



Alcatel-Lucent 1850

Transport Service Switch 5C (TSS-5C) | Release 4.0

Installation and System Turn-Up Guide

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Issue 2
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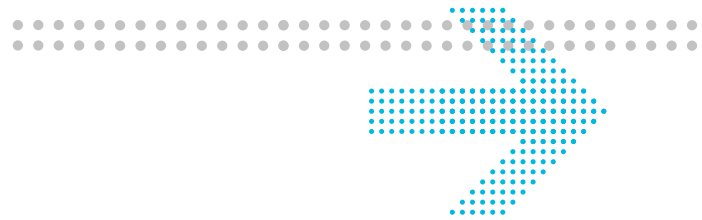
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Ordering Information

For more ordering information, refer to "[How to order](#)" (p. xiv)" in the section titled "[About this document](#)".

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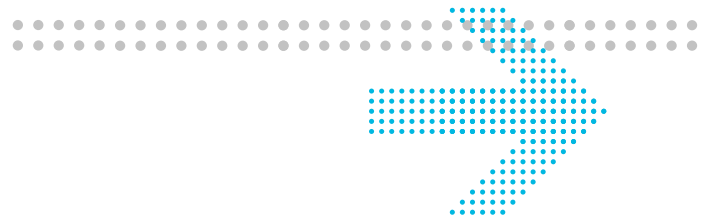
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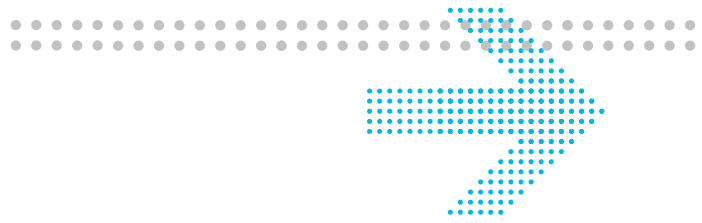
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About this document



Purpose

This *Installation and System Turn-Up Guide* provides the following information for installing and testing Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C):

- Safety
- Physical installation
- Power, cable, and fiber installation
- Stand-alone set-up
- Stand-alone installation testing
- Installation kits and tools
- Fiber optic cleaning
- Cables, connectors, and assemblies
- Install an FTP server

Reason for reissue

To incorporate updates for Release 4.0.1.

Intended audience

This guide is intended for individuals who are responsible for the installation, acceptance, operations, and maintenance of the Alcatel-Lucent 1850 TSS-5C.

How to use this document

This guide is divided into several chapters and appendices. The first chapter contains safety information and general installation information. The other chapters provide instructional steps for personnel needing additional detail or background information.

Refer to the Table of Contents to locate specific information by chapter.

Safety information

For your safety, this document contains safety statements. Safety statements are given at points where risks of damage to personnel, equipment, and operation may exist. Failure to follow the directions in a safety statement may result in serious consequences.

Packaging collection and recovery requirements

Countries, states, localities, or other jurisdictions may require that systems be established for the return and/or collection of packaging waste from the consumer, or other end user, or from the waste stream. Additionally, reuse, recovery, and/or recycling targets for the return and/or collection of the packaging waste may be established. For more information regarding collection and recovery of packaging and packaging waste within specific jurisdictions, contact the Alcatel-Lucent Environment, Health and Safety organization.

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Electronic products and batteries bearing or referencing the symbols shown below shall be collected and treated at the end of their useful life, in compliance with applicable European Union and other local legislation. They shall not be disposed of as part of unsorted municipal waste. Due to materials that may be contained in the product and batteries, such as heavy metals, the environment and human health may be negatively impacted as a result of inappropriate disposal.

Note: For electronic products put on the market in the European Union, a solid bar under the crossed-out wheeled bin indicates that the product was put on the market after 13 August 2005.



Note: For batteries put on the market in the European Union, a chemical symbol Hg (mercury), Cd (cadmium), or Pb (lead), or a combination of those symbols, beneath the cross-out wheeled bin indicates that the battery contains the corresponding heavy metals.



Moreover, in compliance with legal requirements and contractual agreements, where applicable, Alcatel-Lucent will offer to provide for the collection and treatment of Alcatel-Lucent products bearing the logo at the end of their useful life, or products displaced by Alcatel-Lucent equipment offers.

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Related information

The following table lists the documents included in the Alcatel-Lucent 1850 TSS-5C Release 4.0 documentation set:

Part number	Title	Description
8DG24621ADAATQZZA	<i>Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C) Release 4.0 Product Information and Planning Guide</i>	Provides information on the Product and detailed descriptions of the product specifics.
8DG24624ADAATQZZA	<i>Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C) Release 4.0 User Provisioning Guide</i>	Provides information on provisioning, configuration, operation, performance monitoring and maintenance using the Craft Terminal Interface.
8DG24622ADAATQZZA	<i>Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C) Release 4.0 Installation and System Turn-Up Guide</i>	Provides information on product installation and commissioning.

Part number	Title	Description
8DG24623ADAATQZZA	<i>Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C) Release 4.0 Maintenance and Trouble-Clearing Guide</i>	Provides information on Fault Management, alarms and clearance procedures.

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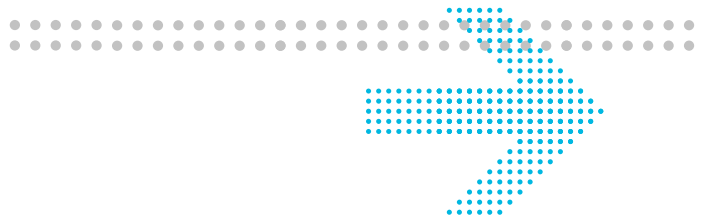
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Part I: Safety

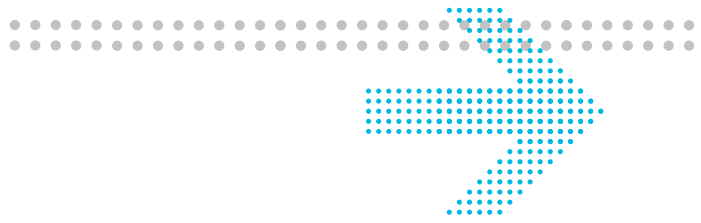
Overview

Purpose

This part of the *Installation and System Turn-Up Guide* includes the safety chapter.

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1 Safety

Overview

Purpose

This chapter provides important safety instructions for the Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

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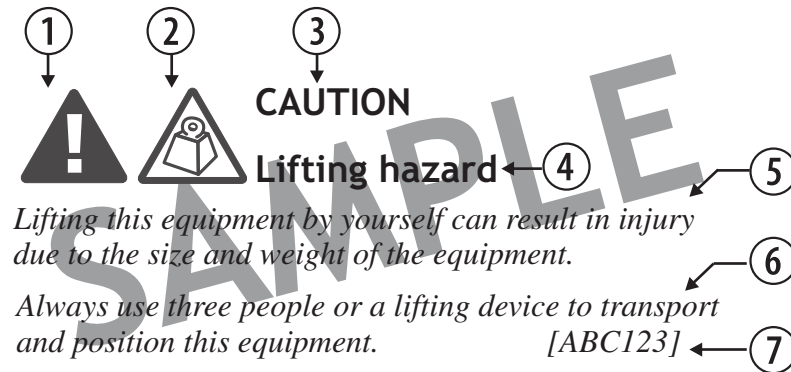
Structure of safety statements

Overview

This topic describes the components of safety statements that appear in this document.

General structure

Safety statements include the following structural elements:



Item	Structure element	Purpose
1	Safety alert symbol	Indicates the potential for personal injury (optional)
2	Safety symbol	Indicates hazard type (optional)
3	Signal word	Indicates the severity of the hazard
4	Hazard type	Describes the source of the risk of damage or injury
5	Safety message	Consequences if protective measures fail
6	Avoidance message	Protective measures to take to avoid the hazard
7	Identifier	The reference ID of the safety statement (optional)

Signal words

The signal words identify the hazard severity levels as follows:

Signal word	Meaning
DANGER	Indicates an extremely hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a hazardous situation not related to personal injury.

Safety awareness

Electrical precautions

Take appropriate safety precautions when performing procedures on electrical equipment. Hazardous electrical potentials are present when system power is on.

Some procedures in this guide require working with small conductive objects, such as screwdrivers, fuses, washers, screws, and nuts. When working on an upper shelf in a system bay, a dropped object that falls into a lower shelf can cause physical damage and electrical shorts. To prevent this, place a piece of paper or other cover over lower shelves to catch fallen objects. Remove the paper or other cover when work is complete.

Laser precautions

Verify that laser labels on equipment state that the system conforms to all applicable standards of IEC 825-1-1993. See [Figure 1-1, “Laser warning label”](#) (p. 1-3) and [Figure 1-2, “Shelf label locations”](#) (p. 1-4). Laser labels are present on equipment openings, panels, and safety interlocks. If there are no danger labels, call the Alcatel-Lucent Technical Assistance Center (TAC).

Figure 1-1 Laser warning label



850-0214
112706

The invisible infrared radiation emitted by the fiber-optic transmitter can cause eye damage. Observe local office procedures and the following dangers.

Figure 1-2 Shelf label locations



  **DANGER**
Laser hazard

The use of controls and/or adjustments, or the performance of procedures other than those specified herein, may result in hazardous infrared radiation exposure.

  **DANGER**
Laser hazard

Laser infrared radiation is not in the visible spectrum; therefore, it is not visible to the naked eye or with laser safety glasses. Although it cannot be seen, laser radiation may be present.

  **DANGER**
Laser hazard

Never look directly into an unterminated fiber-optic connector unless it is absolutely known that no optical power is being emitted by the connector.



Never look into a broken optical fiber cable unless it is absolutely known that no laser radiation is present.



Never look at an optical fiber splice, cable, or connector unless it is absolutely known that no laser radiation is present in the fiber. Laser radiation can come from a fiber-optic transmitter, an Optical Time Domain Reflectometer (OTDR), or other optical test equipment.



Never look directly into an unterminated optical connector or cable with a magnifier/microscope unless it is absolutely known that no laser radiation is being emitted from the connector or cable. A magnifier/microscope greatly increases the laser radiation hazard to the eyes.



This system normally operates as a Class I Laser Product (no hazard). However, during servicing operations, when optical connectors are being connected, disconnected, or handled without dust covers, it is possible to be exposed to Class IIIb laser radiation, which can cause eye damage.



Everyone within a 10-foot radius of an unterminated optical fiber or connector that is connected to a powered transmitter must wear laser safety goggles or eye shields.

Laser safety goggles or eye shields are not required if the following work rules are strictly followed:

1. Always remove electrical power from fiber-optic transmitters before disconnecting fiber-optic connectors in the path between the transmitter and the receiver.
2. Never connect an unterminated optical cable to a fiber-optic transmitter. Always connect fiber-optic cables to fiber-optic receivers, test sets, or some other termination first.

Electrostatic-sensitive devices

Electrostatic sensitivity

An electrostatic-sensitive (ESS) device can withstand voltage spikes of only 10 to 100 volts and can be damaged or effectively destroyed by a discharge that might go unnoticed by a technician. Some devices have built-in protection. However, because this protection is effective only against the lower levels of electrostatic charges, a false sense of security often prevails.

CAUTION: Common plastic, white foam, cellophane, and masking adhesive tapes must not come in contact with ESS devices or their packaging.

Common plastics (synthetic insulating materials), clothing, and paper or cardboard are the most common sources of static charges.

Observe special precautions when the ESS sign is displayed. See [Figure 1-3](#), “Electro-sensitive sign” (p. 1-6).

Figure 1-3 Electro-sensitive sign



The following items are examples of ESS devices:

- MOS (Metal Oxide Semiconductor) capacitors, transistors, Integrated Circuits (ICs)
- CMOS (Complementary Metal Oxide Semiconductor) transistors, ICs
- JFET (Junction Field Effect Transistors)
- IGFET (Insulated Gate Field Effect Transistors)

Handling modules

Although the risk of damage to an ESS device is reduced considerably after it is assembled into a circuit designed to protect sensitive components, take the following precautions to reduce static charges to harmless levels:

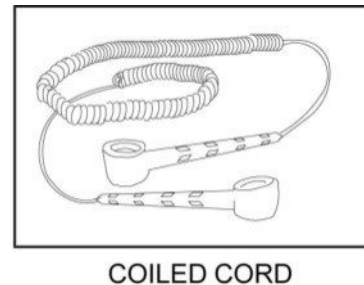
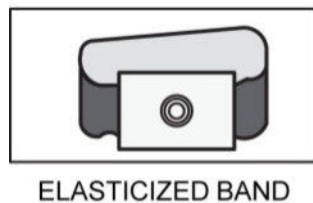
- Handle all modules as ESS devices unless they are known not to contain electrostatic-sensitive parts.

CAUTION: Heel straps are effective only while standing on conductive or electrostatic-dissipative surfaces.

- Wear ground straps, wrist (PN 055-9357-010) or heel (PN 055-9357-020), before and while touching or handling modules containing ESS devices. See [Figure 1-4](#), “Wrist band and cord” (p. 1-7) for an illustration of the wrist strap with cord. The wrist strap is an elasticized band that is worn around the wrist and connected to the coil cord, which is also connected to the rack.

- Cover surfaces with resistance to ground in excess of 100 megohms, such as ordinary tile, with properly grounded static dissipative runners, or wax surfaces with a static dissipative wax (PN 057-4000-006).
- Store (even temporarily), pack, and ship modules in antistatic bags or containers.
- Do not handle printed circuit board or components unnecessarily. Use plastic handle.
- Do not use synthetic bristled brushes or acid brushes to clean modules.
- Handle failed modules with same precautions as good modules.

Figure 1-4 Wrist band and cord

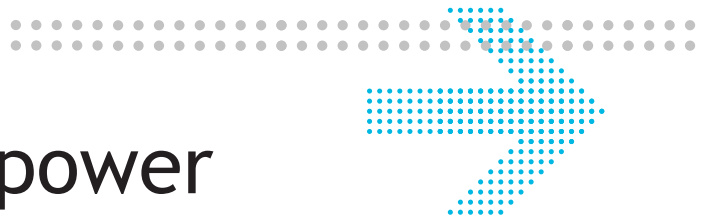


Repairing modules

To protect ESS devices during repair, take the following precautions:

- The workbench must be earth-grounded, and the work surface must be covered with an antistatic or static dissipative material bonded to the bench (bolt). A field service kit (PN 126-3442-010) or equivalent can be used if an adequate workbench is not available.
- Repair technicians must wear a wrist strap of 250 kilohms to 2 megohms that contacts the repair technician's skin and the bolt bonding the covering to the bench or safety ground. The wrist strap must be connected before parts are removed from packaging.
- All electrical equipment must be grounded using a 3-wire power cord.
- Clothing must not touch the device under repair.
- ESS devices are delivered with protective packing (containers or conductive foam). The devices must remain in their original containers until needed.
- Containers with ESS devices must contact the antistatic work surface, and the wrist strap must be connected before parts are removed from packaging. Devices must be handled by their bodies. Leads must be contacted only when necessary.
- Test setups must have correct voltage polarity.
- Volt Ohm Milliamp (VOM)-type meters must not be used to measure resistance; they can damage devices.
- Only antistatic (metallized) desoldering tools must be used.

ESS devices are protected when properly packaged in conductive or antistatic packaging. Acceptable packaging is marked as either conductive or antistatic.



Part II: Physical and power installation

Overview

Purpose

These chapters describe the physical and power installation of the Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

Installation tools

The following is a list of tools and materials used to install Alcatel-Lucent 1850 TSS-5C equipment. Tools specific to a given task are listed in the installation section covering the task. Other tools might be required to perform special procedures. These tools must be gathered in advance in preparation for installing the system.

- Alcatel-Lucent 1850 TSS-5C reference manuals
- Safety glasses and ear protection
- Box cutter or pocket knife
- Static-protection accessories
 - Strap, wrist ground (PN 047-9004-010)
 - Coiled cord, six foot (PN 047-9004-020)
 - ESD Field Service Grounding Kit (PN 1AD012520001)
- BNC connector crimping tool, Thomas & Betts WD416
- Small Thomas & Betts power crimping tool for coaxial cable end connections
- Screwdrivers, standard (slot head)
 - 4-inch shaft
 - 6-inch shaft
 - Small (to fit screws on interrack data cables)
 - 1/8-inch, 8 inches long
- Screwdrivers, Phillips
 - No. 0, 6-inch shaft
 - No. 1, 12-inch shaft

-
- No. 2
 - Power screwdrivers with No. 0 and No. 1 bits
 - 90X No. 1 and No. 2.
 - Insulated trouble lamp (droplight duralamp)
 - Extension cord (50-foot)
 - Ladders and/or portable scaffold
 - Wrenches (3/8- to 11/16-inch), open and box-end combination
 - Socket set, 3/8-inch drive with ratchet handle and extension
 - Foot-pound torque wrench
 - Thread-cutting screws
 - Needle-nose pliers, 4-1/2 inch
 - Diagonal cutters, 5 inch
 - Cable butting tool
 - Cable cutters
 - Cable stripper
 - Multi-stripper
 - Anti-oxidation compound
 - Steel measuring tape (50 feet)
 - Accurate level
 - Chalk line and chalk (blue)
 - Felt -tipped marking pen
 - Stencil kit
 - Vacuum cleaner, high-efficiency particulate Arrester (HEPA)
 - V-bolts, corner and wall brackets, channels, and other hardware for overhead cabling

Special tools and test equipment

In addition to the standard tools, there are special tools that are used on the Alcatel-Lucent 1850 TSS-5C shelf. Details about these tools can be found in [Appendix A, “Installation kits and tools”](#).

- Mini BNC tool
- RJ45 tool
- SFP extraction tool

Method of procedure

The person responsible for the installation, in cooperation with the Telco engineer and Central Office (CO) supervisor, must collect all essential information to prepare a Method of Procedure (MOP). When the MOP is complete, it must be submitted to CO

management for approval. Any work on common equipment may need to be performed during nonstandard working hours. This must be a joint decision between the CO management, the Telco engineer, and the installation personnel.

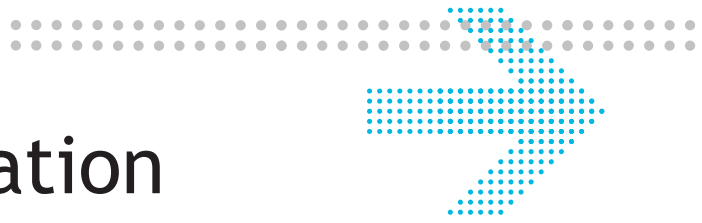
As a minimum, the following items must be addressed, mutually understood, and agreed upon to establish a MOP before installation:

- Service-affecting hazards involved and associated risks imposed
- Installation methods and tools
- Experienced personnel assigned to job
- Protection requirements for equipment and tools
- Time during which various steps of work will be performed, and a list of equipment that is affected
- Identified steps of work that require notification of CO or Telco engineer before work starts
- Procedures to follow and tests to complete before connecting additional or modified equipment to any working equipment
- Steps installer must take to disconnect any alarms associated with the work.
- Procedures to ensure that designation and fuse records are checked against proper drawings before any fuse is removed
- Time that equipment removed from service is restored
- Additional measures to take to ensure that equipment is restored to service on time in case of delays
- Identified steps of work that require presence of CO personnel
- Tests applicable for wiring operations
- Space requirements (for example, storage and administration)
- When applicable, a restoration plan that will be a joint effort between CO personnel, Telco engineer, and installation personnel
- Steps required to ensure that all work is done during hours specified in the MOP
- MOP approval by Telco engineer and CO personnel before installation
- An approved copy of the MOP available and posted for review at job site at all times.

After the MOP is adopted and approved, it cannot be deviated from without approval of the Telco engineer and the CO personnel.

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2 Physical installation

Overview

Purpose

This chapter contains a set of procedures to install the Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

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Unpack and inspect equipment

Purpose

Follow this procedure to unpack and inspect the Alcatel-Lucent 1850 TSS-5C and to report any shipping damage or missing parts.

Alcatel-Lucent provides expert Installation Services for installations that have different requirements from those outlined in this guide. Contact Alcatel-Lucent at 1-888-252-2832 for details.

Recommended tools

The following tools are recommended:

- Box cutter or pocket knife

Hazards

Note: *Equipment damage*

Exercise care when moving equipment to avoid excessive shock or vibration, which can damage equipment.

Preliminary checks

The following information must be printed on the outer box:

International Symbols



fragile



side up :



keep dry

- Trademark/address of the manufacturing company.
- Labels (or template marks) indicating information on the contract and destination site of the product.
- An envelope containing packing list and other information.

Procedure

Receiving

- 1 Upon receipt, check the following:
 1. That the final destination of the container is that indicated on the label.
 2. That no damage was made to the cases.
- 2 Report any shipping damages to the Company's representative or the Shipping Agent.

Unpacking

- 3 When unpacking, proceed as follows:
 1. Make sure that outer packing is properly positioned.
 2. Open the case.
 3. Remove the shockproof material.
 4. Remove the chassis from the case.
 5. Remove pre-packing, polyethylene bag, and any other protection.
 6. Remove the plastic bags containing accessories taped to the racks.
 7. Remove any dehydrating bags.
 8. Check that the goods are not damaged, and that they correspond to those indicated on the packing list. Contact the shipping agency's representative if discrepancies are found.
- 4 Handle the packing material with care; it might be reused for repacking again if goods must be reshipped.

Warehousing

- 5 If packing material needs to be stored, the cardboard boxes must be placed indoors in ventilated rooms.
- 6 Stop. This procedure is complete.

END OF STEPS

Preparation

This section provides physical details and guidelines for installation. Alcatel-Lucent provides expert Installation Services for installations that have different requirements from those outlined in this guide. Contact Alcatel-Lucent at 1-888-252-2832 for details.

Chassis dimensions and weight

The chassis dimensions and weight are as follows:

Width: 442mm (17.4 inches)

Height: 1 Rack Unit (RU), 44mm (1.73 inches)

Depth: 212mm (8.35 inches, including maximum depth of faceplate connectors)

Weight: 4.4kg (9.7lb) maximum

Suitable for installation on rack (19-inch or 23-inch rack systems and ETSI standard racks) and wall using mounting hardware supplied in installation kits

Recommended tools

The following tools and materials are recommended:

- Safety glasses
- Extension cord (50-foot)
- Felt-tipped marking pen
- Insulated trouble lamp (droplight-duralamp)
- Steel measuring tape

Chassis layout

A general conceptual layout of the chassis is shown in [Figure 2-1, “Alcatel-Lucent 1850 TSS-5C chassis layout”](#) (p. 2-4).

Figure 2-1 Alcatel-Lucent 1850 TSS-5C chassis layout



Plug In Modules

The Alcatel-Lucent 1850 TSS-5C provides fixed and pluggable chassis slots to support transmission, management, alarm, and power options.

Figure 2-2 Alcatel-Lucent 1850 TSS-5C fixed and pluggable option slots

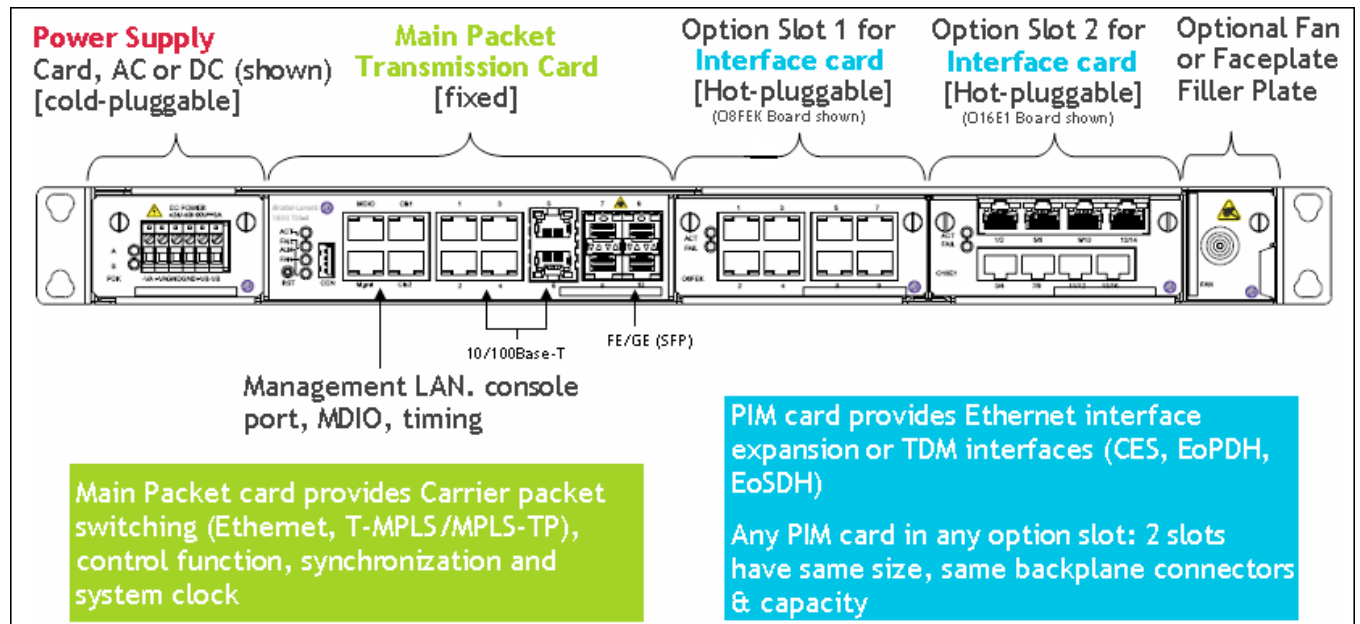


Table 2-1 Alcatel-Lucent 1850 TSS-5C fixed and pluggable hardware components

Component (Part Number)	Description (Part Name)	Type
Main Packet Transmission (8DG24310AAXX)	Management LAN, Console Port, MDIO, 1pps+ToD, 2MHz, 6/12 FE, 4GE (M4O12FEK)	Fixed
Main Packet Transmission (8DG24310ABXX)	Management LAN, Console Port, MDIO, 1pps+ToD, 2MHz, 6/12 FE, 4GE, Temperature Hardened (M4O12FEB)	Fixed
DC Power Supply (8DG24330AAXX)	Dual input, -38.4v to -72v (-60v/-48v nominal) (PD)	Cold-Pluggable

Table 2-1 Alcatel-Lucent 1850 TSS-5C fixed and pluggable hardware components (continued)

Component (Part Number)	Description (Part Name)	Type
DC Power Supply (8DG24330ABXX)	Dual input, -38.4v to -72v (-60v/-48v nominal), EMC/EMI Hardened, K.21 (PDK)	Cold-Pluggable
DC Power Supply (8DG24330ACXX)	Dual input, -38.4V to -72V (-48/-60V nominal), Temperature Hardening, EMC/EMI hardened (PDE)	Cold-Pluggable
DC Power Supply (8DG24330ADXX)	Dual input, -38.4V to -72V (-48/-60V nominal), Temperature Hardening, EMC/EMI hardened, K.21 (PDKE)	Cold-Pluggable
DC Power Supply (8DG24330AEXX)	Dual input, 21.6V to 57.6V (+24/-48V nominal), Temperature Hardening, EMC/EMI hardened, K.21 (PDKE24)	Cold-Pluggable
AC Power Supply (8DG24340ABXX)	100 to 240 VAC (90 to 264v nominal) (PAK)	Cold-Pluggable
Fan Unit (8DG24380AAXX)	Environmental hardened option for extended temperature and humidity range	Hot-Pluggable
Multi-Service Module (PIM) (8DG24420AAXX)	1xSTM-1 (SFP) channelized CES, 1xGigE(SFP), 16xE1 (75ohm) CES (OTRI)	Hot-Pluggable
Fast Ethernet Electrical (PIM) (8DG24350AAXX)	8xFE (10/100Base-T), EMC/EMI Hardened, K.21 (O8FEK)	Hot-Pluggable
Fast Ethernet Optical (PIM) (8DG24430AAXX)	8xFX (SFP), 100Base-T, EMC/EMI Hardened (O8FXK)	Hot-Pluggable

Table 2-1 Alcatel-Lucent 1850 TSS-5C fixed and pluggable hardware components (continued)

Component (Part Number)	Description (Part Name)	Type
E1 (PIM) (8DG24360AAXX)	16xE1 (75ohm) CES, K.21 (O16E1)	Hot-Pluggable
E1/DS1 (PIM) (8DG24370AAXX)	16xE1/DS1 (120/100 ohm) CES, K.21 (O16P1K)	Hot-Pluggable
Microwave Awareness card (8DG24440AAXX)	2xGE(SFP), 2xRJ-45 (1000M) (R2O2E)	Hot-Pluggable
Space Filler Board* (8DG23358AAXX)	Filler board for unused PIM slot (SLOTDMY)	Hot-Pluggable
Space Filler Board* (8DG24406AAXX)	Filler board for unused FAN slot (FANDMY)	Hot-Pluggable
* Note: Space Filler Boards must be used in all empty slots to maintain proper airflow		

Installation steps

Description

-
- 1 Observe the following guidelines:
 1. Verify that layouts of mounting rack or wall mount position are as indicated in applicable drawings and specifications.
 2. Verify that area dimensions and location of reference points correspond to plan.
 3. Mark all reference and layout lines.
 - 2 The Alcatel-Lucent 1850 TSS-5C chassis will be rack, wall, or desk mounted as described in the following sections. For all mounting arrangements, adequate ventilation space is required at the top and sides of each unit. Adjacent equipment should not be stacked or placed in such a way as to block ventilation panels. Refer to the site engineering specification for site specific spacing and ventilation requirements.

END OF STEPS

Rack mount

-
- 1 The Alcatel-Lucent 1850 TSS-5C can be installed in the following racks by use of a suitable installation bracket.
 - Standard ETSI rack (300mm/600mm)
 - Standard ANSI 19" rack
 - Standard ANSI 23" rack
 - 2 Select the appropriate brackets from the installation kit. A rack mounting bracket is displayed in [Figure 2-3, “Alcatel-Lucent 1850 TSS-5C with rack mounting bracket” \(p. 2-9\)](#).

Figure 2-3 Alcatel-Lucent 1850 TSS-5C with rack mounting bracket



- 3 Affix the installation brackets to the Alcatel-Lucent 1850 TSS-5C unit.
- 4 Support the Alcatel-Lucent 1850 TSS-5C in the desired rack position.
- 5 Affix the Alcatel-Lucent 1850 TSS-5C to the rack with four M6 screws and nuts.

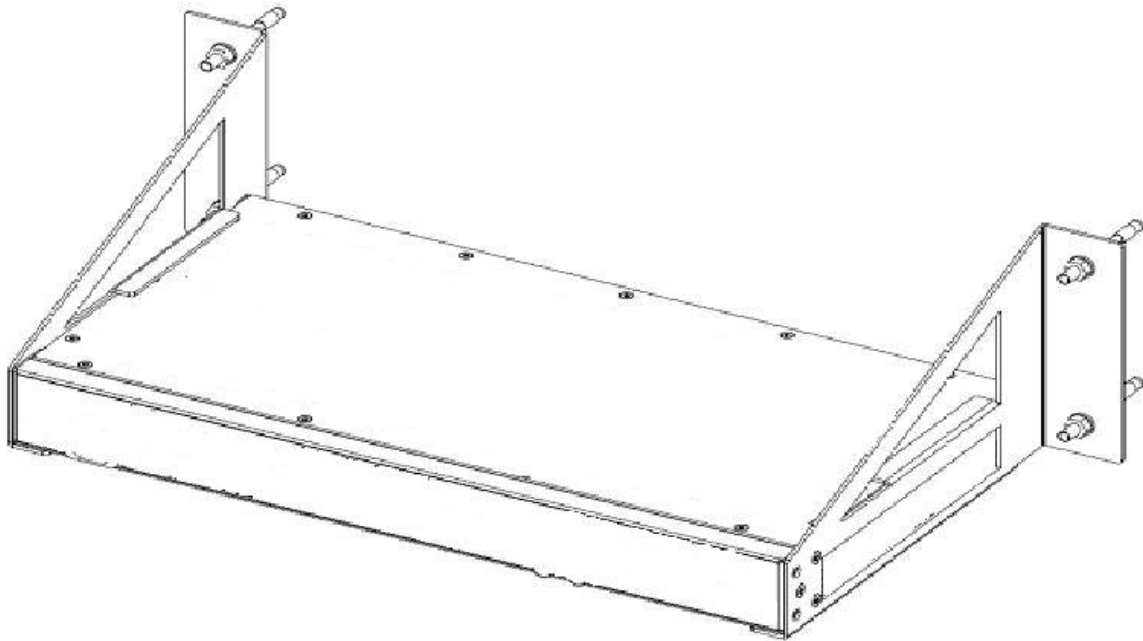
Note: It is recommended that 1xRU (44mm) spacing be left between adjacent 8DG24310AB (temperature hardened version) units, and 2xRU (88mm) spacing be left between adjacent 8DG24310AA (non-temperature hardened version) units, because natural convection requires more space.
- 6 Stop. This procedure is complete. Proceed to next section for cable and fiber connection.

END OF STEPS

Horizontal wall mount

- 1 The Alcatel-Lucent 1850 TSS-5C may be wall mounted as shown in [Figure 2-4](#), “Alcatel-Lucent 1850 TSS-5C with horizontal wall mounting brackets” (p. 2-10).

Figure 2-4 Alcatel-Lucent 1850 TSS-5C with horizontal wall mounting brackets



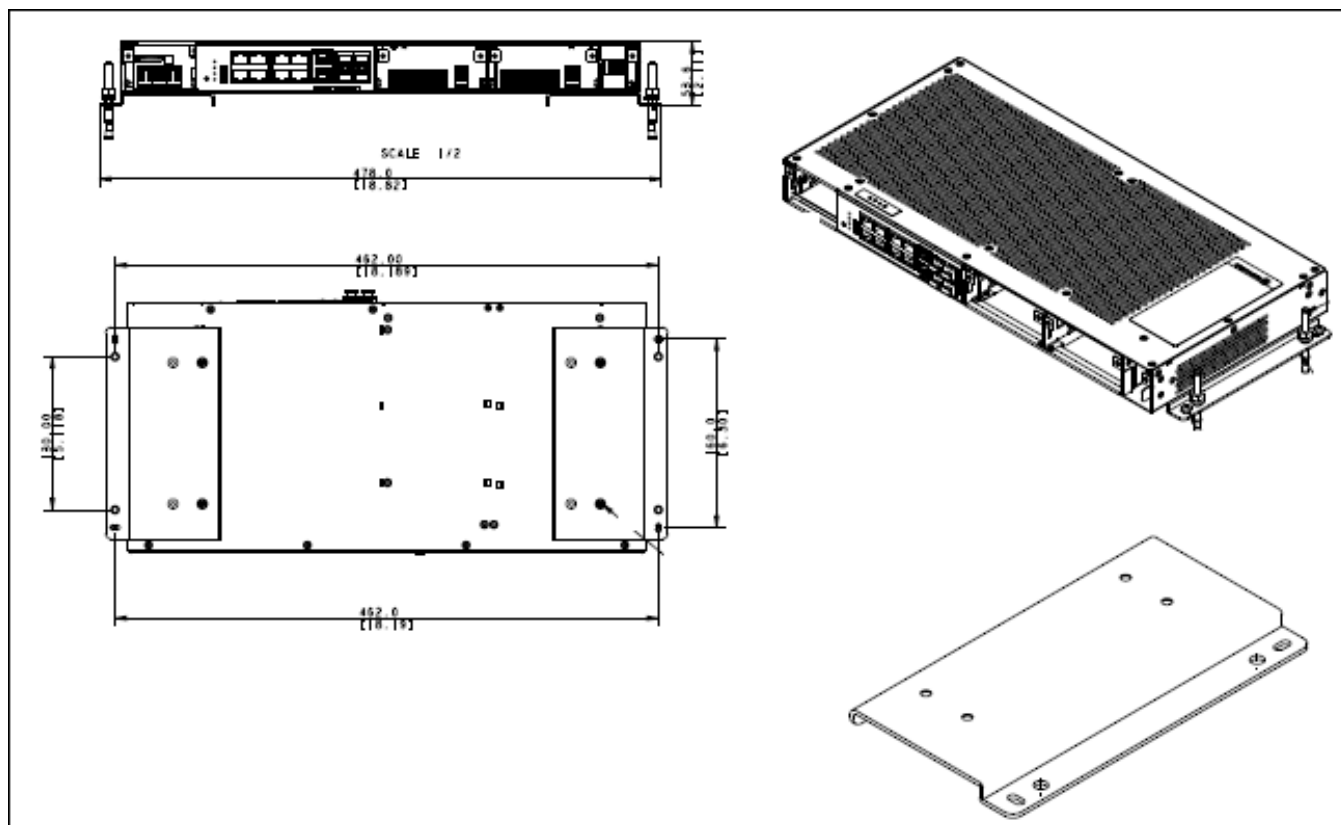
-
- 2 Identify wall mounting brackets in installation kit 8DG23510AFXX.
 - 3 Attach the wall mounting brackets to the Alcatel-Lucent 1850 TSS-5C as shown.
 - 4 Move the unit to desired position on the wall such that the unit is horizontal and mark the points for attachment.
 - 5 Drill holes per the wall kit layout.
 - 6 Attach the Alcatel-Lucent 1850 TSS-5C unit to wall with earthquake resistant bolts.
 - 7 Stop. This procedure is complete. Proceed to [Chapter 3, “Power, cable, and fiber installation”](#) for cable and fiber connection.
-

END OF STEPS

Vertical wall mount

- 1 The Alcatel-Lucent 1850 TSS-5C may be wall mounted as shown in [Figure 2-5](#), “Alcatel-Lucent 1850 TSS-5C with vertical wall mounting brackets” (p. 2-11).

Figure 2-5 Alcatel-Lucent 1850 TSS-5C with vertical wall mounting brackets



- 2 Identify wall mounting brackets in installation kit 8DG24386ACXX.
- 3 Attach the wall mounting brackets to the Alcatel-Lucent 1850 TSS-5C as shown.
- 4 Move the unit to desired position on the wall such that the unit is vertical and mark the points for attachment.
- 5 Drill holes per the wall kit layout.

-
- 6 Attach the Alcatel-Lucent 1850 TSS-5C unit to wall with earthquake resistant bolts.
 - 7 Stop. This procedure is complete. Proceed to [Chapter 3, “Power, cable, and fiber installation”](#) for cable and fiber connection.
-

END OF STEPS

Table placement

-
- 1 The Alcatel-Lucent 1850 TSS-5C may be placed on a table or desk and need not be permanently attached.

Important! A location must be chosen such that the thermal requirements of the Alcatel-Lucent 1850 TSS-5C are observed. In particular the unit must not be installed on top of a heat source (such as another piece of networking equipment). Objects must not be placed on top of the Alcatel-Lucent 1850 TSS-5C or close to the side ventilation holes that would block air flow. Units should not be directly stacked. Top ventilation is required.

- 2 Ensure that the table or desk location has adequate access for cable, fiber, and power connections and that cable, fiber, and power can be properly secured according to local requirements.
-

- 3 Stop. This procedure is complete. Proceed to [Chapter 3, “Power, cable, and fiber installation”](#) for cable and fiber connection.
-

END OF STEPS

3 Power, cable, and fiber installation



Overview

Purpose

This chapter includes a list of procedures for installing power, management, and signal transmission cables on the Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

The Alcatel-Lucent 1850 TSS-5C may be installed in Network Telecommunications Facilities or in customer premise locations where the NEC applies. With appropriate options for environmental (temperature and humidity) hardening, the Alcatel-Lucent 1850 TSS-5C may be installed in outside plant (OSP) locations.

Contents

Install ground and power cables	3-2
Connect management cables	3-8
Signal transmission cables	3-10

Install ground and power cables

Purpose

This procedure provides instructions to route and connect station-ground cables to equipment racks and ground the PDU to the rack.

General

The Alcatel-Lucent 1850 TSS-5C shelf is grounded to the rack through the thread forming screws used to install the shelf in a rack and also by a separate ground cable. For both the AC and DC power options, a GND point is located on the rear side of the chassis.



WARNING

Optional Content

Alcatel-Lucent 1850 TSS-5C interfaces are considered to be intra-building ports of the equipment suitable for connection to intra-building or unexposed wiring or cabling only. The intra-building ports of the equipment MUST NOT be metallically connected to interfaces that connect to the OSP or its wiring. The interfaces are designed for use as intra-building interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed OSP cabling. The addition of Primary Protectors is not sufficient protection in order to connect these interfaces metallically to OSP wiring. The interface ports are only suitable for shielded intra-building cabling grounded at both ends. This warning applies to all metallic interfaces terminated on the Alcatel-Lucent 1850 TSS-5C.

Alcatel-Lucent provides expert Installation Services for installations that have different requirements from those outlined in this guide. Contact Alcatel-Lucent at 1-888-252-2832 for details.

Procedure

-
- 1 Refer to the job site documentation for the exact rack layout and cable specifications.
 - 2 Complete an identification tag for each power cable, then attach the tag to the cable.
 - 3 Install ground and power connections using the procedure below for the DC-powered or AC-powered equipment type.
-

END OF STEPS

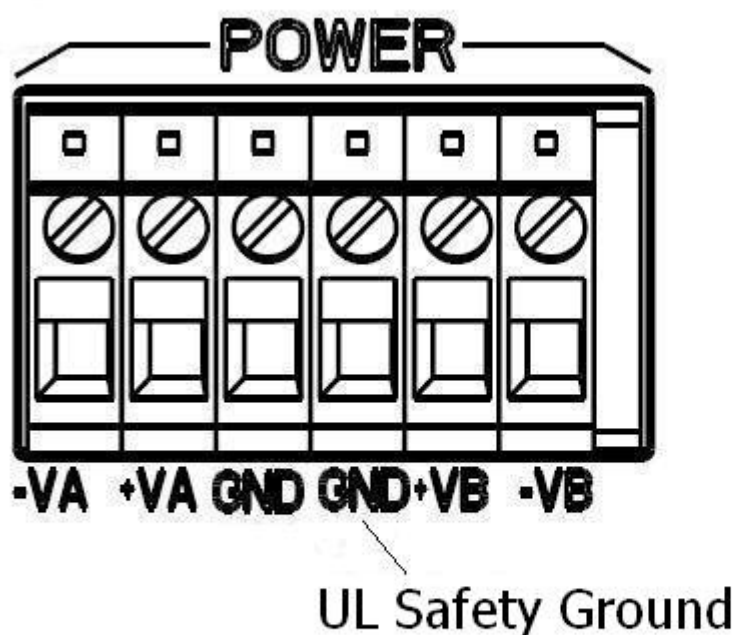
DC-power connections

- 1 Refer to the site engineering specification to determine if a common grounding (bonding) arrangement will be used. If common bonding network (CBN) is specified for -48V/-60V operation, attach a separate grounding wire between the UL safety ground terminals located in the middle of the power terminal block and the +VA and +VB terminals.

If isolated bonding network (IBN) is specified, make no connections to the center ground terminals.

Note: DC-powered operation at other than nominal -48V/-60V may be specified within the range of -40.5v to -72v. Grounding wire must be of the same gauge as the cables used to power the shelf, normally in the range of 16AWG to 12AWG (nominal 1.3mm to 2.0mm conductor cross-sectional diameter). Refer to the site engineering specification.

Figure 3-1 DC power terminal block



- 2 Verify with an ohmmeter that the Alcatel-Lucent 1850 TSS-5C shelf is grounded properly. Measure less than 1 ohm between the Alcatel-Lucent 1850 TSS-5C shelf safety ground screw and the appropriate frame ground.

- 3 Verify with an ohmmeter that the ESD jack on the front of the shelf is grounded properly. Measure less than 1 ohm between the ESD jack and the appropriate frame ground.

END OF STEPS

Power cable installation

- 1 This section provides instructions on installing DC power cabling for the Alcatel-Lucent 1850 TSS-5C shelf.

Each power feeder (A and B) requires a single power feed from the battery distribution fuse board (BDFB), or the battery distribution circuit breaker bay (BDCBB) to the Alcatel-Lucent 1850 TSS-5C shelf.

If the Alcatel-Lucent 1850 TSS-5C is powered through only one power feed, the system will report a minor alarm. To suppress the alarm, use two jumpers, one jumper between the -VA and -VB and the second jumper between +VA and +VB. The gauge of both jumpers should be the same as the gauge being brought in from the Battery Plant (#12AWG to #16AWG).

Refer to [Table 3-1, “Power cable assembly”](#) (p. 3-4) and [Table 3-2, “Power cable recommended color coding for -48V/-60V connection”](#) (p. 3-4) for power cable assembly and power connections.

Table 3-1 Power cable assembly

Description	Cable Assembly	Cable Length (feet)
DC Power cable 12 AWG 4 conductors (not part of installation kit) from power block to DC power source, both ends un-terminated.	per site engineering specification	as required

Table 3-2 Power cable recommended color coding for -48V/-60V connection

	Color Coding	Connection
BAT A	Red	-VA
	Red/Black	+VA
BAT B	Blue	-VB
	Blue/Black	+VB

END OF STEPS

DC Procedure

- 1 Verify that the power source is off.

- 2 Connect the A and B power cables to the A and B connector pins of the terminal block located on the top right. Use a torque screwdriver set to 0.5 nm (4.4 lb-in) to tighten.
Note: Power cables must be between 12 AWG and 16AWG and have a **9-mm** wire strip length for connection to the terminal block.

12AWG wire allows for the greatest distance between a power source (BDFB) and the Alcatel-Lucent 1850 TSS-5C shelf.

Note: For 48V grounding when using -48V/-60V, add a 16 AWG strap between +VA and GND and +VB and GND. The dc terminal block can accommodate wire sizes from 12 to 20 AWG, however, if jumpering between positions, for grounding, the maximum wire size that allows 2-wires into same hole is 16AWG.

- 3 Route the power cables toward the power source (e.g., BDCBB, BDFB etc.)
Important! If using BDCBB or BDFB, verify that the BDCBB breakers are off, or that the BDFB fuses are not installed.

- 4 Splice feeders from the BDCBB or BDFB to the Alcatel-Lucent 1850 TSS-5C power cables.
Note: Four wires are spliced to the power cables:
 - -VA
 - +VA
 - -VB
 - +VB

- 5 Label the feeders at the power source as follows:
 - -VA
 - +VA

-
- -VB
 - +VB

Note: Each -48V/-60V feed should be fused for 2 amperes.

- 6** Leave the power supply mechanism disconnected at the power source until you are ready to perform the procedures in [Part III: “System turn-up and testing”](#).

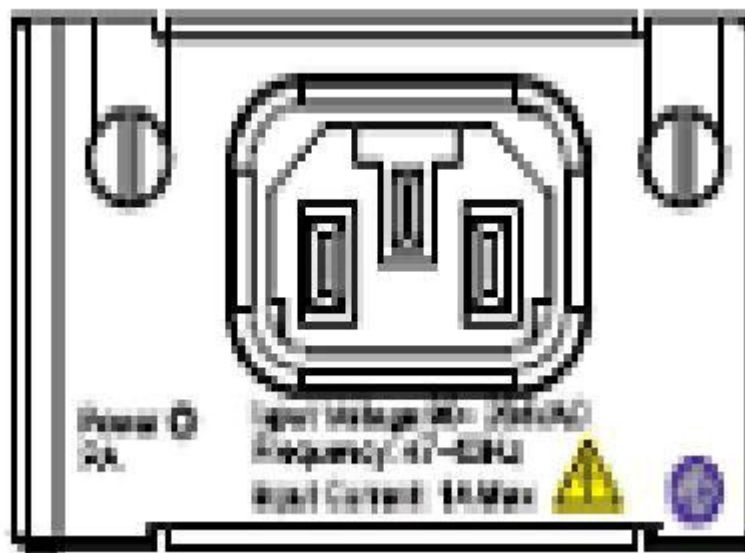
Note: The BDFB requires the removal of fuses to disconnect power.

END OF STEPS

AC-powered

-
- 1** Attach grounding wire between the chassis and appropriate safety ground. Two safety ground points are located on the rear side of the chassis. If the safety ground is located on a rack system, ensure that the rack itself is properly grounded.
- Note:** A separate ground connection to the chassis is required even if ground is present in the AC power cord. The external grounding cable kit is 3m 8DG24543AA.
-
- 2** Route and secure the AC power cord. Verify that the designated AC power source outlet is surge protected. Reference the site engineering specification for any additional site-specific AC requirements

Figure 3-2 AC power connector PIM faceplate



- 3 Connect the AC power cord to the Alcatel-Lucent 1850 TSS-5C and leave the other end disconnected. For rack-mounted units, the AC cord will be connected to an AC power breakout panel in the rack. Leave the AC power disconnected until you are ready to perform the procedures in [Part III: “System turn-up and testing”](#). The AC power cable is based on local AC power source type:

AC Power supply cable for	Part of Installation Kit
China/Australia	8DG24511AAXX
Continental Europe	8DG24511ABXX
North America	8DG24511AEXX
UK/Ireland	8DG24511ADXX

- 4 STOP. This procedure is complete.

END OF STEPS

Connect management cables

Description

This section contains procedures to connect management cables.

RS232 local management

The Alcatel-Lucent 1850 TSS-5C provides RS232 connectivity for a PC or laptop to be used for local management.

- 1 For rack mounted applications, route the RS232 cable along the right side of the equipment rack.
- 2 Secure the cable to the rack. Alternately, for wall or table applications, secure the RS232 cable per job site specifications.
- 3 Connect the RS232 cable to the front panel *CON (Console Port)* connector (USB type).

END OF STEPS

Ethernet LAN local or remote management

Local or remote management is provided through a LAN connection. This connection requires IP configuration after the system is turned up.

- 1 For rack mount applications, route and secure the CAT5 Ethernet cable along the right side of the equipment rack. Alternately, for wall or table applications, route and secure the CAT5 Ethernet cable per job site specifications.
- 2 Connect the CAT5 Ethernet cable to the front panel *MGMT* connector.

END OF STEPS

MDIO

The *MDIO* interface provides for "housekeeping" maintenance functions for up to 3 monitoring inputs and 1 control outputs.

-
- 1 For rack-mounted applications, route and secure the *MDIO* cable along the right side of the equipment rack. Alternately, for wall or table applications, route and secure the *MDIO* cable per the site engineering specification.
-

- 2 Connect the *MDIO* cable to the front panel *MDIO* connector.

END OF STEPS

Signal transmission cables

Equipment options

Review the ordering information and site engineering specifications to determine quantities and types of the following signal transmission cables to be installed. Note that each equipment option has a different front panel connector layout according to the interfaces required. Specific quantities and types of cables will correspond to the equipment type being installed.

For each cable interface type, select the appropriate cable installation procedure from the following sections. For all cable types, ensure that strain relief and bending radius is maintained for the type of cable being installed. Refer to the site engineering specification for any site-specific or customer-specific cabling instructions.

10/100/1000Base-T Ethernet cables

-
- 1 Identify and label all Ethernet cables per the site engineering specification.
 - 2 Route and secure cables on the left side for rack-mount applications or per site engineering specification for wall-mount or table applications.
 - 3 Insert the 10/100/1000Base-T RJ45 connectors into the designated jacks on the Alcatel-Lucent 1850 TSS-5C faceplate panel. Ensure that the retention slide locks operate and that there is adequate strain relief.
-

END OF STEPS

Install SFPs

-
- 1 Verify the correct type and quantities of SFPs per the site engineering specification. SFP types and part numbers are listed in [Appendix C, “Cables, connectors, and assemblies”](#).
 - 2 Remove the dust cover from the SFP cage on the faceplate.
 - 3 Remove the pluggable module from its packaging.
-

-
- 4 If the SFP module contains a latching mechanism, make sure the bail latch is closed (folded back in the SFP module). Some SFP types do not have a latch.
 - 5 While holding the SFP module with the side where the electrical connections are exposed to the bottom, slide the SFP module into one of the receptacles in the faceplate.
 - 6 The SFP module must slide easily into its receptacle until it locks into place. If it does not slide easily, verify the orientation of the module.
-

Note: To remove an SFP, first disconnect the fiber optic cable from the pluggable module.

If the SFP module is equipped with a bail latch, open the latch outward to disengage the module from the receptacle. Open the latch until it is perpendicular to the face of the module. Use the bail latch to carefully pull the SFP module out of its cage on the faceplate. Make sure to apply the extraction force in a direction parallel to the long dimension of the SFP module. If the SFP receptacle will remain empty, insert a dust cover to prevent contamination of the electrical connector. Place the pluggable module back into its ESD-protective packaging.

If the SFP is not equipped with a bail latch, an extraction tool must be used. Using the tool carefully unlatch the retaining tabs and gently pull the SFP in a direction parallel to the long dimension of the module.

Figure 3-3 SFP extraction tool



-
- 7 Repeat the above steps for each SFP to be installed.

END OF STEPS

Gigabit Ethernet / Fast Ethernet (GE/FE) fiber

- 1 Identify and label all GE/FE fiber per the job specification.

Note: GE/FE fibers are terminated with LC type connectors which will connect to the Alcatel-Lucent 1850 TSS-5C through SFPs installed in the Alcatel-Lucent 1850 TSS-5C faceplate. It is essential that the SFP type, multimode or single mode, matches the laser and fiber being installed.

- 2 Route and secure the fiber along the right side of the equipment rack for rack-mount applications or per job specification for wall or table applications.
-

- 3 Connect the LC connector securely to the designated SFP (previously installed).
-

- 4 Connect all fibers required by the site engineering specification.

END OF STEPS

E1 cables

The Alcatel-Lucent 1850 TSS-5C transmits and receives E1 traffic through a 64-pin (4x16) connector on an OTRI option card. E1 traffic may also terminate on O16E1/O16P1K (provisioned as O16P1KE1) option card with RJ-45 connectors providing two terminations per connector. The pin assignments for those options are provided in [Appendix C, “Cables, connectors, and assemblies”](#).

- 1 Route and secure the E1 connectorized cable along the right side of the equipment rack for rack-mount applications or per site engineering specification for wall or table applications.
-

- 2 On the OTRI option card, connect the E1 64-pin connectorized cable to the Alcatel-Lucent 1850 TSS-5C faceplate connector labelled E1.
-

- 3 On the O16E1/O16P1K option card, connect each terminating RJ-45 connector to the E1 port assigned in the site engineering specification.

END OF STEPS

DS1 cables

DS1 traffic terminates on O16P1K (provisioned as O16P1KT1) option card with RJ-45 connectors providing two terminations per connector. The pin assignments are provided in [Appendix C, “Cables, connectors, and assemblies”](#).

- 1 Route and secure the DS1 connectorized cable along the right side of the equipment rack for rack-mount applications or per site engineering specification for wall or table applications.
 - 2 On the O16P1K option card, connect each terminating RJ-45 connector to the DS1 port assigned in the site engineering specification.
-

END OF STEPS

.....

Part III: System turn-up and testing



Overview

Purpose

These chapters describe the system turn-up and testing of the Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

Requirements

Required equipment and test gear list for this part of the document.

1. Test set capable of measuring E1
2. Test set capable of measuring DS1
3. Test set capable of measuring optical GigE
4. Test set capable of measuring electrical GigE
5. Test set capable of measuring optical FE interfaces
6. Optical power meter capable of measuring +5 to –30 dBm at wavelengths of 850 nm, 1310 nm, and 1550 nm
7. Optical power meter adapter, AMP 492328-2
8. Inspection microscope, 200X to 400X—Aerotech World Trade Ltd. AWT200 or AWT300
9. CLETOP® fiber optic cleaner—Aerotech World Trade Ltd. PN 14100500
10. Optical fiber light source
11. Laser safety glasses
12. Plug-in style ESD wrist strap
13. Straight-through RJ-45 LAN cable
14. Two (2) 5-foot LC-to-SC Single Mode (SM) optic cable
15. Two (2) SC-SC Single Mode (SM) optic cable
16. One (1) SC-SC dual optic coupler
17. Single Mode and LC-to-LC looping plugs

-
18. Single Mode SC-to-SC jumper cables
 19. SC-to-LC adapter cables
 20. Two (2) Attenuators, as appropriate for test set and power level of GE(o) output
 21. Two (2) 10 dB attenuators
 22. Two (2) 15 dB attenuators
 23. Two (2) DS3 jumper cables per shelf tested
 24. Two (2) Test BNC cables
 25. Two (2) 75-ohm BNC-to-MiniWeco Adapters
 26. One E1 loopback cable per OTRI PIM to be tested

Contents

Chapter 4, Stand-alone set-up	4-1
Chapter 5, Stand-alone installation testing	5-1

4 Stand-alone set-up



Overview

Purpose

This chapter contains a set of instructions to prepare hardware software components to test a newly installed Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

Contents

Description	4-1
Readiness check	4-3
SFP insertion and removal	4-4
Load software generic	4-6

Description

Purpose

The following procedures must be performed for all Alcatel-Lucent 1850 TSS-5C shelves installed. The procedures will visually check the equipment installation, install SFPs, and download software.

Tools, test equipment, and accessories

The following tools, test equipment, and accessories are required:

- 1 - Box cutter
- 1 - ESD wrist strap
- 1 - CD-ROM with appropriate software
- 1 - PC with appropriate software and hardware (defined below)

-
- 1 - Ethernet cable (straight through)
 - 1 - Phillips screwdriver, #2 × 8-inch

PC minimum requirements

PC requirements	Minimum requirements
Processor	Pentium III — 733 MHz
RAM	512 Mbytes
Free disk space	200 Mbytes (100 Mbytes for installation and 100 Mbytes for log files)
Graphics	Resolution supporting 64K colors with 16-Mbyte RAM on video card
LAN card	IEEE 802.3 LAN card (TCP/IP through 10base T Ethernet)
Serial Port	USB cable for local management port
CD-ROM drive	Required
Operating System	Microsoft Windows 2000 or XP

General

File Transfer Protocol (FTP) services must be installed and administered by the local customer organization responsible for workstation operations.

Readiness check

Purpose

Follow this procedure to verify the Alcatel-Lucent 1850 TSS-5C shelf is properly installed and ready for testing.

Procedure

-
- 1 Verify that the Alcatel-Lucent 1850 TSS-5C shelf is properly grounded.

 - 2 Verify that the shelf is free from damage.
 1. Check the enclosure and previously installed cables and brackets for visible damage.
 2. Check that installed cables will not interfere with SFP installation.
 3. Check that all front panel connectors are easily accessible for temporary connections.

 - 3 Verify all SFPs (and spares) are available based on the equipment order, and inserted in appropriate slots.

 - 4 Verify the CD-ROM with the appropriate software is available.

 - 5 Verify that product documentation is available.

END OF STEPS

SFP insertion and removal

Description

This section provides instructions for replacing SFPs in the Alcatel-Lucent 1850 TSS-5C front panel. SFPs are installed as part of the equipment and cabling steps in Chapter 3. SFPs may, in some cases, be later replaced as a result of, for example, changes in optical power levels or replacement of external fiber connections.



SFPs can be installed and removed with rack power on; however, hazardous electrical potential is present. Use extreme care when installing or removing modules.



Shelf equipment contains electrostatic-sensitive devices. These devices can be damaged by electrostatic discharge. Refer to [Chapter 1, “Safety”](#), the [“Electrostatic-sensitive devices” \(p. 1-6\)](#) section for special handling instructions.

Procedure

Proceed as follows:

- 1 Refer to the order document to verify the SFP type required for each port.
- 2 When inserting a new SFP, use care to orient the locking tab notches to the bottom side of the faceplate receptacle.
- 3 Carefully push in the SFP until it is fully seated.
- 4 Repeat the above steps for each required insertion.
- 5 The procedure for removing SFPs is determined by the type of SFP to be removed, with or without a bail latch.

-
- 6 If the SFP module is equipped with a bail latch, open the latch outward to disengage the module from the receptacle. Open the latch until it is perpendicular to the face of the module. Use the bail latch to carefully pull the SFP module out of its cage on the faceplate. Make sure to apply the extraction force in a direction parallel to the long dimension of the SFP module. If the SFP receptacle will remain empty, insert a dust cover to prevent contamination of the electrical connector. Place the pluggable module back into its ESD-protective packaging.
 - 7 If the SFP is not equipped with a bail latch, an extraction tool must be used. Using the tool carefully unlatch the retaining tabs and gently pull the SFP in a direction parallel to the long dimension of the module.
-

Figure 4-1 SFP extraction tool



-
- 8 STOP. This procedure is complete.
-

END OF STEPS

Load software generic

Purpose

This procedure provides instructions to download generic software from an FTP server to Alcatel-Lucent 1850 TSS-5C.

General information

The preferred method of software installation, maintenance and backup of the Alcatel-Lucent 1850 TSS-5C is to/from an FTP server. Software and maintenance back-up information resides on the FTP server freeing additional space on disks and allowing standard practice off-line storage of software, file systems, and databases.

In this document, the term "FTP server" is used as a general descriptor for a server with file transfer capability. The term is used interchangeably with File Transfer Protocol (FTP) or Trivial File Transfer Protocol (TFTP) according to the step being performed. For example, generic software transfer utilizes an FTP server, but the transfer protocol is TFTP.

It is recommended that field service engineers use their laptop as the FTP server location and use generic or customer provided IP addresses during the software installation process while being locally connected to the new Alcatel-Lucent 1850 TSS-5C. Refer to [Appendix D, "Install an FTP server"](#) for the procedure to setup the PC as an FTP server.

Prerequisites

All specified equipment must be installed, powered on, and have the appropriate cables installed.

A standard LAN cable is supplied with the system.

The customer may provide a previously-defined IP address for the system and the gateway as well as an FTP server IP address. An image of the software is copied to the FTP server and downloaded to the Alcatel-Lucent 1850 TSS-5C for installation testing.

Software is supplied on CD-ROM. A CD-ROM device is required to copy the software image from the CD-ROM to the FTP server application. The software image must be copied to an accessible directory on the FTP server before beginning this procedure.

Note: The Alcatel-Lucent 1850 TSS-5C ships to customer sites pre-loaded with the software release available at the time of manufacture. If the pre-loaded software release matches the release specified in the site engineering specification for the system being installed, **do not** reload software from CD-ROM. Instead, go to [Chapter 5, "Stand-alone installation testing"](#) to continue turn-up and testing.

The pre-loaded software version may be verified by connecting to the Console Management Port with a CAT-5 cable. Open a web browser and enter *http://ipaddress/* in the browser address bar, where *ipaddress* is the specified console address of the Alcatel-Lucent 1850 TSS-5C. Login with the default ALUTSS user ID and password. For pre-loaded software, the default password is Alu_1234. After logging in, select **System Management > DB Management > Network Element**. Verify that the current active Release ID displayed is R99.99.99.

If the site engineering specification requires a software release other than the pre-loaded release, the procedures in this chapter may be followed to install the desired release.

Once software is installed, the release cannot be downgraded to an earlier release while the system is in-service. Downgrading to an earlier release requires that the memory contents be erased so that the older release can be downloaded. The procedure can only be performed on an out-of-service system.

Procedure

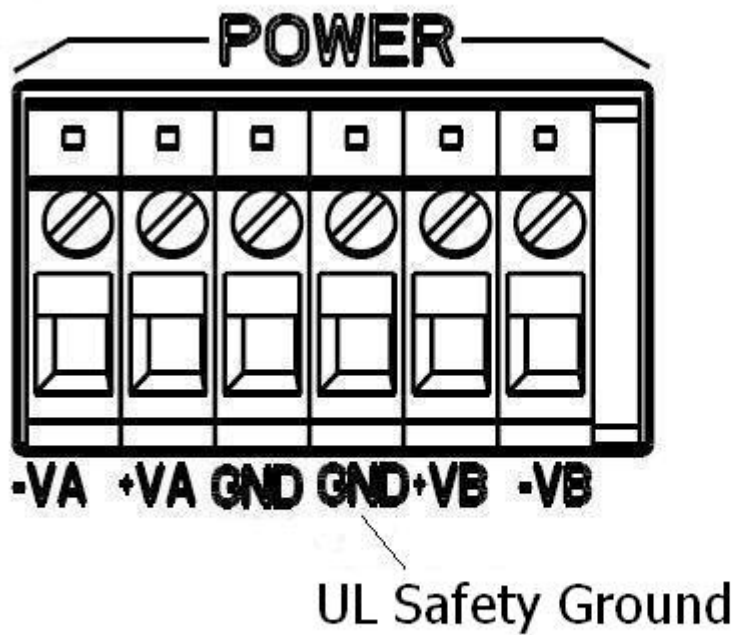
Attention: Use this procedure only for initial turn-up of system. Use this procedure only on a non-traffic-carrying system. Never use this procedure on a traffic-carrying system.

Load software generic

-
- 1 Record the predetermined FTP server IP Address _____.
It is recommended that, for new installations, the field technician's laptop be designated as the FTP server.
 - 2 Record the designated IP address for the TSS-5C system being installed. The address must be obtained from the site engineering specification. Confirm the planned IP address with the customer and record for reference. _____.
 - 3 Connect the laptop serial port to the TSS-5C *CON* port with a standard USB cable and open a hyperterminal session on the laptop. Configure the session for:
 - bits per second: **9600**
 - data bits: **8**
 - parity: **none**
 - stop bits: **1**
 - flow control: **none**
-

-
- 4 Verify the CD-ROM supplied with the TSS-5C contains the appropriate generic software. Two files are required: "TSS5CAPP.bin" and "1850TSS5CD.DSC". Transfer both files to the laptop FTP server home directory.
-
- 5 Begin power-up initialization by inserting the assigned fuses, operating the assigned circuit breaker switches for DC-powered systems, or connecting the AC power cord.

Attention: When taking power measurements at a DC power block, use thin and isolated probes to avoid shorting. Take measurements at the screw slots above the wire terminations.



-
- 6 Autoboot will be indicated by the green *Active* indicator flashing. During the flashing, stop the autoboot when the "Hit any key to stop autoboot....." message prompt appears on the hyperterminal display.
-
- 7 The following steps will download software from the laptop (FTP server) to the TSS-5C.

Note: Before accessing the management port, it may be necessary to turn off proxy server and auto-script options that are active on the PC. Deselect them in the Tools > Internet Options > Connections (tab) > Lan Settings selection screen. Make note of the LAN settings for a later restoral.

To establish an Ethernet connection the PC must reside on the same network and subnet as the Alcatel-Lucent 1850 TSS-5C. Typically, a static route must be added and proxy servers and DHCP must be disabled.

To add a static route:

- Start > Run and type in “cmd” to open a command window
- Following the “Cmd>” prompt, type in and Enter “route ADD -p (*dest*) MASK (*subnetmask*) (*gateway*) where *dest*, *subnetmask*, and *gateway* are determined by the console management port values entered in steps 2 and 3.
- At the next prompt, enter “route print” to display the current routing table on the PC.

The “-p” (persist) option instructs the PC to maintain the static root across the next reboot of the PC. The command “route DELETE (*dest*)”, where *dest* is the static route ip address, may be used to delete the route. The command “route?” will display the command syntax.

If the PC and Alcatel-Lucent 1850 TSS-5C are already in the same sub-network, there is no need to provision a static route on the PC.

8 With autobooting stopped, enter the following commands:

1. **setenv ipaddr 192.168.0.10** (to set the local IP address of the TSS-5C)
 2. **printenv** (to display the TSS-5C and server addresses) Check that the server ip address is 192.168.0.1. If yes, go to step 5.
 3. If no, **setenv serverip 192.168.0.1** (to designate the IP address of the TFTP server)
 4. **printenv** (to recheck the TSS-5C and server addresses)
 5. **saveenv**
 6. **nand erase** (to erase the file system block on flash; the */opt/config* directory is not impacted)
 7. **tftp 0x350000 TSS5CAPP.bin** (to download image from tftp server root directory)
 8. **nand write.jffs2 0x350000 0 0x22b0000** (must be larger than tftp download finish value; to write downloaded image to flash)
- Note:** If this NE was upgraded before, execute the **isd set active error** command before boot.
9. boot

-
10. telnet 127.0.0.1 3083;
 11. act-user::ALUTSS::Alu_1234;
 12. ed-lan:::C000:::LANIP=*ipAddr*, LANMASK=*ipaddrBitMask*;
where *ipAddr* and *ipaddrBitMask* are the **site specified** IP address and mask.
A command example to show the format is:
ed-lan:::C000:::LANIP=192-168-0-10, LANMASK=255-255-0-0;
 13. rtrv-lan:::c0001;
-

9 STOP. This procedure is complete

END OF STEPS

5 Stand-alone installation testing



Overview

Purpose

This chapter contains procedures to provision and test a newly installed Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

Contents

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Set up management interfaces	5-6
Verify installed software release	5-11
Verify installed Plug-In Modules (PIM)	5-12
Verify SFP insertion	5-13
Configure NTP server	5-14
Create a database backup	5-17
Ethernet link verification	5-21
Restore system database	5-25

Description

Purpose

The following procedures must be performed for each Alcatel-Lucent 1850 TSS-5C shelf following installation. The procedures will visually check the installation, software release version, hardware interfaces, and readiness for user provisioning.

Note: The installed software release cannot be downgraded to an earlier release on an in-service system. If a release other than the pre-installed release is required, refer to Chapter 5 for the older release download procedure and only perform the procedure on an out-of-service system.

Tools, test equipment, and accessories

The following tools, test equipment, and accessories are required:

- Ethernet test equipment capable of measuring:
 - GigE optical interfaces
 - FE optical interfaces
 - 10/100/1000 Base-T interfaces
- Optical power meter capable of measuring +5 to –30 dBm at wavelengths of 850 nm, 1310 nm, and 1550 nm
- Optical power meter adapter, AMP 492328-2
- Fiber-Optic cleaner
- SFPs per the ordering specification
- Plug-in style ESD wrist strap
- Local Management Port cable (USB-type)
- Straight-through RJ-45 LAN cable for console port
- (2) 5-foot LC-to-SC single mode (SM) optic cable
- (2) 5-foot LC-to-SC multi-mode (MM) optic cable
- (2) LC-LC single mode (SM) optic cable
- (2) LC-LC multi mode (SM) optic cable
- Single mode and LC-to-LC looping plugs
- Single mode SC-to-SC jumper cables
- SC-to-LC adapter cables
- (2) Attenuators, as appropriate for test set and power level of GIGE or OC-n module output
- (2) 6-dB attenuators
- (2) 12-dB attenuators
- E1 transmission test equipment

-
- DS1 transmission test equipment
 - (2) E1 proprietary 64-pin (4x16) test cable
 - (2) DS1 proprietary 64-pin (4x16) test cable
 - (2) Test E1 traffic cables
 - (2) Test DS1 traffic cable
 - (4) RJ-45 - RJ45 Ethernet cables
 - Laser safety glasses

Hardware port interfaces

The following table provides a provisioning references for Port Types and Port Interface Numbers for each hardware variant.

Table 5-1 Port interfaces numbers*

Hardware Component	Port Types	Port Interface Identifier
Main Unit (fixed) M4O12FEK or M4O12FEB	Up to 12xFE and 4xGE (SFP) MDIO MGMT LAN 2MHz Tx, 1PPS+ToD (Clk1) 2MHz Rx, 1PPS+ToD (Clk2)	FE: 1/11, 2/12, 3/13, 4/14, 5/15, 6/16 (2 channels per RJ-45 connector) GE: 7, 8, 9, 10
Multi-service PIM OTRI	1xSTM-1, 16xE1 (CES 75ohm), 1xGE (SFP)	as labeled
16xE1 PIM O16E1	16xE1 (up to 2 per RJ-45 connector)	1/2, 3/4, 5/6, 7/8, 9/10, 11/12, 13/14, 15/16
16xE1/DS1 PIM O16P1K	16xE1/DS1 (up to 2 per RJ-45 connector)	1/2, 3/4, 5/6, 7/8, 9/10, 11/12, 13/14, 15/16
R2O2E	2xGE (SFP), 2xRJ-45 (1000M)	1,2,3,4,DC1,DC2
8xFE PIM O8FEK	10/100Base-T electrical	1 through 8
8xFX PIM O8FXK	100Base-FX (SFP) optical	1 through 8

* Usable ports are determined by PIM type and placement as well as number and types of ports to be provisioned in each module. Guidelines and rules for port utilization are as follows:

Main Board:

- Each RJ-45 port supports up to 2 FE channels for a total of up to 12 FE channels (channels 1 to 6, and 11 to 16).
- Configuration of FE channels is determined by equipage of the two Option slots. Not all physical ports can be utilized for some configurations. [Table 5-2, “FE port assignment options” \(p. 5-4\)](#) indicates supported configurations.

Table 5-2 FE port assignment options

Configuration	Main Board usage	Option Slot 1	Allowed Usage	Option Slot 2	Allowed Usage
1	1~6 used, 11~16 not used	O8FEK or O8FXX	yes	O8FEK or O8FXX	yes
2	1~6 used, 11~16 not used	OTRI	yes	O8FEK or O8FXX	yes
3	1~6 used and 11~16 not used	O16E1 or O16P1K or R2O2E	yes	O8FEK or O8FXX	yes
4	1~6 and 11~14 used, 15/16 not used	O8FEK or O8FXX	yes	OTRI	yes
5	1~6 and 11~14 used, 15/16 not used	OTRI	yes	OTRI	yes
6	1~6 and 11~14 used, 15/16 not used	O16E1 or O16P1K or R2O2E	yes	OTRI	yes
7	1~6 and 11~16 used	O8FEK or O8FXX	yes	O16E1 or O16P1K or R2O2E	yes
8	1~6 and 11~16 used	OTRI	yes	O16E1 or O16P1K or R2O2E	yes
9	1~6 and 11~16 used	O16E1 or O16P1K or R2O2E	yes	O16E1 or O16P1K or R2O2E	yes

Option Slot 1:

- Any option PIM (O8FEK, O8FXK, OTRI, O16E1 or O16P1K, R2O2E) may be used with full capacity available.

Option Slot 2:

- An O16E1 or O16P1K or R2O2E PIM may be used with full capacity
- An OTRI PIM may be used at full capacity however Main Board FE ports 15 and 16 will not be available
- An O8FEK or O8FXK can be assigned with full capacity only if Main FE ports 11~16 are not used

FE port assignments

For efficient use of FE capacity, Option Slot 1 should be first equipped with O8FEK or O8FXK. The recommended sequence for channel assignment is O8FEK or O8FXK first, followed by OTRI, O16E1 or O16P1K and R2O2E.

GE port assignments

On the Main Board, up to four GE channels are supported by equipping SFP's in ports 7, 8, 9, and 10.

The OTRI can support a single GE channel and R2O2E occupies one GE capacity, however, the maximum number GE channels for the NE is 4. Allowable configurations for the Option Slots are as follows:

Table 5-3 GE port assignment options

Option	Main Board GE Ports	Option Slot 1	Option Slot 2
1	7, 8, 9, 10	Not OTRI/R2O2E	Not OTRI/R2O2E
2	7, 8, 10	OTRI/R2O2E	Not OTRI/R2O2E
3	7, 8, 9	Not OTRI/R2O2E	OTRI/R2O2E
4	7, 8	OTRI/R2O2E	OTRI/R2O2E

Set up management interfaces

Purpose

The following procedure sets up the Alcatel-Lucent 1850 TSS-5C for local PC access for testing purposes and also establishes both remote and local management ports.

General

The system can be accessed through the following management interfaces:

- RJ45 dedicated Ethernet management port
- Dedicated in-band management VLAN

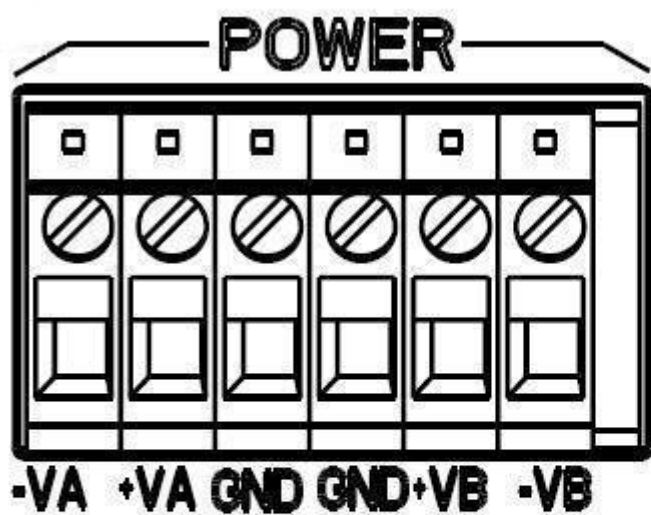
To properly configure the system Ethernet port and the Network Time Protocol (NTP) server for telnet, a set of IP addresses must be obtained from the customer.

On initial power-up, the recommended method of access to the NE is through the serial CON port. Other ports can then be configured for other supported management interfaces. Details of how the management interface must be configured for user access are included within this procedure.

Initial power-up

-
- 1 Begin power-up initialization by inserting the assigned fuses, operating the assigned circuit breaker switches, or connecting the AC power cord.

Important! For power measurements at the DC power block, use thin and isolated probes to avoid shorting. Take measurements at the screw slots above the wire terminations.



END OF STEPS

RS-232 setup procedure

- 1 Connect the PC to be used for testing to the CON (USB) local management port of the Alcatel-Lucent 1850 TSS-5C.
- 2 Launch a hyperterminal session on the PC and set parameters as follows:
 - bits per second: **9600**
 - data bits: **8**
 - parity: **none**
 - stop bits: **1**
 - flow control: **none**
- 3 Login to the system using the username **alu** and password **alu123\$**.

END OF STEPS

Ethernet management port set-up procedure

The following procedure will configure the IP address of the CON local management port.

- 1 Enter the following commands:


```
telnet 127.0.0.1 3083
act-user::ALUTSS::Alu_1234;
```
- 2 Enter the following three commands to configure the management port ip address:


```
ed-lan:::C000:::LANIP=ipAddr, LANMASK=ipAddrBitMask;
```

An example format for *ipAddr* is: 135-252-218-201

An example format for *ipAddrBitMask* is: 255-255-0-0

```
rtrv-lan:::c0001;
canc-user;
```
- 3 Enter the following command to configure a Gateway IP address if needed:


```
ed-lan:::C000:::LANIP=ipAddr, LANMASK=ipAddrBitMask, LANGW=GatewayipAddr;
```

An example format for *ipAddr* is: 135-252-218-201

An example format for *ipAddrBitMask* is: 255-255-0-0

An example format for *GatewayipAddr* is: 135-252-0-1

rtrv-lan:::c0001;

canc-user;

- 4 Connect a CAT-5 cable from the PC's Ethernet port to the Alcatel-Lucent 1850 TSS-5C management port.

Note: Before accessing the management port, it may be necessary to turn off proxy server and auto-script options that are active on the PC. Deselect them in the Tools > Internet Options > Connections (tab) > Lan Settings selection screen. Make note of the LAN settings for a later restoral.

- 5 Ping the management port address. A successful ping indicates the PC and the Alcatel-Lucent 1850 TSS-5C Management Port are properly configured.
-

- 6 The following steps establish an Ethernet connection between a local PC (used for system turn-up) and the MGT port also referred to as the out-of-band management port.

Note: To establish an Ethernet connection the PC must reside on the same network and subnet as the Alcatel-Lucent 1850 TSS-5C. Typically, a static route must be added and proxy servers and DHCP must be disabled.

To add a static route:

- Start > Run and type in "cmd" to open a command window
- Following the "Cmd>" prompt, type in and Enter "route ADD -p (*dest*) MASK (*subnetmask*) (*gateway*) where *dest*, *subnetmask*, and *gateway* are determined by the console management port values entered in steps 2 and 3.
- At the next prompt, enter "route print" to display the current routing table on the PC.

The "-p" (persist) option instructs the PC to maintain the static root across the next reboot of the PC. The command "route DELETE (*dest*)", where *dest* is the static route ip address, may be used to delete the route. The command "route?" will display the command syntax.

Note: If the PC and Alcatel-Lucent 1850 TSS-5C are already in the same subnetwork, there is no need to provision a static route on the PC.

END OF STEPS

In-band management port setup

The following procedure will set-up and configure in-band web browser access to the Alcatel-Lucent 1850 TSS-5C.

- 1 Open a web browser and enter *http://ipaddress/* in the browser address bar, where *ipaddress* is the previously provisioned IP address of the Alcatel-Lucent 1850 TSS-5C.
- 2 Once connected, a login screen will appear in the browser window.
- 3 Login with the default user ID **ALUTSS** and password **Alu_1234**.
- 4 After logging in, select **Communication > DCN Phys. If > IP Address** as indicated in [Figure 5-1, "LAN management screen"](#) (p. 5-10).

Figure 5-1 LAN management screen

The screenshot shows the 'IP address of Network Element' configuration page. The top navigation bar includes 'alarms', 'equipment', and 'NE Generic Cfg'. The main content area has a title 'IP address of Network Element' and the following fields:

MAC address:	00:10:ec:00:52:05
IP address:	10 - 10 - 10 - 10
Subnet mask:	255 - 255 - 255 - 255

A 'Save' button is located at the bottom of the form.

- 5 Enter the "IP Address" and "Subnet Mask" according to the local site information provided.
- 6 Click **Save** to save the configuration.

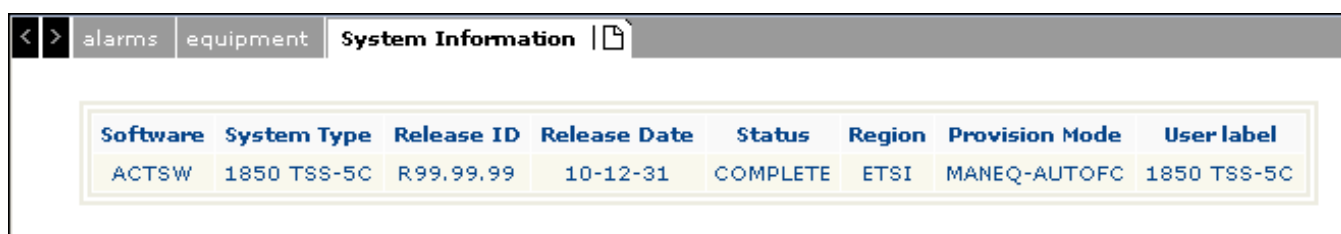
END OF STEPS

Verify installed software release

Procedure

- 1 Select **Equipment** > **System Information** as shown in [Figure 5-2, “System information screen”](#) (p. 5-11).
- 2 Verify that the active software **Release ID** and **Release Date** agree with the release version called for in the site engineering specification.

Figure 5-2 System information screen



The screenshot shows a web interface with a navigation bar at the top containing 'alarms', 'equipment', and 'System Information' (which is highlighted). Below the navigation bar is a table with the following data:

Software	System Type	Release ID	Release Date	Status	Region	Provision Mode	User label
ACTSW	1850 TSS-5C	R99.99.99	10-12-31	COMPLETE	ETSI	MANEQ-AUTOFC	1850 TSS-5C

END OF STEPS

Verify installed Plug-In Modules (PIM)

Procedure

- 1

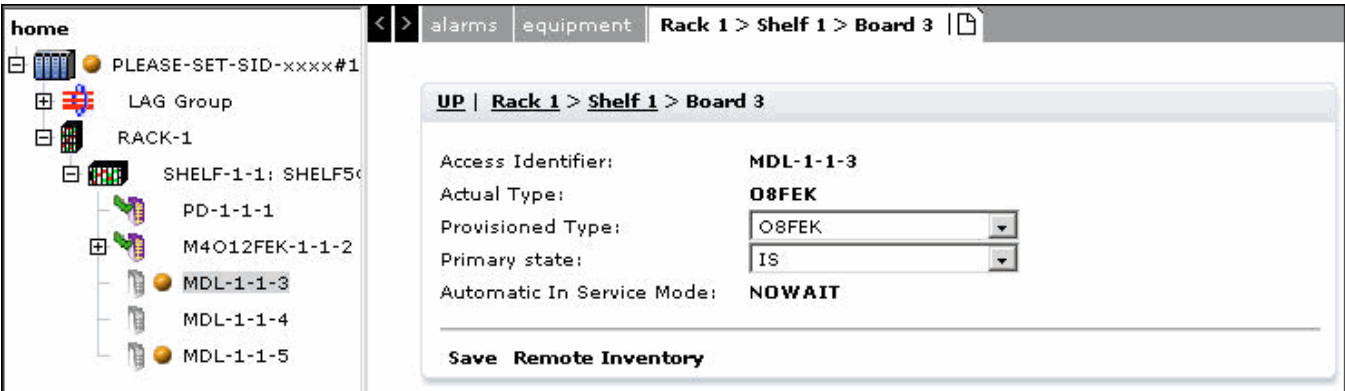
Expand the equipment tree directory on the left side of the screen. The fixed and pluggable rack, shelf, and board locations will be displayed.
- 2

Select each equipped PIM board location as in the [Figure 5-3, “Equipment tree expansion”](#) (p. 5-12) example.
- 3

For each PIM location (1-1-3 for example), verify that the installed module **Provisioned Type** agrees with the information in the site engineering specification.
- 4

For each PIM location, also verify that the **Actual Type** field is populated with the same information as the **Provisioned Type** field.

Figure 5-3 Equipment tree expansion



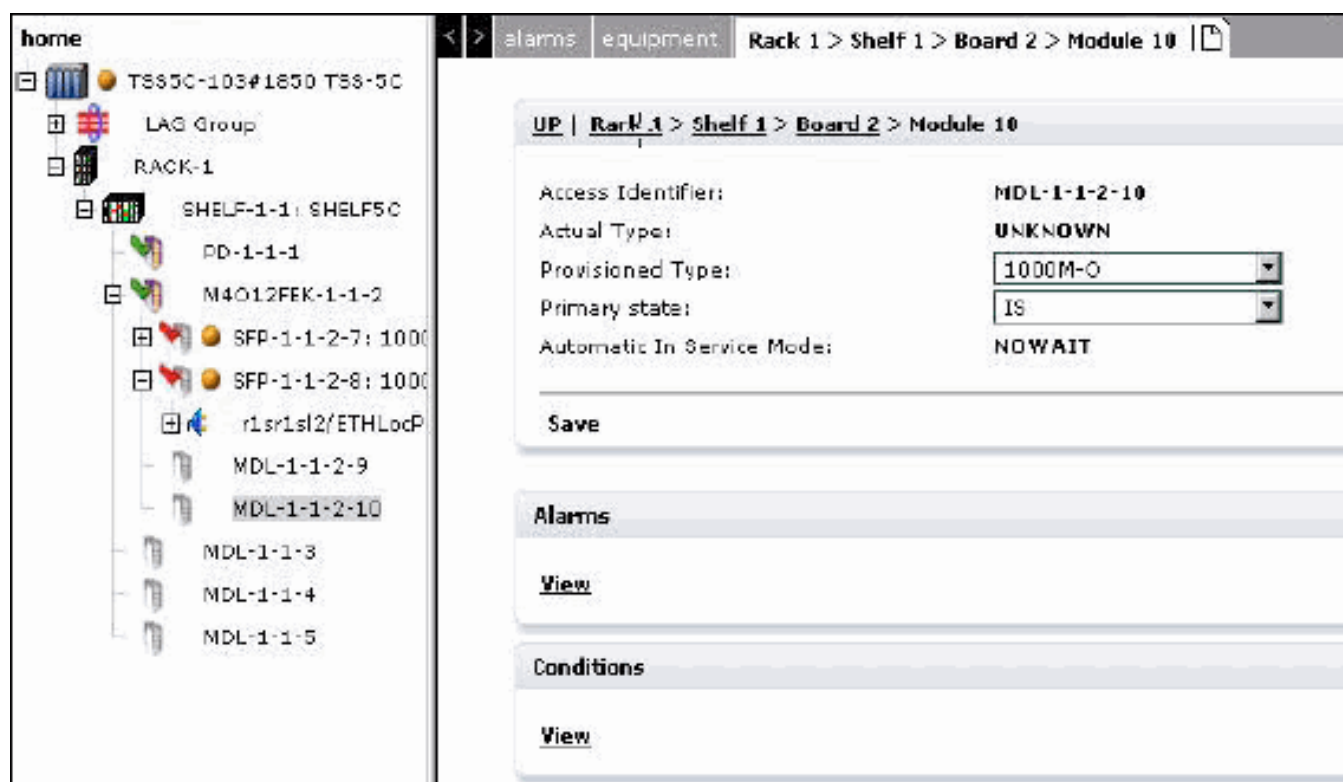
END OF STEPS

Verify SFP insertion

Procedure

- 1 In the left side equipment tree display, select a GE optical port module as shown in [Figure 5-4, “SFP verification example”](#) (p. 5-13).
- 2 For the selected module, verify that the **Actual Type** field is populated for the installed SFP type and that the information in the **Provisioned Type** field is the same as in the **Actual Type** field. Verify that the rate and operational state (enabled) are displayed and agree with the information in the site engineering specification
- 3 Repeat the previous two steps for each installed SFP module.

Figure 5-4 SFP verification example



END OF STEPS

Configure NTP server

Purpose

NTP servers, when enabled, are used for time of day synchronization. The NTP server provides a network time reference for all system messages, alarm reports, logs, and events that carry timestamps. An offset from the network time can be provisioned if required.

General

NTP server address information is supplied by the customer. The following procedure configures and enables the NTP server.

Procedure

-
- 1 Connect the PC to the Alcatel-Lucent 1850 TSS-5C through the local management Ethernet port.
 - 2 Open a web browser and enter `http://ipaddress/` in the browser address bar, where *ipaddress* is the previously provisioned IP address of the Alcatel-Lucent 1850 TSS-5C.
 - 3 Select **System Management > Network Time Protocol** from the menu bar as shown in [Figure 5-5, “NTP configuration screen” \(p. 5-15\)](#) to display the **NTP Config** screen.
-

Figure 5-5 NTP configuration screen

The screenshot shows a web-based configuration interface for NTP. At the top, there are navigation tabs: '< >', 'alarms', 'equipment', and 'NTP config' (which is selected). Below the tabs, the 'Time and Date' section is visible. It displays 'Current Date: 11-02-22' and 'Current Time: 17:32:20'. Below this, there are drop-down menus for 'Date' (Year: 11, Month: 02, Day: 22) and 'Time' (Hour: 17, Minute: 32, Sec: 20). A 'Save' button is located below the time settings. The 'Network Time Protocol' section shows 'Current NTP Server Synchronization: Disabled', 'Current Offset: +00-00', and 'Current Operating Mode: FREE-RUNNING'. At the bottom, there is a 'Create' button and a yellow banner that reads 'There are NO Provisioned NTP Servers'.

Time and Date

Current Date: **11-02-22**
Current Time: **17:32:20**

Date: Year: 11 - Month: 02 - Day: 22
Time: Hour: 17 - Minute: 32 - Sec: 20

Save

Network Time Protocol

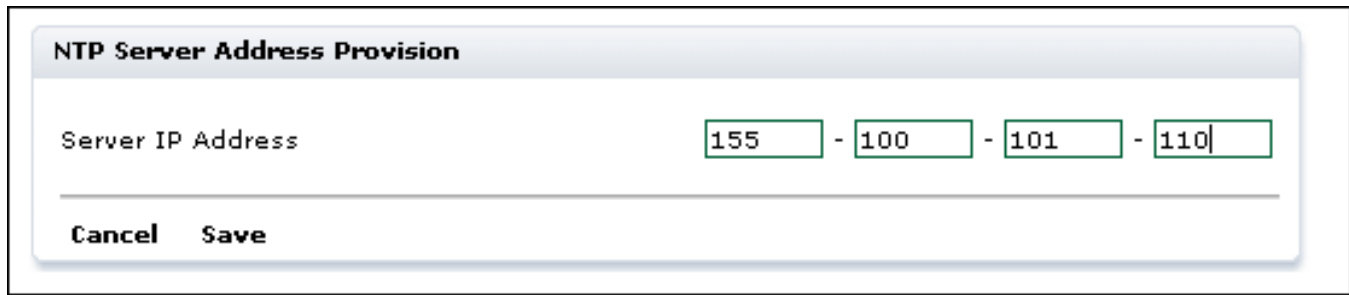
Current NTP Server Synchronization: **Disabled**
Current Offset : **+00-00**
Current Operating Mode: **FREE-RUNNING**

Create

There are NO Provisioned NTP Servers

- 4 Enter Date and Time using the drop-down selections.
- 5 Click **Create** to bring up the NTP provisioning screen as shown in [Figure 5-6, “NTP server address screen”](#) (p. 5-16).

Figure 5-6 NTP server address screen

A screenshot of a software dialog box titled "NTP Server Address Provision". The dialog has a light blue header bar with the title. Below the header, there is a label "Server IP Address" followed by four input fields containing the values "155", "100", "101", and "110" separated by hyphens. At the bottom of the dialog, there are two buttons: "Cancel" and "Save".

NTP Server Address Provision

Server IP Address 155 - 100 - 101 - 110

Cancel Save

- 6 Enter the NTP server Address as in the example in [Figure 5-6, “NTP server address screen” \(p. 5-16\)](#) using the customer supplied address.
- 7 Click **Save** to apply the server address.
- 8 On the “**NTP Config**” screen, change the “**Current NTP Server Synchronization**” to “**Enabled**”.
- 9 Retrieve System Information by selecting **System Management > Network Time Protocol** in the drop-down menu. Verify that the current "NE time" is displayed.

Note: Date and time are synchronized to the NTP server. An offset to the time may be provisioned by the customer if required.

END OF STEPS

Create a database backup

Purpose

The Alcatel-Lucent 1850 TSS-5C database contains the provisioned configuration and system status. The database can be uploaded *to* and restored *from* a local or remote server through FTP.

General

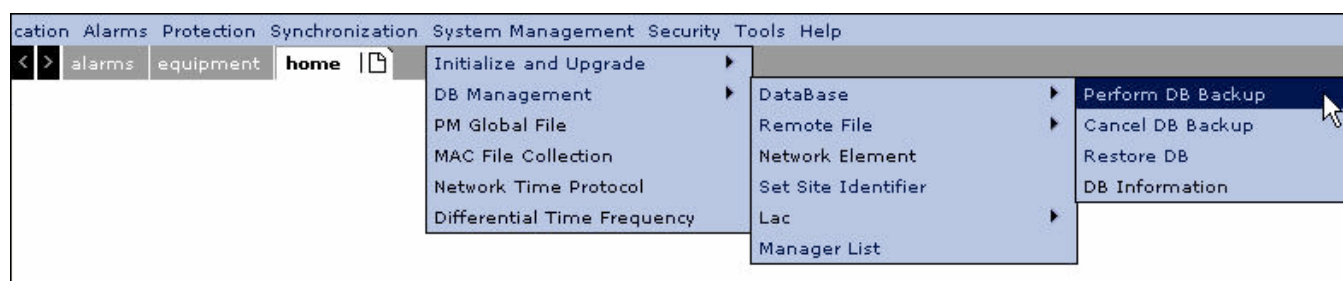
The following procedure establishes the local PC as a backup/restore server and verifies that the Alcatel-Lucent 1850 TSS-5C database can be uploaded and then restored.

Procedure

Use the following steps to create a database backup:

- 1 Login to the Alcatel-Lucent 1850 TSS-5C through the web browser.
- 2 Verify that the system is alarm free and that the alarm status bar on the management display shows all Critical, Major, and Minor alarm counts at zero. Alarms such as LOS (Loss Of Signal) and other alarms associated with external circuits that are not yet connected or functional may be considered an exception. However, all Alcatel-Lucent 1850 TSS-5C equipment internal alarms should be cleared.
- 3 Select **System Management > DB Management > DataBase > Perform DB Backup** from the menu bar.

Figure 5-7 Database backup selection screen



- 4 Apply the database backup as shown in [Figure 5-8, “Apply database backup” \(p. 5-18\)](#).

Figure 5-8 Apply database backup

The screenshot shows a web interface with a top navigation bar containing 'alarms', 'equipment', and 'Database' (selected). Below the navigation bar, there is a section titled 'Last changes applied to the DB by ZIC' with a table showing 'Date' as '11-02-22' and 'Time' as '17-17-50'. Below this, there is a 'Perform Database Backup' section with a confirmation message: 'Performing database backup. Are you sure?'. At the bottom of this section is a 'Yes' button.

- 5 Check that the DB backup is complete. Click **DB Information** to retrieve the Secondary Backup Database. If shown as [Figure 5-9, “Check database copy complete”](#) (p. 5-18), the backup is successful.

Figure 5-9 Check database copy complete

The screenshot shows the same web interface as Figure 5-8. Below the 'Perform Database Backup' section, there is a 'Database Label' section with an 'Access Identifier' dropdown menu set to 'Secondary Backup Database (STBYDB)' and a 'Default' button. Below this is a 'Retrieve' button. At the bottom, there is a 'Database Information' section containing a table with the following data:

Access Identifier	System Type	Release Identification	Site Identifier	Backup Date	Backup Time	Cyclic Redundancy Check	Region
Secondary Backup Database (STBYDB)	1850 TSS-5C	V01.00.16	PLEASE-SET-SID-xxxx	11-02-24	13-47-57	0x8D1DD1B	ETSI

- 6 Click **Perform Copy** as shown in [Figure 5-10, “Perform copy”](#) (p. 5-19).

Figure 5-10 Perform copy

Database

- Initialize and Upgrade
- DB Management
 - DataBase
 - Perform Copy**
 - Cancel Copy
 - File Information
 - Remote File
 - Network Element
 - Set Site Identifier
 - Lac
 - Manager List
- PM Global File
- MAC File Collection
- Network Time Protocol
- Differential Time Frequency

Database Label

Access Identifier: Secondary Backup Database (STBYDB) Default

Retrieve

Database Information

Access Identifier	System Type	Release Identification	Site Identifier	Backup Date	Backup Time	Cyclic Redundancy Check	Region
Secondary Backup Database (STBYDB)	1850 TSS-5C	V01.00.16	PLEASE-SET-SID-xxxx	11-02-24	13-47-57	0x8D1DD1B	ETSI

- 7 Upload DB to an FTP server by configuring FTP as shown in [Figure 5-11, “Configure FTP to upload DB”](#) (p. 5-19). After approximately one minute, verify the upload is complete as shown in [Figure 5-12, “Verify upload successful”](#) (p. 5-20).

Figure 5-11 Configure FTP to upload DB

Remote File

Copy Remote File

From: Secondary Backup Database (STBYDB)

To: Database Backup on a Remote File Server (RFSDB)

User: 15

Password: *****

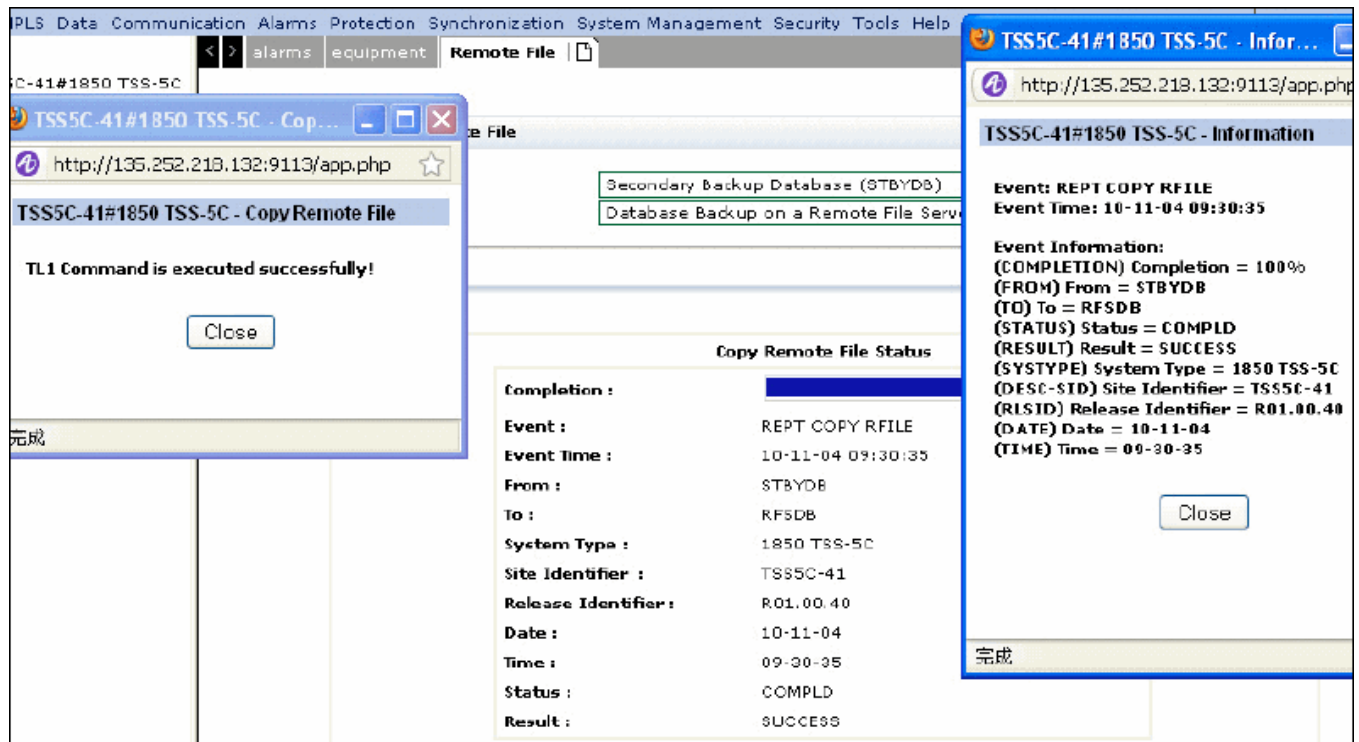
Host: 192.168.3.208

Port: 21

URL Path: /

Apply

Figure 5-12 Verify upload successful



END OF STEPS

Ethernet link verification

Purpose

This section provides procedures for checking basic cable and fiber connectivity for Alcatel-Lucent 1850 TSS-5C Ethernet ports. Each equipment configuration provides a specific set of interface ports as defined in the site engineering specification.

The Ethernet port types include:

- GE(o)
- FE(o)
- 10/100Base-T (RJ-45 based)
- 10/100/1000BT (SFP based)

General

Refer to the customer order and the site engineering specification to verify physical port types. Also verify quantities and types of SFPs and optical attenuators and that SFP insertion and configuration is complete.

The following procedures apply to a standalone Alcatel-Lucent 1850 TSS-5C which has PC management established through the front panel Ethernet management port.

All test equipment access and physical loopbacks required by the procedures are made at the far end of cables and fiber connected to the Alcatel-Lucent 1850 TSS-5C. Direct connections to the Alcatel-Lucent 1850 TSS-5C front panel must only be made for troubleshooting purpose, for example, to isolate a cable or connector problem.

Important! When connecting optical test equipment, always ensure optical attenuators are used to provide proper optical power level at the input to the Alcatel-Lucent 1850 TSS-5C as well as at the input to the test equipment. Refer to the *Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C) Release 1.0 Product Information Guide* for power level ranges and use an optical power meter to verify.

Check 10/100Base-T and 10/100/1000BT connectivity

-
- 1 For 10/100/1000BT ports insert an approved 10/100/1000BT SFP
 - 2 Identify the Ethernet port interfaces and locate the far end connection points for the installed CAT-5 cables.
 - 3 Configure the Ethernet test equipment for duplex operation and auto-enable.
-

-
- 4 Connect the test equipment to the far end connection point of the first Ethernet port identified in Step 2.
 - 5 Verify that the green indicator LED on the faceplate RJ45 connector receptacle lights and that the test equipment indicates successful auto-negotiation, correct speed and duplex operation.
 - 6 Repeat the above steps for each 10/100/1000Base-T port.

END OF STEPS

Check optical port connectivity for GE(o), FE(o)

Note: Before testing Ethernet links, confirm that the appropriate SFPs have been inserted and that the port “admin states” are displayed as “up”.

-
- 1 Identify the optical Ethernet port interfaces and locate the far end connection points (optical patch panel connections) for installed fibers for each port.
 - 2 Check that all installed SFPs and optical attenuators are in agreement with the site engineering specification.
 - 3 Configure the optical Ethernet test equipment for duplex operation, auto-enable, and the type of internet connection (GE(o) or FE(o)) for the port to be tested.
 - 4 Before connecting the optical test equipment, remove the LC input cable at the Alcatel-Lucent 1850 TSS-5C faceplate.
 - 5 Place the optical test equipment at the far end connection point (optical patch panel). For the port connection to be tested, measure the Receive optical power level and verify it is within the test equipment input range. Add optical attenuation if necessary.
 - 6 Connect transmit and receive fibers to the test equipment.

-
- 7 At the Alcatel-Lucent 1850 TSS-5C faceplate, measure the optical power of the receive fiber and verify it is within the range specified for the port being tested. Refer to the *Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C) Release 1.0 Product Information Guide* for input optical power levels. Add an optical attenuator if required.
 - 8 Connect the receive fiber to its assigned port.
 - 9 Verify that the test equipment indicates successful auto-negotiation, correct speed and duplex operation.
 - 10 At the PC, expand the left side equipment directory tree. Select an Ethernet port to display the operational state as shown in [Figure 5-13, “Ethernet port states” \(p. 5-24\)](#).
 - 11 Verify that the port **Operational state** is “up”.
 - 12 Repeat the previous steps for each provisioned optical Ethernet port.

Figure 5-13 Ethernet port states

home

TSS5C-103#1850 TSS-5C

LAG Group

RACK-1

SHELF-1-1: SHELF5C

PD-1-1-1

M4O12FEK-1-1-2

SFP-1-1-2-7: 1000M-O

r1sr1sl2/ETHLocPort#7#1

SFP-1-1-2-8: 1000M-O

r1sr1sl2/ETHLocPort#8#1

MDL-1-1-2-9

MDL-1-1-2-10

MDL-1-1-3

MDL-1-1-4

MDL-1-1-5

< > alarms equipment

Rack 1 > Shelf 1 > Board 2 > Module 8 > Port 1

PHYSICAL

Quality of service

PM DATA

PNAC

State

Port: r1sr1sl2/ETHLocPort#8#1

Admin state: up

Last change: 1970-01-01 00:17:03

Operational state: down

MAU Operational state:

Alarm severity profile: ASAP4

Save Change severity profile

ALARMS - refresh

Raise/Clear time	Severity	Event	Domain
2010/09/26 02:21:51	MAJOR	LOS	TRANS
2010/09/28 23:18:22	MAJOR	URU	TRANS

Loopback

Line loopback: disabled

END OF STEPS

Restore system database

Description

The following steps re-verify an alarm-free system and restore the original system database.

Confirm alarm-free system

Use the following steps to confirm alarm-free system:

- 1 Remove all test equipment that was used in preceding tests.
- 2 Remove all test and jumper cables that were installed for test purposes.
- 3 Restore any port or maintenance connections that were removed for testing purposes.
- 4 Verify that the system is alarm free and that the alarm status bar on the management display shows all Critical, Major, and Minor alarm counts at zero.

Note: Alarms such as LOS (Loss of Signal) associated with external circuits that are not yet connected may be present and may be considered an exception. However, all Alcatel-Lucent 1850 TSS-5C equipment internal alarms must be cleared.

END OF STEPS

Restore database

Use the following steps to restore system database:

- 1 Select **Systems Management > DB Management > Remote File > Perform Copy**.
- 2 Copy Remote file as shown in [Figure 5-14, “Download DB for restore” \(p. 5-26\)](#). After approximately one minute, verify the download is successful as shown in [Figure 5-15, “DB download successful” \(p. 5-26\)](#).

Figure 5-14 Download DB for restore

Copy Remote File

From: Database Backup on a Remote File Server (RFSDDB) ▼

To: Secondary Backup Database (STBYDB) ▼

User: 15

Password: *****

Host: 192.168.3.208

Port: 21

URL Path: /

Command Mode: Forced ▼

Apply

Figure 5-15 DB download successful

Copy Remote File Status

Completion :	
Event :	REPT COPY RFILE
Event Time :	10-11-04 09:31:50
From :	RFSDDB
To :	STBYDB
System Type :	1850 TSS-5C
Site Identifier :	TSS5C-41
Release Identifier :	R01.00.40
Date :	09-12-31
Time :	23-59-59
Status :	COMPLD
Result :	SUCCESS

TSS5C-41#1850 TSS-5C - Information

Event: REPT COPY RFILE

Event Time: 10-11-04 09:31:50

Event Information:

(COMPLETION) Completion = 100%

(FROM) From = RFSDDB

(TO) To = STBYDB

(STATUS) Status = COMPLD

(RESULT) Result = SUCCESS

(SYSTYPE) System Type = 1850 TSS-5C

(DESC-SID) Site Identifier = TSS5C-41

(RLSID) Release Identifier = R01.00.40

(DATE) Date = 09-12-31

(TIME) Time = 23-59-59

TSS5C-41#1850 TSS-5C - Copy Remote File

TL1 Command is executed successfully!

Close

- Click **Restore DB** and **Apply** as shown in Figure 5-16, “Restore DB” (p. 5-27) and Figure 5-17, “Apply restore DB” (p. 5-27) to restore the database.

Figure 5-16 Restore DB

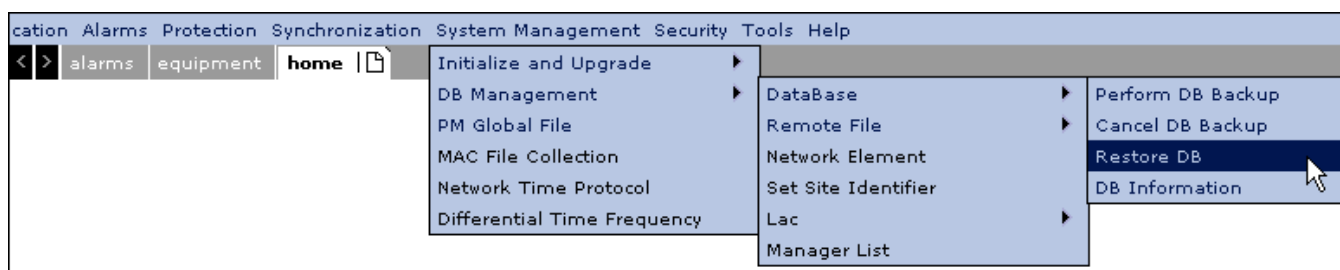
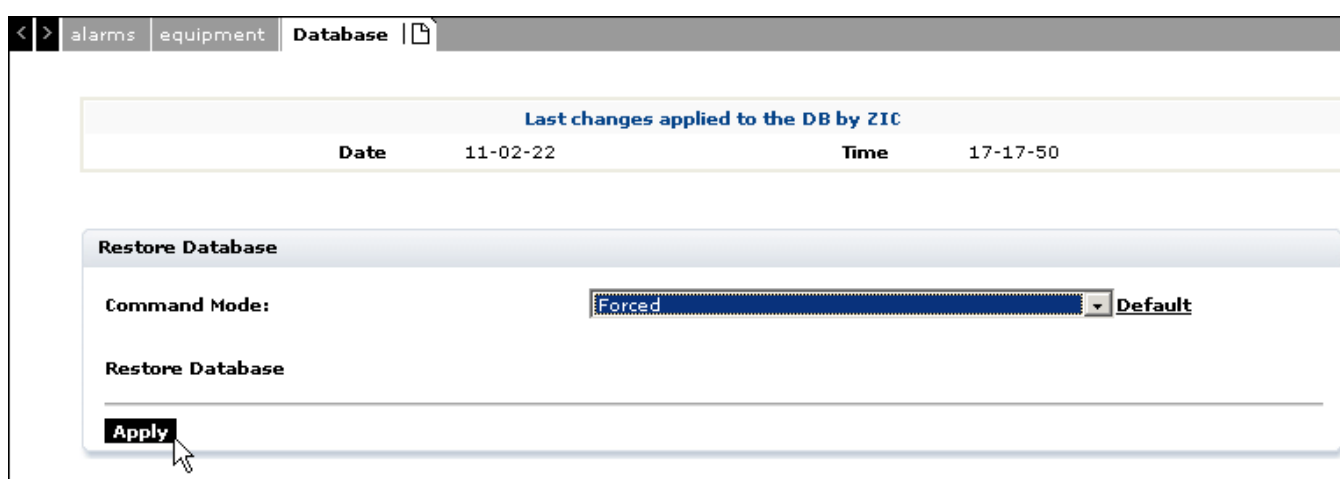


Figure 5-17 Apply restore DB



- 4 After an NE restart, verify the restore is successful.

END OF STEPS

Appendix A: Installation kits and tools



Overview

Purpose

This appendix describes the contents of the installation kits and accessory tools used to install the Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C). Note that the installation kit component parts (shown in *italics*) cannot be ordered separately and are only available as part of the complete kit. The component part numbers are provided here for reference only to confirm the installation kit contents during installation.

Only the leading 10 digits of the part numbers are significant. The last two digits are shown as variable ("XX") to accommodate possible future hardware changes.

Contents

Installation kits	A-1
Tools	A-5

Installation kits

Description

Five shelf mounting variations are available (for use with 8DG24310AA / AB):

- ETSI Rack mounting Kit: 8DG24369ADXX
- 19" Rack mounting Kit: 8DG24369ABXX
- Vertical wall installation and flexible installation kit: 8DG24386ACXX
- Horizontal wall installation kit: 8DG23510AFXX
- 23" Rack mounting Kit: 8DG24368AAXX

Accessories (for use with 8DG24310AA / AB)

Air Filter *8DG24314AAXX*

Cable - Serial, for local Craft terminal (10M) *8DG24520AAXX*

Cable - Console port for local management (RJ45) *8DG23542AAXX*

Space filler board (SLOTDMY) for PIM slot *8DG23358AAXX*

Space filler board (FANDMY) for FAN slot *8DG24406AAXX*

Cable - External Earth - *8DG24543AAXX*

8DG23361AX (for use with 8DG24310AA / AB)

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 5m *8DG23361AAXX*

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 10m *8DG23361ABXX*

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 20m *8DG23361ACXX*

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 30m *8DG23361ADXX*

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 50m *8DG23361AEXX*

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 75m *8DG23361AFXX*

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 100m *8DG23361AGXX*

Multifunction Cable - 2 Mhz timing, MDIO, dual FE, 1pps+ToD, 150m *8DG23361AHXX*

8DG23365AX (for use with 8DG24360AA)

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 5m *8DG23365AAXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 10m *8DG23365ABXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 20m *8DG23365ACXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 30m *8DG23365ADXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 50m *8DG23365AEXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 75m *8DG23365AFXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 100m *8DG23365AGXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 150m *8DG23365AHXX*

Cable assy, 4 Channel E1, 2xRJ-45, 8-fold coax 75Ohm, 200m *8DG23365AIXX*

8DG24524AX (for use with 8DG24370AA)

Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 5m *8DG24524AAXX*

Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 10m *8DG24524ABXX*

Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 20m *8DG24524ACXX*
Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 30m *8DG24524ADXX*
Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 50m *8DG24524AEXX*
Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 75m *8DG24524AFXX*
Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 100m *8DG24524AGXX*
Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 150m *8DG24524AHXX*
Cable assy, 4 Channel E1, 2xRJ-45, 120Ohm, 200m *8DG24524AJXX*

8DG24525AX (for use with 8DG24370AA)

Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 5m *8DG24525AAXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 10m *8DG24525ABXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 20m *8DG24525ACXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 30m *8DG24525ADXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 50m *8DG24525AEXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 75m *8DG24525AFXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 100m *8DG24525AGXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 150m *8DG24525AHXX*
Cable assy, 4 Channel DS1, 2xRJ-45, 100Ohm, 200m *8DG24525AJXX*

8DG24521AX (for use with 8DG24310AA / AB)

2 Mhz timing, 1pps+ToD, 5m *8DG24521AAXX*
2 Mhz timing, 1pps+ToD, 10m *8DG24521ABXX*
2 Mhz timing, 1pps+ToD, 20m *8DG24521ACXX*
2 Mhz timing, 1pps+ToD, 30m *8DG24521ADXX*
2 Mhz timing, 1pps+ToD, 50m *8DG24521AEXX*
2 Mhz timing, 1pps+ToD, 75m *8DG24521AFXX*
2 Mhz timing, 1pps+ToD, 100m *8DG24521AGXX*
2 Mhz timing, 1pps+ToD, 150m *8DG24521AHXX*

8DG24523AX (for use with 8DG24420AA)

Cable E1 for OTRI PIM, 5m *8DG24523AAXX*
Cable E1 for OTRI PIM, 10m *8DG24523ABXX*

Cable E1 for OTRI PIM, 20m *8DG24523ACXX*

Cable E1 for OTRI PIM, 30m *8DG24523ADXX*

Cable E1 for OTRI PIM, 50m *8DG24523AEXX*

Cable E1 for OTRI PIM, 75m *8DG24523AFXX*

Cable E1 for OTRI PIM, 100m *8DG24523AGXX*

Cable E1 for OTRI PIM, 150m *8DG24523AHXX*

Cable E1 for OTRI PIM, 200m *8DG24523AIXX*

8DG24526AX (for use with 8DG24440AA)

Power cable for R2O2E, -48V, LSZH, 50m *8DG24526AAXX*

Power cable for R2O2E, -48V, LSZH, 100m *8DG24526ABXX*

Power cable for R2O2E, -48V, LSZH, 150m *8DG24526ACXX*

Power cable for R2O2E, -48V, LSZH, 200m *8DG24526ADXX*

Power cable for R2O2E, -48V, LSZH, 250m *8DG24526AEXX*

Power cable for R2O2E, -48V, LSZH, 300m *8DG24526AFXX*

8DG24527AX (for use with 8DG24440AA)

Power cable for R2O2E, -48V, UL, 50m *8DG24527AAXX*

Power cable for R2O2E, -48V, UL, 100m *8DG24527ABXX*

Power cable for R2O2E, -48V, UL, 150m *8DG24527ACXX*

Power cable for R2O2E, -48V, UL, 200m *8DG24527ADXX*

Power cable for R2O2E, -48V, UL, 250m *8DG24527AEXX*

Power cable for R2O2E, -48V, UL, 300m *8DG24527AFXX*

Tools

Description

Refer to the following:

- Standard Installer's Tool Kit for equipment mounting and cable preparation, installing, and securing.
- SFP removal tool 3AL81728AA

Appendix B: Fiber optic cleaning



Overview

Purpose

This appendix provides the recommended instructions to clean fiber-optic connectors found in Alcatel-Lucent 1850 TSS-5C.

Prerequisite

Anyone who performs this procedure must be familiar with cleaning fiber-optic connectors and with the specific system on which the procedure is to be performed.

This procedure must not be performed on traffic-carrying equipment. If a system is in service, traffic must be removed from equipment to be cleaned.

Contents

Recommended tools	B-1
Fiber cleaning procedure	B-3

Recommended tools

Description

The following tools must be available for this procedure:

- Optical power meter with standard accessories
- Inspection microscope, 200X to 400X—Aerotech World Trade Ltd. AWT200 or AWT300
- Inspection microscope tip
- Anti-static lint-free swab—Texwipe TX757E, Alcatel-Lucent PN 1552762010

-
- CLETOP® fiber-optic cleaner
 - Aerotech World Trade Ltd. PN 14100500 for all fiber-optic connectors
 - Optical removal and cleaning tool—Alcatel-Lucent PN 3EM07060AAAA
 - Penlight (pocket-style flashlight)
 - Laser safety glasses

Fiber cleaning procedure

Description



DO NOT LOOK INTO FIBER-OPTIC CONNECTOR. Laser infrared radiation is present when fiber-optic connector is open and optical interface is installed. Laser infrared radiation is not visible to naked eye or with laser safety glasses.

Important! Ensure no optical power is connected to fiber being tested. An optical power meter must be used to ensure all optical power has been removed.

Important! Do not disassemble modules to clean fibers. Disassembling module could cause damage to optical splices and could void warranty.

Important! To preserve integrity of fiber-optic connectors, observe the following precautions:

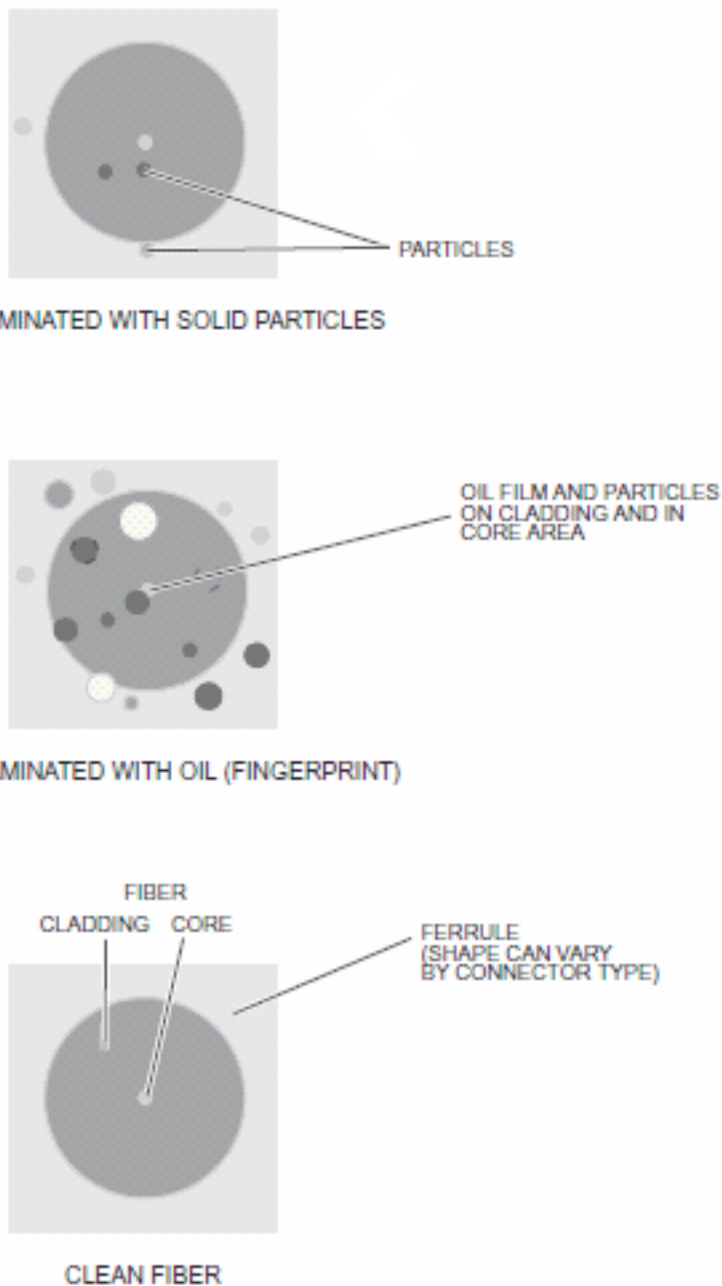
- Do not use cleaning swabs more than once.
- Do not use alcohol or any type of liquid to clean fiber-optic connectors.
- Do not use canned air to clean fiber-optic connectors. Canned air propellant leaves residue that clouds fiber-optic connectors.
- Do not touch polished optical surface of fiber-optic connector. Oil from skin can degrade performance of fiber-optic connector and attract dust particles.
- Always use protective covers to protect disconnected fiber-optic connectors. When protective covers are not in use, store them in a clean container. Do not store protective covers in clothes pocket.

1 Use optical power meter to determine if light is coming out of fiber-optic connector.

2 Did optical power meter detect light coming out of fiber-optic connector?

If yes, find the source and disconnect it.

-
- 3 Use the inspection microscope to inspect the fiber-optic connector. See [Figure B-1, “Fiber-optic connector inspection” \(p. B-5\)](#) for examples of clean and contaminated fibers. Use the following criteria to determine clean fiber:
 1. Fiber core must have no contaminants or defects.
 2. Fiber cladding must have no contaminants. Minor defects (pits and scratches) are acceptable.
 3. Fiber ferrule may not have contaminants or defects that interfere with fiber-optic connector mating.

Figure B-1 Fiber-optic connector inspection**4 Is fiber-optic connector clean?**

If yes, proceed to [Step 12](#).

If no, proceed to [Step 5](#).

-
- 5 Holding CLETOP fiber-optic cleaner with one hand, use metal lever to open metal slide and expose cleaning surface. Do not release lever.
 - 6 Place fiber ferrule firmly against CLETOP fiber-optic cleaner cleaning surface, rotate ferrule 90 degrees, then swipe ferrule along cleaning surface one time in one direction only.
 - 7 Release metal lever.
 - 8 Use inspection microscope to inspect fiber-optic connector. See [Figure B-1, “Fiber-optic connector inspection” \(p. B-5\)](#) for examples of clean and contaminated fibers. Use the following criteria to determine clean fiber:
 1. Fiber core must have no contaminants or defects.
 2. Fiber cladding must have no contaminants. Minor defects (pits and scratches) are acceptable.
 3. Fiber ferrule may not have contaminants or defects that interfere with fiber-optic connector mating.
 - 9 Is the fiber-optic connector clean?
If yes, go to [Step 12](#).
If no, go to [Step 10](#).
 - 10 Clean and inspect the fiber-optic connector up to five more times.
 - 11 Is the fiber-optic connector clean?
If yes, proceed to [Step 12](#).
If no, connector may need to be replaced.
 - 12 Are there more fiber-optic connectors to clean?
If yes, refer back to [Step 1](#).
If no, proceed to [Step 13](#).
-

.....
.....
13 STOP! This procedure is complete.

END OF STEPS
.....

Appendix C: Cables, connectors, and assemblies



Overview

Purpose

This appendix provides details on cables and cable assemblies available for the Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C).

Contents

Electrical signal cables	C-1
Cable pin numbering	C-7

Electrical signal cables

E1 cable product codes

Cable	Product codes
E1 75-ohm for OTRI PIM (5m, 64-pin)	8DG24523AAAA
E1 75-ohm for OTRI PIM (10m, 64-pin)	8DG24523ABAA
E1 75-ohm for OTRI PIM (20m, 64-pin)	8DG24523ACAA
E1 75-ohm for OTRI PIM (30m, 64-pin)	8DG24523ADAA
E1 75-ohm for OTRI PIM (50m, 64-pin)	8DG24523AEAA
E1 75-ohm for OTRI PIM (75m, 64-pin)	8DG24523AFAA
E1 75-ohm for OTRI PIM (100m, 64-pin)	8DG24523AGAA
E1 75-ohm for OTRI PIM (150m, 64-pin)	8DG24523AHAA
E1 75-ohm for OTRI PIM (200m, 64-pin)	8DG24523AIAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (5m)	8DG23365AAAA

Cable	Product codes
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (10m)	8DG23365ABAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (20m)	8DG23365ACAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (30m)	8DG23365ADAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (50m)	8DG23365AEAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (75m)	8DG23365AFAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (100m)	8DG23365AGAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (150m)	8DG23365AHAA
E1 2xRJ-45 8-fold coax 75-ohm for O16E1 (200m)	8DG23365AIAA
E1 2xRJ-45 120-ohm for O16P1K (5m)	8DG24524AAAA
E1 2xRJ-45 120-ohm for O16P1K (10m)	8DG24524ABAA
E1 2xRJ-45 120-ohm for O16P1K (20m)	8DG24524ACAA
E1 2xRJ-45 120-ohm for O16P1K (30m)	8DG24524ADAA
E1 2xRJ-45 120-ohm for O16P1K (50m)	8DG24524AEAA
E1 2xRJ-45 120-ohm for O16P1K (75m)	8DG24524AFAA
E1 2xRJ-45 120-ohm for O16P1K (100m)	8DG24524AGAA
E1 2xRJ-45 120-ohm for O16P1K (150m)	8DG24524AHAA
E1 2xRJ-45 120-ohm for O16P1K (200m)	8DG24524AJAA

DS1 cable product codes

Cable	Product codes
DS1 2xRJ-45 100-ohm for O16P1K (5m)	8DG24525AAAA
DS1 2xRJ-45 100-ohm for O16P1K (10m)	8DG24525ABAA
DS1 2xRJ-45 100-ohm for O16P1K (20m)	8DG24525ACAA
DS1 2xRJ-45 100-ohm for O16P1K (30m)	8DG24525ADAA
DS1 2xRJ-45 100-ohm for O16P1K (50m)	8DG24525AEAA
DS1 2xRJ-45 100-ohm for O16P1K (75m)	8DG24525AFAA
DS1 2xRJ-45 100-ohm for O16P1K (100m)	8DG24525AGAA
DS1 2xRJ-45 100-ohm for O16P1K (150m)	8DG24525AHAA
DS1 2xRJ-45 100-ohm for O16P1K (200m)	8DG24525AJAA

Accessories

Description	Product code
Console cable (craft terminal, USB, RS232, 10m)	8DG24520AAAA
Management cable (RJ-45)	8DG23542AAAA
Multifunction Cable	8DG23361A*AA
Blank faceplate board for unequipped PIM slot	8DG24405AAAA
Blank faceplate board for unequipped FAN slot	8DG24406AAAA

Approved SFP part numbers

Signal Type	Part Number	Application	Temperature Range
Electrical	1AB359780001	EL TRX SFP 1000Base-T RJ45	-5/+85°C
Electrical	1AB359780002	EL TRX SFP ETH (10/100/1000Base-T) RJ45	-40/+85°C
GE	1AB187280042	OPTO TRX 1GBE SFP ZX	-5/+85°C
GE	1AB376720001	OPTO TRX SFP 1000Base-SX	-40/+85°C
GE	1AB376720002	OPTO TRX SFP 1000Base-LX/LX10	-40/+85°C
GE	1AB376720003	OPTO TRX SFP 1000Base-ZX	-40/+85°C
GE	1AB376720006	OPTO TRX SFP 1000Base-VX	-40/+85°C
GE	1AB376720004	OPTO TRX SFP 1000Base-EZX	-40/+85°C
GE (CWDM, APD)	1AB377200009	CWDM 1470NM APD SFP	-40/+85°C
GE (CWDM, APD)	1AB377200010	CWDM 1490NM APD SFP	-40/+85°C
GE (CWDM, APD)	1AB377200011	CWDM 1510NM APD SFP	-40/+85°C
GE (CWDM, APD)	1AB377200012	CWDM 1530NM APD SFP	-40/+85°C
GE (CWDM, APD)	1AB377200013	CWDM 1550NM APD SFP	-40/+85°C
GE (CWDM, APD)	1AB377200014	CWDM 1570NM APD SFP	-40/+85°C
GE (CWDM, APD)	1AB377200015	CWDM 1590NM APD SFP	-40/+85°C
GE (CWDM, APD)	1AB377200016	CWDM 1610NM APD SFP	-40/+85°C
GE (BiDi)	1AB393080005	OE TRX SFP 1GBE BIDIR BX20-U	-40/+85°C
GE (BiDi)	1AB393080006	OE TRX SFP 1GBE BIDIR BX20-D	-40/+85°C
GE (BiDi)	1AB393080009	OE TRX SFP 1GBE BIDIR BX40-U	-40/+85°C
GE (BiDi)	1AB393080010	OE TRX SFP 1GBE BIDIR BX40-D	-40/+85°C

Signal Type	Part Number	Application	Temperature Range
STM-1	1AB376350001	OPTO TRX SFP S-1.1	-40/+85 ⁰ C
STM-1	1AB376350002	OPTO TRX SFP L-1.1	-40/+85 ⁰ C
STM-1	1AB376350003	OPTO TRX SFP L-1.2	-40/+85 ⁰ C
STM-1E	1AB210170001	EL TRX SFP STM-1	-10/+85 ⁰ C
FE	1AB357990001	100Base-FX	-40/+85 ⁰ C
FE	1AB382180001	100Base-LX10	-40/+85 ⁰ C
FE (BiDi)	1AB393080003	100Base-BX20-U	-40/+85 ⁰ C
FE (BiDi)	1AB393080004	100Base-BX20-D	-40/+85 ⁰ C

Note: Above SFPs except 1AB359780001, 1AB210170001 and 1AB187280042 support the temperature hardened feature. 1AB359780001, 1AB210170001 and 1AB187280042 may be used for ETSI Class 3.2 only.

SFP port usage

SFP types may be assigned to Main Board, OTRI, and O8FXK ports as follows:

SFP Type	Main Board Ports 7 to 10	OTRI GE Port	OTRI STM-1 Port	R202E Ports 3 to 4	O8FXK Ports 1 to 8
1000Base-SX	yes	yes	no	yes	no
1000Base-LX	yes	yes	no	yes	no
1000Base-VX	yes	yes	no	yes	no
1000Base-ZX	yes	yes	no	yes	no
1000Base-EZX	yes	yes	no	yes	no
1000Base-BX20/40	yes	yes	no	yes	no
1000Base-X CWDM	yes	yes	no	yes	no
1000Base-T	yes	yes	no	yes	no
STM-1	no	no	yes	no	no
eSTM-1	no	no	yes	no	no
100Base-FX	no	no	no	no	yes
100Base-LX10	no	no	no	no	yes
100Base-BX20	no	no	no	no	yes

MDIO connector detail

Alcatel-Lucent 1850 TSS-5C supports three input sensors and one output control for status and management of customer external equipment and environment, referred to as housekeeping (HK) ports. The HK inputs and output connect through the faceplate Miscellaneous Discrete Inputs and Outputs (MDIO) RJ-45 connector.

Pin Number	Signal Name	Function
1	NC	No Connection
2	HK_IN1	HK input 1
3	HK_REF, -9V	-9 volt reference
4	HK_OUT_P	HK output, positive
5	HK_OUT_N	HK output, negative
6	HK_IN2	HK input 2
7	HK_IN3	HK input 3
8	NC	No Connection

E1 connector pin assignments on OTRI

Pin	Name	Pin	Name	Pin	Name	Pin	Name
A1	TX1P	B1	GND	C1	RX1P	D1	GND
A2	GND	B2	TX2P	C2	GND	D2	RX2P
A3	TX3P	B3	GND	C3	RX3P	D3	GND
A4	GND	B4	TX4P	C4	GND	D4	RX4P
A5	TX5P	B5	GND	C5	RX5P	D5	GND
A6	GND	B6	TX6P	C6	GND	D6	RX6P
A7	TX7P	B7	GND	C7	RX7P	D7	GND
A8	GND	B8	TX8P	C8	GND	D8	RX8P
A9	TX9P	B9	GND	C9	RX9P	D9	GND
A10	GND	B10	TX10P	C10	GND	D10	RX10P
A11	TX11P	B11	GND	C11	RX11P	D11	GND
A12	GND	B12	TX12P	C12	GND	D12	RX12P
A13	TX13P	B13	GND	C13	RX13P	D13	GND
A14	GND	B14	TX14P	C14	GND	D14	RX14P
A15	TX15P	B15	GND	C15	RX15P	D15	GND

Pin	Name	Pin	Name	Pin	Name	Pin	Name
A16	GND	B16	TX16P	C16	GND	D16	RX16P

The E1 faceplate connector on the OTRI PIM is a 4x16 configuration. Rows are designated A through D from bottom to top and columns are designated 1 through 16 from left to right.

E1 connector assignments on O16E1

RJ-45 Pin	Designation
1	Ch1 Tx GND
2	Ch1 Tx Core
3	Ch2 Rx GND
4	Ch1 Rx GND
5	Ch1 Rx Core
6	Ch2 Rx Core
7	Ch2 Tx GND
8	Ch2 Tx Core

E1/DS1 connector assignments on O16P1K

RJ-45 Pin	Designation
1	Ch1 Tx_P
2	Ch1 Tx_N
3	Ch2 Rx_P
4	Ch1 Rx_P
5	Ch1 Rx_N
6	Ch2 Rx_N
7	Ch2 Tx_P
8	Ch2 Tx_N

Console cable (craft terminal, USB, RS232)

USB Pin	Designation
1	No Connect
2	TX Data
3	RX Data
4	GND

Cable pin numbering

Description

This section provides pin numbering assignments for the following cables


Part Number	Description	Signal	Used on
8DG24520AAAA	Serial port cable for local craft terminal (USB)	Management	M4O12FEK
8DG23361A*AA	Multifunction cable - 2 MHz, 1PPS+ToD, MDIO, FE/GE, dual FE	2 MHz; 1PPS+ToD; MDIO; single FE/GE; dual FE	M4O12FEK O8FEK OTRI
8DG24521A*AA	Cable for 2 MHz and 1PPS+ToD	2 MHz and 1PPS+ToD	M4O12FEK
8DG24523A*AA	E1 cable for OTRI PIM, 16-ch, 75 Ohm	E1 16-ch	OTRI
8DG23365A*AA	Cable assy, 4-ch E1, 2xRJ-45; 8- fold coax 75 Ohm	E1 4-ch	O16E1
8DG24524A*AA	Cable assy, 4-ch E1, 2xRJ-45, 120 Ohm	E1 4-ch	O16P1K
8DG24525A*AA	Cable assy, 4-ch DS1, 2xRJ-45, 100 Ohm	DS1 4-ch	O16P1K

8DG24520AAAA: Serial port cable for local craft terminal (USB)

Used on M4O12FEK for CON connector.

Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view.

Table C-1 8DG24520AAAA cable pin numbers

Connector	Pin	Wire color	Definition		Connector	Pin	Wire color	Definition
CON (USB)	1	Red	Not used		DB-9 (female)	2	White	Tx
	2	White	Tx			3	Green	Rx
	3	Green	Rx			5	Black	GND
	4	Black	GND			Others		Not used


8DG23361A*AA: Multifunction cable - 2 MHz, 1PPS+ToD, MDIO, FE/GE, dual FE

Used on M4O12FEK, for connector CLK1, CLK2.

Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view. 1PPS and ToD are provisionable to be Tx or Rx.

Table C-2 8DG23361A*AA cable pin numbers (Timing)

Connector	Pin	Wire color	Definition	
CLK1 (RJ45)	1	White/Orange	2 MHz Tx_P	 8DG23361A*AA
	2	Orange	2 MHz Tx_N	
	3	White/Green	1PPS_N	
	4	Blue	GND	
	5	White/Blue	GND	
	6	Green	1PPS_P	
	7	White/Brown	ToD_N	
	8	Brown	ToD_P	


Connector	Pin	Wire color	Definition	
CLK2 (RJ45)	1	White/Orange	2 MHz Rx_P	 8DG23361A*AA
	2	Orange	2 MHz Rx_N	
	3	White/Green	1PPS_N	
	4	Blue	GND	
	5	White/Blue	GND	
	6	Green	1PPS_P	
	7	White/Brown	ToD_N	
	8	Brown	ToD_P	

8DG23361A*AA: Multifunction cable - 2 MHz, 1PPS+ToD, MDIO, FE/GE, dual FE

Used on M4O12FEK for connector MDIO.

Note: Input and output are from the Alcatel-Lucent 1850 TSS-5C point of view.

Table C-3 8DG23361A*AA cable pin numbers (Housekeepig)


Connector	Pin	Wire color	Definition	
MDIO (RJ-45)	1	White/Orange	Not used	8DG23361A*AA 
	2	Orange	HK_IN 1	
	3	White/Green	HK_REF, -09V	
	4	Blue	HK_OUT_P	
	5	White/Blue	HK_OUT_N	
	6	Green	HK_IN 2	
	7	White/Brown	HK_IN 3	
	8	Brown	Not used	

8DG23361A*AA: Multifunction cable - 2 MHz, 1PPS+ToD, MDIO, FE/GE, dual FE

Used on M4O12FEK/OTRI, for 1000Base-T SFP connector; used on O8FEK, for 10/100Base-T connector.

Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view.


Table C-4 8DG23361A*AA cable pin numbers (10/100/1000Base-T)

Connector	Pin	Wire color	Definition	
(RJ-45)	1	White/Orange	Tx_P	8DG23361A*AA 
	2	Orange	Tx_N	
	3	White/Green	Rx_P	
	4	Blue	Not used	
	5	White/Blue	Not used	
	6	Green	Rx_N	
	7	White/Brown	Not used	
	8	Brown	Not used	

8DG23361A*AA: Multifunction cable - 2 MHz, 1PPS+ToD, MDIO, FE/GE, dual FE

Used on M4O12FEK for connector 1/11, 2/12, 3/13, 4/14, 5/15, 6/16. The following drawing shows the usage on connector 1/11. It's similar to the other connector.

Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view.

Connector	Pin	Wire Color	Definition	
1/11 (RJ-45)	1	White/Orange	Ch1 Tx_P	8DG23361A*AA 
	2	Orange	Ch1 Tx_N	
	3	White/Green	Ch1 Rx_P	
	4	Blue	Ch11 Tx_P	
	5	White/Blue	Ch11 Tx_N	
	6	Green	Ch1 Rx_N	
	7	White/Brown	Ch11 Rx_P	
	8	Brown	Ch11 Rx_N	

8DG24521A*AA: Cable for 2-MHz and 1PPS+ToD

Used on M4O12FEK for connector CLK1, CLK2.

Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view. 1PPS and ToD is provisionable to be Tx or Rx.

Table C-5 8DG24521A*AA cable pin numbers (Timing)

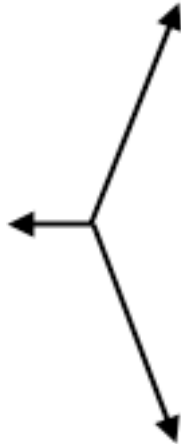
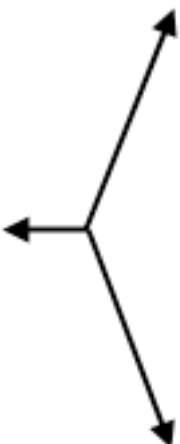
Connector	Pin	Wire color	Definition		Wire color	Definition
CLK1 (RJ-45)	1	White/ Brown	2 MHz Tx_P		White/ Brown	2 MHz Tx_P
	2	Brown	2 MHz Tx_N		Brown	2 MHz Tx_N
	3	White/ Orange	1PPS_N			
	4	White/ Green	GND		Orange	1PPS_P
	5	Green	GND		White/ Orange	1PPS_N
	6	Orange	1PPS_P		Blue	ToD_P
	7	White/ Blue	ToD_N		White/ Blue	ToD_N
	8	Blue	ToD_P		Green	GND
					White/ Green	GND


Table C-5 8DG24521A*AA cable pin numbers (Timing) (continued)

Connector	Pin	Wire color	Definition		Wire color	Definition
CLK2 (RJ-45)	1	White/ Brown	2 MHz Rx_P		White/ Brown	2 MHz Rx_P
	2	Brown	2 MHz Rx_N		Brown	2 MHz Rx_N
	3	White/ Orange	1PPS_N			
	4	White/ Green	GND		Orange	1PPS_P
	5	Green	GND		White/ Orange	1PPS_N
	6	Orange	1PPS_P		Blue	ToD_P
	7	White/ Blue	ToD_N		White/ Blue	ToD_N
	8	Blue	ToD_P		Green	GND
					White/ Green	GND

8DG24523A*AA: E1 cable for OTRI PIM, 16-ch, 75 Ohm

Used on OTRI for connector E1 port. Looking into OTRI board, A1 locates at the lower left corner of the connector.


Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view.

Pin	i = 1, 3, 5, 7, 9, 11, 13, 15	j = 2, 4, 6, 8, 10, 12, 14, 16		Wire label	Definition
D	Ch_i Rx GND	Ch_j Rx Core		m (m=1 .. 16)	Ch_m Tx
C	Ch_i Rx Core	Ch_j Rx GND		n (n=17 .. 32)	Ch (n-16) Rx
B	Ch_i Tx GND	Ch_j Tx Core			
A	Ch_i Tx Core	Ch_j Tx GND			

8DG23365A*AAA: Cable assy, 4-ch E1, 2XRJ-45; 8-fold coax 75 Ohm

Used on O16E1 for connector pair 1/2 and 3/4, 5/6 and 7/8, 9/10 and 11/12, 13/14 and 15/16. The following drawings show the usage on the connector pair 1/2 and 3/4. It is similar for other connector pairs.


Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view.

Connector	Pin	Definition		Wire label	Definition
1/2 (RJ-45)	1	Ch1 Tx GND	8DG23365A*AA 	TX1	Ch1 Tx
	2	Ch1 Tx Core		RX1	Ch1 Rx
	3	Ch2 Rx GND		TX2	Ch2 Tx
	4	Ch1 Rx GND		RX2	Ch2 Rx
	5	Ch1 Rx Core		TX3	Ch3 Tx
	6	Ch2 Rx Core		RX3	Ch3 Rx
	7	Ch2 Tx GND		TX4	Ch4 Tx
	8	Ch2 Tx Core		RX4	Ch4 Rx
3/4 (RJ-45)	1	Ch3 Tx GND			
	2	Ch3 Tx Core			
	3	Ch4 Rx GND			
	4	Ch3 Rx GND			
	5	Ch3 Rx Core			
	6	Ch4 Rx Core			
	7	Ch4Tx GND			
	8	Ch4 Tx Core			

8DG24524A*AA and 8DG24525A*AA: Cable assy, 4-ch E1/DS1, 2xRJ-45, 120/100 Ohm

Used on O16P1K for connector pair 1/2 and 3/4, 5/6 and 7/8, 9/10 and 11/12, 13/14 and 15/16. The following drawings show the usage on the connector pair 1/2 and 3/4. It is similar for other connector pairs.

Note: Tx and Rx are from the Alcatel-Lucent 1850 TSS-5C point of view.

Connector	Pin	Wire color	Definition		Wire label	Wire color	Definition
1/2 (RJ-45)	1	White	Ch1 Tx_P	8DG24524A*AA 	TX1	White	Ch1 Tx_P
	2	Blue	Ch1 Tx_N			Blue	Ch1 Tx_N
	3	White	Ch2 Rx_P		RX1	White	Ch1 Rx_P
	4	White	Ch1 Rx_P			Orange	Ch1 Rx_N
	5	Orange	Ch1 Rx_N		TX2	White	Ch2 Tx_P
	6	Brown	Ch2 Rx_N			Green	Ch2 Tx_N
	7	White	Ch2 Tx_P		RX2	White	Ch2 Rx_P
	8	Green	Ch2 Tx_N			Brown	Ch2 Rx_N
3/4 (RJ-45)	1	Red	Ch3 Tx_P	8DG24525A*AA	TX3	Red	Ch3 Tx_P
	2	Blue	Ch3 Tx_N			Blue	Ch3 Tx_N
	3	Red	Ch4 Rx_P		RX3	Red	Ch3 Rx_P
	4	Red	Ch3 Rx_P			Orange	Ch3 Rx_N
	5	Orange	Ch3 Rx_N		TX4	Red	Ch4 Tx_P
	6	Brown	Ch4 Rx_N			Green	Ch4 Tx_N
	7	Red	Ch4 Tx_P		RX4	Red	Ch4 Rx_P
	8	Green	Ch4 Tx_N			Brown	Ch4 Rx_N

Appendix D: Install an FTP server



Overview

Purpose

This procedure configures a Windows 2000 or XP PC as an FTP server to perform NE database backup/restore functions or to download software to a Alcatel-Lucent 1850 Transport Service Switch 5C (TSS-5C). Refer to [Table D-1, “PC requirements”](#) (p. D-1) for minimum requirements.

In this document, the term "FTP server" is used as a general descriptor for a server with file transfer capability. The term is used interchangeably with File Transfer Protocol (FTP) or Trivial File Transfer Protocol (TFTP) according to the step being performed. For example, generic software transfer utilizes an FTP server, but the transfer protocol is TFTP.

Table D-1 PC requirements

PC Requirements	Minimum Requirements
Processor	Pentium III 733 MHz
RAM	256 Mbytes (512 Mbytes is recommended)
Free disk space	100 Mbytes available for installation plus 100 Mbytes available for log files.
Graphics	Resolution supporting 64K colors with 16 Mbyte RAM on video card.
LAN card	IEEE 802.3 LAN card (TCP/IP through 10baseT Ethernet)
Serial port	Standard RS232-C
CD-ROM drive	Required
Operating system	Microsoft Windows 2000 or XP

Contents

General	D-3
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General

Description

File Transfer Protocol (FTP) services must be installed and administered by the local customer organization responsible for workstation operations. Follow customer guidelines.

This procedure may be used to determine if an FTP service is running, install generic Microsoft 2000 Professional, Internet Information Services (ISS) and/or configure a generic FTP service. Customer guidelines may vary. Consult appropriate local organization before installing any Microsoft products.

Procedure

Proceed as follows:

-
- 1 Is there currently a Microsoft FTP server set up on the local machine?

If yes, proceed to [Step 2](#).

If unsure, proceed to [Step 3](#).

If no, proceed to [Step 18](#).

-
- 2 Is the Local Path information known?

If yes, proceed to [Step 43](#).

If no, proceed to [Step 3](#).

Check if Microsoft FTP server is Installed

-
- 3 Open the Control Panel. Select **Start > Settings > Control Panel**.

-
- 4 Double-click the **Administrative Tools** icon.

-
- 5 Double-click the **Computer Management** icon.

-
- 6 In the Computer Management window, expand the **Services and Applications** node.

-
- 7 Is Internet Information Services listed?

If yes, proceed to [Step 8](#).

If no, there is currently no FTP server installed. Close the Computer Management window and proceed to [Step 18](#).

8 Select Internet Information Services.

9 Is an FTP site listed in the details window?

If yes, proceed to [Step 10](#).

If no, proceed to [Step 18](#).

10 FTP server is set up on local machine. Is current FTP site to be configured with the Alcatel default configuration?

If yes, proceed to [Step 34](#).

If no, proceed to [Step 11](#).

11 Right-click the FTP site and select Properties.

12 Select the Home Directory tab.

13 Write down the value entered for the Local Path for future use.

14 Verify the Read and Write boxes are checked.

15 Click OK.

16 Close the Computer Management window.

17 Proceed to [Step 43](#).

Install Microsoft® FTP server software

18 Open the Control Panel. Select Start > Settings > Control Panel.

-
- 19 Double-click **Add/Remove Programs**.
 - 20 On the left side of the Add/Remove Programs window, select **Add/Remove Windows Components**.
 - 21 In the Components window, highlight **Internet Information Services (IIS)** and click the **Details...** button.
 - 22 Select the **File Transfer Protocol (FTP) Server/Service** checkbox.
 - 23 Click **OK**.
 - 24 In the Windows Components window, click **Next** to initiate the installation.
 - 25 As the installation continues, the user may be asked to provide Windows media. Either insert the disk or browse to location of files.
 - 26 In the completion window, click **Finish**.
 - 27 Close the Add/Remove Programs window.
- Configure FTP Site**

-
- 28 Open the Control Panel. Select **Start > Settings > Control Panel**.
 - 29 Double-click on the **Administrative Tools** icon.
 - 30 Double-click on the **Computer Management** icon.
 - 31 In the Computer Management window, expand the **Services and Applications** node.
 - 32 Select the **Internet Information Services** node.

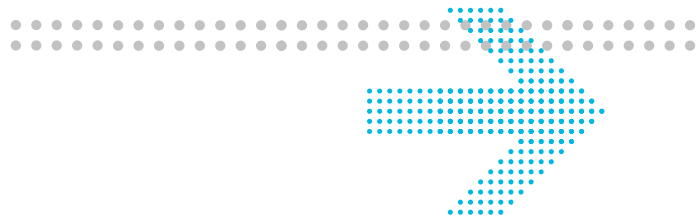
-
- 33 Right-click **Default FTP Site** in the details window and select **Properties**.
 - 34 Select the **Security Accounts** tab.
 - 35 Uncheck the **Allow Anonymous Connections** box.
 - 36 If prompted, click **Yes** in the confirmation window.
 - 37 Select the **Home Directory** tab.
 - 38 Under the FTP Site Directory pane, set the Local Path to where the NE database backups and NE generic software is to be stored.
The Alcatel-Lucent preferred path is: C:/ALCATEL-LUCENT
Note: If selecting a different directory, note the location for future use.
Note: If input to set Local Path is not active, reboot PC to activate.
 - 39 Verify that the **Read** and **Write** check boxes are selected.
 - 40 Click **OK**.
 - 41 Close the Computer Management window.
 - 42 Close the Administrative Tools window.
- Configure FTP user account**
- 43 Open the Control Panel. Select **Start > Settings > Control Panel**.
 - 44 Double-click **Users and Passwords**. (For Windows XP, double-click **User Accounts**.)
 - 45 In the Users and Passwords/User Accounts window, select the **Advanced** tab.
-

-
-
- 46 Under Advanced User Management, click the **Advanced** button.
-
- 47 Right-click the **Users** node and select **New User...**
-
- 48 Enter the name **gemftp** for the User name.
-
- 49 Enter and confirm password.
- Note:** Record this password for future reference and protect it to prevent unauthorized use.
-
- 50 Uncheck the **User must change password at next login** box.
-
- 51 Check the **User cannot change password** and **Password never expires** boxes.
-
- 52 Click **Create**.
-
- 53 Click **Close**.
-
- 54 Close the Local Users and Groups window.
-
- 55 In the Users and Passwords/User Accounts window, click **OK**.
-
- 56 Is PC running Windows XP Service Pack 2?
- If yes, proceed to [Step 57](#).
- If no, proceed to [Step 65](#).
- Create exception for FTP port**
-
- 57 Open the Control Panel. Select **Start > Settings > Control Panel**.
-
- 58 Double-click the **Windows Firewall** icon.
-

-
-
- 59** Click the **Exceptions** tab.
-
- 60** Click the **Add Port...** button.
-
- 61** In the name field, enter **FTP**.
-
- 62** In the Port number field, enter **21**.
-
- 63** Click **OK**.
-
- 64** Click **OK** to close the Windows Firewall box.
-
- 65** STOP! This procedure is complete.

E N D O F S T E P S

Glossary



Numerics

1+1, 1p1

Non-expandable protection scheme. Two full-duplex channels: one active, one standby; either can provide service. Protection switching behavior may be revertive or nonrevertive (normal case). When active channel fails, traffic is switched to standby channel. In revertive, one channel is the preferred active; when preferred channel is repaired, traffic switches back to it. In nonrevertive neither channel is preferred, and switch-back does not occur.

1:n

n main and one standby (or protection). The main channels provide service: If a main channel fails, the standby channel switches to provide service in place of failed channel. Switching is revertive, which permits extra traffic to be carried on the standby channel. (For example, when the main channel is repaired, service will be switched back to it, thus making the standby channel available to protect a subsequent failure.)

1pps

One Pulse Per Second

2fblsr

Two-Fiber Bidirectional Line-Switched Ring. See Bidirectional Ring (Bi-Ring)

4fblsr

Four-Fiber Bidirectional Line-Switched Ring. See Bidirectional Ring (Bi-Ring).

802:1e

An IEEE protocol that allows the loading of a file on an NE on a multicast or point-to-point basis.

A

ABN

Abnormal alarm.

abn confg

Abnormal Configuration

abt

Abort Output Function.

access identifier (aid)

Specifies the object entity (port or equipment) specified in a TL1 command; used to specify

"object entities" within an NE to which user commands are to be applied. Facilities and signals are examples of object entities. The term "object entity" is used by Telcordia; it does not mean the NE is implemented in an object-oriented manner.

ACD

Access Control Domain

ACL

Access Control List

ACM

Administrative Communications Module (module).

ACO

See Alarm Cutoff (ACO).

act

1. Active redundant.
2. Active unit.
3. Active secondary service state; indicates that the entity is capable of being protected and is currently the active entity.

ACU

Alarm communications unit.

Add-Drop Multiplexer (ADM)

Network elements that provide access to all N, or some subset M of Synchronous Transport Signal (STS) line signals contained within an OC-N optical channel. (M is a standard hierarchical level vN.) STSs are added to (inserted) and/or dropped from (extracted) the OC-N signal as it passes through the ADM. ADMs include linear applications between terminals (referred to as a Linear ADM or LADM) and ring network applications (referred to as unidirectional ring [uniring] and bidirectional ring [bi-ring] ADMs). See also Linear Add-Drop Multiplexer (LADM).

addr

Address.

adm

See Add-Drop Multiplexer (ADM).

admin

Administrative domain server.

administrator

A user who has access to all security, system, and database maintenance functions in addition to standard user capabilities.

ADR

Add-Drop Ring.

AGC

Automatic Gain Control.

AIC

Application Identification Channel. Identifies DS3 frame application (C-bit=1, W23=alternate 0s and 1s).

AID

See Access Identifier (AID).

AINS

Automatic In-Service.

AINSTH

Automatic In-Service Threshold

AIS

See Alarm Indication Signal (AIS).

AISL

Alarm Indication Signal, Line. See Alarm Indication Signal (AIS).

AISS

AIS Second.

Alarm (ALM)

Binary visual or audible indication of trouble, significant number of irregularities, or failure; signifies a malfunction or abnormality within the communications equipment; usually classified as minor, major, or critical.

Alarm Cutoff (ACO)

An ACO silences an office alarm.

Alarm Indication

Indication of upstream transmission span failure. In a network of tandem maintenance spans, service-affecting failures may occur, which disrupt normal signals and cause the generation of maintenance alarms.

Alarm Indication Signal (AIS)

A unique line signal sent downstream in a digital network to indicate that an upstream failure is detected and alarmed. Signal replaces normal traffic when a maintenance alarm is activated. There are two types: American (framed; alternating 1s and 0s) and nonstandard (unframed; all 1s).

Alarm Log

Record of recent alarm events logged for a particular Network Element (NE).

Alarm/Condition Codes*

1. Critical (CR) or (CRI).
2. In service (IS).
3. Maintenance (MAINT) or (MT).
4. Major (MAJ) or (MJ)*.
5. Manual control (ManCont).
6. Manual operation (MAN).
7. Memory administration (MA)*.
8. Minor (MN) or (MIN)*.
9. Out of Service (OOS).

* Also referred to as Severity level or Notification Code.

ALM

See Alarm (ALM).

ALS

Automatic Laser Shutdown.

ALSP

AIS or LOP-Path Second.

Alternate Mark Inversion (AMI)

1. Line coding format in T-1 transmission systems, whereby successive ones (marks) are alternately inverted (sent with polarity opposite that of the preceding mark).
2. A line code that uses a ternary signal to convey binary digits; successive binary ones are represented by signal elements normally of alternating, positive/negative polarity but equal in amplitude, and in which binary zeros are represented by signal elements with zero amplitude (an AT&T definition).

American National Standards Institute (ANSI)

A standards-setting, non-government organization that develops and publishes standards for transmission codes, protocols, and high-speed languages for "voluntary" use in the United States.

AMU

Air Movement Unit

Angle Polished Connector

A method used to polish the end of a fiber optic cable.

ANSI

See American National Standards Institute (ANSI).

AOD

Automatic Offline Diagnostics.

APC

See Angle Polished Connector (APC)

API

Application Programming Interface

Application-Specific Integrated Circuit (ASIC)

A chip built for a specific application and used by manufacturers to consolidate many chips into a single package, reducing system board size and power consumption. Many video boards and modems use ASICs. ASICs span Programmable Array Logic (PAL) devices, Electrically Programmable Logic Devices (ELPDs), Field-Programmable Gate Arrays (PPGAs), standard cell-based devices, and full custom-designed Integrated Circuits (ICs).

APS

1. Automatic Protection Switching. See Protection Switching (PS).
2. Administrative Processing System.

APSD

Automatic Power Shutdown.

APSI

Automatic Protection Switching Inhibit. See also Protection Switching (PS).

ASIC

See Application-Specific Integrated Circuit (ASIC).

Asynchronous mode

Bytes are sent without clocking information. Each byte is identified by a start bit and terminated by one or more stop bits.

Asynchronous signal

A digital signal in which there is no common clock. Timing must be recovered from information sent within signal.

ATAG

Autonomous Message Tag; an automatically generated tag for autonomous reports.

Attribute(s)

1. Constitutes a specific property about an object.
2. The form of information items provided by the X.500 Directory Service; directory information base consists of entries, each having one or more attributes; each attribute has a type identifier together with one or more values.
3. MS-DOS file information, indicating whether file is read-only, hidden, or system, and whether it has been changed since it was last backed up.

B b/s

See Bits per Second (b/s).

B3ZS

1. Bipolar with 3 Zero Substitution. The line code used in DS3 transmission systems. This code follows the bipolar rule; however, when three consecutive zeroes occur, the three zeroes are replaced with a unique code that contains bipolar violations in a defined manner.
2. Bipolar 3-Zero Substitution (DS3/STS1). See also Bipolar Signal.

B8ZS

Bipolar 8-Zero Substitution (DS1). See Bipolar Signal.

BER

See Bit Error Ratio).

BERP

Bit Error Ratio, Path. See Bit Error Rate (or Ratio) (BER).

Bidirectional Coupler (optical)

A device that combines transmit and receive optical signals within a single fiber.

Bidirectional Ring (Bi-Ring)

A Synchronous Optical Network (SONET) ring network configuration in which traffic between any two nodes flows in a single path between the two nodes. The other path around the ring is used for protection purposes, providing high reliability. Bi-rings allow reuse of bandwidth around the ring (unlike a unidirectional ring) but are technically much more complicated to protect.

Bidirectional Switching

The protection switching scheme in which both paths of the duplex channel are switched to the protection path when either fails.

BIP

See Bit Interleaved Parity-N (BIP-N).

BIP-N

See Bit Interleaved Parity-N (BIP-N).

BIPL

Bit Interleaved Parity errors, Line. See Parity Bit Interleaved Parity-N (BIP-N).

Bipolar Signal

1. A 3-level digital signal in which logic 1 bits are pulses (typically RZ) which alternate in polarity, and logic 0 bits are 0 volts. The resulting waveform has a dc level of 0 volts. Also referred to as AMI.
2. A signal having two non-zero polarities. It must have two-state or three-state binary coding scheme; is usually symmetrical with respect to zero amplitude.

Bipolar Violation (BPV)

The presence of two consecutive same-polarity *one* bits on the T carrier line.

BIPS

Bit Interleaved Parity errors, Section. See Parity Bit Interleaved Parity-N (BIP-N).

Bit

Binary digit; smallest unit of data in a data stream. The amount of information obtained by asking a yes-or-no question; a computational quantity that can take on one of two values: true and false or 0 and 1; the smallest unit of storage, sufficient to hold one bit. A bit is *set* if its value is true or 1, and *reset* or *clear* if its value is false or 0. Regarding setting and clearing bits: To toggle or *invert* a bit changes it (from 0 to 1 or from 1 to 0).

Bit Error Ratio

Ratio of errors occur in a digital signal divided by the number of transmitted bits. See also Severely Errored Seconds (SES) and Signal Fail (SF).

Bit Interleaved Parity-N (BIP-N)

Method of error monitoring. If even parity is used, the transmitting equipment generates an N-bit code over a specified portion of the first bit of all N-bit sequences in the covered portion of the signal, and the second bit provides even parity over the second bits of all N-bit sequences within the specified portion, etc. Even parity is generated by setting the BIP-N bits so that there is an even number of ones in each of all N-bit sequences including the BIP-N.

BITS

See Building Integrated Timing Supply (BITS).

Bits per Second (b/s)

The rate at which data is sent over some communication line. For example, data rate of a modem is usually measured in kilobits per second.

BITSSYNC

Output synchronization

BKRST

Backup and Restore

BLSR

Bidirectional Line-Switched Rings

BNC

A coaxial connector type commonly known by abbreviation of manufacturer Bayonet-Neill-Concelman

BPM

Binary Performance Monitoring

BPV

See Bipolar Violation (BPV).

BRDG

Multipoint Data Bridge

Buffer

A temporary storage device that compensates for the difference between data transmission speeds when transferring data from one device to another

Building Integrated Timing Supply (BITS)

In North America, the clocks that provide and distribute timing to a wire line network lower levels; known in the rest of the world as Synchronization Supply Unit (SSU).

Byte

A group of eight bits; also called an octet.

C Card Presence Indicator (CPI)

Indicates presence or absence of a module; provides an interrupt to the shelf processor through the Serial Communications Interface (SCI) for modules that have a microcontroller; enables shelf processors to detect removal and/or insertion of any module (or circuit pack) in the shelf. See also Serial Communications Interface (SCI).

CB

Circuit Breaker (also *CKB*)

CBIT

Parity monitoring. Select CBIT monitoring when operating with equipment that generates CBIT parity to monitor signal performance.

CCT

Cross-Connect Type

CDU

Clock Distribution Unit (module)

Central Office (CO)

Typically called C-O; a telephone company facility where subscriber lines are joined to switching equipment for connecting other local and long-distance subscribers to each other; sometimes it means wire center in which there are several switching exchanges. The overseas term for CO is

"public exchange."

CEPT

European Conference of Postal Telecommunication

CEV

See Controlled Environmental Vault (CEV).

CFA

Carrier Failure Alarm

CGI

Control and General Interface

Checksum

The sum of a group of data items used for error checking. Checksum is computed by the sending computer based upon an algorithm that counts the bits going out in a packet. The check digit is then sent to the other end as the packet tail (or trailer). As the packet is being received, the receiving computer goes through the same algorithm. If the receiving computer goes through the same algorithm, and if the check digit it comes up with is the same as the one received, all is well. Otherwise, it requests the packet be sent again.

CID

1. Calling address Identification
2. Communications Interface Device
3. Connect Identification Device
4. Connection Identifier
5. Craft Interface Device

Circuit Emulation Service (CES)

It is an emerging telecommunication technology used to transmit time-division multiplexed (TDM) services such as the traditional Digital Signal (DS) and the E-carrier circuits over Asynchronous Transfer Mode (ATM) networks.

Circuit Pack

Representation of equipment that can be inserted or assigned to a slot within a shelf

CIT

1. Craft Interface Terminal (also known as user interface terminal)
2. Customer Interface Terminal

Cladding

1. The transparent material, usually glass, that surrounds the optical fiber core. Cladding glass has a lower refractive index than core glass. As the light signal travels down the central core transmission path, it naturally spreads out (modal dispersion). The cladding causes the light to be reflected back into the central core, thereby serving to maintain the signal strength over a long distance.
2. When referring to a metallic cable, a process of covering with a metal (usually achieved by pressure rolling, extruding, drawing, or swagging) until a bond is achieved.

CLEI code

Common Language Equipment Identification code (assigned by Telcordia).

CLFI

Common Language Facility Identifier

CLI

Command Line Interface

CLK

Clock

CLLI

Common Language Location Identifier. Indicates the location of circuit packs at a network element.

CMI

Coded Mark Inversion

CMOS

Complementary Metal-Oxide Semiconductor. High-speed, low-power solid state component.

CO

See Central Office (CO).

COA

Craft Orderwire and Alarms

Code Violation

Violation of a coding rule; for example, the Alternate Mark Inversion (AMI) code is corrupted by a Bipolar Violation (BPV).

Coding Violation (CV)

1. A violation in the coding of a signal over a digital circuit; the count of BIT-8 errors. See also Code Violation.
2. Checksum Value. See also Checksum.

COM

Communications port (usually COM1 or COM2, referring to communications port #1 or port #2 on a personal computer [PC]).

Command Language

A set of procedural operators with a related syntax to indicate the functions to be performed by an operating system.

Commands

Short-term maintenance controls such as loopback and manual switch.

Concatenated Synchronous Transport Signal Level N (STS-Nc)

An STS-N Line layer signal in which the STS envelope capacities from the N STS1s have been combined to carry an STS-Nc synchronous payload envelope (SPE), which must be transported as a single entity, not as several separate signals.

Concatenated Virtual Tributary (VTx-Nc)

A set of Virtual Tributaries (VTs) in which the VT envelope capacities from N VTxs have been combined to carry a VTx-Nc, which must be transported as a single entity, not as several separate signals.

Concatenation

A Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) mechanism for allocating contiguous bandwidth for transport of a payload greater than Synchronous Transport Signal Level 1 (STS-1) (the electrical equivalent Optical Carrier Level 1 [OC-1], 51.84 Mb/s; T-3 plus Synchronous Optical Network (SONET) overhead). By using concatenation pointers, multiple OC-1s can be linked end-to-end to provide contiguous bandwidth. The same approach is used in higher SONET OC levels. Concatenation applications include bandwidth-intensive video and high-speed data. See also Synchronous Optical Network (SONET) and Synchronous Digital Hierarchy (SDH).

Condition Type

Reported fault or event type

Configured size

System configuration size as defined in database

Configuring

The act of defining the features to be contained on a module, shelf, or system.

Controlled Environmental Vault (CEV)

An underground room that houses electronic and/or optical equipment under controlled temperature and humidity.

CORBA

Common Object Request Broker Architecture

Correlation Tag (CTAG)

All commands issued to the network element using TL1 are given a correlation tag; response to the command has the same correlation tag.

CPC

See Communication Processor Card (CPC).

CPE

1. C-bit Parity Error
2. Customer Premise Equipment

CPI

1. See Card Presence Indicator (CPI).
2. Common Part Interface.

CPU

Central Processing Unit (module)

CR

1. Critical. See also Alarm/Condition Codes.
2. Change Request

CRC

See Cyclic Redundancy Check (CRC).

CRG

Clock Reference Generator

CRI

Critical alarm. See also Alarm/Condition Codes.

Cross-Connect

Connection point for DSX transmit/receive signals with defined characteristics.

CRS

Cross-connect.

CRU

Clock Reference Unit

CRU

Clock Reference Unit

CT

Craft Terminal.

ctag

See correlation tag (ctag).

CV

See Coding Violation (CV).

CVL

Coding Violation count, Line. See Coding Violation (CV).

CVP

Coding Violation count, Path. See Coding Violation (CV).

Cyclic Redundancy Check (CRC)

A number derived from a block of data and stored or transmitted with the data to detect any errors in transmission; similar to a checksum, but more complicated. A CRC is often calculated by adding words or bytes of the data. The receiving card recalculates the CRC from the data received and compares it to the value originally transmitted; if the values are different, it indicates a transmission error. The CRC is called redundant because it adds no significant information to the transmission itself.

D Data Communications Channel (DCC)

Synchronous Optical Network (SONET) overhead reserved for communication between network elements. The channel transports signals from one data processing device location to another data processing device location.

Data Communications Equipment (DCE)

The devices and connections of a communications network that connect the communication circuit between data source and destination (the Data Terminal Equipment [DTE]). A modem is the most common DCE. Before data can be transmitted over a modem, the Data Terminal Ready (DTR) signal must be active. DTR tells the DCE that the DTE is ready to transmit and receive. DCE and DTE are usually connected by an RS-232 serial line. It is necessary to distinguish these two devices because their connectors must be wired differently if a "straight-through" cable (pin 1 to pin 1, pin 2 to pin 2, etc.) is used. DCE must have a female connector and must transmit on pin two and receive on pin three. Many modems are "DTE" according to the original standard.

Data Link (DL)

A Data Link Control Identifier (DLCI) is a channel number is attached to data frames to tell the network how to route the data.

Data Terminal Equipment (DTE)

A device acting as the source and/or destination of data and controlling the communication channel; includes terminals, computers, protocol converters, and multiplexers; usually connected by means of an RS-232 serial line to Data Communication Equipment (DCE), typically a modem. It is necessary to distinguish these two device types because their connectors must be wired differently if a "straight-through" cable (pin 1 to pin 1, pin 2 to pin 2 etc.) is used.

dB

See Decibel (dB).

DB

Database

DC

Drop-and-Continue

DCC

See Data Communications Channel (DCC).

DCE

1. See Data Communication Equipment (DCE).
2. Data Circuit-terminating Equipment

DCF

Dispersion Compensation Fiber

DCM

Dispersion Compensation Module

DCN

Data Communications Network

DCS

Digital Cross-Connect System

DDM

Digital Diagnostics Monitoring

Decibel (dBm)

A logarithmic expression of the ratio of a given power level relative to 1 milliwatt.

Demux

Demultiplex (-er, -ing).

DEMUX

Demultiplex direction, the tributary output signal, arriving on the optical carrier and leaving through the tributary (electrical) outbound data stream.

Dense Wavelength Division Multiplex (DWDM)

A high-speed version of Wave Division Multiplex (WDM); increases capacity of Synchronous Optical Network (SONET) fiber-optic transmission systems through the multiplexing of multiple wavelengths of light; uses optical channel spacing on the order of 1.6 nm (200 GHz) or better and is compatible with the International Telecommunications Union (ITU) channel plan.

DHCP

Dynamic Host Configuration Protocol

Direct Entry

Function that enables users to interact with a network element in TL1 form.

Dispersion

Dispersion is the process whereby optical pulses are widened as they travel along an optical fiber. It is caused by the different wavelength components of a light signal of finite spectral width traveling down the fiber at different velocities. The effect is a pulse at the terminating end of a fiber that is wider than the original pulse that was transmitted. If the amount of widening is excessive the individual pulses will not be distinguishable by the receiver. See also Chromatic Dispersion and Polarization Mode Dispersion (PMD).

DL

See Data Link (DL)

DLP

Detail Level Procedure

DMAC

1. Direct Memory Access Control
2. Direct Memory Access Controller

DNS

Domain Naming System. Used in the Internet for translating names of network nodes into addresses.

Domain

According to Management Information System (MIS) use, domain is the part of a computer network in which data processing resources are under common control. In Microsoft™ networking, a domain is a collection of computers sharing a common domain database and security policy that is stored on a Windows NT™ server domain controller. Each domain has a unique name.

DPLL

Digital Phase-Locked Loop

dri

Dual Ring Interconnect

Drop

Individual connections (sometimes called nodes) on a multipoint (also called multidrop) circuit.

Drop Side Signal

A traffic path connecting to the tributary side of the network element; path can be electrical (such as DS3 or STS1) or optical (such as OC3 or OC12) and can include Synchronous Optical Network (SONET) overhead information/access. Specific capabilities and format are product and feature dependent.

DS0 Path-Terminating Equipment (DS0 PTE)

Network elements that multiplex/demultiplex the DS0 channels. DS0 PTEs interpret and either modify or create the DS0 signaling information necessary to transport the DS0 channels.

DS0, DS-0

Digital Signal, level 0. a DS0 is 64,000 bits per second (b/s) (64 kilobits), equal to one voice conversation digitized under Pulse Code Modulation (PCM). Twenty-four DS0s (24 64 kb/s) equal one DS1, which is T-1 or 1.544 million b/s.

DS1

Digital Signal level 1 (1.544 Mb/s). Can contain 24 DS0s.

DS3

Digital Signal level 3 (44.736 Mb/s). Can contain 28 DS01s.

DSP

1. Digital Signal Parameter
2. Digital Signal Processing
3. Domain-Specific Port

DSX

Digital signal cross-connect.

DSx

Digital Signal of an unspecified rate

DSX-1

Digital Signal, level 1 cross-connect

DSX-3

Digital Signal cross-connect point for equipment that generates or uses DS3 signals. This point has defined waveshapes and voltage levels, in accordance with American National Standard T1.102.

DTE

See Data Terminal Equipment (DTE).

DWDM

See Dense Wavelength Division Multiplex (DWDM).

DX

Duplex configuration. See Duplex (DX).

E EB

Errored Blocks.

EBC

Errored Block Count

EC

Electrical Container

EC1

1. Electrical Carrier, level 1
2. Electrical Connection Level 1, STS-1 line and section object entity (electrical STSX-1)

EDFA

See Erbium-Doped Fiber Amplifier

EEPROM

Electronically Erasable Programmable Read-Only Memory

EIA

Electronic Industries Alliance. A partnership of electronic and high-tech associates and companies whose mission is to promote the marketing development and competitiveness of the U.S. high-tech industry through domestic and international policy efforts.

Electromagnetic Compatibility (EMC)

It is the term used to describe how well a device or system is able to function in an electromagnetic environment without introducing electromagnetic disturbances that interfere with the operation of other electrical products in the environment.

Electromagnetic Interference (EMI)

It is a common problem that occurs with electronic devices when the performance of a device is disturbed or interrupted by electromagnetic radiation or electromagnetic conduction.

EMA

Element Management Application

Embedded Facility

A lower level (for example, DS1) digital signal transported in a higher level signal. Examples are a DS1 signal embedded in a DS3, or a DS3 embedded in an STS-1 facility.

EML

1. Element Management Layer
2. Equipment Management Layer

EMS

Element Management System

EOC

Embedded Operations Channel

EOS

Ethernet over SONET

EPROM

Erasable Programmable Read-Only Memory

Equipment (EQPT)

Electronic or mechanical devices at network nodes where end users are connected to communications network

Erbium-Doped Fiber Amplifier (EDFA)

The dominant method for signal amplification in long-haul lightwave transmission systems. EDFAs differ from the normal method regenerative or electro-optic repeaters in that light does not have to be converted to an electrical signal, amplified, then converted back to light. EDFAs are not frequency dependent, so they allow bandwidth upgrades (within) limits without replacing the entire transmission systems. Undersea transmission systems use EDFA technology.

Errored Second (ES)

A second during which a Coding Violation (CV) occurs.

ES

See Errored Second (ES).

ESD

Electrostatic-Sensitive Device. A circuit component, such as CMOS integrated circuit, that is prone to damage from static electricity. See also ESS.

ESF

1. Extended Superframe format. DS1 signal framing format consisting of 24 frames. Each frame contains a payload of 24 channels plus 1 overhead bit.
2. See also Extended Superframe (ESF).

ESL

Errored Second, Line. See Errored Second (ES)

ESP

Errored Second, Path. See Errored Second (ES)

ESS

1. Electrostatic-Sensitive Device. A circuit component, such as CMOS integrated circuit, that is prone to damage from static electricity. Also ESS.
2. Errored Second, Section. See Errored Second (ES)

ETSI

European Telecommunication Standards Institute

Extended Superframe (ESF)

One of two possible framing patterns for a DS1 signal. ESF has an extra channel that can pass synchronization messages; the Superframe (SF) cannot.

F	FBE	Frame Bit Error. An error on an incoming DS3 signal detected and reported by the performance monitor.
	FC	Failure Count
	FC/PC	A specific type of fiber-optic cable connector.
	FCC	Federal Communications Commission
	FCP	Failed Count-Path
	FDDI	Fiber Distributed Data Interface
	FDL	<ol style="list-style-type: none">1. Facility Data Link2. See Frame Data Link (FDL).
	FE	<ol style="list-style-type: none">1. Far-End2. Fast Ethernet (10/100 Mbps.)
	FEAC	Far-End Alarm and Control. Channel bit used in C-bit formatting for status and control communications.
	FEBE	Far-End Block Error. Channel bit used in C-bit formatting for performance monitoring event.
	FEC	Forward Error Correction
	FERF	Far-End Receive Failure
	FES	Frame Errored Seconds

FFP

Fast Facility Protection. Refers to line facility groups. It also refers to path facility groups which constitute preferred or alternate paths.

FI

Fault Isolation

Fiber Optic Cable

The core of the fiber optic cable is made of very pure glass; it is surrounded by four protective layers, given here from the core out: cladding, buffer, dielectric strength member, and the polyvinyl chloride (PVC) subunit jacket.

Field-Programmable Gate Array (FPGA)

Used on some cards to modify hardware operation through software, rather than physically changing the hardware on the card; logic network can be programmed into the device after its manufacture. An FPGA consists of an array of logic elements. Most FPGAs are reprogrammable because their logic functions and interconnect are defined by Random Access Memory (RAM) cells; others can be programmed only once, retaining programming permanently. FPGAs have enabled development of logic emulators. See also Complex Programmable Logic Device (CPLD).

Fixed Stuff (R-Bits/Bytes)

Fixed stuff (R) bits and bytes compensate for the differences between the bandwidth available in the STS1 and Virtual Tributary (VT) synchronous payload envelopes and the bandwidth required for the actual payload mappings (for example, DS1, DS1C, DS2, DS3, etc.). They facilitate interworking with existing transmission systems or allow interworking between fixed and floating VTs. R-bits and bytes have no defined value. The receiver ignores the value of these bits/bytes (except for BIP-8 calculation/verification).

FLC

First Level Controller

FLT

Fault

FM

Fault Manager

Format

Refers to basic structure and arrangement or order of elements in a command or data.

FPGA

1. Fused Programmable Gate Array
2. See also Field-Programmable Gate Array (FPGA).

Frame Data Link (FDL)

A message channel in the overhead of a DS1 Extended Superframe (ESF) signal that can relay clock-quality information.

FTP

File Transfer Protocol. An IP-based file transfer protocol.

FTS

Fiber Transmission System

Full Duplex

1. Independent, simultaneous communication in both directions between two locations.
2. Standard 2-way connection.

G Gateway Communications Functions

Functions to facilitate operations communications between two communicating entities across dissimilar subnetworks. Examples include concentration, message routing and relaying (Network Layer), and application layer protocol conversion and/or message translation. See also Mediation Functions.

Gb, Gb/s

Gigabits, Gigabits per second

GB, GB/s

Gigabytes, Gigabytes per second

GbE

See Gigabit Ethernet (GigE)

GFP

Generic Framing Procedure. Protocol for mapping packet data into an octet-synchronous transport such as SONET.

Gigabit Ethernet (GigE)

Input conditioning performed to map Ethernet frames into SONET payload structures.

GigE

See Gigabit Ethernet (GigE)

GND (or Gnd)

Ground

GNE

Gateway Network Element

GOS

Grade of Service

Graphical User Interface (GUI)

This interface supports applications that consist of a series of rectangular presentation regions

called windows. Each window displays another application.

GRD

General Release Document

Grooming

The process of moving traffic from one point to another.

Growth

Increasing system port capacity

GUI

See Graphical User Interface (GUI).

H Half duplex

Standard 1-way connection

Half-Duplex Transmission

A circuit designed for data transmission in both directions, but not at the same time. Telex is an example of a half-duplex system, as is speaking on with most speaker-phones. Compare with Full-Duplex Transmission.

Head End

The point where the line overhead is inserted. (Tail end describes the point where the line overhead is terminated.) A central control device required within some Local Area Network/Area Network (LAN/MAN) systems to provide such centralized functions as remodulation, retiming, message accountability, contention control, diagnostic control, and access.

HLDOVER

See Holdover.

HO

High Order, generally referred to as STS-1 level virtually concatenated signals.

Holdover

A mode in which an oscillator that was previously tracking a reference attempts to maintain the last-known frequency instead of continuing to track. Transition to Holdover could occur for a variety of reasons, including failure on a reference or a manual switch.

HS

High Speed

Hz

Hertz

I I/O

See Input/Output (I/O).

IBFEC

In-Band Forward Error Correction

IC

Integrated Circuit

ID

Identification

IEEE

Institute of Electrical and Electronics Engineers

IGFET

Insulated Gate Field Effect Transistors

IL

Insertion Loss

ILA

In-Line Amplifier

IMP

Integrated Multi-protocol

In Service (IS)

An equipment module is available for use by the system. (It may be online or offline.) An equipped module is either IS or Out of Service (OOS).

In-Service Growth

A feature that enables service providers to install one optical channel initially, then upgrade to additional optical channels or a mix of data rates. Additional modules may be added one at a time while the system is in service.

Input/Output (I/O)

Two of the three computer functions; the third is processing. I/O describes the interrelated tasks of providing information to the computer and providing the results of processing to the user. I/O devices include keyboards (input) and printers (output). A disk drive is an input and an output device because it provides information to the computer and receives information from the computer.

Interleave

1. Transmission of pulses from two or more digital sources in time-division sequence over a single path.
2. A data communication technique, used in conjunction with error-correcting codes, to reduce the number of undetected error bursts. In the interleaving process code symbols are reordered before transmission so that any two successive code symbols are separated by $| - 1$ ($|$ is called the degree of interleaving). Upon reception, interleaved code symbols are reordered into their original sequence, effectively spreading or randomizing errors (in time) to enable more complete correction by a random error-correcting code.
3. Refers to the way a computer writes to and reads from a hard disk.

Intermediate Reach (IR)

Refers to optical sections from a few kilometers (km) to approximately 15 km.

Intermediate System (IS)

Refers to a system that originates and terminates traffic, and forwards traffic to other systems; an Open Systems Interconnection (OSI) term.

Intermediate System to Intermediate System (IS-IS)

An Open Systems Interconnection (OSI) link-state hierarchical routing protocol, based on DECnet Phase V routing, whereby intermediate systems (routers) exchange routing information based on a single metric to determine network topology.

Internet Protocol (IP)

Part of the Transmission Control Protocol/Internet Protocol (TCP/IP) family of protocols describing software that tracks the Internet address of nodes, routes outgoing messages, and recognizes incoming messages; used in gateways to connect networks of Open Systems Interconnection (OSI) network Level 3 and above. See also Internet Protocol (IP) Address and Transmission Control Protocol/Internet Protocol (TCP/IP).

Internet Protocol (IP) Address

A unique, 32-bit number for a specific transmission control protocol/internet protocol (TCP/IP) host on the Internet; normally printed in dotted decimal form (for example, 128.126.50.224). When a domain is assigned a group of numbers by the Internet central registry, it can house one or several domains and/or hosts. Some IP addresses are reserved for broadcasts in respective domains. See also Domain.

IOC

Input/Output Conditioner

IOO

OS-OS Interface

IP

1. In Progress
2. See Internet Protocol (IP).

IPCP

Internet Protocol Control Protocol

IR

See Intermediate Reach (IR).

IS

1. See In Service (IS).
2. See Intermediate System (IS).

IS-ANR

In Service-Abnormal

IS-IS

See Intermediate System to Intermediate System (IS-IS).

IS-NR

In Service-Normal

ISLTD

Isolated, fully

ISO

International Standards Organization

ISU

In-Service Upgrade

ITU

International Telecommunications Union (replaces CCITT)

ITU-T

International Telecommunications Union Telecommunications

IXL

Index Task List

J Jitter

Relative phase change between data time slots and clock (timing) pulses. Results in bit errors and, in voice circuits, noise in telephone circuits. Jitter is cumulative and is primary limitation to maximum system length, including terminals and repeaters, of a digital transmission system.

K K.21

Installation Kit

KAM

Keep Alive Message

KAS

Keep Alive Signal

kb/s

Kilobits per second

kHz

KiloHertz

km

Kilometers

L

L1

Level 1

L2

1. Level 1 (controller).
2. Layer 2 (Ethernet switching).

L3

Level 3 (controller functions).

LAN

Local Area Network

LAPB

Line Access Procedure, Balanced

LAPD

Link Access Procedure, D-channel

LAPS

Link Access Procedure for SDH

LBO

See Line Buildout (LBO).

LC

A specific type of fiber-optic cable connector.

LCAS

Link Capacity Adjustment Scheme

LCI

Logical Channel Identifier

LCN

1. Local Communications Network, a Local Area Network (LAN).
2. Logical Channel Number.

LCP

Link Control Protocol

LD

Line Driver

LDB

Loop Detection Buffer

LDCC

Line Data Communications Channel

LEC

Local Exchange Carrier

LED

Light-Emitting Diode

LIF

Low-speed Interface

Limited mode

System operating mode that allows access to a limited number of commands. It is primarily used for database restoration.

Line

A transmission medium, together with the associated Line-Terminating Equipment (LTE), required to provide the means of transporting information between two consecutive line-terminating network elements: One originates the line signal, and the other terminates the line signal. In SONET, the line envelope is a subset of the section envelope.

Line Alarm Indication Signal (AIS) Code

A code generated by Section-Terminating Equipment (STE) upon loss of input signal, loss of frame, or equipment failure. Line AIS signal maintains operation of downstream regenerators and prevents generation of unnecessary alarms. At the same time, data and orderwire communication is retained between the regenerators and downstream Line-Terminating Equipment (LTE).

Line Buildout (LBO)

Equalization pad or artificial line network.

Line Group

Group of Synchronous Optical Network (SONET) signals at an Add/Drop Multiplexer (ADM) connection.

Line Side Signal

A signal suitable for transmission over outside plant facilities or across an administrative boundary.

Line-Terminating Equipment (LTE)

Network Elements (NEs) that originate and/or terminate line (OC-N) signals; LTE includes NEs that originate and/or terminate line signals. LTEs originate, access, modify, and/or terminate the transport overhead.

Linear Add-Drop Multiplexer (LADM)

Network element in a linear network that provides access to all N, or some subset M (M is a standard hierarchical level vN), of the STS line signals contained within an OC-N optical channel. STS signals are added to (inserted) and/or dropped from (extracted) the OC-N signal as it passes through Add-Drop Multiplexer (ADM).

List Box

Displays a list of choices in the application window of the 1301 Network Manager (NM). A scroll bar is provided if the box contains more choices than the box can hold. The list box can be a single- or multiple-selection type.

LMF

Loss of Multiframe

LO

Low Order, generally referring to VT1.5 level virtually concatenated signals.

LOA

Loss of Activity

LOC

Loss of Clock

Location

The physical location (site) of a network device.

LOF

Loss of Frame

Long Reach (LR)

Refers to optical sections of approximately 25 kilometers or more in length and is applicable to all Synchronous Optical Network (SONET) rates. Compare with Short Reach (SR).

Loopback

A maintenance condition that redirects normal input to output, or vice versa; consists of a diagnostic test in which the transmitted signal is returned to the sending device after passing through a data communications link or network, thereby allowing a technician (or built-in diagnostic circuit) to compare the returned signal with the transmitted signal and determine what is wrong. Loopbacks are often done by excluding one piece of equipment after another, eliminating non-problematic equipment to isolate a problem.

LOP

Loss of Pointer

LOS

Loss of Signal

LPF

Low-Pass Filter

LPR

Light Power Received

LPRN

See Light Power Received Normalized (LPRN)

LPT

Light Power Transmitted

LPTA

Line/Path Terminating ASIC

LR

1. Line Receiver
2. See also Long Reach (LR).

LTE

1. Line-Terminating Element
2. See Line-Terminating Equipment (LTE).
3. Lite-terminating equipment (Synchronous Optical Network [SONET]). Asynchronous Transfer Mode (ATM) equipment, terminating a communications facility using a SONET Lite Transmission Convergence (TC) layer (usually reserved for end user or Local Area Network [LAN] equipment); does not implement some of the maintenance functions used in long-haul networks such as termination of path, line, and section overhead.

M MAC

1. Memory Arbitration Circuit
2. Media Access Control. A standard data link layer address that is required for every port of device that connects to a LAN.

MAJ

Major

MAN

Manual operation

Management Data Input/Output (MDIO)

It is a serial bus defined for the Ethernet IEEE 802.3 specification for Media Independent Interface (MII).

MAU

Medium Attachment Unit

MB

1. Management Information Base
2. MegaByte(s)

Mb/s

Megabits per second

MD

Mediation Device

MDL

Maintenance Data Link. Three bits used as a 28.2 kb/s terminal-to-terminal link identifier. Part of the overhead in the C-bit parity format.

Mediation Functions

Usually consist of gateway communications functions, but can include information processing functions. When the two functions are combined, they are often contained in a stand-alone mediation device (MD) or packaged as an added module to an Network Element (NE) or equipment frame. Gateway communications functions often exist alone in a gateway NE or intermediate NE.

MHz

MegaHertz

MIB

Management Information Base

MIC

1. Module Interface Circuit
2. Module Interface Controller

MIN

Minor

MJ

Major

MN

Minor

Modem

Modulator/Demodulator

Modulator/Demodulator (Modem)

A communications device that enables the computer to transmit information over a telephone line.

Module

An independent assembly of electronic components with some distinct function. A module might contain one, two, three, or more cards. In the past, there was nearly always one card in each module; therefore, "card" might be used when "module" was actually meant. Even in the case of a module that contains only one card, the module includes a front panel, ejector handles, etc. that are mounted on the card. See also Card and Circuit Packs.

MOP

Method of Procedure

MPU

Microprocessor Unit

MRU

Maximum Receive Unit

MTBF

Mean Time Between Failures

MTU

Maximum Transmit Unit

MTX

Matrix module

Multiplex (MUX, Mx)

Multiplex direction, the tributary input signal arriving on tributary interface (electrical) and being multiplexed up onto optical signal, then leaving system. Combining several signals for transmission on some shared medium; signals are combined at the transmitter by a multiplexer

(MUX) and split up at the receiver by a demultiplexer (DEMUX). The communications channel can be shared between the independent signals in one of several different ways: Time Division Multiplexing (TDM), Frequency Division Multiplexing (FDM), and Code Division Multiplexing (CDM). If the inputs take turns to use the output channel (TDM), the output bandwidth need be no greater than the maximum bandwidth of any input. If many inputs are active simultaneously, the output bandwidth must be at least as great as the total bandwidth of all simultaneously active inputs. In this case the multiplexer is also known as a concentrator.

MUX

See Multiplex (MUX, Mx).

N

NA

1. Not Alarmed or No Alarm
2. Not Applicable
3. Not Available, in reference to performance monitoring parameter validity flags.

NAD

Network Access Domain

NAS

North American Standard

NE

1. Near End. See also NEND.
2. Network Element. Can be a switching NE or a transport NE. Cross-connects are transport NEs.
3. See also Network Element (NE).

NE Configuration

The physical components within a Network Element (NE).

NE Type

The model number of a specific Network Element (NE).

NEBS

Network Equipment-Building System typical equipment requirements (Telcordia GR-63).

NEC

National Electric Code

NEL

Network Element Layer

NEND

Near End

Network

Database representation of resources allocated to a secondary user. Network may also refer to physical elements of a communications system; equipment, transmission facilities, and end users.

Network element

A generic piece of equipment (such as a digital cross-connect) that represents a single function in the system

Network Element (NE)

Configurable transmission controller used as a multiplexer, access node, or Add/Drop multiplexer.

Network entity

Any of the physical devices that make up the communications network

Network facility

Equipment used to connect individual NEs

Network resource

All physical devices, including end equipment, transmission facilities, and end users

Network Service Access Point (NSAP)

The point at which the Open Systems Interconnection (OSI) network service is made available to a transport entity. NSAPs are identified by OSI network addresses. The NSAP is a generic standard for a network address consisting of 20 octets. ATM has specified E.164 for public network addressing and the NSAP address structure for private network addresses.

NLAN

Network Local Area Network

nm

Nanometer

NM

Network Management or Network Manager

NMA

1. Network Monitoring and Analysis
2. Network Management Application

NOC

Network Operation Center

Node

A point where transmission lines originate, interconnect, switch, or terminate. Generally consists of one or more pieces of equipment and is connected to other nodes through network facilities. Typically provides switching capabilities, multiplexing capabilities, end-point termination or origination, or other similar networking services. A point in the network where a network element is physically located (such as a digital cross-connect system)

Nonblocking

A feature that allows any input port to be connected to any output port. Nonblocking switch paths ensure that a connection can always be established between any two idle ports without rearranging existing connections.

Nonregenerative

A type of optical amplification whereby the optical signal is amplified without being converted to an electrical signal and then fed directly to the transmission line (as opposed to regenerative amplification where the optical signal is first converted into an electrical signal, amplified, converted back into an optical signal, and then fed to the transmission line).

Nonrevertive

As applied to protection switching, means that service is not automatically reestablished to previously active device when failure is corrected.

NORM

NORMal

North American AIS

The accepted Alarm Indication Signal (AIS) for use in North American Network, consisting of alternating 1010 pattern with valid framing and fixed overhead bit content. (Also called Standard AIS.)

Not Alarmed (NA)

A condition noted on the alarm manager screen, but does not cause an alarm situation to be recorded.

Not Reported (NR)

A condition that is not reported on any screen.

NR

1. Normal
2. Not Reported

NRZ

Nonreturn to Zero

NSA

Nonservice-Affecting

NSAP

See Network Service Access Point (NSAP).

NTE

Network Terminal Equipment

NTP

Network Time Protocol

O	O-LAN	Office LAN
	O-SNCP	Optical Sub-Network Connection Protection
	OA	Optical Amplifier
	OADM	Optical Add/Drop Multiplexer
	OAM&P	Operations, Administration, Maintenance, and Provisioning
	OAS	Optical Amplifier Section (per ITU-T G.681)
	OC	Optical Carrier
	OC-N	Optical Carrier, level N (for high-speed drops)
	OC1	Optical Carrier, level 1 (51.84 Mb/s)
	OC12	Optical Carrier, level 12 (622.08 Mb/s)
	OC12c	Optical Carrier, level 12 (622.08 Mb/s) Concatenated
	OC192	Optical Carrier, level 192 (9.953 Gb/s)
	OC3	Optical Carrier, level 3 (155.52 Mb/s)
	OC3c	Optical Carrier, level 3 (155.52 Mb/s) Concatenated
	OC48	Optical Carrier, level 48 (2.488 Gb/s)
	OC48c	Optical Carrier, level 48 (2.488 Gb/s) Concatenated

OCM

Optical Transceiver

OEM

Original Equipment Manufacturer

OFA

Optical Fiber Amplification

OH

OverHead, Synchronous Optical Network (SONET)

OID

Object Identifier

OOBFEC

Out-of-Band Forward Error Correction

OOF

Out of Frame

OOFP

Out of Frame-Path

OOS

See Out of Service (OOS).

OOS-MA-AS

Out-of-Service-Memory administration-Assigned

Open Systems Interconnection (OSI)

The only internationally accepted framework of standards for communication between different systems made by different vendors. The primary intent for OSI is to create an open systems networking environment in which any vendor computer system, connected to any network, can freely share data with any other computer system on that network or a linked network. OSI was developed by the International Standards Organization. Most of the dominant communications protocols used have a structure based on the OSI model.

Operations Support System (OSS)

Methods and procedures (mechanized or not) that directly support the telecommunications infrastructure daily operation. The average Local Exchange Carrier (LEC) has hundreds of OSSs, including automated systems supporting order negotiation, order processing, line assignment, line testing, and billing.

Operator Action

An operator-initiated action that interferes with the normal mechanism within the product for response to detected conditions, such as forced switching, inhibited switching, or taking a working module out of service.

OPS

Operations Processing System

Optical Carrier Level 1 (OC-1)

Optical signal that results from an optical conversion of an electrical STS-1 signal; this signal forms the basis of the interface.

Optical Carrier Level 12 (OC-12)

Optical signal produced by converting an STS-12 from an electrical signal to an optical signal.

Optical Carrier Level 192 (OC-192)

Optical signal produced by converting an STS-192 from an electrical signal to an optical signal.

Optical Carrier Level 3 (OC-3)

Optical signal produced by converting an STS-3 from an electrical signal to an optical signal.

Optical Carrier Level 48 (OC-48)

Optical signal produced by converting an STS-48 from an electrical signal to an optical signal.

Optical Carrier Level 768 (OC-768)

Optical signal produced by converting an STS-768 from an electrical signal to an optical signal.

Optical Carrier Level N (OC-N)

Optical signal resulting from an optical conversion of an electrical STS-N signal.

Optical Modules

Elements of the system that provide the photonic interface for either transmit or receive functions.

Optical Pulse Distortion/Dispersion

The property of an optical fiber that causes optical signals passing through the fiber to be bandwidth limited. A received light pulse will be wider than that, that was transmitted; the amount of this distortion increases with the fiber length.

ORB

Object Request Broker

Order Wire, Orderwire (OW)

1. A circuit used by telephone personnel for fixing, installing, and removing phone lines.
2. Equipment and circuit providing a telephone company the means to establish voice contact between central office and carrier repeater locations.
3. A Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH) term for a connection request; consists of one octet contained within the Section Overhead (SOH).

OS

1. Operations System (Also called OSS.)
2. Operating System, as in HP-UX, DOS, or Windows 2000

OSC

1. See Oscillator (OSC).
2. Optical Supervisory Channel.

Oscillator (OSC)

1. A device for generating an analog test signal.
2. An electronic circuit that creates a single-frequency signal.

OSDB

Operations System Database

OSI

See Open Systems Interconnection (OSI).

OSL

Output Subscription Level

OSLINK

Operations System LINK has failed (X.25 link)

OSMINE

Operations Systems Modifications for the Integration of Network Elements.

OSNR

Optical Signal-to-Noise Ratio

OSPORT

Operations System Port

OSS

1. See Operations Support System (OSS) (Also called OS.)
2. Operating System Surveillance

OTDR

Optical Time Domain Reflectometer

OTN

Optical Transport Network

OTS

1. Object Transport Service
2. Optical Transmission Section (per ITU-T G.681)
3. Optical Transport System, a dense WDM system (per AT&T RFP)

Out of Service (OOS)

1. A status indication that function is not being performed by a given circuit pack and it can be removed for maintenance.
2. An equipped module is OOS when unavailable for system use; module may be OOS for operator action, equipment failure, diagnostic testing, or family of equipment not carrying traffic. See also SNOS (Status, Not currently Out of Service).
3. Equipment or channel not carrying traffic.
4. Status indicating that traffic is not being processed by a given module and that the module can be removed for maintenance.
5. Designation for an inactive address or function.

Overhead

Anything that is not traffic in a digital bit stream. Traffic is the payload, or information being carried by signal. Overhead is that portion of signal that carries information about timing and maintenance of signal, but does not carry any portion of information originally sent and meant to be received at the far end.

OW

See Order Wire, Orderwire (OW).

P Packet Switching

A communications paradigm in which packets (messages or fragments of messages) are individually routed between nodes, with no previously established communication path. Packets are routed to their destination through the most expedient route (as determined by some routing algorithm). Not all packets traveling between the same two hosts, even those from a single message, will necessarily follow the same route. The destination computer reassembles the packets into their appropriate sequence. Packet switching optimizes available bandwidth use in a network and minimizes latency. See also X.25.

PAD

Packet Assembler/Disassembler

Parameter

An element of a command, which further defines the object of the command or provides data needed for proper command execution. See individual command descriptions.

Parity Check

A process for detecting whether bits of data (parts of characters) have been altered during transmission of that data. Data are transmitted as a stream of bits with values of one or zero; for example, each character of data composed of seven bits has another bit added to it. The value of that bit is chosen so that either the total number of one bits is always even if Even Parity error correction is to be obeyed, or always odd if Odd Parity correction is chosen.

Path

1. A path at a given bit rate is a logical connection between the point at which a standard frame format for the signal is assembled and the point at which the standard frame format for the signal is disassembled.
2. The route a telecommunications signal follows through a circuit or through the air.

Path command

Any valid connect or disconnect command directed to matrix

Path Overhead (POH)

Synchronous Optical Network (SONET) path overhead assigned to and transported with the payload until payload is demultiplexed; used for functions necessary to transport the payload, for example, end-to-end network management. These functions include parity check and trace capability. POH is not implemented in SONET Lite. See also STS Path Overhead (STS POH).

Payload Pointer

The pointer that indicates the location of the beginning of the Synchronous Payload Envelope (SPE).

PBIT

Parity monitoring. Select PBIT monitoring to monitor performance on signals other than CBIT parity. PBIT is corrected at each DS3 level; therefore, it provides only error monitoring from DS3 electrical interface to DS3 interface.

PCM

1. See Pulse Code Modulation (PCM).
2. PCM is also slang for the Sony F1 format, which stores PCM digital audio on videotape.

PCN

Product Change Notification.

PDH

Plesiochronous Digital Hierarchy

PDN

Public Data Network

PDU

Power Distribution Unit.

Performance Monitoring (PM)

Reports and analyzes deviations from defined parameters, detecting any signal degradation that could lead to a service-affecting failure; refers to actions that monitor signal integrity and quality (such as counting parity errors in Synchronous Optical Network [SONET] equipment) and equipment impairments (such as laser degrade). Nominally includes reporting of values recorded during monitoring and sending them over a digitally multiplexed transmission channel.

Permanent Virtual Circuit (PVC)

A virtual circuit that is permanently established, saving the time associated with circuit establishment and tear-down.

PES

Parity Errored Second

Phase-Locked Loop (PLL)

A circuit containing a voltage-controlled oscillator whose phase or frequency can be "steered" to keep it in sync with a reference source. A PLL circuit is generally used to lock onto and "up-convert" the frequency of a stable source.

PIB

Product Information Bulletin.

PID

1. Password Identifier
2. Path Identification
3. Product Identifier

Pigtail

A length of optical fiber with one end terminated at a connector and the other end attached to a light source or detector. The fiber couples light from a source to a connectorized fiber cable or from a fiber cable to a detector.

PIM

Plug-in Module

PIN

1. Positive Intrinsic Negative. Type of photodetector used to sense lightwave energy then to convert it to electrical signals.
2. A type of semiconductor diode that has a 3-layer structure composed of P-type, intrinsic type, and N-type material.

PJC

Pointer Justification Count

PJN

Pointer Justification Negative

PJP

Pointer Justification Positive

PLD

Programmable Logic Device

PLL

Phase-Locked Loop. See Phase-Locked Loop (PLL).

PLM

Payload Mismatch.

PM

See Performance Monitoring (PM).

PMC

Process Monitory and Control

PMD

Polarization Mode Dispersion

PMV

Performance Monitoring Visualization

PNM

Physical Network Manager

POH

See Path Overhead (POH).

Point of Presence (POP)

1. A physical place within a Local Access and Transport Area (LATA) where a long-distance carrier or a cellular provider interfaces with the network of the Local Exchange Carrier (LEC), also called the local telephone company.
2. The point at which the LEC terminates subscriber circuits for cellular phone call, long-distance dial-up phone call, or leased-line communications.
3. A meet point where Internet Service Providers (ISPs) exchange traffic and routes.

Point-to-Point Protocol (PPP)

A communications protocol; the protocol defined in RFC 1661, the Internet standard for transmitting network layer datagrams (for example, IP packets) over serial point-to-point links. PPP is designed to operate over asynchronous connections and bit-oriented synchronous systems. It can configure connections to a remote network dynamically and test that the link is usable. PPP can be configured to encapsulate different network layer protocols by using appropriate Network Control Protocol (NCP).

Polarization Mode Dispersion (PMD)

Identified around 1990, PMD might become a limiting issue in optical span design now that data rates are going higher (10 Gb/s and 40 Gb/s), and spans are getting longer. PMD is the dispersion of an optical signal, caused by the different polarization modes of the optical signal traveling down a fiber at slightly different velocities. The amount of PMD is statistical in nature and varies randomly with time. PMD is independent of chromatic dispersion, so a span can be PMD-limited in distance even in the absence of chromatic dispersion. Due to the random nature of the physical

causes of PMD, it is more difficult to be compensated for, as chromatic dispersion, but newer techniques are being developed. See also Chromatic Dispersion.

POP

See Point of Presence (POP).

Port

1. A physical connection on a network element that has a specified rate and type of physical attachment; a connection or socket on the computer. Ports are used for connecting devices (cables, modems, printers, monitors) to a PC, then sending information from the computer to the devices. Serial ports (COM 1-COM 4) and parallel ports (LPT1, LPT2) are the most commonly used.
2. An interface point between the system and its external environment. Can be physical, logical, or both.

PP

Pointer Procesor

ppm

Parts per million

PPP

Point-to-Point Protocol. See Point-to-Point Protocol (PPP).

PPS

Path Protection Switching. See Protection Switching (PS).

PRBS

Pseudo Random Binary Sequence

PRC

Primary Reference Clock

PRI

1. Primary (alarm)
2. Protection Release Inhibited

PRM

Performance Report Messages

PROT

PROTection

Protection Channel Access (PCA)

The tributary signals carried by the protection channel when it is offline (i.e., not protecting the working traffic). It is lower priority and will be dropped in favor of the working traffic in the event of a working channel failure.

Protection Switch Count (PSC)

The Performance Monitoring (PM) parameter used to count the number of protection switches for a protection group.

Protection Switching (PS)

The automatic Network Element (NE) function that provides recovery of traffic in the event of a network or equipment failure. Protection may be an individual NE function (as in unidirectional linear protection or in a unidirectional ring) or a network function (as in bidirectional linear protection or in a bidirectional ring).

Protection Switching Duration (PSD)

This parameter measures the total time, in seconds, for which service was removed from a given (nonprotection) line.

Protection Switching Line, Counts

This parameter measures the number of times service switches from a particular working line to a protection line.

Protocol

A set of rules that govern the interaction of processes or applications in a system or network

PROV

See Provisioning (PROV).

Proxy

Provides protocol conversion between TL1 commands and Common Management Information Service Element (CMISE) commands.

PRS

Primary Reference System

ps/nm

Picoseconds per nanometer

PSA

Power Supply Alarm

PSC

See Protection Switch Count (PSC).

PSCC

Processor Serial Control Circuit

PSD

Protection Switching Duration

PSN

Packet-Switched Network. See Packet Switching. See also X.25.

PST

Primary State

PSU

Power Supply Unit

PSW

Protect Switch

PTE

Path-Terminating Equipment. See also DS0 Path-Terminating Equipment (DS0 PTE).

Pulse Code Modulation (PCM)

A method by which an audio signal is represented as digital data. Virtually all digital audio systems use PCM.

PVC

1. Permanent Virtual Channel
2. See Permanent Virtual Circuit (PVC).
3. Permanent Virtual Connection (Asynchronous Transfer Mode [ATM] terminology)
4. Polyvinyl Chloride

PWR

1. Power
2. Power converter

Q

QoS

Quality of Service

QRS

Quasi-Random Signal

QRSF

Quasi-Random Signal, Framed

QRSS

Quasi-Random Signal Source. Signals used for testing digital circuits, particularly DS-1 (for example, T-1) circuits.

QRSU

Quasi-Random Signal, Unframed

QTY

Quantity

R	RA	Return Authorization
	Rack	An assembly of shelves within a standard set of vertical mounting posts or rails (called rack channels).
	Rack Unit (RU)	It is a unit of measurement used to describe the height of equipment intended for mounting in a 19- inch rack or a 23-inch rack. One rack unit is 1.75 inches (44.45 mm) high.
	RADM	Ring Add-Drop Multiplexer
	RADMAP	Remote Alarm Display Map
	RAM	See Random Access Memory (RAM).
	Random Access Memory (RAM)	The working memory of the card; memory used for storing data temporarily while working on it, running application programs, etc. "Random access" means that any RAM area can be accessed directly and immediately. RAM is called volatile memory; information in RAM will disappear if the power is switched off before it is saved to disk. RAM is used on all downloadable cards to run the application loads of the cards.
	RCC	Relay Contact-closure Control
	RCV	Receive module
	RDI	Remote Defect Indication
	RDU	Rack Distribution Unit (module)
	Redundancy, Redundant	<ol style="list-style-type: none">1. That part of any message that may be eliminated without losing important information.2. Having one or more "backup" systems available in case of failure of the main system.
	Remote Defect Indication-Line (RDI-L)	An indication returned to a transmitting Line-Terminating Equipment (LTE) upon receipt of a line Alarm Indication Signal (AIS) code or detection of an incoming line failure at the receiving LTE.

(Formerly Line Far-end Receive Failure [FERF].)

Revertive

Service is automatically restored to the primary device after failure is corrected.

RFI

1. Radio Frequency Interference.
2. Remote Failure Indicator.

RFS

Remote File Server

RI

Remote Inventory

Ring

A network where the network nodes are interconnected by means of a circular route that may be broken at any one point without permanently disrupting traffic. Rings are either unidirectional (uniring) or bidirectional (bi-ring).

Ring Add-Drop Multiplexer (RADM)

Network element in a ring network that provides access to all N, or some subset M (M is a standard hierarchical level \leq N), of the STS line signals contained within an OC-N optical channel. STS signals are added to (inserted) and/or dropped from (extracted) the OC-N signal as it passes through the ADM. Ring ADMs may be either unidirectional (uniring) or bidirectional (bi-ring).

RIP

Routing Information Protocol

Route Diversity

A network configuration that provides two connection paths between two points, each physically separated from the other except at the terminal end points. This method retains service over one of the routes if the other route is broken (such as when a cable is cut). A route diversity application can be built using a ring network or a linear network as a basis.

RPC

1. Redundant Power Converter
2. Remote Procedure Call

RS-232

An Electronic Industry Association (EIA) data communications standard using serial binary data interchange standard applicable to interconnection of Data Terminal Equipment (DTE); the most common asynchronous serial line standard; the EIA equivalent of ITU-T V.24 and V.28. RS-232 specifies connector gender and pin use, but not their physical type (RS-423 specifies the electrical signals.); 25-way D-type connectors are common but often only three wires are connected: one ground (pin seven) and one for data in each direction; other pins are mostly related to hardware

handshaking between sender and receiver and to carrier detection on modems, inoperative circuits, busy conditions etc. The standard classifies equipment as either Data Communications Equipment (DCE) or Data Terminal Equipment (DTE).

RS-232C

An Electronic Industry Association (EIA) standard applicable to interconnection of Data Terminal Equipment (DTE) and Data Communication Equipment (DCE) using serial binary data interchange.

RSP

Rack Status Panel (module)

RT

Remote Terminal

RTC

Real-Time Clock

RTN

Return

RTU

Remote Test Unit

RX

Receive, receiver

RX+TX

Receiver plus Transceiver

S

SA

Service-Affecting

SABM

Set Asynchronous Balanced Mode

SAM

System Administrator Manager

SAN

Storage Area Network

SAS

Severe errored frame/Alarm indication signal (SEF/AIS) Second

SB

Short Band (SB). See also Conventional-Band (C-Band).

SBI

Serial Bus Interface

SBS

Stimulated Brillouin Scattering

SCSI

Small Computer System Interface. A bus that links the optical and hard disks to the processor.

SCU

Stratum Clock Unit

SDH

See Synchronous Digital Hierarchy (SDH).

SDMA

Serial Direct Memory Access

SDTH

Signal Degrade Threshold

SEA

Supported Entity Outage

Section

The portion of a transmission facility (including terminating points) between a terminal network element and a regenerator or between two regenerators. A terminating point is the point after signal regeneration, where Performance Monitoring (PM) is or can be done. In Synchronous Optical Network (SONET), the section envelope encompasses the line envelope. See also Synchronous Payloads.

Section-Terminating Equipment (STE)

Network elements that terminate the Synchronous Optical Network (SONET) physical and section layers. STE is either a regenerator or part of a Line-Terminating Equipment (LTE). STEs interpret and either modify or create the section SONET overhead.

SEF

Severely Errored Frame

SEFS

Severely Errored Frame Seconds

SEMF

Synchronous Equipment Management Function

Seq

Sequence

Service Condition

A data path can be selected as In Service (IS), which is the normal operational state, or Out-of-Service (OOS) condition, which disables protection switching and alarm and Performance Monitoring (PM) functions. An OOS data path may or may not be able to carry test traffic, depending on system configuration.

SESCP

Severely Errored Seconds-CP-bit Path

SESL

Severely Errored Seconds-Line

SESP

Severely Errored Seconds-Path

Session

1. A logical network connection between two addressable units for the exchange of data.
2. A connection between a user and the Network Element (NE). One user can have multiple sessions. All provisioning operations, queries, and autonomous reports are transported between the NE and user through a session.

SETG

Synchronous Equipment Timing Group

SETS

Synchronous Equipment Timing Source

Severely Errored Seconds (SES)

Contains more than N Coding Violations (CVs). The value of N with frame size and bit rate must be chosen to correspond to a Bit Error Ratio (BER) of approximately 10^{-3} , assuming errors are randomly distributed. This count may be used to determine problems for particular types of services and/or as a measure of facility outage duration.

SF

1. See Signal Fail (SF).
2. See Superframe (SF).

SFP

Small Form Factor Plug-in

Shelf

Basic rack assembly unit; contains subassemblies (usually circuit packs, also referred to as modules).

Short Band

The shorter wavelength half of the Erbium-Doped Fiber Amplifier (EDFA) amplification window that is approximately 1530 nm to 1543 nm.

Short Reach (SR)

A Synchronous Optical Network (SONET) term; refers to optical sections of approximately 2 kilometers or less in length. The sections may be interoffice or intraoffice. Compare with Long Reach (LR).

SID

1. System Identification. A five-digit number assigned to identify the particular cellular carrier from whom one is obtaining service; identifies "home" system.
2. System Identifier. An alphanumeric designator that uniquely identifies a particular system or site within the network.
3. Site Identifier

SID/NSAP

See System Identification/Network Service Access Point (SID/NSAP).

Signal Fail (SF)

1. Also known as Loss of Signal (LOS), detection of a LOS, Loss of Frame (LOF), or Loss of Pointer (LOP) on the lines or on tributaries (for example, OC12s) connected to the system.
2. Threshold value used to compare calculated Bit Error Rate (or Ratio) (BER) value with SF threshold. If BER value is less than SF threshold, an Excessive BER (EXBER) condition is declared. See also Bit Error Rate (or Ratio) (BER).

Simplex (SX)

1. Operating a channel in one direction only with no ability to operate in the other direction.
2. One-sided printing.

SLC

Second Level Controller.

SLM

Single Longitudinal Mode (laser)

SML

1. Small Machine Language
2. Synchronous Maintenance Link
3. Service Management Layer

SMPS

Switched-Mode Power Supply

SNIDER

Asynchronous ASCII Echoplex Protocol (A trademark of Telcordia.)

SNML

Sub-Network Management Layer

SNMP

Simple Network Management Protocol

Software Generic

A set of files representing a software release for a NEtwork element

SOH

Section Overhead

SOIC

Small Outline Integrated Circuit

SOM

Second of Minute

SONET

See Synchronous Optical Network (SONET).

Span

1. Refers to the optical fiber(s) connecting one site to another site; that portion of a high-speed digital system that connects a Central Office (CO) or terminal office to terminal office.
2. Also called a T-Span Line; a repeated outside plant four-wire, two twisted-pair transmission line.
3. A call center term: the total duration of a schedule from start time to stop time, including all breaks.

SPE

Synchronous Payload Envelope. See also Synchronous Payloads.

SPI

Serial Peripheral Interface.

SPU

Shelf Processor Unit

SR

See Short Reach (SR).

SRAM

Static Random Access Memory

SRDM

Subrate Digital Multiplexing

SRM

Subrate Multiplexer. See also SM.

SSP

System Status Panel

SST

Secondary State

SSU

1. Subrate Service Unit
2. Synchronization Supply Unit. See also Building Integrated Timing Supply (BITS).

ST

A specific type of fiber-optic cable connector.

STBY

Standby

STC

STS-1 Transport Conditioner

STD

Standard

STE

Section-Terminating Equipment

STM-1

Synchronous Transport Module, level 1

STM-16

Synchronous Transport Module, level 16

STM-4

Synchronous Transport Module, level 4

STM-64

Synchronous Transport Module, level 64

STM-N

Synchronous Transport Module, Level N

STP

STS-1 Transport Protect

STS Envelope Capacity

Bandwidth within and aligned to the Synchronous Transport Signal (STS) frame that carries the STS Synchronous Payload Envelope (SPE). This bandwidth can be combined from N STS1s to carry an STS-Nc SPE. See STS Synchronous Payload Envelope (STS SPE).

STS Path Overhead (STS POH)

Nine evenly distributed path overhead bytes per 125 μ s starting at the first byte of the Synchronous Transport Signal Synchronous Payload Envelope (STS SPE); provides for communication between creation and disassembly points of the STS SPE.

STS Path-Terminating Equipment (STS PTE)

Network elements that multiplex/demultiplex the Synchronous Transport Signal (STS) payload. STS PTEs interpret and either modify or create the STS Path Overhead (STS POH) necessary to transport the STS payload.

STS Payload Capacity

The maximum bandwidth within the Synchronous Transport Signal Synchronous Payload Envelope (STS SPE) available for payload. See also STS Synchronous Payload Envelope (STS SPE).

STS POH

See STS Path Overhead (STS POH).

STS PTE

See STS Path-Terminating Equipment (STS PTE).

STS Synchronous Payload Envelope (STS SPE)

A 125- μ s frame structure composed of Synchronous Transport Signal Path Overhead (STS POH) and bandwidth for payload. See also STS Path Overhead (STS POH).

STS-1

Synchronous Transport Signal, level 1; the basic logical building block Synchronous Optical Network (SONET) electrical signal with a rate of 51.84 Mb/s.

STS-12

Synchronous Transport Signal, level 12.

STS-12c

Concatenated Synchronous Transport Signal, level 12. A concatenated signal is formed by linking 12 STS-1 signals together, which allows transport of payloads larger than the capacity of an STS-1. (Payloads larger than one STS-1 are known as superate payloads.) An STS-12c payload consists of 2349 bytes (3 783).

STS-192

Synchronous Transport Signal, level 192.

STS-3

Synchronous Transport Signal, level 3

STS-3c

Concatenated Synchronous Transport Signal, level 3. A concatenated signal is formed by linking 3 STS-1 signals together, which allows transport of payloads larger than the capacity of an STS-1. (Payloads larger than one STS-1 are known as superate payloads.) An STS-3c payload consists of

2349 bytes (3 783).

STS-48

Synchronous Transport Signal, level 48.

STS-48c

Concatenated Synchronous Transport Signal, level 48. A concatenated signal is formed by linking 48 STS-1 signals together, which allows transport of payloads larger than the capacity of an STS-1. (Payloads larger than one STS-1 are known as superate payloads.) An STS-48c payload consists of 2349 bytes (3 783).

STS-SPE

See STS Synchronous Payload Envelope (STS SPE) and STS Envelope Capacity.

SUD

Software Update Document

Superate Payload

Payload larger than one STS-1.

Superframe (SF)

One possible framing format for a DS1 signal (corresponding to D4). Unlike Extended Superframe (ESF), there is no sync messaging channel in an SF signal. Compare with Extended Superframe (ESF).

SVC

Switched Virtual Circuit. See also Virtual Circuit (VC).

SYNC

Synchronous. Events that are phase and frequency locked to a common timing reference.

Synchronization Supply Unit (SSU)

See Building Integrated Timing Supply (BITS).

Synchronous

The essential characteristic of time scales or signals in which their corresponding significant instants occur at precisely the same average rate.

Synchronous Digital Hierarchy (SDH)

European set of standard fiber-optic-based serial standards planned for use with Synchronous Optical Network (SONET) and Asynchronous Transfer Mode (ATM); some SDH and SONET standards are identical; standardized by the International Telecommunications Union (ITU). See also Asynchronous Transfer Mode (ATM) and Synchronous Optical Network (SONET).

Synchronous Network

The synchronization of the payloads of a transmission system to a master (network) clock that can be traced to a reference clock.

Synchronous Optical Network (SONET)

A family of fiber-optic transmission rates (51.84 Mb/s to 13.22 Gb/s), created to provide needed flexibility to transport many digital signals with different capacities, and to provide a design standard. SONET is an optical interface standard that allows interworking of transmission products from multiple vendors; it defines physical interface, optical line rates (optical carrier [OC] signals), frame format, and an Operations, Administration, Maintenance, and Provisioning (OAM&P) protocol. A standard for interconnecting digital networks and lightwave systems agreed upon by most major manufacturers. SONET supports new broadband services, and enhanced OAM&P. This standard permits connecting SONET-compatible equipment of one manufacturer to SONET-compatible equipment of another manufacturer on the other end. All present services, such as DS1s, DS2s, DS3s, LANs, etc., can be brought onto a hub and interfaced with SONET.

Synchronous Payloads

Payloads derivable from a network transmission signal by removing integral numbers of bits in every frame; (for example, there are no variable bit stuffing rate adjustments required to fit the payload in the transmission signal).

Synchronous Signal

A signal associated with a clock, or timing, signal. Clock moves data from one point to another. NRZ signals are usually synchronous.

Synchronous Transport Module Level 1 (STM-1)

The basic Synchronous Digital Hierarchy (SDH) logical building block electrical signal with a rate of 155.520 Mb/s. European SDS building block that equates to STS3.

Synchronous Transport Signal Level 1 (STS1)

The basic Synchronous Optical Network (SONET) logical building block electrical signal with a rate of 51.84 Mb/s.

Synchronous Transport Signal Level N (STS-N)

This electrical signal is obtained by byte interleaving N STS1 signals together. The rate of the STS-N is N times 51.84 Mb/s.

System Identification/Network Service Access Point (SID/NSAP)

An alphanumeric designator that uniquely identifies a particular system or site within a network. See also Network Service Access Point (NSAP).

T T0

Digital transmission link with a capacity of 64 kb/s (DS0)

T1

1. A collective term referring to the DS1 facility as a whole. Refers to traffic-carrying circuits.
2. Digital transmission link with a capacity of 1.544 Mb/s (DS1)

T3

1. A collective term referring to the DS3 facility as a whole. Refers to traffic-carrying circuits rather than to modules.
2. Digital transmission link with a capacity of 44.736 Mb/s (DS3)

TAC

Technical Assistance Center

TAP

1. Test Access Port
2. Test Access Path
3. Trouble Analysis Procedures

TAP

Trouble Analysis Procedure.

Target Identifier (TID)

Number that may be null (missing). TIDs identify which network element receives a Transaction Language 1 (TL1) message.

TARP

Target identifier Address Resolution Protocol

TCA

See Threshold Crossing Alert (TCA).

TCP/IP

Transmission Control Protocol/Internet Protocol. A networking protocol that provides communication across interconnected networks, between computers with diverse hardware architectures and various operating systems.

TDM

1. Time Division Multiplexed
2. See also Time Division Multiplexing (TDM).

TEC

Thermo-Electric Cooler

Terminal

An end point or a device connected to same.

Threshold Crossing Alert (TCA)

Threshold crossing parameters are values assigned to specific types of error conditions. The values represent the number of times that condition occurs within a 15-minute or 1-day time frame. If the number of occurrences exceeds the threshold value, a TCA situation displays on the appropriate Performance Monitoring (PM) screen. See also Performance Monitoring (PM).

TID

See Target Identifier (TID).

TIE

Time Interval Error

Time Division Multiplexing (TDM)

A type of multiplexing where two or more channels of information are transmitted over the same link by allocating a different time interval ("slot" or "slice") for the transmission of each channel. (For example: The channels take turns to use the link. Typically a periodic synchronizing signal or distinguishing identifier is required so the receiver can determine which channel is which. TDM becomes inefficient when traffic is intermittent because the time slot remains allocated even when the channel has no data to transmit. Statistical TDM was developed to overcome this problem.

Time Slot

In time division multiplexing or switching, the slot belonging to a voice, data, or video conversation; it can be occupied with conversation or left blank, but the slot is always present. The capacity of the switch or the transmission channel can be determined by figuring how many slots are present.

TIRKS

Trunks Integrated Record Keeping System (A registered trademark of Telcordia.)

TL1

See Transaction Language 1 (TL1).

TMux

Transmultiplex, or the ability to convert M13 formatted DS3s into VT-mapped STS-1s and visa-versa.

ToD

Time of Day

TOP

Task Oriented Practice

Transaction Language 1 (TL1)

A Telcordia-specified protocol for communication between network elements; a subset of CCITT MML Standard.

Transport

Facilities associated with the transmission of OC1 or higher-level signals.

Transport Overhead

The overhead added to Synchronous Transport Signal (STS) Synchronous Payload Envelope (SPE) for transport; consists of Line and Section overhead.

TS0

Time Slot Zero

TSC

Test Session Controller

TSI

Time Slot Interchange

TSS

Transport service switch

TX

Transmitter, transmit path

U

UAP

User Access Privileges

UASCP

Unavailable Seconds-CP-bit Path

UASL

Unavailable Seconds-Line

UASP

Unavailable Seconds-Path

UDS

Unit Data Sheets

UEQ

Unequipped. Equipment entity is not equipped with necessary hardware.

UI

User Interface

UID

User Identifier

UL

Underwriters Laboratories

Unavailable Seconds (UAS)

The parameter UAS measures the duration for which service was unavailable (in seconds). Service becomes unavailable if 10 consecutive Severely Errored Seconds (SES) occur. When the service becomes unavailable, it remains unavailable until 10 consecutive nonseverely errored seconds.

UNEQ-P

Unequipped-Path

Unequipped Channel

A portion of an STS-N such as an STS1 Synchronous Payload Envelope (SPE) or an intentionally unoccupied Virtual Tributary (VT) SPE.

Unequipped Indication

A code that originating equipment places in unequipped channels to indicate to Path-Terminating Equipment (PTE) that the channel is intentionally unoccupied so that alarms may be inhibited.

Unidirectional Ring (UDR)

Ring networks that send the same traffic over two different routes (for example, counter-rotating paths) to each node in the network. This allows the node to select one direction or the other for its own traffic for protection purposes. Rings send all traffic through each node. Rings also permit add/drop of channels at any node using a T Mux.

Unidirectional Switching

The protection switching scheme whereby the failed path is switched to the protection path, but the path in the other direction is not switched.

Unprotected Operation

A network element (usually a terminal) where the individual transport element does not provide traffic protection; a higher network device, such as a cross-connect, provides protection by moving the traffic from the failed transmission path to other paths in the network.

UPC

A method used to polish the ends of fiber optic cables. This method produces a domed polish that reduces back reflections up to -55dB.

UPPS

Unidirectional Path Protection Switching

UPSR

Unidirectional Path Switched Ring

UPW

Urgent Product Warning

USB

Universal Serial Bus

USDB

User Security Database

User Channel

This is allocated to the user for input of information such as data communication for use in maintenance activities and remoting of alarms external to the span equipment in a proprietary

fashion.

USI

User System Interface. More commonly referred to as Communication Interface Unit (CIU). Also called CID or CPORT.

USI-LAN

User System Interface-Local Area Network

USM

User Services Manager

V

VC

1. Virtual Channel
2. Virtual Container
3. See also Virtual Circuit (VC).
4. Virtual Concatenation

VCAT

Virtual Concatenation

VCG

Virtual Concatenation Group

VCN

Virtual Channel Number

VI

Valid Interrupt

Violation Monitoring and Removal (VMR)

Process by which parity errors are corrected at a switch and section. Equivalent to an infinite stop filter in a Frequency Division Multiplexing (FDM) system. Only parity violations are removed; the bit errors that caused them still exist. Detected violations are removed so they do not propagate beyond maintenance span.

Virtual Circuit (VC)

A communications line, voice or data, that appears to the user to be a dedicated point-to-point circuit. VCs are generally set up on a per call basis and disconnected when the call is ended; VC concept was first used in data communications with packet switching; VCs have become more common in ultra-high speed applications; VC is referred to as a logical, rather than physical path for a call.

Virtual Tributary (VT)

A structure designed for transport and switching of sub-DS3 payloads. A unit of sub-SONET

bandwidth that can be combined, or concatenated, for transmission through the network; VT1.5 equals 1.544 Mb/s; VT2 equals 2,048 Mb/s; VT3 equals 3 Mb/s; VT6 equals 6 Mb/s.

Virtual Tributary Group (VTG)

A 9-row by 12-column structure (108 bytes) that carries one or more Virtual Tributaries (VTs) of the same size. Seven VT groups (756 bytes) are byte interleaved within the VT-structured Synchronous Payload Envelope (SPE).

Virtual Tributary, Path Overhead (V5)

One path overhead for every 500 μ s located at the first byte of the Virtual Tributary, Synchronous Payload Envelope (VT SPE). VT path overhead provides for communication between point of creation and point of disassembly of a VT SPE.

Virtual Tributary, Path-Terminating Equipment (VT PTE)

Network elements that multiplex/demultiplex the Virtual Tributary (VT) payload. VT PTEs interpret and either modify or create the path overhead necessary to transport VT payload. A VT PTE is considered a Synchronous Transport Signal Path-Terminating Equipment (STS PTE), a Line-Terminating Equipment (LTE), and/or a Section-Terminating Equipment (STE).

Virtual Tributary, Synchronous Payload Envelope (VT SPE)

A 500- μ s frame structure carried by the VT is composed of VT path overhead and bandwidth for payload; envelope is contained within and can have any alignment with respect to VT envelope capacity. The term typically refers to VT1.5, VT2, VT3, VT6, and VTx-Nc SPEs.

VLR

1. Very Long Reach.
2. Visitors Location Register. A wireless telecommunications term; refers to local database maintained by cellular provider.

VOA

Variable Optical Attenuator

VSCC

Virtual Tributary/Synchronous Transport Signal (level 1) Cross-Connect

VT

See Virtual Tributary (VT).

VT Payload Capacity

The maximum bandwidth within the Virtual Tributary (VT) Synchronous Payload Envelope (SPE) that is available for payload.

VT PTE

See Virtual Tributary, Path-Terminating Equipment (VT PTE).

VT SPE

See Virtual Tributary, Synchronous Payload Envelope (VT SPE).

VT Superframe

The Virtual Tributary (VT) is organized into a 500- μ s superframe structure overlaid on and aligned to the 125- μ s STS1 Synchronous Payload Envelope (SPE), which contains the VT payload pointer and the VT SPE.

VT1

Virtual Tributary 1.

VT1.5

Virtual Tributary 1.5 (1.728 Mb/s).

VT2

Virtual Tributary level 2.

VTG

See Virtual Tributary Group (VTG).

W

WAN

Wide-Area Network.

WDM

Wavelength Division Multiplex (-er, -ing).

Workstation (WS)

Any one of a variety of Visual Display Terminals (VDTs), ranging from a simple keyboard/monitor to an intelligent, processor-controlled VDT.

X

X-bits

Two overhead bits per DS3 M-frame used as an alarm channel.

XBP

X-Bit Processing

XFP

10 Gigabit small form factor pluggable

XLR

See Extra Long Reach (XLR)

XMT

Transmit module.

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