Alcatel-Lucent 1665

Data Multiplexer (1665 DMX) | Release 9.0

Installation Manual

365-372-304R9.0
CC109696781
Issue 2
July 2010

Conformance statements

Federal Communications Commission (FCC) Part 15 Class A

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

Security statement

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

Limited warranty

Alcatel-Lucent provides a limited warranty for this product. For more information, consult your local Alcatel-Lucent customer support team.

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About this document

Purpose

This document provides the information and procedures necessary to install, self-test and turn up the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX).

Reason for reissue

This document is being reissued to include information about new features and hardware associated with R9.0 including:

- LNW87 Private Line Ethernet circuit pack supports up to four PTM-based FE or GigE optical/electrical interfaces. All FE and GigE optical and electrical PTMs currently supported by Alcatel-Lucent 1665 DMX are compatible with the LNW87.
- LNW203 OC-12 Main circuit pack supports a single PTM-based OC-12 signal. All OC-12 PTMs currently supported by Alcatel-Lucent 1665 DMX are compatible with the LNW203.
- LNW504 OC-48/OC-192 VLF Main circuit pack supports four PTM-based OC-48 signals or four PTM-based OC-192 signals. All OC-48 and OC-192 PTMs currently supported by Alcatel-Lucent 1665 DMX are compatible with the LNW504.
- LNW603 OC-192 circuit pack supports a single PTM-based low-speed OC-192 signal. All OC-192 PTMs currently supported by Alcatel-Lucent 1665 DMX are compatible with the LNW603.
- 100BASE-FX-I1 and 100BASE-ZX-I1 FE PTMs support on LNW74 , LNW87, and LNW170.
- OC3X12X48-LR1-I1 and OC3X12X48-IR1-I1 multi-rate PTM for LNW82 and LNW55.
- G.8032 Ethernet Ring Protection (ERP) support on the LNW170.
- SSH File Transfer Protocol (SFTP) supported for software download, database backup, and database restoration.
- SNMP v3 Monitoring (gets and traps).
- RADIUS authentication support for user login.

- Configuration for SONET and SDH on a per port basis on VLF packs (LNW45, LNW49, LNW55).
- Single TID between shelves (up to 12) for DCS applications.

Intended audience

This installation manual is intended to provide individuals and customers the information and procedures necessary to install, self-test and turn up the Alcatel-Lucent 1665 DMX system.

This manual is not a service or operations manual. For any activities involving circuit turn-up, regular maintenance, or trouble analysis, see

- *Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide, 365-372-301*
- *Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide, 365-372-302*

How to use this document

This manual is divided into the following sections with a brief description of the contents of each major part/chapter/appendix:

About this document

This chapter describes the purpose, intended audience, reason for reissue, and organization of this document. This section references related documentation and explains how to order, make comments or recommend Preliminaryhanges to this document.

Chapter 1, “Safety”

This chapter provides important safety instructions for Alcatel-Lucent 1665 DMX.

Part I: “Physical installation and powering”

Part I provides a checklist to ensure that all necessary procedures have been completed. Use of the installation checklist is required to ensure a quality installation, all completed tasks should be checked off and those not completed should be duly noted as to the reason why. This checklist should be turned in as part of your job complete paperwork.

Chapter 2, “Physical installation”

This section provides physical installation instructions for Alcatel-Lucent 1665 DMX power cabling and fiber management.

Chapter 3, “Cable and fiber installation”

This chapter provides the information and procedures for installing and cabling the Alcatel-Lucent 1665 DMX system. It provides the additional cabling information needed for the added DS1, DS3 capacity and Ethernet capacity.

Chapter 4, “Powering and initial circuit pack installation”

This chapter provides information for verifying that the shelf is being supplied with the proper power and provides instructions for circuit pack installation.

Part II: “Stand-alone installation tests”

Chapter 5, “Software download and circuit pack installation”

Software download and circuit pack installation is covered in this chapter.

Chapter 6, “Installation tests”

This chapter verifies proper transmission cabling installation and functionality.

Chapter 7, “Operational tests”

This chapter provides instructions to test protection switching and the non-transmission cabling. This section is not intended to replace acceptance test procedures.

Part III: “Network turn-up and testing”

Chapter 8, “OC-3/12/48 ring setup and testing: integration procedures”

This chapter provides the tests to verify proper ring fiber cabling and protection switching.

Chapter 9, “WDMX setup and testing: integration procedures”

This chapter is used to verify WDMX connectivity between Alcatel-Lucent 1665 DMX nodes. The chapter includes the LNW785 8 channel Optical Multiplexer Demultiplexer (OMD) and the LNW705 XM10G/8 Muxponder circuit packs. It is not intended to replace acceptance test procedures.

Part IV: “Supplementary information and installation checklist”

Appendix A, “Fiber cleaning”

This appendix describes the Lucent recommended method for the cleaning and inspection of optical connectors using specific tools and materials that have been proven to be effective in the assembly and testing of optical equipment.

Appendix B, “Installing fiber connectors and LBOs”

This appendix provides procedures for installing and removing the types of Line Build Out (LBO) units and fiber connectors onto input and output ports found on the Alcatel-Lucent 1665 DMX circuit packs.

Appendix C, “Backplane pin replacement”

This appendix provides information and the procedures used when a pin or blade on the Alcatel-Lucent 1665 DMX backplane has been bent or broken.

Appendix D, “Fiber labeling”

This appendix provides a description of how to label the fiber.

Appendix E, “Pluggable transmission module installation”

Provides examples of various SFP installation.

Glossary

The Glossary provides definitions for telecommunication acronyms and terms.

Index

The Index supplies users with specific subjects and corresponding page numbers to find necessary information.

Safety information

This information product contains hazard statements for your safety. Hazard statements are given at points where safety consequences to personnel, equipment, and operation may exist. Failure to follow these statements may result in serious consequences.

Safety precautions

Adhere to the following safety precautions:

- Electrostatic discharge (ESD)

You must be properly grounded when making contact with the Alcatel-Lucent 1665 Data Multiplexer (1665 DMX) frame and handling circuit packs. Wrist strap ground cords should be routinely tested for the minimum 1-megohm resistance.

- Plug-in storage

Circuit packs should be stored in static-safe packaging or in a grounded cabinet.

For additional safety precautions, please see the *Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide, 365-372-301.*

Laser safety

NOTICE

Laser safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

For more detailed information and safety precautions, see Chapter 1, “Safety”.

Conventions used

Italic typeface denotes a particular product line or information product.

Helvetica Bold typeface signifies a window, section, command or parameter.

Helvetica typeface indicates a faceplate or Alcatel-Lucent 1665 DMX label designation, as in the ACTIVE LED on a circuit pack.

`Courier Bold` indicates a TL1 command typed in a terminal window by the user, as in **`act-user:LT-DMX:LUC01:ctag::DMX2.5G10G;`**

`Courier` typeface indicates the system or PC response to a command.

For the remainder of this document, “Alcatel-Lucent 1665 DMX” is used in place of Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) in most cases.

Related information

Alcatel-Lucent 1665 DMX Documentation Set

The following table lists the documents included in the Alcatel-Lucent 1665 DMX documentation set.

Table 1-1 1665 DMX documentation set

Comcode	Document number	Title
NA	365-372-330	*WaveStar® CIT User Guide*
109 696 807	365-372-300R9.0	*Alcatel-Lucent 1665 Data Multiplexer (DMX) Applications and Planning Guide*
109 696 765	365-372-301R9.0	*Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide*
109 696 773	365-372-302R9.0	*Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide*
109 696 781	365-372-304R9.0	*Alcatel-Lucent 1665 Data Multiplexer (DMX) Installation Manual*
109 696 799	365-372-306R9.0	*Alcatel-Lucent 1665 Data Multiplexer (DMX) TL1 Message Details*
NA	ED8C871-10	*Alcatel-Lucent 1665 Data Multiplexer (DMX) Engineering and Ordering Information*
NA	ED8C871-20	*Alcatel-Lucent 1665 Data Multiplexer (DMX) Interconnect Information*
109 747 055	NA	*Alcatel-Lucent 1665 Data Multiplexer (DMX) Release 9.0.0 Software Release Description* (Paper)
109 747 063	NA	*Alcatel-Lucent 1665 Data Multiplexer (DMX) Release 9.0.0 Software Release Description* (CD-ROM)
109 747 071		*Alcatel-Lucent 1665 Data Multiplexer (DMX) Release 9.0.0 Customer Documentation CD-ROM*

Technical support

For technical support, contact your local Alcatel-Lucent customer support team. See the Alcatel-Lucent Support web site (http://www.alcatel-lucent.com/support) for contact information.

How to order

To order Alcatel-Lucent documents contact your local sales representative or use Online Customer Support (OLCS) (https://support.alcatel-lucent.com).

How to comment

To comment on this document, go to the Online Comment Form (http://infodoc.alcatel-lucent.com/comments) or email your comments to the Comments Hotline (comments@alcatel-lucent.com).

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, please contact the Alcatel-Lucent Services - Environmental Health and Safety organization.

Material content compliance

European Union RoHS

European Union (EU) Directive 2002/95/EC, “Restriction of the use of certain Hazardous Substances” (RoHS), restricts the use of lead, mercury, cadmium, hexavalent chromium, and certain flame retardants in electrical and electronic equipment. This Directive applies to electrical and electronic products placed on the EU market after 1 July 2006, with various exemptions, including an exemption for lead solder in network infrastructure equipment. Alcatel-Lucent products shipped to the EU after 1 July 2006 comply with the EU RoHS Directive.

China RoHS

The Peoples Republic of China Ministry of Information Industry has published a regulation (Order #39) and associated standards regarding restrictions on hazardous substances (China RoHS). Currently, the legislation requires all Electronic and Information Products (EIP) to comply with certain labeling and documentation requirements. Alcatel-Lucent products manufactured on or after 1 March 2007, that are intended for sale to customers in the China market, comply with these requirements.

In accordance with the People's Republic of China Electronic Industry Standard "Marking for the Control of Pollution Caused by Electronic Information Product" (SJ/T11364-2006), customers may access Alcatel-Lucent's Hazardous Substances Table information at either of the following two URLs (for the convenience of our diverse customer base):

- Access via the Alcatel-Lucent Corporate website at: http://www.alcatel-sbell.com.cn/live/home/index.jsp (http://www.alcatel-sbell.com.cn/
- Access via the Alcatel Shanghai Bell website at: http://www.alcatel-sbell.com.cn/wwwroot/images/upload/private/1/media/China-RoHS-HST-3.1.pdf (http://www.alcatel-sbell.com.cn/wwwroot/images/upload/)

Recycling/take-back/disposal of product

Electronic products 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.

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. For information regarding take-back, recycling, or disposal of equipment by Alcatel-Lucent or for equipment take-back requests, visit the Alcatel-Lucent Take-Back web page (http://www.alcatel-lucent.com/product_takeback) or contact Alcatel-Lucent Take-Back Support (takeback@alcatel-lucent.com). For technical information on product treatment, consult the Alcatel-Lucent Recycling Information web page.

1 Safety

Overview

Purpose

This chapter provides important safety instructions for the Alcatel-Lucent 1665 Data Multiplexer (1665 DMX).

Contents

This appendix provides information on the following topics:

Laser safety

System design

The Alcatel-Lucent system complies with FDA/CDRH 21 CFR 1040.10 and 1040.11 as a Class I and with IEC 60825-1 as a Class 1 Optical Fiber Telecommunication laser product. The system has been designed to ensure that the operating personnel is not endangered by laser radiation during normal system operation. The safety measures specified in the Food and Drug Administration's Center for Devices and Radiological Health (FDA/CDRH) regulations and the international standards IEC-60825 or DIN/EN 60825 are met. Please also see "Laser product classification" (p. 1-9).

Potential sources of danger

Beware of the following potential sources of danger which will remain despite all safety measures taken:

- Laser radiation can cause damage to the skin and eyes.
- Laser radiation from optical transmission systems is in a wavelength range that is invisible to the human eye.

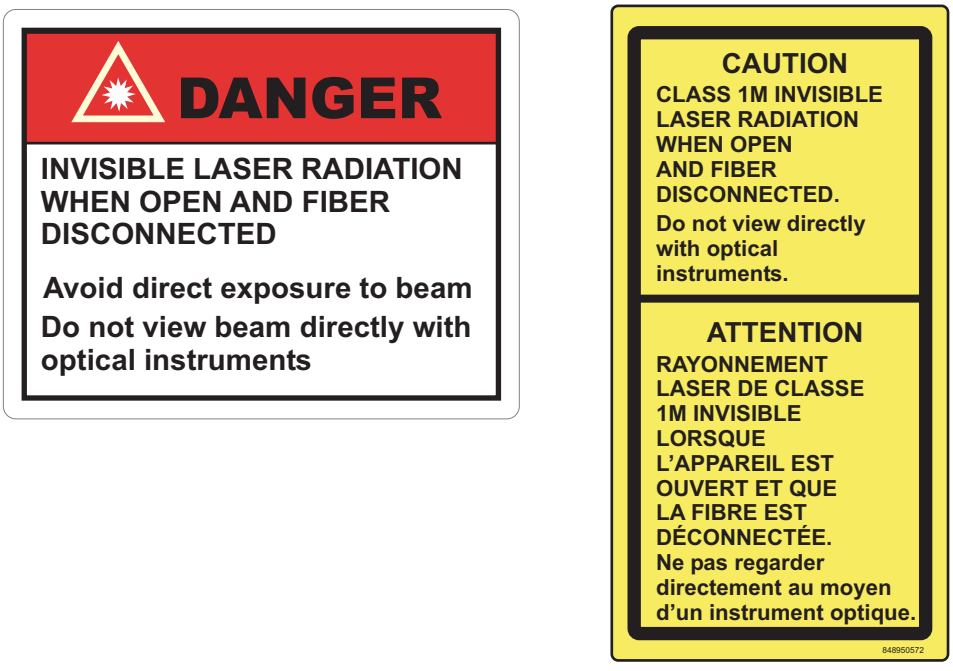
Laser warning labels

The laser warning labels indicate either only the laser class or both the laser class and the maximum output power of laser radiation. The following figure shows different types of laser warning labels and their characteristics.

❶

❷

❸



Legend

1. Laser symbol.
2. Laser classification label. This label may show only the laser class or both the laser class and the maximum output power.
3. Laser warning label.

Laser safety instructions

Observe the following instructions to avoid exposing yourself and others to risk.

- Read the relevant descriptions in the manuals before taking equipment into operation or carrying out any installation and maintenance work on the optical port units, and follow the instructions. Ignoring the instructions can result in exposure to dangerous radiation.
- Do not view directly into the laser beam with optical instruments such as a fiber microscope, because viewing of laser emission in excess of Class 1 limits significantly increases the risk of eye damage.
- Never look into the end of an exposed fiber or an open connector as long as the optical source is still switched on.
- Ensure that the optical source is switched off before disconnecting optical fiber connectors.
- In the event of doubt, check that the optical source is switched off by measuring with an optical power meter.
- When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Electrostatic discharge ESD considerations

ESD precautions

CAUTION

ESD hazard

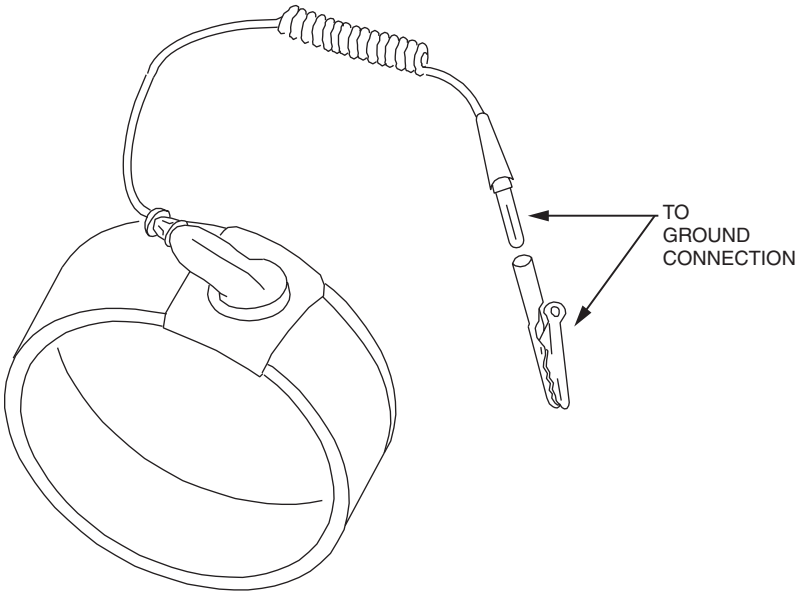
Industry experience has shown that all integrated circuit packs can be damaged by static electricity that builds up on work surfaces and personnel. The static charges are produced by various charging effects of movement and contact with other objects. Dry air allows greater static charges to accumulate.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

In order to prevent damage by electrostatic discharge the following precautions should be observed when handling circuit packs:

- Assume all circuit packs contain solid state electronic components that can be damaged by ESD.
- When handling circuit packs (storing, inserting, removing, etc.) or when working on the backplane, always wear a grounded wrist strap such as the one shown in Figure 1-1, "Static control wrist strap" (p. 5) or wear a heel strap and stand on a grounded, static dissipating floor mat. If a static dissipating floor mat is used, be sure that it is clean to ensure a good discharge path.
- Handle all circuit packs by the faceplate or latch and by the top and bottom outermost edges. Never touch the components, conductors, or connector pins.
- Observe warning labels on bags and cartons. Whenever possible, do not remove circuit packs from antistatic packaging until ready to insert them into slots.
- If possible, open all circuit packs at a static safe work position, using properly grounded wrist straps and static dissipating table mats. If a static dissipating floor mat is used, be sure that it is clean to ensure a good discharge path.
- Always store and transport circuit packs in static safe packaging. Shielding is not required unless specified.
- Keep all static generating materials such as food wrappers, plastics, and styrofoam containers away from all circuit packs. Upon removal from bay, immediately put circuit packs into static safe packages.
- Whenever possible, maintain relative humidity above 20 percent.

To reduce the possibility of ESD damage, assemblies are equipped with grounding jacks to enable personnel to ground themselves using wrist straps [Figure 1-1, "Static control wrist strap" (p. 1-5)] while handling circuit packs or working on an assembly. The jacks for connection of wrist straps are located at the lower right-hand corner of each assembly and are labeled. When grounding jacks are not provided, an alligator clip adapter enables connection to bay frame ground.

Figure 1-1 Static control wrist strap



IMPORTANT SAFETY INSTRUCTIONS

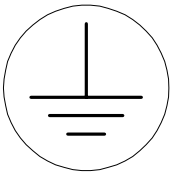
READ AND UNDERSTAND ALL INSTRUCTIONS

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying this product.

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

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on this product.
3. This product should be only operated from the type of power sources indicated on the marking label.
4. Connect this product only to the type of power sources recommended by Alcatel-Lucent. For information on the powering instructions, consult the Installation Manual.
5. This equipment is suitable for mounting on a concrete or other noncombustible surface only.
6. For information on proper mounting instructions, consult the Installation Manual.
7. Install only equipment identified in the Installation Manual. Use of other equipment may result in improper connection of circuitry leading to fire or injury to persons.
8. All metallic telecommunication interfaces should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection, as applicable.
9. Do not use this product near water, for example, in a wet basement.
10. Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
11. Use caution when installing or modifying telecommunications lines.
12. Never install telecommunications wiring during a lightning storm.
13. Never install telecommunications connections in wet locations.
14. Never touch uninsulated telecommunications wires or terminals unless the telecommunications line has been disconnected at the network interface.
15. Never touch uninsulated wiring or terminals carrying direct current or ringing current, or leave this wiring exposed. Protect and tape uninsulated wiring and terminals to avoid risk of fire, electric shock, and injury to service personnel.
16. Never push objects of any kind into this product through slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electrical shock. Never spill liquids of any kind on the product.

17. Slots and openings in the unit are provided for ventilation, to protect it from overheating, and these openings must not be blocked or covered. This product should not be placed in a built-in installation unless proper ventilation is provided.
18. To reduce the risk of an electrical shock, do not disassemble this product. Service should be performed by trained personnel only. Opening or removing covers and/or circuit boards may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electrical shock when the unit is subsequently used.
19. Some of the Alcatel-Lucent 1665 DMX hardware modules contain FDA/CDRH Class I/IEC Class 1 single-mode laser products that are enclosed lightwave transmission systems. Under normal operating conditions, lightwave transmission systems are completely enclosed; nonetheless, the following precautions must be observed because of the potential for eye damage:
    - Do not disconnect any lightwave cable or splice and stare into the optical connectors terminating the cables.
    - Lightwave/lightguide operations should not be performed by a technician who has not satisfactorily completed an approved training course.
    - Do not use optical instruments such as an eye loupe to view a fiber or unterminated connector.
    - More information about laser safety can be found in the Installation Manual.
20. For a unit intended to be powered from –48 V dc voltage sources, read and understand the following:
    - To be powered only by Safety Extra Low Voltage (SELV) -48 V dc Sources.
    - Disconnect up to Two (2) power supply connections when removing power from the system.
    - This equipment must be provided with a readily accessible disconnect device as part of the building installation.
    - Ensure that there is no exposed wire when the input power cables are connected to the unit.
    - Installation must include an independent frame ground drop to building ground. See *Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide, 365-372-301*.



This symbol is marked on the product, adjacent to the ground (earth) area for the connection of the ground (earth) conductor.

- This Equipment is to be Installed Only in Restricted Access Areas on Business and Customer Premises Applications in Accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70. Other Installations Exempt from the Enforcement of the National Electrical Code May Be Engineered According to the Accepted Practices of the Local Telecommunications Utility.

21. For a unit intended to be powered from 100-120/200-240 V ac voltage sources, read and understand the following:
    - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
    - Do not staple or otherwise attach the power supply cord to the building surfaces.
    - Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
    - The socket outlet should be installed near the equipment and should be readily accessible.
    - This product is equipped with a three-wire grounding type plug, a plug having a third (grounding) pin. This plug is intended to fit only into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding type plug. Do not use a 3-to-2-prong adapter at the receptacle. Use of this type adapter may result in risk of electrical shock and/or damage to this product.
    - Do not allow anything to rest on the power cord. Do not locate this product where the cord may be abused by persons walking on it.
    - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

    a. When the powers supply cord or plug is damaged or frayed.

    b. If liquid has been spilled into the product.

    c. If the product has been exposed to rain or water.

    d. If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by qualified technician to restore the product to normal operation.

    e. If the product has been dropped or the cabinet has been damaged.

    f. If the product exhibits a distinct change in performance.

SAVE THESE INSTRUCTIONS

Laser product classification

Standards compliance

The product complies with both IEC standards and the Food and Drug Administration's Center for Devices and Radiological Health (FDA/ CDRH) regulations.

FDA/CDRH regulations

Laser products are classified in accordance with the FDA/CDRH - 21 CFR 1010 and 1040. The classification scheme is based on the ability of the laser emission to cause injury to eye or skin during normal operating conditions.

In the United States, lasers and laser systems in the infrared wavelength range (greater than 700 nm) are assigned to one of the following classes:

- Class I,
- Class IIIb, or
- Class IV.

Laser classification is dependent upon operating wavelength, output power and fiber modefield diameter (core diameter).

IEC requirements

The International Electro-Technical Commission (IEC) establishes standards for the electrical and electronic industries. IEC-60825 has been established for the worldwide safety of laser products.

According to the IEC classification, lasers and laser systems in the infrared wavelength range (greater than 700 nm) are assigned to one of the following classes:

- Class 1,
- Class 3A,
- Class 3B, or
- Class 4.

There are some major differences between the FDA/CDRH regulations and IEC:

1. The Accessible Emission Limits (AEL) are different.
2. Class 3A applies to all wavelengths.
3. Class 3B requires strict engineering controls.
4. Classification is under single fault conditions.

Laser classes

The maximum output power of laser radiation depends on the type of laser diode used. The international standards IEC-60825 or DIN/EN 60825 define the maximum output power of laser radiation for each laser class in accordance with the wavelength.

Table 1-1 Laser classes

Laser class	Wavelength	Maximum output power of laser radiation
1	1310 nm	8.85 mW
	1550 nm	10 mW
3A	1310 nm	24 mW
	1550 nm	50 mW
3B	1310 nm	0.5 W
	1550 nm	0.5 W

Hazard level assignment

Hazard level refers to the potential hazard from laser emission at any location in an end-to-end optical fiber communication system that may be accessible during service or in the event of a failure. The assignment of hazard level uses the AELs for the classes.

Hazard levels for optical transmission equipment are assigned in either of the following two ways:

- Actual output power from the connector or fiber cut.
- If automatic power reduction is used, output power at the connector or fiber cut at one second after automatic power reduction takes place provided that maximum output and restart conditions are met.

Classification of optical telecommunication equipment

Optical telecommunication equipment is generally classified as IEC Class 1 or FDA/CDRH Class I, because under normal operating conditions, the transmitter ports terminate on optical fiber connectors. These are covered by a front panel to ensure protection against emissions from any energized, unterminated transmitter. The circuit packs themselves, however, may be IEC Class 1 or 3A or FDA/CDRH Class I or IIIb.

Alcatel-Lucent 1665 DMX optical specifications

Overview

Table 1-2 provides the optical specifications for Alcatel-Lucent 1665 DMX internal laser circuit packs; these packs do not use PTMs.

Table 1-2 Alcatel-Lucent 1665 DMX optical circuit pack laser safety specifications

Laser Circuit Pack Code	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
LNW27	1310	+3.0	-8.0/-29.0	SM (9)	LC	I(LN50)/1
LNW29	1550	+3.0	-8.0/-29.0	SM (9)	LC	I(LN50)/1
LNW31	1310	0.0	0.0/-18.0	SM (9)	LC	I(LN50)/1
LNW32	1310	1.5	-8.0/-29.0	SM (9)	LC	I(LN50)/1
LNW48	1310	-8.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
LNW50	1310	+2.0	-7.0/-30.5	SM (9)	LC	I(LN50)/1
LNW54	1550	+2.0	-8.0/-29.0	SM (9)	LC	I(LN50)/1
LNW56	1550	+2.0	-1.0/-14.0	SM (9)	LC	I(LN50)/1
LNW57	1533.465	+6.0	3.0/-7.0	SM (9)	LC	I(LN50)/1
LNW58	1310	-1.0	-1.0/-11.0	SM (9)	LC	I(LN50)/1
LNW60	1533.465	+12.5	11.5.-7.0	SM (9)	LC	I(LN50)/1
LNW76	1310	-3.0	-3.0/-18.0	SM (9)	LC	I(LN50)/1

Table 1-3 shows the pluggable transmission module (PTM) laser safety specifications and the supported circuit packs. *Use only the following Alcatel-Lucent Approved Class 1 SFP/XFP transceivers.*

Table 1-3 Alcatel-Lucent 1665 DMX optical PTM laser safety specifications

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
100BASE-ZX-I1	LNW74 LNW87 LNW170	1550	+2.0	-8.0/-31.0	SM (9)	LC	I(LN50)/1
100BASE-LX-L1	LNW63 LNW64 LNW74 LNW87 LNW170	1310	-8.0	-8.0/-25.0	SM (9)	LC	I(LN50)/1
100BASE-FX-I1	LNW74 LNW87 LNW170	1310	-14.0	-14.0/-29.0	MM (50 and 62.5)	LC	I(LN50)/1
1000BASE-ZX-I1	LNW63 LNW64 LNW74 LNW87 LNW170	1550	+5.0	0.0/-22.5	SM (9)	LC	I(LN50)/1
1000BASE-LX-I1	LNW63 LNW64 LNW87 LNW170	1310	-3.0	-3.0/-19.0	SM (9)	LC	I(LN50)/1
1000BASE-SX-I1	LNW63 LNW64 LNW87 LNW170	850	0.0	0.0/-19.0	MM (50 and 62.5)	LC	I(LN50)/1
BASE-T-C1 electrical	LNW63 LNW64 LNW87 LNW170	NA	NA	NA	NA	RJ45	NA
ESCON-MM-I1	LNW73/73C	1310	-14.0	-14.5/-29.0	MM (50 and 62.5)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
GE-1X2XFC-LX-I1	LNW63 LNW64 LNW73/73C LNW87 LNW170 LNW705	1310	-3.0	-3.0/-19.0	SM (9)	LC	I(LN50)/1
GE-1X2XFC-SX-I1	LNW63 LNW64 LNW73/73C LNW87 LNW170 LNW705	850	-2.5	0.0/-17.0	MM (50 and 62.5)	LC	I(LN50)/1
S15512	LNW37 LNW45 LNW55 LNW82 LNW705	1310	-8.0	-8.0/-23.0	SM (9)	LC	I(LN50)/1
OC3IR1-I1	LNW37 LNW45 LNW55 LNW82 LNW705	1310	-8.0	-15.0/-28.0	SM (9)	LC	I(LN50)/1
OC3LR1-I1	LNW37 LNW45 LNW55 LNW82 LNW705	1310	0.0	-10.0/-34.0	SM (9)	LC	I(LN50)/1
OC3X12X48IR1-I1	LNW55 LNW84	1310 (OC-3)	0.0	-10.0/-18.0	SM (9)	LC	I(LN50)/1
		1310 (OC-12/48)	0.0	0.0/-18.0			
OC3X12X48LR1-I1	LNW55 LNW84	1310 (OC-3)	+3.0	-15.0/-2.0	SM (9)	LC	I(LN50)/1
		1310 (OC-12/48)	+3.0	-9.0/-2.0			

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
OC12IR1-I1	LNW49 LNW55 LNW82 LNW203 LNW705	1310	-8.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
OC12LR1-I1	LNW49 LNW55 LNW82 LNW203 LNW705	1310	+2.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
OC12LR2-I1	LNW49 LNW55 LNW82 LNW203 LNW705	1550	+2.0	-8.0/-28.0	SM (9)	LC	I(LN50)/1
OC48LR1-I1	LNW55 LNW62 LNW82 LNW202 LNW402 LNW504 LNW705	1310	+3.0	-9.0/-27.0	SM (9)	LC	I(LN50)/1
OC48LR2-I1	LNW55 LNW62 LNW82 LNW202 LNW402 LNW504 LNW705	1550	+3.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
OC48SR1-I1	LNW55 LNW62 LNW82 LNW202 LNW402 LNW705	1310	-3.0	-3.0/-18.0	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
S2D23C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1558.983	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D25C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1557.363	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D27C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1555.747	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D31C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1552.524	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D33C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1550.918	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
S2D35C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1549.315	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D37C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1547.715	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D45C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1541.349	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D47C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1539.766	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D49C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1538.186	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
S2D53C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1535.036	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D55C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1533.465	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S2D59C6	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1530.334	+4.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S622C47EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1447	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S622C49EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1491	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
S622C51EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1511	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S622C53EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1531	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S622C55EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1551	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S622C57EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1571	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
S622C59EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1691	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
S622C61EL	LNW37 LNW45 LNW49 LNW55 LNW82 LNW504 LNW705	1611	+5.0	-9.0/-28.0	SM (9)	LC	I(LN50)/1
OC192IR2-C1	LNW59 LNW705	1550	+2.0	-1.0/-14.0	SM (9)	LC	I(LN50)/1
OC192IR2-I1	LNW59 LNW502 LNW504 LNW603 LNW705	1550	+2.0	-7.0/-24.0	SM (9)	LC	I(LN50)/1
OC192LR2-C1	LNW59 LNW705	1550	+4.0	-7.0/-24.0	SM (9)	LC	I(LN50)/1
OC192SR1-C1	LNW59 LNW502 LNW504 LNW603 LNW705	1310	-1.0	-1.0/-11.0	SM (9)	LC	I(LN50)/1
X10G21C5	LNW59 LNW502 LNW603 LNW705	1560.606	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G22C5	LNW59 LNW502 LNW603 LNW705	1559.794	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G23C5	LNW59 LNW502 LNW603 LNW705	1558.983	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G24C5	LNW59 LNW502 LNW603 LNW705	1558.173	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
X10G25C5	LNW59 LNW502 LNW603 LNW705	1557.363	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G26C5	LNW59 LNW502 LNW603 LNW705	1556.555	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G27C5	LNW59 LNW502 LNW603 LNW705	1555.747	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G28C5	LNW59 LNW502 LNW603 LNW705	1554.940	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G31C5	LNW59 LNW502 LNW504 LNW603 LNW705	1552.524	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G33C5	LNW59 LNW502 LNW504 LNW603 LNW705	1550.918	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G35C5	LNW59 LNW502 LNW504 LNW603 LNW705	1549.315	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G37C5	LNW59 LNW502 LNW504 LNW603 LNW705	1547.715	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
X10G45C5	LNW59 LNW502 LNW504 LNW603 LNW705	1541.349	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G47C5	LNW59 LNW502 LNW504 LNW603 LNW705	1539.766	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G49C5	LNW59 LNW502 LNW504 LNW603 LNW705	1538.186	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G52C5	LNW59 LNW502 LNW603 LNW705	1535.822	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G53C5	LNW59 LNW502 LNW603 LNW705	1535.036	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G54C5	LNW59 LNW502 LNW603 LNW705	1534.250	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G55C5	LNW59 LNW502 LNW603 LNW705	1533.465	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G56C5	LNW59 LNW502 LNW603 LNW705	1532.681	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1

Module Code	Supported Circuit Pack(s)	Wavelength (nm)	Maximum Out Pwr (dBm)	Max/Min Rcv Pwr (dBm)	Fiber Type (µm)	Conn Type	FDA Class/ IEC Class
X10G57C5	LNW59 LNW502 LNW603 LNW705	1531.898	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G58C5	LNW59 LNW502 LNW603 LNW705	1531.116	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1
X10G59C5	LNW59 LNW502 LNW603 LNW705	1530.334	+3.0	-8.0/Table 1-4	SM (9)	LC	I(LN50)/1

Table 1-4 Dispersion-limited receiver sensitivity for OC-192 DWDM PTMs

Data Rate	Receiver Sensitivity 0 ps/nm dispersion	Receiver Sensitivity 1300 ps/nm dispersion	Receiver Sensitivity 1600 ps/nm dispersion
9.9 Gb/s	-24.0 dBm	-22.0 dBm	NA
10.7-11.1 Gb/s with Forward Error Correction (FEC) enabled	-27.0 dBm	NA	-25.0 dBm

Part I: Physical installation and powering

Overview

Purpose

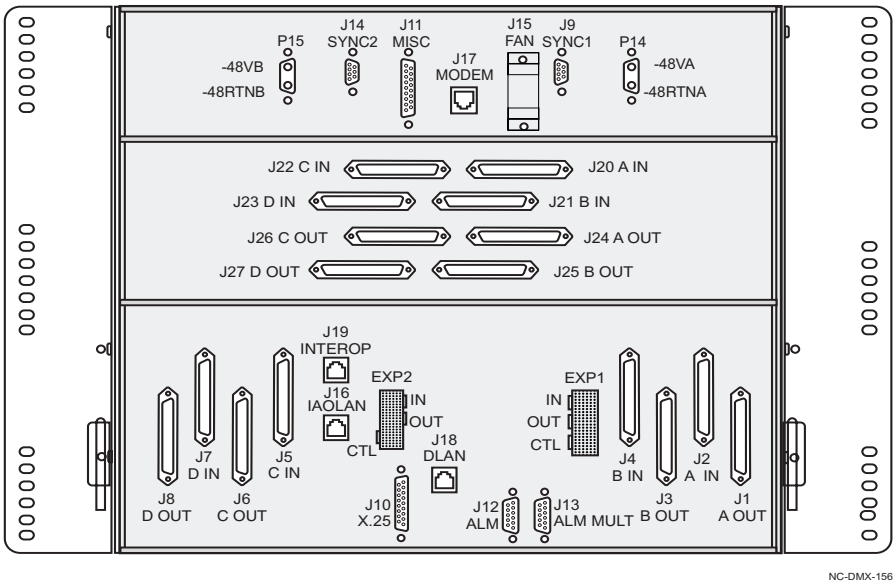
Part I covers the physical mounting of the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) shelf, the running and connecting of power cables, interconnecting cables, alarm cables, and as required, external timing and communication cables. This section also covers initial circuit pack installation (not seated).

Contents

This section is organized into the following chapters:

Note: The high-capacity shelf does not require the installation of an additional fan shelf since the fan unit is integral to the shelf itself. Check Figure I-1, “Alcatel-Lucent 1665 DMX high-capacity shelf backplane” (p. I-2) to determine if the shelf is a Alcatel-Lucent 1665 DMX high-capacity shelf. If the shelf you are installing is NOT equipped with the additional middle connectors (J20 - J27), see the *Metropolis® DMX Access Multiplexer (DMX) Release 5.0 Installation Manual*. Installation details for the Alcatel-Lucent 1665 DMX standard shelf are not included in this issue.

Figure I-1 Alcatel-Lucent 1665 DMX high-capacity shelf backplane



Tools, test equipment, and accessories

This section lists the tools, test equipment and accessories needed to perform all the procedures in this installation manual.

Listed below are the required tools, test equipment and accessories.

Table I-1 Tool, test equipment and accessories required

Quantity	Description	Comments
	Screwdriver(s)	A screwdriver(s) with the appropriate head(s) is (are) required for securing the mounting screws, repositioning the mounting brackets, installing the interfacing cables, and for setting the circuit breakers to the OFF position.
1	Tube NO OX ITE R-3266	
1	***Thomas & Betts**** R-5648B Crimping Tool	The crimping tool and wire stripper are only required if installing DS3 cables. The replacement cassette is for the wire stripper tool.
1	***Paladin***† Coaxial Wire Stripper R-5648B	
	Replacement Paladin† Cassette R-5648B D5	
1	Wire-Wrap Gun R-4496A	The wire-wrap gun is required for terminating DS1 cable and must be able to accommodate 24 gauge wire.
1	Impact Tool -Wire R-5974	The impact tool is required for terminating Ethernet cable onto a 110 type panel.
1	ESD Wrist Strap R-4987C	A wrist strap must be worn when handling circuit packs. Use the electrostatic discharge (ESD) jack provided on the shelf.
1	Torque Wrench R-5952	A torque wrench (50-250 IN-LBS) is used when tightening the Alcatel-Lucent 1665 DMX shelf to the frame. It is also used when reattaching the mounting brackets to the Alcatel-Lucent 1665 DMX shelf.
1	Multimeter (Optional) ITE-6379C	The voltmeter must be capable of measuring DC voltage in the 40 to 60 volt range. The use of the voltmeter is optional since the shelf will alarm or shut down if the proper voltage is not supplied.
1	Ohmmeter ITE-6379C	An ohmmeter is required to verify that the Alcatel-Lucent 1665 DMX is properly grounded.
1	DS1 Error Rate Test Set ITE-7113	A DS1 error rate test set is required for testing of DS1 cabling. A T-BERD 2209 or equivalent is recommended.

Quantity	Description	Comments
1	DS3 Error Rate Test Set ITE-7113	A DS3 error rate test set is required for testing of DS3 cabling. A T-BERD 209 or equivalent is recommended.
1	SONET Optical Test Set	An OC-3, OC-12 or OC-48 test set as required for testing of optical circuit packs. An Agilent OmniBER 718 or equivalent is recommended.
2 or 3	LC-Type Optical Fiber Jumper ITE-7169 (108918269)	Two optical fiber jumpers with LC type connectors are required to optically loop the Alcatel-Lucent 1665 DMX shelf for test purposes. In addition, for shelves containing optical circuit packs in any of the Function unit slots, a single optical fiber jumper is required for testing of the individual ports.
2 or 3	15-dB LC-Type LBO ITE-7196 (108279480)	Two 15-dB LBOs are required when optically looping the Alcatel-Lucent 1665 DMX shelf for test purposes. In addition, for shelves containing optical circuit packs in any of the Function unit slots, a single 15-dB LBO is required for testing of the individual ports
2	LC-Type Optical Fiber Jumper (108918269)	Two optical fiber jumpers with LC type connectors are required to optically loop the Alcatel-Lucent 1665 DMX shelf for test purposes.
	Noyes OFS 300-200X Optical Fiber Scope ITE-7129	Optical Fiber Scope
	2.5 mm Universal Adapter Cap ITE-7129 D1	For use with the Noyes OFS 300-200X Optical Fiber Scope
	1.25mm Universal Adapter Cap ITE-7129 D2	
	Noyes VFS-1 ITE-7187 Video Fiber Scope[1]	This equipment may not be necessary at all locations. It is to be used when the ports need to be verified for cleanliness. If care is exercised when cleaning fibers, the video scope may not be needed

Quantity	Description	Comments
	Individual Presaturated Alcohol Wipes ITE-7136	99% pure isopropyl alcohol
1	CLETOP Cleaning Cassette ITE-7137	Type A Reel
1	CLETOP Cleaning Cassette Replacement Reel ITE-7137 D1	Type A Reel
	Luminex Stick Port Cleaners ITE-7134 & ITE-7135	1.25 mm and 2.5 mm sizes
	Luminex Cloth R-6033	5.5” x 5.5”
1	SPG800	Electric Continuity Test Tool LNW94 TESTPK (for DS1/DS3/Ethernet Cabling)
1	Personal Computer (PC)	Required to run the WaveStar® CIT software. See PC and cable requirements for WaveStar® CIT (p. I-6).
1	CIT Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869). Required to connect the PC to the CIT jack on the front of the SYSCTL circuit pack.
1	LAN 10BaseT Cross-over Cable CAT 5 or better	As required to reach from front of Alcatel-Lucent 1665 DMX to the PC

Notes:

* Registered trademark of Thomas & Betts Corporation

† Registered trademark of Paladin Corporation.

PC and cable requirements for WaveStar® CIT

This section lists the required equipment needed to run the WaveStar® CIT software with the Alcatel-Lucent 1665 DMX.

Quantity	Description	Comments
1	Personal Computer (PC)	See PC minimum requirements below.
1	CIT Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869).
1	Cross Over LAN Cable (If CIT cable is not available)	10-ft. long cable (Comcode 109321810) or equivalent.

PC minimum requirements

It is anticipated that most customers will dedicate a laptop or personal computer (PC) to run the WaveStar® CIT software. However, any properly configured computer will also suffice. The following table shows the requirements for the computer.

Note: Windows Vista is not supported.

Table I-2 Computer requirements

Components	Minimum*	Recommended
Processor	Pentium 266 MHz	Pentium IV 1 GHz
RAM (1 system view)	128 MB	512 MB
RAM (up to 5 system views)	256 MB	1 GB
Virtual Memory	139 MB	267 MB
Available Hard Disk Space†	500 MB	850 MB (for all graphical packages)
Video ‡	800X600 256 Colors (8 Bit)	1024X768 16 Million Colors (24 Bit)
Network Interface**	10/100 baseT Network Card	100 baseT Network Card
CD ROM Drive	Required	Required

Components	Minimum*	Recommended
Operating System	Windows® NT 4.0, Windows® 2000 or Windows® XP	Windows® 2000 or Windows® XP
Internet Browser	Internet Explorer 5.0/5.5/6.0/7.0	Internet Explorer 5.0/5.5/6.0/7.0

Notes:

* Minimum requirements are sufficient to run two to three GUI System Views, unless otherwise noted. Recommended requirements are intended to be used as a general guideline to optimize WaveStar® CIT performance. As the CIT is used with multiple NE connections and multiple NE types, the processor type and speed and the memory size will all factor into CIT performance.

† Available hard disk space required to install and store the CIT and Generic Software is approximately 250 MB (it is 550 MB, if all graphical packages are installed). The additional disk space specified is to provide hard disk space to store Alcatel-Lucent 1665 Data Multiplexer (1665 DMX) backup files**.**

‡ Download and install the latest Video Drivers from the PC/Video manufacturer's web site

** Download and install the latest NIC Drivers from the PC/NIC manufacturer's web site

Table I-3 Installation acceptance checklist

Section and Chapter	Procedure	Required	Completed	
			Yes	No
Part I: "Physical installation and powering"				
Chapter 2, "Physical installation"	Inspection (p. 2-3)	Yes		
	Alcatel-Lucent 1665 DMX high-capacity shelf installation (p. 2-4)	Yes		
	Heat baffle installation (p. 2-8)	See Note 1		
	Power cable and cable bracket installation (p. 2-10)	Yes		
	Fiber management installation (optional) (p. 2-20)	See Note 1		
	Installing the fiber ducts (optional) (p. 2-23)	See Note 1		
	Alcatel-Lucent 1665 DMX high capacity shelf deep add-on fiber tray installation (optional) (p. 2-24)	See Note 1		

Section and Chapter	Procedure	Required	Completed	
			Yes	No
	Alcatel-Lucent 1665 DMX high capacity shelf deep add-on fiber tray and 1-inch sideplate extension installation (optional) (p. 2-26)	See Note 1		
Chapter 3, “Cable and fiber installation”	Cable and optical fiber installation (p. 3-6)	Yes		
	DS1 cable installation (p. 3-7)	See Note 1		
	DS3/EC1 and TMUX 48-port cable installation (p. 3-14)	See Note 1		
	12-DS3/EC1 and TMUX (LNW16 LNW18) cable installation (p. 3-25)	See Note 1		
	10/100BaseT backplane ethernet cable installation (p. 3-32)	See Note 1		
	Ethernet cabling to SFP modules on circuit pack faceplates (p. 3-36)	See Note 1		
	IAO LAN and TCP/IP cable installation (p. 3-39)	See Note 1		
	Modem cable installation (p. 3-43)	See Note 1		
	Sync cable installation (p. 3-45)			
	Sync cable with molded DB-9 connector procedure (p. 3-46)	See Note 1		
	Sync cable with wire-wrap DB-9 connector procedure (p. 3-48)	See Note 1		
	Office alarm cable installation (p. 3-51)	See Note 1		
	Miscellaneous (environmental) discrete telemetry cable installation (p. 3-57)	See Note 1		
	Main optical fiber installation (OC-12, OC-48, OC-192) (p. 3-61)	See Note 1		
	Fiber installation for low-speed packs (p. 3-62)	See Note 1		
	1000Base-F and 100Base-F fiber installation (p. 3-64)	See Note 1		
	Fibre channel fiber installation (p. 3-66)	See Note 1		

Section and Chapter	Procedure	Required	Completed	
			Yes	No
	CIT cable installation (p. 3-67)	See Note 1		
	Final operations (p. 3-70)	Yes		
Chapter 4, “Powering and initial circuit pack installation”	Powering (p. 4-2)	Yes		
	Initial circuit pack installation (p. 4-10)	Yes		
	LNW2 (SYSCTL) installation (p. 4-10)	Yes		
	OC-12 main OLIU installation (p. 4-11)	See Note 1		
	OC-48 main OLIU installation (p. 4-12)	See Note 1		
	OC192 main OLIU installation (p. 4-13)	See Note 1		
	multi-rate main OLIU installation (p. 4-14)	See Note 1		
	LNW80 main switch pack installation (p. 4-15)	See Note 1		
	LNW785 OMD5/8 8-channel low-loss DWDM Optical mux/demux (p. 4-16)	See Note 1		
	LNW705 XM10G/8 muxponder pack (p. 4-17)	See Note 1		
	LNW7(28DS1PM), LNW8(56DS1E1), LNW801(56DS1E1) low-speed installation (optional) (p. 4-18)	See Note 1		
	LNW16 (12DS3/EC1), LNW18 (TMUX), LNW19B (48 DS3/EC1), LNW20 (48TMUX) low-speed installation (optional) (p. 4-19)	See Note 1		
	LNW37 (4 OC-3 PTM OLIUs), LNW45 (8 OC-3 PTM OLIUs), LNW49 (4 OC-12 PTM OLIUs), LNW55 (12OC-3/12OC-12/4 OC-48 PTM OLIUs), LNW62 (4 OC-48 PTM OLIUs), LNW603 (OC-192 PTM OLIU) low-speed installation (optional) (p. 4-20)	See Note 1		
	LNW31 (OC-48 OLIU) or LNW402 (OC-48 PTB-based DWDM) low-speed installation (optional) (p. 4-22)	See Note 1		

Section and Chapter	Procedure	Required	Completed	
			Yes	No
	LNW31 (OC-48 OLIU) or LNW402 (OC-48 PTB-based DWDM) low-speed installation (optional) (p. 4-22)	See Note 1		
	LNW66 (10/100T) installation (optional) (p. 4-23)	See Note 1		
	LNW63 (1000BASE-SX/LX/LX10), LNW64 (8 GbE), LNW74 (10/100 T/F), LNW87 (FE/GBE PL) and LNW170 (100/1G FXS) installation (optional) (p. 4-24)	See Note 1		
	LNW73 (FC-1X/2X) and LNW73C (FC-1X/2X with compression) installation (optional) (p. 4-25)	See Note 1		
	177D/LNW98 blank CP installation (optional) (p. 4-27)	See Note 1		
	177E/LNW97 blank CP installation (optional) (p. 4-27)	See Note 1		
Part II: “Stand-alone installation tests”				
Chapter 5, “Software download and circuit pack installation”	Software installation (p. 5-2)	See Note 1		
	Circuit pack installation (p. 5-2)	See Note 1		
	Use of WaveStar® CIT software (p. 5-6)	Yes		
	Circuit pack firmware version verification (p. 5-11)	Yes		
	Alcatel-Lucent 1665 DMX shelf initialization (p. 5-13)	Yes		
	Provision/enable/disable TCP/IP on an IAO LAN port (p. 5-13)	See Note 1		
	Reset system date and time (p. 5-16)	Yes		
	Provision/enable/disable the Alcatel-Lucent 1665 DMX as a TL1 TCP/IP GNE (p. 5-17)	See Note 1		
Chapter 6, “Installation tests”	LBO software settings (p. 6-2)			
	Setting DS1 LBOs (p. 6-2)	See Note 1		
	Setting DS3/EC1 and TMUX LBOs (p. 6-3)	See Note 1		

Section and Chapter	Procedure	Required	Completed	
			Yes	No
	Local equipment and cross-connect tests (p. 6-6)	Yes		
	Local equipment and cross-connect tests (p. 6-6)			
	DS1 terminating equipment loopback testing (p. 6-6)	See Note 1		
	DS1 non-terminating equipment transmission testing (optical main OLIU) (p. 6-8)	See Note 1		
	DS1 non-terminating equipment transmission testing (LNW80 switch or LNW59 without optics) (p. 6-9)	See Note 1		
	DS1 protection switching (p. 6-10)			
	DS1 function unit protection switching test (manual) (p. 6-10)	See Note 1		
	DS1 function unit protection switching test (command) (p. 6-12)	See Note 1		
	DS1 path switching test (manual) (p. 6-13)	See Note 1		
	DS1 cleanup procedures (p. 6-14)			
	Delete any existing DS1 cross-connections (p. 6-14)	See Note 1		
	Verify cross-connects removed (p. 6-17)	See Note 1		
	DS3/EC1 and TMUX testing procedure (p. 6-17)			
	Verify provisioning (p. 6-18)	See Note 1		
	DS3 terminating equipment loopback testing (optical main OLIUs) (p. 6-18)	See Note 1		
	DS3 non-terminating transmission (optical main OLIU) (p. 6-22)	See Note 1		
	“DS3 protection switching” (p. 6-23)			
	DS3 function unit protection switching test (manual) (p. 6-23)	See Note 1		
	DS3 function unit protection switching test (command) (p. 6-24)	See Note 1		
	DS3 path switching test (command) (p. 6-25)	See Note 1		

Section and Chapter	Procedure	Required	Completed	
			Yes	No
	DS3 cleanup procedures (p. 6-26)			
	Delete the existing DS3 cross-connections (p. 6-26)	See Note 1		
	LNW66 and LNW74 (10/100T) TX ethernet cabling testing (p. 6-29)			
	Ethernet port assignment verification testing (p. 6-30)	See Note 1		
	Ethernet port wiring verification testing (p. 6-31)	See Note 1		
	OC-3 (LNW37, LNW45, LNW55)/OC-12 (LNW49, LNW55)/OC-48 (LNW55, LNW62, LNW402) low-speed SFP test procedure (p. 6-34)			
	OC-3/OC-12/OC-48 SFP low-speed SFP test procedure (p. 6-34)	See Note 1		
	OC-3 (low-speed) testing (p. 6-35)			
	OC-3 testing procedure (p. 6-35)	See Note 1		
	OC-12 testing procedure (p. 6-39)	See Note 1		
	OC-12 facility loopback testing (p. 6-42)	See Note 1		
	OC-48 low-speed testing procedure (p. 6-44)	See Note 1		
	OC-192 facility loopback testing (p. 6-49)	See Note 1		
	OC-192 low-speed testing procedure (p. 6-48)	See Note 1		
	OC-192 facility loopback testing (p. 6-49)	See Note 1		
	LED test procedure (p. 6-52)	See Note 1		
	Additional optical tests (optional) (p. 6-52)			
	Low-speed optical testing (p. 6-52)	See Note 1		
Chapter 7, “Operational tests”	See Note			
	Office alarm test procedure (p. 7-3)	See Note 1		
	Automatic protection switching and alarm test (p. 7-6)			
	Main OLIU switching test (p. 7-7)	See Note 1		

Section and Chapter	Procedure	Required	Completed	
			Yes	No
	Manual switching tests (p. 7-9)			
	Main OLIU switching test (p. 7-9)	See Note 1		
	External timing verification (p. 7-10)			
	Timing verification test procedure (p. 7-11)	See Note 1		
	Miscellaneous (environmental) discrete telemetry test (p. 7-14)			
	Miscellaneous discrete telemetry test procedure (p. 7-14)	See Note 1		
	Modem connection test (p. 7-17)			
	Modem connection test procedure (p. 7-17)	See Note 1		
	Final operations (p. 7-19)	Yes		
Part III: “Network turn-up and testing”				
Chapter 8, “OC-3/12/48 ring setup and testing: integration procedures”	Fiber installation (p. 8-2)			
	Fiber installation procedure (p. 8-4)			
	Optical transmission test (OC-192, OC-48, OC-12) (p. 8-9)			
	Transmission test procedure (p. 8-9)			
	Automatic protection switching test (p. 8-10)			
	Main OLIU switch test (p. 8-11)			
	Manual switching tests (p. 8-12)			
	Manual switching test procedure (p. 8-12)	Yes		
	Function units/growth slots, switching test (p. 8-13)			
	Final operations (p. 8-14)			
	Steps (p. 8-14)			
	Clear PM registers (p. 8-14)			
Chapter 9, “WDMX setup and testing: integration procedures”	Turn-up and test the LNW785 8-channel OMD (p. 9-4)			

Section and Chapter	Procedure	Required	Completed	
			Yes	No
	Turn up and test the LNW705 muxponder (p. 9-6)			
	Integrating the LNW705 into the LNW785 (p. 9-9)			
	Connecting the ring (Mains) to the WDMX (p. 9-11)			
	Removing provisioning and equipage from the LNW705 and LNW785 (p. 9-14)			

Notes:

1. Only required if equipped.

2 Physical installation

Overview

Purpose

This section provides physical installation instructions for the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX), power cabling and fiber management.

Contents

This chapter provides information on the following topics

Planning

Description

This section provides information about the following:

- Tools, test equipment and accessories
- Mounting options
- Cabling checklist.

Tools, test equipment and accessories

The tools, test equipment and accessories necessary to perform the procedures in this section are listed in Table I-1, “Tool, test equipment and accessories required” (p. I-3) Installers should have both metric and English unit tools.

Mounting options

The mounting brackets on the Alcatel-Lucent 1665 DMX high-capacity shelf are designed to allow for mounting in the following:

- Standard 23-inch wide network bay frames

  The recommended network bay frames are the ED-8C500 and the ED-8C501 (rear access only). See Figure 2-3, “Typical Alcatel-Lucent 1665 DMX high-capacity shelf bay mounting arrangements” (p. 2-7) for Alcatel-Lucent 1665 DMX shelf placement in a network bay frame.
- Seismic 23-inch network bay frame

  The ED-8C800-500 and ED-8C801-501 seismic network bay frames are designed for use in all earthquake zones, and in general, do not require top support at the 7-foot level. These frames meet Pacific Bell Equipment Framework Standard PBS-000-102PT.
- 19-inch bay frames
- 23-inch wide EIA-Type bay frames

Alcatel-Lucent 1665 DMX added to the Alcatel-Lucent1675 LambdaUnite MSS configurations

In order for the Alcatel-Lucent 1665 DMX shelf to be placed in a NEBS-2000 Cabinet frame combined with Alcatel-Lucent 1675 LambdaUnite MSS, mounting kit 848856514 is required. For a more complete view of mounting the Alcatel-Lucent 1665 DMX into the Alcatel-Lucent 1675 LambdaUnite MSS Frame, see SIG-L-WW-161A, Alcatel-Lucent 1665 DMX added to the Alcatel-Lucent 1675 LambdaUnite MSS configurations.

Cabling checklist

This section briefly describes cabling information. For information regarding available cable lengths and ordering comcodes, see ED8C871-10.

Table 2-1, "Cable requirements and options" (p. 2-3) lists available cables.

Table 2-1 Cable requirements and options

Cable assembly description	Required	See note
Power	Yes	1
Fan	Yes	2

Notes:

1. One -48VA and -48VB main power feeder is required per shelf.
2. One Fan Cable (848839551) is shipped with each Alcatel-Lucent 1665 DMX high-capacity shelf.

Inspection

Description

Perform the following procedure before installing the Alcatel-Lucent 1665 DMX high-capacity shelf.

Steps

1 Inspect the shelf for visible damage including bent or touching backplane pins.

> **Note:** If any backplane pins are damaged, see Appendix C, "Backplane pin replacement" for instructions on repairing the damaged pin(s).

2 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Alcatel-Lucent 1665 DMX high-capacity shelf installation

Description

As an example of the Alcatel-Lucent 1665 DMX high-capacity shelf installation, the following steps describe mounting the shelf from the rear of a 23-inch bay frame. Mounting from the front of a 23-inch bay frame or from the front/rear of a 19-inch bay frame is similar with the exception of the position of the side brackets.

Positioning of the side brackets is also specified.

Note: This section requires previous bay frame installation and grounding.

Steps

1 Determine the mounting configuration for the Alcatel-Lucent 1665 DMX high-capacity shelf:

- Type of bay frame (23-inch or 19-inch wide)
- Mounting position (front or rear)
- Position in bay (bottom to top).

Note: The Alcatel-Lucent 1665 DMX high-capacity shelf is shipped with the mounting brackets positioned for mounting to the rear of a 23-inch wide network bay frame.

The Alcatel-Lucent 1665 DMX high-capacity shelf mounting brackets may have to be repositioned and remounted, depending on the frame type and mounting position (front or rear).

2 If necessary, reposition the shelf mounting brackets accordingly.

For 23-inch frame, front or rear mounting, see Figure 2-1, “Alcatel-Lucent 1665 DMX high-capacity shelf mounting bracket positions — 23-inch frame” (p. 2-5).

For 19-inch frame, front or rear mounting, see Figure 2-2, “Alcatel-Lucent 1665 DMX high-capacity shelf mounting bracket positions — 19-inch frame” (p. 2-6).

Figure 2-1 Alcatel-Lucent 1665 DMX high-capacity shelf mounting bracket positions — 23-inch frame

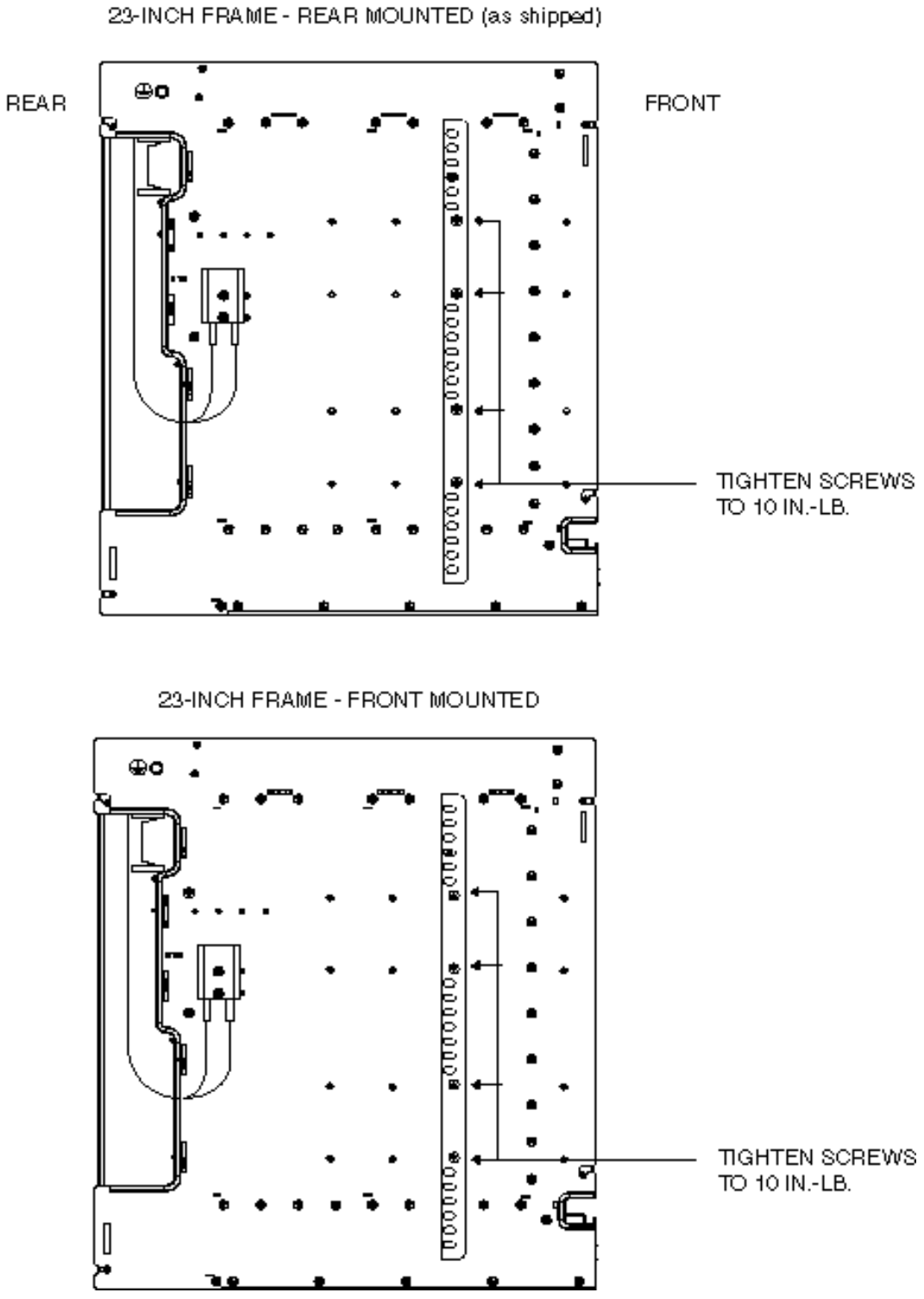
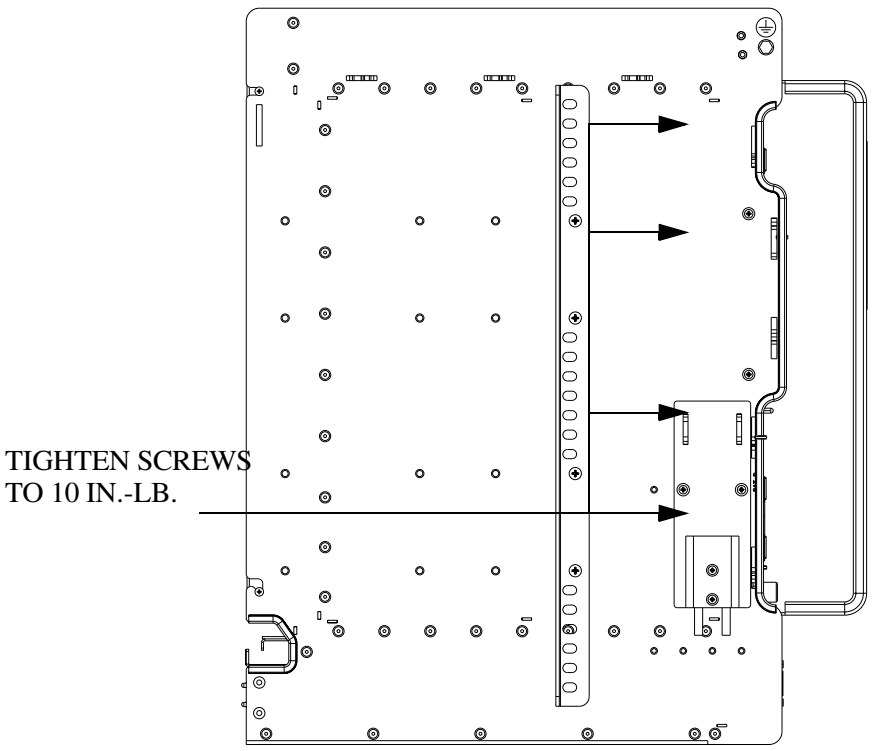


Figure 2-2 Alcatel-Lucent 1665 DMX high-capacity shelf mounting bracket positions — 19-inch frame



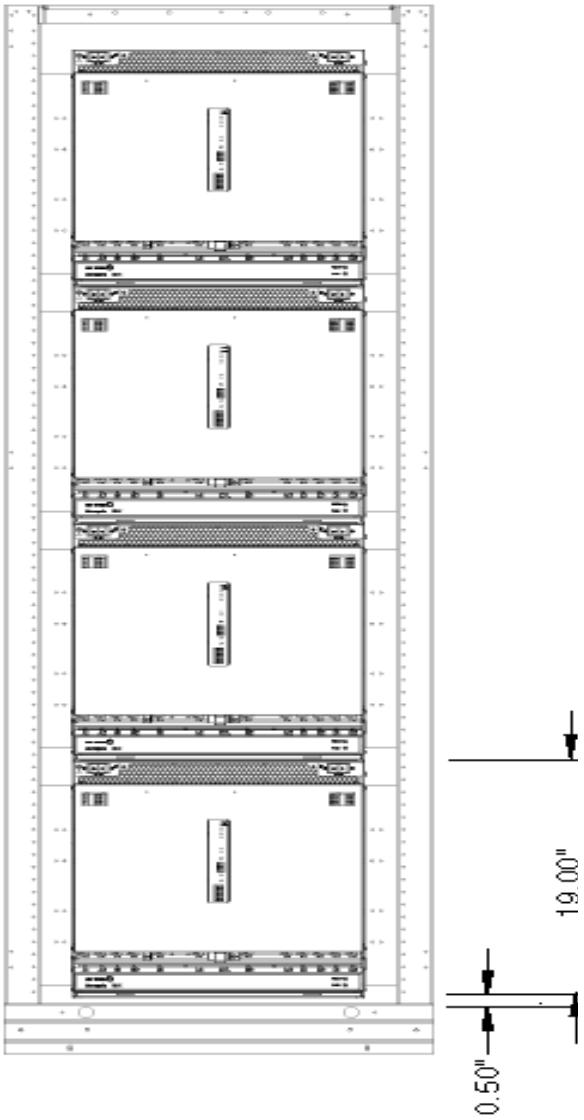
3 Determine the position that the Alcatel-Lucent 1665 DMX high-capacity shelf will be mounted. Figure 2-3, “Typical Alcatel-Lucent 1665 DMX high-capacity shelf bay mounting arrangements” (p. 2-7) shows the recommended mounting positions. Start at the bottom of the bay and add shelves from bottom to top.

Note: There is a switch on the fan unit controller board. It is labeled "CF ALM ON" (Clogged Filter Alarm ON) and "CF ALM OFF" (Clogged Filter OFF). The fan ships with the switch in the disable position which prevents the filter alarm from working. To enable the filter alarm, remove the fan unit from the Alcatel-Lucent 1665 DMX high-capacity shelf, move the switch to the "CF ALM ON" position and then reinstall the fan unit in the shelf.

4 Position the Alcatel-Lucent 1665 DMX high-capacity shelf in the frame and secure it to the frame using the thread-forming screws included with the shelf (4 screws per side). Tighten the screws to 21 in.-lb. (minimum)/30 in.-lb. (maximum).

Note: Be sure to mount the shelf using the thread-forming screws provided with the shelf to ensure a solid ground connection from the bay to the shelf.

Figure 2-3 Typical Alcatel-Lucent 1665 DMX high-capacity shelf bay mounting arrangements



5 Verify with an ohmmeter that the Alcatel-Lucent 1665 DMX high-capacity shelf is grounded to the bay frame. Measure between the Alcatel-Lucent 1665 DMX high-capacity shelf mounting bracket and the office ground lug on the bay frame.

Requirement: The ohmmeter reads less than 1 ohm.

6 If the Ohmmeter reading is not less than 1 ohm, a secondary ground should be used for each shelf. Use an 8 AWG wire from the UL (Green M5 Screw) safety ground on the side of the shelf to bay frame or office ground.

Note: It is important to remove the paint in the area where the wire is to be connected to the bay and to apply no-ox before connecting the wire.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Heat baffle installation

Description

If an Alcatel-Lucent 1665 DMX shelf is added above existing non-Alcatel-Lucent 1665 DMX equipment, one heat baffle (848862181) must be installed between the Alcatel-Lucent 1665 DMX shelf and the existing equipment.

1 Determine the mounting configuration for the heat baffle:

- Type of bay frame (23-inch or 19-inch wide)
- Mounting position (front or rear)
- Position in bay (below shelf mounted above non-Alcatel-Lucent 1665 DMX heat generating equipment).

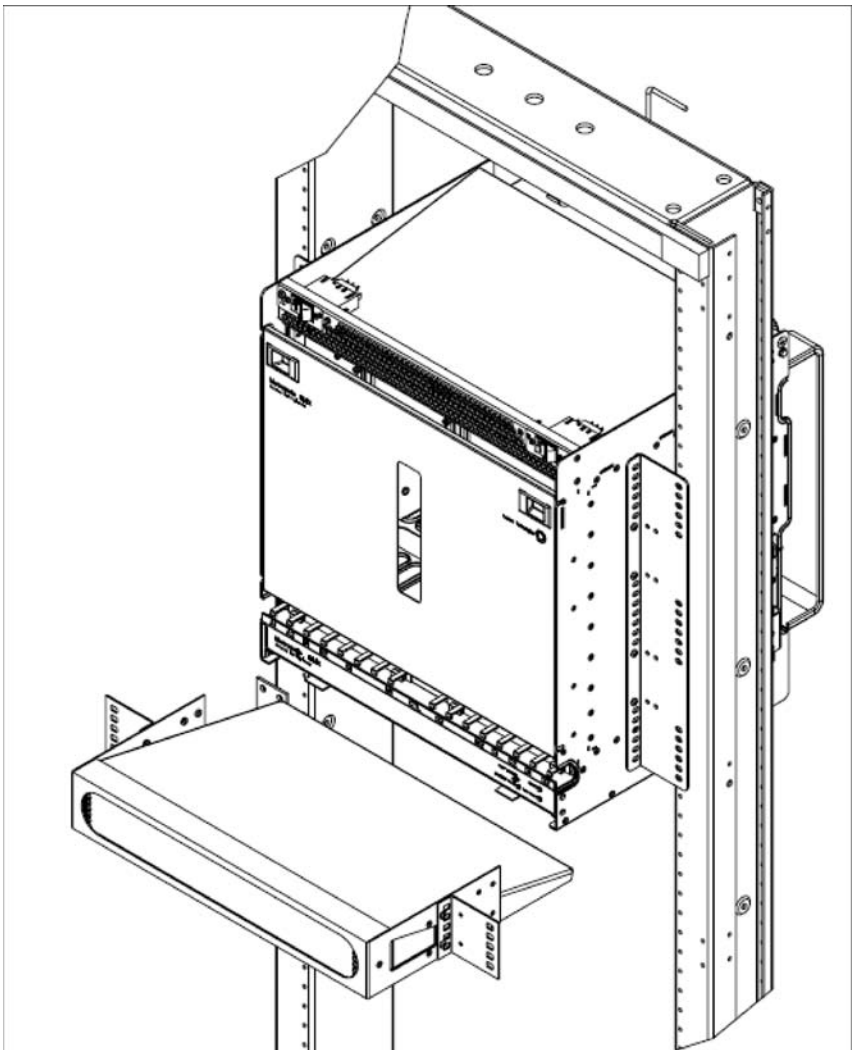
Note: The heat baffle is shipped with the mounting brackets positioned for mounting to the rear of a 23-inch wide network bay frame.

The heat baffle mounting brackets may have to be repositioned and remounted, depending on the frame type and mounting position (front or rear).

2 If necessary, reposition the heat baffle mounting brackets to match the position of the Alcatel-Lucent 1665 DMX high-capacity shelf.

3 See Figure 2-4, Heat baffle position (p. 2-9) for the mounting position and orientation of the heat baffle.

Figure 2-4 Heat baffle position



END OF STEPS

Power cable and cable bracket installation

Description

This section provides instructions on installing the power cable and cable bracket for the Alcatel-Lucent 1665 DMX high-capacity shelf.

Note: Two feeders (A and B) are required from the battery distribution fuse board (BDFB) or battery distribution circuit breaker bay (BDCBB) to the Alcatel-Lucent 1665 DMX bay.

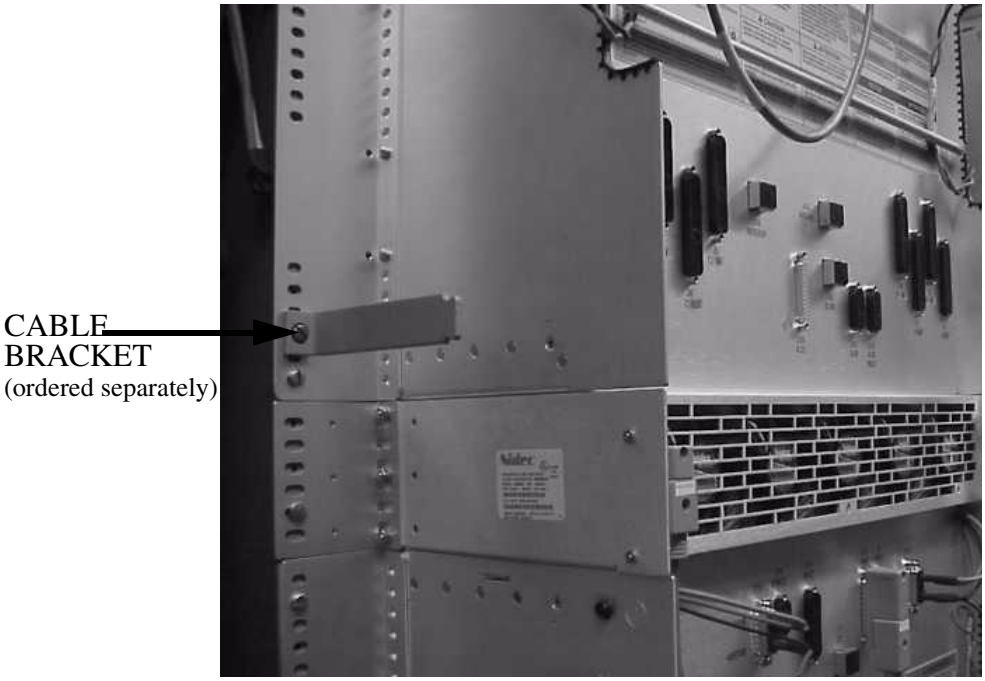
Table 2-3, "Power cable assemblies" (p. 2-19) and Table 2-4, "Power connections" (p. 2-20) list the available power cable assemblies and power connections, respectively.

Important! Verify that the BDCBB breakers are off or that the BDFB fuses are not installed.

Steps

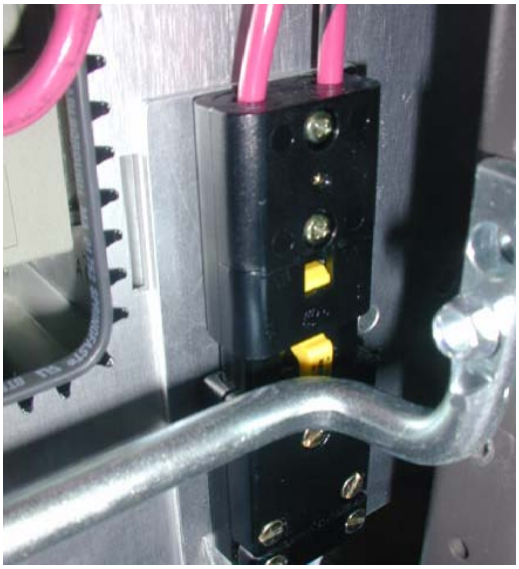
1 Install cable brackets (two per Alcatel-Lucent 1665 DMX high-capacity shelf, 1 on each side) as shown in Figure 2-5, "Cable brackets" (p. 2-11).

Figure 2-5 Cable brackets



Note: Depicted above is the Alcatel-Lucent 1665 DMX shelf for reference purposes only, the cable bracket is the same for the Alcatel-Lucent 1665 DMX high-capacity shelf.

2 If installation is on raised floors, rotate the power connectors on each side of the shelf 180 degrees, as shown:



Otherwise, ensure that power connector is in the following position:

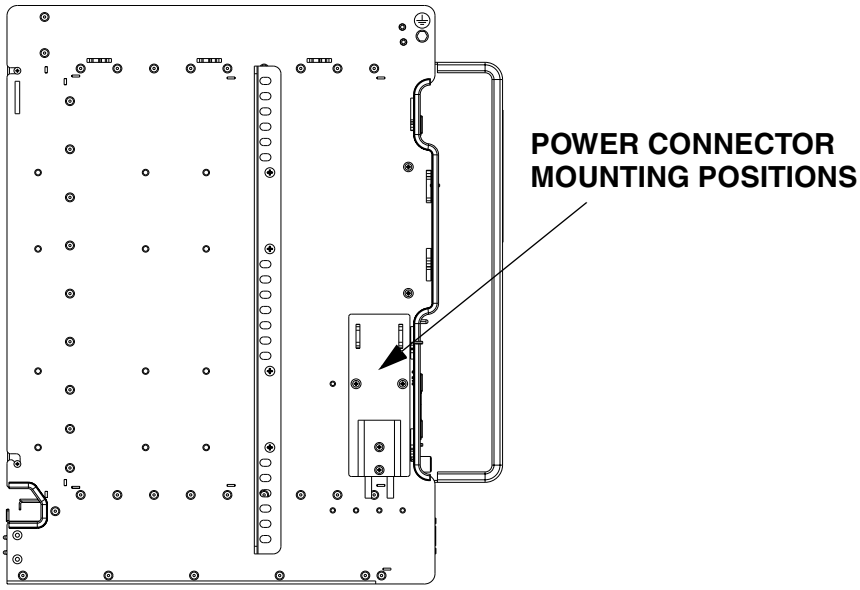
Table 2-2 Power cable positioning

3 There are two mounting positions on each side of the Alcatel-Lucent 1665 DMX high-capacity shelf chassis as shown in Figure 2-6, “Power connector mounting positions” (p. 2-13). It is recommended that if multiple shelves are being installed in a frame, the power connector positions be alternated as shown in Figure 2-7, “Alternating power cable routing” (p. 2-14).

Determine if the power connector needs to be moved to the other mounting position. If so, move the power connector to the other mounting position now.

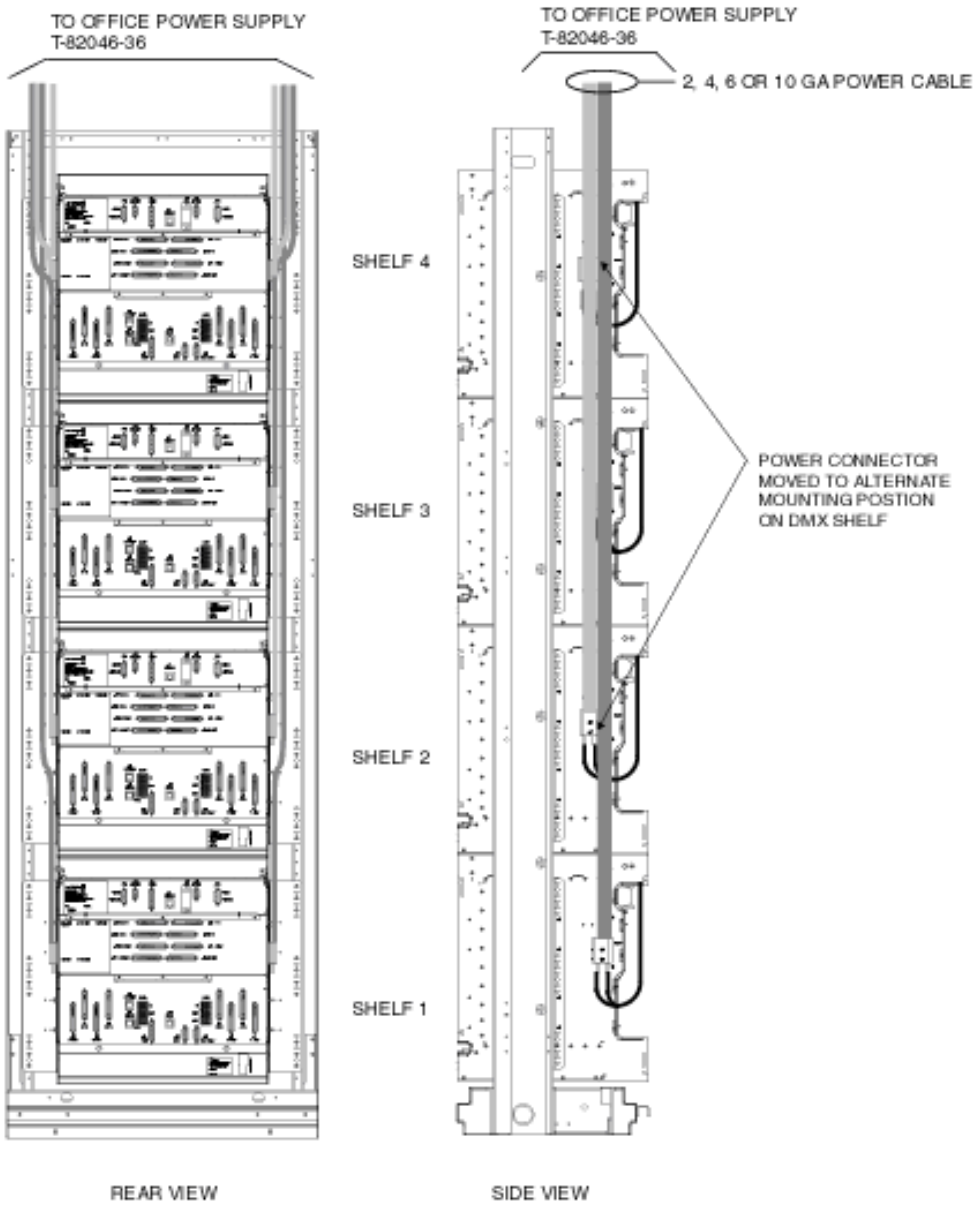
Important! Use provided hardware only to adjust the position of the power connector housing.

Figure 2-6 Power connector mounting positions



Note: Figure 2-7, "Alternating power cable routing" (p. 2-14) shows the typical power cabling for four Alcatel-Lucent 1665 DMX high-capacity shelf shelves in a standard bay frame. The side view shows the power connectors for shelves 3 and 1 mounted closest to the rear of the shelves (default position) with the cabling for shelf 1 bending away from the power connector on shelf 3 and running over it until the power cables exit the bay. The power connectors for shelves 4 and 2 are mounted in the alternate position on the shelf and the power cables routed in the same manner.

Figure 2-7 Alternating power cable routing



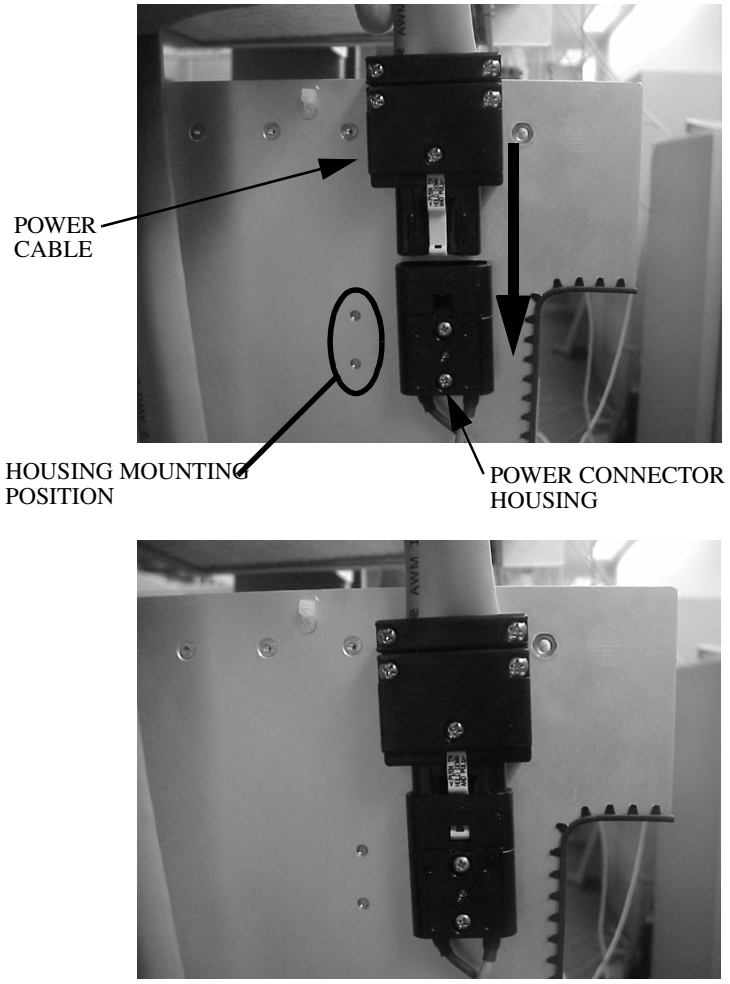
4 Connect power cable to the power connector housing on the Alcatel-Lucent 1665 DMX high-capacity shelf chassis Figure 2-8, “Power connection” (p. 2-15).

NOTICE

Equipment damage

Ensure that the 4 pins inside the connector attached to the power cable are properly aligned before inserting the connector into the power connector housing. Failure to do so may result in damage to the connector.

Figure 2-8 Power connection

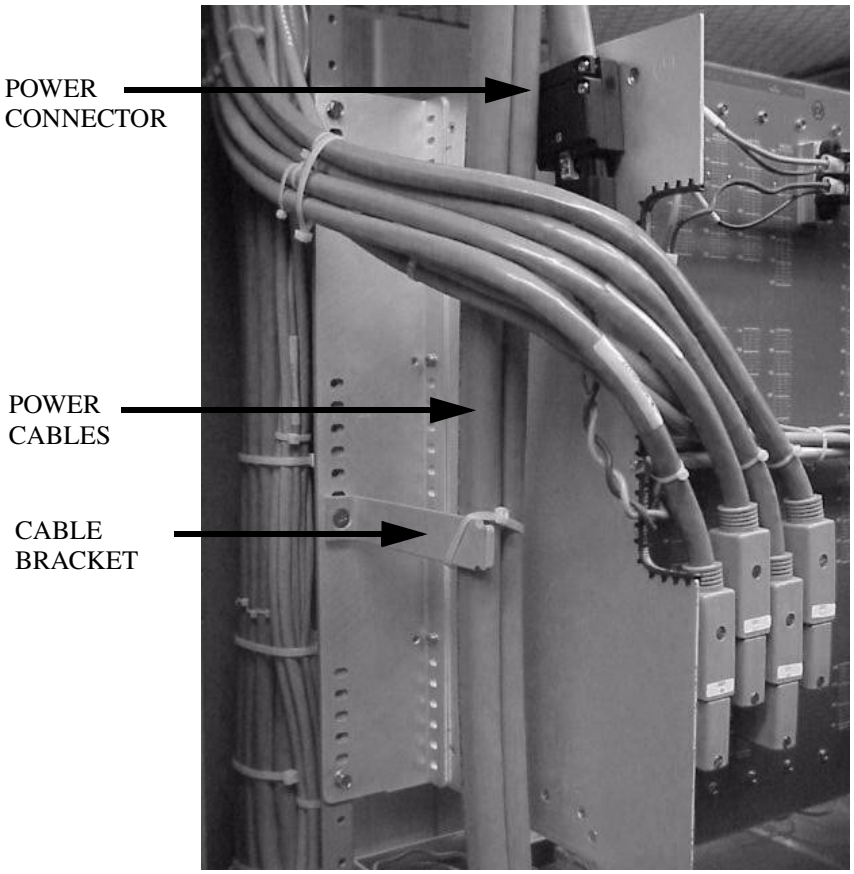


5 Route the power cable out of the bay and toward the BDCBB or BDFB, stacking the cable in the bay as shown in Figure 2-9, “Power cable routing with cable bracket” (p. 2-16) or Figure 2-10, “Power cable routing without cable bracket” (p. 2-17).

Note: The Alcatel-Lucent 1665 DMX high-capacity shelf is powered by -48 V DC.

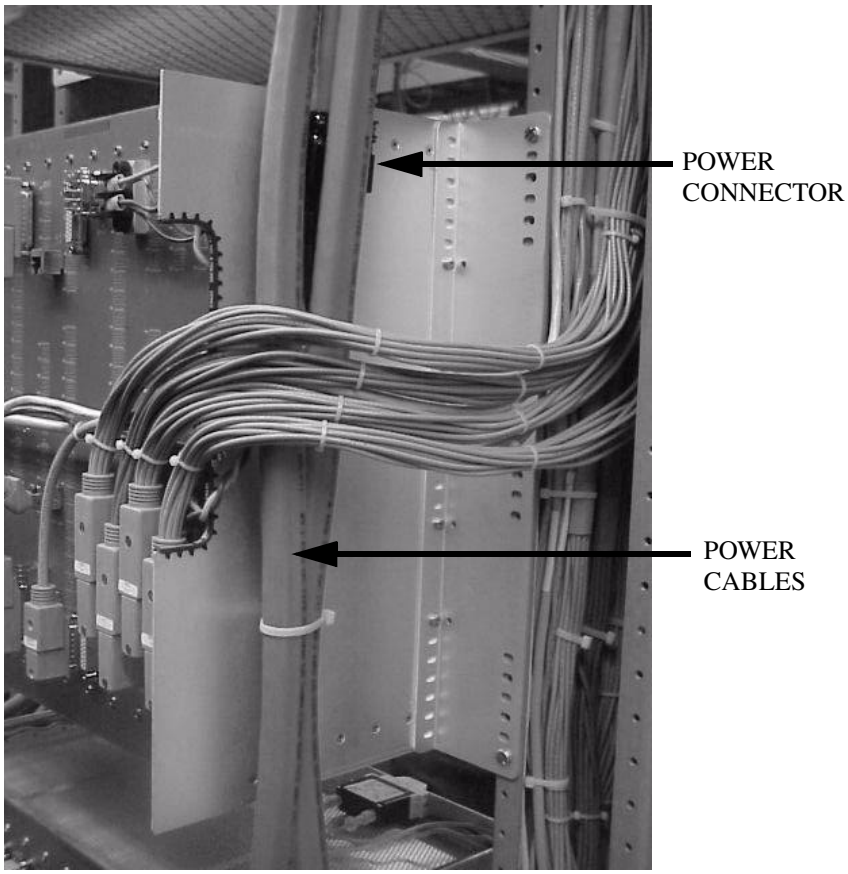
Important! Verify that the BDCBB breakers are off or that the BDFB fuses are not installed.

Figure 2-9 Power cable routing with cable bracket



Note: The shelf shown in Figure 2-9, "Power cable routing with cable bracket" (p. 2-16) is the Alcatel-Lucent 1665 DMX and not the Alcatel-Lucent 1665 DMX high-capacity shelf, however the power cabling remains the same and is depicted here for reference.

Figure 2-10 Power cable routing without cable bracket



Note: The shelf shown in Figure 2-9, “Power cable routing with cable bracket” (p. 2-16) is the Alcatel-Lucent 1665 DMX and not the Alcatel-Lucent 1665 DMX high-capacity shelf, however the power cabling remains the same and is depicted here for reference.

6 Splice feeders from the BDCBB or BDFB to the Alcatel-Lucent 1665 DMX high-capacity shelf power cable. See Table 2-4, “Power connections” (p. 2-20).

Note: Four cables are spliced to each power cable:

1. BAT A
2. BAT A RTN
3. BAT B
4. BAT B RTN

7 Label the feeders at the BDCBB or BDFB as follows:

1. BAT A
2. BAT A RTN
3. BAT B
4. BAT B RTN

Note: Each feeder at the BDCBB should be rated 1.25 times the rating of the circuit breaker on the shelf. For the BDFB, the fuse rating should be 1.5 times the rating of the circuit breaker on the shelf.

8 Leave the BDCBB breakers off or BDFB fuses out until you are ready to perform the procedures in Chapter 4, "Powering and initial circuit pack installation" of this manual.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 2-3 Power cable assemblies

Description	Cable gauge	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX high-capacity shelf backplane connections
Power cable	10	848841839	12	Connectors mounted on sides of the shelf (BAT A and BAT B)
	6	848635009	12	
		848635033	50	
		848635041	75	
		848635058	100	
	4	848935268	35	
		848634986	55	
		848635025	100	
	2	848935276	55	
		848634978	85	
		848635017	100	
Cable connector kit	2	848635231		
	4	848635249		
	6	848635934		
Cable bracket		846593002		

Table 2-4 Power connections

Backplane connection	Shelf power connectors (on sides)	Pin#	Color	Designation	Name
P14	BAT A	1	R	-48VA	BAT A
		2	W	-48RTNA	BAT A RTN
P15	BAT B	1	R	-48VB	BAT B
		2	W	-48RTNB	BAT B RTN

Notes:

1. Power cables for shelves 4 and 2 are mounted using the connector mounting holes located closest to the rear of the shelves with the cabling for shelf 2 bending away (out) from the power connector in shelf 4 and running over it until the power cables exit the bay. The power runs for shelves 1 and 3 are run in the same manner as described for shelves 2 and 4 using the connector holes located furthest from the rear of the shelf.

Fiber management installation (optional)

Description

This section describes how to install the fiber management pieces that may be shipped with the bay.

Note: If fiber management is to be installed, the width of the bay footprint must be extended by at least 2.5 inches beyond the bay upright on each side. This is typically done using base fillers.

Comcode numbers are in parentheses next to the part.

Steps

1 Locate three spools (*106738156*), one fiber radius control module (*321-1B*), one left fiber spool bracket (*848919213*) and three M4 X 6 bracket mounting screws (*901340059*) for each shelf being installed.

2 For each spool, put a nylach fastener through the middle, then insert a pin halfway through.

Note: It is very important that the pin is not completely inserted. This will deform the fastener and prevent it from being assembled to the bracket.

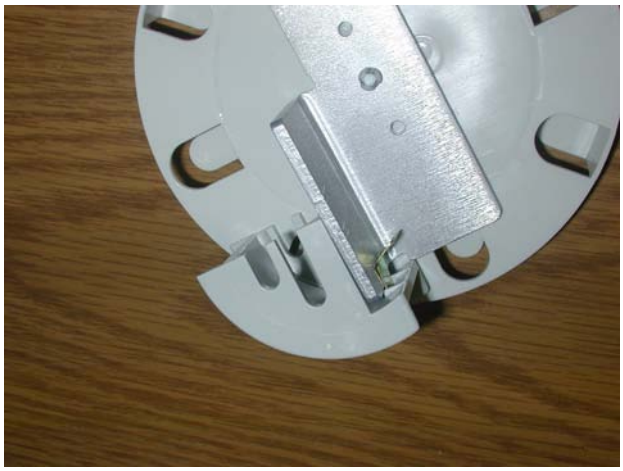
3 Line up the nylach fastener in one of the spools with the large holes on the top arm of the bracket.

4 Spin the spool until the peg on its back fits into the smaller hole on the arm of the bracket. This will keep the spool from spinning any further.

5 Push the pin until it is completely fastened.

6 Repeat Step 3 through Step 5 for all the spools, with three per bracket.

7 Attach one fiber radius control module to the bottom of each bracket, as shown:



8 Position one of the brackets along the left side of shelf 1. Secure with three bracket mounting screws.

9 Repeat Step 8 for all the other shelves being installed.

10 Locate three spools (*848919221*), one fiber radius control module (*321-1B*), one right fiber spool bracket (*848919221*) and three M4 X 6 bracket mounting screws (*901340059*) for each shelf being installed.

11 For each spool, put a nylach fastener through the middle. Then insert a pin halfway through.

Note: It is very important that the pin is not completely inserted. This will deform the fastener and prevent it from being assembled to the bracket.

12 Line up the nylach fastener in one of the spools with the large holes on the top arm of the bracket.

13 Spin the spool until the peg on its back fits into the smaller hole on the arm of the bracket. This will keep the spool from spinning any further.

14 Push the pin until it is completely fastened.

15 Repeat Step 12 through Step 14 for all the spools, with three per bracket.

16 Attach one fiber radius control module to the bottom of each bracket.

17 Position one of the brackets along the right side of shelf 1. Secure with 3 bracket mounting screws.

18 Repeat Step 17 for all the other shelves being installed.

19 Using a label maker, create 16 labels "LS" and 8 labels "HS".

20 Attach the "HS" labels to the uppermost spool on each of the brackets.

21 Attach the "LS" labels to the middle and lower spools on each of the brackets.

22 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Installing the fiber ducts (optional)

Description

This procedure describes how to install the fiber ducts on either side of the bay. The fiber ducts may be shipped with the Alcatel-Lucent 1665 DMX.

Note: If fiber management is to be installed, the width of the bay footprint must be extended by at least 2.5 inches beyond the bay upright on each side. This is typically done using base fillers.

Steps

1 From the 848920476 Fiber Duct Components Kit, locate 2 fiber ducts (*848955845*), 6 metal fiber duct brackets (*848915153*), 12 12-24 X 3/8” HWH screws (*901211177*) and 6 M5 X 8 (*901340547*).

2 Using the 12-24 X 3/8” screws, secure the metal brackets to the front of the bay (three on each side), using the holes in between shelf 1 and shelf 2; shelf 2 and shelf 3; shelf 3 and shelf 4.

3 Position one of the fiber ducts along the left side of the shelves.

4 From the front of the duct, use the M5 X 8 screws to secure it to the metal brackets.

5 Position the other fiber ducts along the right side of the shelves.

6 From the front of the duct, use the M5 X 8 screws to secure it to the metal brackets.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Alcatel-Lucent 1665 DMX high capacity shelf deep add-on fiber tray installation (optional)

Purpose

This procedure describes how to install the deep add-on fiber tray that ships loose with 1665 DMX high capacity shelf (849130158). The procedure assumes that the shelf has already been mounted in a bay frame.

Steps

1 Verify shelf has been physically mounted in a bay frame prior to installing installing the new deep add-on fiber tray.

2 Move any fibers/cables from the existing 1665 DMX high capacity shelf fiber tray out of to way to avoid damage.

NOTICE

Laser hazard

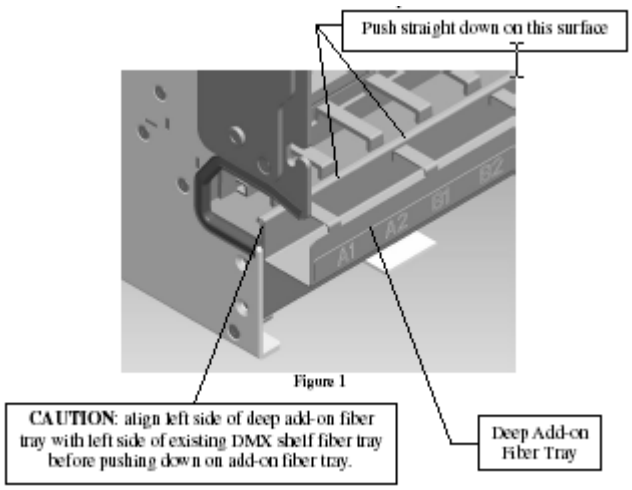
Be careful when touching fibers that are live and ensure the minimum bend radius is met to prevent a service event.

3 Align the end of the deep add-on tray with the existing shelf fiber tray as shown in Figure 2-11, Deep add-on fiber tray (p. 2-26).

4 Push straight down on the add-on fiber tray to install it to the shelf.

Note: Do not use installed add-on fiber tray as a means to lift or position the shelf or risk of injury could occur.

Figure 2-11 Deep add-on fiber tray



Alcatel-Lucent 1665 DMX high capacity shelf deep add-on fiber tray and 1-inch sideplate extension installation (optional)

Purpose

This procedure describes how to install optional add-on sideplate extensions, a deep add-on fiber tray, edging grommet material and a flush front coveron the 1665 DMX high capacity shelf (848793287). The procedure assumes that the shelf has already been mounted in a bay frame.

Steps

1 Verify shelf has been physically mounted in a bay frame prior to installing installing the new deep add-on fiber tray.

2 Move any fibers/cables from the existing 1665 DMX high capacity shelf fiber tray out of to way to avoid damage.

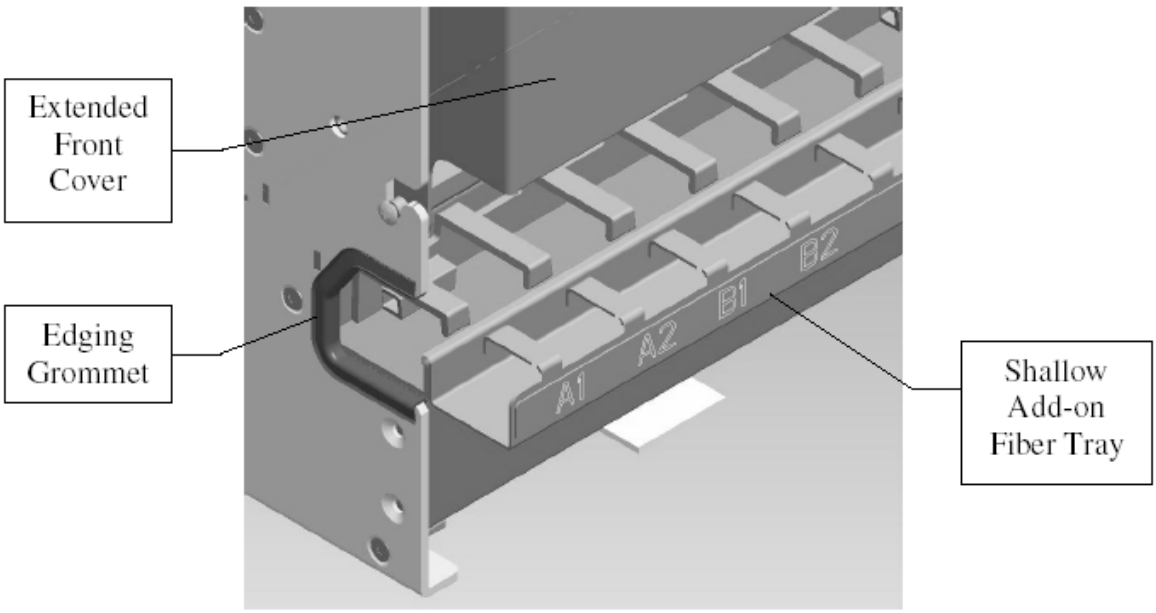
NOTICE

Laser hazard

Be careful when touching fibers that are live and ensure the minimum bend radius is met to prevent a service event.

3 If present, remove and discard the extended front cover, see Figure 2-12, Cover, fiber tray, and edging grommet (p. 2-27). It will not be reused on the shelf.

Figure 2-12 Cover, fiber tray, and edging grommet

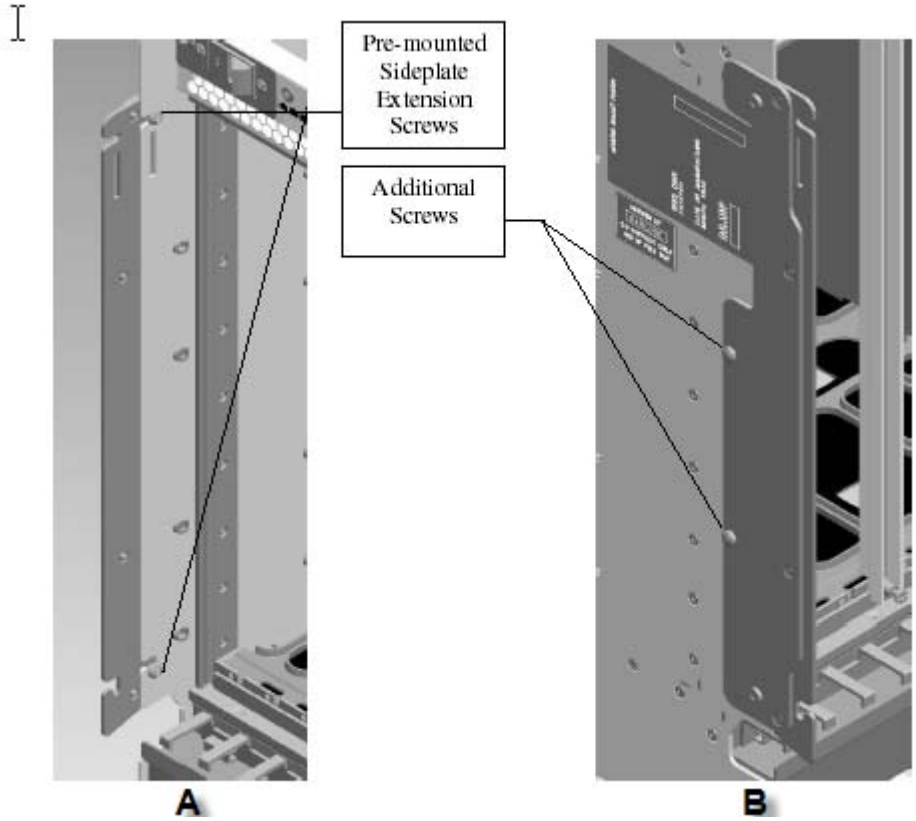


4 If present, remove and discard the existing shallow add-on fiber tray, see Figure 2-12, Cover, fiber tray, and edging grommet (p. 2-27), by rotating/bending the front of the tray upward and then pushing the whole tray upward.

5 Remove the existing edging grommet, see Figure 2-12, Cover, fiber tray, and edging grommet (p. 2-27), from the sideplates near each end of the fiber tray. If too many fibers/cables are routed thru this area to make removal possible, this step can be skipped and the existing fiber tray can remain.

6 Loosen the two screws pre-mounted in the left sideplate extension assembly and mount the assembly to the shelf left sideplate, see Figure 2-13, Sideplate extensions (p. 2-28), Part A.

Figure 2-13 Sideplate extensions

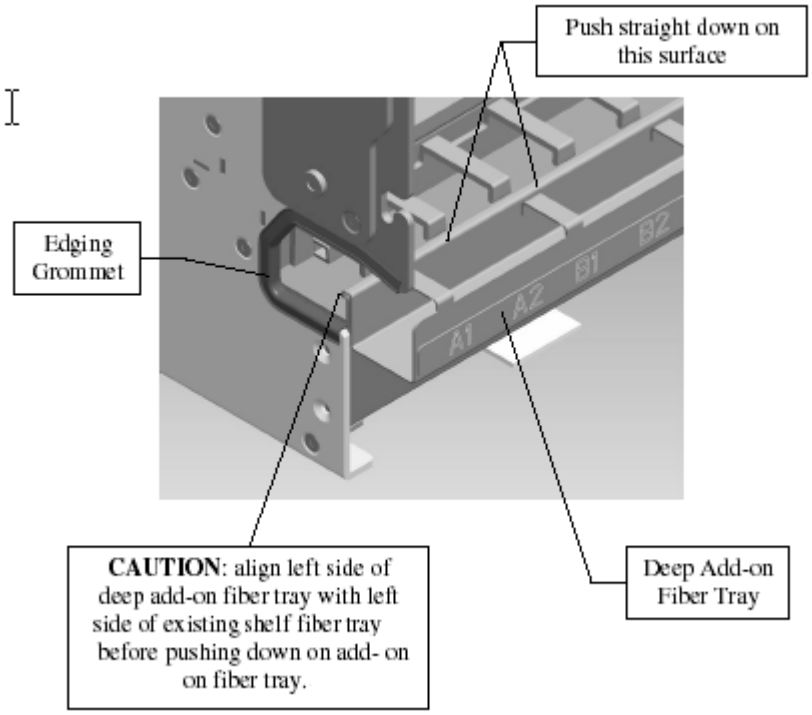


7 Install two additional sideplate extension screws, see Figure 2-13, Sideplate extensions (p. 2-28), Part B. Tighten all four screws.

8 Repeat Step 5 - Step 7 for the right side plate extension assembly.

9 Install the new edging grommet on each sideplate and sideplate extension. The left side installation, see Figure 2-14, Deep add-on fiber tray with edging grommet (p. 2-29). If the original grommet could not be removed due to existing fibers/cables, then cut a short (approximately, 1-inch long) piece of grommet and install it on the bottom edge of each sideplate extension.

Figure 2-14 Deep add-on fiber tray with edging grommet



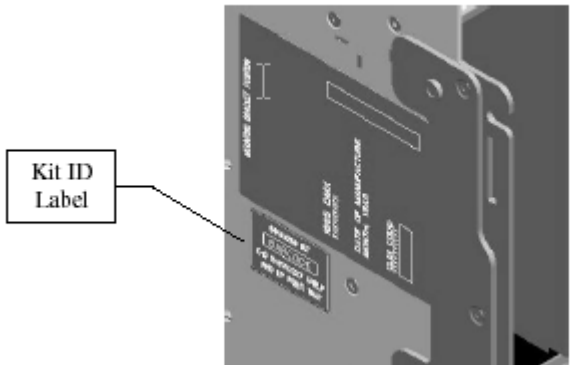
10 Align the end of the deep add-on tray with the existing shelf fiber tray, see Figure 2-14, Deep add-on fiber tray with edging grommet (p. 2-29).

11 Push straight down on the add-on fiber tray to install it to the shelf.

Note: Do not use installed add-on fiber tray as a means to lift or position the shelf or risk of injury could occur.

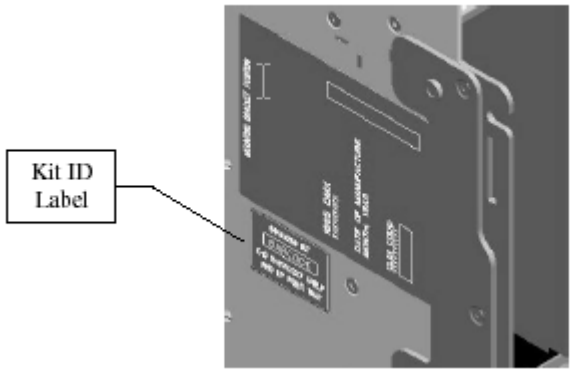
12 Install the Kit ID label on the left sideplate, see Figure 2-15, Kit ID label (p. 2-30).

Figure 2-15 Kit ID label



13 Install the flush front cover, see Figure 2-16, Flush front cover (p. 2-30).

Figure 2-16 Flush front cover



END OF STEPS

3 Cable and fiber installation

Overview

Purpose

This section provides installation and cabling instructions for the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX).

Contents

This chapter provides information on the following topics:

Planning

Description

This section provides information about the following:

- Tools, test equipment and accessories
- Mounting options
- Cabling checklist.

Tools, test equipment and accessories

The tools, test equipment and accessories required in this section are located in Tools, test equipment, and accessories (p. I-2). Installers should have both metric and English unit tools.

.Cabling checklist

This section briefly describes cabling information. For information regarding available cable lengths and ordering comcodes, see ED8C871-10.

Table 3-1, “Cable requirements and options” (p. 3-3) lists available cables.

Table 3-1 Cable requirements and options

Cable assembly description	Required	See note
CIT or Cross over LAN Cable	Yes	1, 7
DS1	Optional	2
DS3	Optional	3
TMUX	Optional	3
10/100BaseT Ethernet	Optional	4
Office Alarm	Optional	5
Office Alarm Mult	Optional	5
Miscellaneous Discrete	Optional	6
LAN 10BaseT (Crossover)	Optional	7
LAN 10BaseT (Straight Through)	Optional	7
Sync Timing	Optional	8
Modem	Optional	9

Notes:

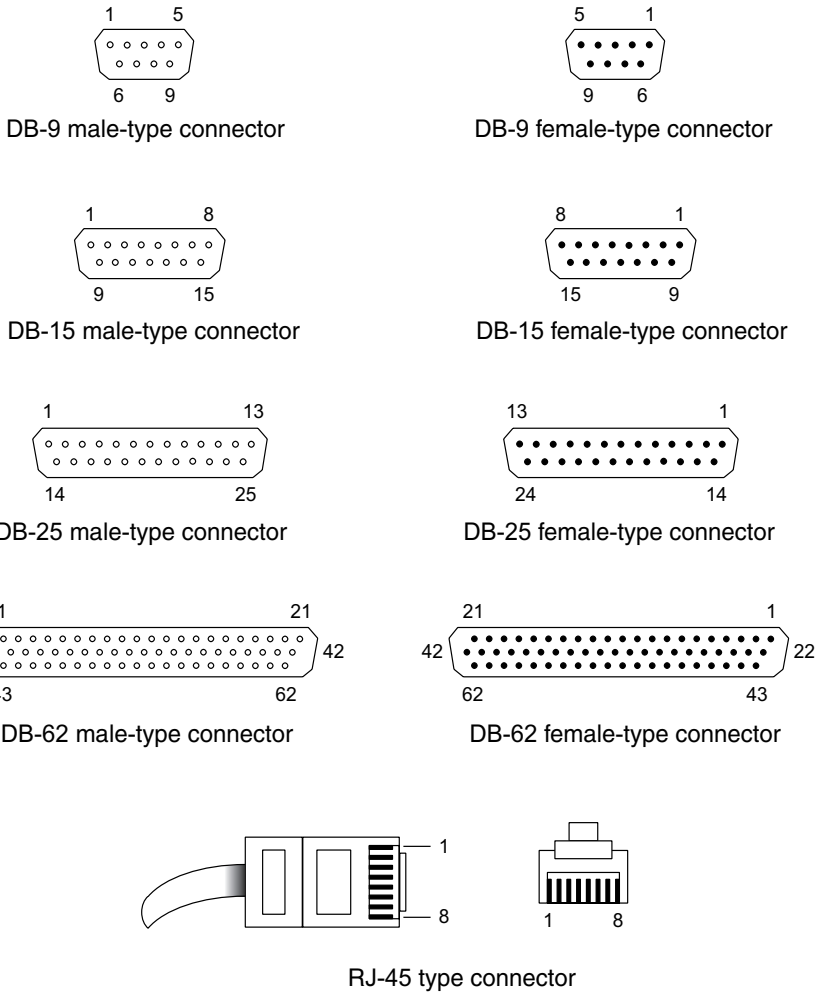
1. One CIT Cable Assembly or Crossover LAN cable is required for PC interface with the Alcatel-Lucent 1665 DMX high-capacity shelf (not included with equipment).
2. a. One DS1 Cable Assembly is required for each Function unit equipped for 28 DS1 service (LNW7). Each DS1 Cable Assembly consists of two separate cables, both containing 28 pairs of 24 gauge cable. One cable is for input and the other cable is for output.
   b.Two DS1 Cable Assemblies are required for each Function unit equipped for 56 DS1 service (LNW8, LNW801). Each DS1 Cable Assembly consists of two separate cables, both containing 28 pairs of 24 gauge cable. One cable is for input and the other cable is for output.
3. a. One DS3 Cable Assembly is required for each Function unit equipped for 12 DS3 service (LNW16/LNW18). Each orderable code provides two cables One cable consists of 12 inputs and the other cable consists of 12 outputs. One DS3 Cable Assembly equipped with 24-coax cables may be used if growth to 48 DS3 packs is planned.
   b. Two DS3 Cable Assemblies are required for each Function unit equipped for 48 DS3 service (LNW19B/LNW20). Each DS3 Cable Assembly consists of two separate cable groups, both containing 735A cables. One cable consists of 24 inputs and the other cable consists of 24 outputs.
4. One cable is required for channels 1 through 12 and another for channels 13 through 24 (LNW66). LNW74 provides only ports 1 through 16.
5. When cabling the Alcatel-Lucent 1665 DMX high-capacity shelf for office alarm applications, one Office Alarm Cable Assembly is required for the bottom Alcatel-Lucent 1665 DMX shelf in a bay frame. One Office Alarm Mult Cable Assembly is required for each additional Alcatel-Lucent 1665 DMX shelf in the bay frame.
   For example, if four Alcatel-Lucent 1665 DMX shelves are located in a single 7-foot bay frame, one Office Alarm Cable Assembly and three Office Alarm Mult Cable Assemblies are required.
6. One misc. discrete cable per shelf as required.
7. These cables are used for IAO LAN (OSI/TCP-IP)/Front LAN (OSI/TCP-IP) connection (J16 and Front LAN port). LAN 10BaseT cross over cable should be used if the shelf is directly connected to a PC and LAN 10BaseT straight through cable should be used if shelf is connected to a hub.
8. Two cables per shelf for Ref1 and Ref2.
9. RS232 modem cable (RJ45 to 25-pin).

Connector references

Description

Figure 3-1, Connector types and pinouts (p. 3-5) provides the pinouts of some of the connectors used to interface with the Alcatel-Lucent 1665 DMX.

Figure 3-1 Connector types and pinouts



Cable and optical fiber installation

Introduction

Note: Ensure only ANGLED LC connectors appear at IN ports of optical circuit packs. The “ANGLED” is referring to the rotating boot on the connector and not the connector. APC or Angled Polished Connectors are not supported.

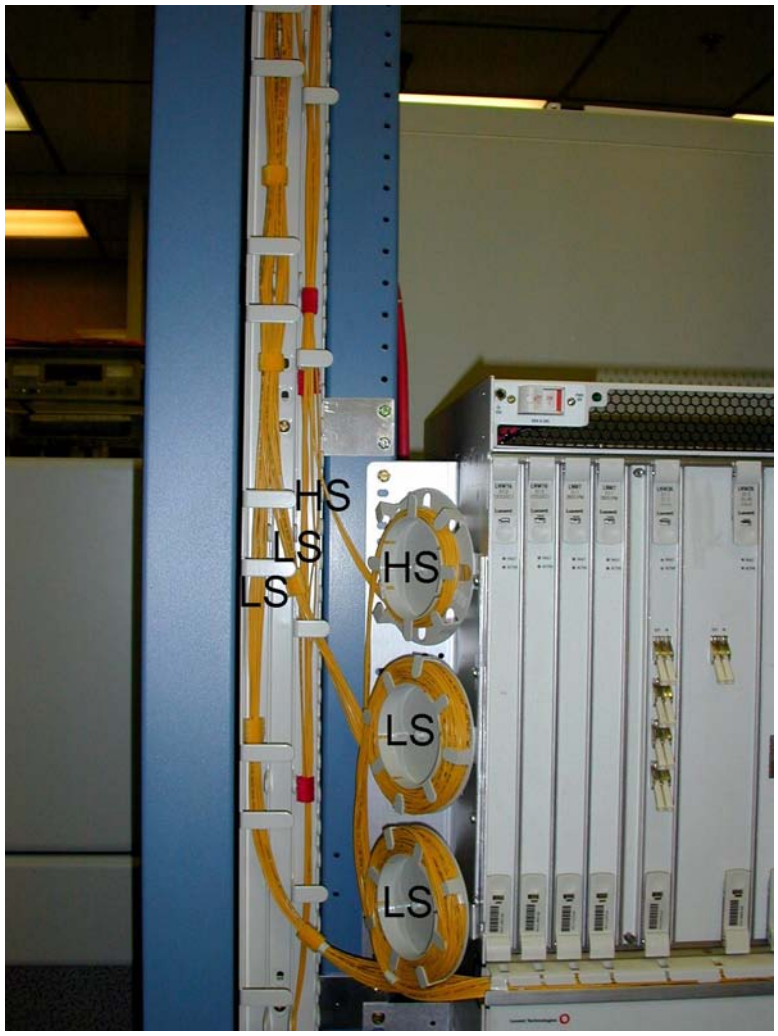
1 If fiber management systems have been installed:

a. High-speed fibers should be routed along the fiber radius control module and then up to the uppermost spool.

b. Fiber management of low speed fibers should start with the lowest spool. Once full, fiber should be routed along the fiber radius control module and then up to the middle spool.

c. As shown in the picture below, fiber from the lowest spool (low speed) is routed in the outermost section of the fiber duct; the middle spool (low speed) to the middle section; and the upper spool (high speed) to the inner section.

Note: The high-speed fiber, routed in the innermost duct, should be held with Hellerman Tyton RED grip tie (GT.75X1802) or equivalent. The low speed fiber should be held with Hellerman Tyton YELLOW grip tie (GT.75X1804) or equivalent.



2 Check off the appropriate box in Table I-2, Computer requirements.

END OF STEPS

DS1 cable installation

Description

This section describes how to connect the DS1 transmission cables to the shelf, route the cables out of the bay and connect the cables to the DSX. Perform this procedure if DS1 cables are required.

Note: When cabling the Alcatel-Lucent 1665 DMX high-capacity shelf to a DSX, the DSX becomes an extension of the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connections. Thus the IN on the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connects to the IN of the DSX and the OUT of the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connects to the OUT of the DSX respectively.

The cables are connectorized at the Alcatel-Lucent 1665 DMX high-capacity shelf end and must be wire-wrapped at the DSX end. A total of four function groups fully cabled may have up to 224 DS1 drop capacity if the higher density DS1 circuit packs are equipped.

Note: The connectorized cable end is grounded to the Alcatel-Lucent 1665 DMX frame ground through the backplane. Alcatel-Lucent recommends that the shield at both ends of the cable be grounded. Ground at the DSX end per office requirements.

Steps

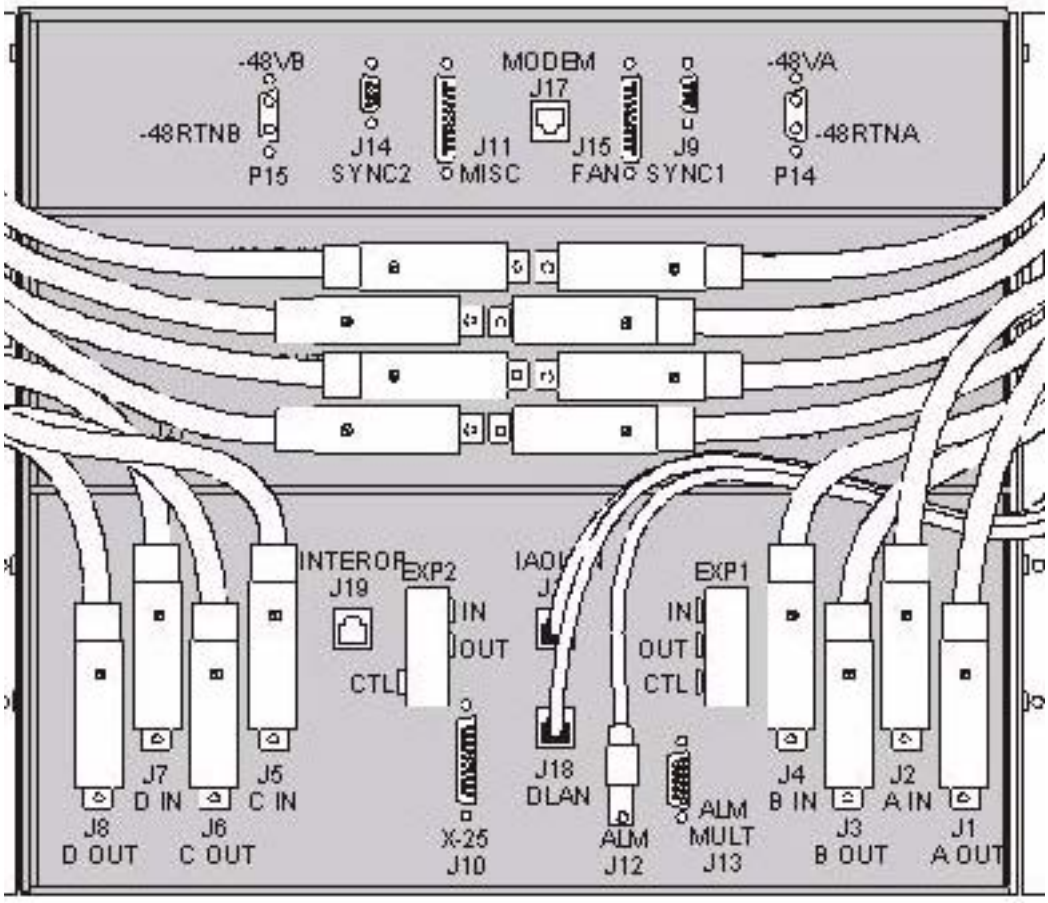
1 See the engineering job specification. Obtain the DS1 cables per Table 3-2, “DS1 cable assemblies” (p. 3-11) and note the function group where each cable will be used. Label the cables, indicating bay, shelf, function group (A, B, C or D) and direction (IN or OUT of the bay) at each end.

Note: The first 28 DS1s of a Function Group, must be connected to the bottom connectors (J1- J8). The additional capacity (28 additional DS1s, 29-56) of the Function Group use the connectors located in the middle of the backplane (J20 - J27).

2 Connect the function group cables at the Alcatel-Lucent 1665 DMX high-capacity shelf end, carefully matching the correct connector with the appropriate backplane connectors as shown in Figure 3-2, “DS1 cable installation” (p. 3-9).

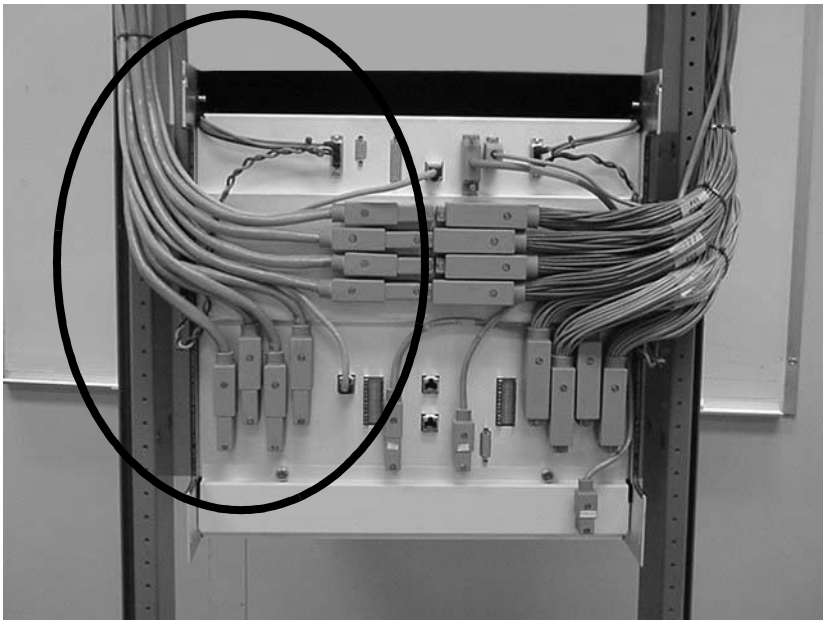
Note: Inspect the DS1 connector for damaged or bent pins before connecting. The DS1 cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

Figure 3-2 DS1 cable installation



3 Route the cables along the backplane and out of the bay to the DSX per Figure 3-3, “DS1 cable routing” (p. 3-10).

Figure 3-3 DS1 cable routing



4 Route the cables along the cable rack and into the terminating bay.

5 Remove slack and cut the DS1 cables to the desired length at the DSX.

6 Referring to Table 3-3, “DS1 transmission connections” (p. 3-12), carefully observe color codes and wire-wrap the cables at the DSX.

7 Verify DS1 cabling using the LNW94 TESTPK or equivalent method.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-2 DS1 cable assemblies

Cable length (feet)	Cable assembly #	Description	Alcatel-Lucent 1665 DMX backplane connections	
			Function Group Outputs	Function Group Inputs
10	848954988	DS1 Cables, 24 gauge	Function Group A	
20	848955001		J1 (DS1) 1-28 J24 DS1 29-56	J2 DS1 1-28 J20 DS1 29-56
30	848923074			
50	848548327		Function Group B	
75	848923082		J3 DS1 1-28 J25 DS1 29-56	J4 DS1 1-28 J21 DS1 29-56
100	848548335			
125	848923090		Function Group C	
150	848548343		J6 DS1 1-28 J26 DS1 29-56	J5 DS1 1-28 J22 DS1 29-56
175	848923108			
200	848923116		Function Group D	
250	848548350		J8 DS1 1-28 J27 DS1 29-56	J7 DS1 1-28 J23 DS1 29-56
350	848790762			
450	848548368			
550	848790770			
655	848790788			

Notes:

1. One code provides one input and one output cable for 28 DS1's, e.g, "J1 A OUT" & "J2 A IN".
2. For Input connections use cable CA1 (DS1 IN) and for Output connections use cable CA2 (DS1 OUT).
3. Cables are terminated in J1 through J8 and J20 through J27 connectors at the Alcatel-Lucent 1665 DMX high-capacity shelf end and unterminated at the other end for wire-wrap installation.
4. P1 through P8 are 62 pins D-Sub male-type connectors fit into J1 through J8. P20 through P27 are 62 pins D-Sub male type connectors fit into J20 through J27.
5. Two codes required for the high-capacity 56 DS1 LNW8 & LNW801, i.e., for DS1 function groups, e.g., "J1 A OUT" & "J2 A IN" and "J24 A OUT"&"J20 A IN"

Table 3-3 DS1 transmission connections

DSX-1 connections*				Alcatel-Lucent 1665 DMX high-capacity shelf backplane connections								
Group	Chan DS1	T/R term	T/R color	62 pin conn. Pin# T/R	Function group A conn.		Function group B conn.		Function group C conn.		Function group D conn.	
					In	Out	In	Out	In	Out	In	Out
1	1 (1)	B8/B7	W/BL*	19/40	J2	J1	J4	J3	J5	J6	J7	J8
	2 (2)	B6/B5	W/O*	18/39	A	A	B	B	C	C	D	D
	3 (3)	B4/B3	W/G*	60/59								
	4 (4)	B2/B1	W/BR	17/38								
2	1 (5)	B8/B7	W/S	58/57								
	2 (6)	B6/B5	R/BL	16/37								
	3 (7)	B4/B3	R/O	15/36								
	4 (8)	B2/B1	R/G	14/35								
3	1 (9)	B8/B7	R/BR	56/55								
	2 (10)	B6/B5	R/S	13/34								
	3 (11)	B4/B3	BK/BL	54/53								
	4 (12)	B2/B1	BK/O	12/33								
4	1 (13)	B8/B7	BK/G	11/32								
	2 (14)	B6/B5	BK/BR	10/31								
	3 (15)	B4/B3	BK/S	52/51								
	4 (16)	B2/B1	Y/BL	9/30								
5	1 (17)	B8/B7	Y/O	50/49								
	2 (18)	B6/B5	Y/G	8/29								
	3 (19)	B4/B3	Y/BR	7/28								
	4 (20)	B2/B1	Y/S	6/27								
6	1 (21)	B8/B7	V/BL	48/47								
	2 (22)	B6/B5	V/O	5/26								
	3 (23)	B4/B3	V/G	46/45								
	4 (24)	B2/B1	V/BR	4/25								

DSX-1 connections*				Alcatel-Lucent 1665 DMX high-capacity shelf backplane connections								
Group	Chan DS1	T/R term	T/R color	62 pin conn. Pin# T/R	Function group A conn.		Function group B conn.		Function group C conn.		Function group D conn.	
					In	Out	In	Out	In	Out	In	Out
7	1 (25)	B8/B7	V/S	3/24								
	2 (26)	B6/B5	W/BL*	2/23								
	3 (27)	B4/B3	W/O*	44/43								
	4 (28)	B2/B1	W/G*	1/22								
1	1 (29)	B8/B7	W/BL*	19/40	J20 A	J24 A	J21 B	J25 B	J22 C	J26 C	J23 D	J27 D
	2 (30)	B6/B5	W/O*	18/39								
	3 (31)	B4/B3	W/G*	60/59								
	4 (32)	B2/B1	W/BR	17/38								
2	1 (33)	B8/B7	W/S	58/57								
	2 (34)	B6/B5	R/BL	16/37								
	3 (35)	B4/B3	R/O	15/36								
	4 (36)	B2/B1	R/G	14/35								
3	1 (37)	B8/B7	R/BR	56/55								
	2 (38)	B6/B5	R/S	13/34								
	3 (39)	B4/B3	BK/BL	54/53								
	4 (40)	B2/B1	BK/O	12/33								
4	1 (41)	B8/B7	BK/G	11/32								
	2 (42)	B6/B5	BK/BR	10/31								
	3 (43)	B4/B3	BK/S	52/51								
	4 (44)	B2/B1	Y/BL	9/30								
5	1 (45)	B8/B7	Y/O	50/49								
	2 (46)	B6/B5	Y/G	8/29								
	3 (47)	B4/B3	Y/BR	7/28								
	4 (48)	B2/B1	Y/S	6/27								
6	1 (49)	B8/B7	V/BL	48/47								
	2 (50)	B6/B5	V/O	5/26								
	3 (51)	B4/B3	V/G	46/45								
	4 (52)	B2/B1	V/BR	4/25								

DSX-1 connections*				Alcatel-Lucent 1665 DMX high-capacity shelf backplane connections								
Group	Chan DS1	T/R term	T/R color	62 pin conn. Pin# T/R	Function group A conn.		Function group B conn.		Function group C conn.		Function group D conn.	
					In	Out	In	Out	In	Out	In	Out
7	1 (53)	B8/B7	V/S	3/24								
	2 (54)	B6/B5	W/BL*	2/23								
	3 (55)	B4/B3	W/O*	44/43								
	4 (56)	B2/B1	W/G*	1/22								

Notes:

* Some wire colors are used twice. White binder cables are for Channel 1 through 25 and 29 through 53 blue binder cables are for Channels 26, 27, 28, 54, 55 and 56.

DS3/EC1 and TMUX 48-port cable installation

Description

This section describes how to connect the DS3/EC1 and TMUX cables to the Alcatel-Lucent 1665 DMX high-capacity shelf and route the cables out of the bay and to the DS3/EC1 terminating equipment. Perform this procedure if DS3/EC1 or TMUX cables are required.

Note: When cabling the Alcatel-Lucent 1665 DMX high-capacity shelf to a DSX, the DSX becomes an extension of the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connections. Therefore, the IN on the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connects to the IN of the DSX and the OUT of the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connects to the OUT of the DSX.

DS3/EC1 and TMUX cable options are listed in Table 3-5 and Table 3-6. Table 3-7 contains miscellaneous DS3 cables for both the 12-port and 48-port installations.

DS3/EC1 and TMUX transmission connections are in Table 3-8. A total of four function groups fully cabled may have up to 192 DS3 drop capacity if using the 48-port DS3/EC1 or TMUX circuit packs.

Steps

1 See the engineering job specification. Obtain the DS3 cables per Table 3-5, Table 3-6 or Table 3-8 and note the function group where each cable will be used. Label the cables, indicating bay, shelf, function group (A, B, C or D) and direction (IN or OUT of the bay) at each end.

Note: The first 24 ports of a Function unit must be cabled to the bottom connectors (J1 - J8), the additional DS3 ports (25 - 48) are cabled to the middle section of the shelf (J20 - J27).

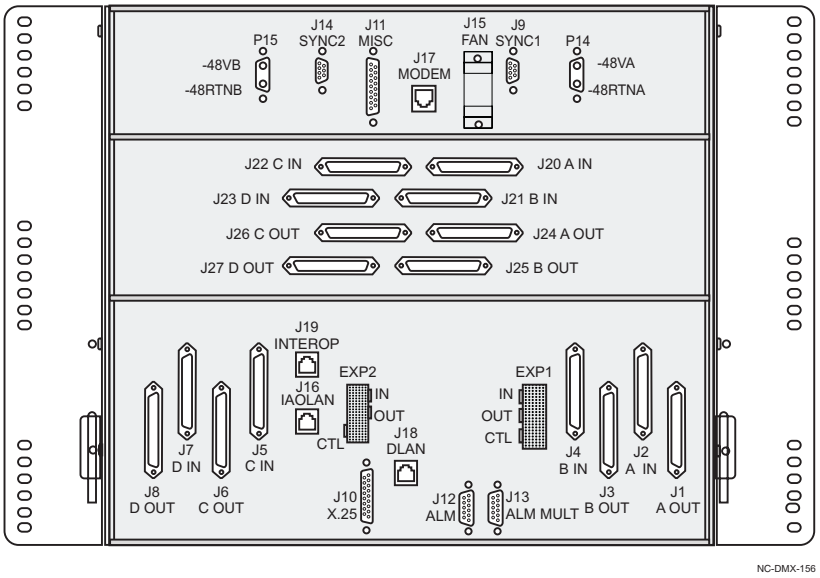
2 Connect the function group cables at the Alcatel-Lucent 1665 DMX high-capacity shelf end, carefully matching the correct connector with the appropriate backplane connectors as shown in Figure 3-4, "DS3/EC1 and TMUX cable installation" (p. 3-16).

Note: Inspect the DS3/EC1 connector for damaged or bent pins before connecting. The DS3/EC1 and TMUX cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

Table 3-4 DS3 connections for each function groups

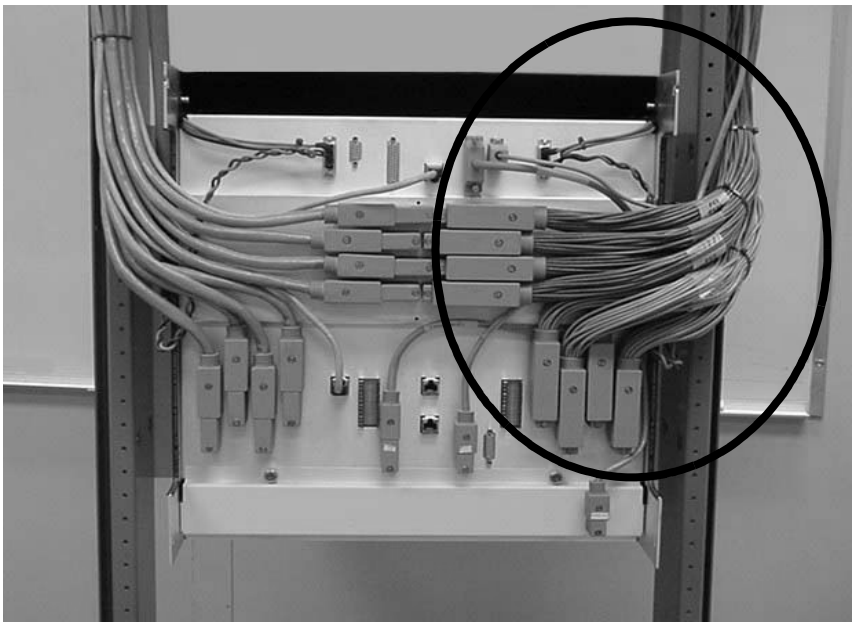
Function group	Associated Connectors
A	A IN (J2 and J20) A OUT (J1 and J24)
B	B IN (J4 and J21) B OUT (J3 and J25)
C	C IN (J5 and J22) C OUT (J6 and J26)
D	D IN (J7 and J23) D OUT (J8 and J27)

Figure 3-4 DS3/EC1 and TMUX cable installation



3 Route the cables along the backplane and out of the bay to the DSX per Figure 3-5, “DS3/EC1 and TMUX cable routing” (p. 3-16).

Figure 3-5 DS3/EC1 and TMUX cable routing



Note: This figure shows DS3 cabling for FNA and FNB.

4 Route the cables along the cable rack and into the terminating bay (DSX or other terminating transmission equipment).

5 Cut the cables to desired length and install the BNC connectors shipped with the cable assemblies.

Note: When installing BNC connectors, follow the manufacturer's instruction carefully to ensure a proper connection. Failure to do so may result in faulty DS3 signals as a result of improperly installed BNC connectors.

6 Connect the cables to their respective positions on the terminating equipment.

Note: The 12-port cable and the 24-port cable use different signal grounds based on the circuit pack not the backplane. There is no issue interchanging these cables on the backplane. The Signals are common between both cables.

7 Verify DS3 cabling using the LNW74 TESTPK or equivalent method.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-5 DS3 Cable with 24 DS3 with BNC (LNW16/LNW18/LNW19B/LNW20)

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections	
			Output	Input
24 individual 735A coaxial cables and 24 ITT Canon 7-ohm BNC plugs shipped loose	849040688	10	Function Group A	
	849040696	20	J1 DS3 1-24 J24 DS3 25-48	J2 DS3 1-24 J20 DS3 25-48
	849040704	30		
	849040712	40	Function Group B	
	849040720	50	J3 DS3 1-24 J25 DS3 25-48	J4 DS3 1-24 J21 DS3 25-48
	849040738	60		
	849040746	100	Function Group C	
	849040753	150	J6 DS3 1-24 J26 DS3 25-48	J5 DS3 1-24 J22 DS3 25-48
	849040761	250		
	849040779	450	Function Group D	
	849041710	450	J8 DS3 1-24 J27 DS3 25-48	J7 DS3 1-24 J23 DS3 25-48
	849041736	750		
	849041744	900		

Table 3-6 DS3 Cable with 24 DS3 w/o BNC(LNW16/LNW18/LNW19B/LNW20))

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections	
			Output	Input
24 individual 735A coaxial cables. Similar to above except no BNCs are shipped.	849040886	10	Function Group A	
	849040894	20	J1 DS3 1-24 J24 DS3 25-48	J2 DS3 1-24 J20 DS3 25-48
	849040902	30		
	849040910	40	Function Group B	
	849040928	50	J3 DS3 1-24 J25 DS3 25-48	J4 DS3 1-24 J21 DS3 25-48
	849040936	60		
	849040944	70	Function Group C	
	849040951	80	J6 DS3 1-24 J26 DS3 25-48	J5 DS3 1-24 J22 DS3 25-48
	849040969	90		
	849040977	100	Function Group D	
	849040985	110	J8 DS3 1-24 J27 DS3 25-48	J7 DS3 1-24 J23 DS3 25-48
	849040993	120		
	849041009	140		
	849041017	150		
	849041025	160		
	849041033	180		
	849041041	200		
	849041066	250		
	849041074	300		
	849041082	400		
	849041090	450		

Table 3-7 Miscellaneous DS3 Cables (LNW16/LNW18/LNW19B/LNW20)

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections	
			Output	Input
DS3#1-24 Cables with ITT Canon BNCs Similar to above except ~10 ft of 735A spliced to 734D coaxial cable with loose ITT Canon BNCs for > 450 ft between two Alcatel-Lucent 1665 DMX's. 900ft is the maximum amount of 734D cable allowed between two Alcatel-Lucent 1665 DMX's. This is a factory splice. Stagger the splices in the cable rack to save space.	848932083	250	Function Group A	
	848932018	275	J1 DS3 1-24 J24 DS3 25-48	J2 DS3 1-24 J20 DS3 25-48
	848932026	300		
	848932034	325	Function Group B	
	848932042	350	J3 DS3 1-24 J25 DS3 25-48	J4 DS3 1-24 J21 DS3 25-48
	848932059	375		
	848932067	400	Function Group C	
	848932075	425	J6 DS3 1-24 J26 DS3 25-48	J5 DS3 1-24 J22 DS3 25-48
	848839528	450		
	848839536	750	Function Group D	
	848839544	900	J8 DS3 1-24 J27 DS3 25-48	J7 DS3 1-24 J23 DS3 25-48
DS3#1-24 Cables with no BNC Similar to above except no BNC's are shipped loose.	849041785	250		
	849041793	275		
	849041801	300		
	849041819	325		
	849041827	350		
	849041835	375		
	849041843	400		
	849041850	425		
	849041868	450		
	849041876	750		
	849041884	900		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections	
			Output	Input
Customer-specific DS3#1-24 Cables Similar to above except Alcatel-Lucent 1665 DMX backplane 62-pin plugs on both ends of 735A coaxial cable	848956249	150		
Customer-specific 12-pack Mini-BNC Cable Harness 12 individual 735A coaxial cables under one jacket, one harness per code, with 12 Mini-BNC plugs to 12 standard BNC plugs .	109508416	25		
	109508424	50		
	109508432	75		
	109508440	100		
	109508457	125		
	109508465	150		
	109508473	175		
	109508481	200		
	109508499	250		
Customer-specific Mini-BNC Cable One 735A coaxial cable per code with one mini-BNC plug to one standard BNC plug.	109508325	25		
	109508333	50		
	109508341	75		
	109508358	100		
	109508366	125		
	109508374	150		
	109508382	175		
	109508390	200		
	109508408	250		

Table 3-8 DS3/EC1 and TMUX transmission connections

Coaxial cable	Lead designation*	Name	Connector pin #
Connectors J1 - J8	(Ports 1 - 24)		
1	DS3 1R/1T	Signal	40
	FRG1	Ground	19
2	DS3 2R/2T	Signal	17
	FRG2	Ground	38
3	DS3 3R/3T	Signal	57
	FRG3	Ground	58
4	DS3 4R/4T	Signal	13
	FRG4	Ground	34
5	DS3 5R/5T	Signal	53
	FRG5	Ground	54
6	DS3 6R/6T	Signal	10
	FRG6	Ground	31
7	DS3 7R/7T	Signal	51
	FRG7	Ground	52
8	DS3 8R/8T	Signal	6
	FRG8	Ground	27
9	DS3 9R/9T	Signal	47
	FRG9	Ground	48
10	DS3 10R/10T	Signal	4
	FRG10	Ground	25
11	DS3 11R/11T	Signal	24
	FRG11	Ground	3
12	DS3 12R/12T	Signal	1
	FRG12	Ground	22
13	DS3 13R/13T	Signal	59
	FRG13	Ground	60

Coaxial cable	Lead designation*	Name	Connector pin #
14	DS3 14R/14T	Signal	16
	FRG14	Ground	37
15	DS3 15R/15T	Signal	36
	FRG15	Ground	15
16	DS3 16R/16T	Signal	55
	FRG16	Ground	56
17	DS3 17R/17T	Signal	12
	FRG17	Ground	33
18	DS3 18R/18T	Signal	32
	FRG18	Ground	11
19	DS3 19R/19T	Signal	9
	FRG19	Ground	30
20	DS3 20R/20T	Signal	49
	FRG20	Ground	50
21	DS3 21R/21T	Signal	28
	FRG21	Ground	7
22	DS3 22R/22T	Signal	5
	FRG22	Ground	26
23	DS3 23R/23T	Signal	45
	FRG23	Ground	46
24	DS3 24R/24T	Signal	43
	FRG24	Ground	44
Connectors J20 - J27	(Ports 25 - 48)		
25	DS3 25R/25T	Signal	40
	FRG25	Ground	19
26	DS3 26R/26T	Signal	17
	FRG26	Ground	38

Coaxial cable	Lead designation*	Name	Connector pin #
27	DS3 27R/27T	Signal	57
	FRG27	Ground	58
28	DS3 28R/28T	Signal	13
	FRG28	Ground	34
29	DS3 29R/29T	Signal	53
	FRG29	Ground	54
30	DS3 30R/30T	Signal	10
	FRG30	Ground	31
31	DS3 31R/31T	Signal	51
	FRG31	Ground	52
32	DS3 32R/32T	Signal	6
	FRG32	Ground	27
33	DS3 33R/33T	Signal	47
	FRG33	Ground	48
34	DS3 34R/34T	Signal	4
	FRG34	Ground	25
35	DS3 35R/35T	Signal	24
	FRG35	Ground	3
36	DS3 36R/36T	Signal	1
	FRG36	Ground	22
37	DS3 37R/37T	Signal	59
	FRG37	Ground	60
38	DS3 38R/38T	Signal	16
	FRG38	Ground	37
39	DS3 39R/39T	Signal	36
	FRG39	Ground	15
40	DS3 40R/40T	Signal	55
	FRG40	Ground	56

Coaxial cable	Lead designation*	Name	Connector pin #
41	DS3 41R/41T	Signal	12
	FRG41	Ground	33
42	DS3 42R/42T	Signal	32
	FRG42	Ground	11
43	DS3 43R/43T	Signal	9
	FRG43	Ground	30
44	DS3 44R/44T	Signal	49
	FRG44	Ground	50
45	DS3 45R/45T	Signal	28
	FRG45	Ground	7
46	DS3 46R/46T	Signal	5
	FRG46	Ground	26
47	DS3 47R/47T	Signal	45
	FRG47	Ground	46
48	DS3 48R/48T	Signal	43
	FRG48	Ground	44

Notes:

* Lead designation for EC1 connection for cable# x should be read as EC1 xR/xT instead of DS3 xR/xT, where x is a number from 1 to 48.

12-DS3/EC1 and TMUX (LNW16 LNW18) cable installation

Description

This section describes how to connect the 12-DS3/TMUX cables to the Alcatel-Lucent 1665 DMX high-capacity shelf and route the cables out of the bay and to the TMUX terminating equipment. Perform this procedure if TMUX cables are required for an LNW18 in a function group.

It should be noted that the cables used for 12-DS3/TMUX support are DS3 cables (12-port). The new high capacity DS3 cables will also support 12-DS3/TMUX, but only in a 12-port capacity.

Note: When cabling the Alcatel-Lucent 1665 DMX high-capacity shelf to a DSX, the DSX becomes an extension of the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connections. Therefore, the IN on the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connects to the IN of the DSX and the OUT of the Alcatel-Lucent 1665 DMX high-capacity shelf backplane connects to the OUT of the DSX.

DS3/TMUX cable options are listed in Table 3-9, Table DS3 Cable assemblies with BNC with 12-DS3 (LNW16/LNW18) and Table 3-10, DS3 Cable assemblies w/o BNC with 12-DS3 (LNW16/LNW18). Table 3-7 contains miscellaneous DS3 cables for both the 12-port and 48-port installations.

TMUX transmission connections are in Table 3-11.

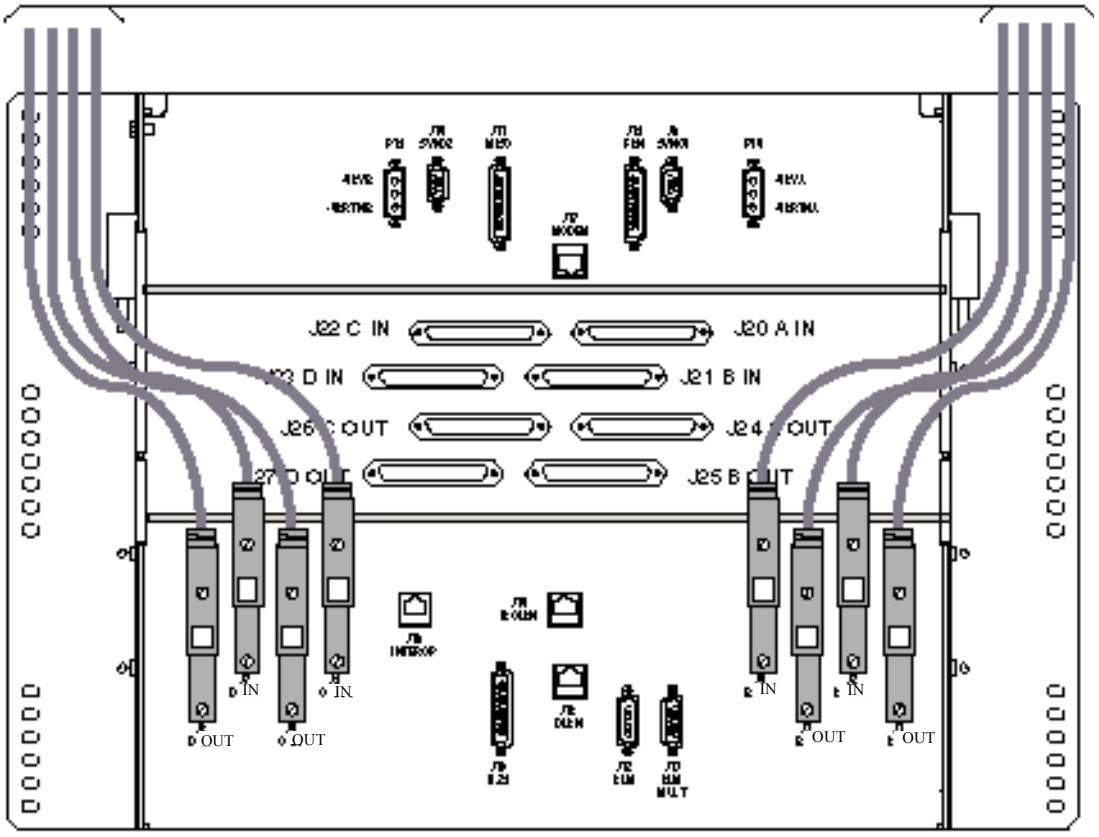
Steps

1 See the engineering job specification. Obtain the TMUX (DS3) cables per Table 3-8, Table 3-9 or Table 3-7 and note the function group where each cable will be used. Label the cables, indicating bay, shelf, function group (A, B, C or D) and direction (IN or OUT of the bay) at each end.

2 Connect the function group cables at the Alcatel-Lucent 1665 DMX high-capacity shelf end, carefully matching the correct connector with the appropriate backplane connectors as shown in Figure 3-6, “12-port DS3/EC1 and TMUX cable installation” (p. 3-27).

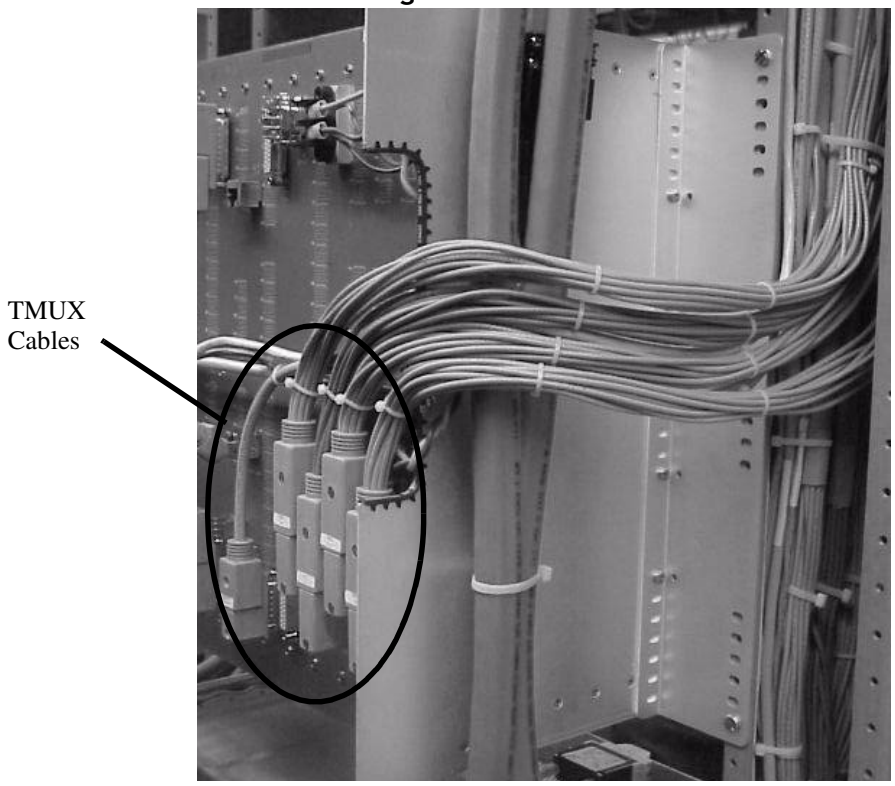
Note: DS3/EC1 and TMUX cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

Figure 3-6 12-port DS3/EC1 and TMUX cable installation



3 Route the cables along the backplane and out of the bay to the DSX per Figure 3-7, “12-DS3/TMUX cable routing” (p. 3-28).

Figure 3-7 12-DS3/TMUX cable routing



Note: The shelf depicted above is a Alcatel-Lucent 1665 DMX standard shelf and is used for cable routing reference only.

4 Route the cables along the cable rack and into the terminating bay (DSX or other terminating transmission equipment).

5 Cut the cables to desired length and install the BNC connectors shipped with the cable assemblies.

Note: When installing BNC connectors, follow the manufacturer's instruction carefully to ensure a proper connection. Failure to do so may result in faulty DS3 signals as a result of improperly installed BNC connectors.

6 Connect the cables to their respective positions on the terminating equipment.

7 Verify DS3 cabling using the LNW74 TESTPK or equivalent method.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-9 Table DS3 Cable assemblies with BNC with 12-DS3 (LNW16/LNW18)

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections	
			Output	Input
12 individual 735A coaxial cables with 12 ITT Canon 75-ohm BNC plugs shipped loose. DS3#1-12 Cables with no BNC, LNW16, LNW18 only 849040779 uses 735A cable, and 450 ft is the maximum amount of 735A allowed between two Alcatel-Lucent 1665 DMXs 849041710 and lengths > 450 ft use ~10ft 735A spliced to 734D cable and 900 ft is the maximum amount of 734D allowed between two Alcatel-Lucent 1665 DMXs. This splice is factory made. Stagger the splices in the cable rack to save space	848955407	10	Function Group A	
	848955415	20	J1 DS3 1-12	J2 DS3 1-12
	848955423	30	Function Group B	
	848955431	40	J3 DS3 1-12	J4 DS3 1-12
	848548277	50	Function Group C	
	848980504	60	J6 DS3 1-12	J5 DS3 1-12
	848548285	100	Function Group D	
	848548293	150	J8 DS3 1-12	J7 DS3 1-12
	848548301	250		
	848548319	450 (NE to NE)		
	848815742	450 (NE to NE)		
	848815734	750 (NE to NE)		
	848815759	900 (NE to NE)		

Table 3-10 DS3 Cable assemblies w/o BNC with 12-DS3 (LNW16/LNW18)

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections	
			Output	Input
12 individual 735A coaxial cables DS3#1-12 Cables with no BNC 849040779 uses 735A cable, and 450 ft is the maximum amount of 735A allowed between two Alcatel-Lucent 1665 DMXs 849041710 and lengths > 450 ft use ~10 ft 735A spliced to 734D cable and 900 ft is the maximum amount of 734D allowed between two Alcatel-Lucent 1665 DMXs. This splice is factory made. Stagger the splices in the cable rack to save space	849040688	10	Function Group A	
	849040696	20	J1 DS3 1-12	J2 DS3 1-12
	849040704	30	Function Group B	
	849040712	40	J3 DS3 1-12	J4 DS3 1-12
	849040720	50	Function Group C	
	849040738	60	J6 DS3 1-12	J5 DS3 1-12
	849040746	100	Function Group D	
	849040753	150	J8 DS3 1-12	J7 DS3 1-12
	849040761	250		
	849040779	450		
	849041710	450		
	849041736	750		
	849041744	900		

Table 3-11 12-port DS3/EC1 and TMUX transmission connections

Coaxial cable	Lead designation	Name	Connector pin #
1	DS3 1R/1T	Signal	40
	FRG1	Ground	39
2	DS3 2R/2T	Signal	17
	FRG2	Ground	18
3	DS3 3R/3T	Signal	57
	FRG3	Ground	58
4	DS3 4R/4T	Signal	13
	FRG4	Ground	14
5	DS3 5R/5T	Signal	53
	FRG5	Ground	54
6	DS3 6R/6T	Signal	10
	FRG6	Ground	11
7	DS3 7R/7T	Signal	51
	FRG8	Ground	50
8	DS3 8R/8T	Signal	6
	FRG8	Ground	7
9	DS3 9R/9T	Signal	47
	FRG9	Ground	46
10	DS3 10R/10T	Signal	4
	FRG10	Ground	3
11	DS3 11R/11T	Signal	24
	FRG11	Ground	23
12	DS3 12R/12T	Signal	1
	FRG12	Ground	2

10/100BaseT backplane ethernet cable installation

Description

This section describes how to connect the 10/100BaseT cables to the Alcatel-Lucent 1665 DMX high-capacity shelf backplane and route the cables out of the bay and to the 10/100BaseT terminating equipment (for example, a *110/RJ45*® punch-down block). Perform this procedure if 10/100BaseT cables are required.

The next section covers installation of Ethernet cables connected directly to SFP modules on circuit pack faceplates if applicable.

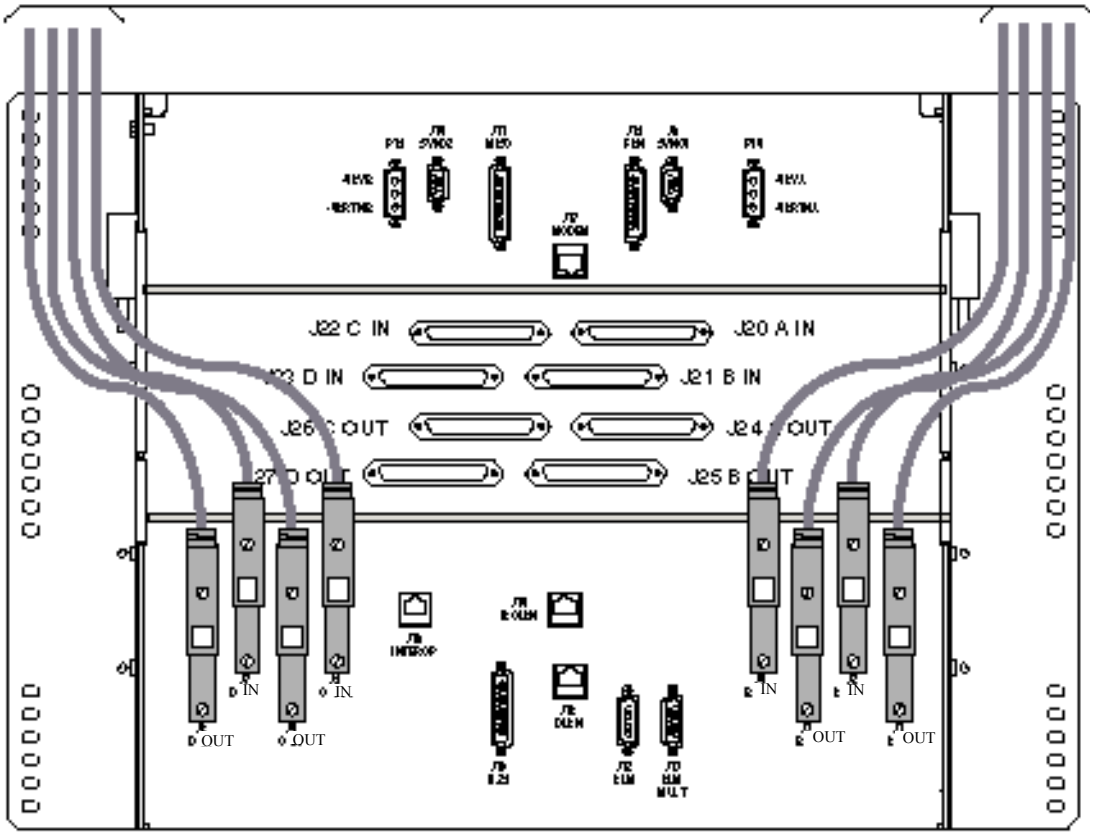
Steps

1 See the engineering job specification. Obtain the 100BASE-TX Ethernet cables per Table 3-12, “10/100BaseT ethernet cable assemblies” (p. 3-34) and note the function group where each cable will be used. Label the cables, indicating bay, shelf and function group (A, B, C or D) at each end.

2 Connect the function group cables at the Alcatel-Lucent 1665 DMX high-capacity shelf end, carefully matching the correct connector with the appropriate backplane connectors as shown in Figure 3-8, “10/100BaseT cable installation” (p. 3-33). See Table 3-13, “10/100BaseT ethernet connections” (p. 3-35).

Note: 100BASE-TX Ethernet cable retaining screws must be tightened to a maximum of 6.5 in-lb. Do not overtighten.

Figure 3-8 10/100BaseT cable installation



3 Route the cables along the backplane and out of the bay to the 110/RJ45 punch down block. Route the cables in the same manner as DS3/EC1 cables. See Figure 3-5, “DS3/EC1 and TMUX cable routing” (p. 3-16).

4 Route the cables along the cable rack and into the terminating bay.

5 Cut cable to length and punch down cable to the 110 block. See Table 3-13, “10/100BaseT ethernet connections” (p. 3-35) for pin out assignments.

NOTICE

The LNW66 and LNW74 10/100BaseT-Ethernet packs do not have lightning protection for the metallic connections. Therefore it is necessary to use a lightning-protected patch panel, such as the Black Box CAT5 protected patch panel JSM110A, for intra-office applications only.

Note: Backplane connectors are associated with function Groups as follows:

- J1, J2 ➠ Function Group A
- J3, J4 ➠ Function Group B
- J5, J6 ➠ Function Group C
- J7, J8 ➠ Function Group D

6 Verify LAN cabling using the LNW94 TESTPK or equivalent method.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-12 10/100BaseT ethernet cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections
10/100baseT ethernet cable	848819090	8	Function Group A
	848778114	20	J1 (ports 1-12) J2 (ports 13-24)
	848923280	35	
	848778122	50	Function Group B
	848923298	75	J3 (ports 1-12) J4 (ports 13-24)
	848778106	100	
	848923306	125	Function Group C
	848778148	150	J6 (ports 1-12) J5 (ports 13-24)
	848923314	175	
	848923322	200	Function Group D
	848923330	225	J8 (ports 1-12) J7 (ports 13-24)
	848923348	250	
	848923355	275	
	848778130	300	

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX backplane connections
Notes: 1. 10/100baseT Ethernet cables have transmit and receive on the same cable. 2. LNW74 has 16 10/100BaseT ports.			

Table 3-13 10/100BaseT ethernet connections

Port# J2, J4, J5, J7	J1, J3, J6, J8	Wire color	Dsub 62M pin #	Signal	RJ-45 pin #
13	1	W/O	50/49	R+/R-	1/2
		W/BL	8/29	T+/T-	3/6
14	2	W/BR	48/47	R+/R-	1/2
		W/G	5/26	T+/T-	3/6
15	3	R/BL	7/28	R+/R-	1/2
		W/S	6/27	T+/T-	3/6
16	4	R/G	46/45	R+/R-	1/2
		R/O	4/25	T+/T-	3/6
17	5	R/S	56/55	R+/R-	1/2
		R/BR	13/34	T+/T-	3/6
18	6	BK/O	11/32	R+/R-	1/2
		BK/BL	10/31	T+/T-	3/6
19	7	BK/BR	54/53	R+/R-	1/2
		BK/G	12/33	T+/T-	3/6
20	8	Y/BL	52/51	R+/R-	1/2
		BK/S	9/30	T+/T-	3/6
21	9	Y/G	19/40	R+/R-	1/2
		Y/O	18/39	T+/T-	3/6
22	10	Y/S	58/57	R+/R-	1/2
		Y/BR	16/37	T+/T-	3/6

Port# J2, J4, J5, J7	J1, J3, J6, J8	Wire color	Dsub 62M pin #	Signal	RJ-45 pin #
23	11	V/O	60/59	R+/R-	1/2
		V/BL	17/38	T+/T-	3/6
24	12	V/BR	15/36	R+/R-	1/2
		V/G	14/35	T+/T-	3/6

Notes:

1. 10/100baseT Ethernet cables have transmit and receive on the same cable.
2. LNW74 has 16 10/100BaseT ports.

Ethernet cabling to SFP modules on circuit pack faceplates

Description

Use this section to run Category 5e cables to the SFP modules on the front of LNW63, LNW64, or LNW170, Ethernet circuit packs. See Figure 3-9.

Steps

1 See Figure 3-9.

Figure 3-9 Ethernet cable routing to faceplate SFP modules

2 Connect the RJ45 plugs to the faceplate SFP modules and run the cables out of the shelf as shown.

Table 3-14 GbE ethernet cables

Description	Cable assembly #	Cable length (feet)
GbE ethernet cables CAT5e Gigabit ethernet shielded connectorized on both ends with straight RJ45 connector.	849010483	5
	849010491	10
	849010509	15
	849010517	20
	849010525	25
	849010533	30
	849010541	40
	849010558	50
	849010566	60
	849010574	70
	849010582	80
	849010590	90
	849010608	100
	849010616	110
	849010624	120
	849010632	130
	849010640	140
	849010657	150
	849010665	160
	849010673	180
	849010681	200
	849010699	220
	849010707	240
	849010715	260
	849010723	280
	849010731	300

END OF STEPS

IAO LAN and TCP/IP cable installation

Description

This section describes how to connect the IAO LAN/TCP-IP (LAN 10BaseT) cable to the Alcatel-Lucent 1665 DMX high-capacity shelf and to the interfacing equipment. Perform this procedure if this cabling is required.

The Alcatel-Lucent 1665 DMX high-capacity shelf supports an IntraOffice LAN (IAO LAN) interface for operations data communications to support operations systems such as the Navis Optical Management System (OMS).

Since the IAO LAN can be provisioned as an extension of the SONET DCC, the IAO LAN can also be used to join multiple, otherwise separate subnetworks.

All NE-to-NE OI features that are supported over the DCC are also supported over the IAO LAN.

The IAO LAN/TCP-IP interface cable is available in two configurations (cross-over and straight-through) and may be connected to either the front or rear of the Alcatel-Lucent 1665 DMX high-capacity shelf. The following tables provide additional information:

- Table 3-15, “LAN 10BaseT cable assemblies” (p. 3-42)
- Table 3-16, “LAN 10BaseT cross-over cable connections” (p. 3-43)
- Table 3-17, “LAN 10BaseT straight-through cable connections” (p. 3-43)

Steps

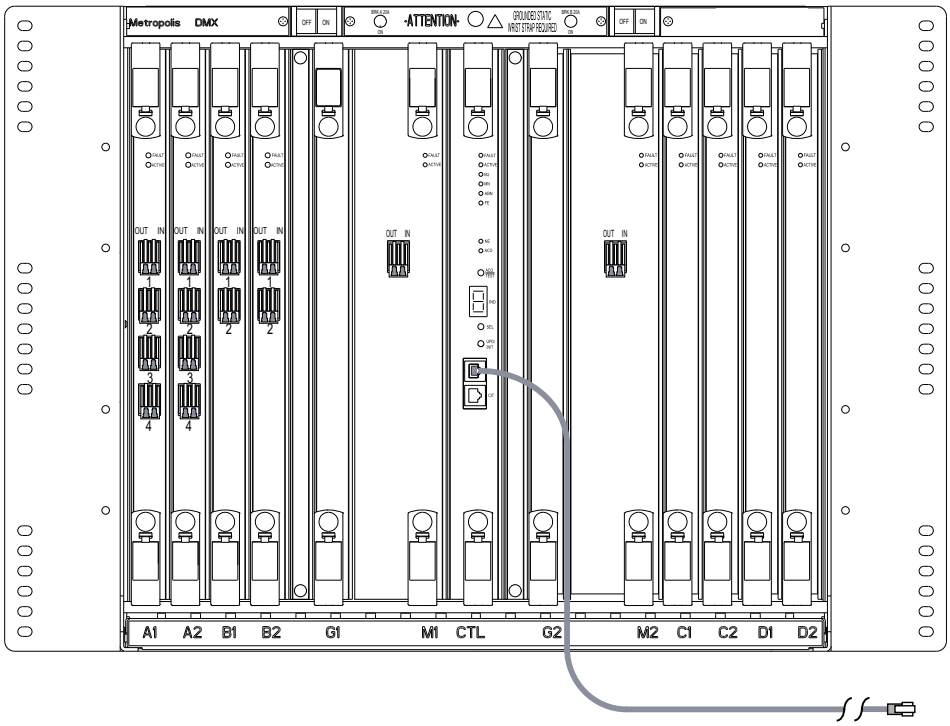
1 If connecting directly to a PC, use a LAN 10BaseT cross-over cable assembly (see Table 3-15).

If connecting to a hub, use a LAN 10BaseT straight-through cable assembly (see Table 3-15).

2 If connecting to the front of the Alcatel-Lucent 1665 DMX high-capacity shelf, connect the cable to the LAN (RJ45) jack on the SYSCTL circuit pack. See Figure 3-10, “LAN cable installation to front of Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 3-40).

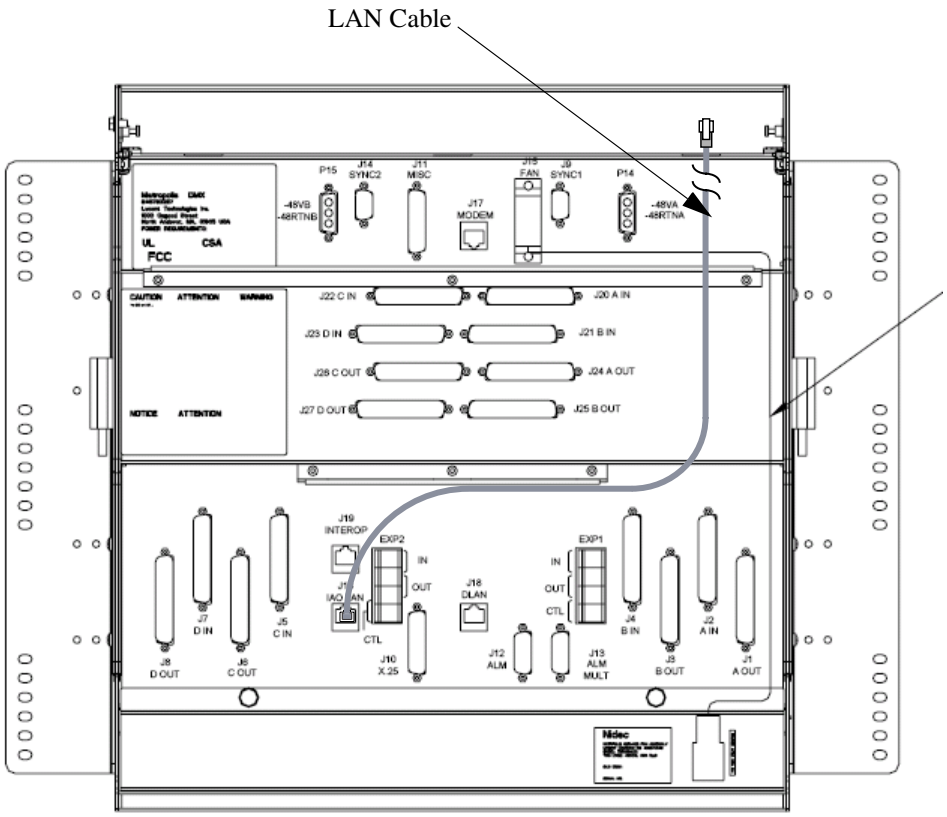
If connecting to the rear of the Alcatel-Lucent 1665 DMX high-capacity shelf, connect the cable to the J16 port (IAO LAN) on the Alcatel-Lucent 1665 DMX high-capacity shelf backplane. See Figure 3-11, “IAO LAN/TCP-IP cable installation to rear of Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 3-41).

Figure 3-10 LAN cable installation to front of Alcatel-Lucent 1665 DMX high-capacity shelf



Note: The above figure shows a standard Alcatel-Lucent 1665 DMX shelf as reference only. The placement of the packs and PC lan port are the same on the Alcatel-Lucent 1665 DMX high-capacity shelf.

Figure 3-11 IAO LAN/TCP-IP cable installation to rear of Alcatel-Lucent 1665 DMX high-capacity shelf



3 If a cross-over cable is used, route the cable to the desired PC LAN port.

If a straight-through cable is used, route the cable to the desired hub port location.

4 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-15 LAN 10BaseT cable assemblies

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX connections	
			Front	Rear
LAN 10BaseT cross-over cable	109321810	10	SYSCTL LAN jack	J16 (IAO LAN)
	848605028	50		
	848605036	100		
	848605051	150		
	848605069	200		
	848605077	300		
LAN 10BaseT straight-through cable	109321836	20	SYSCTL LAN jack	J16 (IAO LAN)
	109321844	30		
	109321851	40		
	848604948	50		
	109321869	60		
	109321877	70		
	109321885	80		
	109321893	90		
	848604955	100		
	109321901	110		
	109321919	120		
	109321927	130		
	109321935	140		
	848604963	150		
	109321943	160		
	109321950	180		
	848604971	200		
	109321968	220		
	109321976	240		

Description	Cable assembly #	Cable length (feet)	Alcatel-Lucent 1665 DMX connections	
			Front	Rear
	109321984	260		
	109321992	280		
	848604997	300		

Table 3-16 LAN 10BaseT cross-over cable connections

Connection	Backplane Pin	Color	Other end
J16 (IAO LAN)	1	BL - W	3
	2	W - BL	6
	3	O - W	1
	6	W - O	2

Table 3-17 LAN 10BaseT straight-through cable connections

Connection	Backplane Pin	Color	Other end
J16 (IAO LAN)	1	BL - W	1
	2	W - BL	2
	3	O - W	3
	6	W - O	6

Modem cable installation

Description

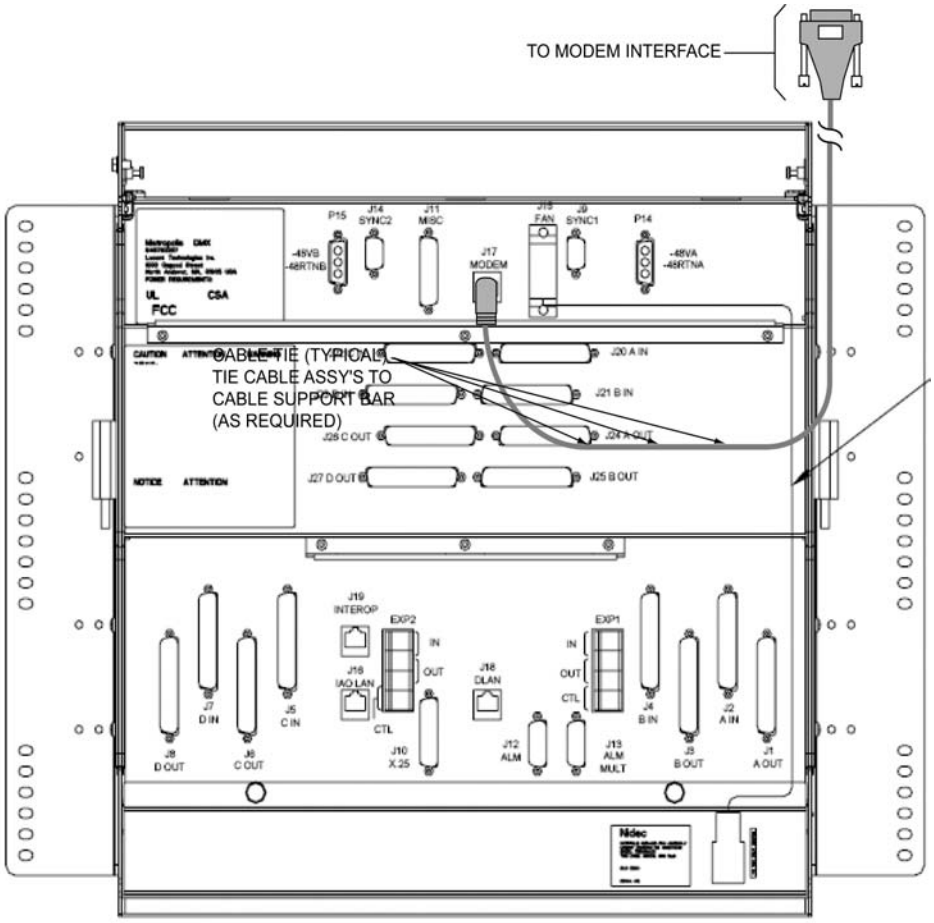
The use of a modem will allow the Alcatel-Lucent 1665 DMX high-capacity shelf to be accessed remotely via dial up.

Note: Perform this procedure for the shelf that will be directly connected to a modem or a distribution frame (if specified in the order).

Steps

1 Obtain the modem cable per Table 3-18, “Modem cable assemblies” (p. 3-45). Connect the RJ45 end of the modem cable to the MODEM port (J17) of Alcatel-Lucent 1665 DMX high-capacity shelf [see Figure 3-12, “Modem cable installation” (p. 3-44)].

Figure 3-12 Modem cable installation



2 Route the modem cable out of the Alcatel-Lucent 1665 DMX high-capacity shelf bay to the modem or distribution frame.

3 Dress and tie the modem cable to the Alcatel-Lucent 1665 DMX high-capacity shelf backplane per Figure 3-12, “Modem cable installation” (p. 3-44).

4 Connect the modem cable to the modem or distribution frame.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-18 Modem cable assemblies

Description	Cable assembly #	Cable length (feet)	Connections
Modem cable	848756508	50	J17 (MODEM)
	848756524	100	
	848756516	150	
	848756532	250	

Table 3-19 Modem cable connections

Connection	RJ45 connector pin#	Color	DB25 Connector Pin #
Modem cable (J17)	1	W - O	8
	2	BR	20
	3	W - BL	3
	5	O / Shield	7
	6	G	2

Sync cable installation

Description

This section provides the instructions for installing the two types of synchronization (Sync) cables to the Alcatel-Lucent 1665 DMX high-capacity shelf.

A Sync cable is required if the shelf is to be externally timed. The Alcatel-Lucent 1665 DMX high-capacity shelf can provide DS1 external timing to a BITS clock. When the shelf is externally timed by a DS1 Reference and/or is configured to provide a Sync Output, a Sync Input timing cable is required.

This procedure should be performed on each Alcatel-Lucent 1665 DMX high-capacity shelf requiring an external timing source. There are two types of cables available:

1. Sync cable with a molded D-Sub 9-Pin (DB-9) connector
2. Sync cable with a wire-wrap DB-9 connector.

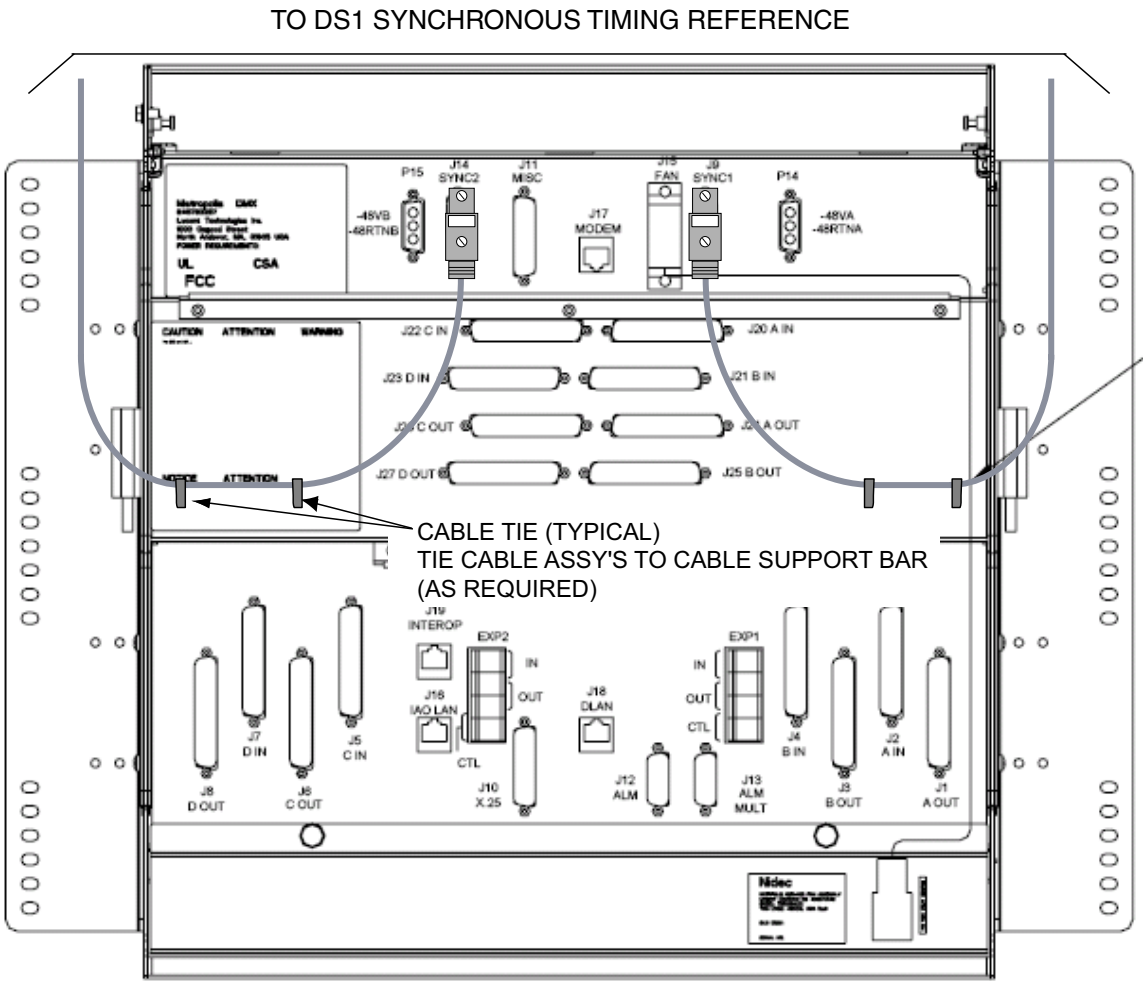
Note: Each of the Sync connections on the backplane provides an input (gray) and output (red) termination for timing. See Table 3-21, “Synchronization cable (DS1 timing reference) connections” (p. 3-51) for the pinouts.

Sync cable with molded DB-9 connector procedure

Perform the following steps when using a Sync cable with a molded DB-9 connector.

1 Connect the DB-9 connector end of the Sync cable to the SYNC1 (J9) port on the Alcatel-Lucent 1665 DMX high-capacity shelf backplane. See Figure 3-13, “Sync cable with molded DB9 connector installation” (p. 3-47).

Figure 3-13 Sync cable with molded DB9 connector installation



2 Route the cable to proper location and cut to desired length.

3 Terminate the wires in the red jacket for an output signal.

4 Terminate the wires in the gray jacket for an input signal.

5 Repeat Step 1 through Step 4 to connect the Sync cable to the SYNC2 (J14) port.

6 Check off the appropriate box in Table I-3, Installation acceptance checklist.

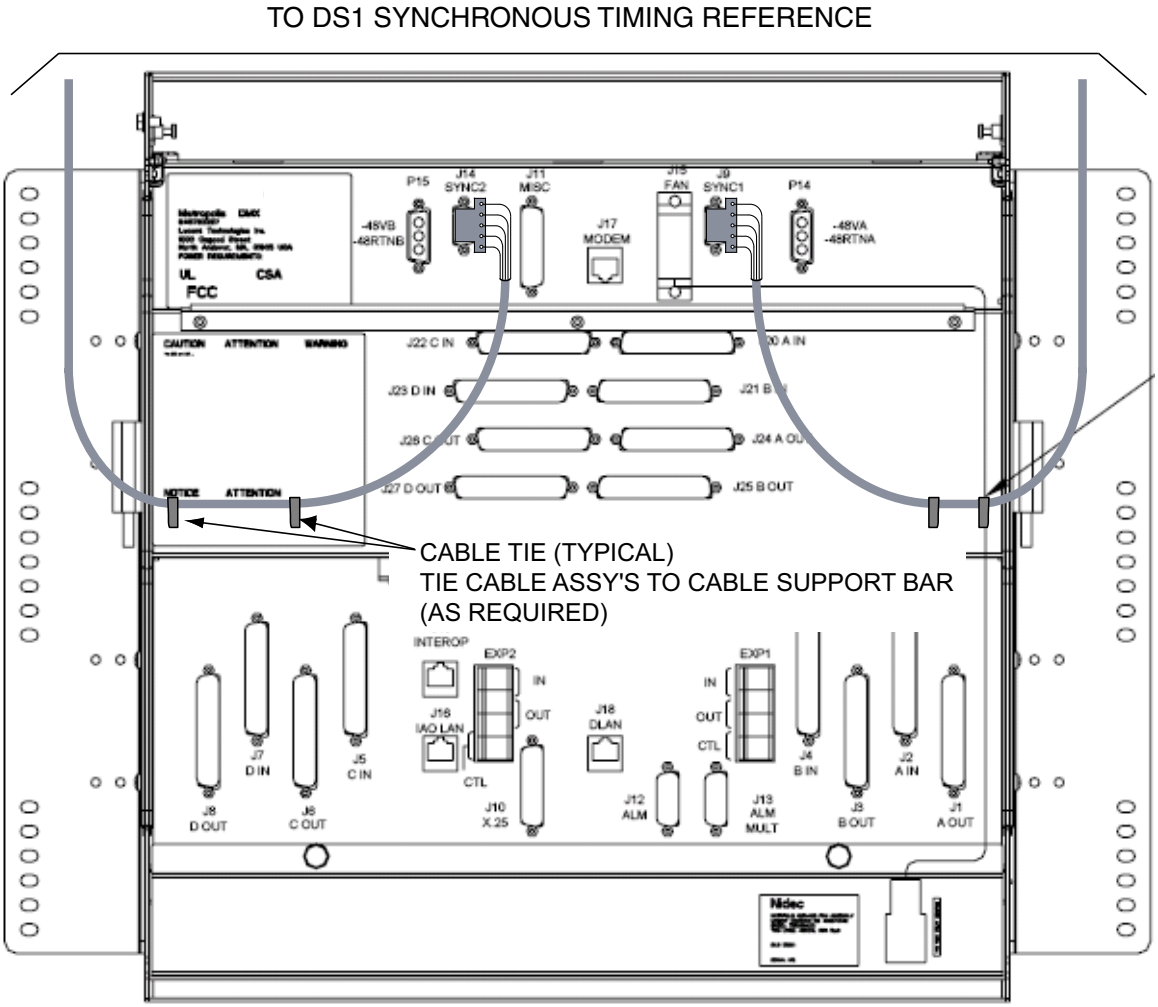
END OF STEPS

Sync cable with wire-wrap DB-9 connector procedure

Perform the following steps when using the Sync cable with the wire-wrap DB-9 connector.

1 Connect the wire-wrap DB-9 connector to SYNC1 (J9). See Figure 3-14, “Sync cable with wire-wrap connector installation” (p. 3-48).

Figure 3-14 Sync cable with wire-wrap connector installation



2 Wire-wrap Rx1 and Tx1 (red cable) on the D-Sub connector for an output signal.

3 Wire-wrap Rx2 and Tx2 (gray cable) on the D-Sub connector for an input signal.

4 Route the cable to proper location and cut to desire length.

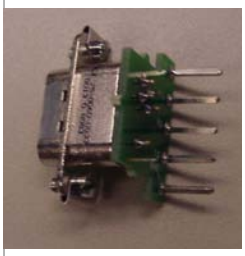
5 Terminate the other end to a clock source or equipment.

6 Repeat Step 1 through Step 5 for SYNC2 (J14) connection.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-20 Synchronization cable assemblies (SYNC1 and SYNC2)

Description		Cable Assembly #	Cable Length (feet)	Backplane connections
	Sync cable with molded DB-9 connector DS1 timing reference for DS1 external sync in/out timing	848839619	50	J9 (Sync1)/ J14 (Sync2)
		848923363	75	
		848839627	100	
		848923371	125	
		848839635	150	
		848923389	175	
		848923439	200	
		848923447	225	
		848839643	250	
		848923454	275	
		848923462	300	
		848839650	450	
	**Sync cable with wire-wrap DB-9 connector** DS1 timing reference for DS1 external sync in/out timing	848631255	50	
		848631271	100	
		848631289	150	
		848631297	250	
		848631305	450	
	Sync cable with filter connector (sync input signal only) DS1 timing reference for DS1 external sync in timing	848929311	50	
		848929329	100	
		848929337	150	
		848929345	250	
		848929352	450	

Notes:

1. The Sync cable is 22 gauge.
2. Ground the filter connector either at the bay frame ground or at the office timing source. See office records.

Table 3-21 Synchronization cable (DS1 timing reference) connections

Conn.	Jacket	Color	9-Pin conn.	Special conn.	Designation	Name
Sync1 (J9)/ Sync2 (J14)	Red	BL	1	Rx1	RGO1/RGO2	Sync Output
		W	6	Tx1	TPO1/TPO2	
	Gray	BL	2	Rx2	RGI1/RGI2	Sync Input
		W	7	Tx2	TPI1/TPI2	
		Drain	5	GND	GRD	

Office alarm cable installation

Description

Office alarms are the common method used in a central office for maintenance personnel to quickly isolate a failure. Perform this procedure if connection to the office alarm system is required.

> **Note:** The office alarm relay contacts are rated at 50 VA which means that they are capable of switching 1 amp at 50 volts, or 2 amps at 25 volts. Their ability to switch large transient currents means that they can, if necessary, switch up to ten 5-watt aisle pilot lamps.

If transient voltages or currents are above these limits, transient noise-suppressing devices such as diodes or contact protection networks must be used to keep within the voltage and current limits. If these protection devices are not sufficient, an external buffer relay MUST be provided.

In all cases, and as a matter of good practice, suppression devices such as diodes or contact protection networks must be provided across any external relay coil being driven by the Alcatel-Lucent 1665 DMX high-capacity shelf to limit transient voltages and currents.

Office alarm cable assemblies are listed in Table 3-22, “Office alarm cable assemblies” (p. 3-56).

Alarm Mult

Office alarm cabling in a Alcatel-Lucent 1665 DMX high-capacity shelf bay starts at the bottom shelf which is cabled directly to the office alarm system. Then as shelves are added to the bay, the office alarm connection is extended by multing the alarm cabling from shelf to shelf (bottom to top). Alarm mults do not leave the bay.

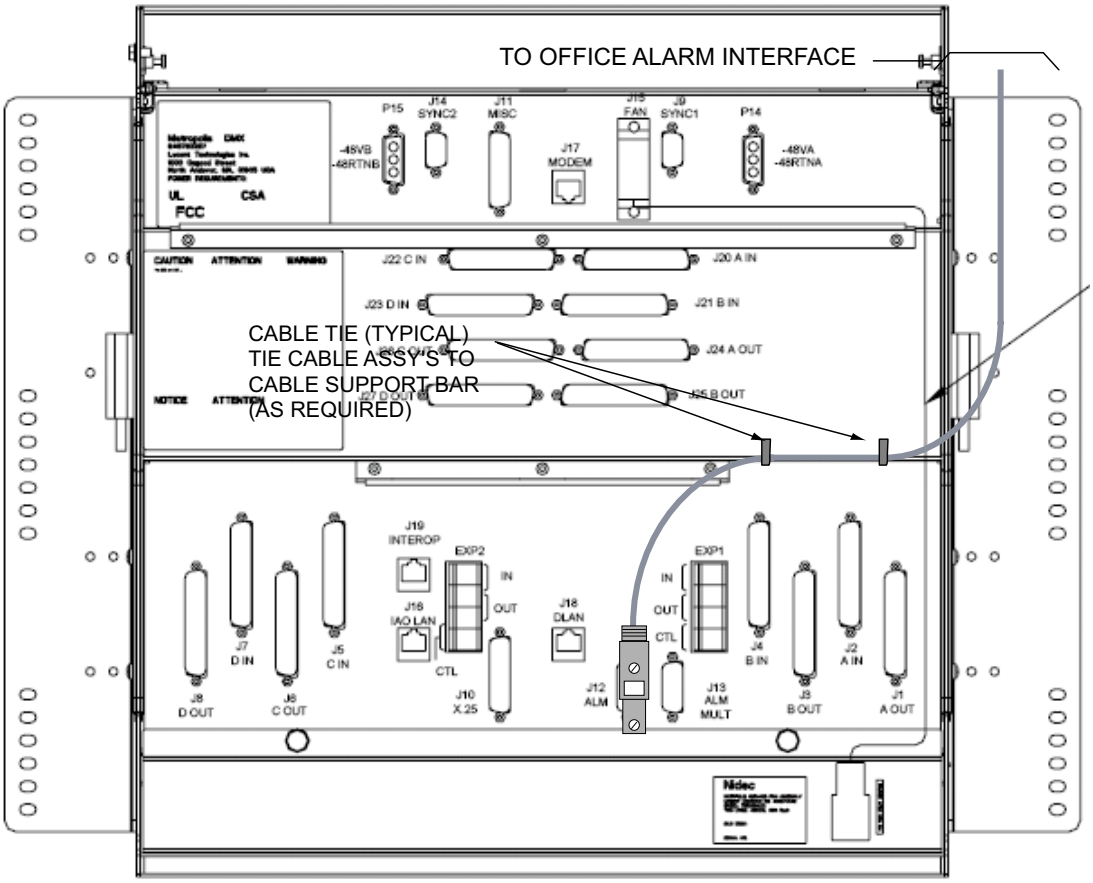
For example, J12 of one shelf should be connected to the office alarm terminal. J13 of the same shelf should be connected to J12 of the next Alcatel-Lucent 1665 DMX high-capacity shelf and the same procedure should be continued to connect more shelves.

Steps

1 Obtain the office alarm cable per Table 3-22, “Office alarm cable assemblies” (p. 3-56). Connect the office alarm cable to ALM (J12) of the bottom Alcatel-Lucent 1665 DMX high-capacity shelf.

2 Route the office alarm cable from the bottom shelf out of the Alcatel-Lucent 1665 DMX high-capacity shelf bay per Figure 3-15, “Office alarm cable installation” (p. 3-53) to the office alarm panel.

Figure 3-15 Office alarm cable installation



3 Inspect the office alarm panel and add a contact protection network (if required).

4 Cut the office alarm cable to the desired length.

5 Wire-wrap the loose end of the office alarm cable to the alarm panel, making connections as listed in Table 3-23, Office alarm connections.

END OF STEPS

Alarm mult

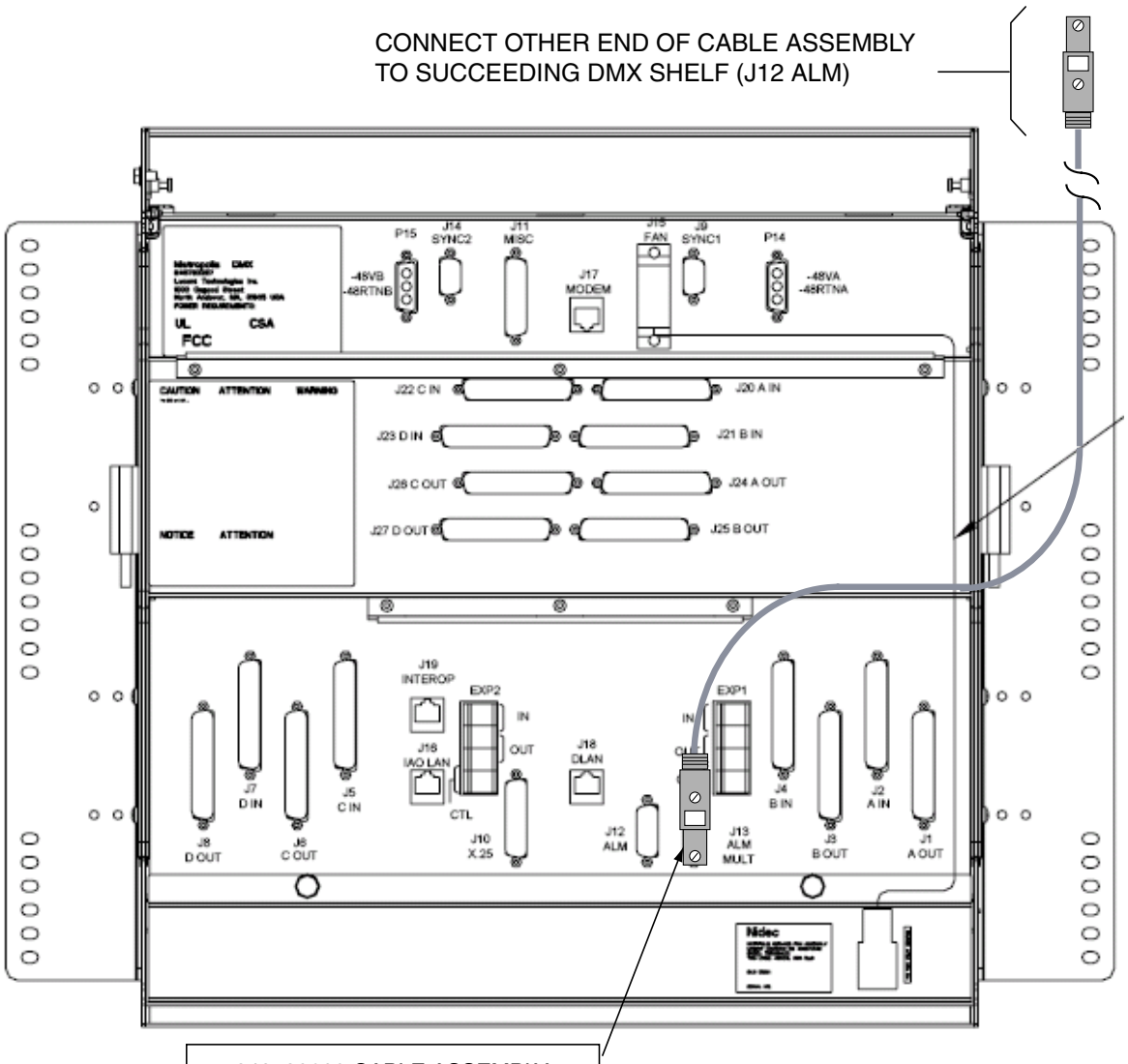
The following steps should be performed when the bottom shelf in the bay will be directly connected to the office alarms. The cable added in this procedure is to mult office alarms in a bay to the bottom shelf. In this procedure the bottom shelf is multed to the shelf immediately above. That shelf is then multed to the shelf above it. Continue until the top shelf is connected.

Note: In order for office alarms in a shelf (other than the bottom shelf) to be reported, all office alarm cable mults from that shelf to the bottom shelf must be in place. No shelf should be skipped.

1 Obtain the office alarm mult cable (848589602 for Alcatel-Lucent 1665 DMX to Alcatel-Lucent 1665 DMX and 848861530 for Alcatel-Lucent 1665 DMX to 1675 LambdaUnite). Connect one end to ALM MULT (J13) of the Alcatel-Lucent 1665 DMX high-capacity shelf.

2 Route the office alarm mult cable to the side of the bay and connect it to ALM (J12) of the Alcatel-Lucent 1665 DMX high-capacity shelf above or to Alcatel-Lucent 1675 LambdaUnite as required.

Figure 3-16 Office alarm mult cable installation



848589602 CABLE ASSEMBLY	
CONNECT THIS END OF CABLE ASSEMBLY AS FOLLOWS	
FROM	**TO**
PATCH CONNECTOR	TO PANEL POSITION
OFFICE ALARM MULT	J13 ALM MULT

3 Repeat this procedure for each shelf in the bay.

4 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-22 Office alarm cable assemblies

Description	Cable assembly #	Cable length (feet)	Backplane connections
Office alarm cable	848558193	50	J12
	848562286	100	
	848562294	150	
	848562302	250	
Office alarm mult cable (Alcatel-Lucent 1665 DMX to Alcatel-Lucent 1665 DMX)	848589602	3	J13
Office alarm mult cable (Alcatel-Lucent 1665 DMX to 1675 LambdaUnite)	848861530	3	J13

Table 3-23 Office alarm connections

Conn.	Pin#	Color	Designation	Name
J12-J13	1	BL-W	RYMJV1	Major Alarm Visible
	2	W-BL	RYMJV2	Major Alarm Visible Return
	3	O-W	RYMJA1	Major Alarm Audible
	4	W-O	RYMJA2	Major Alarm Audible Return
	5	G-W	RYMNV1	Minor Alarm Visible
	6	W-G	RYMNV2	Minor Alarm Visible Return
	7	BR-W	RYMNA1	Minor Alarm Audible
	8	W-BR	RYMNA2	Minor Alarm Audible Return
	9	S-W	RYCRV1	Critical Alarm Visible
	10	W-S	RYCRV2	Critical Alarm Visible Return
	11	BL-R	RYCRA1	Critical Alarm Audible
	12	R-BL	RYCRA2	Critical Alarm Audible Return

Notes:

1. The SYSCTL circuit pack reports office alarms.
2. The connection to the central office alarms from P12 is run for each 1665 DMX assembly when used in a miscellaneously-mounted individual application or from the first 1665 DMX assembly when mounted in a typical bay arrangement.

Miscellaneous (environmental) discrete telemetry cable installation

Description

The miscellaneous (environmental) discrete telemetry access allows the maintenance center to control and monitor equipment collocated with the Alcatel-Lucent 1665 DMX high-capacity shelf.

The environmental control feature enables the maintenance center to remotely initiate up to four contact closures at the remote terminal (RT) for equipment operation such as pumps, generators, etc.

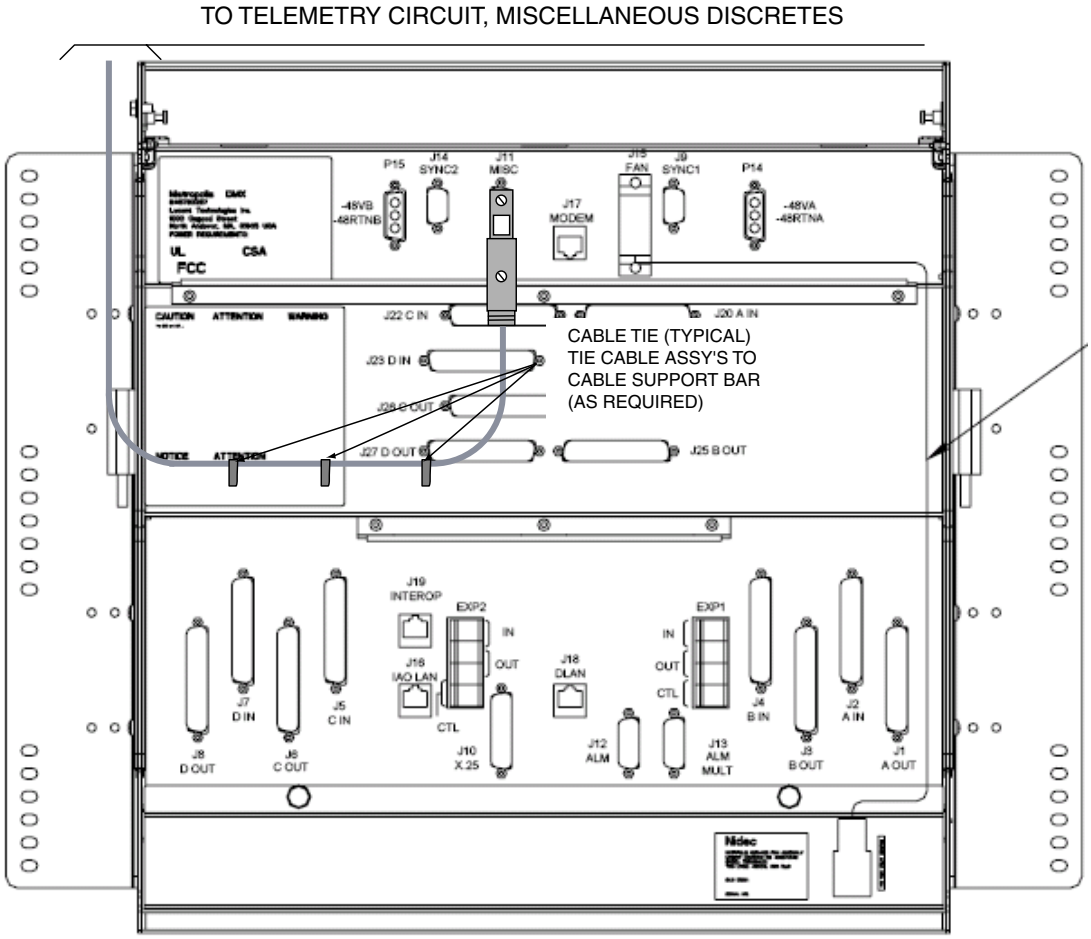
The environmental alarm status indications allow up to 23 miscellaneous user-settable alarm status indications (SI) at the remote terminal for transmission toward the central office.

Miscellaneous (environmental) discrete telemetry cable assemblies and the length options are listed in Table 3-24, “Miscellaneous discrete cable assemblies” (p. 3-59).

Steps

1 Connect the miscellaneous discrete telemetry cable to the J11 MISC connector on the backplane of the Alcatel-Lucent 1665 DMX high-capacity shelf per Figure 3-17, “Miscellaneous discrete cable installation” (p. 3-58).

Figure 3-17 Miscellaneous discrete cable installation



2 Route the cable out of the Alcatel-Lucent 1665 DMX high-capacity shelf bay per Figure 3-17, “Miscellaneous discrete cable installation” (p. 3-58) to the telemetry panel.

3 Cut the miscellaneous (environmental) discrete telemetry cable to the desired length at the telemetry panel.

4 Wire-wrap the loose end of the miscellaneous (environmental) discrete telemetry cable to the wire-wrap terminal strip, making connections per Table 3-25, “Miscellaneous (environmental) discrete telemetry connections” (p. 3-60).

Note: Each miscellaneous (environmental) discrete telemetry designation is connected to the Alcatel-Lucent 1665 DMX high-capacity shelf by two leads (wires). For each input, one lead should be connected to input-common and the other lead should be connected to the appropriate alarm indication.
For each output, one lead should be connected to output-common and the other lead should be connected to the appropriate alarm indication.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-24 Miscellaneous discrete cable assemblies

Description	Cable assembly #	Cable length (feet)	Backplane connections
Miscellaneous discrete cable	109321794	15	J11
	109321802	30	
	848839569	50	
	848839577	100	
	848839585	150	
	848839593	250	
	848839601	350	

Table 3-25 Miscellaneous (environmental) discrete telemetry connections

Conn.	Pin#	Color	Designation	Name
J11	1	BL-W	TLMI1	Env. Input - #1
	2	W-BL	TLMI2	Env. Input - #2
	3	O-W	TLMI3	Env. Input - #3
	4	W-O	TLMI4	Env. Input - #4
	5	G-W	TLMI5	Env. Input - #5
	6	W-G	TLMI6	Env. Input - #6
	7	BR-W	TLMI7	Env. Input - #7
	8	W-BR	TLMI8	Env. Input - #8
	9	S-W	TLMI9	Env. Input - #9
	10	W-S	TLMI10	Env. Input - #10
	11	BL-R	TLMI11	Env. Input - #11
	12	R-BL	TLMI12	Env. Input - #12
	13	O-R	TLMI13	Env. Input - #13
	14	R-O	TLMI14	Env. Input - #14
	15	G-R	TLMI15	env. input -#15 fan fail alarm
	16	R-G	TLMI16	Env. Input - #16
	17	BR-R	TLMI17	Env. Input - #17
	18	R-BR	TLMI18	Env. Input - #18
	19	S-R	TLMI19	Env. Input - #19
	20	R-S	TLMIC48VTRN	Input Common
	21	BL-BK/	TLMO1	Env. Output - #1
	22	BK-BL	TLMO2	Env. Output - #2
	23	O-BK	TLMO3	Env. Output - #3
	24	BK-O	TLMO4	Env. Output - #4
	25	G-BK	TLMOC	Output Common

Main optical fiber installation (OC-12, OC-48, OC-192)

Description

This section describes how to route the optical fiber cables from the interconnecting equipment (for example, a *LGX*® optical fiber distributing frame) to the Main OLIUs of the Alcatel-Lucent 1665 DMX high-capacity shelf. This procedure does not cover routing the optical fiber cable between sites.

The optical fiber cables will be connected to the Alcatel-Lucent 1665 DMX after the circuit packs are installed. The Alcatel-Lucent 1665 DMX requires single-mode fiber for the main OLIUs.

Note: The optical fiber cable is fragile and must be protected. The fibers should be placed in a protective tube or channel, such as PVC tubing, or *PANDUIT* cable channel, when running the cable from the Alcatel-Lucent 1665 DMX high-capacity shelf to the cable rack. The fibers should be placed in the cable rack in a protective channel with nothing on top of them. Cable ties should NOT be used with the optical fiber cables.

Note: Ensure only ANGLED LC connectors appear at IN ports of optical circuit packs. The “ANGLED” is referring to the rotating boot on the connector and not the connector. APC or Angled Polished Connectors are not supported.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view an unterminated optical connector with optical instruments.

WARNING

Laser hazard

Invisible laser radiation when unterminated. Avoid direct exposure of the eyes to the beam.

Note: Prior to connecting the optical fiber cables, the fibers should be examined to ensure that they are clean. See Appendix A, “Fiber cleaning” for recommended cleaning procedures.

Steps

1 Route the optical fiber cables from the interconnecting equipment into the Alcatel-Lucent 1665 DMX high-capacity shelf.

Note: Protective covers must be left on fibers.

2 Place the optical fiber cables in a protective tube or channel.

3 Label the optical fiber cables, indicating bay, shelf, pack, and direction (IN or OUT).

4 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Fiber installation for low-speed packs

Description

This section describes how to route the single-mode fiber optical cables from the interconnecting equipment (for example, a *LGX*® optical fiber distributing frame) to the Alcatel-Lucent 1665 DMX high-capacity shelf OC-3/OC-12/OC-48 optical ports. This procedure does not cover routing the optical fiber cable between sites.

The optical fiber cables will be connected to the optical ports after the circuit packs are installed.

Note: The optical fiber cable is fragile and must be protected. The fibers should be placed in a protective tube or channel, such as PVC tubing, or *PANDUIT* cable channel, when running the cable from the Alcatel-Lucent 1665 DMX to the cable rack. The fibers should be placed in the cable rack in a protective channel with nothing on top of them. Cable ties should NOT be used with the optical fiber cables.

Note: Ensure only ANGLED LC connectors appear at IN ports of optical circuit packs.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view an unterminated optical connector with optical instruments.

WARNING

Laser hazard

Invisible laser radiation when unterminated. Avoid direct exposure of the eyes to the beam.

Note: Prior to connecting the optical fiber cables, the fibers should be examined to ensure that they are clean. See Appendix A, “Fiber cleaning” for recommended cleaning procedures.

Steps

1 See the engineering job specification. Determine the function slot where the pack will be inserted. The OC-3/OC-12/OC-48 pack can be inserted into any of the function slots including the growth slots.

2 Label the optical fiber cables, indicating bay, shelf, function group, pack, and direction (IN or OUT).

3 Route optical fiber cables from the interconnecting equipment into the OC-3/OC-12/OC-48 optical ports

4 Place the optical fiber cables in a protective tube or channel.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

1000Base-F and 100Base-F fiber installation

Description

This section describes how to route the optical fiber cables from the interconnecting equipment (for example, an *LGX*® optical fiber distributing frame) to the optical ports on LNW63, LNW64, LNW74, LNW87, and LNW170 Ethernet circuit packs. Multi-mode optical fiber is required for LNW74 (100 Base-F ports) and LNW170 (100Base-F ports). Single-mode fiber is required for LNW170 (1000Base-F ports).

The optical fiber cables will be connected to the optical ports after the circuit packs are installed.

Note: The optical fiber cable is fragile and must be protected. The fibers should be placed in a protective tube or channel, such as PVC tubing, or *PANDUIT* cable channel, when running the cable from the Alcatel-Lucent 1665 DMX high-capacity shelf to the cable rack. The fibers should be placed in the cable rack in a protective channel with nothing on top of them. Cable ties should NOT be used with the optical fiber cables.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view an unterminated optical connector with optical instruments.

WARNING

Laser hazard

Invisible laser radiation when unterminated. Avoid direct exposure of the eyes to the beam.

Note: Prior to connecting the optical fiber cables, the fibers should be examined to ensure that they are clean. See Appendix A, "Fiber cleaning" for recommended cleaning procedures.

Steps

1 See the engineering job specification. Determine the function group (slot 1 only) where the pack will be inserted. The LNW63, LNW64, LNW74, LNW87, and LNW170 packs can be inserted into any of the function groups (slot 1) including the growth slot (g1). In order to use the 10/100BaseT electrical ports on the LNW74 and LNW87, use FN-A, FN-B, FN-C or FN-D. Only optical ports can be used when LNW74 is located in the Growth-1 position.

2 Label the optical fiber cables, indicating bay, shelf, function group, pack, and direction (IN or OUT).

3 Route optical fiber cables from the interconnecting equipment into the optical ports.

4 Place the optical fiber cables in a protective tube or channel.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Fibre channel fiber installation

Description

This section describes how to route the optical fiber cables from the interconnecting equipment (for example, an *LGX*® optical fiber distributing frame) to the optical ports on LNW73/73C Fibre Channel circuit packs. Multi-mode and single-mode optical fiber is supported. See engineering job spec for fiber requirements.

The optical fiber cables will be connected to the optical ports after the circuit packs are installed.

Note: The optical fiber cable is fragile and must be protected. The fibers should be placed in a protective tube or channel, such as PVC tubing, or *PANDUIT* cable channel, when running the cable from the Alcatel-Lucent 1665 DMX to the cable rack. The fibers should be placed in the cable rack in a protective channel with nothing on top of them. Cable ties should NOT be used with the optical fiber cables.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view an unterminated optical connector with optical instruments.

WARNING

Laser hazard

Invisible laser radiation when unterminated. Avoid direct exposure of the eyes to the beam.

Note: Prior to connecting the optical fiber cables, the fibers should be examined to ensure that they are clean. See Appendix A, “Fiber cleaning” for recommended cleaning procedures.

Steps

1 See the engineering job specification. Determine the function slot that the pack will be inserted. The LNW73/73C can be inserted into any of the function slots including the growth slots.

2 Label the optical fiber cables, indicating bay, shelf, function group, pack, and direction (IN or OUT).

3 Route optical fiber cables from the interconnecting equipment into the optical ports.

4 Place the optical fiber cables in a protective tube or channel.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

CIT cable installation

Description

This section provides the procedure to connect the CIT cable from the LNW2 (SYSCTL) to a PC (serial port). This will allow communications between the PC and the CIT port located on the LNW2.

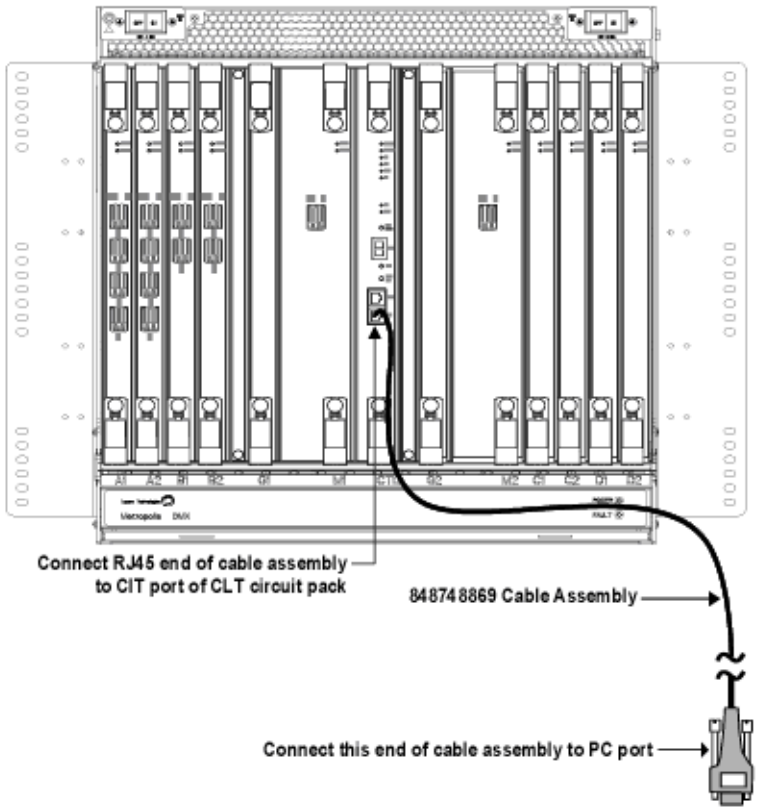
Steps

1 Connect the RJ45 end of the CIT cable to the CIT jack located on the LNW2 (SYSCTL). See Figure 3-18, “CIT cable installation” (p. 3-68).

Note: The LNW2 (SYSCTL) is not in the shelf at this time, this procedure is here to demonstrate the placement of the cable once the circuit pack is in place.

2 Connect the 9-pin D-type connector to the serial port on the PC.

Figure 3-18 CIT cable installation



3 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Table 3-26 CIT Cable Assembly

Description	Cable assembly #	Cable length	Alcatel-Lucent 1665 DMX high-capacity shelf connections
Front CIT cable	848748869	8 feet	CIT/RS-232 jack on SYSCTL (LNW2)

Table 3-27 Standard CIT cable connections

Connection	RJ45 connector		Color	9-Pin D-type connector	
	Pin#	Designation		Pin#	Designation
Front CIT cable	1	FRS232N	W - O	6	DCE Ready
	3	FDTR	W - BL	4	DTE Ready
	4	Ground	W - G	5	Ground
	5	FTXD	O	2	Receive Data
	6	FRXD	G	3	Transmit Data

Notes:

1. The connection and the colors shown above are for a standard Alcatel-Lucent made cable. If you use a RJ-45 to DB-9 connector with a standard straight-through 10BaseT LAN cable, see Table 3-28, “RJ-45 to DB-9 connector connections” (p. 3-69).

Table 3-28 RJ-45 to DB-9 connector connections

From RJ45 connector		To 9-pin D-type connector
Pin#	Color	Pin#
1	Blue	6
3	Black	4
4	Red	5
5	Green	2
6	Yellow	3

Notes:

1. The connection and the colors shown above are for RJ-45 to DB-9 connector.
2. This connector should be used with a standard straight-through cable which has all eight wires connected.

Final operations

Description

Final check on equipment and cable installation.

Steps

1 Verify that all the cables are properly dressed/connected.

2 Verify that all cables are properly labeled.

3 Verify that designations where cables were wire-wrapped are properly labeled.

4 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

4 Powering and initial circuit pack installation

Overview

Purpose

This section provides information for performing the following:

- Shelf powering
- Circuit pack option settings and installation.

Detailed information on the function of each circuit pack is contained in *Alcatel-Lucent 1665 Data Multiplexer (DMX) Applications and Planning Guide, 365-372-300*.

Contents

This chapter provides information on the following topics:

Description

Overview

This section should be performed on all shelf installations.

Tools, test equipment and accessories

The tools, test equipment and accessories necessary to perform the procedures in this section are listed in Tools, test equipment, and accessories (p. I-2) Installers should have both metric and English unit tools.

Powering

Overview

The following table lists the power requirements for the Alcatel-Lucent 1665 DMX high-capacity shelf.

Table 4-1 Alcatel-Lucent 1665 DMX high-capacity shelf power supply requirements

Item	Description
Voltage range, all components	**-40.0V to -60.0V DC**
Power feeders	two -48V power feeders BREAKER (A) BREAKER (B)
Circuit breakers (two per shelf)	20.0A or 30.0 A

Steps

1 Verify that the frame or structure into which the Alcatel-Lucent 1665 DMX high-capacity shelf is installed is properly grounded.

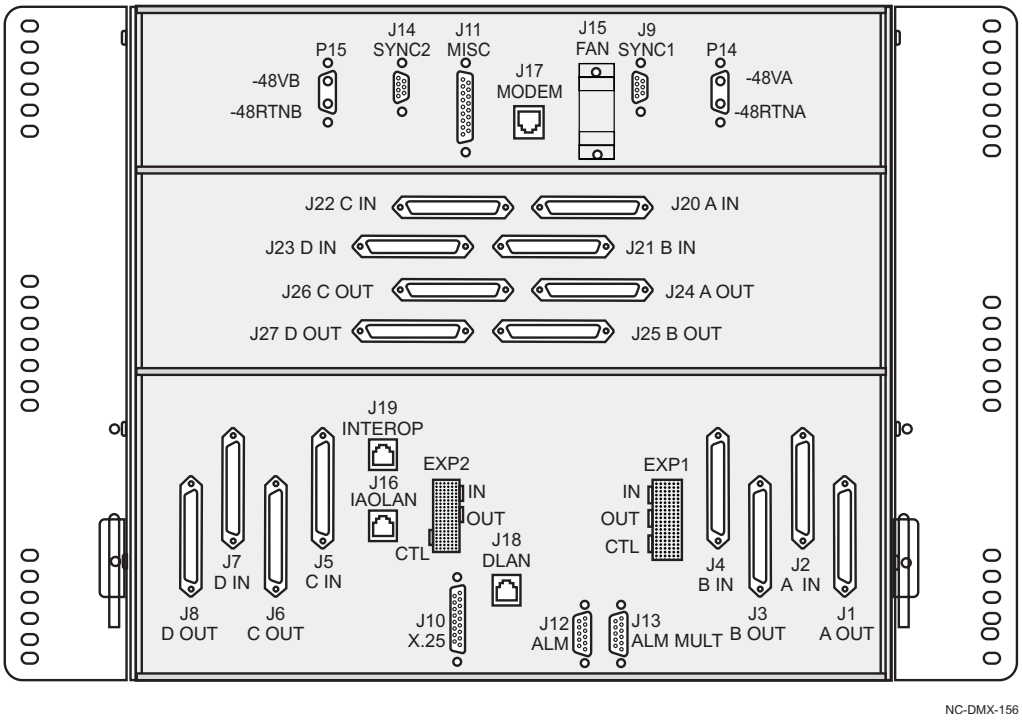
2 Verify that both circuit breakers on the Alcatel-Lucent 1665 DMX high-capacity shelf are in the OFF position. These breakers are located on the front of the Alcatel-Lucent 1665 DMX high-capacity shelf.

Note: A small flat-bladed screwdriver or other similar type tool is required to set the Alcatel-Lucent 1665 DMX high-capacity shelf circuit breakers to the OFF position.

3 Verify no circuit packs seated in shelf

4 Disconnect the power cables from the backplane connectors (P15 from J15 and P14 from J14).

Figure 4-1 Power connections on Alcatel-Lucent 1665 DMX high-capacity shelf backplane



Note: The 30-ampere shelf is comcode 848793287. The 20-ampere shelf is comcode 848935193.

5 If fuses are being used, install fuses that are rated 1.5 times higher than the circuit breaker value on the shelf, in the BDFB that powers the Alcatel-Lucent 1665 DMX high-capacity shelf A and B feeders.

6 If breakers are being used, use circuit breakers that are rated 1.25 times higher than the circuit breaker value on the shelf, in the BDCBB that powers the Alcatel-Lucent 1665 DMX high-capacity shelf. Then switch the breakers to the ON position for the Alcatel-Lucent 1665 DMX high-capacity shelf A and B feeders.

7 At the Alcatel-Lucent 1665 DMX high-capacity shelf backplane power connector, use a voltmeter and measure the voltage on the power cable between BAT A and BAT A RTN. Then measure the voltage between BAT B and BAT B RTN.

Designation	Color
BAT A	Red
BAT A RTN	Black/Red
BAT B	Red
BAT B RTN	Black/Red

Requirement: The voltage MUST be between -40.00 and -60.0 VDC.

8 At the BDFB/BDCBB either remove the fuses or put the both circuit breakers, associated with the of the Alcatel-Lucent 1665 DMX high-capacity shelf in the OFF position.

9 Reconnect the “A” feed of the power cable to the backplane connector (P14 to J14), and reconnect the “B” feed of the power cable to the backplane connector (P15 to J15).

10 At the BDFB/BDCBB either insert the fuses or put the both circuit breakers, associated with the of the Alcatel-Lucent 1665 DMX high-capacity shelf in the ON position.

11 Place both circuit breakers on the Alcatel-Lucent 1665 DMX high-capacity shelf in the ON position.

12 Verify that the fans have started running.

13 At the BDFB/BDCBB either remove the fuse or put the circuit breaker, associated with the “B” feed of the Alcatel-Lucent 1665 DMX high-capacity shelf in the OFF position.

14 Verify the PWR A LED on the Alcatel-Lucent 1665 DMX high-capacity shelf is lighted with only the “A” feed powered.

15 At the BDFB/BDCBB either insert the fuse or put the circuit breaker, associated with the "B" feed of the Alcatel-Lucent 1665 DMX high-capacity shelf in the ON position. Then either remove the fuse or put the circuit breaker, associated with the "A" feed of the Alcatel-Lucent 1665 DMX, in the OFF position.

16 Verify the PWR B LED on the Alcatel-Lucent 1665 DMX high-capacity shelf is lighted with only the "B" feed powered.

17 At the BDFB either insert the fuse or put the circuit breaker, associated with the "A" feed of the Alcatel-Lucent 1665 DMX high-capacity shelf in the ON position.

18 Verify that the both the PWR A LED and PWR B LED on the Alcatel-Lucent 1665 DMX high-capacity shelf user panel are lighted with both the "A" and "B" feeds powered.

19 Verify that the fans are still running and are moving air.

20 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Circuit pack compatibility

Overview

Table 4-2, "R9.0 circuit pack compatibility" (p. 4-6) lists all the circuit packs that are compatible with R9.0 and their respective shelf locations (slots).

Note: If installing the 20 Amp Alcatel-Lucent 1665 DMX high-capacity shelf, the following configurations should be avoided:

Fan Unit	LNW2	(2) LNW59	(10)LNW170	
Fan Unit	LNW2	(2) LNW82	(10)LNW170	

Fan Unit	LNW2	(2) LNW59	(10)LNW20	
Fan Unit	LNW2	(2) LNW59	(8)LNW20	and any optical pack

Table 4-2 R9.0 circuit pack compatibility

Slot name								
A1, A2* †	**B1, B2*** †	**G1***	**M1**	**CTL**	**G2*** †	**M2**	**C1, C2*** †	**D1, D2*** †
				LNW2				
LNW7†	LNW7†						LNW7†	LNW7†
LNW8	LNW8						LNW8	LNW8
LNW16	LNW16						LNW16	LNW16
LNW18	LNW18						LNW18	LNW18
LNW19B	LNW19B						LNW19B	LNW19B
LNW20	LNW20	LNW20‡			LNW20‡		LNW20	LNW20
			LNW27			LNW27		
			LNW29			LNW29		
LNW31	LNW31	LNW31			LNW31		LNW31	LNW31
			LNW32			LNW32		
LNW37	LNW37	LNW37			LNW37		LNW37	LNW37
LNW45	LNW45	LNW45			LNW45		LNW45	LNW45
			LNW48			LNW48		
LNW49	LNW49	LNW49			LNW49		LNW49	LNW49
			LNW50			LNW50		
			LNW54			LNW54		
LNW55	LNW55	LNW55			LNW55		LNW55	LNW55
			LNW56			LNW56		
			LNW58			LNW58		
			LNW59			LNW59		
LNW62	LNW62	LNW62			LNW62		LNW62	LNW62
LNW63	LNW63	LNW63			LNW63		LNW63	LNW63
LNW64	LNW64	LNW64			LNW64		LNW64	LNW64

Slot name								
A1, A2*†	**B1, B2*†**	**G1***	**M1**	**CTL**	**G2*†**	**M2**	**C1, C2*†**	**D1, D2*†**
LNW66	LNW66						LNW66	LNW66
LNW73	LNW73	LNW73			LNW73		LNW73	LNW73
LNW73C	LNW73C	LNW73C			LNW73C		LNW73C	LNW73C
LNW74	LNW74	LNW74**			LNW74**		LNW74	LNW74
			LNW76			LNW76		
			LNW80			LNW80		
			LNW82			LNW82		
LNW87†	LNW87	LNW87			LNW87		LNW87	LNW87
LNW93	LNW93						LNW93	LNW93
LNW94	LNW94						LNW94	LNW94
						LNW97		
LNW98	LNW98	LNW98			LNW98		LNW98	LNW98
LNW170	LNW170	LNW170			LNW170		LNW170	LNW170
177D	177D	177D			177D		177D	177D
			177E			177E		
			LNW202			LNW202		
			LNW203			LNW203		
LNW402	LNW402	LNW402			LNW402		LNW402	LNW402
			LNW502			LNW502		
			LNW504			LNW504		
LNW603	LNW603	LNW603			LNW603		LNW603	LNW603
LNW705	LNW705	LNW705			LNW705		LNW705	LNW705
LNW785	LNW785	LNW785			LNW785		LNW785	LNW785
LNW801	LNW801						LNW801	LNW801

Notes:

* 177D Apparatus Blanks are required in all unequipped Function unit and Growth slots to provide proper air flow for cooling.

† The Etherent/Data packs (LNW63, LNW64, LNW73/73C, LNW74, LNW87, LNW170) can only be installed in slot 2 of function or growth slot if the shelf is equipped with VLF mains (LNW59, LNW82, or LNW504).

‡ In G1 and G2, the LNW20 only supports portless operation.

** Only optical ports on the LNW74 can be used in growth slots.

Switch fabric compatibility

When equipping high-speed slots, it is imperative that the switch fabric of the circuit packs located in Main 1 and Main 2 match.

Table 4-3 OC-12 mains with 12 STS-1s of vt switch fabric

OC-12 Circuit packs	
LNW48	LNW50
LNW54	LNW203

Table 4-4 OC-48/OC-192 Mains with 48 STS-1s of vt switch fabric

OC-48 Circuit Packs	
LNW27	LNW76
LNW29	LNW82
LNW32	LNW504
LNW202	

Table 4-5 OC192 circuit packs with 48 STS-1s of vt switch fabric

OC-192 Circuit Packs	
LNW56	LNW58
LNW57	LNW60
LNW502 (PTM)	

Table 4-6 OC192 circuit packs with 192 STS-1s of vt switch fabric (VLF)

OC-192 Circuit Packs	
LNW59 (VLF)	

Table 4-7 Main Switch Pack (no optics) with 96 STS-1s of vt switch fabric

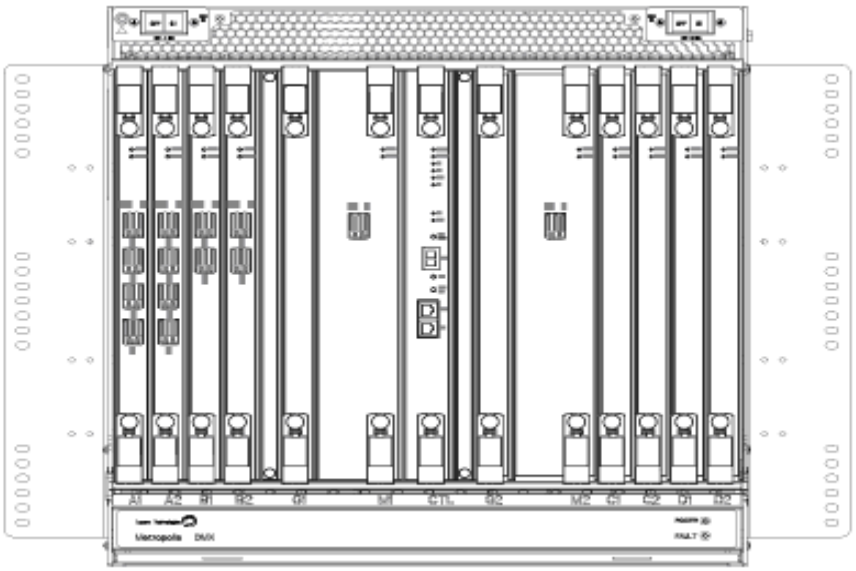
Switch Circuit Pack	
LNW80	

CAUTION

Service disruption hazard

Once a high-speed OLIU is installed and placed in service, another OLIU with a different capacity switch fabric may not be substituted without disruption to traffic.

Figure 4-2 Alcatel-Lucent 1665 DMX high-capacity shelf



Initial circuit pack installation

Description

This section provides instructions for installing, BUT NOT fully seating, circuit packs into the Alcatel-Lucent 1665 DMX high-capacity shelf. After circuit packs have been unpacked, they may be placed in their respective slots in the Alcatel-Lucent 1665 DMX high-capacity shelf but NOT FULLY ENGAGED IN THE BACKPLANE CONNECTOR. The circuit packs will be fully installed (seated) in Chapter 5, "Software download and circuit pack installation", "Circuit pack installation procedure" (p. 5-4).

Note: If office alarms are connected, it is advisable to disconnect the office alarm cable while performing the procedures in this section to prevent spurious alarms from being reported. Reconnect the office alarm cable after completion of all testing.

NOTICE

Blank circuit packs are required in all unequipped Main slots, Function unit, and Growth slots to provide proper air flow for cooling.

CAUTION

ESD hazard

To protect against damage due to electrostatic discharge, a properly grounded ESD wrist strap must be worn when handling equipment.

Note: When only one main OLIU (OC-12, OC-48, OC-192) or main switch pack (LNW80) is required, it must be installed in the M1 slot.

LNW2 (SYSCTL) installation

Follow this procedure to install the LNW2 (SYSCTL) circuit pack into the Alcatel-Lucent 1665 DMX high-capacity shelf.

1 Remove the SYSCTL circuit pack from the packing material. Verify that there are two NVM memory cards.

Note: Do not remove the NVM cards.

2 Identify the CTL slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, "Alcatel-Lucent 1665 DMX high-capacity shelf" (p. 4-9).

3 Place the SYSCTL circuit pack into the CTL slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

4 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Main OLIU Circuit Pack Installation

1 If installing OC-12 main OLIUs proceed to "OC-12 main OLIU installation" (p. 4-11).

2 If installing OC-48 main OLIUs proceed to "OC-48 main OLIU installation" (p. 4-12).

3 If installing OC-192 main OLIUs proceed to "OC192 main OLIU installation" (p. 4-13).

4 If installing OC-3/8OC-12/2OC-48 main OLIU (LNW82) proceed to "multi-rate main OLIU installation" (p. 4-14)

5 If installing LNW80 main switch OLIU proceed to "LNW80 main switch pack installation" (p. 4-15).

END OF STEPS

OC-12 main OLIU installation

Follow this procedure to install the OC-12 OLIU circuit packs listed in Table 4-3, "OC-12 mains with 12 STS-1s of vt switch fabric" (p. 4-8) in the Alcatel-Lucent 1665 DMX high-capacity shelf.

1 Remove the first OC-12 OLIU circuit pack from the packing material.

2 Identify the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, "Alcatel-Lucent 1665 DMX high-capacity shelf" (p. 4-9).

3 Place the OC-12 OLIU circuit pack into the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

4 Remove the second OC-12 OLIU from the packing material.

5 Identify the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

6 Place the second OLIU circuit pack into the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

Important! If any of the Main slots are to remain unequipped, install a blank circuit pack to provide proper air flow for cooling. Always use Main-1 (M1) for shelves equipped with only one main pack.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-48 main OLIU installation

Follow this procedure to install the OC-48 OLIU circuit packs in the Alcatel-Lucent 1665 DMX high-capacity shelf. Verify Switch fabric compatibility (p. 4-8) using Table 4-4, OC-48/OC-192 Mains with 48 STS-1s of vt switch fabric.

1 Remove the first OC-48 OLIU circuit pack from the packing material.

2 Identify the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

3 Place the OC-48 OLIU circuit pack into the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

4 Remove the second OC-48 OLIU from the packing material.

5 Identify the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

6 Place the second OLIU circuit pack into the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

Important! If any of the Main slots are to remain unequipped, install a blank circuit pack to provide proper air flow for cooling. Always use Main-1 (M1) for shelves equipped with only one main pack.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC192 main OLIU installation

Follow this procedure to install the OC-192 OLIU circuit packs in the Alcatel-Lucent 1665 DMX high-capacity shelf. Verify Switch fabric compatibility (p. 4-8) using Table 4-5, OC192 circuit packs with 48 STS-1s of vt switch fabric and Table 4-6, OC192 circuit packs with 192 STS-1s of vt switch fabric (VLF),

1 Remove the first OC-192 OLIU circuit pack from the packing material.

2 Identify the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

3 Place the OC-192 OLIU circuit pack into the M1 slot on the Alcatel-Lucent 1665 DMX shelf. Do **NOT** engage the circuit pack in the backplane connector.

4 Remove the second OC-192 OLIU from the packing material.

5 Identify the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

6 Place the second OLIU circuit pack into the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

Important! If any of the Main slots are to remain unequipped, install a blank circuit pack to provide proper air flow for cooling. Always use Main-1 (M1) for shelves equipped with only one main pack.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

multi-rate main OLIU installation

Follow this procedure to install the following LNW82 OC3/OC12/OC48 or LNW504 OC-48/OC-192 circuit packs in the Alcatel-Lucent 1665 DMX high-capacity shelf.

- LNW82
- LNW504

Note: A deeper shelf cover (comcode 849068358) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW82 OC3/OC12/OC48, LNW504 OC-48/OC-192, LNW785 OMD, and/or LNW705 XM10G/8 circuit packs. This shelf cover provides more space to prevent fibers from touching the front cover when the cover is closed.

1 Remove the first OLIU circuit pack from the packing material.

2 Identify the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

3 Place the OLIU circuit pack into the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

4 Remove the second OLIU from the packing material.

5 Identify the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

6 Place the second OLIU circuit pack into the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

Important! If any of the Main slots are to remain unequipped, install a blank circuit pack to provide proper air flow for cooling. Always use Main-1 (M1) for shelves equipped with only one main pack.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW80 main switch pack installation

Follow this procedure to install the LNW80 circuit packs in the Alcatel-Lucent 1665 DMX high-capacity shelf.

1 Remove the first LNW80 circuit pack from the packing material.

2 Identify the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

3 Place the LNW80 circuit pack into the M1 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

4 Remove the second LNW80 from the packing material.

5 Identify the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. See Figure 4-2, “Alcatel-Lucent 1665 DMX high-capacity shelf” (p. 4-9).

6 Place the second LNW80 circuit pack into the M2 slot on the Alcatel-Lucent 1665 DMX high-capacity shelf. Do **NOT** engage the circuit pack in the backplane connector.

Important! If any of the Main slots are to remain unequipped, install a blank circuit pack to provide proper air flow for cooling. Always use Main-1 (M1) for shelves equipped with only one main pack.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW785 OMD5/8 8-channel low-loss DWDM Optical mux/demux

Follow this procedure to install the LNW785 circuit packs in the Alcatel-Lucent 1665 DMX high-capacity shelf. The LNW785 OMD5/8 circuit pack multiplexes/demultiplexes up to 8 DWDM optical channels spaced 100 GHz apart, ranging from 1530 to 1536 nm.

Note: A deeper shelf cover (comcode 849068358) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW82 OC3/OC12/OC48, LNW504 OC-48/OC-192, LNW785 OMD, and/or LNW705 XM10G/8 circuit packs. This shelf cover provides more space to prevent fibers from touching the front cover when the cover is closed.

1 See the engineering job specification. Identify the proper function group slots where LNW785 circuit packs will be installed.

2 Remove the first LNW785 circuit pack from the packing material.

3 Place the circuit pack into the shelf (slot A1, A2, B1, B2, C1, C2, D1, D2, G1, or G2 as required). Do **NOT** engage the circuit pack in the backplane connector.

4 Repeat Step 1 through Step 3 for each additional LNW785 to be equipped.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW705 XM10G/8 muxponder pack

Follow this procedure to install the LNW705 circuit packs in the Alcatel-Lucent 1665 DMX high-capacity shelf. The LNW705 XM10G/8 circuit pack multiplexes/demultiplexes up to 8 ports onto a single 10G wavelength. The LNW705 XM10G/8 circuit pack provides transport for the following types of signals: OC-3/12/48, 1GE, FC, FICON and 2XFC

Note: A deeper shelf cover (comcode 849068358) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW82 OC3/OC12/OC48, LNW504 OC-48/OC-192, LNW785 OMD, and/or LNW705 XM10G/8 circuit packs. This shelf cover provides more space to prevent fibers from touching the front cover when the cover is closed.

Note: The LNW705 circuit packs require PTM modules for the optical interface. This procedure will consist of two parts. Installing the circuit card and installing the PTM per Appendix E, "Pluggable transmission module installation", Pluggable transmission modules (PTM) (p. E-1).

1 See the engineering job specification. Identify the proper function group slots where LNW705 circuit packs will be installed.

2 Remove the first LNW705 circuit pack from the packing material.

3 Place the circuit pack into the shelf (slot A1, A2, B1, B2, C1, C2, D1, D2, G1, or G2 as required). Do **NOT** engage the circuit pack in the backplane connector.

4 Repeat Step 1 through Step 3 for each additional LNW705 to be equipped.

5 See Appendix E, Pluggable transmission modules (PTM) (p. E-1).

6 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW7(28DS1PM), LNW8(56DS1E1), LNW801(56DS1E1) low-speed installation (optional)

Follow this procedure only if installing LNW7 (28DS1PM), LNW8 (56DS1E1), or LNW801 (56DS1E1) circuit packs into the Alcatel-Lucent 1665 DMX high-capacity shelf.

Note: LNW7 is not supported with VLF main circuit packs.

1 See the engineering job specification. Identify the proper function group slots where LNW7, LNW8, or LNW801 circuit packs will be installed.

2 Remove the LNW7, LNW8, or LNW801 from the packing material.

3 Place the circuit pack into the shelf (slot A1, B1, C1 or D1 as required). Do **NOT** engage the circuit pack in the backplane connector.

4 If a protection circuit pack is required, continue with Step 5. If not, install a blank circuit pack into the protection circuit pack slot (A2, B2, C2 or D2 as required), then proceed to Step 7.

Important! Blank circuit packs are required in all unused slots to provide proper air flow for cooling.

5 Remove the second LNW7, LNW8, or LNW801 from the packing material.

6 Place the circuit pack into the shelf (slot A2, B2, C2, or D2 as required). Do **NOT** engage the circuit pack in the backplane connector.

7 Repeat Step 1 through Step 6 for each additional function group to be equipped with LNW7, LNW8, or LNW80 circuit packs.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW16 (12DS3/EC1), LNW18 (TMUX), LNW19B (48 DS3/EC1), LNW20 (48TMUX) low-speed installation (optional)

Follow this procedure only if installing LNW16 (12DS3/EC1), LNW18 (TMUX), LNW19B (48 DS3/EC1 supporting Terminal Loopbacks) or LNW20 (48TMUX) circuit packs into the Alcatel-Lucent 1665 DMX shelf.

1 See the engineering job specification. Identify the proper function group(s) where LNW16, LNW18, LNW19B or LNW20 circuit packs will be installed.

2 Remove the LNW16, LNW18, LNW19B or LNW20 from the packing material.

3 Place the circuit pack into the shelf (slot A1, B1, C1, D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.

Note: The LNW20 (48TMUX) is allowed in G1, G2 when used in portless mode. LNW16, LNW18, and LNW19B are not allowed in G1, G2.

4 If a protection circuit pack is required, continue with Step 5. If not, install a blank circuit pack into the protection circuit pack slot (A2, B2, C2, D2 or G2 as required), then proceed to Step 7.

Important! Blank circuit packs are required in all unused slots to provide proper air flow for cooling.

5 Remove the second LNW16, LNW18, LNW19B or LNW20 from the packing material.

6 Place the circuit pack into the shelf (slot A2, B2, C2, D2 or G2 as required). Do **NOT** engage the circuit pack in the backplane connector.

Note: The LNW20 is allowed in G1, G2 when used in portless mode. LNW16, LNW18, and LNW19B are not allowed in G1, G2.

7 Repeat Step 1 through Step 6 for each additional function group to be equipped with LNW16, LNW18, LNW19B or LNW20 circuit packs.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW37 (4 OC-3 PTM OLIUs), LNW45 (8 OC-3 PTM OLIUs), LNW49 (4 OC-12 PTM OLIUs), LNW55 (12OC-3/12OC-12/4 OC-48 PTM OLIUs), LNW62 (4 OC-48 PTM OLIUs), LNW603 (OC-192 PTM OLIU) low-speed installation (optional)

Follow this procedure only if installing the LNW37 (4 OC-3 PTM OLIUs), LNW45 (8 OC-3 PTM OLIUs), LNW49 (4 OC-12 PTM OLIUs), LNW55 (12 OC-3/12 OC-12/4 OC-48 PTM OLIUs), LNW62 (4 OC-48 PTM OLIUs), or LNW603 (OC-192 PTM OLIU) circuit packs into the Alcatel-Lucent 1665 DMX shelf.

Note: A deeper shelf cover (comcode 849068358) is required for shelves equipped with LNW55 OC3/OC12/OC48, LNW82 OC3/OC12/OC48, LNW504 OC-48/OC-192, LNW785 OMD, and/or LNW705 XM10G/8 circuit packs. This shelf cover provides more space to prevent fibers from touching the front cover when the cover is closed.

Note: The LNW37, LNW45, LNW49, LNW55 and LNW62 circuit packs require PTM modules for the optical interface. This procedure will consist of two parts. Installing the circuit card and installing the PTM per Appendix E, Pluggable transmission modules (PTM) (p. E-1).

1 See the engineering job specification. Identify the proper function group(s) and/or growth slot(s) where the low-speed OLIU circuit packs will be installed.

2 Remove the OLIU from the packing material.

3 Place the circuit pack into the shelf (slot A1, B1, C1, D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.

Note: If using VLF mains (LNW59, LNW82, LNW504), the circuit pack may be installed in slots A2, B2, C2, D2, G2. Always consult the engineering job specification for placement of circuit packs.

4 If a companion circuit pack is required, continue with Step 5. If not, install a blank circuit pack into the companion circuit pack slot (A2, B2, C2, D2 or G2 as required), then proceed to Step 7.

Note: Blank circuit packs are required in all unused slots to provide proper air flow for cooling.

5 Remove the second OLIU from the packing material.

6 Place the circuit pack into the shelf (slot A2, B2, C2, D2 or G2 as required). Do **NOT** engage the circuit pack in the backplane connector.

7 Repeat Step 1 through Step 6 for each additional function group and/or growth slot to be equipped with LNW37, LNW45, LNW49, LNW55 or LNW62 circuit packs.

8 Install the PTM module per Pluggable transmission modules (PTM) (p. E-1).

9 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW31 (OC-48 OLIU) or LNW402 (OC-48 PTB-based DWDM) low-speed installation (optional)

Follow this procedure only if installing LNW31 or LNW402circuit packs into the Alcatel-Lucent 1665 DMX shelf.

1 See the engineering job specification. Identify the proper function group(s) and/or growth slot(s) where LNW31 or LNW402 circuit pack will be installed.

2 Remove the LNW31 or LNW402 from the packing material.

3 Place the circuit pack into the shelf (slot A1, B1, C1, D1 or G1 as required). Do **NOT** engage the circuit pack in the backplane connector.

Note: If using VLF mains (LNW59, LNW82, LNW504), the circuit pack may be installed in slots A2, B2, C2, D2, G2. Always consult the engineering job specification for placement of circuit packs.

4 If a companion circuit pack is required, continue with Step 5. If not, install a blank circuit pack into the companion circuit pack slot (A2, B2, C2, D2 or G2 as required) then proceed to Step 7.

Important! Blank circuit packs are required in all unused slots to provide proper air flow for cooling.

5 Remove the second LNW31 or LNW402 from the packing material.

6 Place the circuit pack into the shelf (slot A2, B2, C2, D2 or G2). Do **NOT** engage the circuit pack in the backplane connector.

7 Repeat Step 1 through Step 6 for each additional function group and/or growth slot to be equipped with LNW31 or LNW402 circuit packs.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW66 (10/100T) installation (optional)

Follow this procedure only if installing LNW66 (10/100T) circuit packs into the Alcatel-Lucent 1665 DMX shelf.

1 See the engineering job specification. Identify the proper function group slot (A1, B1, C1 or D1) where the LNW66 circuit pack will be installed.

Note: The LNW66 or circuit pack can only be installed in slot 1 of any function group.

2 Remove the LNW66 from the packing material.

3 Place the circuit pack into the shelf (slot A1, B1, C1 or D1 as required). Do **NOT** engage the circuit pack in the backplane connector.

4 Install a blank circuit pack into the companion circuit pack slot (A2, B2, C2 or D2 as required).

Important! Blank circuit packs are required in all unused slots to provide proper air flow for cooling.

5 Repeat Step 1 through Step 4 for each additional function group slot 1's to be equipped with LNW66 circuit packs.

6 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW63 (1000BASE-SX/LX/LX10), LNW64 (8 GbE), LNW74 (10/100 T/F), LNW87 (FE/GBE PL) and LNW170 (100/1G FXS) installation (optional)

Follow this procedure only if installing LNW63 (1000BASE-SX/LX/LX10), LNW64 (8 GbE), LNW74 (10/100 T/F), LNW87 (FE/GBE PL), and LNW170 (100/1G FXS) circuit packs into the Alcatel-Lucent 1665 DMX shelf.

Note: The LNW63, LNW64, LNW74, LNW87, and LNW170 circuit packs require PTM modules for the Ethernet interface. This procedure will consist of two parts. Installing the circuit card and installing the PTM per Appendix E, Pluggable transmission modules (PTM) (p. E-1).

1 See the engineering job specification. Identify the proper function group slot (A1, A2, B1, B2, C1, C2, D1, D2, G1 or G2) where the LNW63, LNW64, LNW74, LNW87, or LNW170 circuit pack will be installed.

Note: When LNW74 is installed in the G1 or G2 position, only the faceplate optical 100 Base-F ports are available for use.

The LNW63, LNW64, LNW74, LNW87, and LNW170 circuit packs can only be installed in slot 1 of any function group **unless** the mains are equipped with VLF mains (LNW59, LNW82, LNW504). With the VLF mains, both slots in a function or growth group may be equipped.

2 Remove the LNW63, LNW64, LNW74, LNW87, or LNW170 from the packing material.

3 Place the circuit pack into the shelf fn slot. Do **NOT** engage the circuit pack in the backplane connector.

4 Install a blank circuit pack into the companion function group circuit pack slot as required.

Important! Blank circuit packs are required in all unused slots to provide proper air flow for cooling.

5 Repeat Step 1 through Step 4 for each additional function group to be equipped with LNW63, LNW64, LNW74, LNW87, or LNW170 circuit packs.

6 Install the PTM module per Appendix E, Pluggable transmission modules (PTM) (p. E-1).

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW73 (FC-1X/2X) and LNW73C (FC-1X/2X with compression) installation (optional)

Follow this procedure only if installing LNW73 (FC-1X/2X) and LNW73C (FC-1X/2X with compression) circuit packs into the Alcatel-Lucent 1665 DMX high-capacity shelf.

Note: The LNW73 and LNW73C circuit pack requires PTM modules for the optical interface. This procedure will consist of two parts. Installing the circuit card and installing the PTM per Pluggable transmission modules (PTM) (p. E-1).

1 See the engineering job specification. Identify the proper function group slot (A1, A2, B1, B2, C1, C2, D1, D2) and/or growth slot (G1, G2) where the LNW73 or LNW73C circuit pack will be installed.

Note: The LNW73 and LNW73C circuit packs can only be installed in slot 1 of any function group **unless** the mains are equipped with VLF mains (LNW59, LNW82, LNW504). With the VLF mains, both slots in a function or growth group may be equipped.

2 Remove the LNW73 or LNW73C from the packing material.

3 Place the circuit pack into the shelf function group slot as required. Do **NOT** engage the circuit pack in the backplane connector.

4 Install a blank circuit pack into the companion circuit pack slot as required.

Important! Blank circuit packs are required in all unused slots to provide proper air flow for cooling.

5 Repeat Step 1 through Step 4 for each additional function group and/or growth slot to be equipped with LNW73 or LNW73C circuit packs.

6 Install the PTM module per Appendix E, Pluggable transmission modules (PTM) (p. E-1).

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

177D/LNW98 blank CP installation (optional)

Follow this procedure to install 177D Apparatus Blank(s) or LNW98 Detectable Blank(s) into the Alcatel-Lucent 1665 DMX high-capacity shelf.

Note: A 177D Apparatus Blank or LNW98 Detectable Blank is required in any unequipped slots to provide proper air flow for cooling.

1 Identify all the unequipped Function unit or Growth slots.

2 Remove the 177D or LNW98 from the packing material.

3 Insert (fully seat) the 177D or LNW98 blank into an unequipped slot on the shelf.

4 Continue with the next unequipped slot until all the unused slots are equipped with an 177D Apparatus Blank or LNW98 Detectable Blank.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

177E/LNW97 blank CP installation (optional)

Follow this procedure to install 177E Apparatus Blank(s) or LNW97 Detectable Blank(s) into the Alcatel-Lucent 1665 DMX high-capacity shelf.

Note: A 177E Apparatus Blank or LNW97 Detectable Blank is required in the Main-2 (M2) slot to provide proper air flow for cooling when only one main is equipped. Always use Main-1 (M1) for shelves equipped with only one main pack.

1 Identify any unequipped Main slots.

2 Remove the 177E or LNW97 from the packing material.

3 Insert (fully seat) the 177E or LNW97 into the unequipped Main slot on the shelf.

4 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Part II: Stand-alone installation tests

Overview

Purpose

Part II covers the generic software download to the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX), stand-alone installation tests to verify correct interconnect cabling, alarm cabling, and as required, external timing and communication cabling. This section also covers circuit pack installation (fully seated).

Contents

This section is organized into the following chapters:

Tools, test equipment, and accessories

This section lists the tools, test equipment and accessories needed to perform all the procedures in this installation manual.

Listed below are the required tools, test equipment and accessories.

Quantity	Description	Comments
	Screwdriver(s)	A screwdriver(s) with the appropriate head(s) is (are) required for securing the mounting screws, repositioning the mounting brackets, installing the interfacing cables, and for setting the circuit breakers to the OFF position.
1	ESD Wrist Strap	A wrist strap must be worn when handling circuit packs. Use the electrostatic discharge (ESD) jack provided on the shelf.
1	Multimeter (Optional)	The voltmeter must be capable of measuring DC voltage in the 40 to 60 volt range. The use of the voltmeter is optional since the shelf will alarm or shut down if the proper voltage is not supplied.
1	DS1 Error Rate Test Set	A DS1 error rate test set is required for testing of DS1 cabling. A T-BERD 211 or equivalent is recommended.
1	DS3 Error Rate Test Set	A DS3 error rate test set is required for testing of DS3 cabling. A T-BERD 305 or equivalent is recommended.
1	SONET Optical Test Set	An OC-3, OC-12, or OC-48 test set is required for testing of optical circuit packs. An Agilent OmniBER 718 or equivalent is recommended.
1	Optical Power Meter	An optical power meter capable of measuring optical levels from +5.0 dBm to -30.0 dBm. The meter should also have adapters for LC type connectors and any other connectors used in the office.
2 or 3	LC-type Optical Fiber Jumper (108918269)	Two optical fiber jumpers with LC type connectors are required to optically loop the Alcatel-Lucent 1665 DMX shelf for test purposes.
2	15 dB LC-type LBO (108279480)	Two 15-dB LBOs are required when optically looping the Alcatel-Lucent 1665 DMX shelf for test purposes.
1	Personal Computer (PC)	See Chapter 5, “Software download and circuit pack installation”, “PC minimum requirements” (p. 5-2).
1	CIT Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869).

5 Software download and circuit pack installation

Overview

Purpose

This chapter provides the procedures for the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) initial software download and use of the craft interface terminal (CIT).

Contents

This chapter provides information on the following topics

Tools, test equipment and accessories

The tools, test equipment and accessories necessary to perform the procedures in this section are listed in “Tools, test equipment, and accessories” (p. II-2).

PC minimum requirements

It is anticipated that most customers will dedicate a laptop or personal computer (PC) to run the WaveStar® CIT software. However, any properly configured computer will also suffice. The minimum PC requirements are found in Table I-2, Computer requirements following table shows the requirements for the computer:

Software installation

Description

Software installation is accomplished by performing the appropriate software download procedures in the *Alcatel-Lucent 1665 Data Multiplexer (DMX) Release 9.0.0 Software Release Description* which is shipped with the software.

When the software installation is complete check off the appropriate box in Table I-3, Installation acceptance checklist.

Circuit pack installation

Description

This section provides instructions and the recommended order for installing (fully seating) the circuit packs in the Alcatel-Lucent 1665 DMX shelf. The procedures in this section assume that the SYSCTL is installed and software has been successfully downloaded as described in the section, "Software installation" (p. 5-2).

Locations of circuit packs (Function unit slots) are shown in Chapter 4, "Powering and initial circuit pack installation", Figure 4-2, "Alcatel-Lucent 1665 DMX high-capacity shelf" (p. 4-9).

Circuit packs are keyed to prevent being inserted into the wrong shelf position. Installing circuit packs requires some force.

NOTICE

Laser safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

NOTICE

Equipment damage

When installing the circuit packs, be careful to insert them straight to avoid damaging the backplane pins.

When a circuit pack is installed, its FAULT LED will light for several seconds to possibly several minutes then extinguish.

CAUTION

ESD hazard

A properly grounded ESD wrist strap MUST be worn when handling circuit packs.

Note: The UPD/INIT pushbutton on the SYSCTL circuit pack is recessed and will require a pointed object.

Circuit pack installation procedure

Note: Dust plugs supplied with the optical packs should always be in each optical port if no optical connector is installed. The dust plugs should be saved so that they can be reinstalled when the optical connector is removed.

1 Fully insert both M1 and M2 (OC-3/OC-12/OC-48, OC-12, OC-48, OC-192 or Switch) OLIUs into the shelf.

Note: When LNW59, LNW82, LNW202, LNW203, LNW502, or LNW504 packs are used in the main slots, pluggable transmission modules are required for the optical interface. From the engineering work order, determine if PTMs are required and in which port(s).

The LNW59 can operate as a switch pack when PTMs are not equipped.

LNW80 is a main switch pack with no optics. If equipped, continue with Step 6.

2 For circuit packs in the main slots, determine if PTMs are required. If the installation calls for optical interfaces to the mains, locate and install the PTMs per the procedure in Appendix E, Install pluggable transmission modules (p. E-3).

3 Insert the proper LBO into the IN connectors of each MAIN OLIU. See Chapter 1, “Safety” for maximum and minimum transmit levels. If necessary, see Appendix B, “Installing fiber connectors and LBOs”.

Note: Attenuation may be required when optically looping an OLIU on itself. See Chapter 8, “OC-3/12/48 ring setup and testing: integration procedures”, Table 8-1, “Attenuation Table” (p. 8-5), to find out the attenuator value.

4 If not already inserted, fully seat blank packs in any unequipped Main slots.

5 Connect IN to OUT on the OLIU in the M1 slot of the Alcatel-Lucent 1665 DMX shelf using an optical fiber jumper cable. See Appendix A, “Fiber cleaning” for proper fiber cleaning instructions.

Connect IN to OUT on the OLIU in the M2 slot of the Alcatel-Lucent 1665 DMX shelf using an optical fiber jumper cable.

Result: After a few minutes the flashing FAULT LEDs should extinguish on each OLIU circuit pack. The FAULT, MJ and NE LEDs will light on the SYSCTL due to DCC alarms created by optically looping the OLIUs. These SYSCTL LEDs will remain lit until the DCC is disabled. See Chapter 6, "Installation tests", Local equipment and cross-connect tests (p. 6-6) to clear the alarms.

6 Starting with slot A1, fully seat the circuit pack slotted there using a steady pressure on both of the faceplate latches at the same time until the circuit pack is fully seated.

Note: All electrical circuit packs must be slotted in the function slots with the proper cables attached in the back of the shelf.

The ACTIVE and FAULT LEDs should light when circuit packs are inserted and the FAULT LED should extinguish after a short period of time. Some circuit packs such as may take several minutes before their FAULT LEDs extinguish.

7 Continue seating the circuit packs with slot A2 and then on to B1, B2, G1, G2, C1, C2, D1, and D2.

8 Fully seat Blank packs in any other unfilled slots.

Blank Types	Comcode	Series	Continue with
LNW177D w/o PEMS	108950585	S1:2	Step 10
LNW98 w/o PEMS	109412866	S1:2	Step 10
LNW177D w/ PEMS If installing the Fiber Bracket Kit*	108950585 848949871	S1:3 NA	Step 10 Step 9
LNW98 w/ PEMS If installing the Fiber Bracket Kit*	109412866 848949871	S1:3 NA	Step 10 Step 9
LNW177D w/ Fiber Bracket Installed	848960175	S1:3	Step 10
LNW98 w/ Fiber Bracket Installed	848960167	S1:3	Step 10

Notes:

* The fiber bracket kit is used in conjunction with the LNW177D and LNW98 that is equipped with the PEMS.

9 If equipping the fiber bracket, attach the fiber bracket to the blank pack with the hardware provided.

Note: The bracket must be positioned with the LC openings in the down position.

10 If there are any FAULT LEDs on or flashing on any of the inserted circuit packs, press the UPD/INIT pushbutton on the SYSCTL circuit pack.

Result: The operation of the UPD/INIT pushbutton on the SYSCTL circuit pack will update the system and should clear all standing alarms.

11 If FAULT LEDs remain lit on any of the inserted circuit packs, replace the respective circuit pack.

12 Any other alarms will be cleared later on in this chapter.

13 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Use of WaveStar® CIT software

Description

Complete the following steps to login to the Alcatel-Lucent 1665 DMX via WaveStar® CIT. It is assumed that the CIT software has been installed on the PC and the NE software has been downloaded to the Alcatel-Lucent 1665 DMX shelf per the Software Release Description. See “Software installation” (p. 5-2).

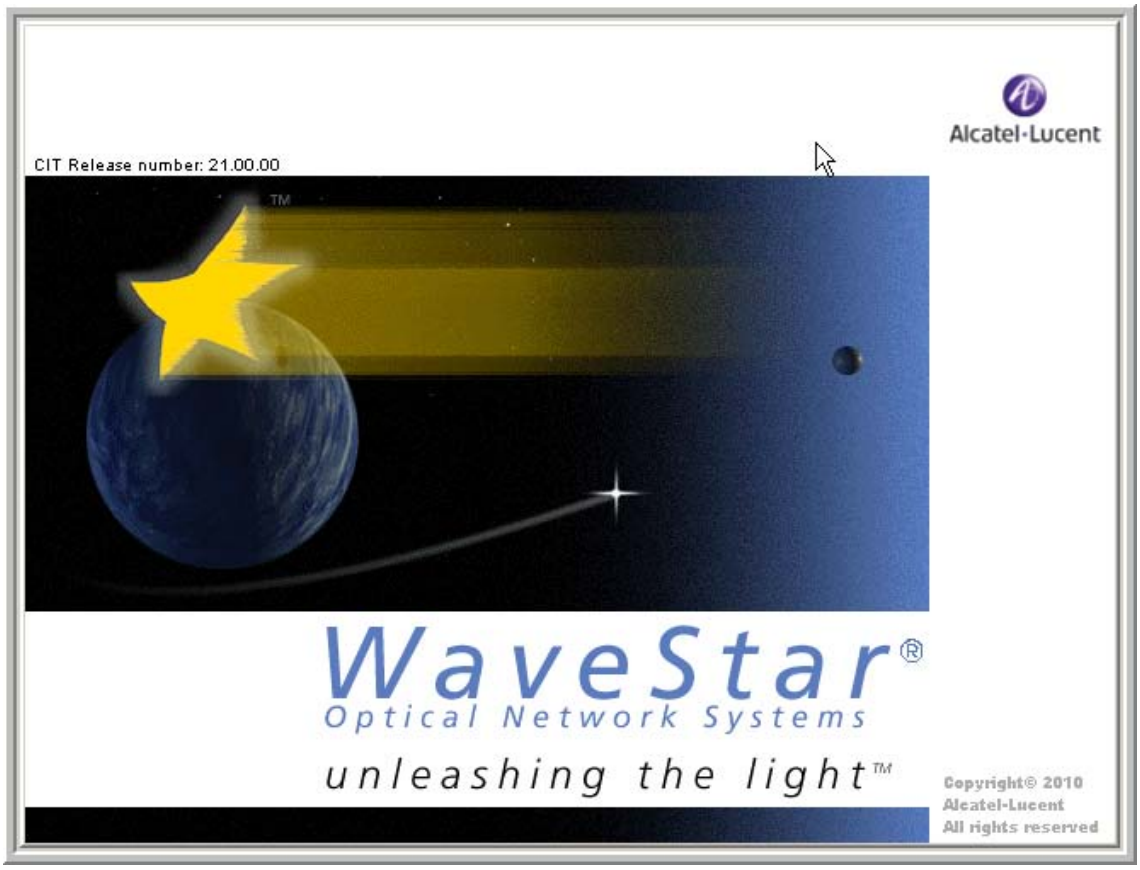
Steps

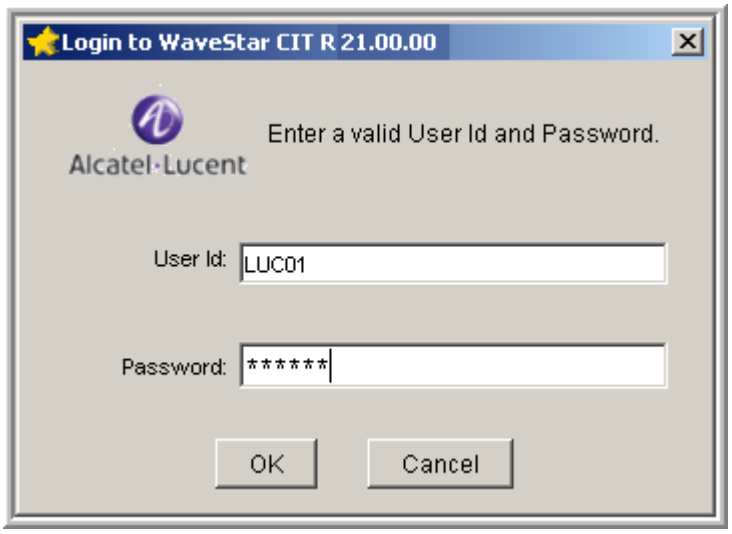
1 Connect the PC Serial cable to the RS232 (Serial) jack on the front of the SYSCTL circuit pack. Or connect a PC LAN cable (cross-over) to the LAN (OSI) connector on the front of the SYSCTL circuit pack.

Note: An IP address must be assigned to the NIC card on the PC or laptop. Otherwise, you may experience login problems. To assign an IP address, start the DOS prompt on the computer, and type the command ipconfig/all. The command will show an IP address line. If there is no address line or 0.0.0.0 for an IP address, then you must assign an IP address to the NIC card of the computer.

2 Start the WaveStar® CIT software on the PC by double clicking on the WaveStar® icon that was created by the installation procedure.

The following windows appear:



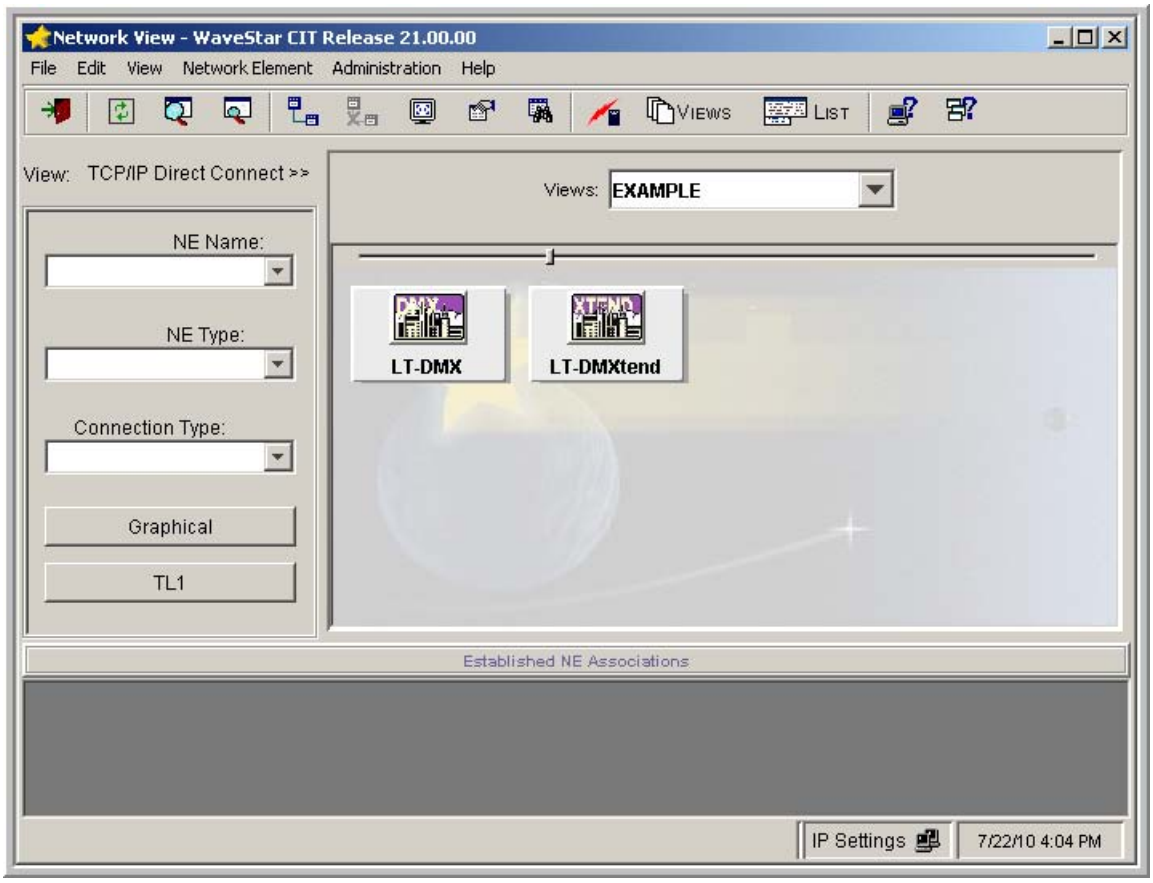


3 If necesssary, enter the following in the Login window: **Note: User ID and password are case sensitive.**

User ID: LUC01
Password: LUC+01

Note: When the CIT is installed, there is an optional step to enable or disable CIT logins. This screen shot would not be displayed if the user chose to disable CIT logins.

4 Click **OK** to connect. The screen appears:



5 Under **NE Name**, enter **LT-DMX**.

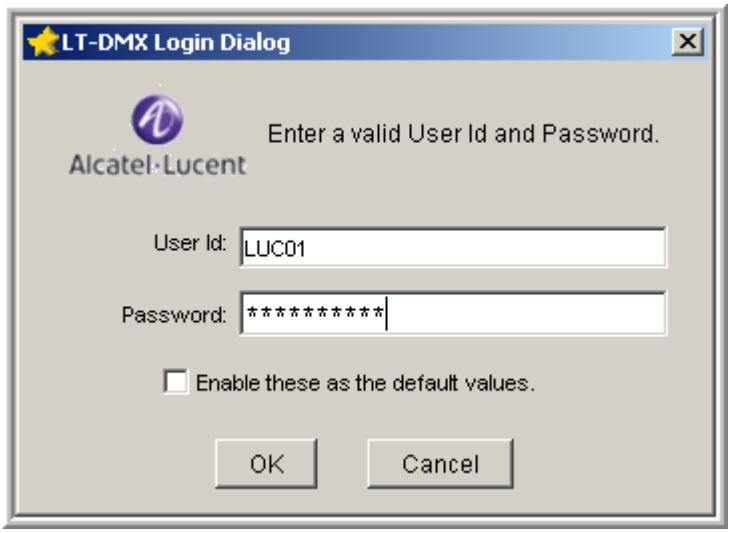
6 Under **NE Type**, select **DMX** from the drop-down list.

7 Under **Connection Type**, click on the drop-down menu arrow and choose Serial, OSI, or TCP/IP depending on the type of connection you are using.

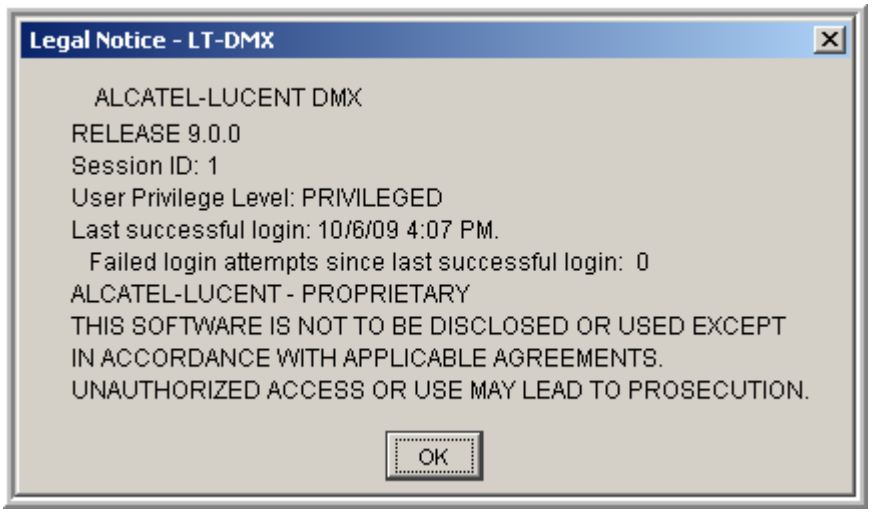
Note: TCP/IP is available when the SYSCTL has a bootcode of 7.1 or higher. The SYSCTL (LNW2) displays the boot code on initial turn up and the 7.1 bootcode is indicated by a flashing M P 7 1 in the display. When the bootcode is 7.1 or higher, the SYSCTL has a default IP address of 169.254.1.1. If the PC's LAN card to is configured as DHCP, the SYSCTL will provide the PC with an IP address within a

minute or so. Connection through TCP/IP is now possible using the default IP address of 169.254.1.1.

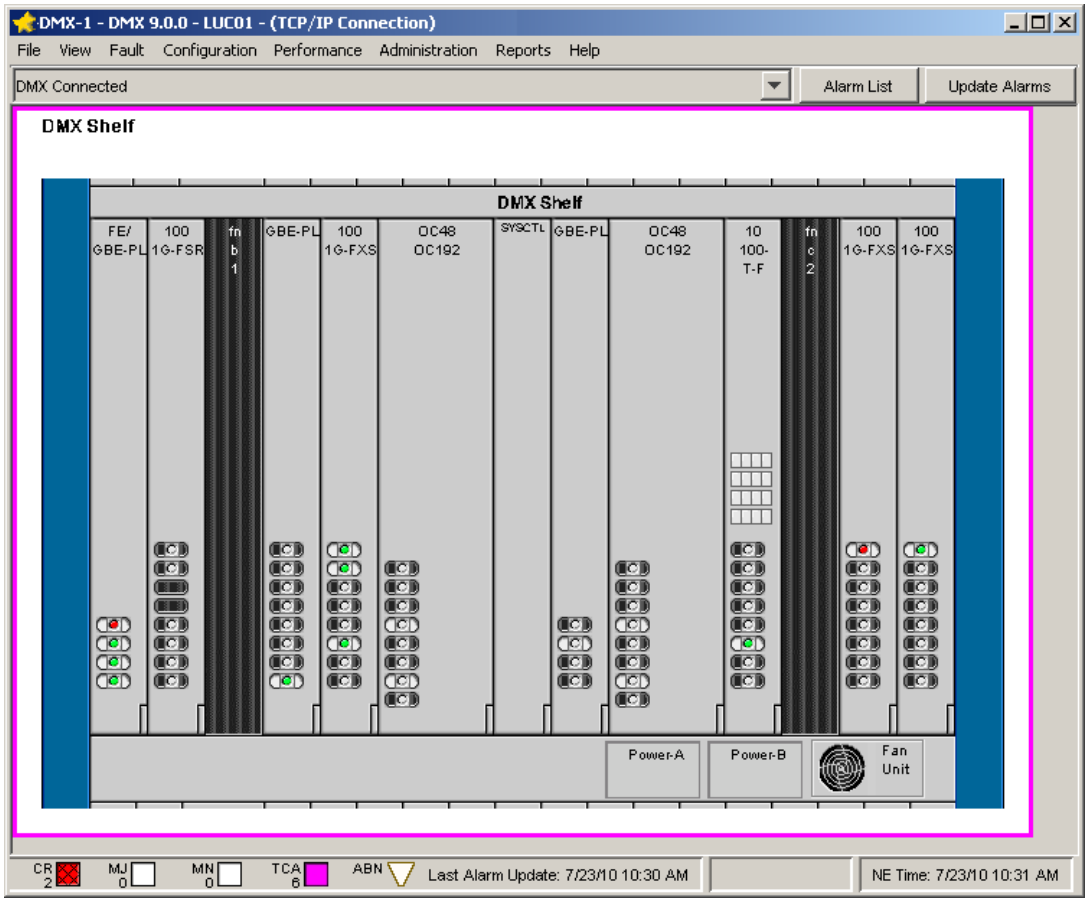
8 Click **Graphical** and the NE login screen appears.



9 Enter the Login information (case sensitive)for the shelf:
User Id: **LUC01**
Password: **DMX2.5G10G**
Click **OK** and the NE legal notice appears.



10 Click **OK** and the System View appears.



11 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Circuit pack firmware version verification

Description

This section provides instructions to verify firmware versions on the circuit packs in the Alcatel-Lucent 1665 DMX shelf. The procedures in this section assume that the SYSCTL is installed and software has been successfully downloaded and the circuit packs have been installed in the shelf as described in the preceding sections.

Steps

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in the "Use of WaveStar® CIT software" (p. 5-6).

2 In the System View, select **View > Equipment**.

Result: All packs inserted into the shelf are displayed.

3 Click on an installed circuit pack.

4 Click **Select** to issue the command.

The circuit pack information will be displayed. If the circuit pack has a program associated with it, the version number will be displayed next to **Program Version:**. Compare it to the table of Program Versions in Chapter 6 of the *Alcatel-Lucent 1850 Transport Service Switch (TSS-60) Release 9.0.0 Software Release Description.*

5 Compare the **Program Version:** again for the circuit pack just reseated and if it still does not match the table, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide, 365-372-301* for detailed troubleshooting procedures.

6 Compare the Program Version to the information provided in the *Alcatel-Lucent 1850 Transport Service Switch (TSS-60) Release 9.0.0 Software Release Description*.

Note: OLIU circuit packs are not considered "smart packs", therefore will not provide program version. The exception is the VLF Mains.

7 If the Program Version did not match the version number in the Firmware Version table in the SRD, reseat that circuit pack and wait 15 minutes.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Alcatel-Lucent 1665 DMX shelf initialization

Description

This section provides instructions for initializing the Alcatel-Lucent 1665 DMX shelf, to insure that all circuit pack databases are correct for the current shelf and software release. The procedures in this section assume that the SYSCTL is installed and software has been successfully downloaded and the circuit packs have all been installed in the shelf as described in the preceding sections.

Steps

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in the "Use of WaveStar® CIT software" (p. 5-6).

2 Select **Fault > Reset > Initialize System**...

3 Click **OK** and then **Yes** to the Warning.

Result: After a few minutes the shelf will reset and end the CIT session.

4 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Provision/enable/disable TCP/IP on an IAO LAN port

Description

This is an optional task which describes the steps necessary to provision, enable or disable the TCP/IP on the IAO LAN Port.

Before you begin

Prior to performing this task, you must:

- Obtain the work instructions for this task.
- Know which LAN Port is being provisioned.

- Obtain the IP Address and IP Subnet Mask of the desired LAN Port and the IP Default Router Address if you are connecting to a router.
- Be able to log in to a Alcatel-Lucent 1665 DMX with the WaveStar® CIT and be familiar with the functions of the WaveStar® CIT.

Steps

1 Use the WaveStar® CIT to log in to the Alcatel-Lucent 1665 DMX shelf being provisioned using a Graphical connection.

2 Determine which IAO LAN Port(s) you want to use (front or rear).

Note: If you are using the rear IAO LAN port, use lan-2 as the AID. If you are using the front IAO LAN port, use lan-1 as the AID.

3 From the System View menu, select

Administration > Data Communications

Result: The **Data Communications** window opens

4 In the **Data Communications** window, click on the **TCP/IP** tab at the top of the window.

Result: The TCP/IP parameters are displayed.

5 Select and/or modify the following parameters:

1. Select the **Port Aid**: (lan-1 [front] or lan-2 [rear]) being provisioned.

   Note: When provisioning TCP/IP on the Network Element, do not disable the OSI function from LAN-1 unless the engineering specification calls for it. If the OSI function is disabled, the only access to the shelf may be through the Serial Port.

2. If applicable, one at time, click the **Modify** button to set the **IP Address** and **IP Subnet Mask** of the desired LAN port and the **IP Default Router Address**, if connecting to a default router.

   When the provisioning window opens for the IP address being provisioned, enter the IP address as four dot-separated decimal numbers ranging from 0 to 255. Click **OK** to make your changes or **Cancel** to quit.

3. Select **Enable** to enable the TCP/IP function, or **Disable** to disable the TCP/IP function.

   Note: If you enter duplicate IP addresses and/or IP subnet addresses, a warning appears: I**nput, Data Not Valid, each IAO LAN Port must have a unique IP subnet mask**.
   Scroll through the Port AID drop-down menu and identify the duplication, then assign correct addresses as necessary.

   Note: If you select **Enable** and click **OK** to apply any changes, then execute the command when requested, the system may reset and you will be logged off. Selecting **Disable** allows you to stay logged on to the system to perform more provisioning. You can then come back to this window and enable the TCP/IP function.

   Note: Following a Alcatel-Lucent 1665 DMX system reset, the date and time may revert to January 1, 1970 (70-01-01) at midnight (00:00:00). If automatic synchronization is unsuccessful from the network, the date and time must be reset manually.

6 Click **Apply** at the bottom of the window to make your changes.

Result: A warning window opens and asks if you want to execute this command.

7 Click **Yes** to execute the command.

Result: If you made changes and also enabled the TCP/IP function, the changes are applied, the system resets, and you are logged off the system. If you made changes and disabled the TCP/IP function, the changes are applied and you are still logged on to the system.

8 If the TCP/IP function was enabled and the system reset, provision the TCP/IP Gateway using "Provision/enable/disable the Alcatel-Lucent 1665 DMX as a TL1 TCP/IP GNE" (p. 5-17) to complete the TCP/IP provisioning, otherwise continue with Step 9.

9 Click **Close** when you want to exit the window if you are still logged into the system.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Reset system date and time

Steps

The following steps are instructions on how to change the date and time on your shelf if they have been reset to default values (January 1970).

1 Connect the PC and establish a WaveStar® CIT session (graphical).

2 From the **System View** menu, select **Administration > Set Date and Time** to bring up the Set Systems Date and Time screen for Alcatel-Lucent 1665 DMX.

3 From the **Date** panel, select the **Year** and **Month** from the pull-down menus.

Result: A calendar is displayed for the month and year selected.

4 Click on the **Date** from the calendar.

5 From the **Time** panel, select the **Hour**, **Minute** and **Second** from the pull-down menus (based upon a 12-hour clock).

6 Select **am** or **pm.**

7 Click **OK**.

Result: The new date and time appear in the lower right-hand corner of the GUI System View.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Provision/enable/disable the Alcatel-Lucent 1665 DMX as a TL1 TCP/IP GNE

Purpose

Use this task to provision, enable or disable the Alcatel-Lucent 1665 DMX as a TL1 TCP/IP GNE.

Required equipment

The following equipment is required:

- Personal Computer (PC) with WaveStar CIT® software installed
- Wrist Strap

Safety precautions

To assure both personal safety and the proper functioning of the Alcatel-Lucent 1665 DMX, it is imperative to review and understand these warnings and precautions prior to performing this task.

CAUTION

ESD hazard

Use a static ground wrist strap whenever handling circuit packs or working on a system to prevent electrostatic discharge damage to sensitive components.

Before you begin

Prior to performing this task, you must:

- Obtain the work instructions for this task.
- Complete the *Circuit pack firmware version verification* procedure to provision and enable TCP/IP for the selected LAN port.
- Complete the "Provision/enable/disable TCP/IP on an IAO LAN port" (p. 5-13).
- Know which LAN port is being provisioned.
- Know the IP addresses, host names and host types for the gateway hosts which will be allowed access to the Alcatel-Lucent 1665 DMX TL1 TCP/IP GNE.
- Be able to log in to a Alcatel-Lucent 1665 DMX WaveStar®CIT and be familiar with the functions of the WaveStar® CIT.

Steps

1 Use the WaveStar® CIT to log in to the Alcatel-Lucent 1665 DMX TL1 TCP/IP GNE to be modified, enabled or disabled, using a Graphical connection through the serial or OSI cable.

2 On the **System View** menu, select **Administration > Data Communications**

Result: The **Data Communications** window opens.

3 In the Data Communications window, click on the **TCP/IP** tab at the top of the window.

Result: The TCP/IP parameters display.

4 Verify that TCP/IP is properly provisioned and enabled for the required LAN port(s).

5 In the Data Communications window, click on the **TCP/IP Gateway** tab at the top of the window.

Result: The TCP/IP Gateway parameters display.

6 From your work instructions, determine which IP calling addresses will be allowed to access the Alcatel-Lucent 1665 DMX TL1 TCP/IP GNE.

7 Use the instructions on the screen to add, modify, or delete a gateway host from the **TCP/IP Gateway Host List**.

The following parameters apply:

- The OS host IP address which is four dot-separated decimal numbers, each ranging from 0 to 255.

  Note: Only IP addresses listed in the TCP/IP Gateway tab will be allowed access into the system. Enter the wildcard address of 255.255.255.255 to disable this security feature, allowing access to all hosts.
- The OS Host Name which may consist of 1 to 24 alpha-numeric characters.
- The OS Type which may consist of standard types or listed as other.

Repeat this step for each of the Host IP address you want to authorize for access to the Alcatel-Lucent 1665 DMX TL1 TCP/IP GNE. There may be up to 50 provisioned entries in the list.

8 On the Data Communications window under **TCP/IP Gateway Control**, select **Enable** to enable the TCP/IP Gateway, or select **Disable** to disable the TCP/IP Gateway.

9 Click **Apply** at the bottom of the window.

Result: A warning window opens and asks if you want to execute this command.

10 Click **Yes** to execute the command, then click **Close** to exit the window, if desired.

11 Repeat this procedure for each TL1 TCP/IP GNE to be modified, enabled or disabled.

12 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

6 Installation tests

Overview

Purpose

The purpose of this section is to verify proper transmission cabling installation and R9.0 functionality as well as the associated functionality of the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) shelf.

For end-to-end turn-up and testing procedures, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide, 365-372-301*.

Contents

This chapter provides information on the following topics

Tools, test equipment and accessories

The tools, test equipment and accessories necessary to perform the procedures in this section are listed in "Tools, test equipment, and accessories" (p. II-2).

LBO software settings

Description

This section provides instructions for setting the software Line Build Out (LBO) for the DS1, DS3/EC1 and TMUX cabling and requires that the SYSCTL, DS1, DS3/EC1 and/or TMUX circuit packs be installed and that software has been downloaded.

Setting DS1 LBOs

If provisioning DS1 LBO settings for the DS1, circuit packs follow the procedure below otherwise, skip to Setting DS3/EC1 and TMUX LBOs (p. 6-3).

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in the 5, "Use of WaveStar® CIT software" (p. 5-6).

2 See the following table of cable lengths and LBO values. Determine the LBO value corresponding to the DS1 cables installed.

LBO value	Distance (feet)
20	0 - 133 (default)
40	134 - 267
60	268 - 420
80	421 - 533
100	534 - 655

3 From the CIT GUI, select **Configuration > Equipment**...

4 Select the desired DS1 port by clicking the "**+**" sign next to the CP and VT Group.

5 Highlight the **port** and click **Select**.

From the pull-down next to Line Build Out: choose the LBO value determined in Step 2.

6 If a change is made click **Apply**.

7 Repeat Step 2 through Step 6 for all DS1 ports in all function unit slots which are populated with DS1 circuit packs.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Setting DS3/EC1 and TMUX LBOs

The DS3/EC1 and TMUX cabling will be tested with all ports provisioned for DS3. Set DS3 LBO values as follows.

1 See the following table of cable lengths and LBO values. Determine the LBO value corresponding to the DS3 (TMUX) cables installed:

Table 6-1 Cable lengths (feet)

LBO Value	734D	735A
IN	0 - 225	0-125
OUT	225-450	125-250

2 From the CIT GUI, select **Configuration > Equipment**...

3 Select the desired DS3 port by clicking the **+** sign next to the CP.

4 Highlight the **port** and click **Select**.

5 Next to Line Build Out: choose the LBO value determined in Step 1.

6 Repeat Step 1 through Step 5 for all DS3 ports in all function unit slots that are populated with DS3 or TMUX circuit packs.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Clearing alarms

Description

In order to clear standing alarms the Alcatel-Lucent 1665 DMX synchronization will be optioned for "Free Running." The DCC will be disabled in order to prevent DCC alarms from being generated due to the optical loopback on the main OLIUs.

1 Select **Configuration > Timing/Sync**...

Result: From the Timing Mode: pull-down, choose **Free Running**.

2 Click **OK**.

3 Select **Configuration > DCC Terminations**...

4 From the Port AID: pull-down, select **dcc-m1-1**.

5 Next to OSI Over DCC, click **disabled**.

6 Click **Apply**.

7 From the Port AID: pull-down, select **dcc-m2-1**.

8 Next to OSI Over DCC, click **disabled**.

9 Click **Apply**.

10 Click **Close**.

11 If there are any FAULT LEDs on or flashing, press the **UPD/INIT** push button on the SYSCTL circuit pack.

Note: LNW16 (DS3/EC1) circuit pack require either a 75-ohm termination or a loopback at the DSX-3 on all ports. If loopbacks are used, make sure to take down any cross-connections.

12 If there are still FAULT LEDs on, replace the respective circuit pack.

13 Disconnect the office alarm cable until all procedures and testing have been completed.

14 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Local equipment and cross-connect tests

Description

The tests in this section verify the proper operation of the circuit packs and the circuit pack positions in the Alcatel-Lucent 1665 DMX shelf. It verifies proper cabling from the Alcatel-Lucent 1665 DMX to the DSX cross-connect panel or connecting equipment. The shelf must successfully pass this test before testing any other feature of the Alcatel-Lucent 1665 DMX.

It is assumed that Chapter 4, "Powering and initial circuit pack installation" and Chapter 5, "Software download and circuit pack installation" have been completed and the Alcatel-Lucent 1665 DMX shelf has fiber loop-back cables on the Main OLIUs with proper LBOs installed, and synchronization set to free-running.

On initial installation/turn-up of Alcatel-Lucent 1665 DMX there are no default cross-connects. All cross-connects need to be entered for these tests. Upon completion of this test all cross-connections will be deleted.

Note: If the shelf is not fully equipped, move circuit packs to unequipped function slots and repeat the test. Test all circuit pack positions which have DSX cabling.

Note: After completing this test, isolate and correct any incorrect wiring or isolate and replace any failed units. If any cabling is corrected or units replaced, repeat the Local Equipment and cross-connect tests until the units pass without failure.

CAUTION

ESD hazard

A properly grounded ESD wrist strap MUST be worn when handling circuit packs.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

DS1 terminating equipment loopback testing

Facility Loopback testing allows the installer to verify electrical cabling to the DS1 Terminating Equipment. This test is only required if the Alcatel-Lucent 1665 DMX shelf is connected to DS1 terminating equipment such as a DACS. It will be necessary to work with the Customer Network Control Center to have them establish a terminal loopback. If the shelf is NOT connected to DS1 terminating equipment, skip this section and continue with DS1 non-terminating equipment transmission testing (optical main OLIU) (p. 6-8).

The Function unit slot under test must contain a 28 DS1 (LNW7) or a 56DS1/E1 (LNW8 or LNW801) circuit pack in order to perform this test. The 56DS1/E1 circuit packs can only be used with high capacity shelves. If the Alcatel-Lucent 1665 DMX shelf is not fully populated, it may be necessary to move the circuit pack(s) from slot to slot in order to test all DS1 cabling.

Steps

This command creates a cross-connect to map the first DS1 of a DS1 circuit pack in a Function unit to the first VT1.5 within the first VT Group of STS1 of the Main OLIUs.

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in 5, "Use of WaveStar® CIT software" (p. 5-6).

2 Select **Configuration > Cross-Connections**...

3 Use the Cross-Connection Wizard to enter a new cross-connection at the **VT1.5** rate, **UPSR Ring Add/Drop**, between **m1-1-1-1-1** and **fn1-1-1-1** (fn will be a,b,c or d depending on the slot where the DS1 CP is located).

4 At this point it is necessary to have the Customer Network Control Center establish a terminal loopback at the port under test at the DS1 terminating equipment.

5 Run a test transmission test to verify the electrical cabling.
Select **Fault > Test > Transmission.**..

6 Select the **CP**, **VT Group** and **Port 1-1** (DS1) associated with the cross-connection entered above.

7 Select the **FACILITY** direction.

Result: The results should indicate that the test ran for a duration of 60 seconds followed by 0 es (errored seconds).

8 Complete the above test on all Function unit slots terminating at DSX equipment. Once you have completed the test make sure that all loopbacks have been removed at the Customer Network Control Center before moving on to any other testing.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS1 non-terminating equipment transmission testing (optical main OLIU)

Perform the following steps for all Alcatel-Lucent 1665 DMX shelf Function unit slots that are cabled to a DSX-1 and not to any terminating equipment.

A Function unit slot cabled to the DSX-1 must contain a 28DS1 (LNW7) circuit pack or a 56DS1/E1 (LNW8 or LNW801) circuit pack in order to perform these tests. If the Alcatel-Lucent 1665 DMX shelf is not fully populated, it may be necessary to move the circuit pack(s) from slot to slot in order to test all DS1 cabling.

This procedure requires the use of a DS1 test set.

Steps

This command creates a cross-connect to map the first DS1 of a DS1 circuit pack in a Function unit to the first VT1.5 within the first VT Group of STS1 of the Main OLIUs.

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in the 5, “Use of WaveStar® CIT software” (p. 5-6).

2 Select **Configuration > Cross Connections**...

3 Use the Cross-Connection Wizard to enter a new cross-connection at the **VT1.5** rate, **UPSR Ring Add/Drop**, starting with **m1-1-1-1-1** and **fn1-1-1-1** (fn will be a,b,c or d depending on the slot where the DS1 CP is located). See Table 6-2, “DS1 Cross-Connections” (p. 6-14).

4 Set the DS1 test set to transmit and receive a Quasi-Random Sequence Signal (QRSS) with B8ZS formatting.

5 Connect a cable from the DS1 test set **transmit** connection to the IN jack of the DSX-1 associated with the DS1 tributary to be tested (start with the first).

6 Connect a cable from the DS1 test set **receive** connection to the OUT jack of the DSX-1 associated with the DS1 tributary to be tested (start with the first).

Result: The DS1 test set should indicate it is receiving an error-free QRSS signal with B8ZS formatting.

If an error-free signal is not received:

- Verify that the DS1 line coding format is set to B8ZS using the **View > Equipment** command
- Verify that the LBOs are set according to cable length using the **View > Equipment** command (see Setting DS1 LBOs (p. 6-2).
- Check DS1 cabling for proper connections.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS1 non-terminating equipment transmission testing (LNW80 switch or LNW59 without optics)

Perform this test when the Alcatel-Lucent 1665 DMX is equipped with LNW80 switch packs or LNW59 without optics in the main slots.

Facility loopback testing allows the installer to verify the electrical cabling to the Alcatel-Lucent 1665 DMX NE. Follow the procedure below to perform a facility loopback test at the Alcatel-Lucent 1665 DMX shelf.

To test cabling to the DSX-1, use a DS1 test set to transmit and receive toward the facility loopback.

Perform the following tests for each DS1 circuit cabled to the Alcatel-Lucent 1665 DMX.

1 Select **Fault > Analysis > Loopback...**

2 Choose the **DS1 port** to test and click **Select.**

3 Select **Operate** and Loopback Type: **Facility** and click **Apply**.

4 Once the loopback is up, a test signal is generated at the DS1 terminating equipment which will verify that the cabling is correct.

Note: A test set can be applied at the DSX-1 to test cabling toward the facility loopback.

5 Once the test is complete, remove the loopback.

Select **Fault > Analysis > Loopback**...

6 Choose the **DS1 port** to test and click **Select**.

7 Select **Release** and Loopback Type: **Facility** and click **Apply**.

8 Repeat Step 1 through Step 7 for each DS1 cabled to the DSX-1.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS1 protection switching

DS1 function unit protection switching test (manual)

While a VT cross-connection exists, and a test set is connected, path switching will be verified.

Use this procedure to test all of the Function unit Slots occupied by a LNW7/LNW8/LNW801 (DS1) circuit pack.

Note: This test is performed when the DS1 circuit packs are in a 1x1 protection arrangement. It is not mandatory to perform this test on each VT cross-connection, however this procedure should be performed on each Function unit Slot pair.

Steps

1 Locate the Function Group equipped with the DS1 circuit pack.

2 Determine the system is alarm free by clicking on the **Alarm List** button on the system view.

3 Unseat the active circuit pack. The active circuit pack has an ACTIVE LED lit. Monitor the test set connected to the DSX patch panel.

Result: The ACTIVE LED on the other circuit pack in the Function Group will light. The MN alarm and the NE LED lamps on the SYSCTL will light.
Transmission at the test set will take a momentary hit and then re-establish.

Confirm that there is a CP Removed alarm by clicking on the Alarm List button on the system view.

4 Unseat the second circuit pack of the pair.

Result: On the SYSCTL, the MN alarm extinguishes and the CR alarm lights. Test set will be registering continuous bit errors and indicate AIS alarm.

5 Reseat the first circuit pack that was removed.

Result: The ACTIVE LED on the reseated circuit pack will light. The FAULT LED on the circuit pack will light for several seconds then extinguish.
On the SYSCTL, the CR alarm extinguishes and the MN alarm and the NE LED will be lit. Test set will indicate good transmission.

6 Reseat the second circuit pack.

Requirement: The ACTIVE LED on the first circuit pack remains on.
The ACTIVE LED on the second circuit pack remains off.
The FAULT LED on the second circuit pack will light for several seconds then extinguish. On the SYSCTL, the MN alarm extinguishes.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS1 function unit protection switching test (command)

This test will initiate switching commands from the CIT and verify proper switching and LED indications.

Note: It is not necessary to perform this test on each vt cross-connection, however this procedure should be performed on each Function unit Slot pair.

1 Select **Fault > Protection Switch**...

2 Click on **1+1 Equip fn-x** (x is a,b,c or d corresponding to the function group equipped with DS1).

3 Click **Select**.

4 In the Switch Type: pull-down, select **Manual** (Normal).

5 Click **Apply**.

Result: The pack that was active should now be the standby pack and the pack that was standby is now active. Transmission should take a momentary hit as it is switched to the other pack. This information should agree with the ACTIVE LEDs on the LNW7 or LNW8/LNW801 circuit packs.

6 Repeat Step 1 through Step 5 to verify a switch back to the original Function unit circuit pack, with the same results as the previous step.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS1 path switching test (manual)

Note: It is not mandatory to perform this test on each vt cross-connection, however this procedure should be performed on each Function unit Slot pair.

1 Select **Fault > Protection Switch**...

2 Under Path Protection, click on **Path m1-1-1-1**.

3 Click **Select**.

4 At the Switch Type: pull-down, select **Manual.**

5 Click **Apply**.

Result: The Active Path: indicates a change from m1 to m2 (or if m2 was originally the active path, the switch is from m2 to m1).
The Switch Request State: indicates Manual Switch.

6 At the Switch Type: pull-down, select **Clear**.

7 Click **Apply**.

8 Repeat Step 1 through Step 7 to verify a switch back to the original ring.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist

END OF STEPS

DS1 cleanup procedures

Delete any existing DS1 cross-connections

Before moving on to the next port to test, it is necessary to remove the cross-connection. This procedure details the necessary steps to delete a cross-connection.

1 Select **Configuration > Cross-Connections**...

2 Use the Cross-Connection Wizard to Delete leg(s) of an existing cross-connection associated with CP main-1, Port 1.

Requirement: The DS1 test set should indicate a blue (AIS) signal is being received in place of the QRSS signal.

3 Remove the test set connections from the DSX-1.

4 Select **Configuration > Update System... > Update All**.

Result: This command will remove alarms generated by removing the test signals from the DSX-1.

5 Repeat the DS1 terminating equipment loopback testing (p. 6-6) or the DS1 non-terminating equipment transmission testing (optical main OLIU) (p. 6-8) procedure and the Delete any existing DS1 cross-connections (p. 6-14) procedure to test each of the remaining DS1 tributaries of the Function unit. This is necessary in order to ensure that the cabling of each port address is correct.

The table below lists the tributaries and cross-connections for all DS1s associated with a function group.

When testing cabling for a Function unit slot other than a, replace the **a** in each of the addresses with the letter (**b**, **c**, or **d**) corresponding to the Function unit slot under test.

Table 6-2 DS1 Cross-Connections

Tributary @ DSX-1	Cross-Connection
1	m1-1-1-1-1,a1-1-1-1
2	m1-1-1-1-2,a1-1-1-2

Tributary @ DSX-1	Cross-Connection
3	m1-1-1-1-3,a1-1-1-3
4	m1-1-1-1-4,a1-1-1-4
5	m1-1-1-2-1,a1-1-2-1
6	m1-1-1-2-2,a1-1-2-2
7	m1-1-1-2-3,a1-1-2-3
8	m1-1-1-2-4,a1-1-2-4
9	m1-1-1-3-1,a1-1-3-1
10	m1-1-1-3-2,a1-1-3-2
11	m1-1-1-3-3,a1-1-3-3
12	m1-1-1-3-4,a1-1-3-4
13	m1-1-1-4-1,a1-1-4-1
14	m1-1-1-4-2,a1-1-4-2
15	m1-1-1-4-3,a1-1-4-3
16	m1-1-1-4-4,a1-1-4-4
17	m1-1-1-5-1,a1-1-5-1
18	m1-1-1-5-2,a1-1-5-2
19	m1-1-1-5-3,a1-1-5-3
20	m1-1-1-5-4,a1-1-5-4
21	m1-1-1-6-1,a1-1-6-1
22	m1-1-1-6-2,a1-1-6-2
23	m1-1-1-6-3,a1-1-6-3
24	m1-1-1-6-4,a1-1-6-4
25	m1-1-1-7-1,a1-1-7-1
26	m1-1-1-7-2,a1-1-7-2
27	m1-1-1-7-3,a1-1-7-3
28	m1-1-1-7-4,a1-1-7-4
29*	m1-1-2-1-1,a1-2-1-1
30*	m1-1-2-1-2,a1-2-1-2
31*	m1-1-2-1-3,a1-2-1-3

Tributary @ DSX-1	Cross-Connection
32*	m1-1-2-1-4,a1-2-1-4
33*	m1-1-2-2-1,a1-2-2-1
34*	m1-1-2-2-2,a1-2-2-2
35*	m1-1-2-2-3,a1-2-2-3
36*	m1-1-2-2-4,a1-2-2-4
37*	m1-1-2-3-1,a1-2-3-1
38*	m1-1-2-3-2,a1-2-3-2
39*	m1-1-2-3-3,a1-2-3-3
40*	m1-1-2-3-4,a1-2-3-4
41*	m1-1-2-4-1,a1-2-4-1
42*	m1-1-2-4-2,a1-2-4-2
43*	m1-1-2-4-3,a1-2-4-3
44*	m1-1-2-4-4,a1-2-4-4
45*	m1-1-2-5-1,a1-2-5-1
46*	m1-1-2-5-2,a1-2-5-2
47*	m1-1-2-5-3,a1-2-5-3
48*	m1-1-2-5-4,a1-2-5-4
49*	m1-1-2-6-1,a1-2-6-1
50*	m1-1-2-6-2,a1-2-6-2
51*	m1-1-2-6-3,a1-2-6-3
52*	m1-1-2-6-4,a1-2-6-4
53*	m1-1-2-7-1,a1-2-7-1
54*	m1-1-2-7-2,a1-2-7-2
55*	m1-1-2-7-3,a1-2-7-3
56*	m1-1-2-7-4,a1-2-7-4

Note: Tribs 29-56 (denoted *) are only used for LNW8/LNW801 circuit packs.

6 Repeat this procedure for each Function unit slots cabled to a DSX-1 via DS1 cabling.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Verify cross-connects removed

1 Select **View > Cross-Connections**...

2 Choose **shelf (Alcatel-Lucent 1665 DMX)** and click **Select**.

3 Verify that there are no cross-connections on the shelf.

4 Select **Configuration > Update System > Update All**.

Result: This command will remove alarms generated by removing the test signals from the DSX-1.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS3/EC1 and TMUX testing procedure

Description

Perform the following steps for all Alcatel-Lucent 1665 DMX shelf Function unit slots containing 12DS3/EC1 (LNW16), 48DS3/EC1 (LNW19/LNW19B), 12TMUX (LNW18) and 48TMUX (LNW20) circuit packs and cabled to a DSX-3 via DS3/EC1 cabling. The 48DS3/EC1 and 48TMUX circuit packs can only be used with high capacity shelves.

If the Alcatel-Lucent 1665 DMX is cabled to some other type of DS3/EC1 terminating equipment, use this procedure by substituting these ports for the DSX-3 ports called out in the procedure. If the Alcatel-Lucent 1665 DMX shelf is not fully populated, it may be necessary to move the circuit pack(s) from slot to slot in order to test all DS3/EC1 and TMUX cabling.

This procedure requires the use of a DS3 test set.

Note: The LNW16 and LNW19/LNW19B circuit packs are provisioned on a "per port" basis for DS3 or EC1. The default setting for all ports is DS3. Tests in the section will verify proper cabling by using a DS3 test set with all ports provisioned as DS3.

Verify provisioning

Verify that all ports are provisioned as DS3.

1 Select **View > Equipment**...

2 Click on the "**+**" sign next to the CP fn with the DS3/EC1 circuit pack.

3 Verify that all ports are labeled as DS3.

4 To change provisioning from EC1 to DS3, select **Configuration > Equipment**... Select the **DS3/EC1** circuit pack and port, then choose **DS3** and click **Apply**.

5 Repeat Step 1 through Step 4 for each Function Group equipped with DS3/EC1/TMUX circuit pack(s).

6 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS3 terminating equipment loopback testing (optical main OLIUs)

When the Alcatel-Lucent 1665 DMX is equipped with optical main OLIUs, they are looped on themselves and the following tests verify correct operation.

When the Alcatel-Lucent 1665 DMX is equipped with LNW80 switch packs or LNW59 mains without optics, go to DS3 terminating equipment loopback testing (LNW80 switch and LNW59 without optics) (p. 6-20).

Facility Loopback testing allows the installer to verify the electrical cabling to the Alcatel-Lucent 1665 DMX NE. Follow the procedure below to perform a facility loopback test at the Alcatel-Lucent 1665 DMX shelf. When the Alcatel-Lucent 1665 DMX is cabled to

other DS3 terminating equipment, in order to complete the loopback testing, it will be necessary to contact the Customer Network Control Center and have a signal established at the port(s) under test.

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in Chapter 5, "Software download and circuit pack installation", "Use of WaveStar® CIT software" (p. 5-6).

2 Select **Configuration > Cross-Connections**...

3 Using the Cross-Connection Wizard create a new cross-connection, **UPSR Ring Add/Drop**, at the **STS1** rate from **m1-1-1** to **fn1-1** (fn is a,b,c or d). See Table 6-3, "DS3 cross-connections" (p. 6-27).

4 Select **Fault > Analysis > Loopback**...

5 Choose the **DS3 port** to test and click **Select**.

6 Select **Operate** and Loopback Type: **Facility** and click **Apply**.

7 Once the loopback is up, a test signal is generated at the DS3 terminating equipment which will verify that the cabling is correct.

8 While observing the error-free transmission, grasp the DS3 cable about two inches from the BNC connector head and gently rotate (twist) the cable in a clockwise and counter clockwise direction about 45 degrees (gently).

Result: If any errors are detected while performing this "wiggle test," the BNC connector must be cut off and replaced.

If an error-free signal is not received:

- Check the LBOs settings using **View > Equipment** (see Setting DS3/EC1 and TMUX LBOs (p. 6-3).
- Verify that the pack is provisioned for the framing format being sent from the test set, CBIT or M13.

- Verify that the port is provisioned for DS3. See Verify provisioning (p. 6-18).
- Check the DS3/EC1 cabling for proper connections.

9 Once the test is complete, remove the loopback.

Select Fault > Analysis > Loopback...

10 Choose the **DS3 port** to test and click **Select**.

11 Select **Release** and Loopback Type: **Facility** and click **Apply**.

12 Repeat Step 1 through 11for each DS3 cabled to the DSX-3.

13 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS3 terminating equipment loopback testing (LNW80 switch and LNW59 without optics)

Perform this test when the Alcatel-Lucent 1665 DMX is equipped with LNW80 switch packs or LNW59 without optics in the main slots.

Facility Loopback testing allows the installer to verify the electrical cabling to the Alcatel-Lucent 1665 DMX NE. Follow the procedure below to perform a facility loopback test at the Alcatel-Lucent 1665 DMX shelf. When the Alcatel-Lucent 1665 DMX is cabled to other DS3 terminating equipment, in order to complete the loopback testing, it will be necessary to contact the Customer Network Control Center and have a signal established at the port(s) under test.

To test cabling to the DSX-3, use a DS3 test set to transmit and receive toward the facility loopback.

Perform the following tests for each DS3 circuit cabled to the Alcatel-Lucent 1665 DMX.

1 Select **Fault > Analysis > Loopback**...

2 Choose the **DS3 port** to test and click Select.

3 Select **Operate** and Loopback Type: **Facility** and click **Apply**.

4 Once the loopback is up, a test signal is generated at the DS3 terminating equipment which will verify that the cabling is correct.

Note: A test set can be applied at the DSX-3 to test cabling toward the facility loopback.

5 While observing the error-free transmission, grasp the DS3 cable about two inches from the BNC connector head and gently rotate (twist) the cable in a clockwise and counter clockwise direction about 45 degrees (gently).

Result: If any errors are detected while performing this "wiggle test," the BNC connector must be cut off and replaced.

If an error-free signal is not received:

- Check the LBOs settings using **View > Equipment** (see Setting DS3/EC1 and TMUX LBOs (p. 6-3).
- Verify that the pack is provisioned for the framing format being sent from the test set, CBIT or M13.
- Verify that the port is provisioned for DS3. See Verify provisioning (p. 6-18).
- Check the DS3/EC1 cabling for proper connections.

6 Once the test is complete, remove the loopback.

Select Fault > Analysis > Loopback...

7 Choose the **DS3 port** to test and click **Select**.

8 Select **Release** and Loopback Type: **Facility** and click **Apply**.

9 Repeat Step 1 through Step 8 for each DS3 cabled to the DSX-3.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS3 non-terminating transmission (optical main OLIU)

Perform the remaining steps in this procedure for all Function Groups equipped with LNW16 (12DS3/EC1), LNW19/LNW19B (48DS3/EC1), LNW18 (TMUX) or LNW20 (48TMUX) circuit packs that are terminated at a DSX3 patch panel.

1 Select **Configuration > Cross-Connections**...

2 Use the Cross-Connection Wizard to enter a new cross-connection at the **STS1** rate, **UPSR Ring Add/Drop**, between **m1-1-1** and **fn-1** (fn will be a,b,c or d depending on the slot where the DS3 or TMUX CP is located).

3 Set the DS3 test set to transmit and receive a framed Pseudo Random Bit Stream (PRBS) DS3 test signal M13.

M13 should be used to test TMUX.

4 Connect a cable from the DS3 test set **transmit** connection to the IN jack of the DSX-3 associated with the first DS3 or TMUX tributary of the Alcatel-Lucent 1665 DMX Function unit slot to be tested.

5 Connect a cable from the DS3 test set **receive** connection to the OUT jack of the DSX-3 associated with the first DS3 or TMUX tributary of the Alcatel-Lucent 1665 DMX Function unit slot to be tested.

Result: The DS3 test set should indicate it is receiving an error-free PRBS signal. To verify that the port on the DS3 or TMUX pack is receiving the signal, verify that the port has transitioned to an "in service" state with the **View > Equipment** command.

A port state of "IS" indicates that the pack is receiving a good signal to the port.

6 While observing the error-free transmission at the DSX, grasp the DS3 cable about two inches from the BNC connector head and gently rotate (twist) the cable in a clockwise and counter clockwise direction about 45 degrees (gently).

Result: If any errors are detected while performing this "wiggle test," the BNC connector must be cut off and replaced.

If an error-free signal is not received:

- Check the LBOs settings using the **View > Equipment** command (see Setting DS3/EC1 and TMUX LBOs (p. 6-3).
- Verify that the pack is provisioned for the framing format being sent from the test set, M13.
- Verify that the port is provisioned for DS3. See Verify provisioning (p. 6-18).
- Check the DS3/EC1 cabling for proper connections.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS3 protection switching

DS3 function unit protection switching test (manual)

Use this procedure to test all of the Function unit Slots occupied with an LNW16 (DS3/EC1), LNW19/LNW19B (48DS3/EC1), LNW18 (TMUX) or LNW20 (48TMUX) circuit pack, whether they are cabled to a DSX or terminating equipment.

Note: This test is performed when the DS3 circuit packs are in a 1x1 protection arrangement.
It is not mandatory to perform this test on each sts cross-connection, however this procedure should be performed on each Function unit Slot pair.

1 Locate the Function Group equipped with the DS3/TMUX circuit pack.

2 Unseat the active circuit pack. The active circuit pack has an ACTIVE LED lit.

Result: The ACTIVE LED on the other circuit pack in the Function Group will light. The MN alarm and the NE LED lamps on the SYSCTL will light. Transmission at the test set will take a momentary hit and then re-establish.

3 Unseat the second circuit pack of the pair.

Result: On the SYSCTL, the MN alarm extinguishes and the CR alarm lights. The test set is registering loss of transmission.

4 Reseat the first circuit pack that was removed.

Result: The ACTIVE LED on the reseated circuit pack will light. The FAULT LED on the circuit pack will light for several seconds then extinguish. On the SYSCTL, the CR alarm extinguishes and the MN alarm and the NE LED will be lit. Transmission is re-established at the test set.

5 Reseat the second circuit pack.

Requirement: The ACTIVE LED on the first circuit pack remains on.
The ACTIVE LED on the second circuit pack remains off.
The FAULT LED on the second circuit pack will light for several seconds then extinguish.
On the SYSCTL, the MN alarm extinguishes.

6 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS3 function unit protection switching test (command)

While an STS cross-connection exists, and a test set is connected, the protection switching will be verified.

This test will initiate switching commands from the CIT and verify proper switching and LED indications while monitoring transmission at a test set.

Note: It is not necessary to perform this test on each sts cross-connection, however this procedure should be performed on each Function unit Slot pair.

1 **Select Fault > Protection Switch**...

2 Click on **1+1 Equip fn-x** (x is a,b,c or d corresponding to the function group equipped with DS3).

3 Click **Select**.

4 In the Switch Type: pull-down, select **Manual** (Normal).

5 Click **Apply**.

Result: The pack that was active should now be the standby pack and the pack that was standby is now active. Transmission should take a momentary hit as it is switched to the other pack. This information should agree with the ACTIVE LEDs on the LNW16/LNW19/LNW19B, LNW18 or LNW20 circuit packs.

6 Repeat Step 1 through Step 5 to verify a switch back to the original Function unit circuit pack, with the same results as the previous step.

7 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

DS3 path switching test (command)

While an STS cross-connection exists, and a test set is connected, path switching will be verified.

Note: It is not mandatory to perform this test on each sts cross-connection, however this procedure should be performed on each Function unit Slot pair.

1 Select **Fault > Protection Switch.**..

2 Under Path Protection, click on **Path m1-1-1**.

3 Click **Select**.

4 At the Switch Type: pull-down, select **Manual.**

5 Click **Apply**.

Result: The Active Path: indicates a change from m1 to m2 (or if m2 was originally the active path, the switch is from m2 to m1).
The Switch Request State: indicates Manual Switch.

6 At the Switch Type: pull-down, select **Clear**.

7 Click **Apply**.

8 Repeat Step 1 through Step 7 to verify a switch back to the original ring.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist

END OF STEPS

DS3 cleanup procedures

Delete the existing DS3 cross-connections

Before moving on to the next port to test, it is necessary to remove the cross-connection.

1 Select **Configuration > Cross-Connections**...

2 Use the Cross-Connection Wizard to **Delete leg(s) of an existing cross-connection** associated with **CP main-1, Port 1**.

Result: The DS3 test set should indicate a blue (AIS) signal is being received in place of the PRBS signal.

3 Remove the test set connections from the DSX-3.

4 Select **Configuration > Update System... > Update All**.

Result: This command will remove alarms generated by removing the test signals from the DSX-3.

5 Repeat the DS3 terminating equipment loopback testing (optical main OLIUs) (p. 6-18) or the DS3 non-terminating transmission (optical main OLIU) (p. 6-22) procedure and the Delete the existing DS3 cross-connections (p. 6-26) procedure to test each of the remaining DS3 tributaries of the Function unit, substituting the following address information within the Cross-Connection Wizard. This is necessary in order to ensure that the cabling of each port address is correct.

The table below lists the tributaries and cross-connections for all DS3s associated with a function group.

When testing cabling for a Function unit slot other than **a**, replace the **a** in each of the addresses with the letter (**b**, **c**, or **d**) corresponding to the Function unit slot under test.

Table 6-3 DS3 cross-connections

Tributary @ DSX-3	Cross-Connection
1	m1-1-1,a1-1
2	m1-1-2,a1-2
3	m1-1-3,a1-3
4	m1-1-4,a1-4
5	m1-1-5,a1-5
6	m1-1-6,a1-6
7	m1-1-7,a1-7
8	m1-1-8,a1-8
9	m1-1-9,a1-9
10	m1-1-10,a1-10
11	m1-1-11,a1-11
12	m1-1-12,a1-12

Tributary @ DSX-3	Cross-Connection
13*	m1-1-13,a1-13
14*	m1-1-14,a1-14
15*	m1-1-15,a1-15
16*	m1-1-16,a1-16
17*	m1-1-17,a1-17
18*	m1-1-18,a1-18
19*	m1-1-19,a1-19
20*	m1-1-20,a1-20
21*	m1-1-21,a1-21
22*	m1-1-22,a1-22
23*	m1-1-23,a1-23
24*	m1-1-24,a1-24
25*	m1-1-25,a1-25
26*	m1-1-26,a1-26
27*	m1-1-27,a1-27
28*	m1-1-28,a1-28
29*	m1-1-29,a1-29
30*	m1-1-30,a1-30
31*	m1-1-31,a1-31
32*	m1-1-32,a1-32
33*	m1-1-33,a1-33
34*	m1-1-34,a1-34
35*	m1-1-35,a1-35
36*	m1-1-36,a1-36
37*	m1-1-37,a1-37
38*	m1-1-38,a1-38
39*	m1-1-39,a1-39
40*	m1-1-40,a1-40
41*	m1-1-41,a1-41

Tributary @ DSX-3	Cross-Connection
42*	m1-1-42,a1-42
43*	m1-1-43,a1-43
44*	m1-1-44,a1-44
45*	m1-1-45,a1-45
46*	m1-1-46,a1-46
47*	m1-1-47,a1-47
48*	m1-1-48,a1-48

Note: Tribs 13-48 (denoted *) are for LNW19/LNW19B and LNW20 circuit packs only.

6 Repeat this procedure for each Function unit slot cabled to a DSX-3 via DS3/EC1 cabling.

7 Verify there are no existing DS3 cross-connections. Use the View > Cross-Connections command.

8 Select **Configuration > Update System... > Update All**.

Result: This command will remove alarms generated by removing the test signals from the DSX-3.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LNW66 and LNW74 (10/100T) TX ethernet cabling testing

Description

This procedure is used to test the ethernet 10/100 TX cabling from the function groups to the RJ45 patch panel.

Ethernet port assignment verification testing

1 Connect the Front CIT cable between the PC and the CIT/RS 232 jack of System Controller and login to the shelf using the serial connection.

2 Identify the function groups that contain an LNW66 or LNW74 (10/100T) circuit packs with cabling for testing.

3 Identify the RJ45 patch panel associated with the function groups identified above.

4 Connect the RJ45 cable from the first RJ45 on the patch panel to the ethernet port on your PC.

5 Watch for the link LED to light on the PC's Ethernet card or wait for 30 seconds and then disconnect the RJ45 cable from the patch panel.

6 The Fault LED will start flashing on the LNW66 or LNW74.

7 Verify that there is an inc. FE-LAN LOS alarm associated with the ethernet port where the signal was removed. Use the Alarm List button on the CIT system view.

8 Select **Configuration > Update System... > Update All**.

Result: The flashing fault LED on the LNW66 or LNW74 will clear.

9 Connect the RJ45 cable to the next jack on the RJ45 patch panel and repeat starting at Step 5 until all connected jacks have been tested.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist

END OF STEPS

Ethernet port wiring verification testing

Note: Continue with the following section only for LNW66 circuit packs. Testing is complete for LNW74 packs!

1 If not still connected serially from the last procedure then, connect the Front CIT cable between the PC and the CIT/RS-232 jack of System Controller and login to the shelf using the serial connection.

2 Select **Configuration > Data > Create Virtual Switch**.

3 Choose the **LNW66** that is being tested.

4 Click **Select**.

5 Enter Virtual Switch ID: **1**.

6 Under Ethernet (LAN) Ports, click **Select All**.

7 Click **Apply**.

8 Click **Close**.

9 Select **Configuration > Data > Create VLAN**.

10 Choose the **CP fn** circuit pack that applies.

11 Click **Select**.

12 Enter VLAN ID:**100**.

13 Choose Virtual Switch:**1**.

14 Under “Untagged Traffic” click on **Select All**.

15 Click **Apply.**

16 Connect a RJ45 Ethernet cable from the LAN port on the LNW2 SYSCTL to the first position on the RJ45 Ethernet patch panel.

17 Connect a second RJ45 Ethernet cable from the PC Ethernet port to the second position on the RJ45 Ethernet patch panel.

18 Watch for the link LED to light on the PC’s Ethernet card or wait for 30 seconds.

19 Login to the shelf using the OSI connection.

Result: Successful login to the Alcatel-Lucent 1665 DMX.

20 Log out of the Alcatel-Lucent 1665 DMX shelf.

21 At the RJ45 Ethernet patch panel disconnect the RJ45 Ethernet cable run to the PC Ethernet port and connect it to the next position on the RJ45 Ethernet patch panel to be tested.

22 Ignore the flashing fault LED on the Ethernet circuit pack and any alarms on the shelf.

23 Watch for the link LED to light on the PC’s Ethernet card or wait for 30 seconds.

24 Login to the shelf using the OSI connection.

Result: Successful login to the Alcatel-Lucent 1665 DMX.

25 Log out of the Alcatel-Lucent 1665 DMX shelf.

26 Repeat this procedure starting at Step 21 for the remaining Ethernet connections on the RJ45 patch panel connected to the LNW66 under test, then continue on to Step 27.

27 Disconnect the PC from the RJ45 patch panel and the Alcatel-Lucent 1665 DMX LAN port from the RJ45 patch panel.

28 Connect the Front CIT cable between the PC and the CIT/RS 232 jack of System Controller and login to the shelf using the serial connection.

29 Select **Configuration > Update System... > Update All**.

Result: The flashing fault LED on the Ethernet circuit pack will clear and any alarms on the Alcatel-Lucent 1665 DMX shelf will also clear.

30 Select **Configuration > Data > Delete Virtual Switch**.

31 Choose the **LNW66** circuit pack and click **Select**.

32 Select the **VRTSW ID** and click **Apply.**

33 Log out and disconnect the PC from the Alcatel-Lucent 1665 DMX serial port.

34 Repeat this procedure for every slot containing and LNW66.

35 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-3 (LNW37, LNW45, LNW55)/OC-12 (LNW49, LNW55)/OC-48 (LNW55, LNW62, LNW402) low-speed SFP test procedure

OC-3/OC-12/OC-48 SFP low-speed SFP test procedure

NOTICE

Laser safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Note: When reference is made to optical fiber loopback connections to IN and OUT on the OLIU, make the connections at the LGX equipment in order to verify correct installation and labeling of the fibers.

LBOs are installed on the OLIU faceplate IN port.

1 Identify the function groups that contain an LNW37/LNW45 OC-3, LNW49 OC-12, LNW62/LNW402 OC-48 or LNW55 12-port multi-rate OLIU circuit pack.

2 Insert a 15-dB LC-type LBO into the top IN connector (Port 1) of the first SFP equipped. See Appendix B, “Installing fiber connectors and LBOs”.

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 1).

Note: If inserting an SFP, see Appendix E, “Pluggable transmission module installation”.

3 Connect the Port 1 IN connector to the Port 1 OUT connector (at the LGX) of the OC-3, OC-12 or OC-48 OLIU using an optical fiber jumper cable. See Appendix A, “Fiber cleaning” for proper fiber cleaning instructions.

Requirement: The FAULT LED on the OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

4 Remove the optical fiber jumper from the OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

The alarm on the SFP module will flash.

5 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

6 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

7 From the system view click Alarm List to verify that the circuit pack alarm is cleared.

8 Repeat this entire procedure for each LNW37, LNW45, LNW49, LNW55, LNW62 or LNW402 SFP equipped in the Alcatel-Lucent 1665 DMX shelf.

9 Replace all protective dust covers on the LNW37, LNW45, LNW49, LNW55, LNW62 or LNW402 SFP OLIU connectors (OLIU and LGX), that were removed to perform this procedure.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-3 (low-speed) testing

OC-3 testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMX shelf function unit or growth slots containing OC-3 OLIU circuit packs.

NOTICE

Laser safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Note: When reference is made to optical fiber loopback connections to IN and OUT on the OLIU, make the connections at the LGX equipment in order to verify correct installation and labeling of the fibers.

LBOs are installed on the OLIU faceplate IN port.

1 Identify the function groups that contain an OC-3 OLIU circuit pack and fully insert the OLIU into the shelf.

Requirement: After a few moments, the ACTIVE LED should be lit on the OC-3 OLIU.

2 Insert a 15-dB LC-type LBO into the top IN connector (Port 1) of the OC-3 OLIU. See Appendix B, “Installing fiber connectors and LBOs”.

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 1).

3 Connect the Port 1 IN connector to the Port 1 OUT connector (at the LGX) of the OC-3 OLIU, using an optical fiber jumper cable. See Appendix A, “Fiber cleaning” for proper fiber cleaning instructions.

Requirement: The FAULT LED on the OC-3 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC-3 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

4 Remove the optical fiber jumper from the OC-3 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-3 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

5 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

6 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OC-3 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

7 Place the 15-dB LBO that was removed from the OC-3 OLIU (Port 1) and place it on the IN connector directly below it (Port 2).

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 2).

8 Connect the Port 2 IN connector to the Port 2 OUT connector (at the LGX) of the OC-3 OLIU, using an optical fiber jumper cable.

Requirement: The FAULT LED on the OC-3 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC-3 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

9 Remove the optical fiber jumper from the OC-3 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-3 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

10 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

11 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OC-3 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

12 Remove the 15-dB LBO from the OC-3 OLIU (Port 2) and place it on the IN connector directly below it (Port 3).

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 3).

13 Connect the Port 3 IN connector to the Port 3 OUT connector (at the LGX) of the OC-3 OLIU, using an optical fiber jumper cable.

Requirement: The FAULT LED on the OC-3 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC-3 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

14 Remove the optical fiber jumper from the OC-3 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-3 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

15 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

16 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OC-3 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

17 Remove the 15-dB LBO from the OC-3 OLIU (Port 3) and place it on the IN connector directly below it (Port 4).

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 4).

18 Connect the Port 4 IN connector to the Port 4 OUT connector (at the LGX) of the OC-3 OLIU, using an optical fiber jumper cable.

Requirement: The FAULT LED on the OC-3 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC-3 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

19 Remove the optical fiber jumper from the OC-3 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-3 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

20 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

21 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OC-3 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

22 Remove the 15-dB LBO from the OC-3 OLIU (port 4).

23 Replace all protective dust covers on the OC-3 OLIU connectors (OLIU and LGX), that were removed to perform this procedure.

24 Repeat this entire procedure for each OC-3 OLIU in the Alcatel-Lucent 1665 DMX shelf.

25 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-12 (low-speed) testing

OC-12 testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMX shelf Function unit or Growth slots containing OC-12 OLIU circuit packs.

NOTICE

Laser safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Note: When reference is made to optical fiber loopback connections to IN and OUT on the OLIU, make the connections at the LGX equipment in order to verify correct installation and labeling of the fibers.

LBOs are installed on the OLIU faceplate IN port.

1 Identify the function groups that contain an OC-12 OLIU circuit pack and fully insert the OLIU into the shelf.

Requirement: After a few moments, the ACTIVE LED should be lit on the OC-12 OLIU.

2 Insert a 15-dB LC-type LBO into the top IN connector (Port 1) of the OC-12 OLIU. See Appendix B, "Installing fiber connectors and LBOs".

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 1).

3 Connect the Port 1 IN connector to the Port 1 OUT connector (at the LGX) of the OC-12 OLIU, using an optical fiber jumper cable. See Appendix A, "Fiber cleaning" for proper fiber cleaning instructions.

Requirement: The FAULT LED on the OC-12 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC1-2 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

4 Remove the optical fiber jumper from the OC-12 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-12 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

5 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

6 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OC-12 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

7 Remove the 15-dB LBO from the OC-12 OLIU (Port 1) and place it on the IN connector directly below it (Port 2).

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 2).

8 Connect the Port 2 IN connector to the Port 2 OUT connector (at the LGX) of the OC-12 OLIU, using an optical fiber jumper cable.

Requirement: The FAULT LED on the OC-12 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC-12 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

9 Remove the optical fiber jumper from the OC-12 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-12 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

10 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

11 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OC-12 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

12 Remove the 15-dB LBO from the OC-12 OLIU (Port 2).

13 Replace all protective dust covers on the OC-12 OLIU connectors, that were removed to perform this procedure.

14 Repeat this entire procedure for each OC-12 OLIU in the Alcatel-Lucent 1665 DMX shelf.

15 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-12 facility loopback testing

Facility Loopback testing allows the installer to verify cabling to the OC-12 equipment. This test is only required if the Alcatel-Lucent 1665 DMX shelf is connected to OC-12 equipment. If the shelf is NOT connected to OC-12 equipment, skip this section and continue to the section on OC-48 low-speed testing procedure (p. 6-44).

Note: An optical test set with the capability to transmit OC-12 SONET levels are necessary for the testing.

The Function unit slot under test must contain a OC-12 circuit pack in order to perform this test.

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in the 5, "Use of WaveStar® CIT software" (p. 5-6).

2 Select **Configuration > Cross-Connections**...

3 Use the Cross-Connection Wizard to enter a new cross-connection at the **STS-12** rate, **UPSR Ring Add/Drop**, between **m1-1-1** and **fn-1-1** (fn will be a,b,c,d or g depending on the slot where the OC-12 CP is located).

This command creates a cross-connect to map the first OC-12 of an OC-12 circuit pack to the first STS-12 of the Main OLIUs.

4 Verify transmission at the patch panel.

5 Select **Configuration > Cross-Connections.**..

6 Use the Cross-Connection Wizard to **Delete leg(s) of an existing cross-connection** associated with **CP main-1, Port 1** (the OC-12 cross-connection).

7 Verify loss of transmission at the patch panel. This should be evident by a SONET alarm and a loss of pattern alarm.

8 Select **Fault > Analysis > Loopback**...

9 Choose the correct port on the **OC-12 CP** and click **Select.**

10 Click on **Operate** and Loopback Type: **Facility.**

11 Click **Apply.**

This command creates a facility loopback on the OC-12 port of an OC-12 circuit pack.

12 Verify transmission at the patch panel. There should be no alarms at the test set.

13 Select **Fault > Analysis > Loopback**...

14 Choose the correct **port on the OC-12 CP** and click **Select**.

15 Click on **Release**.

16 Click **Apply**.

17 Verify loss of transmission at the patch panel. This should be evident by a SONET alarm and a loss of pattern alarm.

18 Repeat this section for all OC-12 ports.

19 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-48 (low-speed) testing

OC-48 low-speed testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMX shelf Function unit or Growth slots containing OC-48 (LNW31 or LNW402) OLIU.

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Note: When reference is made to optical fiber loopback connections to IN and OUT on the OLIU, make the connections at the LGX equipment in order to verify correct installation and labeling of the fibers.

LBOs are installed on the OLIU faceplate IN port.

1 Identify the function groups that contain an OC-48 OLIU circuit pack and fully insert the OLIU into the shelf.

Requirement: After a few moments, the ACTIVE LED should be lit on the OC-48 OLIU.

2 Insert a 15-dB LC-type LBO into the IN connector of the OC-48 OLIU. See Appendix B, “Installing fiber connectors and LBOs”.

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 1).

3 Connect the IN connector to the OUT connector (at the LGX) of the OC-48 OLIU, using an optical fiber jumper cable. See Appendix A, "Fiber cleaning" for proper fiber cleaning instructions.

Requirement: The FAULT LED on the OC-48 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC-48 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

4 Remove the optical fiber jumper from the OC-48 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-48 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

5 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

6 Select Configuration > Update System... > Update All.

Requirement: The flashing FAULT LED should extinguish on the OC-48 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

7 Remove the 15-dB LBO from the OC-48 OLIU.

8 Replace all protective dust covers on the OC-48 OLIU connectors, that were removed to perform this procedure.

9 Repeat this entire procedure for each OC-48 OLIU in the Alcatel-Lucent 1665 DMX shelf.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-48 facility loopback testing

Facility Loopback testing allows the installer to verify cabling to the OC-48 equipment. This test is only required if the Alcatel-Lucent 1665 DMX shelf is connected to OC-48 equipment. If the shelf is NOT connected to OC-48 equipment, skip this section and continue to the next chapter.

Note: An optical test set with the capability to transmit OC-48 SONET levels are necessary for the testing.

The Function unit slot under test must contain an OC-48 (LNW31 or LNW402) circuit pack in order to perform this test.

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in the "Use of WaveStar® CIT software" (p. 5-6).

2 Select **Configuration > Cross-Connections**...

3 Use the Cross-Connection Wizard to **enter a new cross-connection** at the **STS48** rate, **UPSR Ring Add/Drop**, between **m1-1-1** and **fn-1-1** (fn will be a,b,c,d or g depending on the slot where the OC-48 CP is located).

This command creates a cross-connect to map the first STS-48 of an OC-48 circuit pack to the first STS-48 of the Main OLIUs.

4 Verify transmission at the patch panel. There should be no alarms at the test set.

5 Select **Configuration > Cross-Connections**...

6 Use the Cross-Connection Wizard to **Delete leg(s) of an existing cross-connection** associated with **CP main-1, Port 1** (the OC-48 cross-connection).

7 Verify loss of transmission at the patch panel. This should be evident by a SONET alarm and a loss of pattern alarm.

8 Select **Fault > Analysis > Loopback**...

9 Choose the correct port on the **OC-48 CP** and click **Select**.

10 Click on **Operate** and Loopback Type: **Facility**.

11 Click **Apply**.

This command creates a facility loopback on the OC-48 port of an OC-48 circuit pack.

12 Verify transmission at the patch panel. There should be no alarms at the test set.

13 Select **Fault > Analysis > Loopback**...

14 Choose the correct port on the **OC-48 CP** and click **Select**.

15 Click on **Release**.

16 Click **Apply**.

17 Verify loss of transmission at the patch panel. This should be evident by a SONET alarm and a loss of pattern alarm.

18 Repeat this section for all OC-48 ports.

19 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-192 (low-speed) testing

OC-192 low-speed testing procedure

Perform the following steps for all Alcatel-Lucent 1665 DMX shelf Function unit or Growth slots containing OC-192 (LNW603) OLIU.

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Note: When reference is made to optical fiber loopback connections to IN and OUT on the OLIU, make the connections at the LGX equipment in order to verify correct installation and labeling of the fibers.

LBOs are installed on the OLIU faceplate IN port.

1 Identify the function groups that contain an OC-192 OLIU circuit pack and fully insert the OLIU into the shelf.

Requirement: After a few moments, the ACTIVE LED should be lit on the OC-192 OLIU.

2 Insert a 15-dB LC-type LBO into the IN connector of the OC-192 OLIU. See Appendix B, "Installing fiber connectors and LBOs".

Connect the fibers labeled IN and OUT from the LGX to the OLIU (Port 1).

3 Connect the IN connector to the OUT connector (at the LGX) of the OC-192 OLIU, using an optical fiber jumper cable. See Appendix A, "Fiber cleaning" for proper fiber cleaning instructions.

Requirement: The FAULT LED on the OC-192 OLIU will begin flashing and the MN and NE LEDs should be lit on the SYSCTL circuit pack.

After approximately 20 seconds the flashing FAULT LED should extinguish on the OC-48 OLIU and the FAULT, MJ and NE LEDs should be lit on the SYSCTL circuit pack.

4 Remove the optical fiber jumper from the OC-192 OLIU (at the LGX).

Result: The FAULT LED should begin flashing on the OC-192 OLIU and only the MN and NE LEDs should be lit on the SYSCTL circuit pack.

5 From the system view click Alarm List to verify that the circuit pack alarm is associated with the optical port being tested.

6 Select **Configuration > Update System... > Update All**.

Requirement: The flashing FAULT LED should extinguish on the OC-192 OLIU. There should be no alarm indications on the Alcatel-Lucent 1665 DMX shelf.

7 Remove the 15-dB LBO from the OC-192 OLIU.

8 Replace all protective dust covers on the OC-192 OLIU connectors, that were removed to perform this procedure.

9 Repeat this entire procedure for each OC-192 OLIU in the Alcatel-Lucent 1665 DMX shelf.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

OC-192 facility loopback testing

Facility Loopback testing allows the installer to verify cabling to the OC-192 equipment. This test is only required if the Alcatel-Lucent 1665 DMX shelf is connected to OC-192 equipment. If the shelf is NOT connected to OC-192 equipment, skip this section and continue to the next chapter.

Note: An optical test set with the capability to transmit OC-192 SONET levels are necessary for the testing.

The Function unit slot under test must contain an OC-192 (LNW603) circuit pack in order to perform this test.

1 Log on to the Alcatel-Lucent 1665 DMX shelf using the CIT software as described in the Chapter 5, "Software download and circuit pack installation", "Use of WaveStar® CIT software" (p. 5-6).

2 Select **Configuration > Cross-Connections**...

3 Use the Cross-Connection Wizard to **enter a new cross-connection** at the **STS48** rate, **UPSR Ring Add/Drop**, between **m1-1-1** and **fn-1-1** (fn will be a,b,c,d or g depending on the slot where the OC-48 CP is located).

This command creates a cross-connect to map the first STS-48 of an OC-48 circuit pack to the first STS-48 of the Main OLIUs.

4 Verify transmission at the patch panel. There should be no alarms at the test set.

5 Select **Configuration > Cross-Connections**...

6 Use the Cross-Connection Wizard to **Delete leg(s) of an existing cross-connection** associated with **CP main-1, Port 1** (the OC-48 cross-connection).

7 Verify loss of transmission at the patch panel. This should be evident by a SONET alarm and a loss of pattern alarm.

8 Select **Fault > Analysis > Loopback**...

9 Choose the correct port on the **OC-48 CP** and click **Select**.

10 Click on **Operate** and Loopback Type: **Facility**.

11 Click **Apply**.

This command creates a facility loopback on the OC-48 port of an OC-48 circuit pack.

12 Verify transmission at the patch panel. There should be no alarms at the test set.

13 Select **Fault > Analysis > Loopback**...

14 Choose the correct port on the **OC-48 CP** and click **Select**.

15 Click on **Release**.

16 Click **Apply**.

17 Verify loss of transmission at the patch panel. This should be evident by a SONET alarm and a loss of pattern alarm.

18 Repeat this section for all OC-48 ports.

19 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

LED test

Description

This test verifies proper operation of all LEDs on the Alcatel-Lucent 1665 DMX circuit packs. Operation of all the LEDs is necessary to assist in trouble isolation.

Note: If there are any LED failures, determine if the problem is with the circuit pack or shelf and replace the faulty unit.

Note: If the shelf is not fully equipped, move circuit packs around and repeat the test for all valid circuit pack positions.

LED test procedure

1 Select **Fault > Test > LED**...

2 Choose **shelf (Alcatel-Lucent 1665 DMX)**.

3 Click **Select**.

4 Choose Number of Iterations: **1**.

5 Click **OK**.

Result: All LEDs on the shelf should light for 10 seconds, then extinguish for 10 seconds, and then the proper LEDs will light to indicate the current status of the shelf.

6 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Additional optical tests (optional)

Low-speed optical testing

The following procedure is provided for installers wishing to further test the low-speed optical packs using an optical test set. Perform the following steps for all Alcatel-Lucent 1665 DMX shelf Function unit or Growth slots. DCC will be disabled in order to prevent DCC alarms from being generated due to the optical loopback.

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

To test this procedure an optical test set is required as well as a 1x2 optical splitter.

Note: When reference is made to optical fiber loopback connections to IN and OUT on the High-Speed OLIU, make the connections at the LGX equipment in order to verify correct installation and labeling of the fibers.

The high-speed packs (OC-12, OC-48 or OC-192) should still be looped back on themselves and the dcc disabled to prevent dcc alarms. The dcc can be verified with the View > DCC GUI command. If the high speed packs are no longer looped back, do so at the LGX panel. The dcc should also be disabled at the function unit slot under test since it will be connected to a test set and will register alarms. The dcc can be provisioned with the Provision > DCC Terminations GUI command. Change the dcc on M2 and the FN slots by using the same command and double clicking on the m1 and selecting m2 or selecting the FN a-g slot.

The OC-48 Optical Packs including the High-Speed OLIUs should be attenuated with 15-dB LBOs. If using OC-192 in the high-speed slots, attenuate with 5 dB. LBOs are installed on the OLIU faceplate IN port.

Steps

Log in to the Alcatel-Lucent 1665 DMX shelf and verify that there are no existing alarms by viewing the Alarm List.

1 Starting at Function Slot A, insert the optical packs to be tested in Slot A-1 and A-2. Both packs must be of the same type, otherwise a **circuit pack not allowed alarm** will be displayed.

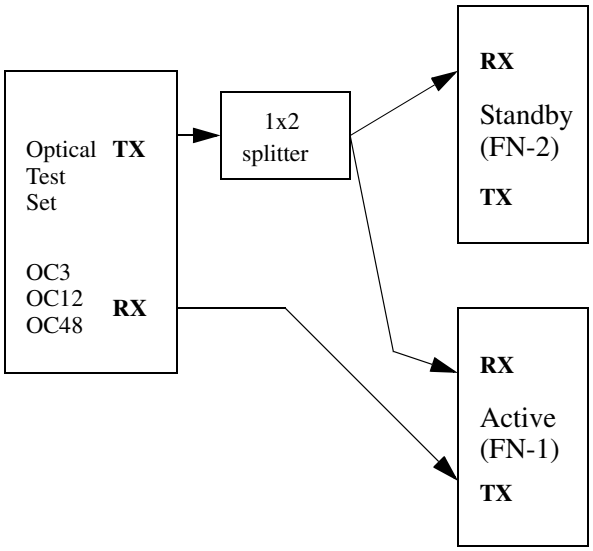
Note: If using VLF mains, some applications are allowed where the circuit packs in a function group are not the same type. See the *Alcatel-Lucent 1665 Data Multiplexer (DMX) Applications and Planning Guide, 365-372-300.*

2 At the LS LGX Bay, measure the TX output level of all Ports on all OC-3, OC-12 and OC-48 low-speed cards. Ensure the transmit level conforms to Chapter 1, “Alcatel-Lucent 1665 DMX optical specifications”. If the levels are not within specification, check the levels at the Alcatel-Lucent 1665 DMX. If levels are not within specification at the Alcatel-Lucent 1665 DMX, replace the pack with a spare and return the suspect pack back through the RMA process. If levels meet specifications, check the fiber to the LGX panel for continuity.

3 Ensure that the optical packs to be tested have 15-dB attenuators inserted to the IN port of the port under test. Failing to insert attenuators may overdrive the circuitry and cause permanent damage to the circuit packs. Start testing in Port 1.

4 Connect the optical test set using the 1 x 2 optical splitter. The TX of the test set is connected to the LGX ports corresponding to the RX of both FN-1 and FN-2 of the function slots under test. The LGX port corresponding to the TX of the port under test of FN-1 (active slot) is connected to the RX of the test set. (Some test sets require an attenuation of at least 10dB on the RX side). Reference Figure 6-1, “Optical test set arrangement” (p. 6-54).

Figure 6-1 Optical test set arrangement



5 Set the test set to the required rate for the packs under test. See Table 6-4, Transmission rate.

Table 6-4 Transmission rate

	OC-3 (LNW37, LNW45,LNW55)	OC-12 (LNW49,LNW55)	OC-48 (LNW31,LNW55, LNW62, LNW402)
Test signal mapping	STS-3C	STS-3C/12C	STS-3C/12C/48C
Pattern	2^23 -1 PRBS	2^23 -1 PRBS	2^23 -1 PRBS

6 Once the test set is in place, it will display pattern and AIS alarms. This is due to the fact that we have not established a cross-connection. Enter a cross-connection either through

the GUI using the cross-connect wizard. Enter the command according to the optical pack and function slot under test.

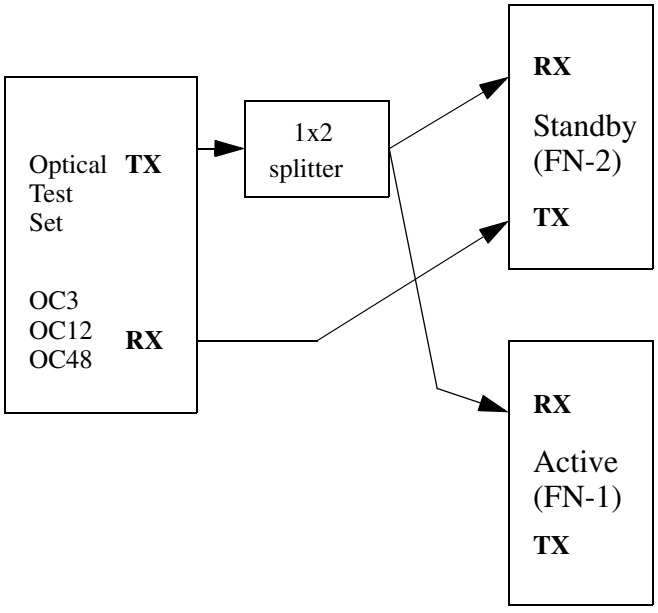
7 Check the transmission at the test set. It should show no alarms. If alarms are present, check the test set provisioning and the cross-connection to ensure they correspond to the pack under test. Make any adjustments necessary, and do not continue the test until transmission is good.

8 Check that the pack in FN-1 is the active pack with the GUI command View > Protection and selecting the associated pack.

If slot 1 is the active slot continue with testing, if slot 2 is active and slot 1 is standby, reseat the pack in slot 2, switching the active path to slot 1.

9 At the LS LGX Bay, move the Test Set RX cable to the Standby TX Port, see Figure 6-2. Examine the test traffic received by the test set. Look for errors or any other signal information that the test set is capable of indicating. The Standby OCN card should be running without errors.

Figure 6-2 Optical test arrangement RX fiber moved



10 Remove the Test Set TX cable from the Active OCN Card in FN-1. This will result in an Active to Standby OCN card switch. Verify that the traffic switched to the current Active

OCN card FN-2, and that there is a LOS alarm issued against the current Standby OCN card FN-1. Retrieving the alarms can be accomplished by selecting the Alarm List button on the top right of the GUI.

Note: The test set will indicate that there was a transmission hit indicating the switch, but should clear and show good transmission.

11 Return the Test Set TX Cable to normal operation and ensure that the LOS alarm clears.

12 Delete any cross-connects through the GUI Cross-Connection Wizard.

13 Select **Configuration > Update System... > Update All**.

14 Repeat this test on all OCN ports for all optical packs which will reside in the shelf.

15 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

7 Operational tests

Overview

Purpose

This section provides instructions to test protection switching and the non-transmission cabling for the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX). This section is not intended to replace acceptance test procedures. If problems are encountered, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide, 365-372-302* for detailed troubleshooting procedures.

Contents

This chapter provides information on the following topics

Tools, test equipment and accessories

The tools, test equipment and accessories necessary to perform the procedures in this section are listed in "Tools, test equipment, and accessories" (p. II-2).

Safety instructions

Note: All precautions should be observed when handling fiber.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

NOTICE

The operational tests in this section are run only in an out-of-service mode of operation. Office alarms will normally be connected only during the office alarm test to prevent constant alarms throughout this section.

Office alarm test

Description

This test verifies proper operation and wiring of the office alarms.

Audible and visual reporting of critical, major, minor alarms will be verified.

Prerequisite

The following is a list of items to verify before beginning tests in this section.

- The Alcatel-Lucent 1665 DMX Main OLIUs should be optically looped from the previous section. Verify that the Alcatel-Lucent 1665 DMX shelf is clear of all alarms (only green LEDs are lighted) prior to and after completing this test.
- The office alarm cable will be temporarily connected during this procedure. Table 7-1, “Office alarm connections” (p. 7-3) lists the office alarm connections.
- It is a requirement that alarms on the Alcatel-Lucent 1665 DMX do not affect and are not affected by other equipment via office alarm connections. During this test, the alarm state of other equipment connected to the same office alarms as the Alcatel-Lucent 1665 DMX should be examined after creating or clearing every alarm.

- A properly grounded ESD wrist strap must always be worn while handling circuit packs.
- This test should be performed on all shelves where office alarm reporting is required.
- After completing the office alarm test, the Alcatel-Lucent 1665 DMX office alarms should be disconnected from the office alarm system for the remainder of the test procedures. This will prevent the office alarms from being activated while performing the other tests in this section.

Table 7-1 Office alarm connections

Conn..	Pin#	Color	Designation	Name
J12-J13	1	BL-W	RYMJV1	Minor Alarm Visible
	2	W-BL	RYMJV2	Minor Alarm Visible Return
	3	O-W	RYMJA1	Minor Alarm Audible
	4	W-O	RYMJA2	Minor Alarm Audible Return
	5	G-W	RYMNV1	Major Alarm Visible
	6	W-G	RYMNV2	Major Alarm Visible Return
	7	BR-W	RYMNA1	Major Alarm Audible
	8	W-BR	RYMNA2	Major Alarm Audible Return
	9	S-W	RYCRV1	Critical Alarm Visible
	10	W-S	RYCRV2	Critical Alarm Visible Return
	11	BL-R	RYCRA1	Critical Alarm Audible
	12	R-BL	RYCRA2	Critical Alarm Audible Return

Office alarm test procedure

1 Connect the office alarm cable to J12 (ALM) on the backplane of the Alcatel-Lucent 1665 DMX shelf. If the shelf to be tested is part of a multiple shelf bay arrangement, the office alarm cable connects to shelf 1.

2 Verify that one of the function groups is equipped with a pair of LNW7/LNW8/LNW801 DS1, LNW16/LNW19B DS3 or LNW18/LNW20 TMUX circuit packs.

3 Establish a CIT session by following the procedure under "Use of WaveStar® CIT software" (p. 5-6) in Chapter 5, "Software download and circuit pack installation".

4 Select **Configuration > Cross-Connections**.

5 Use the Cross-Connection Wizard to **enter a new cross-connection** at the **STS-1** rate, **UPSR Ring Add/Drop,** between **m1-1-1** and **fn1-1** (fn will be a,b,c or d depending on the slot where the DS1, DS3, or TMUX CP is located).

This command creates a cross-connection to map 28 DS1s of a DS1circuit pack or the first DS3 of a DS3/EC1 or TMUX circuit pack in a Function unit slot(s) to the first STS-1 of the Main OLIUs.

6 Select **Configuration > Alarms > Alarm Severity Assignment Profile**.

7 After screen appears, click the "+" next to ASAP Type System, Highlight **DEFAULT** and click the **Provision** Button.

8 After the screen on the right appears, click on the A**larm Level on the Power/Fuse Failure row** and change the alarm severity to **Major**.

9 Click **APPLY**.

10 Unseat one of the LNW7/LNW8/LNW801, LNW16/LNW19B or LNW18/LNW20 circuit packs from the function group being used.

Result: Activated office alarms: MN visual, MN audible.

Note: Alarms will not be activated until the alarm delay time has passed. The default time is 2 seconds.

11 Press the **ACO** pushbutton on the SYSCTL.

Result: Activated office alarm: MN visual.
The MN audible alarm clears.

12 Using a small flat bladed screwdriver, set one of the circuit breakers to OFF.

Result: Activated office alarms: MJ visual, MJ audible.

13 Press the **ACO** pushbutton on the SYSCTL.

Result: Activated office alarm: MJ visual.
The MJ audible alarm should clear.

14 Unseat the second circuit pack from the same function group pair as the circuit pack removed in Step 10.

Result: Activated office alarms: CR visual, CR audible.

15 Press the **ACO** pushbutton on the SYSCTL.

Result: Activated office alarm: CR visual.
The CR audible alarm should clear.

16 Reseat the pair of function units.

17 Turn on the breaker that was turned off in Step 12.

Result: After a few minutes, all alarm indications should clear.

18 Disconnect the office alarm cable connected in Step 1 for the remainder of the test procedures in this chapter.

19 Select **Configuration > Alarms > Alarm Severity Assignment Profile**.

20 After screen appears, click the "**+**" next to ASAP Type System, Highlight DEFAULT and click the Provision Button.

21 After the screen on the right appears, click on the **Alarm Level on the Power/Fuse Failure row** and change the alarm severity Default to **Minor**.

22 Click **Apply**, then **Yes**.

Note: Do **NOT** delete the cross-connect that was entered for this test.

23 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Automatic protection switching and alarm test

Description

This section provides the procedures for verifying the Alcatel-Lucent 1665 DMX shelf automatic protection switching.

Note the following:

- These tests do NOT simulate circuit pack failures.
- The tests will verify proper alarm reporting and LED indications when circuit packs are removed.
- All protected circuit packs will be tested.
- A properly grounded wrist strap must always be worn while handling circuit packs.
- This test is performed with the Alcatel-Lucent 1665 DMX shelf optically looped back on itself (that is, with the IN of the OLIU M1 looped to the OUT of the OLIU M1, and the IN of the OLIU M2 looped to the OUT of the OLIU M2).
- Prior to performing each test, the shelf under test must be clear of all alarms (that is, only green LEDs are lit).

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

CAUTION

ESD hazard

A properly grounded ESD wrist strap MUST be worn when handling circuit packs.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

Main OLIU switching test

Use this procedure to test the following Main OLIU circuit packs in a UPSR (default) configuration:

OC-3

LNW82

OC-12

LNW48, LNW50, LNW54, LNW82, LNW203

OC-48

LNW27, LNW29, LNW32, LNW76, LNW82, LNW202, LNW504

OC-192

LNW56, LNW58, LNW59, LNW502, LNW504

It should be noted that switching tests for Function unit circuit packs were performed in the previous chapter.

1 Establish a CIT session by following the procedure under "Use of WaveStar® CIT software" (p. 5-6) in Chapter 5, "Software download and circuit pack installation".

2 Select **View > Cross-Connections**.

3 Choose **shelf (Alcatel-Lucent 1665 DMX)** and click **Select**.

4 Verify that the cross-connection entered in the previous section is on the list. If the cross connect exist proceed to Step 7; otherwise, continue to establish a cross connection.

5 Select **Configuration > Cross-Connections**.

6 Use the Cross-Connection Wizard to enter a new cross-connection at the **STS-1** rate, **UPSR Ring Add/Drop**, between **m1-1-1** and **fn1-1** (fn will be a,b,c or d depending on the slot where the DS1, DS3, or TMUX CP is located).

This command creates a cross-connection to map 28 DS1s of a DS1 circuit pack or the first DS3 of a DS3/EC1 or TMUX circuit pack in a Function unit slot(s) to the first STS-1 of the Main OLIUs.

7 Select **View > Protection.**

8 Under **Path Protection** choose **m-1-1**.

9 Click **Select**.

10 Note the Active Path: (m1-1-1 or m2-1-1).

The M1 OLIU is associated with Ring 1 and the M2 OLIU is associated with Ring 2.

11 Disconnect the optical fiber connected to the IN port of the OLIU that is the active receiver.

Result: The MN* and then NE alarm LED should light on the SYSCTL and the FAULT LED should flash on the OLIU.

12 Click **Refresh** in the **View Protection** window.

Result: The Active path has changed. (If m1-1-1 was active before, m2-1-1 is active now).

13 Reconnect the fiber at the OLIU.

Result: After a short time, the MN* and NE alarm LEDs on the SYSCTL and the FAULT LED on the OLIU should extinguish.

14 Repeat Step 10 through Step 13 to verify a switch back to the OLIU that was originally active.

15 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Manual switching tests

Description

This test will initiate switching commands from the CIT and verify proper switching and LED indications.

Main OLIU switching test

Note: An STS-1 cross-connect should still exist from the previous tests.

1 Select **Fault > Protection Switch**.

2 Under **Path Protection** choose **Path m-1-1**.

* Only if the ASAP has been set back to “Default”.

3 Click **Select**.

4 Note the Active Path.
The M1 OLIU is associated with Ring 1 and the M2 OLIU is associated with Ring 2.

5 In the Switch Type: pull-down, choose **Manual**.

6 Click **Apply**, then **Yes**.

Requirement: The ring that was active in Step 4 is no longer active and the other ring is now active.

7 In the Switch Type pull-down, choose **Clear**.

8 Click **Apply**, then **Yes**.

9 Repeat Step 4 through Step 8 to verify a switch back to the original ring.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

External timing verification

Description

This test should be performed if the Alcatel-Lucent 1665 DMX shelf is going to be externally timed. The shelf timing cable must be installed and connected between the Alcatel-Lucent 1665 DMX shelf and the office timing source (BITS clock) and the timing source must be active.

Timing verification test procedure

1 Determine the frame format (SF or ESF) and line code (AMI or B8ZS) of the DS1 timing signals being generated by the timing source.

2 Select **Configuration > Timing/Sync**.

3 In the **Timing Mode**: pull-down, verify External Timing is displayed. If not choose **External** and click **OK**, **Yes**, **Yes** and select **Configuration > Timing/Sync.**

4 Click on the **Timing Input Ports** tab at the top of the window.

5 Enter the DS1 Input and Output Format: **(SF or ESF) for REF-1 and REF-2**.

6 Enter the DS1 Input Line Code: (**AMI or B8ZS**) for REF-1 and REF-2.

Note: During the installation test, ensure the **Clock Mode Switching** is provisioned to “Revertive”. Otherwise, the system will go into holdover during some of the following test. The Clock Mode Switching option is located on the **System Timing** tab.

7 Enter the SSM Support (**Enabled or Disabled**).

Note: SSM is only supported on VLF mains and ESF framed inputs.

8 Click **OK**.

9 Select V**iew > Timing/Sync**.

Result:

- Correct line coding and frame format
- Provisioned and active timing mode are both external
- Both references are in service (IS)

- Which of the two references is active.

Note: If a reference does not indicate **IS**, that input is not receiving a proper timing reference. Verify:

– Cabling between the timing source and the Alcatel-Lucent 1665 DMX shelf

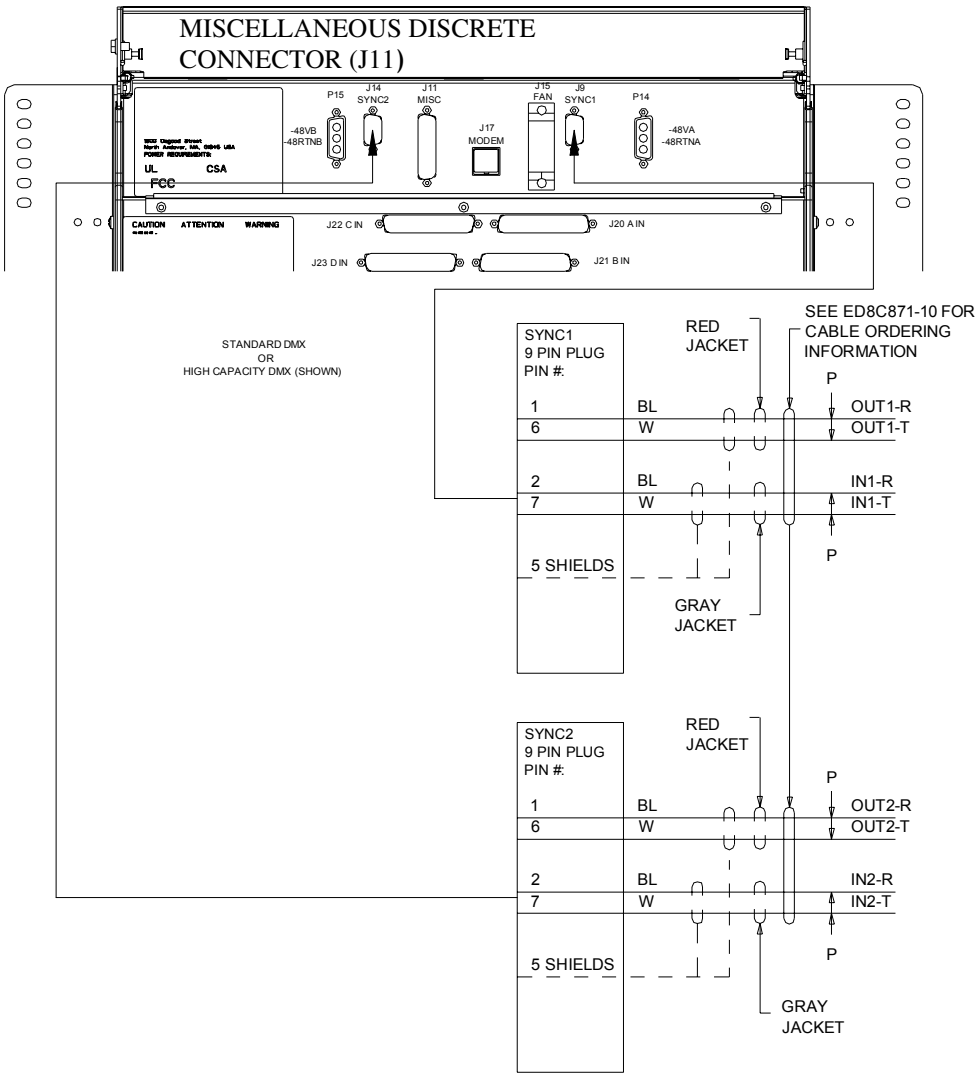
– Correct line coding

– Correct frame format.

10 At the rear of the shelf (see Figure 7-1, “Alcatel-Lucent 1665 DMX shelf backplane” (p. 7-13), disconnect the input timing cable from the connector associated with the active reference.

Requirement: The MN LED lights on the SYSCTL and the FAULT LED flashes on the MAIN OLIU circuit pack associated with that reference (SYNC1 is associated with M1 and SYNC2 is associated with M2).

Figure 7-1 Alcatel-Lucent 1665 DMX shelf backplane



Note: Above is the Alcatel-Lucent 1665 DMX shelf, but it should be noted that the timing connections are the same for the Alcatel-Lucent 1665 DMX high-capacity shelf.

11 Click **Refresh** in the View Timing/Sync window.

Result: The other reference is now the active reference.

12 Reconnect the timing cable at the rear of the shelf.

Requirement: The MN LED extinguishes on the SYSCTL and the FAULT LED on the OLIU stops flashing.

13 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Miscellaneous (environmental) discrete telemetry test

Description

Miscellaneous discrete telemetry access allows the maintenance center to control and monitor equipment co-located with the Alcatel-Lucent 1665 DMX shelf. Perform this procedure for shelves that are cabled for miscellaneous discrete telemetry.

Miscellaneous discrete telemetry test procedure

1 Determine which environmental inputs are to be monitored via the Alcatel-Lucent 1665 DMX shelf.

2 Verify that the miscellaneous discrete cable is connected to the J11 MISC connector on the shelf. See Figure 7-1, “Alcatel-Lucent 1665 DMX shelf backplane” (p. 7-13).

3 See Table 7-2, “Miscellaneous (environmental) discrete telemetry connections” (p. 7-16) to determine the wire color of the cable lead associated with the environmental input to be tested.

4 At the far end of the cable, short the associated environmental input lead to the red-slate (R-S) Input Common lead.

5 Verify that the minor (MN) alarm lights on the SYSCTL.

6 From the system view click **Alarm List.**

Result: Verify that the correct environmental alarm has been activated.

7 Remove the short and verify that the minor (MN) alarm indication on the SYSCTL clears.

8 Repeat Step 3 through Step 7 for each environmental input being used.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Figure 7-2 Miscellaneous (environmental) discrete functions

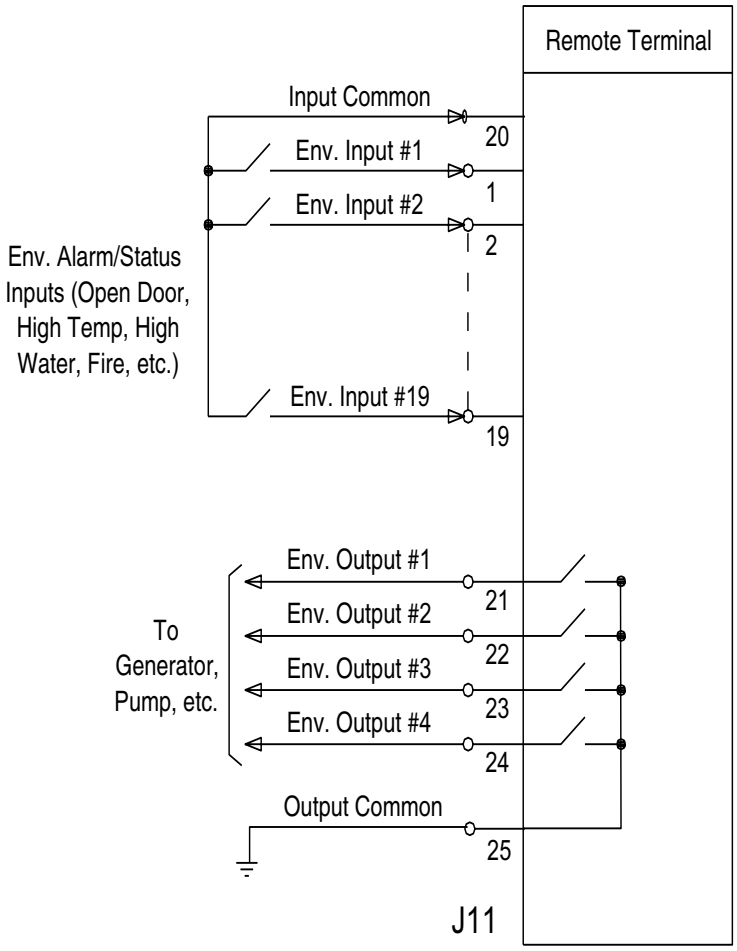


Table 7-2 Miscellaneous (environmental) discrete telemetry connections

Conn.	Pin#	Color	Designation	Name
J11	1	BL-W	TLMI1	Env. Input - #1
	2	W-BL	TLMI2	Env. Input - #2
	3	O-W	TLMI3	Env. Input - #3
	4	W-O	TLMI4	Env. Input - #4
	5	G-W	TLMI5	Env. Input - #5
	6	W-G	TLMI6	Env. Input - #6
	7	BR-W	TLMI7	Env. Input - #7
	8	W-BR	TLMI8	Env. Input - #8

Conn.	Pin#	Color	Designation	Name
	9	S-W	TLMI9	Env. Input - #9
	10	W-S	TLMI10	Env. Input - #10
	11	BL-R	TLMI11	Env. Input - #11
	12	R-BL	TLMI12	Env. Input - #12
	13	O-R	TLMI13	Env. Input - #13
	14	R-O	TLMI14	Env. Input - #14
	15	G-R	TLMI15	env-15 fan shelf failed
	16	R-G	TLMI16	Env. Input - #16
	17	BR-R	TLMI17	Env. Input - #17
	18	R-BR	TLMI18	Env. Input - #18
	19	S-R	TLMI19	Env. Input - #19
	20	R-S	TLMIC48VTRN	Input Common
	21	BL-BK	TLMO1	Env. Output - #1
	22	BK-BL	TLMO2	Env. Output - #2
	23	O-BK	TLMO3	Env. Output - #3
	24	BK-O	TLMO4	Env. Output - #4
	25	G-BK	TLMOC	Output Common

Modem connection test

Description

This test will verify proper modem connection to the Alcatel-Lucent 1665 DMX shelf.

This test should only be performed if a modem is required.

Modem connection test procedure

1 Verify the generic parameters of the modem are set to the following:

Modem parameters

- 1200, 2400, 4800, 9600, or 19,200 baud
- Full duplex

- 8 data bits
- No parity bits
- 1 start bit
- 1 stop bit
- No flow control
- Transparent data mode - ON
- Direct operating mode - ON

Note: Modems supporting a large set of options and error detection capabilities may require other options be set before using the modems to download generic software. See manufacture's manuals for instructions on setting modem parameters.

2 Verify that the modem cable is properly connected from the modem to J17 (MODEM) on the backplane of the Alcatel-Lucent 1665 DMX shelf.

3 Verify that the modem is connected to the phone line.

4 Select **Administration > Data Communications.**

5 Click the **Serial Port** tab.

6 Choose CIT Port: **cit-2**.

7 Choose **Baud Rate**: to match the modem being connected.

8 Dial into the modem using an application such as HyperTerminal from a PC with a modem configured to similar parameters.

9 After a connection is established, press the enter key.

Result: /* SYSTEM TID: LT-DMX */

10 Enter the command:

```
act-user:LT-DMX:LUC01:ctag::DMX2.5G10G;
```

Result: A message indicating that the command completed will be displayed along with the Alcatel-Lucent disclosure.

11 Enter the command:

```
canc-user:LT-DMX:LUC01:ctag;
```

Result: A message indicating that the command completed will be displayed.

12 Disconnect the HyperTerminal session.

13 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Final operations

Description

The following procedure ensures that all test signals and cross-connects have been removed and the Alcatel-Lucent 1665 DMX shelf is alarm free and ready for network connection procedures.

Steps

1 Select **Configuration > Cross-Connections**.

2 Choose **Delete leg(s) of an existing cross-connection**.

3 Click **Next** and continue with the Cross-Connection Wizard to delete the cross-connections associated with CP main-1, Port 1.

4 To verify that all cross-connections are deleted, select **View> Cross-Connections**.

5 Choose shelf **(Alcatel-Lucent 1665 DMX)** and click **select**.

6 Verify that no alarm LEDs are lit and no FAULT LED is lit on any circuit pack.

If any alarm is present, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide, 365-372-302*.

7 If desired, reconnect the office alarm cable at this time.

8 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Part III: Network turn-up and testing

Overview

Purpose

This section starts the process of integrating the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) into the customer's network. The section provides the procedures to connect inter-office fibers and verify DCC communications and path switching. The section is broken down into two areas, Ring (UPSR/BLSR) setup and WDMX. If the network is engineered as a ring, proceed to Chapter 6, there is no need to procedure to the WDMX chapter. If the network consists of a ring integrated into the WDMX application, then proceed to "WDMX setup and testing: integration procedures" (p. 9-1).

Contents

This section is organized into the following chapters:

Tools, test equipment, and accessories

This section lists the tools, test equipment and accessories needed to perform all the procedures in this installation manual.

Listed below are the required tools, test equipment and accessories.

Quantity	Description	Comments
	Screwdriver(s)	A screwdriver(s) with the appropriate head(s) is (are) required for securing the mounting screws, repositioning the mounting brackets, installing the interfacing cables, and for setting the circuit breakers to the OFF position.
1	ESD Wrist Strap	A wrist strap must be worn when handling circuit packs. Use the electrostatic discharge (ESD) jack provided on the shelf.
1	Multimeter (Optional)	The voltmeter must be capable of measuring DC voltage in the 40 to 60 volt range. The use of the voltmeter is optional since the shelf will alarm or shut down if the proper voltage is not supplied.
1	DS1 Error Rate Test Set	A DS1 error rate test set is required for testing of DS1 cabling. A T-BERD 211 or equivalent is recommended.
1	DS3 Error Rate Test Set	A DS3 error rate test set is required for testing of DS3 cabling. A T-BERD 305 or equivalent is recommended.
1	SONET Optical Test Set	An OC-3, OC-12, or OC-48 test set is required for testing of optical circuit packs. An Agilent OmniBER 718 or equivalent is recommended.
1	Optical Power Meter	An optical power meter capable of measuring optical levels from +5.0 dBm to -30.0 dBm. The meter should also have adapters for LC type connectors and any other connectors used in the office.
2 or 3	LC-type Optical Fiber Jumper (108918269)	Two optical fiber jumpers with LC type connectors are required to optically loop the Alcatel-Lucent 1665 DMX shelf for test purposes.
2	15 dB LC-type LBO (108279480)	Two 15-dB LBOs are required when optically looping the Alcatel-Lucent 1665 DMX shelf for test purposes.
1	Personal Computer (PC)	See Chapter 5, “Software download and circuit pack installation”, “PC minimum requirements” (p. 5-2).
1	CIT Interface Cable	8-ft. long RJ45 to 9-pin D-sub serial cable (Comcode 848748869).

8 OC-3/12/48 ring setup and testing: integration procedures

Overview

Purpose

This procedure is used to make fiber connections between Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) nodes in a ring. It is not intended to replace acceptance test procedures. If problems are encountered, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide, 365-372-302* for detailed troubleshooting procedures.

If additional provisioning procedures are desired, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide, 365-372-301.*

Contents

This chapter provides information on the following topics

Tools, test equipment and accessories

The tools, test equipment and accessories necessary to perform the procedures in this section are listed in Tools, test equipment, and accessories (p. III-2).

Safety instructions

Note: All precautions should be observed when handling fiber.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

NOTICE

The operational tests in this section are run only in an out-of-service mode of operation. Office alarms will normally be connected only during the office alarm test to prevent constant alarms throughout this section.

Fiber installation

Description

This section is used to verify proper fiber connections between Alcatel-Lucent 1665 DMX nodes.

Prerequisite

The following is a list of items to verify before beginning tests in this section.

- Two people are required to perform the end-to-end turn up in this section (one at each adjacent node).
- The Alcatel-Lucent 1665 DMX Main OLIUs should be optically looped from the previous section. Verify that the Alcatel-Lucent 1665 DMX shelf is clear of all alarms (only green LEDs are lighted) prior to and after completing this test.
- CIT is still connected to the Alcatel-Lucent 1665 DMX.
- The office alarm cable will remain disconnected during this procedure.

CAUTION

ESD hazard

A properly grounded ESD wrist strap MUST be worn when handling circuit packs.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Note: If the transmit pluggable tranmission module is failed and transmitting an invalid signal during installation, no alarms are reported since the receive port at the opposite end of the span has not transitioned from AUTO to IS, even though the measured receive power is within acceptable levels.
The failed transmit pluggable transmission module appears as an LOS to the receive pluggable transmission module causing the port state to remain AUTO.
If the receive pluggable transmission module is receiving a signal within acceptable levels but does not transition from AUTO to IS, replace the transmit pluggable transmission module at the opposite end of the span.

Fiber installation procedure

The following procedures are performed at each end of the optical span being tested.

1 Verify that the office alarm cable to J12 (ALM) on the backplane of the Alcatel-Lucent 1665 DMX shelf is disconnected. If the shelf to be tested is part of a multiple shelf bay arrangement, the office alarm cable connects to shelf 1.

2 Enter the shelf **TID** per the customer order or set TIDs to LT-DMX-1 and LT-DMX-2, etc.

3 Enable Remote NE Status and Alarm Gateway (AGNE) at LT-DMX-1 only. Select **Administration > Set NE**...

4 Enable Remote NE Status at the far end node. Select **Administration > Set NE.**..

5 Dress optical cables in the fiber tray at the bottom front of the shelf.

Note: We recomment that the fibers be dressed by alternating the use of the front and back sections of the fiber tray.The fibers coming from slots A1 and D2 should just be dressed out the opening and not in the fiber tray. The packs in slots A2 and D1 should be dressed in the front tray and then alternate the next packs (moving to the center of the shelf) to the back section of the fiber tray.

6 Route the optical jumpers from the bottom of the shelf.

7 Establish communications with the technician at the other end of the optical span.

8 At both ends of the optical span, remove protective covers from receive and transmit optical jumper cables and clean LC connectors.

Note: The Alcatel-Lucent 1665 DMX OLIUs require single-mode lightguide cable. It may take from 15 seconds to 3.5 minutes for the FAULT LEDs to stop flashing after the cables are connected, depending on the setting of the signal degrade threshold.

9 At both ends of the optical span, ensure that only the dual LC adapter is installed on the OLIU (no LBO).

Note: For Alcatel-Lucent 1665 DMX ring configurations, optical fibers extend in two different directions to make up the ring. At each shelf (node) in the ring, the **M1** OLIU will connect to the **M2** OLIU in one adjacent node, and the **M2** OLIU will connect to the **M1** OLIU in the other adjacent node. Likewise, when the Alcatel-Lucent 1665 DMX is interfacing with another Alcatel-Lucent 1665 DMX at low-speeds (OC-3, OC-12 or OC-48) using 0x1S1 and 0x1S2 protection, the Function Group slot (A, B, C, D, or G) 1 will connect to Main 1 or Function/Growth slot 2 on the shelf the Alcatel-Lucent 1665 DMX is being connected to. The Function Group slot (A, B, C, D, or G) **2** will connect to Main 2 or Function/Growth slot 1.

10 At each end of the optical span, connect the optical fiber transmit cables to the OLIU OUT connectors.

11 At each end of the optical span, measure the optical power of the optical fiber receive cables using an optical power meter.

12 Determine the LBO value required based on the received optical power measurement. See the following table.

Table 8-1 Attenuation Table

Optics	Circuit Pack	Received Power (dBM)	LBO (dB)
OC-48 (High Speed)	LNW27 LNW29 LNW32	+3.0 to -9.0 -9.0 to -29.0	15 0
	LNW76	-3.0 to -18.0	0
Low-Speed Optics (OC-3, OC-12, OC-48)	LNW31 (OC-48)	0.0 to -18.0	0

Optics	Circuit Pack	Received Power (dBM)	LBO (dB)
OC-12 (high speed)	LNW48	-8.0 to -28.0	0
	LNW50	+2.0 to -7.0	10
		-7.0 to -30.5	0
	LNW54	+2.0 to -7.0	10
		-7.0 to -29.0	0
OC-192 (high speed)	LNW56	+2.0 to -1.0	5
		-1.0 to -14.0	0
	LNW58	-1.0 to -11.0	0

Table 8-2 Attenuation table (Pluggable Transmission Modules)

SFP/XFP optics	Circuit Pack	Received Power (dBM)	LBO (dB)
S15512	LNW37, LNW45, LNW55, LNW82, LNW705	-8.0 to -23.0	0
OC-3 IR1-I1	LNW37, LNW45, LNW55, LNW82, LNW705	-8.0 to -28.0	0
OC-3 LR1-I1	LNW37, LNW45, LNW55, LNW82, LNW705	0.0 to -5.0	15
		-5.0 to -10	10
		-10 to -34.0	0
OC-12 IR1-I1	LNW49, LNW55, LNW82, LNW705	-8.0 to -28.0	0
OC-12 LR1-I1	LNW49, LNW55, LNW82, LNW705	+2.0 to -5.0	15
		-5.0 to -15	10
		-15 to -28.0	0
OC-12 LR2-I1	LNW49, LNW55, LNW82	+2.0 to -5.0	15
		-5.0 to -15	10
		-15 to -28.0	0

SFP/XFP optics	Circuit Pack	Received Power (dBM)	LBO (dB)
OC3/12 LR-2 S622C47-61 EL	LNW37, LNW45, LNW49, LNW55, LNW82, LNW705	-8.0 to -28.0	15
OC-48 SR-I1	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705	-3.0 to -18.0	0
OC-48 LR-I1	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705	+3.0 to -5.0	15
		-5.0 to -10.0	10
		-10.0 to -15.0	5
		-15.0 to -27.0	0
OC-48 LR2-I1	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705	+3.0 to -5.0	15
		-5.0 to -10.0	10
		-10.0 to -15.0	5
		-15.0 to -27.0	0
S2DxxC6 series	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705	+3.0 to -5.0	15
		-5.0 to -10.0	10
		-10.0 to -15.0	5
		-15.0 to -27.0	0
OC192SR1-C1	LNW59, LNW502	-1.0 to -11	0
OC192IR2-C1	LNW59, LNW502	+2.0 to -1.0	5
		-1.0 to -14	0
OC192LR2-C1	LNW59, LNW502	+4.0 to 0.0	15
		0.0 to -7.0	10
		-7.0 to -24.0	0
X10GxxC5* series	LNW59, LNW502, LNW705	-8.0 to -24	15

Notes:

* LNW705 only uses X10G31C5-X10G59C5

13 Select the proper LBO based on the value required and the comcode as listed below.

Code	Comcode	Loss (dB)
ABLCS-05.0	108279381	5
ABLCS-10.0	108279431	10
ABLCS-15.0	108279480	15
ABLCS-20.0	108279530	20

14 Clean LC LBOs and install LBO assemblies in the OLIU IN connector.

15 At the far end, connect the input optical fiber to the proper OLIU IN connector.

Requirement: The FAULT LED on the OLIU extinguishes.

16 At the near end, connect the input optical fiber to the proper OLIU IN connector.

Requirement: The FAULT LED on the OLIU extinguishes.

17 Disconnect the fiber cable from the OUT connector on the OLIU at one end of the span. At the other end, verify that the associated FAULT LED is flashing, indicating a loss of signal. Reconnect the fiber and repeat the process for the other direction of transmission.

18 Enable communications with the adjacent Alcatel-Lucent 1665 DMX nodes. **Configuration > DCC Terminations**...

19 Select Port AID: **dcc-m1-1**, OSI Over DCC: **enabled**, LAPD Role: **user-side**.

20 Select Port AID: **dcc-m2-1**, OSI Over DCC: **enabled**, LAPD Role: **network-side**.

21 Set the timing to internal (free running) at LT-DMX-1 and line time LT-DMX-2. **Configuration > Timing/Sync... Timing Mode: Free Running.**

22 Verify proper communications with the adjacent Alcatel-Lucent 1665 DMX nodes. Administration>OSI Neighbor Map.

Result: The adjacent node appears in the neighbor list.

23 Perform steps in this procedure on all adjacent nodes in the ring.

24 After all connections and tests have been made, verify optical fiber cables are placed in fiber tray and properly routed in bay framework.

25 Reconnect the office alarm cable disconnected in Step 1.

26 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Optical transmission test (OC-192, OC-48, OC-12)

Overview

The following test verifies error-free transmission between nodes.

Transmission test procedure

1 At the test location, select **Performance > View PM Reports > OCn Section**...

2 Choose **CP main-1, Port 1**

3 Click **Select**.

4 Select Time Period: **15-Min**, Monitored Date: **Current Date** and Monitor Level: **0 UP**.

5 Click **Select All** to move all Available Parameters to the Selected Parameters column.

6 Click **Apply**.

Result: The Response Window indicates no transmission errors.

7 Repeat Step 1 through Step 6 substituting CP main-2 in Step 2.

8 Repeat Step 1 through Step 7 for all Alcatel-Lucent 1665 DMX shelves at the test location.

9 Repeat Step 1 and Step 8 for each node in the ring.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Automatic protection switching test

Description

This section provides the procedures for verifying the Alcatel-Lucent 1665 DMX shelf automatic and manual protection switching.

Note the following:

- These tests do NOT simulate circuit pack failures.
- A properly grounded wrist strap must always be worn while handling circuit packs.
- Prior to performing each test, the shelf under test must be clear of all alarms (that is, only green LEDs are lighted).

Main OLIU switch test

1 In order to perform path switching, an add/drop cross-connection must be entered. Select **Configuration > Cross-Connections**... and use the Cross-Connection Wizard to enter an add/drop cross-connection.

2 Select **View > Protection**...

3 Under Path Protection choose **Path m-1-1** and click **Select**.

4 Note the Active Path (m1 or m2).

5 Disconnect the optical fiber connected to the IN port on the active path OLIU.

Result: The MN and then MJ alarm LED should light on the SYSCTL and the FAULT LED should flash on the OLIU.

6 Click **Refresh** in the View Protection window.

7 Verify the Active Path has changed (from m1 to m2 or m2 to m1).

8 Reconnect the optical fiber to the OLIU.

Result: After a short time, the MJ alarm LED on the SYSCTL and the FAULT LED on the OLIU should extinguish.

9 Repeat Step 2 through Step 8 to verify a switch back to the OLIU that was originally active.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Manual switching tests

Description

This test will initiate switching commands from the CIT and verify proper switching and LED indications.

Note: An STS-1 cross-connect is required in order to perform manual switching.

Manual switching test procedure

1 Enter an STS-1 add/drop cross-connection between an equipped Function unit and the Main OLIU. Select Configuration > Cross-Connections... and use the Cross-Connection Wizard to enter an add/drop cross-connection.

2 Select **Fault > Protection Switch**...

3 Under Path Protection choose **Path m-1-1** and click **Select**.

4 Note the Active Path (m1 or m2).

5 Choose Switch Type: **Manual**.

6 Click **Apply**.

7 Verify that the Active Path: has changed (m1 to m2 or m2 to m1).

8 Repeat Step 2 through Step 7 to verify a switch back to the original ring.

9 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Function units/growth slots, switching test

This test will initiate switching commands from the CIT and verify proper switching and LED indications.

Note: This procedure should be performed on each Function unit equipped with protected electrical TDM circuit packs.

1 Select **Fault > Protection Switch**...

2 Click on **1+1 Equip fn-x** (x is a,b,c or d corresponding to the function group equipped).

3 Click **Select.**

4 Note which Function unit or Growth Slot circuit pack is the active circuit pack.

5 In the Switch Type: pull-down, select **Manual** (Normal).

6 Click **Apply**.

Result: The pack that was active should now be the standby pack and the pack that was standby is now active. Transmission should take a momentary hit as it is switched to the other pack. This information should agree with the ACTIVE LEDs on the circuit packs.

7 Repeat Step 1 through Step 6 to verify a switch back to the original Function unit circuit pack, with the same results as the previous step.

8 Repeat this procedure for each Function unit pair.

9 Swap circuit packs from another function group to test any unequipped function slots.

10 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Final operations

Description

The following procedure ensures that all test signals and cross-connects have been removed and the Alcatel-Lucent 1665 DMX shelf is alarm free and ready for network connection procedures.

Steps

1 Select **Configuration > Cross-Connections**...

2 Use the Cross-Connection Wizard to **Delete leg(s) of an existing cross-connection** associated with **CP main-1, Port 1**.

3 Select **Configuration > Update System... > Update All.**

4 Verify that no alarm LEDs are lit and no FAULT LED is lit on any circuit pack.

If any alarm is present, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide, 365-372-302*.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Clear PM registers

The following steps will clear all the performance monitoring registers:

1 Select **Performance > Initiate PM Registers > Both**.

2 If desired, reconnect the office alarm cable at this time.

3 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

9 WDMX setup and testing: integration procedures

Overview

Purpose

This chapter is used to verify WDMX connectivity between Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) nodes. The chapter includes the LNW785 8 channel Optical Multiplexer Demultiplexer (OMD) and the LNW705 XM10G/8 Muxponder circuit packs. It is not intended to replace acceptance test procedures.

The testing performed in this procedure uses an OC-48 test set. If the OC48 PTM and test sets are unavailable, other rates or signals can be substituted, i.e OC-3/-12 or GigE. If additional provisioning procedures are desired, see *Alcatel-Lucent 1665 Data Multiplexer (DMX) User Operations Guide, 365-372-301 and* 3*Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide, 365-372-302* for detailed troubleshooting procedures.

Contents

This chapter provides information on the following topics:

How to use this chapter

All of the sections in this chapter are stand alone procedures and are not intended to be followed in any sequence. Locate the procedure in this chapter and follow the procedure based on the requirements of the turn-up. When one procedure relies on steps from another procedure or continues on with the next procedure, the link is provided in the procedure.

Tools, test equipment and accessories

The tools, test equipment and accessories necessary to perform the procedures in this section are listed in Tools, test equipment, and accessories (p. III-2).

Prerequisite

The following is a list of items to verify before beginning tests in this section.

- Two or more people are required to perform the end-to-end turn up in this section (one at each adjacent node).
- The office alarm cable will remain disconnected during this procedure.

Safety instructions

Note: All precautions should be observed when handling fiber.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

NOTICE

The operational tests in this section are run only in an out-of-service mode of operation. Office alarms will normally be connected only during the office alarm test to prevent constant alarms throughout this section.

CAUTION

ESD hazard

A properly grounded ESD wrist strap MUST be worn when handling circuit packs.

WARNING

Laser hazard

Unterminated optical connectors may emit laser radiation. Do not view beam with optical instruments.

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Turn-up and test the LNW785 8-channel OMD

Description

This section provides the procedure to provision and test an optical span using the 8-channel OMD LNW785 circuit pack. The procedure requires an LNW785 at both ends of the span and that there is least one OC-192/10Gbps source at each end of the span. The source OC-192 could be an LNW502, LNW59, or an OC-192/10Gbps from a alien shelf but the source MUST be compatible with the wavelengths on the LNW785. The LNW502 or LNW59 must be equipped with X10G52C5, X10G53C5, X10G54C5, or X10G55C5. If using an alien 10Gbps source, see Table 9-1, "Channel/port assignments" (p. 9-17) for the wavelengths specifications.

If the LNW705 is used as the test signal, proceed to "Turn up and test the LNW705 muxponder" (p. 9-6)

1 Determine and document the test signal frequency.

2 Install the LNW785 into the Alcatel-Lucent 1665 DMX shelf by opening both faceplate latches and seating in the slot while closing the latches.

Note: The LNW785 can be installed in any Function/Growth slot. When the shelf is to be configured as an add/drop, it is recommended that the Growth slots are not used because the passthrough fibers would have to route over the SYSCTL.If the Main slots are not equipped with VLF mains (LNW59, LNW82, LNW504), then the circuit packs in a Function/Growth slot must be the same type.

3 Login to the Alcatel-Lucent 1665 DMX using the WaveStar® CIT.

4 Create OCH Cross-connections
Select **Configuration > OCH Cross-connections** from the System View

5 Select the **Create a new OCH cross-connection** radio button in the OCH Cross-Connection Wizard. Click **Next**.
Click the **2-way Add/Drop** radio button from the cross-connection list. Click **Next**.

6 Click **Select**, then select **REMAID** and the port will appear on the right side of the screen, click on the **Port** to highlight it then click **Select**.

7 Click **Select** for the Add/Drop port, expand the circuit pack (OMD5/8) and click on the **Port** and the port will appear on the right side of the screen, click on the **Port** to highlight it then click **Select**.

Note: The port is determined by the test signal wavelength documented in Step 1.

8 Click **Next**, then **Finish** and complete the cross-connection by clicking on **Yes** in the confirmation window.

9 Connect fibers from Test port to selected channel on LNW785, while observing optical power requirements and cleaning procedures. See Table 1-2, “Alcatel-Lucent 1665 DMX optical circuit pack laser safety specifications” (p. 1-11) and Table 1-3, “Alcatel-Lucent 1665 DMX optical PTM laser safety specifications” (p. 1-12) for Alcatel-Lucent 1665 DMX optical power specifications.

Note: The LNW785 circuit pack has variable optical attenuators(VOAs) on the inputs for individual channel-power control. It can perform automatic channel power balancing of the add channels via the VOAs.

10 Repeat Step 2 to Step 9 at the remote Network Element.

11 Connect the Transmit fibers on the LNW785 at each end, following proper fiber cleaning procedures.

12 Connect the Receive fibers on the LNW785 at each end, while observing optical power requirements and cleaning procedures.

Result: Span is in-service

13 If adding a span in the other direction using the LNW785 repeat Step 1 through Step 12, otherwise continue.

14 Perform end-to-end testing. Follow the end to end testing procedures determined by the input test signal. If the test signal is the Alcatel-Lucent 1665 DMX as part of a ring, proceed to Chapter 8, "OC-3/12/48 ring setup and testing: integration procedures" and locate the appropriate procedure.

15 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Turn up and test the LNW705 muxponder

Description

The following procedure is a simple method of testing end to end continuity of the LNW705 Muxponder circuit. The test requires that a LNW705 is installed in two nodes and that there is fiber continuity between the two LNW705s. The fiber path could be a direct fiber connection, through a passive optics device, a LNW785 or through a DWDM like the Alcatel-Lucent 1695 EON system. In any case, the LNW705 link must be established. Once the end-to-end link has been established, an OC-3/OC-12/OC-48 test set and PTMs will be used to perform the end to end test.

Steps

This procedure provides the steps needed to equip and test the Alcatel-Lucent 1665 DMX with an LNW705. The steps include installing and equipping the LNW705 with the 10G and low speed PTMs, along with all the necessary provisioning.

1 Install the LNW705 into the Alcatel-Lucent 1665 DMX shelf by opening both faceplate latches and seating in the slot while closing the latches.

> **Note:** The LNW705 can be installed in any Function/Growth slot. If the Main slots are not equipped with VLF mains (LNW59, LNW82, LNW504), then the circuit packs in a Function/Growth slot must be the same type.

2 Install the appropriate 10G PTM "Channel/port assignments" (p. 9-17) into Port 9.

3 Install an OC-3/OC-12/OC-48 PTM in Port 1 of the LNW705 [see Appendix E, "Pluggable transmission modules (PTM)" (p. E-1)].

Note: The PTMs at both ends of the circuit must be the same rate.

For purposes of this document, the examples in the procedures below are equipped with an OC48 PTM. Any other signal listed in Appendix E, "Pluggable transmission modules (PTM)" (p. E-1) could be substituted, however use the guidelines set in Table 9-2, "XM10G/8 PTM port guidelines" (p. 9-18) for the port restrictions.

4 Login to the Alcatel-Lucent 1665 DMX using the WaveStar® CIT.

5 Provision the PTM/OTU-2
Select **Configuration > Equipment** from the System View

6 Click the "**+**" next to XM10G/8 circuit pack to expand the list.

7 Highlight the **PTM sc9** and click **Select.**

8 Enter the Frequency in the Expected Frequency and click **Apply**.

Note: The frequency is determined by the PTM inserted in Port 9. See the LNW705 column in Table 9-1, "Channel/port assignments" (p. 9-17) for acceptable values.

9 Highlight the **Port 1** and click **Select**.

10 Set the **Signal type** to match the PTM type, using the pull down window (for example if the PTM is a OC48SR1-I1, set the Signal Type to OC48) and click **Apply**.

11 Perform a single node self test by connecting an OC-48 test set to Port 1, while observing the proper optical power levels and cleaning procedures.
Insert a 15 dB LBO into the input of Port 9 and connect a fiber from the output of Port 9 to the input of Port 9.

12 Connect an OC-48 test set to the PTM in port 1 while observing the proper optical power levels listed in Table 9-4, “Attenuation table (pluggable transmission modules)” (p. 9-20).

13 Condition the test set to transmit and receive a STS-48 PRBS test signal.

Result: Observe error-Free Transmission.

14 Inject a single error from the test set.

Result: Test set reports the error.

15 Repeat Step 1 to Step 14 at the other node.

16 Remove fiber and LBOs from Port 9 of both LNW705s.

17 Establish the end to end link on the 10G PTM while observing the proper optical levels listed in Table 9-4, “Attenuation table (pluggable transmission modules)” (p. 9-20). If connecting through the LNW785 go to Procedure , “Integrating the LNW705 into the LNW785” (p. 9-9), otherwise continue.

18 Locate and connect the span fibers to the LNW705 while observing the proper optical levels listed in Table 9-4, “Attenuation table (pluggable transmission modules)” (p. 9-20).

19 Repeat Step 18 at the LNW705 at the other node on the opposite end of the span.

20 Observe test set and verify error-free transmission. If only one test set is available, connect a fiber from the In port to the Out port of the PTM in port 1 at one end. Use the information listed in Table 9-4, “Attenuation table (pluggable transmission modules)” (p. 9-20) to determine the proper LBO/Attenuator.

Note: Test duration may be determined by engineering specification or by the end customer.

21 Disconnect test set(s) and fiber jumper from ports.

22 Remove PTM from LNW705 if necessary and clear any associated alarms by Selecting **Configuration > Update System>Update Inventory**.

23 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Integrating the LNW705 into the LNW785

Description

The output of the LNW705 OTU-2 signal is compatible with the input channels of the LNW785. The procedure below assumes that Step 1 through Step 16 in "Turn up and test the LNW705 muxponder" (p. 9-6) have been completed.

Steps

1 Install the LNW785 into the Alcatel-Lucent 1665 DMX shelf by opening both faceplate latches and seating in the slot while closing the latches.

> **Note:** The LNW785 can be installed in any Function/Growth slot. When the shelf is to be configured as an add/drop, it is recommended that the Growth slots are not used because the passthrough fibers would have to route over the SYSCTL. If the Main slots are not equipped with VLF mains (LNW59, LNW82, LNW504), then the circuit packs in a Function/Growth slot must be the same type.

2 Login to the Alcatel-Lucent 1665 DMX using the WaveStar® CIT.

3 Create OCH Cross-connections
Select **Configuration > OCH Cross-connections** from the System View

4 Select the **Create a new OCH cross-connection** radio button in the OCH Cross-Connection Wizard. Click **Next**.

5 Click the **2-way Add/Drop** radio button from the cross-connection list. Click **Next**.

6 Click **Select** and expand the circuit pack list by clicking the "**+**" next to XM10G/8, highlight **Port 9 OTU-2** and the port will appear on the right side of the screen, click on the **AID** to highlight it then click **Select**.

7 Click **Select** for the Add/Drop port, expand the circuit pack (OMD5/8) and click on the **Port** (the port must match XM10G/8 OTU-2 port) and the port will appear on the right side of the screen, click on the **AID** to highlight it then click **Select**.

8 Click **Next**, then **Finish** and complete the cross-connection by clicking on **Yes** in the confirmation window.

9 Connect fibers from the LNW705 Port 9 to the corresponding channel on the LNW785 while observing proper optical power levels and cleaning procedures.

10 Repeat Step 1 though Step 9 at the remote node.

11 Connect the Transmit fibers to the OTS port on the LNW785 at each end of the span, following proper fiber cleaning procedures.

12 Connect the Receive fibers, while observing optical power requirements and cleaning procedures

13 Observe test set and verify error-free transmission. If only one test set is available, connect a fiber from the In port to the Out port of the PTM in port 1 at one end. Use the information listed in Table 9-4, "Attenuation table (pluggable transmission modules)" (p. 9-20) to determine the proper LBO/Attenuator.

Note: Test duration may be determined by engineering specification or by the end customer.

14 Disconnect test set(s) and fiber jumper from ports.

15 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Connecting the ring (Mains) to the WDMX

Description

This section provides guidance on how to integrate an OC-48/OC-192 into the WDMX. Depending on the Main circuit packs and the port rate, the ring can be integrated through the LNW705 and/or the LNW785. All of the OC-48 Main circuit pack can be integrated into the LNW705, however only the LNW59 and LNW502 can be integrated directly into the LNW785 providing the circuit pack is equipped with one of the compatible PTMs listed in Table 9-1, “Channel/port assignments” (p. 9-17).

Important! The procedures in this section make two assumptions, the first is that the span between LNW785s or the span between the two LNW705s is established while the second is that this is a new turn-up and not on an existing network.

LNW705/OC-48

The LNW705 span is established and tested using “Turn up and test the LNW705 muxponder” (p. 9-6) procedure. In some instances, only one direction may be added to the WDMX circuit pack. Main 1 is always referred to as the West direction, while Main 2 is the East

1 Determine the direction of the Span, Main 1 or Main 2.

2 Install an OC-48 PTM in the assigned port slot. See Appendix E, Table E-1, “Alcatel-Lucent approved pluggable transmission modules” (p. E-11).

Note: The OC-48 PTM is restricted to ports 1, 3, 5, and 7.
Both ends of the circuit must have the PTM installed in the same port.

3 Login to the Alcatel-Lucent 1665 DMX using the WaveStar® CIT.

4 Provision the PTM
Select **Configuration > Equipment** from the System View

5 Click the "**+**" next to XM10G/8 circuit pack to expand the list.

6 Highlight the **Port x** and click **Select**.

7 Set the **Signal type** to match the PTM type, using the pull down window (for example if the PTM is a OC48SR1-I1, set the Signal Type to OC48) and click **Apply**.

8 Connect the fibers from Main 1/Main2 to the PTM in the LNW705 while observing proper optical levels, fiber cleaning procedures and fiber routing in the shelf.

9 Repeat Step 1 to Step 8 at the other end of the circuit.

Result: Once both ends are completed the Mains should go into service and LOS alarms cleared between the nodes.

10 If configuring the other direction, repeat Step 1 to Step 9.

11 Check off the appropriate box in Table I-3, Installation acceptance checklist

END OF STEPS

LNW785/OC192

The LNW785 span is established and tested using the "Turn-up and test the LNW785 8-channel OMD" (p. 9-4) procedure. In some instances, only one direction may be added to the WDMX circuit pack. Main 1 is always referred to as the West direction, while Main 2 is the East

1 Determine the direction of the Span, Main 1 or Main 2.

2 Install an OC-192 PTM in the assigned port slot in the Main circuit pack see Table 9-1, “Channel/port assignments” (p. 9-17).

Note: Only the first 4 wavelengths can be used in the LNW59 and LNW502, PTMs X10G52C5 through X10G55C5.

3 Login to the Alcatel-Lucent 1665 DMX using the WaveStar® CIT.

4 Provision the PTM/OTU-2
Select **Configuration > Equipment** from the System View

5 Click the “**+**” next to Main 1 circuit pack to expand the list.

6 Highlight the **PTM** and click **Select.**

7 Enter the Frequency in the Expected Frequency and click **Apply**, then **Close**.

Note: The frequency is determined by the PTM inserted in Port 9. See the LNW705 column in Table 9-1, “Channel/port assignments” (p. 9-17) for acceptable values.

8 Create OCH Cross-connections
Select **Configuration > OCH Cross-connections** from the System View

9 Select the **Create a new OCH cross-connection** radio button in the OCH Cross-Connection Wizard. Click **Next**.

10 Click the **2-way Add/Drop** radio button from the cross-connection list. Click **Next**.

11 Click **Select** and expand the circuit pack list by clicking the "**+**" next to Main 1, highlight **Port 1 OTU-2** and the port will appear on the right side of the screen, click on the **AID** to highlight it then click **Select**.

12 Click **Select** for the Add/Drop port, expand the circuit pack (OMD5/8) and click on the **Port** (the port must match Main 1 OTU-2 port) and the port will appear on the right side of the screen, click on the **AID** to highlight it then click **Select**.

13 Connect the fibers from Main 1/Main2 PTM to the corresponding channel in the LNW785 while observing proper optical levels, fiber cleaning procedures and fiber routing in the shelf.

14 Repeat Step 1 to Step 13 at the other end of the circuit.

Result: Once both ends are completed the Mains should go into service and LOS alarms cleared between the nodes.

15 If configuring the other direction, repeat Step 1 to Step 14.

16 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Removing provisioning and equipage from the LNW705 and LNW785

Description

This section provides procedures on how to properly remove provisioning from the Alcatel-Lucent 1665 DMX shelf once testing is completed and the equipment/ports are no longer needed. Locate the procedure below to remove the equipment and return the Alcatel-Lucent 1665 DMX back to the original status.

Deleting the OCH cross-connection

1 Login to the Alcatel-Lucent 1665 DMX using the WaveStar® CIT.

2 Retrieve OCH Cross-connections.
Select **View > OCH Cross-connections** from the System View

3 Click the "**+**" next to OMD5/8 circuit pack to expand the list.
Record the list of ports to be used when deleting OCH cross-connections. If there are more than one OMD5/8 circuit packs installed, click on the "**+**" next to the others to document the list of OCH cross-connection for the remaining circuit packs.

4 Delete OCH Cross-connections
Select **Configuration > OCH Cross-connections** from the System View

5 Select the **Delete an existing OCH cross-connection** radio button in the OCH Cross-Connection Wizard. Click **Next**.

6 Click the "**+**" next to OMD5/8 circuit pack to expand the list

7 Highlight one of the OCH cross-connections from the list recorded in Step 3 and click **Next**.

8 Highlight **All Legs** and click **Next**, **Finish,** then **Yes**.

9 Repeat Step 5 through Step 8 for all remaining OCH cross-connections recorded in Step 3.

10 End the OCH cross-connection Wizard session by clicking **Close**.

END OF STEPS

Delete LNW785 circuit pack

1 Remove the LNW785 circuit pack from the Alcatel-Lucent 1665 DMX shelf.

2 Update the Alcatel-Lucent 1665 DMX inventory.
Select **Configuration > Update System > Update Inventory**

3 Click **Yes** to acknowledge the request.

END OF STEPS

Delete low-speed PTM

1 Remove Low Speed PTM from LNW705 by reversing the procedure in Appendix E, "Install pluggable transmission modules" (p. E-3).

2 If removing the LNW705 from the shelf proceed to Delete LNW705 circuit pack (p. 9-16), otherwise provision the port back to Signal Type Not Available.
STNA Select **Configuration > Equipment**

3 Click the "**+**" next to the XM10G/8 that had the PTM installed to expand the list.

4 Locate the port where the PTM was installed and highlight the port and click **Select**.

5 After the screen on the right appears, provision the Signal Type to STNA by using the pull down arrow and select **STNA** then **Apply** then **Close**.

END OF STEPS

Delete LNW705 circuit pack

1 Remove the LNW705 circuit pack from the Alcatel-Lucent 1665 DMX shelf.

2 Update the Alcatel-Lucent 1665 DMX inventory
Select **Configuration > Update System > Update Inventory**

3 Click **Yes** to acknowledge the request.

END OF STEPS

Table 9-1 Channel/port assignments

Apparatus Code	Channel	LNW705	LNW785 OCH	Frequency
X10G52C5	52	9520	9520	195200 GHz
X10G53C5	53	9530	9530	195200 GHz
X10G54C5	54	9540	9540	195200 GHz
X10G55C5	55	9550	9550	195200 GHz
X10G56C5	56	9560	9560	195200 GHz
X10G57C5	57	9570	9570	195200 GHz
X10G58C5	58	9580	9580	195200 GHz
X10G59C5	59	9590	9590	195200 GHz

LNW705 XM10G/8 port guidelines

The following table list the PTM restrictions and guidelines.

Table 9-2 XM10G/8 PTM port guidelines

Port Number	Signal Type					
	OC-3/STM1	OC-12/STM4	OC-48/STM16	1Gbe	1GFC	2GFC
1	Yes	Yes	Yes	Yes	Yes	Yes
2	Yes	Yes	No	Yes	Yes	No
3	Yes	Yes	Yes	Yes	Yes	Yes
4	Yes	Yes	No	Yes	Yes	No
5	Yes	Yes	Yes	Yes	Yes	Yes
6	Yes	Yes	No	Yes	Yes	No
7	Yes	Yes	Yes	Yes	Yes	Yes
8	Yes	Yes	No	Yes	Yes	No

Table 9-3 Attenuation table

Optics	Circuit Pack	Received Power (dBM)	LBO (dB)
OC-48 (High Speed)	LNW27 LNW29 LNW32	+3.0 to -9.0 -9.0 to -29.0	15 0
	LNW76	-3.0 to -18.0	0
Low-Speed Optics (OC-3, OC-12, OC-48)	LNW31 (OC-48)	0.0 to -18.0	0
OC-12 (high speed)	LNW48	-8.0 to -28.0	0
	LNW50	+2.0 to -7.0	10
		-7.0 to -30.5	0
	LNW54	+2.0 to -7.0	10
		-7.0 to -29.0	0
OC-192 (high speed)	LNW56	+2.0 to -1.0	5
		-1.0 to -14.0	0
	LNW58	-1.0 to -11.0	0

Table 9-4 Attenuation table (pluggable transmission modules)

SFP/XFP optics	Circuit Pack	Received Power (dBM)	LBO (dB)
S15512	LNW37, LNW45, LNW55, LNW82, LNW705	-8.0 to -23.0	0
OC-3 IR1-I1	LNW37, LNW45, LNW55, LNW82, LNW705	-8.0 to -28.0	0
OC-3 LR1-I1	LNW37, LNW45, LNW55, LNW82, LNW705	0.0 to -5.0	15
		-5.0 to -10	10
		-10 to -34.0	0
OC-12 IR1-I1	LNW49, LNW55, LNW82, LNW705	-8.0 to -28.0	0
OC-12 LR1-I1	LNW49, LNW55, LNW82, LNW705	+2.0 to -5.0	15
		-5.0 to -15	10
		-15 to -28.0	0
OC-12 LR2-I1	LNW49, LNW55, LNW82	+2.0 to -5.0	15
		-5.0 to -15	10
		-15 to -28.0	0
OC-48 SR-I1	LNW55, LNW62, LNW82, LNW202	-3.0 to -18.0	0
OC-48 LR-I1	LNW55, LNW62, LNW82, LNW202, LNW705	+3.0 to -5.0	15
		-5.0 to -10.0	10
		-10.0 to -15.0	5
		-15.0 to -27.0	0
OC-48 LR2-I1	LNW55, LNW62, LNW82, LNW202, LNW705	+3.0 to -5.0	15
		-5.0 to -10.0	10
		-10.0 to -15.0	5
		-15.0 to -27.0	0
OC192SR1-C1	LNW59, LNW502	-1.0 to -11	0

SFP/XFP optics	Circuit Pack	Received Power (dBM)	LBO (dB)
OC192IR2-C1	LNW59, LNW502	+2.0 to -1.0	5
		-1.0 to -14	0
OC192LR2-C1	LNW59, LNW502	+4.0 to 0.0	15
		0.0 to -7.0	10
		-7.0 to -24.0	0
S622CxxEL	LNW37, LNW45, LNW49, LNW55, LNW82, LNW705	+5.0 to -10.0 -10.0 to -29.0	0 0
S2DxxC6 series	LNW55, LNW62, LNW82, LNW202	+3.0 to -5.0	15
		-5.0 to -10.0	10
		-10.0 to -15.0	5
		-15.0 to -27.0	0
X10GxxC5* series	LNW59, LNW502, LNW705	-8.0 to -24	15

Notes:

* LNW59 and LNW502 do not use X10G56C5, X10G57C6, X10G58C8 and X10G59C5

Part IV: Supplementary information and installation checklist

Overview

Purpose

This section provides supplementary information that is useful when installing the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) system and using this Installation Manual.

Contents

This section is organized into the following sections:

A Fiber cleaning

Overview

Purpose

This appendix describes the Alcatel-Lucent recommended method for the cleaning and inspection of optical connectors using specific tools and materials that have been proven to be effective in the assembly and testing of optical transmission equipment. It is critical that connector faces are clean and free from particular contamination to assure proper performance and reliability of lightwave systems. With the modern high speed, high power, and wider bandwidth optical transmission systems, clean connectors along the optical path are essential for successful operation.

Contents

This appendix provides information on the following topics:

Objectives

This chapter provides information to perform the following:

1. Properly clean an optical connector.
2. Inspect an optical connector for cleanliness.

Related information

A course on connector cleaning and the connector inspection process is now offered through Alcatel-Lucent University, Course Code: LMC200H “Understanding Fiber Optic Cleaning, Inspection and Testing.” To learn more about this course, consult your local Alcatel-Lucent Account Representative.

Equipment requirements and recommendations

Description

For proper cleaning, the following equipment and materials are recommended:

Table A-1 Required and recommended equipment and materials

Product	Model/ Description	Comcode	ITE #	Installation Order #
Optical Fiber Scope	Noyes OFS 300-200X	408197028	ITE-7129	33712900
2.5mm Universal adapter cap	For use with the Noyes OFS 300-200X	408197044	ITE-7129D1	33712901
1.25mm Universal adapter cap	For use with the Noyes OFS 300-200X	408197069	ITE-7129D2	33712902
Video Fiber Scope[1]	Noyes VFS-1	TBD	TBD	TBD
Individual presaturated alcohol wipes	99% pure isopropyl alcohol	901375147	ITE-7136	33713600
CLETOP Cleaning Cassette	Type A Reel	901375154	ITE-7137	33713700
CLETOP Cleaning Cassette Replacement Reel	Type A Reel	901375014	ITE-7137 D1	33713701

Product	Model/ Description	Comcode	ITE #	Installation Order #
Luminex Stick port cleaners	1.25 mm	901375030	ITE-7134	33713400
Luminex Stick port cleaners	2.5 mm	901375022	ITE-7135	33713500
Luminex Cloth	5.5” x 5.5”	408201226	R6033	23603300

Notes:

1. This equipment may not be necessary at all locations. It is to be used when the ports need to be verified for cleanliness. If care is exercised when cleaning fibers, the video scope may not be needed.

Note: The equipment and material listed above has been tested and is proven effective when used in conjunction with this procedure. Substitution of equipment or materials is at the discretion of the user and is not recommended.

Safety instructions

Description

WARNING

Laser hazard

Never view an energized optical cable with the naked eye or with an optical magnifying instrument. Disconnected or separated optical connectors may emit invisible laser radiation and direct exposure can severely injure the eye. If inspecting the endfface of a connector with a fiberscope, be absolutely certain that the system is deactivated.

WARNING

Noxious substance hazard

Alcohol is flammable and is harmful if swallowed, inhaled or absorbed through the skin. Keep alcohol away from heat, sparks, or flame. Avoid contact with eyes, skin and clothing.

Cleaning/inspecting optical connectors

Introduction

The procedure that follows utilizes the “Wet/Dry” method for connector cleaning. This method first applies a “wet” solvent such as high purity alcohol to the connector endface to dissolve/remove any organic particulate or oily films, followed by a “dry” double clean wipe using the CLETOP cleaning cassette.

This procedure is recommended for connector ferrules 2.5 mm and 1.25 mm in diameter associated with ST, SC, FC, and LC connectors. The ferrule of a fiber optic connector consists of a ceramic or stainless steel cylinder with a hole located longitudinally down the center of its axis, allowing enough tolerance for a fiber to pass through.

All optical connectors should be cleaned prior to being connected. Keep the protective ferrule dust cap on the connector until initiating the cleaning process.

Cleaning procedure

The following cleaning procedure is acceptable for field service/installation activities:

1 Remove the dust cap from the connector ferrule, thus exposing the connector endface.

2 Open an individual foil packet of pre-saturated isopropyl alcohol (99% pure) wipe.

See Figure A-1, “Cleaning the ferrule endface” (p. A-5).

Grasp the connector housing and place the connector ferrule endface perpendicular to the alcohol wipe.

Drag it against the wipe three (3) times in a figure eight pattern. This action applies the alcohol solvent to the endface and initially loosens and scrubs away organic/solid contaminates.

Figure A-1 Cleaning the ferrule endface

3 If a CLETOP cassette cleaner is not available, proceed with Step 7. Otherwise, hold the CLETOP cassette cleaner in the palm of your hand with the cassette shutter door facing up.

See Figure A-2, “CleTop cleaner” (p. A-6).

Rotate the cassette lever all the way down with your thumb. Do not release the lever. The lever advances the “dry” Luminex cleaning cloth inside the case and simultaneously opens the shutter. The CLETOP cassette shutter door is now open and ready for cleaning the connector.

Figure A-2 CleTop cleaner

4 Insert and press the connector ferrule endface perpendicular against the cleaning cloth in the first of two slots of the cleaner.

See Figure A-3, “Acceptability criteria for fiber cleaning” (p. A-8).

Drag it down (in the direction indicated by the arrows on the cleaner). Make certain not to release the lever of the cassette.

5 Lift the connector from the first slot and rotate it 90 degrees and repeat the downward motion using the second slot. Be sure the ferrule is pressed snug against the cleaning cloth while dragging the ferrule to assure the proper cleaning action.

6 Release the cassette lever allowing the shutter door to close to its initial position. Continue with Step 5.

7 Wrap a Luminex cleaning cloth around the ferrule and rotate the connector housing, cleaning the outside periphery of ferrule.

Follow this by folding an unused portion of the cloth over the end of the ferrule endface and then with light pressure from the thumb, slightly drag the cloth from the center of the ferrule to the edge while rotating the connector 360 degrees. If the Luminex cleaning cloth is not available, a lint free cleanroom optic wipe can be used. The Luminex cleaning cloth is washable and can be used multiple times, optic wipes are single use and disposable.

8 Inspect the connector for cleanliness. If necessary, repeat the cleaning process.

See "Connector inspection" (p. A-7).

END OF STEPS

Connector inspection

After cleaning the connector, inspect the ferrule endface to ensure that it is free from any particulate contamination using an optical fiber inspection scope of at least 200X magnification. When using an optical fiber scope (for example, the Noyes OFS 300-200X) exercise extreme caution to assure fiber being examined is de-energized.

WARNING
When using an optical power meter to verify the connector and fiber to be clean, take special precaution to make sure the no power is being emitted from the fiber before viewing.

1 Follow the instructions in the manual provided with the Optical Fiber Scope to view the ferrule endface of the fiber under inspection.

2 The visual area of the ferrule endface (ferrule and fiber) as observed by the inspection system/scope should be free of any contaminates. See Figure A-3, "Acceptability criteria for fiber cleaning" (p. A-8).

Repeat the Cleaning procedure if the fiber endface does not meet the following requirements:

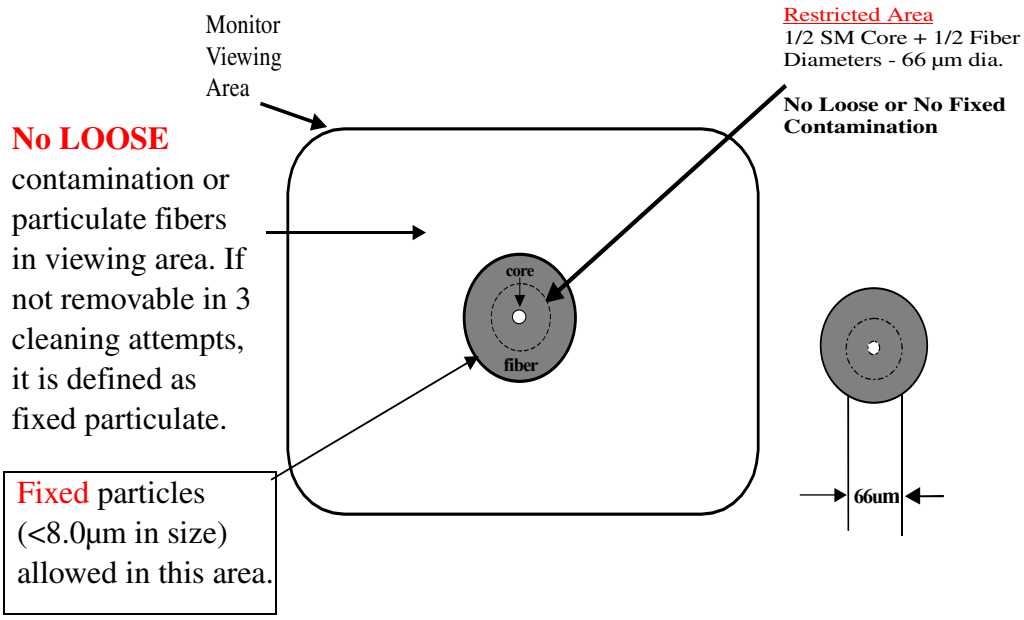
Requirement: No fixed type of contamination (contaminates that remain at the same location after three wet-dry cleaning cycles), regardless of size, is allowed in the restricted area of the glass fiber endface.

Requirement: The restricted area is defined as ~66 microns (µm) diameter for both singlemode and multimode fibers.

Requirement: No chips, cracks or scratches are allowed near the core of the glass fiber endface.

Requirement: No large floating (loose) contaminates are allowed on the glass fiber and ceramic ferrule endface.

Figure A-3 Acceptability criteria for fiber cleaning



3 After the connector has been verified to be cleaned, it should be immediately inserted into the adapter buildout of the optical component. This will assure maximum cleanliness and effectiveness of the connector.

4 If the cleaned connector cannot be immediately connected to a corresponding adapter, the connector ferrule must be protected with a connector dust cap. Before placing the cap on the ferrule, make sure the cap is clean. This can be accomplished by inserting a CLETOP stick cleaner (swab) of the same inside diameter as the cap (either 2.5 or 1.25 mm) and rotate the stick 360 degrees three (3) times. Following this procedure, carefully place the cap over the ferrule. When the cleaned connector is ready for assembly, it should be re-inspected for cleanliness prior to connection.

END OF STEPS

Fiber adapters or circuit pack connectors

During testing and/or trouble shooting activities it may be necessary to clean the optical buildout adapter or the circuit pack connector. The following procedure is recommended.

NOTICE

Do not attempt to clean ports equipped with yellow Light guide BuildOut (LBO) attenuators. Attenuators contain a thin glass lens that is extremely fragile. The LBO will be damaged if cleaned using this method.

1 Using the appropriate CLETOP stick cleaner (2.5 mm for SC, ST, and FC connectors, 1.25 mm for LC connectors) dampen the stick cleaner with Ethyl alcohol using the alcohol wipe. Insert the stick cleaner into the adapter rotating the stick 360 degrees while inserting. Push/rotate stick until the stick cleaner makes contact with the connector. Apply slight pressure upon contact and rotate stick 360 degrees at least three (3) times.

2 Remove the stick cleaner rotating it upon removal.

3 Using a dry CLETOP stick cleaner of appropriate diameter, repeat the above cleaning procedure. This procedure will clean the side walls of the adapter and the endface of the circuit pack connector.

4 Gently insert the Video Fiber Scope probe into the port until the fiber ferrule comes into view.

5 Verify that the fiber ferrule is clean. Repeat Step 1 through Step 3 if the fiber does not meet the requirements specified in "Connector inspection" (p. A-7).

END OF STEPS

Cleaning pluggable optics modules

Purpose

This task describes the Alcatel-Lucent recommended method for cleaning pluggable optics modules using specific tools and materials that have been proven to be effective in the assembly and testing of optical transmission equipment.

Note: Pluggable optics modules are shipped with a water-tight process plug installed into the optical ports to maintain cleanliness during storage and/or transportation. It is recommended that the process plug be kept in place to maintain cleanliness until the optical fiber is connected. With proper care and handling, cleaning the pluggable optics modules should not be necessary.Because a major source of contamination is often a contaminated mating connector, it is extremely important to clean the connector ferrule end surface each time before making connections.

Steps

Complete the following steps to clean a pluggable optics module.

1 Remove the protective process plug from the pluggable optics module. Keep the process plug clean until reinstalled later, if required.

CAUTION

Corrosive substance hazard

*When performing this step hold the canned dry nitrogen or air **upright**. If the canned dry nitrogen or air is held upside down, inert gas may be released onto the connector surface. The inert gas leaves contamination on the connector surface that cannot be removed.*

2 While holding the canned dry nitrogen or air, position the tip of the nozzle extension as close as possible, but not close enough to make physical contact, to the sleeve inside the port receptacle and make three consecutive short blows (approximately one second each).

Repeat this step for the other port.

3 Using the stereo zoom scope, visually inspect the optics module. If required, repeat Step 2 up to two more times then go to the next step.

NOTICE

This step should only be performed on the transmit (TX) port if the air blows did not work. Do not perform this step on the receive (RX) port. The receive (RX) port contains a lens for focusing a wide input. The lens is more easily scratched than cleaned.

4 If required, insert a CLETOP stick into the transmit (TX) port sleeve until vertical force can be applied to the fiber stub end surface. Rotate the CLETOP stick five full rounds.

5 Using the stereo zoom scope, visually inspect the optics module. If required, repeat Step 4.

NOTICE

It is recommended that the process plug be installed into the optical ports on the pluggable optics module to maintain cleanliness until the optical fiber is connected.

6 If required, reinstall the process plug into the optical ports to maintain cleanliness.

END OF STEPS

B Installing fiber connectors and LBOs

Overview

Purpose

This appendix provides procedures for installing and removing Line Build Out units (LBOs) and fiber connectors onto input and output ports found on the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) optical circuit packs.

Contents

This appendix provides information on the following topics:

Objectives

This appendix provides information to perform the following:

- Install and remove LC-type LBOs onto and from LC-type ports.
- Install and remove LC-type fiber connections.

Fiber cleaning

See Appendix A, “Fiber cleaning” for fiber cleaning information. Do not attempt to clean LBOs as they may be damaged by a cleaning attempt. Discard suspect LBOs and replace with a new unit.

LBOs

General

LBOs are fixed-value optical attenuators that mate into mounting blocks and provide a specific connector interface (LC, ST, FC or SC-type) for external fiber connections. The Alcatel-Lucent 1665 DMX optical circuit packs are equipped with LC-type connector ports designed for use with LC-type LBOs and fiber connectors. Dust caps should be applied on all LBOs when not installed in connector ports.

LC-type connector port

The LC-type connector port will only accept LC-type LBOs for external fiber connection.

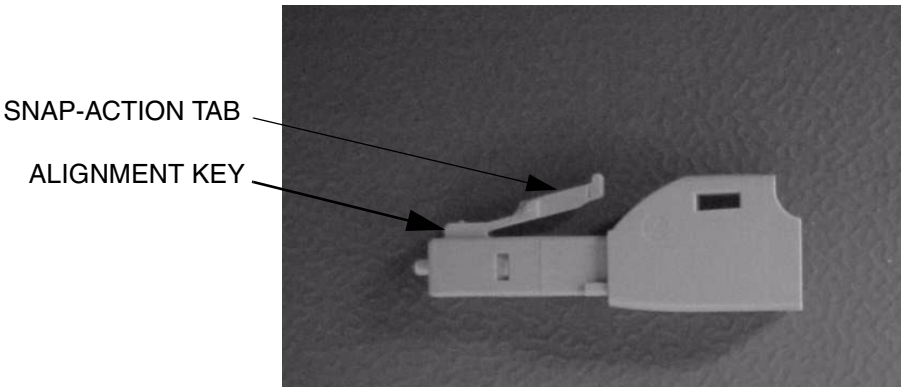
Figure B-1 LC-Type Connector Ports on Circuit Pack

LC-type LBO

Alcatel-Lucent 1665 DMX utilizes Alcatel-Lucent's state-of-the-art *AllWave ADVANTAGE*™ Fiber Optic Attenuators. These attenuators reduce optical power from the transmitter that can result in over-saturation of the receiver, have low reflection to meet stringent system requirements, and are backward-compatible with existing transmission systems. Unique to the AllWave ADVANTAGE optical connectivity solution (OCS), the

new *LC*™ optic attenuators are designed to provide flat spectral loss across the full spectrum, allowing the attenuators to be used in the 1300-nm, 1400-nm, and 1500-nm bands.

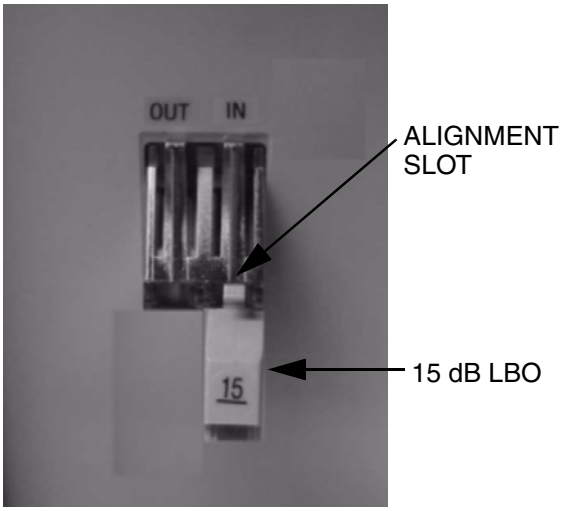
Figure B-2 LC-Type LBO



Assembly of LC-type LBO into LC block

The LC-type LBOs are installed into the LC-type connector by aligning the alignment key with the slot in the connector port and pushing the LBO into the port until it snaps into place.

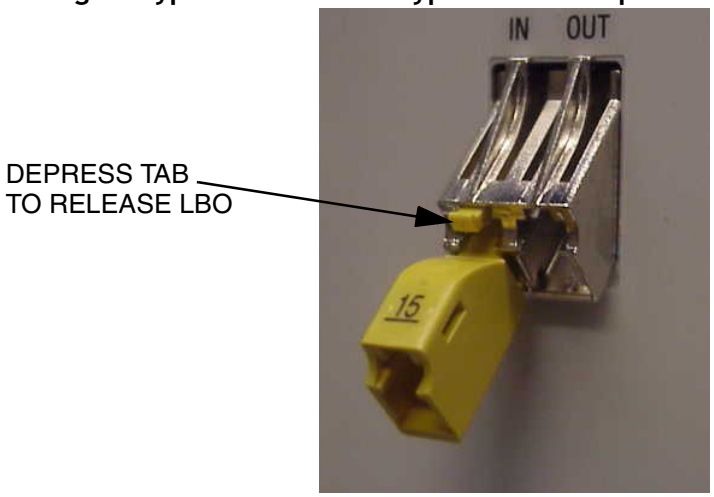
Figure B-3 LC-type LBO inserted Into LC-type connector port



Removal of LC-type LBO from LC block

The LC-type LBOs are removed from the LC-type connector port by depressing the tab to release the LBO and then pulling straight out.

Figure B-4 Removing LC-type LBO From LC-type connector port



Fiber connections

General

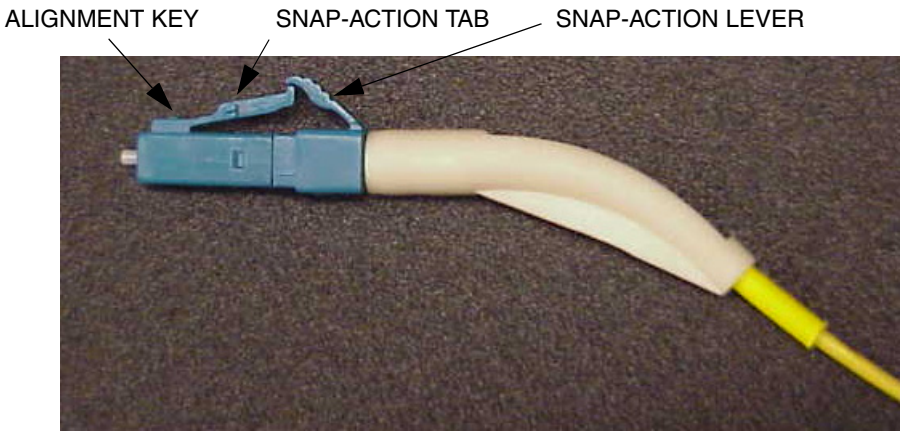
Alcatel-Lucent 1665 DMX uses *AllWave ADVANTAGE*™ Lightguide Jumpers, part of Lucent's *AllWave ADVANTAGE*™ Optical Connectivity Solution (OCS). These jumpers contain a boot angled at 40 degrees, allowing the jumpers to dress appropriately into the fiber tray. The angled boot eliminates projection outside the front of the shelf assembly.

All fiber connectors should be cleaned and inspected before assembling into connector ports. See Appendix A, "Fiber cleaning" for Fiber Cleaning information. Dust caps should be applied to all fiber connectors when not installed in a connector port.

LC-type connections

LC-type fiber connectors use a snap-action, lever-tab locking method to join the fiber connector to the port connector.

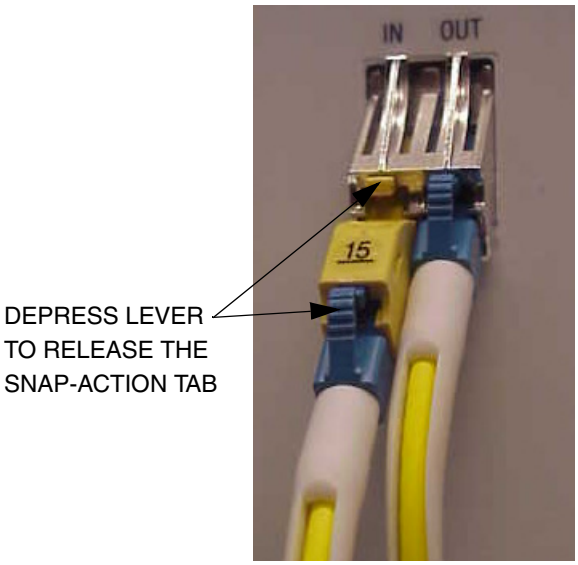
Figure B-5 LC-Type fiber connector



The LC-type fiber connector is assembled onto an LC-type connector port of a circuit pack or LC-type LBO by aligning the alignment key with the slot in the connector port and pushing the connector into the port until it snaps into place.

The LC-type fiber connector is removed from a connector port by depressing the snap-action lever to disengage the fiber connector.

Figure B-6 LC-type fiber connection



C Backplane pin replacement

Overview

Purpose

This appendix provides information and the procedures used when a connector and/or pin on the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) backplane has been bent or broken.

Contents

This appendix provides information on the following topics:

Objectives

This appendix provides information and procedures to do the following:

- Identify a bent or broken pin
- Determine the correct replacement pin and pin kit
- Straighten bent pin
- Replace broken pins

Pin and connector background

Description

This section describes the procedures for the repair/replacement of the press-fit connector pins used on the backplane of the Alcatel-Lucent 1665 DMX shelf. Trouble clearing procedures may lead you to inspect the backplane for damaged connectors.

Circuit packs are plugged into METRAL™ signal pin connectors which have been press-fit into the backplane. A plastic shroud is included with the connectors to protect the pins. The signal pin press-fit terminals in these connectors my be replaced individually if they have been damaged beyond simple repair methods.

D-subminiature connectors

Interface cabling to and from the Alcatel-Lucent 1665 DMX shelves is connected through D-Subminiature connectors which have been press-fit into the backplane. Should these connectors be damaged beyond simple repair methods, contact your next level of support for the replacement procedure.

RJ45 jacks

Interface cabling to and from the Alcatel-Lucent 1665 DMX shelves is connected through RJ45 connectors (jacks) which have been press-fit into the backplane. Should these jacks be damaged beyond simple repair methods, contact your next level of support for the replacement procedure.

Shelves and backplanes

The Alcatel-Lucent 1665 DMX has its connectors and terminal identifiers stenciled on the back surface for identification of location or position. The stenciling can only be seen when the back cover is removed.

Pins are identified by a column and row position on the backplane. D-Subminiature connectors are identified by their designation and J-number. All the METRAL™ pins used on the Alcatel-Lucent 1665 DMX shelves have the same tail length of 4.30 mm (0.169 in.).

Table C-1, “Backplane locations of METRAL pins” (p. C-3) show the location and type of METRAL™ pins on the Alcatel-Lucent 1665 DMX backplane.

Table C-1 Backplane locations of METRAL pins

Row	Column	Type	Mating Length (mm)	Tail Length (mm)
001, 154, 156, 162	GND	Signal Pin	5.75	4.30
001, 154, 156, 162	a, b, c, d, e	Signal Pin	8.00	4.30
All others	All others	Signal Pin	5.75	4.30

Repair kits and tools

Repair kits

For the repair or replacement of METRAL signal pins, use one of the following repair kits:

- Berg Electronic MT370-01 Shelf Level Press-Fit Repair Kit
- IMDARC R-6004 Metral Pin Repair Kit - Comcode 407959881

This kit include the tools, parts and instructions for repair and replacement of signal pins.

Replacement pins

Replacement pins are available. These pins are defined by the mating length extending beyond the inside of the plastic shroud and by their tail length for press-fitting into the backplane. The tail length includes a compliant press-fit section needed to achieve a gas-tight connection in four contact areas. All the METRAL pins used on the Alcatel-Lucent 1665 DMX shelves have the same tail length of 4.30 mm (0.169 in.).

Additional replacement signal pins may be ordered in packages of 100 by the part number shown in Table C-2, “Metral pins” (p. C-3).

Table C-2 Metral pins

Type	Mating Length (mm)	Berg Part #
Ground	5.75	88929-502
Signal Pin	5.75	88929-502
Signal Pin	8.00	88929-519

Simple repair methods

Precautions

NOTICE

These procedures should be done with the shelf out of service and powered down to ensure no further damage to the equipment or to the person doing the repair. If service cannot be removed or rerouted, contact your next level of support before proceeding.

CAUTION

ESD hazard

Proper ESD precautions must be followed.

Make sure that you have adequate space to access the backplane area and that you have good light sources so that you can see what you are doing.

Visual examination

Visually examine the connector pins to determine which pins may have been damaged and the degree of the damage. Pins that have been slightly bent may be carefully restored to their initial straight position. Examine both sides of the backplane to determine if the press-fit termination has been disturbed. These pins depend on an undisturbed interference fit between the terminal body and the plated-through hole in the backplane to create a reliable connection.

If the visual examination suggests that the connector pins are loose or are damaged beyond repair, replace the connector pin.

NOTICE

This is a delicate procedure. Take your time to gently straighten the pin in several small steps. Large movements may damage adjacent pins.

METRAL backplane pins

Follow the instructions and use the tools provided in the MT370-01 Shelf Level Press-Fit Repair Kit to straighten METRAL pins which may have been bent out of position.

Guide pins and keying pins

If a stainless steel guide pin or keying pin has been bent out of alignment, attempts to straighten it may damage the backplane. The recommended alternative is to replace the bent pin.

D-subminiature pins

The D-subminiature connectors on the Alcatel-Lucent 1665 DMX backplane are all of the receptacle type. These connectors are designated as jacks and not as plugs. The individual connector terminals are protected somewhat by the molded plastic insert inside the connector shell. It is unlikely that these terminals would be bent in the manner that the exposed pin terminals of a plug might be bent. The damage concern for these receptacle terminals is that they may be "crushed" or otherwise distorted out of shape. Attempts to "straighten" these terminals may result in fracturing them. If a receptacle terminal has been damaged to the extent that the mating plug connector cannot be connected, then the recommended alternative is to replace the entire backplane.

RJ45 jacks

The RJ45 connectors (jacks) are press-fitted into the Alcatel-Lucent 1665 DMX backplane. Should these jacks be damaged beyond simple repair methods, contact your next level of support for the replacement procedure.

Replacement methods

Background

Connector pins are designed to withstand a considerable removal force. An impact-type tool is used to generate a controlled removal force. Similarly, proper insertion of a press-fit connector pin is done with an impact-type tool to control the insertion forces and not damage adjacent pins.

Precautions

Read the following Important statements before proceeding:

Note: Any press-fit connector pin may be removed and replaced **one time** in the Alcatel-Lucent 1665 DMX backplane. A second removal and replacement in the same plated-through hole may not meet the long-term reliability objectives. If a replacement is needed for a previously replaced connector pin, contact your next level of support before proceeding.

Note: Protect the surrounding area from any debris which may be generated during the pin removal and replacement.

Steps

Use the procedure below to replace pins when required:

1 Verify that the problem cannot be fixed using a simple repair procedure.

2 Secure the proper tool kit.

3 Read the tool kit instructions before beginning.

4 Plan and write out a “Method of Steps” specific to your location.

5 Follow the instructions provided to remove the damaged pin.

6 Install the replacement pin.

7 Verify that the new pin is securely in the backplane.

8 If the replacement is not successful, contact your next level of support.

END OF STEPS

Guide and keying pin procedure

If it becomes necessary to replace Guide or Keying Pins, contact your next level of support for tooling, replacement parts and detailed replacement procedures. The replacements will need to installed with screws and washers.

D-subminiature pin procedure

If it becomes necessary to replace either the D-Subminiature pins or connector, contact your next level of support for detailed replacement procedures.

RJ45 jacks

If it becomes necessary to replace a RJ45 connector, contact your next level of support for the replacement procedure.

D Fiber labeling

Overview

Purpose

This chapter describes the labeling of the fiber.

Contents

This chapter contains the following.

Fiber description

Fibers

There are three different types of single-mode fiber used with the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) system, simplex blue fiber, simplex yellow fiber, and the customer's fiber, and two types of multi-mode fiber used with the Alcatel-Lucent 1665 DMX, multi-mode simplex gray fiber and the customer's multi-mode fiber.

Gray fiber

Gray fiber is made up of a multi-mode gray colored fiber equipped with LC connectors at both ends. The Gray Fibers come in different lengths as well as custom lengths. The length is given on the protection boot of the LC connector.

These fibers are used to make connections from the circuit pack to the LGX. Installation is covered in 2, 4, 5, and 8.

Yellow fiber

Yellow fiber is made up of a single-mode yellow colored fiber equipped with LC connectors at both ends. The Yellow Fibers come in different lengths as well as custom lengths. The length is given on the protection boot of the LC connector.

These fibers are used to make connections from the circuit pack to the LGX. Installation is covered in 2, 4, 5, and 8.

Outside fiber

Outside fiber is the fiber connecting the customer equipment to the Alcatel-Lucent 1665 DMX. Depending on the customers specifications, these fibers may be any combination of SC, FC, or ST connectors. The length of these fibers depends on the system interface setup. This fiber is usually referred to as the ***Outside Bay or Plant Fiber***.

Outside Bay Fiber management should be specified by the customer. It is beyond the scope of this document to specify the route or dressings that the fiber should take once it leaves the equipment bays.

Precautions

NOTICE

Equipment Damage

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

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

Single-mode fiber testing requirements

All fibers should be tested after they are installed as follows:

- All fibers should be tested after installation, but prior to turn-up
- Before fibers are tested, they should be labeled properly and all cable tags should be removed.
- A 1310-nm or 1550-nm test source and an ITE# 7116 (or equivalent) optical power meter should be used to perform all tests.
- The light source shall first be measured for a reference point/baseline.
- No fiber jumper may have a measured loss of more than 2 dB.

Fiber labels

Introduction

If pre-printed labels are not available, use a label-maker to create labels for each end of each fiber. The label should include:

- Rack location
- Circuit pack
- Port
- Direction (IN,OUT)

Labeling the fibers

To apply the labels to the connectors, use the following procedure.

1 Remove the appropriate label from the backing sheet or the label maker.

2 Apply the label to the strain relief boot, close to the body of the LC connector.

3 Adhere the end of the label with the printed text first.

4 The label must be oriented perpendicular to the main axis of the connector.

5 Wrap the label around the boot so that the second wrap is directly on top of the first wrap. (The label will wrap around the boot approximately two times). The text is printed diagonally on the label so that it can be read when applied the correct way.

Note: Do not apply the label diagonally to the boot. The label must wrap directly on top of itself for the adhesive to work.

END OF STEPS

E Pluggable transmission module installation

Overview

Purpose

This chapter describes how to insert a pluggable transmission module (PTM) into a Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) circuit pack. PTMs are sometimes referred to as SFP (small form-factor pluggable) modules.

NOTICE

Laser Safety

When connecting fiber loops between the IN and OUT ports on optical circuit packs, always connect to the IN port first and then the OUT port. This will prevent any optical radiation from being present at the fiber end.

Contents

This chapter contains the following.

Pluggable transmission modules (PTM)

Description

This section contains the instructions for the installation of the pluggable transmission modules.

1 See the engineering job specification. Identify the proper circuit pack type and the port socket being equipped with the pluggable module. Make sure the transmission rate (OC-3, OC-12, OC-48, OC-192, 100Base Ethernet GbE, FICON) matches the rate of the PTM See Table E-1, "Alcatel-Lucent approved pluggable transmission modules" (p. E-11).

Note: Pluggable modules are shipped with a dust plug installed into the ports to maintain cleanliness during storage and/or transportation. It is recommended that the dust plug be kept in place to maintain cleanliness. With proper care and handling, cleaning the pluggable modules should not be necessary.

2 Check the ports for cleanliness and clean the pluggable module if necessary. See Appendix A, "Fiber cleaning".

NOTICE
Never mechanically clean the receive (RX) port. Air blows only should be used on the receive (RX) port. The receive (RX) port contains a lens for focusing a wide input. The lens is more easily scratched than cleaned.

3 Insert the pluggable module in the required socket of the circuit pack faceplate, then wiggle the module to verify that it is locked in the socket. See "Pluggable transmission modules (PTM)" (p. E-1). Verify that all unused sockets are equipped with dust plugs.

Note: If installing PTMs in a LNW705, see Table 9-2, "XM10G/8 PTM port guidelines" (p. 9-18) for installation guidelines.

4 Repeat Step 1 through Step 3 if more modules need to be installed.

5 Check off the appropriate box in Table I-3, Installation acceptance checklist.

END OF STEPS

Install pluggable transmission modules

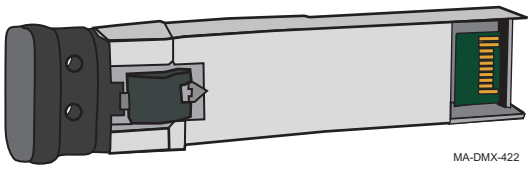
Steps

Complete the following steps to install pluggable transmission modules in a circuit pack that has already been installed in a shelf.

1 Determine the circuit pack and socket being equipped with the pluggable transmission module.

2 Hold the connector/latch-end of the module in your left hand with the gold fingers facing you. The module should be positioned in manner similar to Figure E-1, “Pluggable transmission module with dust plug (optical PTMs only)” (p. E-3).

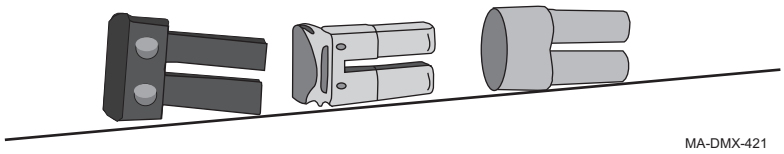
Figure E-1 Pluggable transmission module with dust plug (optical PTMs only)



Note: Do not remove the dust plug unless you are ready to connect fibers or if you need to clean the module.

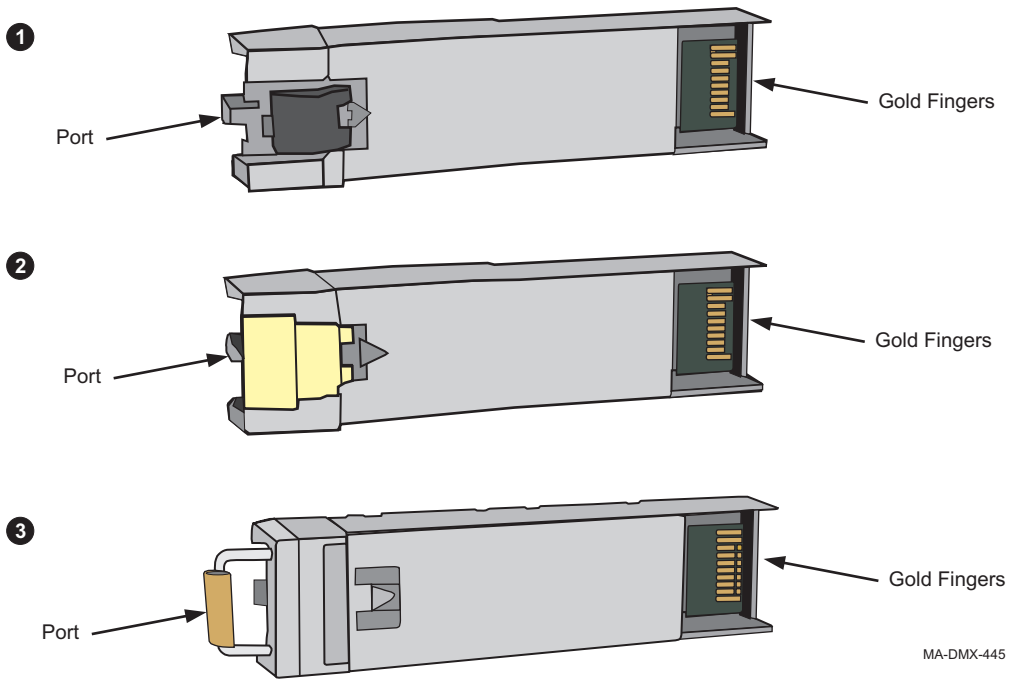
Dust plugs (Optical PTMs only) There are a variety of different types of dust plugs. Any of the following examples could be similar to the dust plug in your pluggable transmission module.

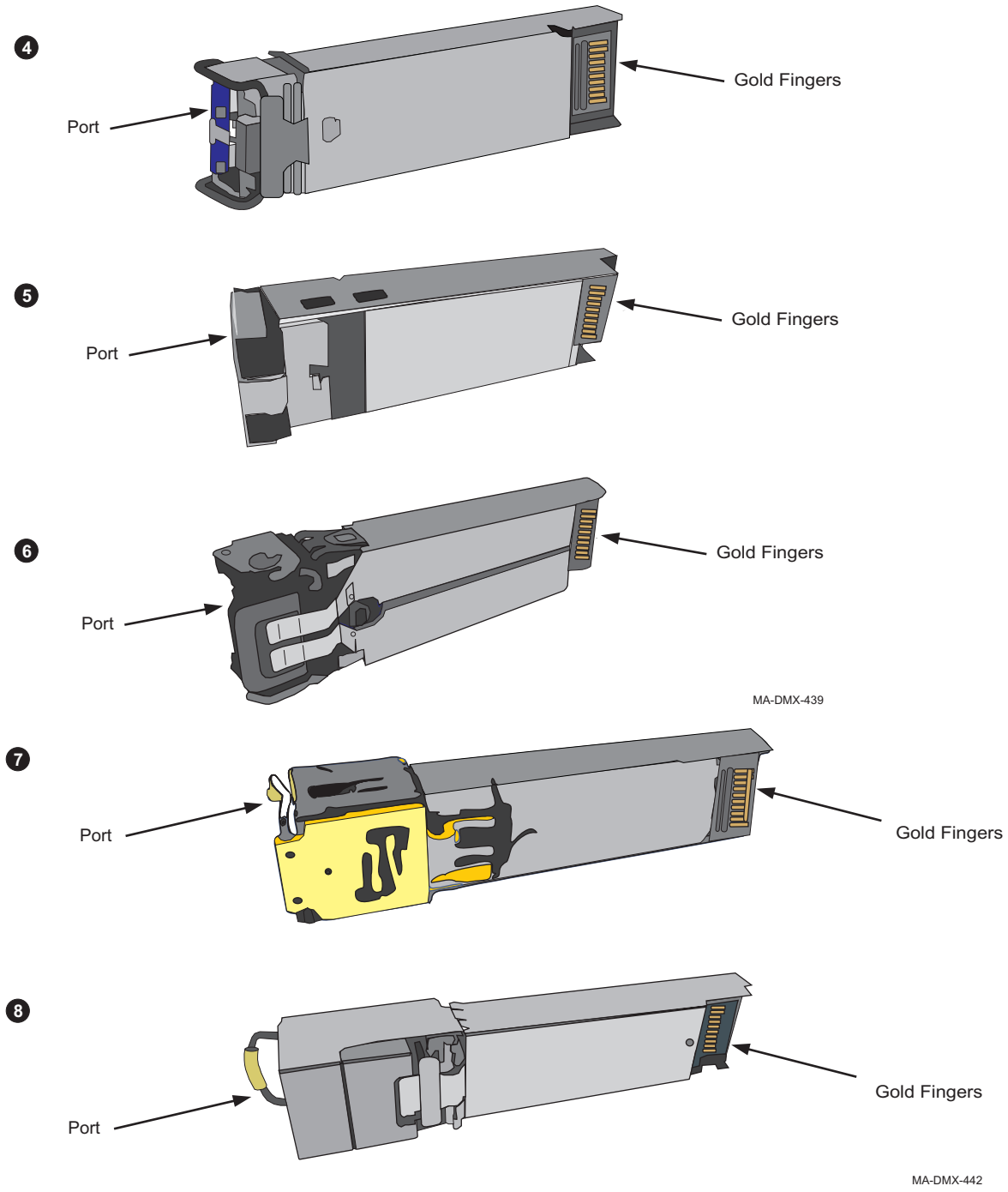
Figure E-2 Examples of dust plugs



3 Referring to Figure E-3, “Module types” (p. E-4) below, determine the type of latching mechanism on the pluggable transmission module you have.

Figure E-3 Module types





Note: Optical pluggable transmission modules are shipped with a dust plug installed into the optical ports to maintain cleanliness during storage and/or transportation. It is recommended that the dust plug be kept in place to maintain cleanliness until the cabling is connected. With proper care and handling, cleaning the pluggable transmission modules should not be necessary.

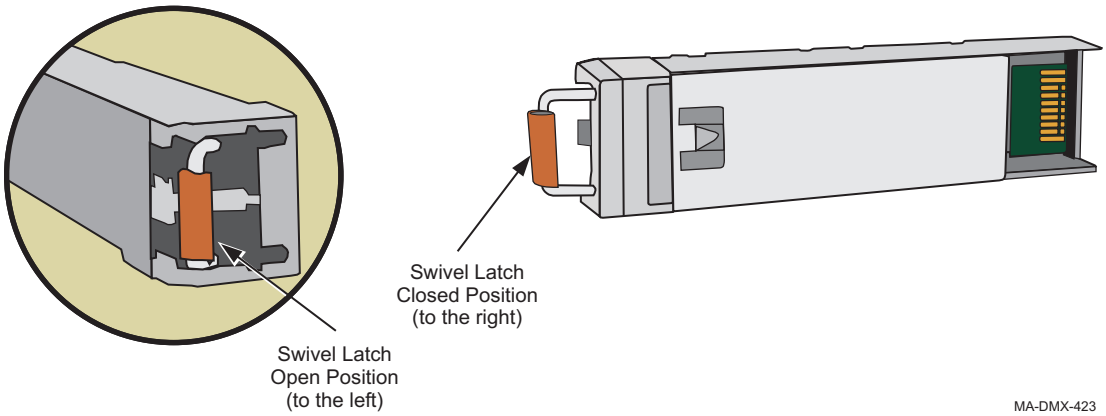
4 Referring to Step 3, what type of latching mechanism does your module have?.

If...	Then...
Type 1 or 2 (optical)	Proceed to Step 8
Type 3 (optical)	Continue with Step 5
Type 4, 5, or 6 (optical)	Proceed to Step 7
Type 7 or 8 (electrical)	Proceed to Step 7

5 Before inserting the module, the latch must be in the closed position. With the dust plug in place, the latch is in the closed position.

Figure E-4 shows the open and closed position of the latch. Depending on your PTM type, the appearance of the port opening and latch mechanism may vary.

Figure E-4 Latch type 3 (opened and closed)

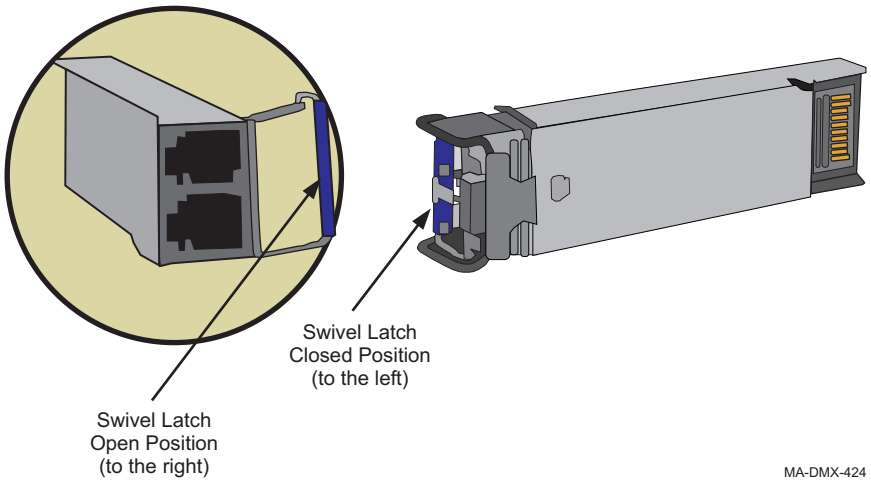


6 Proceed to Step 8.

7 Before inserting the module, the latch must be in the closed position. With the dust plug in place, the latch is in the closed position.

Figure E-5 shows the open and closed position of the latch. Depending on your PTM type, the appearance of the port opening and latch mechanism may vary.

Figure E-5 Latch type 4, 5, 6, 7 and 8 (opened and closed)

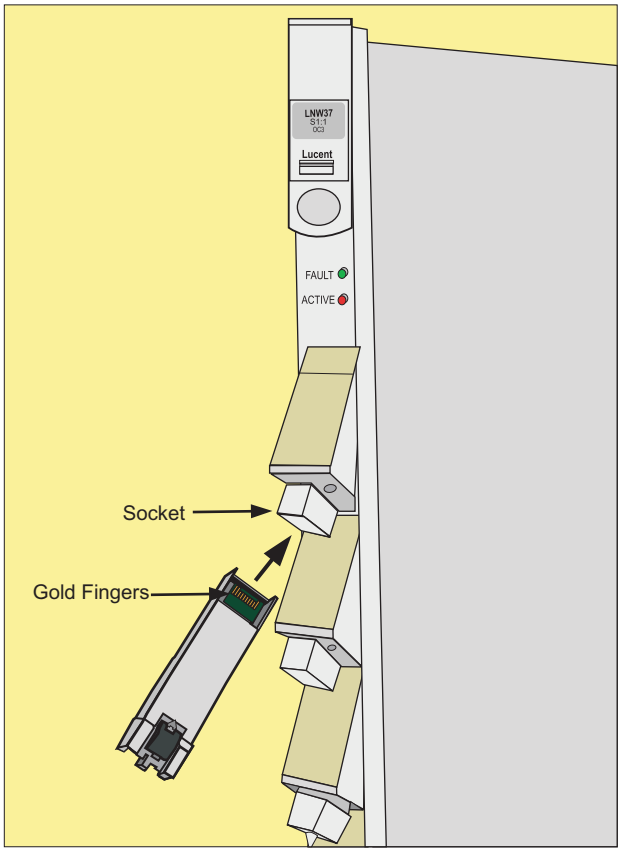


8 With your left hand, hold the pluggable transmission module by the dust plug (optical) or port end (electrical). The ports are in your left hand and the gold fingers are visible (facing you). (Do not insert pluggable transmission module.)

9 Rotate the module; the dust plug or port end is facing you and the gold fingers are pointing away from you and are facing to the right. (Do not insert pluggable transmission module.)

10 Insert the pluggable transmission module in the required socket of the circuit pack faceplate. Confirm that the pluggable transmission module is locked in the socket. Verify that all unused sockets on the circuit pack are equipped with dust covers.

Figure E-6 Insert pluggable transmission module into socket



Result: The port appears in the WaveStar® CIT System View indicating successful installation.

If response is not correct, replace the pluggable transmission module. If the pluggable transmission module fails when inserted, and another pluggable transmission module in the shelf fails at the same time, replace the newly-installed pluggable transmission module. Each pluggable transmission module has unique internal data for warranty purposes. If this data for any reason is not unique, both pluggable transmission modules with the duplicated information will be declared failed. See the *Alcatel-Lucent 1665 Data Multiplexer (DMX) Alarm Messages and Trouble Clearing Guide, 365-372-302*.

11 Push on the dust plug or port end to insert the module. The latch automatically catches when the module is inserted. The module is secure.

To verify that the pluggable transmission module is properly latched in the cage, gently pull the pluggable transmission module (parallel to the direction the pluggable transmission module was installed). Do *not* rotate the swivel latch or activate the de-latching feature on the pluggable transmission module.

12

If installing a pluggable transmission module in an...	Then...
Optical OLIU circuit pack,	Continue with Step 13.
Ethernet/DATA circuit pack,	Proceed to Step 23.

13 To test the OC-n optical port on installed OLIU circuit packs, loop back the OC-n optical port on itself (IN to OUT) with a 15-dB Attenuator.

Result: No alarms on the OLIU.

14 Remove the lightguide jumper used to loop back the OC-n optical port and the LBO.

Result: The port LED starts flashing. The **MN** and **NE** LEDs are lighted on the SYSCTL circuit pack.

15 From the System View window, select **Configuration > Update System > Update All**.

Result: The port LED stops flashing. All alarms are cleared.

16 Repeat Step 1 to Step 15 for additional pluggable transmission modules.

17 If installing ethernet pluggable transmission module continue, otherwise proceed to Step 23

18 To test optical Ethernet ports, with the appropriate fiber type (Single/Multi-Mode) loop back the optical Ethernet port to itself (In to Out) LBOs are not required with optical Ethernet ports.

19 From the System View window, double click on the optical port under test.

Result: In the Fault tab, Port Monitoring Mode: should display IS
Alarms tab Highest Alarms: should display Not Alarmed

20 Remove the lightguide jumper used to loop back the optical Ethernet port and click **Refresh** to the View Equipment window.

Result: The FAULT LED on the pack and port LED starts flashing. The CR and NE LEDs are lighted on the SYSCTL circuit pack. In the Alarms tab Highest Alarms: should display Critical.

21 From the System View window, select Configuration > Update System > Update All.

Result: The port LED stops flashing. All alarms are cleared.

22 Repeat Step 18 toStep 21 for additional ethernet pluggable transmission modules.

23 If all pluggable transmission modules are installed, then from the System View menu click on the Alarm List button to verify that no alarms are present for the pluggable transmission modules just installed on the circuit packs.

END OF STEPS

Pluggable transmission modules

Alcatel-Lucent approved Class 1 SFP transceivers

The following table lists all the current approved pluggable transmission modules to be used with Alcatel-Lucent 1665 DMX.

Table E-1 Alcatel-Lucent approved pluggable transmission modules

Apparatus Code	Comcode	Description	Used in
BASE-T-C1 FE and GbE (electrical - NOT OSP)	109565549	Electrical PTM, provisionable to 100 or 1000 Mbps, Lucent approved RJ-45 Cat 5-E cable, maximum span length of 100 meters	LNW63, LNW64, LNW170
S15512	109602599	OC-3 PTM TRCVR Short Reach, 1.3 SR-1, 1310 nm	LNW37, LNW45, LNW55, LNW82, LNW705
OC3IR1-I1	109453894	OC-3 PTM TRCVR Intermediate Reach, 1.3 IR-1, 1310nm	LNW37, LNW45, LNW55, LNW82, LNW705
OC3LR1-I1	109453886	OC-3 PTM TRCVR Long Reach, 1.3 LR-1, 1310nm	LNW37, LNW45, LNW55, LNW82, LNW705
OC3X12X48-IR1-I1	109708131	OC3/STM1/OC12/STM4/ OC48/STM16 SFP, 15km, 1310nm	LNW55, LNW82
OC3X12X48-LR1-I1	109708149	OC3/STM1/OC12/ STM4/OC48/STM16, 40km, 1310nm	LNW55, LNW82
OC12IR1-I1	109453902	OC-12 PTM TRCVR Intermediate Reach, 1.3 IR-1, 1310nm	LNW49, LNW55, LNW82, LNW705
OC12LR1-I1	109467522	OC-12 PTM TRCVR Long Reach, 1.3 LR-1, 1310nm	LNW49, LNW55, LNW82, LNW705
OC12LR2-I1	109604447	OC-12 PTM TRCVR Long Reach, 1.5 LR-2 (80km), 1550	LNW49, LNW55, LNW82, LNW705
S622C47EL	109664086	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch47 1471nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705

Apparatus Code	Comcode	Description	Used in
S622C49EL	109664094	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch49 1491 nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705
S622C51EL	109664102	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch51 1511nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705
S622C53EL	109664110	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch53 1531nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705
S622C55EL	109664128	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch55 1551nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705
S622C57EL	109664136	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch57 1571 nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705
S622C59EL	109664144	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch59 1691nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705
S622C61EL	109664151	OC3/12 622Mb/s Coarse WDM (CDWDM) Ch61 1611nm SM	LNW37. LNW45, LNW49, LNW55, LNW82, LNW203, LNW705
OC48SR1-I1	109564518	OC-48 PTM TRCVR Short Reach, 1.3 SR-1 (2km), 1310nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW705
OC48LR1-I1	109493528	OC-48 PTM TRCVR Long Reach, 1.3 LR-1 (40km), 1310nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705

Apparatus Code	Comcode	Description	Used in
OC48LR2-I1	109504431	OC-48 PTM TRCVR Long Reach, 1.5 LR-2 (80 km), 1550 nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D23C6	109610378	OC-48/STM16/OTU1 DWDM 192.3THz/1558.983nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D25C6	109610394	OC-48/STM16/OTU1 DWDM 192.5THz/1557.363nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D27C6	109610410	OC-48/STM16/OTU1 DWDM 192.7THz/1555.747nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D31C6	109610451	OC-48/STM16/OTU1 DWDM 193.1THz/1552.524nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D33C6	109610477	OC-48/STM16/OTU1 DWDM 193.3THz/1550.918nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D35C6	109610493	OC-48/STM16/OTU1 DWDM 193.5THz/1549.315nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D37C6	109610519	OC-48/STM16/OTU1 DWDM 193.7THz/1547.715nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D45C6	109610600	OC-48/STM16/OTU1 DWDM 194.5THz/1541.349nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705

Apparatus Code	Comcode	Description	Used in
S2D47C6	109610626	OC-48/STM16/OTU1 DWDM 194.7THz/1539.766nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D49C6	109610642	OC-48/STM16/OTU1 DWDM 194.9THz/1538.186nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D53C6	109610691	OC-48/STM16/OTU1 DWDM 195.3THz/1535.036nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D55C6	109610717	OC-48/STM16/OTU1 DWDM 195.5THz/1533.465nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
S2D59C6	109610766	OC-48/STM16/OTU1 DWDM 195.9THz/1530.334nm	LNW55, LNW62, LNW82, LNW202, LNW402, LNW504, LNW705
OC192SR1-C1	109537902	OC-192 XFP TRCVR Short Reach, 1.3 SR-1 (2 km), 1310 nm	LNW59, LNW502, LNW504, LNW603, LNW705
OC192IR2-C1	109537563	OC-192 XFP TRCVR Intermediate Reach, 1.5 IR-2 (40 km), 1550 nm	LNW59, LNW705
OC192LR2-C1	109537555	OC-192 XFP TRCVR Long Reach, 1.5 LR-2 (80 km), 1550 nm	LNW59, LNW502, LNW504, LNW603, LNW705
X10G21C5	109615005	OC-192/STM-64/OTU2 DWDM, Long Reach, 1560.606 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G22C5	109615013	OC-192/STM-64/OTU2 DWDM, Long Reach, 1559.794 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G23C5	109615021	OC-192/STM-64/OTU2 DWDM, Long Reach, 1558.983 nm,	LNW59, LNW502, LNW504, LNW603, LNW705

Apparatus Code	Comcode	Description	Used in
X10G24C5	109615039	OC-192/STM-64/OTU2 DWDM, Long Reach, 1558.173 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G25C5	109615047	OC-192/STM-64/OTU2 DWDM, Long Reach, 1557.173 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G26C5	109615054	OC-192/STM-64/OTU2 DWDM, Long Reach, 1556.555 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G27C5	109615062	OC-192/STM-64/OTU2 DWDM, Long Reach, 1555.747 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G28C5	109615070	OC-192/STM-64/OTU2 DWDM, Long Reach, 1554.940 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G52C5	109615310	OC-192/STM-64/OTU2 DWDM, Long Reach, 1535.822 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G53C5	109615328	OC-192/STM-64/OTU2 DWDM, Long Reach, 1535.036 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G54C5	109615336	OC-192/STM-64/OTU2 DWDM, Long Reach, 1534.250 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G55C5	109615344	OC-192/STM-64/OTU2 DWDM, Long Reach, 1533.465 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G56C5	109615351	OC-192/STM-64/OTU2 DWDM, Long Reach, 1532.681 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G57C5	109615369	OC-192/STM-64/OTU2 DWDM, Long Reach, 1531.898 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
X10G58C5	109615377	OC-192/STM-64/OTU2 DWDM, Long Reach, 1531.116 nm,	LNW59, LNW502, LNW504, LNW603, LNW705

Apparatus Code	Comcode	Description	Used in
X10G59C5	109615385	OC-192/STM-64/OTU2 DWDM, Long Reach, 1530.334 nm,	LNW59, LNW502, LNW504, LNW603, LNW705
100BASE-ZX-I1	109703157	100 Mb/s optical Fast Ethernet SFP TRCVR	LNW63, LNW64, LNW74, LNW87, LNW170
100BASE-LX-I1	109527812	Optical Fast Ethernet PTM LC-type connectors (FE-1310SM)	LNW63, LNW64, LNW74, LNW87, LNW170
100BASE-FX-I1	109703140	100 Mb/s optical Fast Ethernet SFP TRCVR	LNW63, LNW64, LNW87, LNW170
ESCON-MM-I1 (ESCON)	109523886	ESCON, Multi-Mode PTM, LC-type connectors (ESCON - 1310)	LNW73, LNW73C
GE-1X2XFC-SX-I1 (1000BASE-SX, 1Gbps)	109570606	GbE short-reach, Single Mode PTM, supports Ethernet and Fibre-Channel traffic, LC-type connectors OSP hardened (GbE/FC/2FC-850)	LNW63, LNW64, LNW73, LNW73C, LNW87, LNW170, LNW705
GE-1X2XFC-LX-I1 (1000BASE-LX, 1 Gbps)	109568782	GbE long-reach, Single Mode PTM, supports Ethernet, FICON, and Fibre-Channel traffic, LC-type connectors, OSP hardened (GbE/FC/2FC-1310)	LNW63, LNW64, LNW73, LNW73C, LNW87, LNW170, LNW705
1000BASE-ZX-I1 (1000BASE-ZX, 1Gbps)	109541862	GbE long-reach, Single Mode PTM, supports Ethernet, LC-type connectors, OSP hardened (GbE - 1550)	LNW63, LNW64, LNW74, LNW87, LNW170
1000BASE-LX-I1 (1000BASE-LX, 1Gbps)	109541854	GbE long-reach, Single Mode PTM, supports Ethernet, LC-type connectors, OSP hardened (GbE - 1550)	LNW63, LNW64, LNW74, LNW87, LNW170

Apparatus Code	Comcode	Description	Used in
1000BASE-SX-I1 (1000BASE-SX, 1Gbps)	109541847	GbE Short-reach, Single Mode PTM, supports Ethernet, LC-type connectors, OSP hardened (GbE - 850)	LNW63, LNW64, LNW87, LNW170

Glossary

Acronyms and abbreviations

A

ABN
Abnormal (status condition)

ACO
Alarm Cutoff

ACO/SW
Alarm Cutoff and Test

ADM
Add/Drop Multiplexer

AGNE
Alarm Gateway Network Element

AIS
Alarm Indication Signal

AMI
Alternate Mark Inversion

ANSI
American National Standards Institute

APS
Automatic Protection Switch

ARM
Access Resource Manager

AS&C
Alarm, Status, and Control

ASCII
American Standard Code for Information Interchange

ASN.1
Abstract Syntax Notation 1

ASNE
Alarm Server Network Element

ATM
Asynchronous Transfer Mode

Auto
Automatic

AUXCTL
Auxiliary Control

B

B3ZS
Bipolar 3-Zero Substitution

B8ZS
Bipolar 8-Zero Substitution

BDFB
Battery Distribution and Fuse Bay

BER
Bit Error Ratio

BIP
Bit Interleaved Parity

BITS
Building Integrated Timing Supply

BRI
Basic Rate Interface

C

CC
Clear Channel

CCITT
International Telephone and Telegraph Consultative Committee

CEV
Controlled Environment Vault

CD-ROM
Compact Disk, Read-Only Memory

CDTU
Channel and Drop Test Unit

CIT
Craft Interface Terminal

CLF
Carrier Line Failure Status

CLK
Clock

CMISE
Common Management Information Service Element

CMOS
Complementary Metal Oxide Semiconductor

CMTS
Cable Modem Termination System

CO
Central Office

CP
Circuit Pack

CPE
Customer Premises Equipment

CR
Critical (alarm status)

CSA
Carrier Serving Area

CSU
Channel Service Unit

CS&O
Customer Support and Operations

CV
Coding Violation

CVFE
Coding Violation Far End

D

DCC
Data Communications Channel

DCE
Data Communications Equipment

DEMUX
Demultiplexer

DLC
Digital Loop Carrier

DPLL
Digital Phase-Locked Loop

DRI
Dual Ring Interworking

DS1
Digital Signal Level 1

DS3
Digital Signal Level 3

DSLAM
Digital Subscriber Line Access Multiplexer

DSNE
Directory Services Network Element

DSX
Digital Cross-Connect Panel

DT
Distant Terminal

DTE
Data Terminating Equipment

E

EC-1
Electrical Carrier Level 1

ECI
Equipment Catalog Item

EEPROM
Electrically-Erasable Programmable Read-Only Memory

EIA
Electronic Industries Association

EMC
Electromagnetic Compatibility

EMI
Electromagnetic Interference

EOOF
Excessive Out of Frame

EPROM
Erasable Programmable Read-Only Memory

EQ
Equipped (memory administrative state)

ES
Errored Seconds

ESD
Electrostatic Discharge

ESF
Extended Super Frame

EST
Environmental Stress Testing

F

FCC
Federal Communications Commission

FDDI
Fiber Distribution Data Interface

FE
Far End

FE ACTY
Far End Activity

FEBE
Far End Block Error

FE ID
Far End Identification

FEPROM
Flash EPROM

FERF
Far End Receive Failure

FE SEL
Far End Select

FIT
Failures in 10^9 hours of operation.

G

GbE
Gigabit Ethernet

GNE
Gateway Network Element

GR
Telcordia Technologies General Requirement

GTP
General Telemetry Processor

GTSIP
Global Technical Support Information Platform

GUI
Graphical User Interface

H

HECI
Humans Equipment Catalog Item

I

IC
Internal Clock

ID
Identifier

IEC
International Electrotechnology Commission

IMF
Infant Mortality Factor

INC
Incoming Status

I/O
Input/Output

IP
Internet Protocol

IR
Intermediate Reach

IS
In Service

ISCI
Intershelf control Interface

ISI
Intershelf Interface

ISDN
Integrated Services Digital Network

ISO
International Standards Organization

ISP
Internet Service Provider

IVHS
Intelligent Vehicle Highway System

L

LAN
Local Area Network

LAPD
Link Access Procedure "D"

LBO
Line Build Out

LCN
Local Communications Network

LEC
Local Exchange Carrier

LED
Light-Emitting Diode

LOF
Loss of Frame

LOP
Loss of Pointer

LOS
Loss of Signal

LR
Long Reach

LS
Low Speed

M

MD
Mediation Device

MJ
Major Alarm

MM
Multimode

MML
huMan-Machine Language

MN
Minor Alarm

MPEG
Moving Picture Experts Group

MSDT
Multi-Services Distant Terminal

MTBF
Mean Time Between Failures

MTBMA
Mean Time Between Maintenance Activities

Mult
Multipling

MUX
Multiplex

MXBIU
Multiplexer and Backplane Interface Unit

N

NE
Near End

NE
Network Element

NE ACTY
Near-End Activity

NEBS
Network Equipment-Building System

nm
Nanometer (10^{-9} meters)

NMA
Network Monitoring and Analysis

NMON
Not Monitored (provisioning state)

NRZ
Nonreturn to Zero

NNI
Network-Network Interface

NSA
Not Service Affecting

NSAP
Network Services Access Point

NTF
No Trouble Found

O

OAM&P
Operations, Administration, Maintenance, and Provisioning

OC-1
Optical Carrier Level 1 Signal (51.84 Mb/s)

OC-3
Optical Carrier Level 3 Signal (155 Mb/s)

OC-12
Optical Carrier Level 12 Signal (622 Mb/s)

OC-48
Optical Carrier Level 48 Signal

OLIU
Optical Line Interface Unit

OOF
Out of Frame

OOL
Out of Lock

OPS/INE
Operations System/Intelligent Network Element

OS
Operations System

OSGNE
Operations System Gateway Network Element

OSI
Open Systems Interconnection

OSMINE
Operations Systems Modifications for the Integration of Network Elements

OSP
Outside Plant

P

P-bit
Performance Bit

PC
Personal Computer

PCU
Power Conversion Unit

PID
Program Identification

PINFET
Positive Intrinsic Negative Field Effect Transistor

PJC
Pointer Justification Count

PLL
Phase-Locked Loop

PM
Performance Monitoring

PMN
Power Minor Alarm

POH
Path Overhead

POP
Points of Presence

POTS
Plain Old Telephone Service

PRM
Performance Report Message

PROTN
Protection

PRS
Primary Reference Source

PSU
Power Supply Unit

PTM
Pluggable Transmission Module

PVC
Permanent Virtual Circuit

PWR
Power

R

RAM
Random Access Memory

RPP
Reliability Prediction Procedure (described in Telcordia Technologies TR-NWT-00032)

RT
Remote Terminal

NARTAC
Lucent Regional Technical Assistance Center (1-866-LUCENT8)

RZ
Return to Zero

S

SA
Service Affecting

SCADA
Supervisory Control and Data Acquisition

SD
Signal Degrade

SDH
Synchronous Digital Hierarchy

SEFS
Severely Errored Frame Seconds

SEO
Single-Ended Operations

SES
Severely Errored Seconds

SF
Super Frame (format for DS1 signal)

SFP
Small Form Pluggable

SID
System Identification

SLA
Service Level Agreements

SLIM
Subscriber Loop Interface Module

SM
Single Mode

SONET
Synchronous Optical NETwork

SPE
Synchronous Payload Envelope

SQU
Sync Quality Unknown

SRD
Software Release Description

STS, STS-n
Synchronous Transport Signal

STM
Synchronous Transfer Mode

STS-1 SPE
STS-1 Synchronous Payload Envelope

STS-3c
Synchronous Transport Level 3 Concatenated Signal

STS-12c
Synchronous Transport Level 12 Concatenated Signal

SYSCTL
System Controller (circuit pack)

T

T1X1 and T1M1
The ANSI committees responsible for telecommunications standards

TA
Telcordia Technologies Technical Advisory

TABS
Telemetry Asynchronous Byte Serial (Protocol)

TARP
Target ID Address Resolution Protocol

TCA
Threshold-Crossing Alert

TCP/IP
Transmission Control Protocol/Internet Protocol

TCVCXO
Termperature-Compensated Voltage-Controlled Crystal Oscillator

TDM
Time Division Multiplexing

TID
Target Identifier

TL1
Transaction Language 1

TLB
Timing Looped Back

TOP
Task Oriented Practice

TR
Telcordia Technologies Technical Requirement

TSA
Time Slot Assignment

TSI
Time Slot Interchange

TSO
Technical Support Organization

U

UAS
Unavailable Seconds

UNI
User Network Interface

UOC
Universal Optical Connector

UPD/INIT
Update/Intialize

UPSR
Unidirectional Path Switched Rings

V

VF
Voice Frequency

VLAN
Virtual Local Area Network

VLSI
Very Large Scale Integration

VM
Violation Monitor

VMR
Violation Monitor and Removal

VoIP
Voice over Internet Protocol

VONU
Virtual Optical Network Unit

VPN
Virtual Private Network

VT
Virtual Tributary

VT1.5
Virtual Tributary 1.5 (1.728 Mb/s)

VT-G
Virtual Tributary Group

W

WAN
Wide Area Network

Terms and definitions

0x1
See Ring (0x1) Low-Speed Interface.

1+1
The 1+1 protection switching architecture protects against failures of the optical transmit/receive equipment and their connecting fiber facility. One bidirectional interface (two fibers plus associated OLIUs on each end) is designated "service," and the other is designated "protection." In each direction, identical signals are transmitted on the service and protection lines ("dual-fed"). The receiving equipment monitors the incoming service and protection lines independently, and selects traffic from one line (the "active" line) based on performance criteria and technician/OS control. In 1+1 both service and protection lines could be active at the same time (service in one direction, protection in the other).

1xN, 1x1
1xN protection switching pertains to circuit pack protection that provides a redundant signal path through the Alcatel-Lucent 1665 Data Multiplexer (Alcatel-Lucent 1665 DMX) (it does not cover protection switching of an optical facility; se "1+1"). In 1xN switching, a group of N service circuit packs share a single spare protection circuit pack. 1x1 is a special case of 1xN, with N=1. In 1x1 only one is active at a time.

1GE
Gigabit Ethernet - 1.250 Gbps line rate.

A

Active
Active identifies a 1+1 protected OC-N line which is currently selected by the receiver at either end as the payload carrying signal or a 1x1 or 1xN protected circuit pack that is currently carrying service. (See Standby).

AGNE - Alarm Gateway Network Element
A defined NE in an alarm group through which members of the alarm group exchange information.

AIS - Alarm Indication Signal

A code transmitted downstream in a digital network that shows that an upstream failure has been detected and alarmed.

AMI - Alternate Mark Inversion

A line code that employs a ternary signal to convey binary digits, in which successive binary ones are represented by signal elements that are normally of alternating, positive and negative polarity but equal in amplitude, and in which binary zeros are represented by signal elements that have zero amplitude.

ASCII - American Standard Code for Information Interchange

A standard 8-bit code used for exchanging information among data processing systems and associated equipment.

Auto

One possible state of a service interface port. In this state, the port will automatically be put "in service" if a good incoming signal is detected on the port.

Automatic Protection Switch

A feature that allows another synchronization source to be automatically selected and the synchronization source provisioning to be automatically reconfigured in the event of a synchronization source failure or network synchronization change, for example, a fiber cut.

Available Time

In performance monitoring, the 1-second intervals.

B

B3ZS - Bipolar 3-Zero Substitution

A line coding method that replaces a string of three zeros with a sequence of symbols having some special characteristic.

B8ZS - Bipolar 8-Zero Substitution

A line coding method that replaces a string of eight zeros with a sequence of symbols having some special characteristic.

Backbone Ring

A host ring.

BER - Bit Error Ratio

The ratio of bits received in error to the total bits sent.

BIP - Bit Interleaved Parity

A method of error monitoring over a specified number of bits, that is BIP-3 or BIP-8.

BITS - Building Integrated Timing Supply

A single clock that provides all the DS1 and DS0 synchronization references required by clocks in a building.

Broadband

Any communications channel with greater bandwidth than a voice channel; sometimes used synonomously with wideband. Also refers to signals at the DS3 (44.736 Mb/s) and higher. Wideband refers to lower rates (i.e. DS1, VT1.5, etc.).

C

CC - Clear Channel

A provisionable mode for the DS3 output that causes parity violations not to be monitored or corrected before the DS3 signal is encoded.

CCITT - International Telephone and Telegraph Consultative Committee

An international advisory committee under United Nations' sponsorship that has composed and recommended for adoption worldwide standards for international communications. Recently changed to the International Telecommunications Union Telecommunications Standards Sector (ITU-TSS).

Channel

A logical signal within a port. For example, for an EC-1 port, there is one STS-1 channel and sometimes 28 VT1.5 channels. See Port.

Channel State Provisioning

A feature that allows a user to suppress reporting of alarms and events during provisioning by supporting multiple states (automatic, in-service and not monitored) for VT1.5 and STS-1 channels. See Port State Provisioning.

CV - Coding Violation

A performance monitoring parameter.

CVFE - Coding Violation Far-End

An indication returned to the transmitting terminal that an errored block has been detected at the receiving terminal.

D

DACS III-2000

Digital Access and Cross-Connect System that provides clear channel switching at either the DS3 or the STS-1 rates, eliminating the need for manual DSXs.

DACS IV-2000

Digital Access and Cross-Connect System that provides electronic DS3/STS-1 or DS1/VT1.5 cross-connect capability, eliminating the need for manual DSXs.

DCC - Data Communications Channel

The embedded overhead communications channel in the SONET line. It is used for end-to-end communications and maintenance. It carries alarm, control, and status information between network elements in a SONET network.

DCE - Data Communications Equipment

In a data station, the equipment that provides the signal conversion and coding between the data terminal equipment (DTE) and the line. The DCE may be separate equipment or an integral part of the DTE or of intermediate equipment. A DCE may perform other functions usually performed at the network end of the line.

DDM-2000

Lucent's first generation SONET multiplexers that multiplex DS1, DS3, or EC-1 inputs into EC-1, OC-1, OC-3, or OC-12 outputs.

Default Provisioning

The parameter values that are preprogrammed as shipped from the factory.

Demultiplexing

A process applied to a multiplexed signal for recovering signals combined within it and for restoring the distinct individual channels of these signals.

DEMUX - Demultiplexer

The DEMUX direction is from the fiber toward the DSX.

Digital Multiplexer

Equipment that combines time-division multiplexing several digital signals into a single composite digital signal.

DRI - Dual Ring Interworking

Two ring networks interconnected at two common nodes.

Drop and Continue

A technique that allows redundant signal appearances at two central offices in a DRI network, allowing protection against central office failures.

DS1

Digital Signal Level 1 (1.544 Mb/s).

DS1(28) Circuit Pack

The DS1(28) circuit pack interfaces to the DSX-1 panel.

DS3

Digital Signal Level 3 (44.736 Mb/s).

DS3/EC-1 Circuit Pack

The DS3/EC-1 circuit pack interfaces to the DSX-3 panel.

DSn - Digital Signal Rate n

One of the possible digital signal rates at Alcatel-Lucent 1665 DMX interfaces: DS1 (1.544 Mb/s) or DS3 (44.736 Mb/s).

DSNE - Directory Services Network Element

A designated network element that is responsible for administering a database that maps network element names (TIDs) to addresses (NSAPs - network service access points) in an OSI subnetwork. There can be one DSNE per ring. Can also be a GNE.

DSX - Digital Cross-Connect Panel

A panel designed to interconnect to equipment that operates at a designated rate. For example, a DSX-3 interconnects equipment operating at the DS3 rate.

DTE - Data Terminating Equipment

That part of a data station that serves as a data source (originates data for transmission), a data sink (accepts transmitted data), or both.

Dual Homing

A network topology in which two Alcatel-Lucent 1665 DMX serve as hosts supporting up to 16 OC-3 rings or 4 OC-12 rings. Each OC-3 and OC-12 ring is interconnected between the two separate hosts.

DWDM

Dense Wave Division Multiplexer

E

EC-1, EC-n - Electrical Carrier

The basic logical building block signal with a rate of 51.840 Mb/s for an EC-1 signal and a rate of n times 51.840 Mb/s for an EC-n signal. An EC-1 signal can be built in two ways: A DS1 can be mapped into a VT1.5 signal and 28 VT1.5 signals multiplexed into an EC-1 (VT1.5 based EC-1), or a DS3 can be mapped directly into an EC-1 (DS3 based EC-1).

ECI - Equipment Catalog Item

The bar code number on the faceplate of each circuit pack used by some inventory systems.

ES - Errored Seconds

A performance monitoring parameter.

ESF - Extended Super Frame

The format for a DS1 signal.

F

FC100

Fibre Channel 100 Mbps interface

FC400

Fibre Channel 400 Mbps interface

FE - Far End

Any other network element in a maintenance subnetwork other than the one the user is at or working on. Also called remote.

FE ACTY - Far End Activity

An LED on the SYSCTL circuit pack faceplate.

FEBE - Far End Block Error
An indication returned to the near-end transmitting node that an errored block has been detected at the far end.

FEPROM - Flash EPROM
Nonvolatile Electrically-erasable Programmable Read-Only Memory.

FERF - Far End Receive Failure
An indication returned to the transmitting terminal that the receiving terminal has detected an incoming section failure.

FE SEL - Far End Select
An LED on the faceplate of the SYSCTL circuit pack.

FICON
FICON is equivalent to Fibre Channel throught layers 1-3.

FICON_EXP

FIT
Failures in 10^9 hours of operation.

Free Running
An operating condition of a clock in which its local oscillator is not locked to an internal synchronization reference and is using no storage techniques to sustain its accuracy.

FT-2000
Lucent's SONET OC-48 Lightwave System.

Function Unit
Refers to any one of a number of different circuit packs that can reside in the A, B, C, or D function unit slots on the Alcatel-Lucent 1665 DMX.

G

GNE - Gateway Network Element
A network element that has an active X.25 link. Can also be a DSNE.

H

Hairpin Routing
A cross-connection between function units (inter-function unit). For example, function unit C to function untis A, B, or D. Also, a cross-connection within the same function unit (intra-function unit). Cross-connections go through Main, but no bandwidth or time slots are taken from the backbone ring. Eliminates need for another shelf.

Holdover

An operating condition of a network element in which its local oscillator is not locked to any synchronization reference but is using storage techniques to maintain its accuracy with respect to the last known frequency comparison with a synchronization reference.

I

IC - Internal Clock

Used in synchronization messaging.

ID

See shelf ID and site ID.

IR - Intermediate Reach

A term used to describe distances of 15 to 40 km between optical transmitter and receiver without regeneration. See long reach.

IS - In Service

One possible state of a DS1, DS3, or EC-1 port. Other possible states are "auto" (automatic) and "nmon" (not monitored).

J

Jitter

Timing jitter is defined as short-term variations of the significant instants of a digital signal from their ideal positions in time.

L

LBO - Line Build Out

An equalizer network between the Alcatel-Lucent 1665 DMX and the DSX panel. It guarantees the proper signal level and shape at the DSX panel.

LED - Light Emitting Diode

Used on a circuit pack faceplate to show failure (red) or service state. It is also used to show the alarm and status condition of the system.

Line Timing

The capability to directly derive clock timing from an incoming OC-N signal while providing theuser the capability to provision whether switching to an alternate OC-N from a different source (as opposed to entering holdover) will occur if the OC-N currently used as the timing reference for that NE becomes unsuitable as a reference. For example, intermediate nodes in a linear network are line timed. See Loop Timing.

Local

See Near-End.

Locked Cross-Connection

This is a variation of the ring cross-connection that allows the user to lock the path selector to a specified rotation of the ring. Any signal received from the other rotation of the ring is ignored.

LOF - Loss of Frame

A failure to synchronize to an incoming signal.

Loop Timing

Loop timing is a special case of line timing. It applies to NEs that have only one OC-N interface. For example, terminating nodes in a linear network are loop timed. See Line Timing.

LOP - Loss of Pointer

A failure to extract good data from an STS-1 payload.

LOS - Loss of Signal

The complete absence of an incoming signal.

LR - Long Reach

A term used to describe distances of 40 km or more between optical transmitter and reciever without regeneration. See Intermediate Reach.

M

Main

The two slots (M-1 and M-2) on the Alcatel-Lucent 1665 DMX shelf in which the OC-48 OLIU circuit packs are installed.

Midspan Meet

The capability to interface between two lightwave terminals of different vendors. This applies to high-speed optical interfaces.

Multiplexing

The process of combining several distinct digital signals into a single composite digital signal.

Mult - Multipling

The cascading of signals in a bay. In the MULT mode, the DS1 external reference can be cascaded to other shelves in a bay using Mult cables. Normally starting with the bottom shelf (Number 1) and working towards the top of the bay.

N

NE - Near End

The network element the user is at or working on. Also called local.

NE - Network Element

The basic building block of a telecommunications equipment within a telecommunication network that meets SONET standards. Typical internal attributes of a network element include: onr or more high- and low-speed transmission ports, built-in intelligence, synchronization and timing capability, and access interfaces for use by technicians and/or operation systems. In addition, a network element may also include a time slot interchanger.

NE ACTY - Near End Activity

An LED on the faceplate of the SYSCTL circuit pack.

NMA - Network Monitoring and Analysis

An operations system designed by Telcordia Technologies which is used to monitor network facilities.

NMON - Not Monitored

A provisioning state for equipment that is not monitored or alarmed.

Node

In SONET, a node is a line terminating element.

Non-Revertive

A protection switching mode in which, after a protection switch occurs, the equipment remains in its current configuration after any failure conditions that caused a protection switch to occur clear or after any external switch commands are reset. See Revertive.

NSAP - Network Services Access Point

An address that identifies a network element. Used for maintenance subnetwork communication using the OSI protocol.

O

OC, OC-n - Optical Carrier

The optical signal that results from an optical inversion of an STS signal; that is, OC-1 from STS-1 and OC-n from STS-n.

OC-1

Optical Carrier Level 1 Signal (51.844 Mb/s).

OC-3

Optical Carrier Level 3 Signal (155 Mb/s).

OC-3c (STS-3c)

Optical Carrier Level 3 Concatenated Signal. Low-speed broadband equivalent to three STS-1s linked together with a single path overhead.

OC-12

Optical Carrier Level 12 Signal (622 Mb/s).

OC-12c (STS-12c)

Optical Carrier Level 12 Concatenated Signal. High-speed broadband equivalent to twelve STS-1s linked together with a single path overhead.

OC-48

Optical Carrier Level 48 Signal.

Operations Interface

Any interface that provides information on the system performance or control. These include the equipment LEDs, SYSCTL faceplate, and office alarms.

OS - Operations System

A central computer-based system used to provide operations, administration, and maintenance functions.

OSI - Open Systems Interconnection

Referring to the OSI reference model, a logical structure for network operations standardized by the Internation Standards Organization (ISO).

OSGNE - Operations System Gateway Network Element

An OSGNE serves as a single interface to the OS for NEs in the same subnetwork using X.25 interfaces.

P

Pass Through

Paths that are cross-connected directly across an intermediate node in a ring network.

Plesiochronous Network

A network that contains multiple maintenance subnetworks, each internally synchronous and all operating at the same nominal frequency, but whose timing may be slightly different at any particular instant. For example, in SONET networks, each timing traceable to their own Stratum 1 clock are considered plesiochronous with respect to each other.

PM - Performance Monitoring

Measures the quality of service and identifies degrading or marginally operating systems (before an alarm would be generated).

Port

The physical, electrical, or optical interface on a system. For example, DS1, DS3, EC-1, OC-3, OC-12, and OC-48. ***See Channel***.

Port State Provisioning

A feature that allows a user to supress alarm reporting and performance monitoring during provisioning by supporting multiple states (automatic, in-service, and not monitored) for low-speed ports. ***See Channel State Provisioning***.

Proactive Maintenance

Refers to the process of detecting degrading conditions not severe enough to initiate protection switching or alarming, but indicative of an impending signal fail or signal degrade defect (for example, performance monitoring).

Protection Line

As defined by the SONET standard, the protection line is the pair of fibers (one transmit and one receive) that carry the SONET APS channel (K1 and K2 bytes in the SONET line overhead). On a Alcatel-Lucent 1665 DMX, a protection line is a pair of fibers that terminate an OLIU circuit pack in the Main-2, A-2, B-2, C-2, D-2, or G-2 slots. ***See Service Line***.

Product Family 2000

Lucent's first line of SONET standard network products providing total network solutions.

R

Reactive Maintenance

Refers to decting defects/failures and clearing them.

Remote

See Far-End (FE).

Revertive

A protection switching mode in which, after a protection switch occurs, the equipment returns to the nominal configuration (that is, the service equipment is active, and the protection equipment is standby) after the clearing of any failure conditions that caused a protection switch to occur or after any external switch commands are reset. ***See Non-Revertive***.

Ring

A configuration of nodes comprised of network elements connected in a circular fashion. Under normal conditions, each node is interconnected with its neighbor and includes capacity for transmission in either direction between adjacent nodes. Path switched rings use a head-end bridge and tail-end switch. Line switched rings actively reroute traffic over a protection line.

Ring (0x1) Low-Speed Interface

Formerly referred to as dual 0x1 or single 0x1. In ring applications, the Alcatel-Lucent 1665 DMX may use a 0x1 interface, meaning both fibers carry service, as opposed to a linear (1+1) low-speed interface where one fiber is used for service and other for protection. ***See 1+1***.

RPP - Reliability Prediction Procedure

Described in Telcordia Technologies TR-NWT-00032.

RT - Remote Terminal

An unstaffed equipment enclosure that may have a controlled or uncontrolled environment.

S

Self-Healing

Ring architecture in which two or more fibers are used to provide route diversity. Node failures only affect traffic dropped at the failed node.

SEO - Single-Ended Operations

The maintenance capability that provides remote access to all Alcatel-Lucent 1665 DMX systems from a single location over the DCC.

Service Line

On a Alcatel-Lucent 1665 DMX, a service (or "working") line is a pair of fibers (one transmit and one receive) that terminate on an OLIU circuit pack in the Main-1, A-1, B-1, C-1, or D-1 slots. As defined by the SONET standard, the SONET APS channel is not defined on a service line. ***See Protection Line***.

SES - Severely Errored Seconds

This performance monitoring parameter is a second in which a signal fail occurs, or more than a preset amount of coding violations (dependent on the type of signal) occurs.

SF - Super Frame

The format for DS1 signals.

Small Form Pluggable (SFP)Optics

SFP optics are used on the LNW37/45/49/70/73/74 packs. SFP optics are “pluggable" optics. This means that the circuit pack does not come equipped with optics. The customer orders the number and type of optics required at the time of installation. Additional optics can be ordered as new services are required. Thus Alcatel-Lucent 1665 DMX interface density is made scalable to meet the unique needs of each customer. The SFP optics also allow for some versatility in the span lengths and rates that can be covered by the same pack. The SFP optics adhere to Telcordia GR-253 and ITU G.957 standards.

Single 0x1 Cross-Connection

In a dual-homed application, the Alcatel-Lucent 1665 DMX uses a single 0x1 cross-connection to map the VT1.5 channels between the DDM-2000 FiberReach, OC-3 Multiplexer, or OC-12 Multiplexer and the Alcatel-Lucent 1665 DMX rings. This single 0x1 architecture maps low speed to high speed on a specified ring rotation. The high speed to low speed drop is made on the same specified ring with no path switching. Protection is provided at the VT1.5 end points.

Single Homing

A network topoly in which a single DDM-2000 FiberReach, OC-3 Multiplexer, or OC-12 Multiplexer serves as a Alcatel-Lucent 1665 DMX host supporting up to six OC-3 or OC-12 rings.

Standby

Standby identifies a 1+1 protected OC-N line which is not currently selected by the receiver at either end as the payload carrying signal, or 1x1 or 1xN protected circuit pack that is not currently carrying service. ***See Active***.

Status

The indication of a short-term change in the system.

STS, STS-n - Synchronous Transport Signal

The basic building block signal with a rate of 51.840 Mb/s for an STS-1 signal and a rate of n times 51.840 Mb/s for an STS-n signal.

STS-1 SPE - STS-1 Synchronous Payload Envelope

A 125-microsecond frame structure composed of STS path overhead and the STS-1 payload.

STS-3c

Synchronous Transport Level 3 Concatenated Signal. ***See OC-3c***.

Subnetwork

Group of SONET network elements that share a SONET data communications channel.

Synchronization Messaging

SONET synchronization messaging is used to communicate the quality of network timing, internal timing status, and timing states throughout a subnetwork.

SYSCTL - System Controller

The system controller circuit pack that provides overall administrative control of the terminal.

T

T1X1 and T1M1

The ANSI committees responsible for telecommunications standards.

TCA - Threshold Crossing Alert

A condition set when a performance monitoring counter exceeds a user-selected threshold. A TCA does not generate an alarm but is available on demand through the CIT and causes a message to be sent to NMA via the X.25/TL1 interface.

TL1 - Transaction Language 1

A Telcordia Technologies machine-to-machine communications language that is a subset of ITU-TSS, formerly CCITT's, human-machine language.

U

UAS - Unavailable Seconds

In performance monitoring, the count of seconds in which a signal is declared failed or, in which, 10 consecutively severely errored seconds (SES) occurred, until the time when 10 consecutive non-SES occur.

Unidirectional

A protection switching mode in which the system at each end of an optical span monitors both service and protection lines and independently chooses the best signal (unless overridden by an equipment failure or by an external request, such as a forced switch or lockout). In a system that uses unidirectional line switching, both the service and protection lines may be active simultaneously, with one line carrying traffic in one direction and other line carrying traffic in the other direction. For a 1+1 protection scheme the K1 and K2 bytes in the SONET line overhead are used to convey to the far end which line the near-end receiver has chosen, so that an "active" indication may be made at the far end.

UOC - Univeral Optical Connector

Receptacles on the faceplate of some OLIUs that accept ***ST***, SC, or FC connectors.

UPD/INIT

A push-button on the SYSCTL faceplate.

V

VM - Violation Monitor

A mode of the DS3 circuit pack in which it will monitor but not remove P-bit parity violations on the DS3 signal from the received fiber.

VMR - Violation Monitor and Removal

A mode of the DS3 circuit pack in which it will monitor and remove P-bit parity violations on the DS3 signal received from the fiber.

VT - Virtual Tributary

A structure designed for transport and switching of a sub-DS3 payload.

VT1.5

A 1.728 Mb/s virtual tributary.

VT-G - Virtual Tributary Group

A 9-row by 12-column SONET structure (108 bytes) that carries one or more VTs of the same size. Seven VT groups (756 bytes) are byte-interleaved within the VT-organized STS-1 synchronous payload envelope

Z

Zero Code Suppression

A technique used to reduce the number of consecutive zeros in a line-codes signal (B3ZS for DS3 signals and B8ZS for DS1 signals).

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