control points are deactivated.

RDTIP (RESTORE-Database:IP — dest. TID

Database restoration is in progress. The Network Element (NE) shall complete execution of the Restore function within two minutes of receipt, with an objective execution time of one minute.

The restoration command shall fail for any of the following reasons:

1. If the destination pathname on the responder is not a directory.

2. If after retrieving the directory listing(s) from the Operating System (OS), the Network Element (NE) determines the number and types of files are not of the correct format for the database.

3. If the data is corrupted during transfer, found to be corrupted after transfer, invalid in any way or does not match the format used by the currently running software generic. In all of these failure cases the Network Element (FlashDisk) copy of the database with the current contents of the backup FlashDisk database.

Procedure

1 If an error message appears on the screen during the backup, copy program, download, initiate and restore of the software procedure, reinitiate the desired procedure per the *LambdaXtreme Transport Software Release Description, Release 1.1,* .

Important! This is not a clearing activity; wait for the condition to finish.

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TAP-612: Address 'Test alarm in progress' and 'Test LED in progress'

Overview The `Test alarm in progress` condition indicates that a test of the the Office Alarms panel LEDs is in progress. The `Test LED in progress` condition indicates that a test of the circuit pack LEDs is in progress. The user-activated test may repeat itself 10 times (100 seconds).

Procedure

1   Wait up to 10 minutes for the test to be completed.

2   Did the condition clear?

IF…	THEN…
YES	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Consult the appropriate maintenance support organization for further technical assistance.

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TAP-613: Address 'Provisioned Control Point' and/or 'Provisioned Environmental Point'

Overview   This procedure is used when the following failures is detected:

- Provisioned Control Point

- Provisioned Environmental Point

If either these conditions appears in the NE Alarm List report, it indicates that the condition is active. These conditions are provisioned by the customer (user enters the text string).

Procedure

1   Which condition are you to address?

IF…	THEN…
Environmental Point	Continue with Step 2.
Control Point	Go to Step 4.

Important! The environmental condition is external to *LambdaXtreme*™ Transport network element.

2   Consult and follow the local maintenance procedures to clear the indicated environmental condition.

3   *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

Important! The control condition is external to *LambdaXtreme* Transport network element and can be (if required) cleared by a manual command at the CIT (refer to"TAP-603: Clear Condition When 'NE ACTY/INFO-N' LED is Lit" (6-156)).

4   Consult and follow the local maintenance procedures to clear the indicated control condition.
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TAP-614: Address 'Reset in progress'

Overview   This procedure explains how to monitor a `Reset in progress` operation and correct problems.

Procedure

1   Is the FAULT LED steadily lit on the NCTL?

IF…	THEN…
YES	Wait 15–30 minutes, depending on system size, before proceeding with Step 2.
NO	Continue with Step 4.

2   At the CIT, initiate a login session. For details, refer to Appendix A of the *LambdaXtreme™ Transport User Operations Guide, Release 1.1*, (365-575-781R1.1).

3   At the CIT, view the **NE Alarm List**. Is `Reset in progress` still reported?

IF…	THEN…
YES	Cntinue with Step 4.
NO	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***

4   From the CIT **Node Manager**, Select **Administration ⇒ System Reboot**. When the **TID: System Reboot** window appears, press the **OK** button.

5   Wait 15–30 minutes, depending on system size. Does the `Reset in progress` condition still exist?

TAPs for SYSTEM and PortOther Alarm
Groups
TAP-614: Address 'Reset in progress'

Trouble Clearing Tasks

IF...	THEN...
YES	Consult the appropriate maintenance support organization for further technical assistance.
NO	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

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7 Detail Level Procedures

Overview

Purpose This chapter contains detailed "how to" instructions, beginning with .

Contents

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DLP-601: Connect and Condition Craft Interface Terminal (CIT)

Overview   This procedure provides instructions to verify proper connections between a network element and a personal computer (PC). The PC will be running *LambdaXtreme*™ Transport CIT software.

Important! The PC must meet the minimum personal computer requirements stated in the "Using the CIT" section of the *User Operations Guide*.

Procedure   **Important!** The warning message `NE not responding` **can be caused by user being logged out due to inactivity. Initiate a new login session. For details, refer to Appendix A of the *LambdaXtreme Transport User Operations Guide, Release 1.1, (365-575-781R1.1*).**

....

1   Verify the PC is safely positioned on a cart or table.

....

2   Verify the cable connections at the PC.

> **Reference:**
>
> *LambdaXtreme Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1)

....

3   To summarize, check the following:

- The appropriate interface cable is connected between the ***CIT*** connector and a serial connector on the PC.

- If required, a printer with the appropriate printer cable is connected to the PC per the instructions provided with the printer.

....

4   Turn on the PC if necessary.

....

Important! See the CIT tutorial available on the *LambdaXtreme* Transport Network Element and Craft Interface CD-ROM for examples of screens showing a successful login session.

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5 Double-click on the *LambdaXtreme* Transport CIT icon.

> **Result:**
> The OLS Manager window appears

....

6 From the **OLS Manager** window, double-click on the icon for the desired TID.

> **Result:**
> The Login window appears.

....

7 Enter your User ID and Password, and click **OK**.

....

8 Is the desired **Node Manager** window displayed?

IF…	THEN…
YES	*STOP! YOU HAVE COMPLETED THIS PROCEDURE.*
NO	Go to the section describing "TID Address Mapping" in the *LambdaXtreme Transport Software Release Description, Release 1.1,* to establish a new TID.

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DLP-602: Test LEDs on Circuit Packs

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Overview   Use the procedure below to test the LEDs on the circuit pack faceplates.

Procedure   ....

1   Remove the appropriate shelf cover(s). All LEDs are visible from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

2   At the CIT, select **FAULT-Test-LED** then select the appropriate bay and shelf, then click on the select button.

Important! *Requirement:* All LEDs are lighted for 10 seconds, off for 10 seconds for each iteration, then they return to their normal condition.

....

3   Select the number of iterations and then click on the Start button.

....

4   Did the LED(s) of interest operate as indicated above?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 7.

....

5   Reinstall the shelf cover(s). For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

....

6   *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

....

7   At the CIT, select **Fault -Test-LED** then select the appropriate bay, shelf, and select 3 iterations for the test.

....

8   Did the same circuit pack LED consistently fail the LED test?

....

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IF…	THEN…
YES	Continue with Step 9
NO	Go to Step 10

....

9   Contact the appropriate maintenance organization to correct the LED trouble before returning to this procedure.

....

10   Reinstall the shelf cover(s). For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

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DLP-603: Test Alarm LEDs on Office Alarm Panel

Overview   Use this procedure to test the audible alarms and LEDs on the Office Alarm panel.

Procedure

1   Remove the appropriate shelf cover(s). All LEDs are visible from the front. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

2   At the CIT, select **FAULT-Test-ALM** then select the appropriate bay and shelf, then click on the select button.

   Important! *Requirement:* All LEDs are lighted for ten seconds, off for ten seconds for each iteration, then they return to their normal condition.

3   Select the number of iterations and then click on the **Start** button.

4   Did the LED(s) of interest operate as indicated above?

IF…	THEN…
YES	Continue with Step 5.
NO	Go to Step 7.

5   Reinstall the shelf cover(s). For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

6   *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

7   At the CIT, select **Fault -Test-ALM** then select the appropriate bay, shelf, and select 3 iterations for the test.

8   Did the same circuit pack LED consistently fail the LED test?

IF…	THEN…
YES	Continue with Step 9
NO	Go to Step 10

....

9 Contact the appropriate maintenance organization to correct the LED
trouble before returning to this procedure.

....

10 Reinstall the shelf cover(s). For details, go to "DLP-607:
Remove/Install Front Cover" (7-17).

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DLP-604: Identify Source of Incoming Signal

Overview   You were sent to this procedure to identify the signal source associated with an incoming signal condition so that you can issue a Trouble Report to the personnel at that location.

`Incoming OC-48/STM-16 LOF failure`

`Incoming OC-48/STM-16 LOS failure`

`Incoming OC-192/STM-64 LOF failure`

`Incoming OC-192/STM-64 LOS failure`

`Incoming optical line LOS (loss of signal)`

`Incoming OCH 2.5G LOF failure`

`Incoming OCH 2.5G LOS failure`

`Incoming SUPVY channel fail`

Procedure   **Important!** The source of the incoming signal condition is the upstream network element in the direction of the incoming signal. For example, with `AID 4-2-5 IN_2, INCOMING OC-48 LOS`**, the incoming LOS appears on Bay 4, Shelf 2, Slot 5, Port IN_2.**

1   From office records, determine the location of the upstream network element and send a Trouble Report to the personnel responsible for maintaining that site.

2   *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

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DLP-605: Install/Remove Apparatus Blank

Overview   This procedure describes how to install or remove an apparatus blank.

Procedure

1   Is an apparatus blank to be installed or removed?

IF…	THEN…
To be *installed*	Continue with Step 2.
To be *removed*	Go to Step 5.

2   Position the apparatus blank vertically with its extended release tabs facing towards you.

3   Insert the apparatus blank into the circuit pack slot and push it in until the upper and lower release tabs snap onto the shelf cross-support channels.

4   *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

5   Push down on the upper release tab and pull up on the lower release tab to release the apparatus blank from the shelf cross-support channels.

6   Slide the apparatus blank from the slot.

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DLP-606: Inspect and Clean Optical Fiber Connectors

Overview   This procedure 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.

⚠ **CAUTION**

SERVICE AFFECTING — This procedure could result in service interruption.

Clean connector   Figure 7-1, "Image of Clean Connector" (7-11) shows an example of a clean fiber connector.

Figure 7-1   Image of Clean Connector
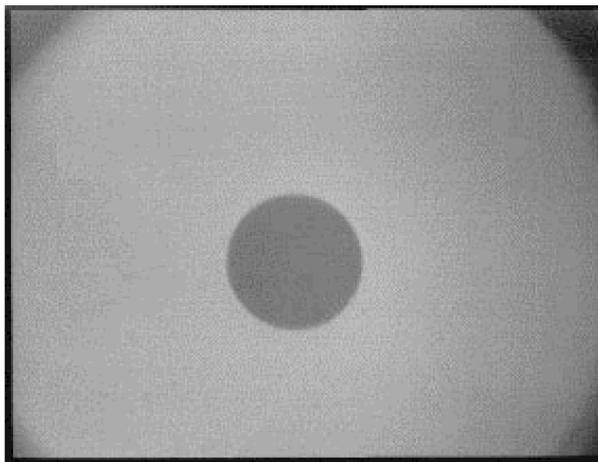
Required equipment   The following equipment is required:

- CLETOP Cleaning Cassette Type A (comcode 901375154) or Type B

    - Replacement Reel for CLETOP Cleaning Cassette Type A (comcode 901375014)

    - Replacement Reel for CLETOP Cleaning Cassette Type B

- Individual Pre-saturated Alcohol Wipes - Tech Spray brand, 99% pure anhydrous Isopropyl alcohol (comcode 901375147)

- Optical Fiber Scope, Noyes OFS 300-200X (comcode 408197028, used for ST, SC, FC, and LC type connectors)

- 1.25 mm (LC) Adapter Cap for Noyes OFS 300-200X (comcode 408197069)

- 2.50 mm (ST, SC, FC) Adapter cap for Noyes OFS 300-200X (comcode 408197044).

Important! All optical fiber connectors ($ST^{®}$,SC, FC, and LC types) should be subjected to this procedure before making initial connections or reconnections per the following instructions. Only the connectors being assembled at this particular time should be subjected to this procedure. To prevent contamination, keep all dust caps and plugs in place on the fiber connectors as well as on the lightguide buildouts until it is time to make connections. After cleaning is complete and contamination is suspected, discard lightguide buildouts and/or connectors and replace them with new parts before making fiber connections.

Cleaning Connectors on Optical Jumpers and Pigtails

....

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 7-2, "Cleaning the Ferrule Endface" (7-13).

Figure 7-2 Cleaning the Ferrule Endface

....

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. See Figure 7-3, "CLETOP Cleaner" (7-14)

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 7-3 CLETOP Cleaner

....
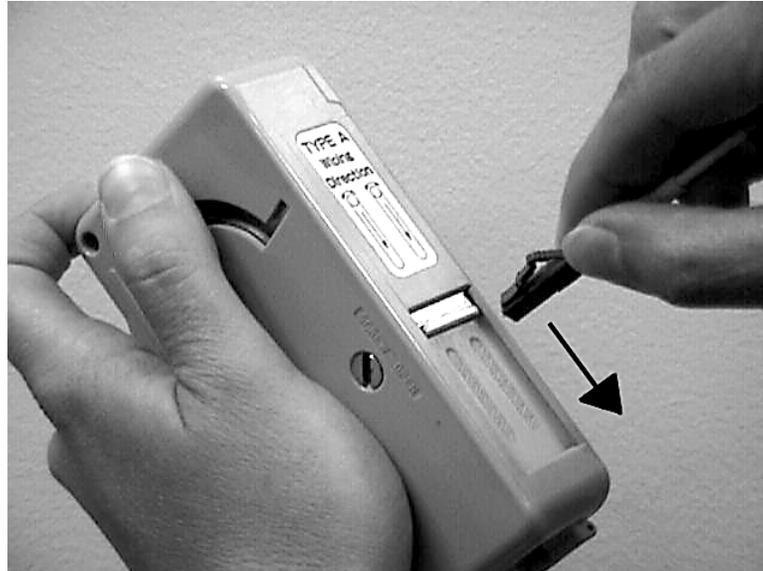
4   Insert and press the connector ferrule endface perpendicular against the cleaning cloth in the first of two slots of the cleaner.

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,

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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.

E ND OF S TEPS
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Definitions

Figure 7-4 Acceptability Criteria for Single-Mode and Multimode Fibers
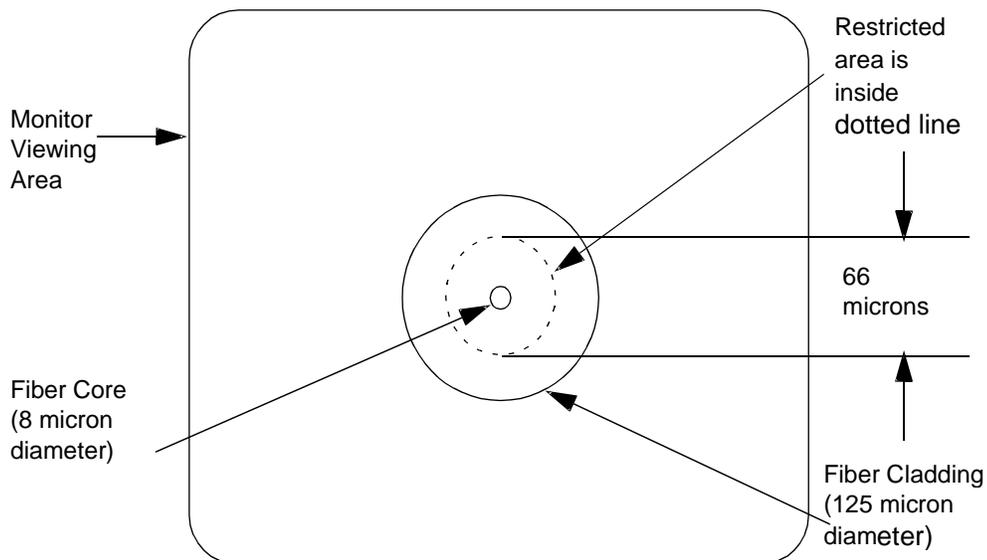
Restricted Area: A circle with a diameter of 66 microns centered on the fiber core. This diameter is equal to half the sum of the single-mode fiber core and fiber cladding diameters.

Fixed Contamination: Contamination that cannot be removed, and does not change appearance or location, during or after three cleaning attempts.

....

Loose Contamination: Contamination that can move or change position on the fiber Ferrule Endface. This contamination can be removed in three (or fewer) cleaning attempts.

Fiber Cladding: This is the large dark circle near the center of the viewing area. This is the outermost region of the end of the glass fiber.

Fiber Core: In single-mode fibers, this appears as a small white circle near the center of the Viewing area (in multimode fibers, this circle is much larger). The core may be found at the center of the Fiber Cladding, which appears as a larger circle. The single-mode fiber core is approximately 8 microns in diameter and the cladding is approximately 125 microns in diameter.

Ferrule Endface: This appears as a light colored area that surrounds the entire Fiber Cladding region. This area may sometimes look rough or "pebbled," but must be uniform in appearance. The Ferrule Endface fills the entire viewing area outside of the Fiber Cladding.

Cleanliness Requirements

- No ***loose*** contamination or particulate matter of any size is allowed in Viewing Area.

- No contamination, chips, or cracks of any size are allowed with the Restricted Area.

- Fixed Contamination is allowed ***only*** if it is smaller than the single-mode Fiber Core diameter (8 microns), ***and*** is located outside of the Restricted Area, ***and*** it cannot be moved or removed in three cleaning attempts.

- Scratches are acceptable***only*** if they do not go through the core and are less than 2 microns in width.

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DLP-607: Remove/Install Front Cover

Overview   These procedures describe how to remove or install a front shelf cover or DCM cover.

⚠ **CAUTION**

Use a static ground wrist strap whenever handling circuit packs or working on a LambdaXtreme™ Transport System network element to prevent electrostatic discharge damage to sensitive components.
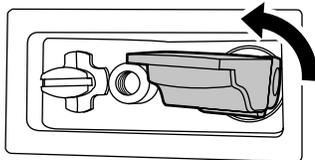
Remove a shelf cover

1   Each shelf cover is secured by a pair of latches located in the top-right and top-left corners of the shelf cover. Rotate the locking screws 90 degrees counter-clockwise to release the latch handles.
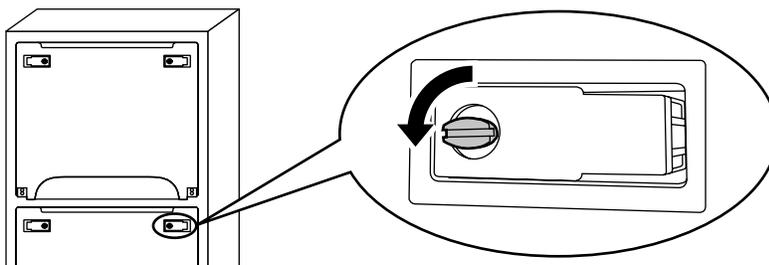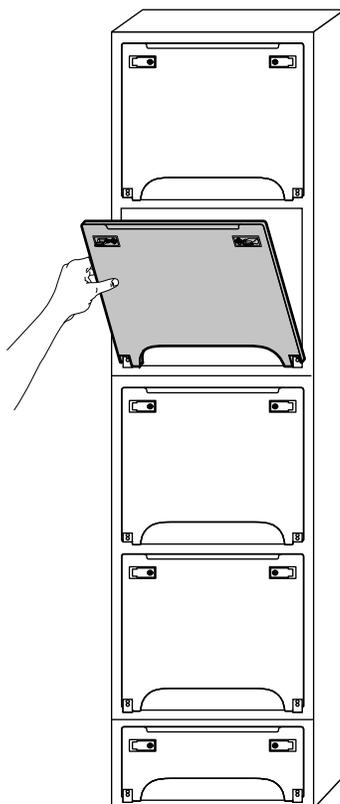

2   Push on the outside edge of each latch handle so that the inside edge lifts up.

....
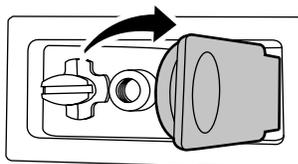
3   Rotate the open handles 90 degrees counter-clockwise to release the latches.

....

4   Pull the top of the cover several inches toward you, while supporting it so that it does not fall.

....

5   Remove the cover by lifting it straight up to free it from the two hinge brackets located at the bottom of the shelf.

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Install a shelf cover   To re-install a cover, reverse the procedure to <u>"Remove a shelf</u> <u>cover" (7-17)</u>:

....

1   Replace the cover, inserting the bottom corners of the cover into the two hinge brackets, and pressing the top of the cover into place, flush with the bay.

....

2   Rotate the open latch handles 90 degrees clockwise to close the latches.

....

3   Push on the raised edge of each latch handle to close it, so it is flush with the latch mechanism.

....

4   Rotate the locking screws 90 degrees clockwise to secure the latch handles.

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DLP-608: Remove and/or Install Circuit Pack

....

Overview This procedure describes how to install and/or remove circuit packs.

Refer to the *LambdaXtreme™ Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1) and office records to identify pre-installed and labeled fibers in the bay that connect to various circuit pack slots.

CAUTION

*During initial software installation and when circuit packs are inserted into a running system, there will be an automatic upgrade of the firmware on the circuit packs to the latest version. Flashing green LEDs on the circuit pack faceplates will indicate that the upgrade is occurring (typically less than 30 seconds). Please DO **NOT** remove the circuit pack during this upgrade because it may cause damage to the affected pack. After the pack LEDs stop flashing it is then safe to remove the packs or power down the system as needed.*

CAUTION

Use a static ground wrist strap whenever handling circuit packs or working on a LambdaXtreme Transport network element to prevent electrostatic discharge damage to sensitive components.

Important! When removing and inserting circuit packs, keep the pack out of the slot for sixty (60) seconds.

Procedure **Important!** Verify that all fibers are labeled to prevent possible service interruption.

....

1 What type of circuit pack is being removed and/or installed?

....

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IF…	THEN…
OA, OD, OMON, OM, OT, RP, RPG, or SUPVY	Continue with <u>Step 2</u>.
NCTL	Go to <u>"Remove an NCTL circuit pack" (7-24)</u>, later in this procedure.
SCTL	Go to <u>"Remove/Install an SCTL circuit pack " (7-26)</u>, later in this procedure.
DCM	Go to <u>"Remove/Install a DCM circuit pack" (7-27)</u>, later in this procedure.
CIO, SIO	Go to <u>"Remove/Install a CIO or SIO circuit pack" (7-28)</u>, later in this procedure.

2   Are you to remove or install an OA, OD, OMON, OM, OT, RP, RPG, or SUPVY circuit pack?

IF…	THEN…
remove	Go to <u>"Remove an OA, OD OMON, OM, OT, RP, RPG, or SUPVY circuit pack." (7-22)</u>.
install	Go to <u>"Install an OA, OD, OMON, OM, OT, RP, RPG, or SUPVY circuit pack." (7-23)</u>.

E N D   O F   S T E P S

 WARNING

*Unterminated optical connectors may emit invisible laser
radiation. Eye damage may occur if beam is viewed directly
or with improper optical instruments. Avoid direct exposure
to the beam.*

**Remove an OA, OD OMON, OM, OT, RP, RPG, or SUPVY circuit
pack.**

....

1   Disengage the circuit pack from the appropriate shelf as follows:

1. Push up on the bottom and down on the top locking clips to
    unlock the circuit pack latches.

2. Disengage the circuit pack by carefully and continuously pulling
    out equally on the top and bottom latches.

3. Remove the fiber(s) from the appropriate port(s) listed for the
    circuit pack(s) in Table 7-1, "Circuit Packs and Ports" (7-29).

4. Drape the removed fibers so as not to interfere with the circuit
    pack(s) removal.

5. Carefully slide the circuit pack out of the slot guides to remove it
    from the shelf. ***DO NOT ROCK THE CIRCUIT PACK BACK
    AND FORTH***.

....

2   Are you to install another circuit pack in this slot?

IF…	THEN…
YES	Go to Step 2 of "Install an OA, OD, OMON, OM, OT, RP, RPG, or SUPVY circuit pack." (7-23).
NO	Continue with Step 3.

....

Important! When a slot has no circuit pack in place an apparatus
blank must be installed in lieu of the circuit pack to provide the
correct level of cooling.

3   Install an apparatus blank in each vacant slot. For details, go to
"DLP-605: Install/Remove Apparatus Blank" (7-10).

E N D   O F   S T E P S
....

Install an OA, OD, OMON, OM, OT, RP, RPG, or SUPVY circuit pack.

....

1 If required, remove the apparatus blank from this slot. For details, go to "DLP-605: Install/Remove Apparatus Blank" (7-10).

....

2 Obtain a circuit pack with the same or higher series number, or if adding channel as required per circuit order.

....

3 Open both latches on the circuit pack.

....

4 Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. ***DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH.***

....

5 With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged and the clips are in the locked position.

....

6 Make the proper fiber connections between the OT and OM circuit packs.

....

7 Wait for eight minutes.

....

8 Clean the optical fiber(s) and connector(s). For details, go to "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

9 Connect the optical fiber(s) to the required ports. For details, go to Table 7-1, "Circuit Packs and Ports" (7-29).

....

10 Dress the fiber(s) at the slot guide to ensure fiber(s) do not interfere with the circuit packs insertion.

....

11 Was an OT installed?

IF…	THEN…
YES	***STOP! YOU HAVE COMPLETED THIS PROCEDURE.***
NO	Go to Step 12 (for OA, OD, OMON, OM, RP, RPG, or SUPVY).

....

12 With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged and the clips are in the locked position.

E N D   O F   S T E P S

....

Remove an NCTL circuit pack

....

1 Press the green Reset button next to the FlashDisk.

....

2 Wait until the green LED starts to blink steadily.

....

3 Remove the FlashDisk.

....

4 Push up on the bottom and down on the top locking clips to unlock the circuit pack latches.

....

5 Disengage the circuit pack by carefully and continuously pulling out equally on the top and bottom latches.

DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH

....

6 Remove the circuit pack.

....

Important! Do not reseat the NCTL circuit pack before first inserting the FlashDisk.

E N D   O F   S T E P S

....

Install an NCTL circuit pack

....

Important! Do not reseat the NCTL circuit pack before first inserting the FlashDisk.

1 Insert FlashDisk into the NCTL circuit pack, orienting the FlashDisk in the direction indicated by the red arrow printed on the bottom of the FlashDisk.

....

2 Reseat the NCTL circuit pack.

....

3 Open both latches on the circuit pack.

....

4 Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. *DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH*.

....

5 With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged and the clips are in the locked position.

E N D   O F   S T E P S

....

Remove/Install an SCTL circuit pack

....

1 Are you ready to remove or install an SCTL circuit pack?

IF…	THEN…
remove	Continue with "Remove an SCTL circuit pack" (7-26).
install	Go to "Install an SCTL circuit pack" (7-27).

E N D   O F   S T E P S

....

Remove an SCTL circuit pack

....

1 Push up on the bottom and down on the top locking clips to unlock the circuit pack latches.

....

2 Disengage the circuit pack by carefully and continuously pulling out equally on the top and bottom latches.

DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH

....

3 Remove the circuit pack.

E N D   O F   S T E P S

....

Install an SCTL circuit pack

....

Important! Before replacing an SCTL circuit pack, make sure the replacement pack has the same or higher series number as the original pack.

1 Insert the SCTL circuit pack.

....

2 Open both latches on the circuit pack.

....

3 Place the circuit pack into the slot guides and slowly slide it into the shelf until the latches touch the shelf. *DO NOT ROCK THE CIRCUIT PACK BACK AND FORTH*.

....

4 With a thumb on each latch, continue sliding the circuit pack with one firm, continuous motion until the latches are fully engaged and the clips are in the locked position.

E N D   O F   S T E P S ....

Remove/Install a DCM circuit pack

....

1 Identify the correct DCM circuit pack to be removed.

....

2 Locate the correct fiber jumpers to the DCM from the assigned OA. Log on a piece of paper the correct jumper assigned to the DCM IN and OUT connections.

....

3 Remove the fiber jumpers from the IN and OUT connections of the DCM.

....

4 Drape the removed fibers so as not to interfere with the DCM removal.

....

5 Loosen the two screws holding the DCM in place by turning them counter clockwise with a flat bladed screwdriver.

....

....

6   Remove the defective DCM.

....

7   Obtain a replacement DCM with the correct DCM series.

....

8   Orient and insert the new DCM into the shelf tray.

....

9   Tighten the screws holding the DCM in place by turning the screws clockwise.

....

10   Clean the optical fibers and connectors. For details, go to "DLP-606: Inspect and Clean Optical Fiber Connectors" (7-11).

....

11   Reconnect the fibers (removed in Step 3) to the correct IN and OUT connections of the DCM.

E N D   O F   S T E P S
....

Remove/Install a CIO or SIO circuit pack

Important! Before disconnecting the data cable from the CIO or SIO circuit pack, make note of the port from which you remove it. Before removing a Group Shelf Controller CIO (slot A1-1-16B) , make note of the data cable connections between the Group Shelf Controller CIO and the associated CIO circuit packs.

....

1   Disconnect the data cable from circuit pack.

....

2   Using a flat-blade screwdriver, remove the circuit pack.

....

3   Install a replacement circuit pack.

....

4   Connect the data cable to the new circuit pack, using the same port you removed it from in Step 1.

....

Important! When you install a CIO circuit pack, the SCTL circuit pack associated with this CIO starts to boot.

E N D   O F   S T E P S

Table 7-1, "Circuit Packs and Ports" (7-29) provides a listing of circuit packs and their respective ports.

Table 7-1   Circuit Packs and Ports

Circuit Packs	Ports	Notes
OMON (4 Port)	IN_1 IN_2 IN_3 IN_4	
OMON (8 Port)	IN_1 IN_2 IN_3 IN_4 IN_5 IN_6 IN_7 IN_8	
SUPVY	IN_1 IN_2 OUT_1 OUT_2	
PWR	-48/-60V_IN	
OT(10G RZ ADD/Drop)	OUT wxyz, IN ADD, OUT DROP, IN wxyz	
OT(10G SOL ADD/Drop)	OUT wxyz, IN ADD, OUT DROP, IN wxyz	
OT(4x2.5G RZ MUX)	OUT TRIB 1, OUT TRIB 2, OUT TRIB 3, OUT TRIB 4, IN TRIB 1, IN TRIB 2, IN TRIB 3, IN TRIB 4,	
OA(DGEF)	OUT DCM, IN DCM, OUT LINE, IN CORP, IN SIG, MON, OMON, OUT SUP	

Table 7-1   Circuit Packs and Ports   (continued)

Circuit Packs	Ports	Notes
OA(OADM, LineIn, 50G/100G)	IN DCM, OUT 50/150G, OUT 0/100G, IN DCF, MON, OMON	
OA(OADM LineOut)	IN SIG, OUT LINE, IN CORP, MON, OMON, OUT SUP	
OA(OADM Thru)	OUT SIG, IN SIG, MON, OMON	
OA(OADM Add)	OUT DCM, IN DCM, OUT SIG, IN SIG, MON, OMON	
OA(OADM PreAmp High Gain Drop)	OUT DCM, IN DCM, IN SIG, OUT SIG, MON, OMON	
OA(Raman)	IN DCM, OUT LINE, IN DCF, IN CORP, MON, OMON, OUT SUP	
OA(Raman EDFA)	IN DCM, OUT LINE, IN DCF, IN CORP, MON, OMON, OUT SUP	
OA(VOA)	OUT DCM, IN DCM, OUT LINE, IN CORP, IN SIG, MON, OMON, OUT SUP	
OD(0GHz Offset)	IN 0/100G, OUT 100G	
OD(50GHz Offset)	IN 50/150G, OUT 150G	
OD(100GHz Offset)	IN 100G	
OD(150GHz Offset)	IN 150G	
OD(OADM 0GHz Offset)	IN OA-P, OUT OA-D, IN OA-D, OUT THRU, OUT 100G	
OM(0GHz Offset)	IN 100G, IN 50/150G, OUT SIG, MON, OMON	
OM(50GHz Offset)	IN 150G, OUT 50/150G	
OM(100GHz Offset)	OUT 100G	
OM(150GHz Offset)	OUT 150G	
OM(OADM 0GHz Offset)	OUT SIG, IN OA-A, IN THRU, IN 100G, IN EXPRS, OUT OA-A, OUT SIG, OMON SIG, OMON-A, MON SIG, MON -A	
RP(OSP)	OUT SIG, IN LINE, IN RPG, MON, OMON, IN SUP	
RP (OSP 50G/100G)	IN LINE, OUT 50/150G, OUT 0/100G, IN RPG, MON, OMON, IN SUP	
RPG	OUT CORP, OUT RPG	
RPG(DCF)	OUT CORP, OUT RPG, OUT DCF	

Notes:

1.

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DLP-609: Inspect Optical Fiber(s)

Overview   This procedure is used to correct an input or output fiber problem such as a damaged or disconnected fiber.

Refer to the *LambdaXtreme™ Transport Installation Manual and System Turn-Up Services, Release 1.1,* (365-575-782R1.1) and office records to identify pre-installed and labeled fibers in the bay that connect to various circuit pack slots.

Procedure

⚠ CAUTION

SERVICE AFFECTING - This procedure could result in service interruption.

1   If required, remove the appropriate shelf covers. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

2   Verify the fibers are properly connected.

3   Visually inspect the fiber, starting at the connector on the local network element and going as far as practical (usually to an interconnection bay or to a cross-connect panel).

Look for any of the following problems:

- Visible damage to the fiber
- Excessive bends of kinks in the fiber
- Damaged connectors
- Improper/partial insertion of connectors

4   Correct any problems with the fiber, following local procedures.

5   Reinstall the shelf covers. For details, go to "DLP-607: Remove/Install Front Cover" (7-17).

E N D   O F   S T E P S

DLP-610: Replace Power Line Filter

Overview Follow the procedure below to replace a power line filter. There are two power line filters in each double-shelf, located in slots 16A and 16C of shelves 1 and 3.

Procedure

1 Identify the correct power line filter to be removed.

2 Set the circuit breaker on the replacement filter to the off position.

3 Remove the shelf cover. For details refer to "DLP-607: Remove/Install Front Cover" (7-17).

4 If equipped, remove the interconnect panel cover on the power filter shelf. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

5 Unplug the filters power cable by depressing both tabs at the same time and pulling the connector from the filters socket.

6 Loosen the screw holding the filter to its holding bracket using a flat-bladed screwdriver.

7 Remove the defective filter by sliding it out towards the front of the shelf.

⚠️ **WARNING**

When inserting a power filter into the shelf, ensure that the plastic power connector on the filter clears the power filters screw bracket. This will prevent damage to the plastic power connector.

8   Orient and insert the new filter.

....

9   Tighten the screw holding the filter in place.

....

10   Set the circuit breaker on the replacement filter to the off position.

....

11   Reconnect the power plug to the filters socket (keyed to ensure proper insertion).

....

12   Set the circuit breaker on the replacement filter to the on position.

....

13   Reinstall shelf covers. For details, refer to "DLP-607: Remove/Install Front Cover" (7-17).

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DLP-611: Inspect/Replace Air Filter

Purpose This procedure is used to remove air filters from bays and repeaters for inspection, and when necessary, to replace the air filter.

Note: An appropriate screwdriver is needed for this procedure.

Important! A dirty filter causes a substantial reduction in the amount of available cooling air to the bay. The air filter should be inspected periodically and changed every six months.

Procedure

1   Identify the location of the plastic cover on the shelf that contains the air filter. See Figure 7-5, "Air filter removal process" (7-34).

2   Remove the front cover (for details, see "DLP-607: Remove/Install Front Cover" (7-17)) to expose the air filter slide holder assembly. The following figure shows the steps to remove the air filter.

Figure 7-5 Air filter removal process

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....
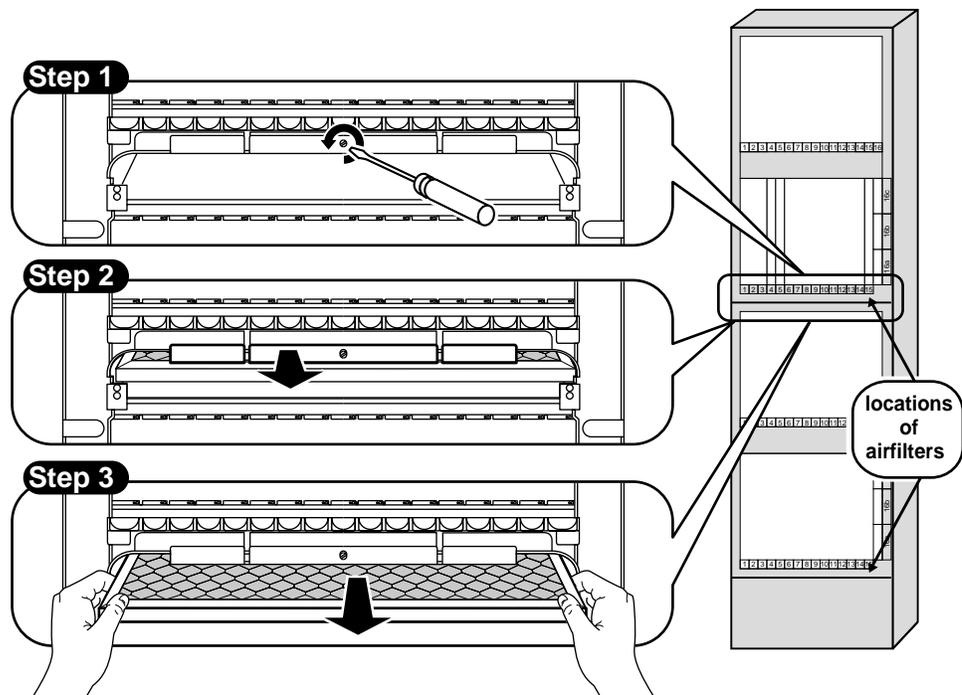
3   Turn the screw (counterclockwise) on the air filter slide holder to free it and then pull it toward you.

>   **Result:**
>
>   The air filter which was held in place by the slide holder is released.

....

4   Remove the air filter and inspect it for any dirt or dust accumulation that may clog it. The following figure shows the air filter.

Figure 7-6   System Bay Air Filter

....
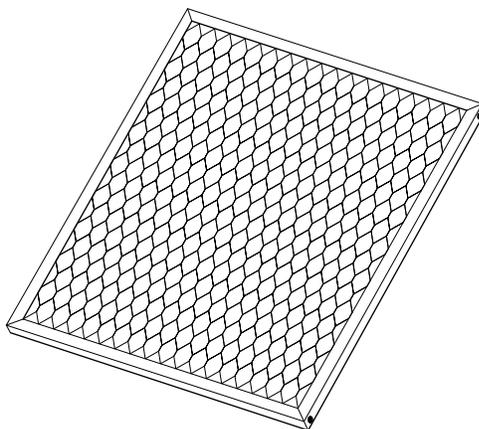
5   The filter can be reused if in good condition, but must be replaced if dirt or dust has accumulated.

....

6   Insert a filter back into the shelf. While holding it up into position, push the air filter slide holder back into position (make sure the back lip of the assembly slides under the filter to secure it).

Important! When inserting a filter into the shelf, make sure the air flow arrows (located on the filter's edge) are pointing up.

....

7   Turn the screw (clockwise) on the air filter slide holder to secure it.

....

....

8   Replace the shelf cover (for details, see <u>"DLP-607: Remove/Install</u>
<u>Front Cover" (7-17)</u>).

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7 - 3 6

DLP-612: Replace Fan Assembly

Overview Use the procedure below to replace a defective fan assembly.

Procedure **Important!** Individual defective fans are not to be replaced. The entire fan assembly is to be replaced and returned for repair.

1 Identify the location of the defective fan assembly by the lit Fault LED located at the front of the fan assembly. Verify this in the CIT **Equipment Tree**.

2 Push on the edges of the circuit pack latch tabs with both thumbs, so that the tabs lift up.

3 Rotate the tabs 90 degrees counter-clockwise to release the latches, and slide out the fan assembly.

   DO NOT ROCK THE FAN ASSEMBLY BACK AND FORTH.

4 Place a replacement fan assembly into the slot guides, and with a thumb on each latch, continue sliding the circuit pack with a firm, continuous motion until the front of the assembly is flush with shelf.

5 Rotate the tabs 90 degrees clockwise to engage the latches.
   E N D   O F   S T E P S

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DLP-613: Baseline Optical Parameters

Overview   This procedure establishes baseline optical parameters for replaced circuit packs, repaired fiber, and added or deleted optical channels to the system.

Procedure   **Important!** All commands can be entered from any network element by logging into the desired remote network element. For details, refer to Appendix A of the *LambdaXtreme*™ *Transport User Operations Guide, Release 1.1,* (365-575-781R1.1).

1   Which Baseline Optical Parameter function is to be performed?

IF…	THEN…
SUPVY circuit pack replacement	Go to "Baseline SUPVY" (7-39).
OA circuit pack replacement	Go to "TAP 213: Clear 'TCA optics: OLINE (TOPT-OL)'" (6-73).
OMON circuit pack replacement	Go to "Baseline OMON (SPT–C, SPR–C)" (7-41).
RP circuit pack replacement	Go to "TAP 212: Clear 'TCA optics: OLINE (TOPR-OL)'" (6-70).
adding an Optical Channel to the system	Go to "Manually Baseline Added Optical Channel" (7-42).

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Baseline SUPVY

....

1   When a SUPVY circuit pack is replaced, use the CIT at that network element to select **PERFORMANCE ⇒ Supvy**.

....

2   Select the optical line: Supv-1e: Supvy Channel.

....

3   Click on the **Performance** button.

....

4   Select **Manual Baseline**.

....

5   Click the **Retrieve** button.

....

6   Select the **Signal Power Transmitted** checkbox.

....

7   Select **SUPVY–Replaced** from the **Reason** drop-down menu.

....

8   Select **This Supervisory Channel** from the **Apply To** drop-down menu.

....

9   Select the same reason for both supervisory channel directions (SPR-SU and SPT-SU).

....

10 Click on the **Apply** button.

....

11 For a Ring Node or repeater(s), repeat <u>Step 1</u> through <u>Step 10</u> for the other line-1e or 1w.

....

12 *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

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....

Baseline OA (TOPT–OLINE)

....

1 When an OA circuit pack is replaced, use the CIT at that network element to select **Optical Line**.

....

2 Click on the **Performance** button.

....

3 Select **Analog Baseline**.

....

4 Click the **Retrieve** button.

....

5 Select the **Total Power Transmitted** checkbox.

....

6 Select **OA–Replaced** from the **Reason** drop-down menu.

....

7 Select **This Optical Line** from the **Apply To** drop-down menu.

....

8 Click on the **Apply** button.

....

9 *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

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....

Baseline OMON (SPT–C, SPR–C)

....

Important! When an OMON circuit pack is replaced, part of this procedure must be repeated for all optical lines present at the node since the OMON is shared across all optical lines.

1 From the CIT, select any optical channel.

....

2 Click on the **Performance** button.

....

3 Select **Analog Baseline**.

....

4 Click the **Retrieve** button.

....

5 Select the checkboxes for both **Signal Power Transmitted** and **Signal Power Response**.

....

6 Select a reason for both from the **Reason** drop-down menu.

....

7 Select **All Optical Channels** from the **Apply To** drop-down menu.

....

8 Click on the **Apply** button.

....

9 *STOP! YOU HAVE COMPLETED THIS PROCEDURE.*

E N D   O F   S T E P S

....

Manually Baseline Added Optical Channel

....

1 At the CIT, select **Optical Line**, and the corresponding channel.

....

2 Click on the **Retrieve** button.

....

3 Select the **Signal Power Transmitted** checkbox.

....

4 Select a reason from the **Reason** drop-down menu.

....

5 Select **This Optical Channel** from the **Apply To** drop-down menu.

....

6 Click on the **Apply** button.

....

7 Click on the **Retrieve** button to verify that the new baseline has been registered.

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Appendix A: Alarm/Condition List

Refer to this table for a list of conditions cross-referenced to their respective trouble clearing tasks.

Table A-1   Trouble Condition—TAP Cross Reference

Alarm/Condition	Proceed to:
Add side OC-48/STM-16 client synchronization failure	"TAP-504: Clear 'Add side OC-48/STM-16 client synchronization failure' " (6-139)
Add side OC-48/STM-16 LOF failure	"TAP-502: Clear Incoming (LOF/LOS) Signal Failure " (6-133)
Add side OC-48/STM-16 LOS failure	"TAP-502: Clear Incoming (LOF/LOS) Signal Failure " (6-133)
Add side OC-192/STM-64 LOF failure	"TAP-502: Clear Incoming (LOF/LOS) Signal Failure " (6-133)
Add side OC-192/STM-64 LOS failure	"TAP-502: Clear Incoming (LOF/LOS) Signal Failure " (6-133)
APR active: fiber disconnect RPG to OA for Raman DCF pumps	"TAP-210: Clear APR Active Conditions for Fiber Disconnects" (6-65)
APR active: fiber disconnect RPG to RP for Raman counter-pumps	"TAP-210: Clear APR Active Conditions for Fiber Disconnects" (6-65)
APR active: fiber disconnect RPG to OA for Raman co-pumps	"TAP-210: Clear APR Active Conditions for Fiber Disconnects" (6-65)

Table A-1   Trouble Condition—TAP Cross Reference   (continued)

Alarm/Condition	Proceed to:
APR active: line	"TAP-203: Clear 'APR active: line'" (6-52)
APR active: OA DCF Raman startup pumps	"TAP-206 Clear 'APR active: OA DCF Raman startup pumps'" (6-59)
APR active: OA (OADM-add)	"TAP-205 Clear 'APR active: OA (OADM-add)'" (6-57)
APR active: OA (preamp)	"TAP-204 Clear 'APR active: OA (preamp)'" (6-55)
APR active: RPG Raman co-pumps	"TAP-207 Clear 'APR active: RPG Raman co-pumps'" (6-61)
APR active: RPG Raman counter-pumps	"TAP-208 Clear 'APR active: RPG Raman counter-pumps'" (6-62)
APR active: switch protection OA (OADM-add)	"TAP-211 Clear APR Switch Protection Conditions" (6-68)
APR active: switch protection OA (preamp)	"TAP-211 Clear APR Switch Protection Conditions" (6-68)
APR active: switch protection RPG Raman co-pumps	"TAP-211 Clear APR Switch Protection Conditions" (6-68)
APR active: switch protection RPG Raman counter-pumps	"TAP-211 Clear APR Switch Protection Conditions" (6-68)
APR active: switch protection RPG port DCF	"TAP-211 Clear APR Switch Protection Conditions" (6-68)
Backup-Database: in progress: destination tidname	"TAP-611: Address 'CPYPGMIPDST', 'CPYPGMIPSRC', 'SWDIP', 'BKUPIP', 'RDTIP'" (6-175)
CIO failure	"TAP-103: Clear 'CIO failure'" (6-10)
Circuit breaker/power failure A	"TAP-116: Clear 'Circuit Breaker/Power Failure "A or B" or "A and B"' " (6-40)
Circuit breaker/power failure A and B	"TAP-116: Clear 'Circuit Breaker/Power Failure "A or B" or "A and B"' " (6-40)
Circuit breaker/power failure B	"TAP-116: Clear 'Circuit Breaker/Power Failure "A or B" or "A and B"' " (6-40)
Copy-Program: in progress: destination tidname	"TAP-611: Address 'CPYPGMIPDST', 'CPYPGMIPSRC', 'SWDIP', 'BKUPIP', 'RDTIP'" (6-175)

Table A-1   Trouble Condition—TAP Cross Reference   (continued)

Alarm/Condition	Proceed to:
Copy-Program: in progress: source tidname	"TAP-611: Address 'CPYPGMIPDST', 'CPYPGMIPSRC', 'SWDIP', 'BKUPIP', 'RDTIP'" (6-175)
DCM LOS: RP to OA	"TAP-202: Clear 'DCM LOS'" (6-48)
DCM LOS: OA	"TAP-202: Clear 'DCM LOS'" (6-48)
DCM LOS: OA (preamp)	"TAP-202: Clear 'DCM LOS'" (6-48)
Download-Software: in progress	"TAP-611: Address 'CPYPGMIPDST', 'CPYPGMIPSRC', 'SWDIP', 'BKUPIP', 'RDTIP'" (6-175)
Drop side OC-192/STM-64 LOF failure	"TAP-503: Clear Drop Side Incoming LOF Failures" (6-137)
Drop side OC-48/STM-16 LOF failure	"TAP-503: Clear Drop Side Incoming LOF Failures" (6-137)
Duplicate NENUM provisioned	"TAP-602: Clear 'Duplicate NENUM Provisioned'" (6-154)
Duplicate tid provisioned	"TAP-601: Clear 'Duplicate TIDs'" (6-152)
EMS link failure	"TAP-604: Clear 'EMS link failure'" (6-158)
EMS Port unavailable	"TAP-605: Clear 'EMS Port unavailable'" (6-160)
Fan failure	"TAP-106: Clear 'Fan failure' " (6-16)
Fan removed	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
FLASH memory module code mismatch	"TAP-107: Clear 'FLASH memory module code mismatch'" (6-17)
Flash memory module ready for removal	"TAP-603: Clear Condition When 'NE ACTY/INFO-N' LED is Lit " (6-156)
Flash memory module removed	"TAP-108: Clear 'Flash memory module removed' " (6-21)
Incoming optical channel LOS	"TAP-501: Address Incoming Line-Side Signal Failure" (6-130)
Incoming SUPVY channel LOF	"TAP-501: Address Incoming Line-Side Signal Failure" (6-130)
Incoming SUPVY channel LOS	"TAP-501: Address Incoming Line-Side Signal Failure" (6-130)
Inhibit alarms: office alarms	"TAP-603: Clear Condition When 'NE ACTY/INFO-N' LED is Lit " (6-156)

Table A-1   Trouble Condition—TAP Cross Reference   (continued)

Alarm/Condition	Proceed to:
JØ mismatch	"TAP-505: Clear 'JØ mismatch'" (6-143)
Line side: WaveWrapper payload type mismatch	"TAP-501: Address Incoming Line-Side Signal Failure" (6-130)
Line side WaveWrapper LOF failure	"TAP-501: Address Incoming Line-Side Signal Failure" (6-130)
Line side WaveWrapper LOS failure	"TAP-501: Address Incoming Line-Side Signal Failure" (6-130)
Logins inhibited	"TAP-603: Clear Condition When 'NE ACTY/INFO-N' LED is Lit " (6-156)
Network controller failure	"TAP-104: Clear 'Network controller failure'" (6-11)
No circuit pack expected in slot	"TAP-111: Clear 'No circuit pack expected in slot'" (6-30)
OA booting in progress	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
OA failure	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
OA pump failure	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
OA removed	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
OA warmup in progress	"TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36)
OD booting in progress	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
OD failure	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
OD removed	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
OD warmup in progress	"TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36)
OM booting in progress	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
OM failure	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
OM removed	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
OM warmup in progress	"TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36)

Table A-1   Trouble Condition—TAP Cross Reference   (continued)

Alarm/Condition	Proceed to:
`OMON booting in progress`	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
`OMON failure`	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
`OMON LOS`	"TAP-606: Clear 'OMON LOS' " (6-161)
`OMON removed`	"TAP-110: Clear 'OMON Removed', 'SUPVY Removed'" (6-28)
`OMS LOS: 0GHz and 100GHz offset at OA (preamp)`	"TAP-302: Clear 'OMS LOS: 0GHz and 100GHz offset at OA (preamp)' and 'OMS LOS: 50GHz and 150GHz offset at OA (preamp)'" (6-81)
`OMS LOS: 0GHz and 100GHz offset at OD (0GHz offset)`	"TAP-306: Clear 'OMS LOS: 0GHz and 100GHz offset at OD (0GHz offset)'" (6-97)
`OMS LOS: 100GHz offset at OD (100GHz offset)`	"TAP-308: Clear 'OMS LOS: 100GHz offset at OD (100GHz offset)' or 'OMS LOS: 150GHz offset at OD (150GHz offset)'" (6-104)
`OMS LOS: 100GHz offset at OM (0GHz offset)`	"TAP-303: Clear 'OMS LOS: 100GHz offset at OM (0GHz offset)'" (6-85)
`OMS LOS: 150GHz offset at OD (150GHz offset)`	"TAP-308: Clear 'OMS LOS: 100GHz offset at OD (100GHz offset)' or 'OMS LOS: 150GHz offset at OD (150GHz offset)'" (6-104)
`OMS LOS: 150GHz offset at OM (50GHz offset)`	"TAP-305: Clear 'OMS LOS: 150GHz offset at OM (50GHz offset)'" (6-93)
`OMS LOS: 50GHz and 150GHz offset at OA (preamp)`	"TAP-302: Clear 'OMS LOS: 0GHz and 100GHz offset at OA (preamp)' and 'OMS LOS: 50GHz and 150GHz offset at OA (preamp)'" (6-81)
`OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)`	"TAP-307: Clear 'OMS LOS: 50GHz and 150GHz offset at OD (50GHz offset)'" (6-100)
`OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset)`	"TAP-304: Clear 'OMS LOS: 50GHz and 150GHz offset at OM (0GHz offset)'" (6-89)
`OMS LOS: add 100GHz at OM (OADM 0GHz offset)`	"TAP-310: Clear 'OMS LOS: add 100GHz at OM (OADM 0GHz offset)'" (6-111)
`OMS LOS: all at OA`	"TAP-301: Clear 'OMS LOS: all at OA'" (6-78)
`OMS LOS: drop all at OA (preamp)`	"TAP-309: Clear 'OMS LOS: drop all at OA (preamp)'" (6-108)
`OSC LOS (opposite direction to optical channels)`	"TAP-201: Clear 'OTS LOS' and/or 'OSC LOS (opposite direction to optical channels)' " (6-45)

Table A-1   Trouble Condition—TAP Cross Reference   (continued)

Alarm/Condition	Proceed to:
`OT booting in progress`	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
`OT failure`	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
`OT removed`	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
`OTS LOS`	"TAP-201: Clear 'OTS LOS' and/or 'OSC LOS (opposite direction to optical channels)' " (6-45)
`Power removed`	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
`Power Monitor for N48V_A`	"TAP-115: Clear 'Power Monitor for N48V_A' and 'Power Monitor for N48V_B' " (6-39)
`Power Monitor for N48V_B`	"TAP-115: Clear 'Power Monitor for N48V_A' and 'Power Monitor for N48V_B' " (6-39)
`Provisioned control point`	"TAP-613: Address 'Provisioned Control Point' and/or 'Provisioned Environmental Point'" (6-178)
`Provisioned environmental point`	"TAP-613: Address 'Provisioned Control Point' and/or 'Provisioned Environmental Point'" (6-178)
`Restore-Database: in progress: destination tidname`	"TAP-611: Address 'CPYPGMIPDST', 'CPYPGMIPSRC', 'SWDIP', 'BKUPIP', 'RDTIP'" (6-175)
`Reset in progress`	"TAP-614: Address 'Reset in progress'" (6-179)
`RP booting in progress`	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
`RP failure`	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
`RP pump failure`	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
`RP removed`	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
`RP warmup in progress`	"TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36)
`RPG booting in progress`	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
`RPG failure`	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
`RPG pump failure`	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
`RPG removed`	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)

Table A-1   Trouble Condition—TAP Cross Reference   (continued)

Alarm/Condition	Proceed to:
RPG warmup in progress	"TAP-114: Clear 'OM/OD/OA/RP/RPG warm-up in progress'" (6-36)
Shelf controller booting in progress	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
Shelf controller failure	"TAP-105: Clear 'Shelf controller failure'" (6-14)
Shelf controller removed	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
SIO failure	"TAP-102: Clear 'SIO Failure'" (6-8)
SIO removed	"TAP-109: Clear 'Circuit Pack Removed'" (6-24)
Supervisory booting in progress	"TAP-113: Address 'Circuit Pack Booting'" (6-34)
SUPVY Data Link Failure	"TAP-608: 'SUPVY Data Link Failure' " (6-170)
SUPVY failure	"TAP-101: Clear 'Circuit Pack Failure'" (6-5)
SUPVY removed	"TAP-110: Clear 'OMON Removed', 'SUPVY Removed'" (6-28)
SUPVY transmitting LOS	"TAP-607: Clear 'SUPVY transmitting LOS' " (6-166)
TCA optics: OCHAN (SPR-C)	"TAP-404: Clear 'TCA optics: OCHAN (SPR-C)'" (6-123)
TCA optics: OCHAN (SPT-C)	"TAP-405: Clear 'TCA optics: OCHAN (SPT-C)'" (6-127)
TCA optics: OLINE (TOPR-OL)	"TAP 212: Clear 'TCA optics: OLINE (TOPR-OL)'" (6-70)
TCA optics: OLINE (TOPT-OL)	"TAP 213: Clear 'TCA optics: OLINE (TOPT-OL)'" (6-73)
TCA optics: OT OC-192/STM-64 (OPR)	"TAP-506: Clear 'TCA optics: OT OC-192/STM-64 (OPR)'" (6-146)
TCA optics: OT OC-192/STM-64 (OPT)	"TAP-507: Clear 'TCA optics: OT OC-192/STM-64 (OPT)'" (6-149)
TCA optics: SUPVY (SPT-SU)	"TAP-214: Clear 'TCA optics: SUPVY (SPT-SU)'" (6-75)
Test alarm in progress	"TAP-612: Address 'Test alarm in progress' and 'Test LED in progress'" (6-177)
Test LED in progress	"TAP-612: Address 'Test alarm in progress' and 'Test LED in progress'" (6-177)

Table A-1   Trouble Condition—TAP Cross Reference   (continued)

Alarm/Condition	Proceed to:
Topology construction incomplete	"TAP-609: Clear 'Topology Construction Incomplete'" (6-172)
Topology construction in progress	"TAP-610: Address 'Topology Construction In Progress'" (6-174)
Transmitting optical channel LOS	"TAP-401: Clear 'Transmitting optical channel LOS' " (6-116)
Unexpected channel	"TAP-403: Clear 'Unexpected channel'" (6-122)
Unexpected circuit pack type	"TAP-112: Clear 'Unexpected circuit pack type'" (6-32)

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3R (Reshaping, Reamplification, Retiming) Functionality

When a signal is converted from optical to electrical, optical translators reshape, reamplify, and retime the electrical signal.

10/100 BASE-T

A twisted-pair cable version of an IEEE 802.3 network.

100BASE-TX

A 100-Mbps Ethernet implementation over Category 5 twisted-pair cabling. In other words, this is a 100 megabit-per-second local area network known by the generic name of Fast Ethernet operating over twisted copper cable. This technology is becoming very popular and cost-effective. It is designed to integrate with existing networks with minimal disruption.

A   ACO (Alarm Cut-Off)

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.

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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.

ANSI (American National Standards Institute)

A United States standards body that accredits standards for programming languages, communications 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)

An 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, 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.

Auto-Provisioning

Configuration of system parts without pre-provisioning. When a part is plugged into the system it is accepted with its default configuration.

Automatic Protection Switch

A protection switch that occurs automatically in response to an automatically detected fault condition.

Autonomous Messages

Messages sent to the CIT to notify it of state changes in the system. These messages are initiated by the system. They are not responses to a CIT-initiated command.
Examples of Autonomous Messages include alarms, events (non-alarmed condition), notification of connections that are added or deleted, and changes in the node database.

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

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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.

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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, etc. 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.

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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 an 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

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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 re-mating, temperature cycling, etc.). 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. For a 1 x 2 WDM or coupler with output powers O1 and O2, and Oi representing both output powers.

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 Underwriters 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.

Current SW Generic (Current Software Generic)

The software and data that the NE is currently using. It is loaded on to the active partition of the FMM.

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 dispersion 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 Agent)

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 part of a broader grouping of equipment known as customer premises equipment which includes voice, data, and end terminals.

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Duplex Cable

A two-fiber cable suitable for duplex transmission.

Duplex Transmission

Transmission in both directions, either one direction at a time (half-duplex) 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)

Code construction that provides a way to protect, correct data from errors, and maintain the data integrity.

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 light 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, OCI or SNMS, which are either directly attached to a NE or remotely by using the DCN.

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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 electronic 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.

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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 photo detector 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 one billion operating hours.

FIT Rate
Number of device failures in one billion device hours.

FMM (FlashDisk 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   **Gain**

The increase in power and magnitude of a signal.

GNE (Gateway Network Element)

A system node that has a physical attachment to the management 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).

Grooming

Consolidating or segregating traffic for efficiency.

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 electricity 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 and is greater than or equal to one.

Index-Matching Gel

A gel with an index of refraction nearly equal to that of the fiber's core. This gel is used to reduce Fresnel reflection at fiber ends.

Insertion Loss

The loss of power that results from inserting a component, such as a connector or splice, into a previously continuous 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 Transport, 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 normally up to 10 km. 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.

LC (Lucent Connector)
A small-form-factor (SFF) design based on a proven 1.25 mm ceramic ferrule. This connector uses RJ-style latching. It facilitates high-speed applications with lower power requirements due to lower insertion loss (0.1 dB typical) and higher return loss (55 dB single mode).

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-Arsenide; a semiconductor that emits incoherent light when forward biased.

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LGX (Lightguide Cross-Connect)

(Lucent product family) Fiber termination shelves and hardware used for interconnecting fiber cables, jumpers and closures that connect the switching systems to the transmission equipment.

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 neighbor information over a DCC link. LID makes use of LAPD (OSI) or PPP (IP).

Interchannel Isolation

The ability to prevent undesired optical energy from appearing in one signal path as a result of coupling from another signal path.

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 (Long Reach)

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 axis from a straight line.

MAN (Metropolitan Area Network)

A network covering an area larger than a local area network. A wide area network (two or more local area networks), that covers a metropolitan area.

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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 checks if the four-bit multiplexed 10G data streams are demultiplexed correctly. It has a value of 10100101 in the first 10G data stream, and 01011010 in the other 10G data streams.

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.

Microbending

Minute but severe bends in fiber that result in light displacement and increased loss.

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).

MPI (Multipath Interference)

Signal reflections and delayed signal images that interfere with the proper signal path. MPI is caused by reflections from dirty/damaged connectors, and return loss of the jumpers/patch cords. MPI may cause severe system degradation.

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, 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.

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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.

NCTL (Network Element Controller)

The NCTL provides control and user interfaces at the NE level.

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 Systems)

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), and 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.

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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.

NZDSF (Non-Zero Dispersion Shifted Fiber)

Fiber that was designed to introduce a small amount of dispersion without the zero point crossing being in the WDM passband. With this type of fiber you can eliminate, or at least greatly reduce the degradation due to four wave mixing, a distortion mechanism that requires the spectral components to be phase matched along the fiber. Examples are the TrueWave fiber from Lucent and the LS fiber from Corning.

O   **OA (Optical Amplifier)**

A device that amplifies an input optical signal without converting it into electrical form. The best OAs developed are optical fibers doped with the rare earth element, erbium.

OADM (Optical Add Drop Multiplexer) Terminal

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 where 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).

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OGC (Optic Gate Controller)

The controller of an Optic Gate 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 in which the frame alignment sequence of an SDH/SONET frame has not been found for several consecutive frames.

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.

Operational Recovery

A recovery with the intent to perform an operation, such as to activate new software version.

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. Used in laser modules, for example. Also called an isolator.

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 Analyzer)
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 System Interconnection)
The internationally accepted grouping of standards for communication between different systems made by different vendors.

OSNR (Optical Signal to 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 Transport 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.

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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 International Association)

An international standards body and trade association that establishes standards for Integrated Circuit cards and promotes interchangeability among mobile computers where ruggedness, low power, and small size were critical.
PCMCIA publishes the PC Card standard which contains all of the physical, electrical and software specifications for the PC card technology. .

PCMCIA Adapter (Personal Computer Miniature Communications International Association) Adapter

A slot on the Network controller or PC where the flash disk is inserted.

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.

PID (Password Identification)

A word or character string recognized by automatic means that permits a user access to protected storage, files, or input or output devices.

Pigtail

A short optical fiber permanently attached to a source, detector or other fiber optic device.

Plastic Clad Silica

Also called hard clad silica (HCS). A step-index fiber with a glass core and plastic or polymer cladding instead of glass.

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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 that has flammability and smoke characteristics which 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 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.

PPP/IP (Point-to-Point Protocol/Internet Protocol)

A protocol used by a computer to connect to the Internet via a dial up telephone line and modem.

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.

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Provisioning
Placing and configuring hardware and software required to activate a telecommunications service for a customer. If the equipment is in place, provisioning may consist of creating or modifying a customer record in a database to activate the services.

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 inhomogeneties of material density or composition.

RBOC (Regional Bell Operating Company)
One of the seven regional holding companies formed after the AT&T divestiture. These companies included Ameritech, Bell Atlantic, BellSouth, NYNEX, Pacific Telesis, Southwestern Bell, and U.S. West. Later on, Bell Atlantic and NYNEX merged and became Verizon; Ameritech, Pacific Telesis and Southwestern Bell merged and became SBC; and U.S. West was renamed Quest.

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 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. REI allows alignment of the near-end and far-end performance monitoring processes. Examples of REI signals are the FEBE bits in SDH signals.

Repeater

A receiver and transmitter set designed to amplify attenuated signals. 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.

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Riser Cables
High-strength cables used in vertical shafts between floors in multi-story buildings.

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)
In LambdaXtreme Transport, RPs provide amplification/gain in the outside plant fiber by supplying a counterpropagating signal. The amplification is provided by "pumping" high-intensity wavelengths (that are lower than the signal wavelength) into the fiber that carries the incoming DWDM signal. (Also see RPG).

RPG (Growth Raman Pump)
In LambdaXtreme Transport, RPGs provide amplification/gain in the outside plant fiber and internally in the Dispersion Compensation Module. RPGs provide copropagating wavelengths to the outside plant fiber at the output DWDM signal and counterpropagating wavelengths to the incoming DWDM signal and to the Dispersion Compensation Module. RPGs are optional; they are used for channels above 188.45 THz. (Also see RP).

S   SC (Subscription channel connector.)
A push-pull type of optical connector that originated in Japan. Some of its features are high packing density, low loss, low backreflection, and low cost.

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.

SCOT (Software Control of Transmission)
The software architecture and algorithms for control of transmissions in LambdaXtreme Transport. Software control includes the following areas: startup, transient control, APR and APR recover, single node failure in a network, adding/deleting channels, and adding the expansion pump pack (RPG).

SCTL (Shelf Controller)
SCTL provides control at the double shelf backplane level (half of a bay).

SDH (Synchronous Digital Hierarchy)

A family of digital transmission rates from 51.84 Mb/s to 9.953 Gb/s that allows the interconnection of transmission products around the world.

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

Single element (for example, a simplex connector is a single-fiber connector).

Simplex Cable

A term sometimes used 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).

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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 coupler.

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 fiber shortage solutions.

SR (Short Reach)

Optical sections of 2 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 that uses a bayonet style coupling rather than a screw-on coupling.

Step-Index Fiber

Fiber that has a uniform index of refraction throughout the core.

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.

SUPVY Pack (Supervisory Pack)

SUPVY circuit pack is a low-speed transmission pack that facilitates communication between LambdaXtreme NEs.

SUPVY/SUP (Supervisory Channels)

SUPVY/SUP supports the following communications: node-to-node, interworking, client LAN, and orderwire communication.

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.

TCP/IP (Transmission Control Protocol/Internet Protocol)

A suite of several networking protocols developed for the Internet that provides communication across interconnected networks, between computers with diverse hardware architectures and various operating systems. Some examples are FTP, SMTP, SNMP, and so forth.

TD (Transmit Degrade)

Indicates that the transmitted signal has degraded to a level where a certain threshold of error code violations is exceeded.

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TDC (Tunable Dispersion Compensator)

A device which has negative chromatic dispersion where the amount 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 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 (Target Identifier)

A provisionable parameter used to identify a 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 Telcordia 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 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.

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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.

UID (User Identification)

A CIT user code that comprises one to ten alphanumeric, case-sensitive characters. UID identifies a user when he/she logs into a system.

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 in the transmission line.

VSR (Very Short Reach)

VSR is a SONET/SDH interface that provides a low-cost solution interconnection 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.

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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)

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

Undesired coupling from a circuit, part of a circuit, or channel to another.

Y   Y Coupler

A variation on the tee coupler in which input light is split between two channels (planar waveguide) that branch out like a Y.

Z   Zero DSF (Zero Dispersion Shifted Fiber)

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 attenuation wavelength.

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